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SCHOOL OF HUMANITIES AND SOCIAL SCIENCES

**Psychosocial Factors as Predictors of Risky Driving Behavior and
Accident Involvement among Drivers in Oromia Region, Ethiopia**

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Contents

Acknowledgements	ii
List of Tables	iv
List of Figures	iv
Abstract	v
Background	1
Statement of the problem	4
Theoretical Framework.....	5
Hypotheses	5
Significance of the study	6
LITERATURE REVIEW.....	7
Introduction	7
Definition of Road Traffic Accident	7
Road Traffic Accidents in the Global Context.....	7
Road Traffic Accident in Ethiopia	9
Major Causative Factors for Road Traffic Accidents.....	10
Risky Driving Behaviors and Accident Involvement	12
Determinants of Risk-driving and Accident Involvement	13
Personality Traits as Determinants of Risky Driving	14
<i>Aggressiveness</i>	14
<i>Normlessness</i>	15
<i>Altruism</i>	15
Strategies of Preventing Road Traffic	15
Previous Research into the Psychology of Driving	17
Summary.....	19
Research Methodology.....	21
Participants	21
Instruments	21
Data analysis	21
Results and Discussion.....	22
Results.....	22
<i>Demographic Information</i>	22

<i>Basic Assumptions, Reliability and Correlation Analyses</i>	22
<i>Multiple Regression Analyses</i>	23
<i>Mediation Analysis</i>	24
Discussion	27
Conclusion and Implications	29
<i>Conclusion</i>	29
<i>Implications</i>	29
References	31
Appendix I- Normality Analysis Result.....	35

List of Tables

<i>Table 1: Mean (M), standard deviation (SD), internal consistencies (Chronbach's α) and bivariate relationships of the study variables for N = 343.....</i>	22
<i>Table 2: Results of multiple regressions for predicting risky driving behavior from psychosocial factors</i>	24
<i>Table 3: Results of multiple regressions for predicting accident involvement from risky driving behavior</i>	25
<i>Table 4: Results of multiple regression for predicting accident involvement from psychosocial variables</i>	26
<i>Table 5: Results of multiple regression of psychosocial variables predicting accident involvement while controlling risky driving behavior</i>	27

List of Figures

<i>Fig. 1 Theoretical Framework of the Study</i>	5
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Abstract

The current study examined the influence of selected psychosocial factors (alcohol /substance use behavior, driving anger, altruistic, and normlessness,) on risky driving behavior and accident involvement among drivers in Oromia Region, Ethiopia. A total of 343 were selected using purposive and random sampling techniques to fill close-ended questionnaire consists of bio-data, alcohol and/or substance use, driving anger, altruism, normlessness, risky driving behavior and accident involvement subscales. To test the proposed hypotheses, correlation coefficient, multiple regression analysis and path analysis were utilized. Results of the study elucidated that selected psychosocial factors, specifically driving anger or irritability, alcohol/substance use and normlessness influence risky driving behavior of drivers. The study also pointed out association between risky driving behaviors and experience of collisions. Besides, the study explicated that risky driving behavior mediates the link between psychosocial factors and road traffic accidents. Implications of the findings have been discussed in terms of improving drivers training curricula, and improving enforcement of traffic laws.

Key Terms: Psychosocial factors, risky driving, accident involvement, Ethiopia

Background

Road traffic accident (RTA) has been defined as incidents which occur in the system of road transportation when vehicles collide with other vehicle or physical objects causing property damages, injuries and death of road users (EC, 2016). RTA is one of the serious challenges facing humankind in the 21st century. On average, it claims lives of 1.25 million people while causing another 20-50 million injuries across the world every year (WHO, 2015). RTA caused 26,000 death and 1.3 million injuries in 2014 alone (EC, 2016).

In low and middle income countries where 81 % of the world population share about 20% the world's registered vehicle, traffic fatality rate ranges from 19.5 to 21.5 per 100,000 populations while the rate in high income countries which possess 80% of the world's registered vehicle is 10.3 per 100,000 people. In other words, about 90 % of the worlds RTA occurred in low and middle income countries (WHO, 2015; Agbonkhese et al., 2013). WHO forecasted the total worldwide road traffic related deaths and injuries to rise by 65% between 2000 and 2020. The growth of such death rate in low and middle income countries in the same period is expected to reach 80% (WHO, 2004). Agbonkhese et al, (2013) also assert that RTA can claim up to 1.9 million people annually by 2020. Cognizant of the severity of the problem, World Health Assembly adopted Resolution WHA 27.59 declaring traffic accident a major health issue as early as 1974 and urging member countries to give attention to the problem.

RTA is posing considerable impact on the economic advancement of countries. The annual cost of world's RTA is estimated to be USD 518 million which accounts for 1-3 % of the GNP of countries. In addition to causing disabilities, road traffic injuries "place a huge strain on health care services in terms of financial resources, bed occupancy and demand placed on health professionals" (WHO,2009:2). According to the same source, in Kenya 45-60 %, in India 20-50% of beds in the surgical wards of health facilities are occupied by patients with road traffic injury. Countries are losing productive manpower for 75% of road traffic casualties are young and productive adults that can have significant contribution in their economic advancement (Bhat, 2016; WHO, 2004).

In Ethiopia, the rate of road traffic death and injuries is found to be very high although the country is still at low motorization level, 2 vehicles per 1,000 people (UN, 2001). In the country,

nearly 2000 deaths and 10,000 injuries are recorded every year (Ethiopian Federal Police Report, 2010/2011). RTA is ranked 13th among the common causes of death in Ethiopia (WHO, 2012). A local study by Fesseha Hailu and Sileshi Teshager (2014) revealed that between 2007 and 2011 alone, 2,761 people died and 3,890 injured, mostly in the age range of 15-50, in 10,162 recorded RTAs in the country. The property damage for the same period was estimated to be 128,398,879 birr. Of these accidents, accident due to vehicle-pedestrian interaction takes the lions share (54.5%) followed by vehicle-road structure crash (35.5%). Fikadu Mekasha, (2015) also indicated that the average annual RTAs of Ethiopia were 8115 for the year (1996-2015).

Scholars categorize major causes of road traffic accident into three: i) the human related, ii) vehicle related and iii) road environment related factors (Kai Plankermann, 2013; Vogel and Bester, 2005; Hickford and Hall, 2004). Vehicle related factors include mechanical faults, design problems, lack of maintenance while road environment factors can be classified as natural factors which include bad weather condition and manmade factors such as road design and maintenance, construction work, problem with signage and lighting, and mismatch between road infrastructure and number of vehicles and others (Agbonkhese et al., 2013). Human factors include risky driving behaviors such as inappropriate speed, violation of traffic signs, drink driving or using drugs or other substances, and negligence. The human factors include the actions of both the driver and pedestrians (Vogel and Bester, 2005).

Previous studies indicated the contribution of various risky driving behaviors to RTA. For instance increasing average speed by 5% can increase RTA by 10% (WHO, 2009: 29). Pedestrian on the road led to 9.7% of the accident (Vogel and Bester, 2005:38). About 30% of drivers killed in the road traffic have high concentration of alcohol in their blood (Aavik, 2010:13). The use of cell phone while driving increases the likelihood of facing traffic accident by 2.86 folds (Elvik, 2011). Proper use of seat belts can minimize the risk of traffic accident (fatality by 47% and injury by 52% (Stephanie Hughe, 2016:9). Fatigue-driving also leads to errors such as getting too close to vehicles at the front and losing control over the vehicle (Elzohairy, 2008). Stephanie Hughe, (2016) summarize human related risky driving behaviors into six: seat belt non-compliance, speeding, cell phone-distracted driving, fatigued driving, aggressive driving, and alcohol-impaired driving.

RTA studies so far conducted and data from relevant offices elucidated that drivers take the lion's share. Human factors or otherwise called psychosocial factors in which driving behavior is central, were contributing elements in 95 percent of road traffic accidents (Ulleberg and Rundmo, 2003). Local studies also revealed that accidents due to drivers fault accounts for 84% of the recorded accidents (Fesseha Hailu and Sileshi Teshager, 2014:9). In terms of the type of vehicles involved in the accidents, freights take a big share (51%) followed by passengers' car which accounts for 35% (ibid). In general, drivers' risky driving behavior has remained the primary cause of RTA across the world. Previous studies found out the presence of strong correlation between self reported risky driving behaviors and accident involvement (Iversen and Rundmo, 2002; Nayum, 2008).

Risky driving behavior is often categorized into three as violations, errors and lapses (Reason et al., 1990; Parker et al., 1995a). Violation refers to intentional deviation from traffic rules or safe driving practices. It includes disregarding speed limit, sounding horn, running red lights, giving chase to another driver when angered (Nayum, 2008). An error on the other hand is taken as failure to take precautions which could be hazardous for others. It includes failing to check one's rear-view mirror before pulling out or changing lanes. Lapse or absent-minded behaviors is the third type of risky driving behavior which is found to have less threat to road users (Amit Shahar, 2008). Previous studies revealed that various personality traits or psychosocial factors can lead to these risky driving behaviors (Berdoulat, Avassori & Sastre, 2013; Bone and Mowen, 2006; Ulleberg, 2004; Ulleberg and Rundmo, 2003).

Personality traits refer to behaviors which are peculiar to an individual human being and which are consistently reflected by the same irrespective of the situations he/she is in (Walters, 2000; Thørrisen, 2013). Personality traits such as, impulsiveness, aggression/hostility, sensation-seeking and normlessness and social deviance were found to be highly correlated with risky driving behavior (Amit Shahar, 2008; Nayum, 2008).

Several scholars claim that drivers' psychological traits are as important as the other factors mentioned above when it comes to causing traffic accident (Forward, 2013). For instance, aggressive driving behavior which include yelling, honking the car horn, displaying negative gestures, and squeezing the car in front (Thørrisen, 2013) has contributed for 18% road traffic death (Beirness et al., 2001). Normlessness or engagement in socially unacceptable behaviors to

meet one's objectives or goals (Zheng et al., 2017) is also associated with risky driving (Iversen & Rundmo, 2002). According to Yang et al., (2013), anger and normlessness were effective predictors for aggressive violations of traffic rules. Altruism or individuals' tendency of becoming cooperative or kind hearted towards others (Zheng et al., 2017) was found to be negatively associated with risky driving ($\beta = -0.178$, $p < 0.01$) among Chinese drivers (Yan Ge et al., 2014).

Nevertheless, RTA and road safety researches so far conducted have given much emphasis to drivers' motor skill, the road environment and other risky driving behaviors disregarding these underlying psychosocial factors which encourages drivers to engage in risky driving (Venter, 2014; Forward, 2013).

Statement of the problem

Given the increasing magnitude and severity of road traffic accidents in Ethiopia, road safety research seems to have been given less attention. Road safety studies so far conducted mainly focused on causative factors such as risky driving behaviors, drivers' demographic variables, vehicle related factors, pedestrians, road related factors and the magnitude of RTA (Girma Birehan, 1996; Getu et al., 2013; Fesseha Hailu and Sileshi Teshager, 2014; Haile Mekonnen and Demeke Lakew, 2014; Fikadu Mekasha, 2015). The results of these studies indicate that use of alcohol and drugs, lack of proper training, loose enforcement of traffic laws were among the major factors that contributed to RTA in the country. Although researches which focus on personality traits of drivers have long history in the world, there are no such studies in Ethiopia to the best knowledge of the researchers.

In terms of the study sites, the above studies addressed the situation in Addis Ababa, Amhara Region and Ethiopia in general. None of them directly addressed the problem in Oromia National Regional State in particular though the region is at the heart of the nation with the highest traffic flow. Thus, the current study was aimed at examining the influence of some selected psychosocial traits, such as *alcohol /substance abuse, aggressiveness, normlessness, and altruistic behavior* on risky driving behavior and accident involvement of selected drivers in Oromia Region, Ethiopia. To this end, the following theoretical framework and research hypotheses were formulated to guide the study.

Theoretical Framework

The current study adapted ‘Theory of Planned Behavior’ (TPB) contributed by Ajzen (1991). This is a prominent theory that depicts the link between attitude and behavior. According to this theory, one can engage in performing a certain action only if he/she has favorable attitude towards the outcome of that action. Hence, drivers’ attitude towards a certain type of risky driving behavior determines their involvement in that behavior and eventually leading them to accident (Nayum, 2008). This model has been used in many psychological researches conducted in the area of risky driving behavior (Man, 2001; Parker et al., 1992). Thus, drawing on Traffic Psychology notions, Theory of Planned Behavior, and objectives of the study, the researchers formulated assumption that selected psychosocial traits (driving anger, altruism and normlessness) and alcohol/ substance use influence risky driving behavior which in turn leads to accident involvement as indicated in Fig 1.

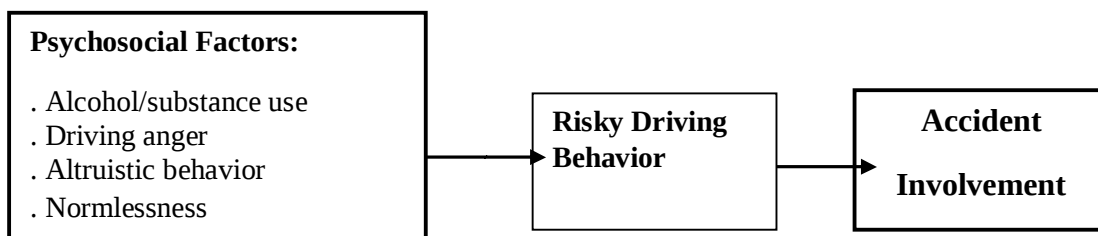


Fig. 1 Theoretical Framework of the Study

Hypotheses

Drawing on review of previous studies and theoretical model considered, the researchers formulated the following hypotheses:

- H1: Alcohol/substance use, driving anger and normlessness are positively related with risky driving behavior and accident involvement.
- H2: Altruism is negatively related with risky driving behavior and accident involvement.
- H3: Risky driving behavior is positively related with accident involvement.
- H4: Psychosocial factors account for significant variability in risky driving behavior.
- H5: Risky driving behavior mediates the relationship between selected psychosocial factors and accident involvement.

Significance of the study

The study explored the impact of selected personality and motivational factors on risk driving behavior and involvement in accidents among drivers. The investigators believe that the results of the current study can have several benefits for various bodies. First, the result of this study can give insight for the academia regarding the influence of psychological factors on the drivers' involvement in accident and risky driving behavior. Second, the result of this study could help the government and other stakeholders to take informed decisions that could help in curbing the problem of car accidents in the country. Drivers training centers, universities, and interested researchers could also benefit from the results of this study. In short, the findings of the study may enhance the idea of using psychological constructs in improving drivers' behavior for road safety.

LITERATURE REVIEW

Introduction

This chapter presents a review of literature in relation to the purpose of the study. The chapter first presents the definition of road traffic accident before discussing the situation of road traffic accidents at global, national and regional level focusing on the causes and consequences. Then the major causes of traffic accident are discussed emphasizing on personality factors. Next, the chapter presents various types of risky driving behavior and their correlation with accident involvement and strategies suggested for prevention of road traffic accidents. The chapter ends with a brief summary of major findings of previous studies conducted across the world.

Definition of Road Traffic Accident

Road traffic accident has been defined by various bodies with almost the same essence emphasizing on the means of transportation and the people or material being transported. WHO (2012) defines a transport accident as “any accident involving a device designed primarily for, or being used at the time primarily for, conveying persons or goods from one place to another”. According to Vienna Convention, road traffic accident is defined as “a collision of a moving vehicle on a public road in which a road user (human or animal), is injured” (IRTAD, 1992). Economic Commission for Europe (EC, 2016) also defines road traffic accidents as “accidents that occur on a way or street open to public traffic; result in one or more persons being killed or injured, and at least one moving vehicle was involved.” The second definition is most widely accepted among scholars. For the purpose of this study, the broader definition by Economic Commission for Europe has been adapted.

Road Traffic Accidents in the Global Context

Several researches conducted in the area revealed that, road traffic accident is one of the serious challenges facing humankind in the 21st century. On average, it claims the lives of 1.25 million people while causing another 20-50 million injuries across the world (WHO, 2015). According to European commission annual accident report, road traffic accident caused 26,000 death and 1.3 million injuries in 2014 alone (EC, 2016). Data released by WHO depicts that in 2011, the world’s traffic accident fatality number was estimated to be 55 million which means nearly 3500 deaths every day. This puts road traffic accident among the 10 leading causes of deaths. If its growth trend continues with the same pace, road traffic accident will be the 5th leading cause of

human death in the world by 2030. As a result, it is often considered as Global epidemics by health professionals.

World Health Organization also forecasted the total worldwide road traffic related deaths and injuries to rise by 65% between 2000 and 2020. According to the same source, the growth of such death rate in low and middle income countries in the same period is expected to be 80% (WHO, 2004). Strengthening this, Agbonkhese et al., (2013:91) state that unless proper remedies are sought on time "road traffic crashes are predicted to result in the deaths of around 1.9 million people annually by 2020". Cognizant of the severity of the problem, World Health Assembly adopted Resolution WHA 27.59 declaring traffic accident a major health issue as early as 1974 and urging member countries to give attention to the problem.

Although RTA is the major source of death in both developed and developing countries, the situation in low and middle income countries is more serious. In low and middle income countries where 81 % of the world population share about 20% worlds registered vehicle, the traffic fatality rate ranges from 19.5 to 21.5 per 100,000 populations while the rate in high income countries which possess 80% of the world's registered vehicle is 10.3 per 100,000 people. In other words, about 90 % of the worlds road traffic accident occurred in low and middle income countries (WHO, 2015; Agbonkhese et al., 2013). According to Fesseha Hailu and Sileshi Teshager (2014:9) the road traffic injury mortality rate in sub-Saharan Africa was estimated to be 28.3 per 100,000 populations.

Road traffic accidents are also posing considerable impact on the economic advancement of countries. The annual cost world's road traffic accident is estimated to be USD 518 million which accounts for 1-3 % the GNP +of countries. In addition to causing disabilities, road traffic injuries "place a huge strain on health care services in terms of financial resources, bed occupancy and demand placed on health professionals" (WHO,2009:2). According to the same source, in Kenya 45-60 % in India 20-50% of beds in the surgical wards of health facilities are occupied by patients with road traffic injury (Ibid:4). In addition to medical treatment expenses, countries also lose productive manpower that can have significant contribution in their economic advancement (Bhat, 2016). According to WHO (2004), 75% of road traffic casualties were among young and productive adults. The so called vulnerable road users such as pedestrians,

cyclists, motorcycles were found to be the major victims of road traffic accident. Half of the traffic deaths belong to these groups (WHO, 2015).

Road Traffic Accident in Ethiopia

As it has been discussed elsewhere in the preceding section, in connection to road traffic deaths and injuries, the world share of developing countries is estimated to be 90% although these countries possess less than half of the vehicles currently registered across the world. Being a developing country in sub-Saharan, Ethiopia cannot be immune to this problem (Getu et al., 2013).

According to traffic police reports, the only official source of data, in Ethiopia, the rate of road traffic death and injuries is found to be very high although the country is still at low motorization level, 2 vehicles per 1,000 people (UN, 2001). This is mainly attributable to over utilization of road transport, poor road infrastructure and poor enforcement of traffic laws (WHO, 2009). In Ethiopia, nearly 2000 deaths and 10,000 injuries are recorded every year (Ethiopian Federal Police Report, 2010/2011). According to WHO, road traffic accident is ranked 13th in the list of common causes of death in Ethiopia (WHO, 2012).

Quoting the Central Statistical Agency, [CSA], 2000/01-2010/11, Fikadu Mekasha (2015) indicated that the average annual road traffic accidents of Ethiopia were 8115 for the year (1996-2015). Another study also revealed that in the years 2007 up to 2011 alone, 2,761 people died and 3,890 injured, mostly in the age range of 15-50, in 10,162 recorded road traffic accidents in the country. The property damage for the same period was estimated to be 128,398,879 birr. Of these traffic accidents, accident due to vehicle-pedestrian interaction takes the lions share (54.5%) followed by vehicle-road structure crash (35.5%) (Fisseha Hailu and Sileshi Teshager 2014). The same study revealed that accidents due to drivers fault accounts for 84% of the recorded accidents. Of those drivers' faults which led to road traffic accident, the five major ones were "failure to give priority to pedestrians (32.1%), speeding (31.5%), driving on the wrong side of the road (10.7%), failure to maintain distance between vehicles (4.1%) and failure to give priority for other vehicles (3.8%)" (Ibid). This clearly depicts that human factors was the major causes of traffic accidents in the country compared to vehicle or road environment related factors. Nevertheless, the increase in of the number of vehicles, which hardly match, with the

speed of infrastructure development is among the factors that worsened the problem of road traffic accidents in Ethiopia (Fikadu Mekasha, 2015; UNECA, 2009).

Most to these accidents (74.4%) also occurred on paved road (Getu et al., 2013). In terms of the type of car involved in the accident, freight vehicles take a big share (51%) followed by passengers car which accounts for 35% of all accident (Fesseha Hailu and Sileshi Teshager, 2014). A comparative analysis made among regions in Ethiopia indicates that Amhara Region stands first with 27.3 % of total road traffic accidents in the country. Oromiya Regional State and Addis Ababa took the second and third place with 22.7, and 21.2 percent respectively (Berhane G/Yesus, 2015).

Major Causative Factors for Road Traffic Accidents

The major causes of road traffic accident may vary from country to country, yet most of the scholars in the area categorize them into three broad areas as i) the human related , ii) the vehicle related and iii) road environment related factors (Hickford and Hall, 2004; Kai Plankermann, 2013; Vogel and Bester, 2005). The three categories of factors and their interactions contribute differently. For instance, in Oman, human factor contributes for 95.4%, environment 44.2% and human -road environment interaction for 34.8% of road traffic accident (Kai Plankermann, 2013:8). In South Africa, human factor accounts for 70-80% of RTA, vehicle related factor for account for 10-15% and environment related factors for 5-10% of the road traffic accident (Vogel and Bester, 2005). Agbonkhese et al. (2013) also affirm that drivers or human error are the main causes of road traffic accident. As can be seen from the above figure, human related factors largely contribute for the occurrence of road traffic accident. The three categories of causes of road traffic accident have been elaborated in the subsequent sections.

Vehicle related factors include mechanical faults, design problems, lack of maintenance. For instance if some important parts of a vehicle such as the horn, side mirrors, wipers, braking system, lighting system, and break -system (to mention just a few) are malfunctioning, there is high probability of facing traffic accident. In connection to vehicle design, exceeding maximum load that the car is designed for, fixing wrong tyres to a car, over inflated or under inflated tyres can lead to road traffic accident (Agbonkhese et al., 2013).

Road environment factors can be classified as natural and manmade factors. Natural factors include bad weather condition such as fog, rain, mist and sunrays. On the other hand manmade factors include road design and maintenance, construction work, problem with signage and lighting, urban mobility menace, gridlocks and mismatch between road infrastructure and number of vehicles (Ibid).

Human factors include actions that a person did or failed to do when the accident occurred. These usually include: inappropriate speed, violation of traffic signs, drinking alcohol or using drugs or other substances, and negligence. The human factors also include the actions of both the driver and pedestrians (Vogel and Bester, 2005). Among most frequently mentioned human related causes of road traffic accident is also, speed. According to WHO, “A 5% increase in average speed leads to an approximately 10% increase in crashes that cause injuries and a 20% increase in fatal crashes” (WHO, 2009: 29). The same source reveals that driving at 30 km/h can increase pedestrians’ chance of surviving car crash by 90%, but the pedestrian chance of surviving the accident caused by a car with speed of 45km/h is estimated to be less than 50%.

Other human factors such as unsafe overtaking, colliding with an oncoming vehicle, losing control over vehicle due to speeding or inattention accounts for 65.8% of the accidents recorded between 1999-2003 in some selected site in South Africa. The same study showed that Pedestrian on the Road (crossing or walking on the road) led to 9.7% of the accident (Vogel and Bester, 2005:38).

Drink driving is also among the common human related factor mentioned in the literature. This factor largely increases the risk of traffic accident and the likelihood of subsequent death or fatal injury by disturbing the function of nervous system and impairing drivers’ skill. About 30% of drivers killed in the road traffic accident were found to have high concentration of alcohol in their blood (Aavik, 2010). According to scholars, if blood alcohol concentration (BAC) of a driver goes beyond 0.04 g/dl., it increases the likelihood of the drivers facing traffic accident. Some drugs prescribed by health professionals for medical treatment may also affect the normal function of brain and lead to road traffic accident (Agbonkhese et al., 2013; Aavik, 2010).

Failure to use safety devices such as seat-belt is also among human related factors. According to previous researches, proper use of seat belts can minimize the risk of traffic accident (fatality by 47% and injury by 52% (Hughe, 2016).

Distracted driving due to cell phone use has also become the major causes of road traffic accidents in the world. The use of cell phone while driving increases the likelihood of facing traffic accident by 2.86 folds Elvik (2011) by reducing the drivers visual inputs and subsequently affecting their performance or ability to make the right decision (Hughe,2016:9). Agbonkhese et al., 2013:93) also state “Drivers using a mobile phone are approximately four times more likely to be involved in a traffic accident than when a driver does not use a phone”. The risk is still the same for those drivers who use handled and hands- free cell phones because the latter leads to cognitive destruction on the concentration of the drivers (Brace et al., 2009). Although it is difficult to measure the level of its impact, fatigue-driving also leads to road traffic accident. It can lead to errors such as getting too close to vehicles at the front and losing control over the vehicle (Elzohairy, 2008).

Hughe, (2016:9) summarized human related causes of traffic accident into six as risky driving behaviors: seat belt non-compliance, speeding, cell phone-distracted driving, fatigued driving, aggressive driving, and alcohol-impaired driving. However, almost all the human related factors discussed above emphasize on the physical or motor skill aspect of the drivers disregarding the role of psychological or cognitive factors which have equal contribution in encouraging drivers’ involvement in risky driving and their accidents involvement.

Risky Driving Behaviors and Accident Involvement

Risky Driving behavior is often categorized into three as violations, errors and lapses, (Parker et al., 1995a; Reason et al.,1990). Violation is defined as intentional deviation from traffic rules or safe driving practices. It includes disregarding speed limit, sounding your horn, running red lights, sounding one’s horn or giving chase to another driver when angered (Nayum , 2008).

Scholars define errors as ‘the failure to take precautions which could be hazardous for others. It includes failing to check one’s rear-view mirror before pulling out or changing lanes. Error also involves actions that we plan and perform but fail to meet its objectives: braking too quickly on a slippery road, or steering the wrong way in a skidding vehicle (Amit Shahar, 2008). **Lapses** are

the third types of risky driving behavior which are defined “as as absent-minded behaviors which usually do not pose any threat to road users (Ibid).

Most of the researches which focused on investigating the relationship between the above three types of driving behavior and accident involvement revealed the presence of strong correlation between traffic violation and accident involvement. However, the remaining two driving behaviors, errors and lapses, were found to have less or no significant correlation with accident involvement (Nayum, 2008). Nevertheless, a study conducted by some other scholars discovered the existence of positive correlation between errors and lapses and accident involvement among elderly drivers (Iversen and Rundmo, 2002).

Determinants of Risk-driving and Accident Involvement

In the traditional approach to traffic accident and road safety researches, scholars have given emphasis to drivers' motor skill, the road environment and eventually recommended upgrading the drivers' skill and improving the road environment. However, recently scholars have come to realize that the psychological or cognitive status of the driver which determines his/her ability to drive safely has no less contribution in determining the safety of road traffic. Hence, they started to give attention to this underlying factor which encourages drivers to engage in risky driving (Karien Venter, 2014; Forward, 2013).

Several studies confirmed that, risky driving is the major cause for traffic accident. Some believe that “drivers who have a high score on self-reported risky driving will be more frequently involved in traffic accidents than other respondents” (Iversen and Rundmo, 2002; Nayum, 2008). There are several factors identified as determinants of risky deriving. These factors could be categorized as individual, social and cognitive and often the contribution of these factors are investigated in combination (Nayum, 2008).

Among individual factors highly correlated to risky driving are: (i) *demographic variables* such as age and gender, (ii) *personality traits* such as, impulsiveness, aggression-hostility, sensation-seeking and normlessness, self control and social deviance, (iii) *driving experience*, and (iv) *attitudes related to driving* (Nayum, 2008; Amit Shahar, 2008). Previous studies revealed that age is negatively correlated with risky driving and accident involvement. Strengthening this,

Norris, Matthews, & Riad (2000) asserted that the chance of accident involvement of young people aged between 19 and 39 is twice that of adults aged between 56 and 88.

Drivers experience is the next major factor which leads to risky driving and accident involvement. There is a belief that the driving skill of person improves as his driving experience increases. Hence, Lack of driving experience which is often characterized by poor coordination of cognitive and motor skills, can result in risky driving and accident involvement.

Personality Traits as Determinants of Risky Driving

Personality trait has been conceptualized differently by different scholars. Walters (2000:178) understands personality as "an internalized attribute of reasonable consistency and stability to which individual differences in behavior can be ascribed". McCrae and Costa (1990) on their part conceptualize personality traits as "individual personality dimensions consisting of distinct and consistent patterns of cognitions." As can be learned from these definitions, personality traits are behaviors which are peculiar to an individual human being and which are consistently reflected by the same irrespective of the situations he/she is in (Thørrisen, 2013:14). Researches so far conducted in the area revealed strong association between personality traits and risky driving behaviors (Bone & Mowen, 2006; Ulleberg, 2004; Ulleberg & Rundmo, 2003).

Aggressiveness

Aggression or driver anger is another personality trait which contributes for risky driving and accident involvement. The manifestations of aggressive driving are yelling, honking the car horn, displaying negative gestures, and squeezing the car in front (Thørrisen, 2013). Research evidences prove that drivers who reflect hostility or aggressive tendencies are more likely to face more traffic accidents because of deterioration of their attention, information processing and ability to manipulate the vehicle (Iversen and Rundmo, 2002: 1254). When it is supported with sensation-seeking trait, aggressiveness strongly motivates reckless driving which eventually end up in severe crash (Nayum, 2008: 8). According to Beirness et al. (2001), 18% of road traffic death can be attributable to aggressive driving.

Normlessness

Another personality trait which determines risky driving and accident involvement is normlessness. Individuals with this personality trait are more likely to engage in socially unacceptable behaviors to meet their objectives or goals (Zheng et al., 2017). *Normlessness* is often characterized by disrespecting presumed norms or deviating from the normal way to achieve one's goals. However, the issue of categorizing personal behaviors or actions as moral or immoral is subjective. Consequently, Kohn and Schooler (1983) operationalized *normlessness* on a continuum ranging from the individual's belief that it is "acceptable to do whatever (one) can get away with" to "holding responsible moral standards" (cited in Iversen and Rundmo (2002: 1253). Previous studies revealed that high score on normlessness is associated with more risky driving (Ibid).

Altruism

Altruism is conceptualized as individuals "propensity to be cooperative, kind hearted, and actively concerned about others (Zheng et al., 2017: 4). Eisenberg (1986) asserts that altruistically motivated individuals are believed to be more helpful and sociable than other (cited in Carlo, et al, 1991). Altruism is also the other personality trait which determines drivers' involvement in risky driving and accident involvement. Yan Ge et al., (2014) found out significant negative association between altruism and risky driving ($\beta = -0.178$, $p < 0.01$) in their study among Chinese drivers. According to the same authors, "drivers who are more concerned about others are less likely to drive while intoxicated than those who are less concerned about others".

Strategies of Preventing Road Traffic

As indicated in the preceding sections, road traffic accident can be caused by factors related to human the vehicle and the road nature. Scholars suggest various strategies that can help in reducing or preventing road traffic accidents caused by these three factors.

Enforcement of various traffic laws such as speed limit, wearing seat-belt, sobriety checkpoints and random breath-testing is the major recommendation forwarded by several bodies. These scholars revealed research results which clearly show the outcome of effective enforcement of theses traffic laws in reducing road traffic accidents. For instance, reducing maximum urban speed limit to lower than 50% and giving legislative mandate for local authorities to reduce the

speed limit based on local circumstances such as schools or high concentrations of vulnerable road users (WHO, 2009). Similar study revealed that “Wearing seat-belt reduces risk of a fatality among front passengers by 40-50% and among rear seats by 25-75 %” (WHO, 2009:35). It was also possible to reduce crashes by 35% and fatalities by about 55% through effective implementation of speed limit strategies such as rumble strips and speed humps. Utilization of speed cameras also help in reducing 12%-65 % of injuries and 17%-71% of road traffic deaths according to several studies conducted in various countries (Fisseha Hailu and Sileshi Teshager, 2014). It was also possible to reduce alcohol driven road traffic accidents by about 20% through proper enforcement of sobriety checkpoints and random breath testing. This strategy was also proved to be very effective in developed countries such as USA (Agbonkhese et al., 2013). It also possible to minimize road traffic death by nearly 40% and the risk of injuries by 70% through proper implementation of motorcycle helmet rules (WHO, 2015). Enacting law that prohibits the use of mobile phone while driving also helps in minimizing traffic accident (Agbonkhese et al., 2013). According to WHO, the enforcement of these traffic laws need to be accompanied by awareness raising campaigns through media in order to reduce road traffic in a sustainable manner (WHO, 2009).

In addition to enforcing the above mentioned traffic laws, scholars also suggest various measures, which could reduce non-motorized vulnerable road users susceptibility to road, traffic accident. The measures include “building cycling and pedestrian only routes/lanes, tunnels and car free areas on major roads in the city, excluding cars from the city centers at peak times in the morning and in the afternoon, enforcement of road safety laws” (Ibid:29).

Vehicle safety is also another area that needs to be addressed in reducing road traffic accidents. Urging vehicle manufacturers implement minimum international standard for cars produced with in the country and limiting the import of sub-standard cars are among the actions for reducing road traffic accidents (WHO, 2015). The proper implementation of the recommended strategies of minimizing road traffic accident mainly relays on the political will and commitment on the part of the government. Many countries have various traffic laws, but they don't show commitment in enforcing these laws WHO (2004). Given the dynamic nature of road traffic system, Agbonkhese et al. (2013) also recommend training and retraining of drivers as one strategy of reducing road traffic accidents.

Previous Research into the Psychology of Driving

The personality trait approach has long history in traffic accident researches. Looking for emotional and personality variables behind driving behavior traced back to the landmark study of Tillmann and Hobbs (1949) who set out to establish that personality is the determining factor that makes certain individuals more accident-prone. These researchers examined the social behavior of two groups of taxi drivers: 20 high-accident drivers and 20 low-accident drivers. The former group was made up of aggressive individuals unable to tolerate authority, while the latter was found to be made up of serious, stable, and well-adjusted individuals. In the effort to increase the generalizability of this finding, these researchers also analyzed the social behavior of 96 male drivers with four or more accidents on their record, and 100 accident-free drivers. The names of these drivers were submitted to various social and correctional agencies. The results were similar to those obtained with the taxi drivers, namely, social maladjustment was found with similar frequency in the general population with high accident record which enables the researchers to conclude with the dictum: “a man drives as he lives”.

Lajunen and Parker (2001) also studied the relationship between general aggressiveness, driver anger, and aggressive driving. The researchers surveyed 270 British drivers (171 males and 98 females) and the obtained results showed that individuals that characterized themselves as verbally aggressive were more likely to get angered by other drivers’ reckless driving. Furthermore, the more they got angered, the more likely aggressive the response they obtained were.

Bachoo *et al.* (2013) on their part explored the role of anger, impulsivity, sensation seeking and driver attitudes as correlates for risky driving practices among drivers and they drew comparisons between age and gender using a sample of 306 post-graduate university students from two universities in Durban, South Africa. The participants were made to complete self-administered questionnaire. In this study, the researchers found out that drivers with higher anger, sensation seeking, urgency, and those who lack premeditation and perseverance in their daily activities were found to be more likely involved in riskier driving acts. Male drivers’ involvement in the acts of risky driving behavior (RDB) was reported to be significantly greater than that of females. Driver attitudes significantly predicted self-reported acts of RDB on most indicators. Older drivers (25 years and above) had safer driver attitudes, lower sense of sensation seeking and urgency in life.

Other researchers, Dahlen and White (2006), studied the utility of combining trait driving anger (i.e., the tendency to become angry when encountering frustration and provocation on the road), sensation seeking, and the Big Five Personality factors in predicting driving anger expression, and frequency of aggressive and risky driving behavior. The researchers found that openness, emotional stability, agreeableness, trait driving anger, and sensation seeking predicted driving behavior and outcomes independent of gender, age, and miles/week. More specifically, aggressive driving was predicted by lower scores in emotional stability (i.e., higher scores in neuroticism), and increased driving anger score and sensation seeking score.

Similarly, Schwebel et al., (2006) studied both the independent and combined effects of three personality traits (namely, sensation seeking, conscientiousness, and anger/hostility) on risky driving behavior. These researchers collected data from 73 college students (41% male, 55% female, and 4% unknown sex, and with age range from 21 to 51) at the University of Alabama. These participants completed seven questionnaires regarding their personalities and driving history. Besides, they engaged in a virtual environment task set in a quiet, darkened room using a PC equipped with simulators which has steering wheel and accelerator/brake hardware peripherals, to evaluate risk-taking driving behavior. Schwebel and his group found out that sensation-seeking, conscientiousness, and angry/hostile behavior patterns each predicted risky driving on self-reports, and these personality traits contribute incrementally to explain risky driving. However, no personality trait predicted risky driving in the simulator.

Moore and Dahlen (2008) exemplify a line of research on aggressive driving that takes a different orientation. Instead of trying to identify personality dimensions that exacerbate aggressive driving, these researchers focused on investigating personality factors that might reduce this behavior. In particular, Moore and Dahlen examined the effects of two personality factors, forgiveness and consideration of future consequences, on the risk for aggressive driving. These researchers were interested in investigating “positive/protective” factors which might play a role in reducing an individual’s tendency to engage in aggressive driving. They hypothesized that an individual that scores high in trait forgiveness (i.e., a more forgiving person) will be more tolerant of other driver’s mistakes, and even rude behavior, and thus less likely to express driving anger aggressively. Similarly, an individual scoring high in consideration of future consequences of his/her behavior was hypothesized to be less likely to drive aggressively. They surveyed 316

undergraduate students at the University of Southern Mississippi using various scale. Results of the study were consistent with the researchers' predictions: trait forgiveness was inversely related to driving anger, aggressive and risky driving while consideration of future consequences was inversely related to aggressive and risky driving.

One recent study by Yang, et al., (2013) examined the effects of personality variables on Chinese drivers' unsafe driving behaviors and accident involvement. Two hundred and twenty-four Chinese drivers aged 20 to 50 were made to fill questionnaires assessing their personality traits (anger, sensation-seeking, altruism, and normlessness), risky driving behaviors (aggressive violations, ordinary violations), and accident involvement (all accidents, serious accidents, at-fault accidents). Multivariate regression analyses, adjusting for gender, age, and overall mileage, were conducted to identify the personality traits related to risky driving behaviors and accident involvement. The results of the analysis revealed that participants' personality traits were found to be significantly correlated with both risky driving behavior and accident involvement. Specifically, the traits of anger and normlessness were effective predictors for aggressive violations. The traits of anger, sensation-seeking, normlessness, and altruism were found to be effective predictors for ordinary violations. Moreover, altruism and normlessness were significant predictors for the total number of accidents participants had faced during the last 3 years. Yang and his co investigators concluded that personality traits play an important role in predicting Chinese drivers' risky driving behaviors and their accident involvement.

Summary

In this chapter, relevant literatures related to the causes and consequences of road traffic accident have been presented. In the discussion, attempts have been made to cover results of both local and international empirical studies. The chapter begins with the definition of road traffic accident. In the current study, road traffic accident has been defined as an incident which involves the collusion of a vehicle with another vehicle or other physical objects leading to material loss, injuries and loss of life.

As indicated in the discussion, in spite of the efforts so far made in the world to curb the problem, road traffic accident has remained a serious threat to the socio-economic advancement of countries claiming nearly 1.25 million lives every year and putting the problem as the 10

leading causes of deaths. Although the problem of RTA cuts across all nations and social groups, the severity of the problem seem to be higher in developing countries. In Ethiopia, the rate of road traffic death and injuries is found to be very high although the country is still at low motorization. This is mainly attributable to over utilization of road transport, poor road infrastructure and poor enforcement of traffic laws.

The major causes of road traffic accident can be categorized into three as driver related, environment related and vehicle related factors. Previous studies show that driver or human related factors take the lion's share in causing road traffic accident. Almost 75% to 95 % of the accidents are believed to be due to drivers fault. Among human/driver related factors, risky driving which is manifested as disobeying traffic rules take the first position in causing RTA. Although there could be other demographic factors which lead drivers to risky driving behavior, the contribution of drivers' personality traits such as impulsiveness, aggression-hostility, sensation-seeking and normlessness, self control and altruism is very big.

Cognizant of the negative impact of this threat, international organizations such as WHO and many countries have given due attention to curbing this problem. Various traffic laws such as speed limit, wearing seat-belt, sobriety checkpoints and random breath-testing have been implemented across the world. In addition to these rules, scholars also suggested improving road conditions and implementing minimum international standard for vehicles and banning the import of sub-standard cars. Through proper implementation of these solutions, several developed countries have managed to reduce the magnitude of RTA over the last decades. However, the situation remains worse in developing countries.

Most of the previous studies on road safety mainly emphasized on drivers' motor skill or what they actually perform on the road, road environment related factors and vehicle related factors. Little attention has been given to the emotional or personality traits which motivate drivers to engage in risky driving. Nevertheless, the personality trait approach has long history in traffic accident researches. Researches so far conducted in the area revealed strong association between personality traits such as impulsiveness, aggression-hostility, sensation-seeking and normlessness, self control and altruism and driving behaviors.

Research Methodology

Participants

Cross-sectional descriptive survey has been used to collect data from public transport and freight drivers in four zones (East Shewa, West Arsi, Finfinne and North Shewa) of Oromia National Regional State. The sites were selected mainly due to the size of traffic flow in the areas and their geographical proximity while the vehicle types were selected because of their high involvement in RTA as previous studies revealed. According to Oromia Road and Transport Authority, there were 4275 public transport operators and 724 freight transport operators in the region by the time the data were collected (June, 2017). Considering the size of the population, 427 public transport drivers (10%) and 72 freight drivers (10%) were selected by using random sampling from the target zones. Out of 414, questionnaires distributed, 343 (82.85 %) were filled properly.

Instruments

Standardized Five –point self-reporting Likert scale have been adapted from various sources to collect data for the current study. Alcohol/ substance use was assessed by four items scale. Driving Anger scale with 14 items has been adapted from “Driving Anger Scale” developed by Deffenbacher et al. (1994). Similarly, Witt & Boleman (2009) scale was adapted to measure Altruism. Normlessness was measured using Kohn and Schooler’s (1983) four items scale while Risky Driving Behavior has been measured using modified version of Manchester Driver Behavior Questionnaire (DBQ). Accident involvement was assessed using a single item as also been used in other studies (Oltedal & Rundmo, 2006).

Data analysis

Descriptive statistics such as frequency and mean were used to summarize the data on demographic and other variables whereas inferential statistics such as Person product momentum correlation and multiple linear regression have been used to show the relationships among study variables. To ascertain the meditational role of risky driving behavior between psychosocial factors and accident involvement, regression path analysis was used while to determine the magnitude of the path effects, standardized path coefficient estimates were considered. For the statistical analyses Statistical Package for Social Sciences (SPSS), version 20 was utilized.

Results and Discussion

Results

Demographic Information

In this study, 343 male drivers including 271 (79%) public transport operators and 72 (21%) freight drivers were involved. Female drivers were not included because they were not involved in such services in the study area. Participants were in age range of 20- 65 year with average age of 33 year. The majority 218 (63%) are married, 114 (33%) single and 11(3.2%) divorced. Over half of them 89(55%) have high school education, 75 (22%) primary education, 64 (18.7 %) TVET/Diploma graduates and 14(4.1%) fall in 'others' category. They have between 1-40 years driving experience with average of 8.43 years. More than half (53%) of them are employed by other car owners while others drove their own or family car. Half of the respondents (51.1%) reported they never faced any kind of accident, 44.0% faced accident once or twice, 4.9% more than twice.

Basic Assumptions, Reliability and Correlation Analyses

Prior to data analyses, several pre-tests were considered to check normality, linearity, and item-internal consistency. Skewness and kurtosis analyses and visual inspection of histograms, normal Q-Q plots, and box plots, revealed that the data were normally distributed. The assumption of linearity was also met. Internal consistency of the scales and bivariate relationship between study variables were determined by Chronbach alpha and Pearson Product moment correlation (r) respectively as indicated in Table 1.

Table 1: Mean (M), standard deviation (SD), internal consistencies (Chronbach's α) and bivariate relationships of the study variables for N = 343

	M	SD	α	Age	Edu	DE	DA	Al/Sub	ALT	NOR	RD	AI
Age	33.36	7.50		1								
Edu	3.45	1.21		-.05	1							
DE	8.43	6.47		.70**	-.03	1						
DA	33	9.5	.84	-.11*	.002	-.09	1					
AlSub	7.74	2.60	.81	-.004	-.09	-.06	.042	1				
ALT	23.15	5.07	.73	-.15	.12*	.01	.058	-.105	1			
NOR	11.75	3.34	.74	-.18**	-.12*	-.04	.080	.147**	-.223**	1		
RD	21.04	5.71	.87	-.14*	.08	-.13*	.191**	.182**	-.058	.229**	1	
AI	-----	-----		.09	.08	-.11*	.107	.140**	-.067	.158**	.290**	1

Notes: * p <0 .05, ** p <0.01 (two tailed). Edu- Educational level, DE- Driving experience, DA- Driving anger, Al/Sub- Alcohol/substance use, ALT- Altruism, NOR- Normlessness, RD- Risky driving, AI- Accident involvement, M- Mean, SD – Standard deviation

As shown in Table 1, internal consistency of all scales used in the current study demonstrated traditionally acceptable internal reliability levels (α ranged from 0.73 to 0.87) for social sciences. The same table showed that bivariate relationships between driving anger and alcohol /substance use, driving anger and altruism, driving anger and normlessness, driving anger and accident involvement were found to be statistically not significant. Similarly, the correlation between alcohol/substance use and altruism, risky driving and altruism, and altruism and accident involvement failed to reach significance levels.

On the other hand, significant, but weak positive correlations were observed between driving anger and risky driving behavior ($r = .19$, $p < 0.01$), alcohol/substance use and normlessness ($r = .15$, $p < 0.01$), alcohol/substance use and risky driving behavior ($r = .18$, $p < 0.01$), alcohol/substance use and accident involvement ($r = .14$, $p < 0.01$), normlessness and risky driving behavior ($r = .23$, $p < 0.01$), normlessness and accident involvement ($r = .16$, $p < 0.01$) and risky driving behavior and accident involvement ($r = .29$, $p < 0.01$). Similarly, statistically significant negative correlation ($r = -.22$, $p < 0.01$) was observed between altruism and normlessness. In short, the associations among the predictor variables of the current study were found to be small or non significant whereas the associations between most of the predictor variables and the dependent variable were found to be statistically significant.

With respect to associations of demographic factors with dependent variables, the relationship of educational status with risky driving behavior and accident involvement failed to reach significance levels whereas age was negatively, but weakly associated with risky driving ($r = -.14$, $p < 0.05$). Similarly, driving experience was negatively, but weakly correlated with both risky driving behavior ($r = -.13$, $p < 0.05$) and accident involvement ($r = -.11$, $p < 0.05$).

Multiple Regression Analyses

Hierarchical multiple regression analysis was calculated to test the associations of selected psychosocial factors with risky driving behavior and accident involvement. First, risky driving behavior was regressed over the predictor variables in which background factors were kept controlled.

Table 2: Results of multiple regressions for predicting risky driving behavior from psychosocial factors

	Variables	β	t
Step 1			
	Age	-.033	-.428
	Edu	.100	1.857
	DE	-.060	-.775
	R ²	.02	
Step 2			
	DA	.13	2.33*
	AL/sub	.19	3.56**
	ALT	- .04	-.75
	NOR	.22	3.84**
	ΔR^2	.12	
Total	R ²	.14	

Notes: * $p < 0.05$, ** $p < 0.01$ (two tailed).

Edu- Educational level, DE- Driving experience, DA- Driving anger, AL/Sub-Alcohol/substance use, ALT- Altruistic, NOR- Normlessness, RD- Risky driving, AI- Accident involvement

Table 2 shows that, 12 % of the variation in risky driving behavior can be explained by the combination of psychosocial factors considered ($\Delta R^2 = 0.12$, $F(4, 304) = 10.75$, $p < 0.01$). The standardized path coefficients of driving anger ($\beta = 0.12$, $p < 0.05$), alcohol/substance use ($\beta = 0.19$, $p < 0.01$) and normlessness ($\beta = 0.22$, $p < 0.01$) were positive and significant indicating the fact that these variables uniquely and significantly contributed for the variation in the risky driving behavior. The remaining predictor variable, altruism, has contributed nothing uniquely in terms of predicting risky driving behavior of the target drivers. Based on these results, H1 and H4 are accepted, whereas H2 is rejected.

Mediation Analysis

To test the mediational role of risky driving behavior in the link between psychosocial variables and accident involvement, regression path analysis was carried out. As per Baron and Kenny's (1986) suggestion, three conditions had to be met to establish mediation. First, the independent variable(s) had to be related to the mediator. Second, the mediator had to be related to the dependent variable (s). Third, a significant relationship between the independent variable(s) and a dependent variable(s) will be reduced (partial mediation) or no longer be significant (full mediation) when controlling for the mediator.

The first assumption has already been met. To test for the second and the third assumptions, first accident involvement was regressed over the assumed mediator and then regressed over the whole psychosocial variables controlling for risky driving behavior.

Table 3: Results of multiple regressions for predicting accident involvement from risky driving behavior

Variables		β	t
Step 1			
Age		-.04	-.49
Edu		-.09	-1.66
DE		-.09	-1.14
R ²	.01		
Step 2			
RD		.29	5.47**
ΔR^2	.09		.
Total R ²	.10		

Note: **p < 0.01 (two tailed). Edu- Educational level, DE- Driving experience RD- Risky driving

The results in Table 3 show that 9 % ($\Delta R^2 = 0.09$, $F(4, 324) = 9.42$, $p < 0.01$) of variability in accident involvement was explained by risky driving behavior. The standardized path coefficient of risky driving behavior ($\beta = 0.29$, $p < 0.01$) was also positive and significant demonstrating its influence on accident involvement. Based on these results, H3, which is the second assumption for mediation analysis is accepted.

To confirm the third assumption, consecutive regression analyses were performed. First accident involvement was regressed over psychosocial variables. Next, it was regressed over the same variables by controlling the effects of risky driving behavior.

Table 4: Results of multiple regression for predicting accident involvement from psychosocial variables

Variables		β	t
Step 1			
Age		-.03	-.39
Edu		-.07	-1.34
DE		-.09	-1.15
R ²	.02		
Step 2			
DA		.06	1.07
AL/sub		.14	2.43*
ALT		-.02	-.33
NOR		.12	2.1*
ΔR^2	.04		
Total R ²	.06		

Notes: * $p < 0.05$ (two tailed). Edu- Educational level, DE- Driving experience, DA- Driving anger, AL/Sub- Alcohol/substance use, ALT- Altruistic, NOR- Normlessness

Table 4 show that small, but significant amount (4%) of variability in accident involvement was accounted for by psychosocial variables considered in the current study ($\Delta R^2 = 0.04$, $F(4, 305) = 3.45$, $p < 0.01$). The standardized path coefficients show the presence of significant level of influence of alcohol or substance use ($\beta = 0.14$, $p < 0.05$) and normlessness ($\beta = 0.11$, $p < 0.05$) on accident involvement.

To test for assumption of reduction in variability of accident involvement due to psychosocial variables while controlling the influence of risky driving behavior, a regression was performed and its result is depicted below.

Table 5: Results of multiple regression of psychosocial variables predicting accident involvement while controlling risky driving behavior

Variables	β	t
Step 1		
Age	.003	.033
Edu	-.07	-.1.31
DE	-.07	-.86
RD	.23	3.9
R ²	.09	
Step 2		
DA	.03	.61
AL/sub	.09	1.63
ALT	-.009	-.16
NOR	.07	1.18
ΔR^2	.015	
Total R ²	.106	

Note: ** p < 0.01 (two tailed).

Edu- Educational level, DE- Driving experience, DA- Driving anger, AL/Sub-Alcohol/substance use, ALT- Altruistic, NOR- Normlessness, RD- Risky driving

The results in Table 5 show that the amount of variability in accident involvement explained by psychosocial variables was reduced from 4% to about 1.5% ($\Delta R^2 = 0.015$, $F(4, 303) = 1.26$, $p > 0.05$) when the influence of risky driving behavior was removed, and thus its contribution failed to reach significant level. This confirmed the presence of strong mediational role of risky driving behavior in the web of associations of variables considered in the study. Thus, H5 of the study can be accepted.

Discussion

The current study was aimed at examining the influence of human factors, particularly the role of some selected psychosocial variables such as alcohol /substance use, driving anger, altruism, and normlessness, identified through review of literature, on risky driving behavior and accident involvement among drivers in Oromia Region, Ethiopia. Specifically, the study examined how these factors operate in influencing drivers' behavior on the road and lead them to accident.

Results of multiple regression analyses elucidated that selected psychosocial factors such as aggressive driving, alcohol/substance use and normlessness have significant impact on risky driving behavior of drivers. Irritable or hot tempered drivers who got frustrated in various traffic situation and those who drank alcohol/ took some stimulants shortly before driving or drive

under its influence were found to be more susceptible to risky driving behavior. These happen mainly because when drivers get angry, they engage in various acts of traffic rule violation such as driving fast, tailgating, sounding horn which in turn lead to traffic accident. Similarly, driving under the influence of drug and other stimulants can lead to risky driving by disturbing the function of nervous system and impairing drivers' skill (Agbonkhese et al., 2013; Aavik, 2010).

Likewise, normless drivers who tended to engage in socially disapproved behavior to achieve a certain personal goal were more likely to engage in risky driving because normlessness may mirror itself in traffic situations, in the form of traffic rule violation or risky driving. Previous studies also revealed that high score on normlessness is associated with more risky driving (Iversen and Rundmo, 2002). Ullebeg & Rundmo (2003) also reported positive associations of normlessness and aggression with risky driving behavior and negative association between altruistic behavior and risky driving behavior. On the other hand, even though previous studies indicated negative relationship between altruistic behavior and risky driving behavior, the result of the current study failed to support it. This might have occurred due to culture sensitive nature of altruistic sub-scale.

In general, the current study revealed that, taken as a group, the psychosocial variable in the current study were found to be significant predictors of risky driving behavior and accident involvement. However, detail analyses of the prediction power of the independent variables indicate that alcohol/stimulants use, driving anger and normlessness uniquely predicted risky driving behavior. Lastly, the study explicated that risky driving behavior mediates the link between psychosocial variables and road traffic accidents. In other words, the target psychosocial variables motivate or discourage drivers' engagement in risky driving behavior on the road and this in turn enhances or reduces the likelihood of these drivers involvement in road traffic accidents.

Conclusion and Implications

Conclusion

It is commonly acknowledged that human factors contribute greatly to road traffic accidents. In particular, driving behavior was identified as the most central of these factors. From the current study, it can be concluded that aberrant driving behavior of public and freight transport drivers' driving under the influence of alcohol or other types of stimulants and other psychosocial variables such as irritability and normlessness have contributed significantly in increasing drivers' involvement in road traffic accidents.

It is also possible to conclude that risky driving behavior of the target drivers have significantly contributed for their involvement in road traffic accident. To summarize, psychosocial variables considered in the current study have shown the tendency to exacerbate drivers' involvement in risky driving behavior which in turn determined their accident involvement.

Implications

Although the prevailing economic change has led to expansion of urbanization and motorization in Ethiopia, the current investment in road safety appears to be not satisfactory. Given the increasing magnitude and severity of road traffic accidents in Ethiopia, road safety campaigns, education and research also seem to have been given less attention.

The results of the current study have some implications for future actions that could be taken to curb the existing problem of road traffic accidents and for future studies to be conducted in the area. The observed influences of psychosocial variables on risky driving behavior and accident involvement in the current study calls for the integration of these factors in drivers training curricula, safety campaign, traffic rule enforcement practices, and research. Particularly, alcohol/substance intake while driving or driving under its influence is found to be critical factor for drivers' to partake in risky driving which leads to road traffic accident. Thus, random breath testing and checking for substance intake should be strictly enforced. Similarly, designing safety programs that take personality traits into account may result in better success.

Despite its substantive contributions, this study has certain limitations. Primarily, the cross-sectional design used in this study does not warranty causal relationships among variables. Though theoretically treating the personality traits as exogenous variables seems reasonable, for future research, longitudinal research design is suggested. Besides, self-reporting method of

collecting data utilized in the study, despite its advantage is susceptible to social desirability and inaccuracy, and thus future research may consider other methods for measure.

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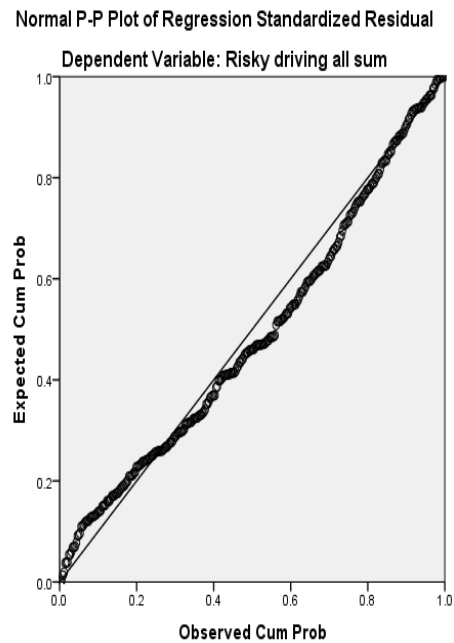
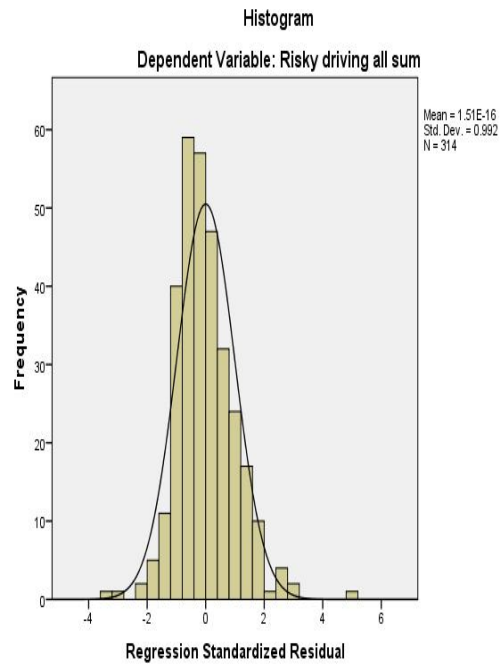
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Appendix I- Normality Analysis Result

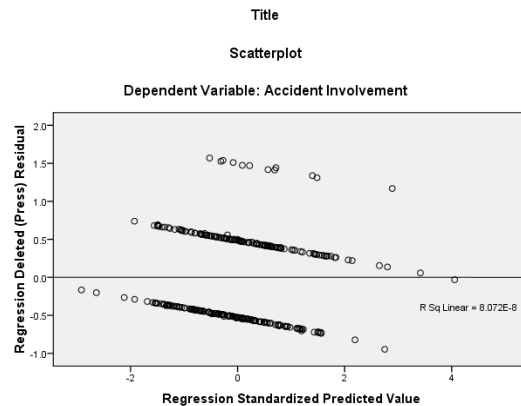


Model Summary^b

Model	Durbin-Watson
1	2.018 ^a

a. Predictors: (Constant), Normlessness Sum, Driver Anger sum, Alcohol and Drugs Sum, Altruism Sum

b. Dependent Variable: Accident Involvement



Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Driver Anger sum	.954	1.048
	Normlessness Sum	.969	1.032
	Alcohol and Drugs Sum	.958	1.044
	Risky driving all sum	.935	1.069

a. Dependent Variable: Altruism Sum