

## CHAPTER 2

### REVIEW OF LITERATURE

#### 2.1 Age and Dangerous Driving

Willemsen et al, (2008) reported that older drivers and female drivers tend to have low levels of DDDI dimension which is consistent with international literature suggesting that drivers seem to become more law abiding and display a tendency to take lesser risks when they grow older (Golias & Karlaftis 2002).

Schechtman et al., (1999) found that when age is considered drivers seem to be more law abiding and take lesser risks as they grow older, It should also be mentioned that drivers over 55 years seem to exert a distinctly more careful than younger drivers do, while those below 25 year seem to exert a distinctly less law abiding approach to driving or are more prone to violations.

Norris et al (2000) noted that younger age is one of the predictors of future motor vehicle accidents (MVAS) as younger adults (ages 19 to 39) are twice as likely to have an accident in comparison to older adults (ages 56 to 88) , The importance of such factors is further supported by studies which showed that a relatively large reduction in the accident risk of young drivers (usually a reduction of 50%) during the first year that they possess a driving license (Maycock, Lockwood & Lester,1991; Sagberg 1997) Moreover young drivers tend to have a persistent bias in perception of risk and evaluation of their own driving skills compared to other age groups they are found to be more likely to underestimate

the probability of the specific risks caused by traffic situations (Brown & Groeger, 1988; Deery, 1999) and have a propensity to perceive themselves as invulnerable to negative outcomes (Millstein, 1993), They are also prone to failure in perceiving the hazards in traffic (Deery, 1999; Groeger & Brown, 1989; milech, Glencross & Hartely, 1989 and overestimate their own driving skills (Moe, 1986), The second explanation emphasizes motivational factors as the main reason behind young driver's accidents'. According to this view, the reason why the accident rate decreases with advancing age is that the drivers gradually become more socially and emotionally mature, as well as more responsible

Elander, West and French (1993) noted that younger drivers tend to have an increased crash involvement the recent studies consistently underlined the younger drivers are at a greater risk of being involved in a traffic accident (Maycock et al., 1991; Stewart & Sanderson, 1984; Mayhew et al., 1981). Maycock et al. (1991) found that 17 year-old drivers have 50% year-old. Likewise, Dobson et al. (1999) observed that the average number of accidents in the last 3 years was three times greater in the young (18-23) than the mid-age (45-50) group.

Pelz and Schuman (1968) reported that 18 and 19 year-old drivers had the highest violation and crash rates in comparison to older drivers while controlling for exposure and experience. Further, Toomath and White (1982) found that the global accident risk of young drivers does not decrease when annual mileage is taken into account. These studies demonstrated that young drivers are still at a

high risk of being involved in an accident when experience and miles driven are controlled for,

Szlyk et al, (1995) found that, although older groups had power driving related skills, they did not have significantly higher on-road accidents than the younger groups. The showed that older and younger age groups tend to be involved in different types of traffic accidents. Still it is the younger driver groups who are more at risk in terms of crash involvement.

Beck wang and Mitchell (2006) found that aggressive drivers were more likely to be male and and aged 45 and under, Aggressive drivers were less likely to report using their seat belt, but more likely to report driving a car every day. This effect of age is thought to be reflected in safer driving. It is further strengthened by some studies, which showed that young drivers tend to be more prone to deliberate risk taking in traffic than others, specifically, they are more likely to drive faster (Jonah,1986), follow too closely (Baxter et al.. 1990), overtake dangerously, and an run on yellow(koneci, Ebbesen & Koneci, 1976) compared to other drivers (summala, 1987, Moreover Reason et al (1990) have found that the tendency to commit driving violations declines with age, whereas the propensity to commit driving errors does not.

Ulleberg and Rundmo (2002) that those who belong to the age group of 15 – 24 year are at the highest risk of motor vehicle crashes in New Zealand, USA, Canada, and the EU and road crashes are the most common cause of death among

those aged less than 25 years These riskier attitudes may be the result of a general over – confidence that young people have with regard to their driving ability.

Furthermore, in a longitudinal study Begg and Langley (2004) found that aggressive behaviour at 18 years of age significantly predicated subsequent self – reported drunk driving (Begg Langley & Stephenson 2003, Gulliver & Begg,2004),

Golias and Karlaftis (2002) reported that drivers seem to be more law abiding and less risks taking, as they grow older, It should also be mentioned that drivers over 55 years, seem to distinctly drive more carefully than younger drivers do, while below 25 years seem to distinctly less law – abiding approach to driving or are more prone to violations younger drivers are at a greater risk of crash involvement. With a marked difference between 18/19 year and 25 year. Younger drivers displayed the highest driving violation, rates. Drivers aged 20 and under showed the highest observed speeds the highest reported ‘normal’ speeds, speeds. Younger drivers tended to overestimate driving ability and underestimate personal risk.

Vassallo et at, (2010) found that the majority of young people identified as being in the moderate and high level risk driving clusters at 19-20 years showed a reduction in risky driving by 23-24 years For a small number, this improvement was quite marked with one in ten high –level risky drivers showing low levels of risky driving by 23-24 years These findings highlight the fact that young

problematic drivers are not destined to continue posing a road safety risk as they grow older. Rather it would appear that improvement is not only possible, but also common.

Hatfield and Job (2006) observed that age was significantly negatively associated with self-reported likelihood of speeding suggesting that younger people are more likely to speed. Younger people were also more likely to deny that speeding increases the risk of a crash on a clear dry day. Thus, overall results concurred with previous findings that younger drivers have more risky attitudes and behaviors than older drivers do. Many studies have more shown younger drivers (under 34 years) are more likely to be speeders (Fildes et al. 1991; Ogle, 2005., Williams et al. 2006). In contrast, drivers over 55 years are less likely to be speeders (Fildes et al., 1991; Ogle, 2005).

## **2.2 Influence of Age and Experience**

Stradling (2000) identified that young inexperienced drivers are a high risk group of drivers. Abdel Aty et al. (2000) also noted that teenage drivers have less training and experience which leads to more traffic violations. McCartt et al. (1999) reported that when controlling for age, driving violations increased with increasing driving experience and the frequency of drowsy driving decreased with increased experience. Conversely when the authors controlled for driving experience, driving violations decreased as age increased, and drowsy driving increased as age increased.

The literature showed that drivers of any age display higher violations and crash rates in the early stages in licensure than they do after more experience has been acquired (waller et al.,2001; Maycock et al, 1991 found evidence that age and experience were both important factors affecting crash risk, waller et al.. (2001) found that there is a 5% reduction in total crash odds for each additional year of age at time of increasing which is consistent with maycock et al., (1991) who reported a 6% risk reduction.

### **2.3 Differences in the level of Education**

Norris et al., (2000) showed that those participants who had post-secondary education had more accidents than others did, However, the effect of education on motor vehicle accidents was not found to be significant once age was controlled for, Macmillan (1975) also reported a failure to observe a relationship between education and accidents. Conversely, Dobson et al. (1999) observed that those women with literacy education, in the mid age group (aged 45-50 years ), displayed a significantly higher accident risk, but that education did not have an effect in the younger driver's group (aged 18-23)year.

Shinar et al., (2001) found that the number of people who reported that they observed the speed limit decreased with increasing education, This finding was corroborated by Hemenway and solnick (1993) who reported that drives with higher education were more likely to report that they speed more than the other drivers who were with lower levels of education. Dobson et al, (1999) further

supported these studies in their observations that women with higher scores for violations speeding, lapses and errors tend to possess territory level education The majority of aggressive drivers were poorly educated (Lancaster & ward, 2002),

Shinar et al., (2001) subsequently suggested that, as the level of education increases, people become more familiar with the conflicting arguments and data, regarding the relationship between speeding and crashes and believe that they can judge for themselves the merits and risks of speeding.

Lancaster and ward (2002) reported that these with a higher level of education were more likely to report speeding These participants with tertiary level education, in the 45-50 age range displayed a significantly higher accident risk, but education did not have an effect on the younger drivers, Reported use of seat belts increased with increasing education.

A study by beck, wang and Mitchell (2006) found that young people with differing levels of education significantly differed in several aspects of their driving experiences and behaviors Those with a university degree were less likely to have had their license cancelled or suspended than those with another type of post secondary education qualification, however, those with only secondary education were ,more likely to have been fined or charged because of involvement in a crash.

Hatfield and job (2006) revealed that, the more the level of education of the respondents the higher the likelihood to speed, the more the chances to give

greater estimate of the number of kmph over a 60 kmph speed limit the higher the chance of crashing and lesser the level of agreement with the statements, “speeding can be safe for a skillful driver” and “speeding can be safe In some circumstances” and agreed less strongly with the attitude, “penalties for speeding are genuinely intended to deter people from speeding in order to promote road safety However education was significantly negatively associated with the number of kmph over a 60 kmph speed limit required for a driver to be termed irresponsible or criminal, Thus, whilst people with higher education appear to speed more themselves. And are more likely to view speeding as safe, they also appear to be less tolerant of other speeding drivers than less educated people are.

Yilmaz, and celik (2006) examined the effect of education, age and experience on driving behavior and found that men are eager to bend basic traffic rules than women, while 19-29 age groups take the highest average value on violation to traffic rules the lowest average value is for the 61 and older age group, and for education level and experience risk taking was not found to be significant.

#### Section IV: Lacuna of Road Safety Research

World Health Organization in global status report on road safety (2009) revealed that India topped in road accident fatalities, than any other country in the world, including the most populous, china, In India number of road accidents, deaths due to road accidents and injuries are increasing every year whereas in European countries such as Germany Sweden, England, Denmark. And other

developed countries the numbers are either stagnant or reducing, The world Health Organization in global status report anticipants that unless immediate action is taken, during the next 15 years. The number of people dying annually in road traffic, crashes may raise to 2.4 million. The increase will probably occur entirely in low and middle income countries and road traffic injuries will become one of the three major causes of death.

National crime Record Bureau, india (2011) reported the average death rate due to accident in India as 32, 41 per 100,000 population as compared to 21.5 in other low income countries and 10.1 in high income countries (World Health Organization in Global Status Report Safety (2009), Rate of death per 10,000 vehicles is 14 in India as compared to below the level of 2 in developed countries. Among the 430,600 road accidents occurred during the year 2010 reported death of 133,938 persons and 470,600 persons were injured fatally (NCRB,2011), A study by the planning commission in 2002 estimated that the social coast of road accidents in India stands at Rs. 55,000 crore annually, which constitutes about 3% of the GDP (Sunder et al., 2007). It is estimated that the country loses around 750 billion rupees (\$17 billion) per year due to road traffic accidents, which is 2-3 percent of the gross domestic product (sikdar & Bhavsar,2009).

## **2.4 Speeding**

Speed is at the core of the road safety problem. Very strong relationships have been established between speed and both crash risk and crash severity (Aarts

& vanSchagen, 2006; Elvik et al.,2004). Excessive driving speed for the existing road conditions is considered as one of the most important contributors to road crashes. Regardless of the driver's age and level of skill (Elliott et al.,2004).,Even when aware of the potential consequences for speeding ,drivers in Australia still indicate involvement in speeding behavior (Brown&Cotton,2003). Clarke et at, 2002) also suggested that speed is the most common factor causing driving offence among young drivers. West and Hall (1997) found that speed is a significant contributor to specific kinds of crashes such as active reversing, and loss of control crashes along with both poor attitudes towards driving and social deviance. Mekenna and Horwill (2006) suggested that involvement in speeding behavior may also be due to a low probability of negative outcome.

The consequences of speeding in terms of increasing both the risk and severity of a crash are well documented. For instance, the report of New South Wales was a contributory factor in 32 percent of fatal crashes and 16 percent of all crashes resulting in injuries Despite this many motorists still do not consider speeding to be dangerous (Lieb & Wiseman,2001)with the majority of drivers admitting to exceeding the speed limit at least occasionally by 10kmph or more (Fleiter & Watson,2005).

## **2.5 Speed and Crash Rate**

Nilsson (2000) suggested that the ratio of change in accident rate is proportional to the ratio of change in mean speed raised to a power, which

depends on the consequence of the accident; injured ,severed injured or killed. As a result of this, a decrease in mean speed results in a decrease in accidents of all types of consequences Aarts and vanSchagen (2006) reported that there is a link between speed and crash rate which not only affects the severity of crashes, but also increases the risk of being involved in a crash, If drivers drive 10-15% above the speed of surrounding traffic they are much more likely to have an accident (Taylor et at., 2000), It is fairly clear that there is a straightforward relationship between speed and crash involvement (Aarts & van Schagon, 2006; Finch et al., 1994; Richter et at.,2006), It would appear. Therefore., that public safety would benefit from measures that reduce speed. Clearly then, the enforcement of speed limits would naturally be a significant part of the process of reducing speed .In England and wales the primary method by which this enforcement is achieved is through automated safety cameras, In fact, 91% of speeding offences are detected through cameras (fiti &Murry,2005; while cameras are effective in reducing speed and crash involvement (Gains et at.,2005; Hirst et at.,2005),they have received considerable adverse publicity in the media.

Greaves and Ellison (2010) showed that overall twenty percent of the moving distance travelled was above the posted speed limit, with a small but significant number of drives regularly travelling more than 10 kmph above the speed limit ,Exploratory analysis showed that speeding is more than females but there are only marginal differences as far age is considered. Speeding is more

prevalent on weekends than weekdays but weekday speeding is higher in the mornings whilst weekend speeding is higher at night, (ogle,2005; wundersitz et al.,2009)

Davey, Freeman and Wishart (2006) reported that drivers were more likely to report engaging in speeding behaviors and believed speeding was more acceptable compared to drunken driving, following too closely or engaging in risky overtaking maneuvers. The results indicated that speeding is the most common form of aberrant behavior reported about the fleet drivers which is similar to previous research on professional drivers (Newnam et al., 2004; Sullman et al.,2002., Davey et al., 2006) while analyzing gender and speeding. Stradling (2000) observed that, females appear to sharply reduce their driving speed in their 20s, and then maintain this reduced speed with increasing age. Males, however, do not appear to reduce their 'normal' driving speed until their 30s but still sustain higher speeds than their age equivalent females. Stradling (2000) also noted that older drivers were less likely to have been penalized for speeding the highest speeding offenders were aged between 21 and 40, whereas the lowest were for those drivers aged 60 and above. Additionally, Davey, Becki & STEVE (2001) reported that the likelihood of having broken the speed limit was highest in the 20 to 24 year old age group, and that this steadily declined with increasing age thereafter.

Wasielewski (1984) found that drivers aged 20 years and under had the highest observed speeds, shinar et al,(2001) noted that number of people who reported that they observe the speed limit all the time increased with age, also finding that the tendency to speed decreases with increasing age, Finn et al. (1985) further found that younger drivers perceived speeding to be less dangerous than experienced drivers, indicating the younger driver's tend to have greater likelihood to speed. Additionally, French et al,(1992) and parker et al,(1992) observed that faster and more deviant driving styles were associated with male and young drivers, Such findings therefore corroborate the association between age and faster average driving speed,parker et al, (1992) reported that younger drivers endorsed speeding and dangerous overtaking more strongly than did older drivers.

Goldenbeld and vanSchagen (2007) observed that the preferred speed of young car drivers (18-25 year-old)was significantly higher than that of older car driver (40-55and56+year old),At the same time the preferred speed of 40-55 year old car driver was significantly higher than that of the group who were above 55 years. With regard to safe speed limits,the two youngest age groups differed significantly from the oldest age group with the latter group considering lower speed limits to be safe.

## **2.6 Attitude to Speeding**

A negative attitude to speeding means that speed is believed to be “bad”, whereas a positive attitude to speeding means that speed is believed to be “good”

vanlaar, simpson and Robertson (2008) reported that the perception of the level of risk associated with certain dangerous driving behaviors – speeding excessively, using a cell phone while driving, distracted driving and using illegal drugs while driving – was found to be high enough to cause concern. Someone who believes these behaviors are risky is more likely to be concerned about them.

Warner and Aberg (2006) examined the application of theory of planned behavior to predict driver's everyday speeding behavior control were significant determinants of self – reported speeding A majority of studies conducted on speeding behavior have been based on self – reported behavior (forward) 1997; parker et al., 1992; straddling and parker,1997), but several studies based on measurements of speed under restricted conditions have also been conducted (Aberg.1997; vogel&Rothengatter,1984).

According to Haglund and Aberg (2000) the relationship between self – reported speed and actual speed is strong ( $r=0.58$ ), reaffirming the theory of planned behavior which is shown to afford a level of prediction of drivers self reported speeding as well as of their logged speeding.

Warner and Aberg (2006) found that specific attitude to speeding (“how acceptable is it for you personally to exceed different speed limits in both urban and rural environments), subjective norm and perceived behavioral control significantly predicated self – reported speeding.

Flieter and Watson (2006) found that approximately 67% of participants reported that speeding is both not ok and not worth the risk, and that these attitudes were also significant predictors of self – reported speeding behavior.

Trantera and warnb (2008) indicated a significant relationship between gender, age, interest in motor sport, attitudes to speeding and speeding and speeding violations. Interest motor sport had a significant but indirect relationship for both sexes need to continue to target attitudes to speeding. And to change the belief that experienced drivers can ‘speed safely’,

Davey et al,(2006) found that those who engaged in highway code violations such as speeding were also more likely to exhibit aggressive acts while driving further the participants who agreed with the seriousness of the specified aberrant driving behaviors were less likely to report engaging in such behaviors over the past six months, which provide evidence that specific driving behaviors and attitudes that have direct links to crash involvement can be identified,

Several studies have illustrated the importance of investigating drivers attitudes and beliefs in relation to risky driving (parker et al., 1995; prabhakar et al.,1996; Ulleberg & Rundmo, 2002) For example in a longitudinal study examining self – reported risky driving and traffic safety attitudes, Iversen (2004) found that drivers with more positive attitudes toward rule viotations and speeding were more frequently observed to engage in risky driving behavior.

Mckenna (2007) found that there was a highly significant positive change in attitudes following the intervention of speed awareness programs, There was a highly significant gender effect indicating that women had a more negative attitude towards speeding.

Among the most significant of these variables influencing drivers attitudes to speeding driving attitudes to speeding driving violations and accident involvement are age gender and sensation seeking propensity (Dobson et al., 1999; jonah et al.,2001; Laapotti & Keshinen,2004; Turner and McClure 2003) There are also important environmental influences on attitudes to speeding and driving behavior, including the influences of alcohol and peer pressure (Elliot et al., 2004),

Elliot et al, (2004) provided strong support for the Theory of planned Behavior (TPB)indicating that attitudes, subjective norms and perceived behavioral control were each statistically significant independent predictor of intentions. and together accounted for 54% of the variance, In turn intentions and perceived behavioral control together accounted for 67% of the variance in self – reported speeding behavior and each was a statistically significant independent predictor.

Trantera and warnb (2008) reported that the level of interest in motor racing is significantly related to attitudes speeding. Controlling for age education level and sensation seeking propensity. Higher levels of interest in motor racing are associated with higher pro – speeding attitudes, Unlike the previous research on

young male drivers there was no significant relationship established between interest in motor sport attitudes indicated a significant relationship between gender age, interest in motor sport attitudes to speeding and speeding violation, The same trend noticed among the mature drivers as there is an association between interest in motor racing and attitudes to speeding (Trantera&Warnb,2008).

Watson et al ,(2007) found that riders appeared to hold positive attitudes to riskier behaviors Many of the crashes described by these riders appeared to be directly related to their higher risk riding style.

Fildes Rumbold and Leening (1991) reported that a surprisingly high Number of motorists (28%) who tend to believe that exceeding the speed limit by 30 kmph were not dangerous regardless of whether they reported driving regularly above or below the posted speed limit, Together, these results suggested that while speeding is recognized as a significant contributor to crashes, the actions of many users indicate that they remain unconvinced, undeterred, or perhaps, that they perceive speeding as acceptable until it reaches a certain threshold.

Rundmo and Iversen (2004) found that attitudes to speeding were not only related to age and gender but also to risk taking behavior in traffic and involvement in near accidents and accidents, Werner and Aberg (2006) also defined a link between attitudes to speeding and accident involvement.

Iversen (2004) investigated whether attitudes toward traffic safety issues are predictors for future risk behavior in traffic, Results of his research show a

high correlation between the dimensions of attitudes and behaviors at the two data collection points Iversen's model has three exogenous latent variables (1-attitudes toward rule violations and speeding 2- attitude toward the careless driving of others 3-attitude toward drinking and driving) and an endogenous latent variable; risky driving behavior.

Hatfield and job (2006) found stronger support for the association between compulsory fitting of speed governors for serious offenders and lower self reported speeding likelihood, This may indicate that people with negative attitudes towards speeding are both less likely to do it, and more likely to support heavy penalties for those who do it.

The most recent Australian Transport Safety Bureau's (ATSB) community Attitudes to Road Safety survey (2004) revealed that speed is still the most frequently cited contributing factor to crashes. Overall, 59% of respondents named it as one of the three main causal factors, and 39% identified it as the primary contributor to road crashes (Pennay,2005) Further,90% agreed that an accident at 70 kmph would be more severe than one at 60 kmph (Pennay,2005). This level of agreement has increased steadily over the past decade from 80% in 1985, This clearly shows a growing recognition of the risks associated with speeding among the community.

Forward (2009) examined two different driving violations by applying the Theory of planned Behavior and reported that attitudes comprised the largest

contribution for driving violations, which is contrary to the findings of Warner and Aberg (2008) and Parker et al. (1992) who either found subjective norms or perceived behavioral control to be the most important component.

## **2.7 Speeding Behavior and Dangerous Driving Behavior**

Using factor analysis Golias and Karlaftis (2002) revealed that speeding behavior is strongly related to other dangerous driving behavior. The results seem to imply that drivers who speed also tend to drive more dangerously (and vice-versa), while drivers who report driving under the influence of alcohol do not seat belts.

### **Dangerous Driving**

According to Dula and Geller (2004) driving behaviors that endanger or have the potential to endanger others should be considered as lying on a behavioral spectrum of dangerous driving. Three dimensions of dangerous driving are delineated; (a) intentional acts of aggression toward others, (b) negative emotions experienced while driving, and (c) risk-taking, using Dula Dangerous Driving Index (DDDI). The DDDI measures the likelihood to drive dangerously, consistent with the aggressive driving negative cognitive/emotional driving, and risky driving aspects.

Dangerous driving includes a broad variety of behaviors, which are often identified as aggressive driving such as showing annoyance towards slow drivers

(aggressive intention),and enhancing high and intense sensations (risk-taking motivation).

Furthermore, negative emotional driving is related to irritability, anger while driving. And a tendency to become annoyed with other drivers However this emotional state does not necessarily translate into aggression (Galovski et al.. 2006),Risky driving, on the other hand, denotes a careless style of driving and can be defined as deliberate on road risk taking not intended to harm other drivers.

Indeed in contrast to aggressive driving risky driving has been shown to be positively related with self-regulation tendencies aimed at escaping self-awareness and reducing tension. Or in order to compensate for low self-esteem or to maintain a particular self-image (Richer et at 2007). Risky driving behavior may include self-assertive driving ,speeding, and rule violations, Many researchers (Aarts & VanSchegan,2006; Lam,2003 Jonah,1997)have studied speeding as a risky driving behavior.

### **Drunken Driving**

Dula (2003) reported that the covariance between risky driving, negative cognitive/emotional driving and aggressive driving on the one hand, and drunken driving on the other hand appeared to be only moderate, Intoxicated driving is a form of dangerous driving behavior that can be distinguished from other risky behaviors, such as speeding, illegal passing ,obstructing traffic, aggressive driving is a form of dangerous driving behavior that can be distinguished form other risky

behaviors, such as speeding .illegal passing, obstructing traffic, aggressive driving etc.. The validity of this statement was confirmed by the fact that drivers convicted for drunk driving scored highest on the drunken driving subscale, but lower on the other dangerous driving subscales.

## **Section II: Violation Behavior of Traffic Rules**

Yilmaz and Celik (2006) found that violations of traffic rules was the strongest predictor for risk taking behavior as there are significant negative causal relationships between obedience to speed rules and risky driver attitudes, which reaffirms the proposition ,”The more obedience to speed rules, the fewer risky driver attitudes.”

Applying the model of Theory of planned Behavior, wickens, Toplak and Wiesenthal (2008) reported that attitudes normative beliefs and control beliefs predict violation behavior. The Theory of planned Behavior which incorporates both social and personal factors, has therefore been applied to understand and predict this behavior. Drivers usually find speeding behavior as acceptance than on a minor one. Violators were aware of negative consequences but did not really believe that it would happen to them.

Bener et al.,(2008) investigated the factor structure of the DBQ and examined the relationships between the factors of the DBQ and accident involvement ,and finally to compare DBQ scores between the two gulf countries; Qatar and the United Arab Emirates.

Logistic regression analyses showed that 5 errors, lapses, and aggression-speeding violations predicted accident involvement in Qatar but not in UAE after controlling the effect of the demographic variables such as age, sex, and annual mileage. Jonah (1997) reported several studies finding a weak relationship between the personality trait of sensation seeking and involvement in traffic and the propensity to commit driving violations.

Forward's (2009) study was to assess the effect of more traditional variables used to explain driving violations, namely age, sex and annual mileage. The results showed that age and mileage added to the prediction of speeding in an urban area. This would then indicate that young people are more likely to violate traffic laws (this is something, Yagil, 1998). The significant contribution of mileage indicated that drivers who used the evidence presented by Lawton and others (1997) where violations are related to a higher mileage, studies have shown that young men risky driving has become part of establishing their gender identity. In addition to this, Taubman-Ben-Ari and others (1999) found that young men use the car to increase their self-confidence. Thus, violations have become very alluring. This is a trend, which would need to be broken, and its symbolic interpretations need to be deconstructed.

### **Violations and Crash Involvement**

Research stations reported associations between major deviations (both slower and faster) from the average traffic speed and an increase in crash risk

(parker et al., 1992) speeding is not only a common violations. Many also regard it with a degree of tolerance. It is rather of the propensity to violate, deliberate infringements, than the tendency to make errors of intention or action while driving, which is associated with involvement in accidents among elderly people, while operative accidents was associated with high scores on the lapse factor (parker et al.,2000) considering these results, we can expect that drives who have a high score on self-reported risky driving will be more frequently involved in traffic accidents than other respondents

Malfetti and other(1989) who regarding adolescents risk taking attitudes related to driving reported that attitudes towards rule violations and belief in accidents causation to be significant predictors of risk-taking behavior in traffic.

Errors and violations in traffic many influence accident involvement differently. Based on a review of several studies of the effect of individual in road accident risk, elander west and French (1993) concluded that driving styles (violations) such as fast driving and willingness to commit driving violations could be explained by motivational factors such as personality, anti-social motivation, existing norms, and driving related attitudes, It has also been shown that private car driver's accident involvement can be predicated by self-reported tendency to commit violations (Gras et at.,2006; ozkan&Lajunen,2005; parker, Reason et al,1995; parker et al.,1995; Rimmo Aberg,1999).,aggressive violations (ozkan Lajunen chliaoutakis et al., 2006) or highway code violations

(konotogiannis et al., 2002). In addition, Mesken et al (2002) found that driver's involvement in passive accidents (where a vehicle hits them) correlated with the driver's self-reported tendency to commit interpersonal violations.

Lawton et al.( 1997) and meadows et at.,(1998) reported that there is a significant relationship between social deviance expressed whilst driving. The relationship between violation and crash involvement also been researched, showing that those with a tendency to commit violations tend to be involved in more traffic accidents (Rothengatter, 2000; Lawton et al., 1997; parker et al.,1995 a., 1995 b) parker et al (1995 a, 1995 b) found that violations, i.e behaviors that involve deliberate deviations from safe driving practice correlated with both past (parker et al.,1995) corroborated this by reporting that violation score was a significant predictor of accident rate in their study Rothengatter (2000) further supported this association by noting that those drivers who regularly committed traffic violations were more involved in road crashes than were other drivers.

Meadows et al, 1998 found that both the propensity to commit driving violation and extreme social deviance predicated accident involvement. However, the relationship between extreme social deviance and accident involvement was partly mediated by a tendency to commit driving violations.

Horsthuis et al., (2011) demonstrated that psychological factors are better predictors of risky behavior than age and gender, self-efficacy and subjective norms are the most dominant predictors concerning violations, concerning

dangerous error subjective norms and self-efficacy are the most powerful predictors. Self-efficacy is the best predictor as far as inadequate attention and lapses are concerned.

De winter and dodou (2010) found that errors predicated accidents significantly. The meta analysis also showed that errors and violations correlated negatively with age and positively with exposure, and that males reported fewer errors and more violations than females, supplementary analyses have conducted focusing on the moderating role of age, and on predicting accidents prospectively and retrospectively. The present meta-analysis synthesized the available information and showed that both driver behavior questionnaire (DBQ) errors and violations are significant predictors of self-reported accidents.

Watson et al., (2007) examined psychological and social factors influencing motorcycle rider Intentions and behavior and reported many riders endorse riding at excessive speeds was 'safe' provided it was done at the right time and place. In addition., several riders reported to have crashed as they were going too fast to deal with an unexpected event.

While examining the independent and combined roles of three personality traits-sensation seeking conscientiousness and anger hostility- in predicting risky driving behavior, schwebel et al (2006) found that each fact of personality has correlated to risky driving behavior in independent univariate analyses, in

multivariate analyses, sensation seeking emerged as the best predictor of self-reported driving violations.

### **Section III: Personality, Aggression and Violations**

Vasallo et al.(2007) utilized longitudinal data of the psychological development of young people and indicated that high levels of antisocial behavior and aggression, and low levels of empathy were precursors to young drivers involvement in risky driving and speeding violations, Low levels of anxiety were also associated with involvement in speeding violations.

A wide range of individual differences variables in the driver influences safe management of a motor vehicle, one set of traits long recognized as relevant to predicting dangerous driver behaviors is the driver's personality (tillmann and Hobbs, 1949; Fine,1963 Arthur et al., 19910 Machin and sankey (2008) have shown that the key personality factors have an important influence on both risk perceptions and driving behavior, Adrain and patric (1999) repoted that there appears to be sufficient evidence that personality variables do relate to all kind of accidents in all kind of population The two orthogonal factors that appear to be the best predictors of accidents are clearly extraversions/sensation /A-type behavior and neuroticism/anxiety/instability.

Sommer et at., (2008) investigated the utility of combining the personality traits variables in the prediction of safe driving behavior and reported that the relationship between fitness to drive driving-related ability and personality traits

do not necessarily need to be linear. This conclusion is supported by the superiority of the result obtained with artificial neural networks compared to classical multivariate methods.

### **Personality Traits, Accident Involvement and Driving Behavior**

The role of personality traits in accidents has been central in explanations that emphasize accident proneness (Farmer & chambers, 1939; Tillman & Hobbs, 1949) wide range of studies has reported that through personality traits are likely to be weak they are consistently associated with accident involvement in traffic (Beirness, 1993) There is, however, reason to believe that the role of personality traits pertaining to accident involvement in traffic may be underestimated,

Muhammad and mati-ur-rehman (2007) analyzed driver's personality traits and driving style while driving at T- Intersections and reported that the diversity in the driver's behavior is due to their personal traits such as LOC, tolerance to uncertainty.

Ho and Gee (2008) explored the primary motives underlying dangerous driving among young males. Moreover they found that the decision by young males to engage in risky driving is a joint function of their desire top drive fast and take risks, an inflated sense of confidence in their driving ability. And a negative attitude disrespect towards traffic laws, The overall findings fit well with the growing body of literature that characterizes those who are at greatest driver risk

to be; high risk takers sensation seekers overconfident in their driving ability; low in danger perception show disrespect towards traffic laws, and males.

### **Personality and Speeding**

Svenssoon and Trygg (1994) investigated the relationship between traffic accidents and personality patterns, focusing particularly on professional drivers, In addition, they discovered that there is a clear connection between certain personality factors and both accident frequency and professional adaptation, and are subsequently able to predict the accident frequency of individual drivers with relatively high accuracy. Solely based on the results of the personality test used. The link between personality traits and speeding has attracted the attention of many researcher as being a more definitive indicator of speeding.

Several researchers have shown that the ‘sensation seeking’ propensity of drivers is highly correlated with risky behaviors such as speeding (Jonah et al., 2001, Greaves & Greaves & Ellison, 2010) others have focused on the ‘classic’ personality types demonstrating type A personalities are more likely to speed (Tay et al., 2003) conversely, characteristics such as altruism and aversion to taking risks have been shown to be negatively correlated with speeding (Machin & sankey,2008; Greaves & Ellison 2010).

Machin and sankey (2008) have shown that personality factors tend to have an important influence on both risk perceptions and driving behavior, Using structural equation modeling as a means of assessing the overall fit of each model

39% of the variance in young driver's speeding is found to be accounted for by excitement seeking, altruism, their aversion to risk taking and their own likelihood of having an accident, with altruism and aversion to risk taking both showing moderate negative relationships.

Machin and Sankey (2008) explored effects of personality variables on driving behaviors of young drivers and reported that speeding has correlated with four of the personality variables such as anger, excitement seeking, altruism and formlessness. Further, excitement seeking and altruism are significant unique predictors accounting for 2% and 3% of the variance, respectively.

## **2.8 Aggression in Driving**

Beck et al (2006) reported that people who limit to being aggressive drivers (at least) within the last months) were less likely to be concerned about speeding and aggressive driving than people who did not admit to these activities. Aggressive drivers differed from non-aggressive drivers on dispositional traits. As expected, they reported being more frustrated and hurried when they drive and were less calm and courteous than non-aggressive drivers.

Arthur and Doverspike (2001) have found that crashes significantly correlated with the five factor model of personality; suggesting that further research is required to uncover the role of the personality factors in engaging in risky driving behavior. Recent research suggested that there exists, a sub group of

aggressive adolescent drivers who are significantly at a high risk of engaging in risky driving behavior (Ulleberg,2001),

Gulliver and begg (2007) examined the relationship between personality measured in late adolescence and persistent risky driving behaviors 18 and 26 years of males and reported that aggression traditionalism, and alienation were the personality factors most frequently associated with risky driving behavior and crash risk, After adjusting for driving exposure, only high levels of aggression predicated a driver being involved in a crash and alienation predicated a driver involved in an injury crash.

Beck et at. (2006) investigated beliefs, driving personality dispositions and behaviors that distinguish self – defined aggressive drivers from non – aggressive drivers, he reported that aggressive drivers were more likely to be male and aged 45 and under, Further, compared to non – aggressive drivers aggressive drivers were more likely to report that they had, used a cell phone while driving driven while drowsy has an encounter with an aggressive driver, been ticketed or booked for a traffic offence etc., Aggressive drivers were less likely to report using their seat belt (88.5%vs97.7%), but more likely to report driving a car every day (89.2% vs 79.3%). Furthermore, in a longitudinal interview study, Begg and Langley (2004) found that aggressive behavior at 18 years of age significantly predicated subsequent self-reported speeding.

Comparing hostile aggressive drivers with normal drivers o' Brien (2011) reported that hostile aggressive drivers tend to have higher levels of trait aggression than 'other' general road users. Further the results suggest that in response to particular on-road situations the hostile aggressive driver tends to interpret 'other driver' behavior as threatening aggressive or antagonistic, They would appear to be more likely to experiences stronger negative emotions, more negative attributions together with thoughts of taking action against the 'other driver'.

### **Risky Driving and Driver Anger**

Anger and hostility are constructs measured both as stable emotional patterns and as transient dispositional states, Whether considered as states or traits, the tendency toward hostile frustrated, and angry behavior found repeatedly linked to risky driving (deffenbacher et al., 2001,2002; Iverson & Rundmo,2002).The link appears robust and reported in large representative community samples (Iversen & Rundmo 2002) reported a significant correlation between a brief self-reported measure of risky driving and the short form of the driver anger scale (Deffenbacher et al, 1994).

Deffenbacher (2009) reported that while driving, high anger drivers experience more anger triggers, frequent and intense anger, hostile thinking, aggression risky behavior and some crash- related conditions than low anger drivers do, These findings supported state trait theory hypotheses and show that

drives with a high level of anger and at risk, Drivers who have a high level of anger are angered by more things of anger in more hostile/ aggressive ways, engage in more aggressive and risky behaviors, are at risk for more anger – and crash related outcomes and possess other psychological characteristics that interact negatively with, and may exacerbate problems with driving anger. They are a risk to themselves and potentially to those who ride or share the road with them, Anger and aggression while driving decrease with age, If groups differed on age, then age effects could confound the findings.

### **Sensation seeking**

Sensation seeking is a type of personality trait most frequently studied in relation to driving behavior and traffic accident involvement. sensation seeking is defined as the desire for and engagement in varied, novel, complex and arousing sensations and experience (Zuckerman, 1984,1994) and is consistently linked to risky driving behavior in empirical research (Jonah,1997,). A typical characteristic of sensation seeking is the willingness to accept risks for the sake of such experiences and as such sensation seeking is closely linked to risky driving (Jonah,1997;Jonah Thiessen & Au-yeung 2001) Zuckerman (1994) suggests that sensation seeking is presently the most common purpose of risky driving in young men, aged 16-20 years. Driver who are high in sensation seeking are more likely to drive in risky manners (Burn & Wilde,1995; Iverson & Rundmo, 2002, Jonah, Thiessen & Au-Yeung, 2001; Trimpop & Kivkaldy,1997).

## **Sensation Seeking and Speeding**

A number of studies have suggested have suggested that speeding is a type of behavior that is likely to be exhibited by individuals who possess the personality trait known as sensation seeking (Jonah,1997), sensation seeking propensity has been found to positively correlate well with many risky driving behaviors including speeding (Jonah,1997),

## **Sensation seeking Type a Behavior and Speeding**

Tay, champness and Watson (2003) found both sensation seeking and Types –A behavior pattern has positively correlated with self-reported speeding behavior, Furthermore, this study found that the linear association was only slightly stronger for sensation seeking than for Type-A behavior pattern, The latter result implied that sensation seeking might be a slightly better predictor of speeding behavior than Type – A personality.

## **Sensation seeking Locus of Control, Hostility, Aggression and Risky Driving**

Lancaster and ward (2002) reported that driving behavior was associated with sensation seeking, thrill seeking impulsiveness, hostility/aggression emotional instability, depression, and locus of control (LOC), Among those drivers who had driver levels of sensation seeking, “risk-taking was associated with drinking and driving”. In addition, higher scores on ‘venture someness’ and ‘impulsivity’ were associated with higher levels of dangerous driving and

substance abuse. Gregersen (1996) and Williams (1997) reported that sensation seekers drive very often without a safety belt and under the influence of alcohol.

Sensation seeking has demonstrated in numerous studies linked with risky driving attitudes to speeding and increased accident rates (Arnett,1996; Descrichard & Denarie,2005; Jonah, 1997; Whissell & Bigelow,2003) speeding violations were directly linked to being younger sensation seeking propensity and having attitudes that endorsed speeding above the legal limit (Trantera & Warnb,2008).

Vanlaar et al, 2007 2008 reported that when person and personality characteristics such as younger the driver more speeding tickets received in the past 3 years more crashes in the past 3 years and higher the annual mileage, higher will be the level of sensation seeking.

Burns and wilds (1995) found there is a link between sensation seeking and risky driving among a sample of almost 80 professional taxi drivers, Further such correlational links between self reported sensation seeking and risky driving behaviours was supported by others (Jonah et al.,2001; Trimpop & Kirkcaldy ,1997; Iverson & Rundmo, 2002) Research with adolescent samples suggests sensation seeking is related to risky driving practices among young drivers (Arnett, 1990, 1996,1997), A case control study comparing drivers convicted and not convicted of offences such as speeding or reckless driving also yielded

significant differences in sensation seeking measures Among the two groups (Furnham & saipe, 1993)

Schwebel et al. (2007) found that personality was a modest but consistent correlate with risky driving behavior, sensation seeking seemed to be most strongly related to violations and tickets while temperamental control was more broadly related to a number of risky driving measures, These results held after controlling for the effects of gender age and years pf driving experiences.

One of the personality traits that predict accident involvement is sensation seeking Jonah (1997) pointed out that sensation seeking was significantly related to aberrant driver behaviors such as driving while intoxicated driving over the speed of 80mph driving 20mph or more over the speed limit, racing the car passing in a no-passing zone, over speed low seat belt usage, studies on the relationship between sensation seeking and risky driving indicated that high sensation seekers are more likely to report risky driving behaviors (eg speeding not wearing seat belts, driving after drinking perceiving a low risk of driving while intoxicated and aggressive driving than low sensation seekers (Furnhan & saipe 1993; Jonah, Thiessen & Au-yeung,2001 ; Rimmo & Aberg 1999; Rosenbloom,2003).

Several researchers have suggested that risky driving is motivated on the basis of the sensation seeking thrill (Arnett,1990,1991; Jonah several studies have found sensation seeking to be associated with a risky lifestyles and risky driving

(Arnett 1990,1991,1996,Wilson & Jonah 1988 Yu & williford 1993; Jonah 1997, The motivational influence of sensation seeking on risky driving behavior is further supported by findings demonstrating the sensation seeking explains a large part of the variation in the propensity to commit driving violations, but accounts for very little of the variance in the propensity to commit driving violations but accounts for the very little of the variance in the tendency to commit driving error (Rimmo & Aberg,1999) Drivers who are high in sensation seeking are more likely to drive in risky manners (burns & wilde) 1995, Iverson & Rundmo 2002 Jonah Thieesen & Au- Yeung 2001 Trimpop & kivkaldy 1997) .

Iversen and rundmo (2002) examined relationship between personality risky driving and involvement in accidents and found that those who scored high on sensation seeking recklessness and driver anger reported to have more frequent episodes of risky driving compared to those who scored low on these variables.

White and dehlen (2001) found that sensation seeking added significantly to the prediction of risky and aggressive driving independent of driving anger, Given the complexity of driving behavior and the myriad of factors contributing to vehicular accidents it is likely that multivariate models are needed to predict unsafe driving behaviour.

## **2.9 Risky Driving and Experience in Driving**

Machin and Sankey (2008) have shown that inexperienced drivers underestimate the risks associated with a range of driving situations., Young

people who drove when fatigued were found to spend longer periods on the road than other drivers, spending more hours each week driving at night and during the day, both on weekdays and weekends, Other Australian research on fatigued driving among young people revealed similar trends (Harrison,2006) Harrison concluded that fatigued driving appeared to be a consequence of lifestyle-related motivational factors that overrode young people's concerns about the potential negative consequences of driving when fatigued, Respondents believed that the effects of tiredness on driving were manageable except at the most extreme levels and those they could habituate to tiredness with experience.

Yilmaz and celik (2006) found that drivers having experience of less than 2 years demonstrate a positive attitude towards obedience to speed rules relative to those experienced over 2 year. According to this result as drivers get more experienced their self-confidence increases and they abide by the traffic rules. Lancaster and ward (2002) found inexperienced drivers were shown to be a high-risk group of driversthe cohort were less experienced drivers, Likewise, the average number of crashes experienced had risen from 1.36 to 1.6 over the time period, These findings are consistent with past research, which has linked driver inexperience to heightened rates of crash involvement (cavallo & Triggs, 1996; Engstrom et al., 2003, Triggs & smith 1996, Nevertheless after almost 6 years of licensure 40% of the sample had not experienced a crash when driving and a similar percentage had not been detected speeding.