

Driver's Personality Traits, Driving Anger, Risky Driving, Aggressive Driving and Road Accident Proneness in Malaysia: A Proposed Safety and Logistic Framework

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Abstract- Road accidents are recognized as the most serious threats that have been haunting worldwide motoring public from children to senior citizens. Human factors such as driver's personality traits, driving anger and risky driving has been recognized as the contributor to high rate of road accident proneness through their driving style such as aggressive driving. The studies in road accident proneness is still lacking and requires an extensive study, therefore it is important to understand the influence of driver's personality traits, driving anger and risky driving in predicting road accident proneness through aggressive driving. A conceptual framework is being proposed to investigate the relation and influence of these variables on road accident proneness. The contribution will be beneficial for motoring public that want to find solution towards decreasing the rate of road accidents through their personality traits, emotions, attitude and driving style while driving. Besides, the result obtained will give overall benefits to related agencies to understand the impact of human factors and driver's driving style particularly aggressive driving in reducing road accident.

Keywords- Road accident proneness, driver's personality traits, driving anger, risky driving, aggressive driving

1. Introduction

Road accidents in Malaysia have been in huge numbers annually for the past five years. Malaysia was ranked as one of the country that had highest road accidents and fatalities compared to other Southeast Asian countries with total road accidents recorded was about 505,262 in 2017 [1]. Deaths and injuries resulting from road accidents also have recorded an enormous record in the last five years,

such as 7,438 people have died and 24,786 people were injured in year 2017 [1]. Overall, the trend of road accidents in Malaysia including death and injuries are very high in the last five years.

[1] identified that cars are one of the most vehicle involved in road accidents and fatalities of drivers and passengers with total 3.26 million cars were involved in road accidents and 60% of them are classified as total loss damage from year 2013 to 2017. [1] also revealed that most of the car accidents occurred due to speeding, tailgating, red light running and cutting-in failure to which these driving styles could be categorized as aggressive driving.

Behavioural researchers had identified that about 85% of the road accidents worldwide are caused by human factors. This is because road accidents are usually dependent on the driver's characteristics, feelings, attitudes and driving styles while driving on the road [2-4].

Previous researchers had discovered several critical factors related to human behaviours that might influence road accident proneness such as driver's personality traits, driving anger, driver's risky driving and aggressive driving [5-7]. Thus, this study intends to further explore these factors in order to determine their effects on road accident proneness.

This concept paper also aims to propose a new conceptual framework to understand road accident proneness. The discussion of each variable will clarify their meaning and how each of it fit together in such framework to understand road accident proneness.

2.0 Road accident proneness

Road accident proneness can be defined as some drivers have greater tendency to involve in road accidents as they are exposed to equal risk while driving on the road [8]. Drivers are exposed to the

same risk but carries different perception and behaviour while driving. For example, a driver might perceive road accident proneness from the perspective of near misses such as damage on side-mirror, front bumper, little scratch on the car; whereas, other driver might define road accident proneness only from the road accidents perspective such as injury, ill health, loss or damage to the vehicle, fatality or any combination of all these. [9].

Since a driver's behavioural factors have linkage towards a driver's involvement in road accidents, this study will integrate several driver's behavioural factors such as personality traits, anger, aggressive driving and risky driving in order to provide further understanding on the effects of these factors on drivers' road accident proneness.

3.0 Driver's Behavioural Factors

3.1 Driver's Personality Traits

In road safety research, personality traits can interfere a driver's decision while driving their vehicle on the road. The model of personality traits that is discussed in this study is big five model (BFM) consist of extraversion, openness, agreeableness, conscientiousness and neuroticism [10].

In driving context, extraversion is positively correlated with aggressive driving as it is marked by active and sometimes impulsive behaviours [11]. Given that aggressive driving appear to be impulsive by nature, it is expected that drivers with a high level of extraversion to be more incline to aggressive behaviour while driving and more prone towards involve in road accidents those who violated traffic regulations were more prone to road accidents [11].

Next, openness to experience postulates that an egocentric mentality that often associated with aggression in traffic is lower among more sensitive, broad-minded, and tolerant people especially those with a high openness to experience trait [12]. The majority of aggressive behaviours exhibited while driving was associated with high openness to experience as this might influence driver's road accident proneness [13].

The personality trait that reflects an individual's relationships with and attitudes about other people is called agreeableness. For example, individuals with a high score on the agreeableness scale tend to be altruistic, empathetic and willing to help others, believing that they will receive same treatment from others in return, while low scores on this trait tend to reflect an antagonistic, egocentric, manipulative and competitive individual [14]. According to [14], antagonistic people tend to be aggressive and irritating and have the need to confront, attack or punish others. Therefore, it can

be concluded that people with low traits of agreeableness are more prone to road accidents.

The trait of conscientiousness specified that in driving context, people with high conscientiousness are persistence and directed towards a goal such as being able observe traffic regulations and laws and to act thoughtfully at road, thus reducing the accident proneness while driving [12].

Neuroticism is a personality trait that is defined as an inclination to experience negative emotions and difficulty in dealing with problems [13]. Neuroticism is related to reactive aggression including a constant and strong experience of anger such as anxieties, worries, anger issues, uncontrolled actions, insecurities and depression [14]. In addition, [14] indicated that reactive aggression is linked to high tendency of drivers to be involved in road accidents.

Although previous studies had shown that driver's personality traits have linkage an individuals' road accident proneness, however there is still an ambiguous knowledge among researchers on how driver's personality traits may affect an individuals' road accident proneness. Since, there is limited research has been done to investigate the effect of driver's personality traits on individuals' road accident proneness, further investigation is warranted to understand the influence of driver's personality traits.

3.2 Driving Anger

Driving anger refers to an individual's emotional and physiological arousal to become angry when facing a provocation and frustration situations on the road [15]. Driving anger portrays a vital and hazardous phenomenon that frequently occurs among drivers. For instances, individuals with high anger are likely to express anger more frequently and intensely while driving; resulting in more traffic violations and road accidents, compared to low anger drivers [16].

Besides that, angry drivers are more likely to respond angrily to provoking situations, experience more intense anger, and engage in more aggression and risky driving [15], [16] indicated that it will more interesting to focus on how people express their anger as this may be more important in a traffic situation. For example, two drivers may be equally angered by the same situation (e.g., a slow car in front of them), but express their anger in dramatically different ways. One driver might get very angry, honking and give the offending driver a sharp stare, and overtake him while the other driver might merely follow the car and continue to drive safely. Therefore, how one expresses anger may play an important role in determining the driving outcome and resulting in driver safety.

3.3 Risky Driving

The terminology of risky driving is used to explain attitudes that directly increase accident risk such as not using seat belts while driving using mobile phones, micro sleep and drunken driving as the strongest predictor resulting a person to be involved in near misses or road accidents [17].

[17] added that the driving attitudes of an individual will reflects the environment of the place, be it town, city, state or country as it reflects the true behaviour of the people living in that area, although the individual behaviour is different. This is the reason why an individual's driving style also different. Driving reflects ones' true nature, most of the time this needs an instant reaction which brings out the true self.

Risky driving depends on several factors such as attitude of the individual, his/her needs, values, life style, skills, and social influence while driving and as a driver, he has to respond and act according to the actions of the other drivers who share the same space and of course it not only involves the response of the other driver but also with the pedestrians and road environment [18].

3.4 Aggressive Driving

Aggressive driving is indicted as a deliberate act of violence and hostile driving that can result in accidents [5]. Previous studies had indicated that aggressive driving such as tailgating, cutting another vehicle off, not using signal indicators, violating a stop sign, violating a traffic signal, speeding, breaking abruptly, rushed over-pass are the unsafe and intentional performances that endanger other road users or properties [5], [13], [14] and [16].

Aggressive driving should have the following basic characteristics such as malice, the desire to harm others, the characteristic of injury outcome to which that, the aggressive behaviour of a driver will cause corresponding injury for others, for example, psychology abuse, the humiliation and threat on body [19].

Aggressive driving could be categorized into three levels such as low, middle and high. Low level of aggressive driving will lead to negative driving style as it will trigger anger to the driver but no external driving performance. The medium level of aggressive driving will lead to mild aggressive driving such as speeding up, random change lanes, disobey traffic signs, random overtaking and many more. Finally, the high level aggressive driving will cause extreme driving behaviour such as fighting or shooting. Research found that most of the road accidents happened were due to medium level of aggressive driving [20].

Most aggressive driving researches has adopted the view that the expression of aggressive driving will derived when an individual experiences a negative emotional state such as high levels of frustration [5], [13], [14] and [16].

In keeping with the foregoing reviews, this paper will therefore utilise a definition of aggressive driving that includes the elements of frustration. Thus, aggressive driving refers to any on-road actions adopted by a driver that is intended to cause physical or psychological harm to another road user and is associated with feelings of frustration or threat. Being consistent with the available literatures, this definition facilitates the scientific investigation of the phenomenon of aggressive driving. Additionally, it allows the concept of aggressive driving to be investigated more fully from the perspective of popular perceptions of the phenomenon, which may allow a more practical understanding of the behaviour.

4.0 Research Gap Discussion

4.1 Driver's Personality Traits, Driving Anger and Risky Driving Towards Road Accident Proneness

Although there are empirical evidences regarding the effect of driver's personality traits, driving anger and risky driving on road accident proneness separately, there are still insufficient explanations regarding the direct effects of these behavioural factors on road accident proneness [21], [22], [23], [4], [7] and [24].

For example, [21] conducted a study among motorcyclists of above 18 years old in India. According to [21], different individuals may behave differently to a given situation or under common circumstances, which probably because of an individual's personality trait. Result showed that impulsive trait has the highest percentage that was found among all the motorcyclists encountering road accidents. However, there are several limitations that could be addressed from the study done by [21]. The first limitation is that this study only focuses on single predictor (e.g. personality traits) and the second limitation is the sample of this study is focusing only on one category of respondents (e.g. 18 years old motorcyclist) rather than mixing all ages of motorcyclist in order to make this study be more interesting.

Other example, [22] carried out a research to explore the relationship of personality traits and accident-proneness of truck drivers in India. From the results obtained, about 126 truck drivers were discovered to be accident prone with their total driving hours in a day was about 10 hours considered as high and with respect to personality it was found that openness to experience and neuroticism was significantly associated with road accidents.

However, the study done by [22] only examined the effect of one predictor on road accident proneness instead of integrating several predictors in this study. Besides that, this study has limitation on geographical area where the study is done only in one city in India.

In relation to driver anger, [23] conducted a study on driving anger among 132 professional drivers in China. The researchers indicated that anger is one emotion that drivers often experience while driving as it can suddenly arise in various situations and be expressed immediately [23]. [23] also reported that angry drivers were triggered by specific anger situations such as (e.g. heavy traffic jam, slow vehicle in front of them) and the way they expressed their anger was very dangerous and could cause an accident. As a result, it can be concluded that driving anger has become an important contributor to road accidents. One of the limitations that can be identified in [23] is that this study focused only on one predictor (e.g. driving anger) of road accidents rather than integrating other predictors of road accidents in their study. In addition, other limitation that could be identified is this study was conducted among single gender and category of drivers (e.g. male and bus drivers respectively) rather than mixing genders (e.g. male and female) and category of drivers (e.g. commercial vehicle drivers) so that this study will be more comprehensive.

Another study conducted by [4] to predict the relationship of driving anger towards crash-related outcomes such as near misses and road accidents. This study was done among drivers from two different countries (e.g. United Kingdom and Republic of Ireland). The result from multigroup invariance analysis showed that the anger expression while driving and crash involvement are significant among drivers across both countries [4]. In addition, drivers reported with frequent expressing their anger while driving are reported to involved more minor accidents and more frequent losses of concentration and vehicle control [4].

Based on the study done by [4], there are limitations that can be acknowledged such as this study focused only on one predictor (e.g. driving anger) of road accidents rather than integrating other predictors of road accidents in this study. On top of that, the measurement for driver's road accident was not able to include major or minor accidents. Therefore, present study included major and minor accidents in order to measure road accident proneness.

In risky driving research, [7] have conducted a survey among 459 (239 males, 220 females) adolescents, from four secondary government schools in Melbourne, Australia relating to risky driving and road accidents proneness. Adolescent Risk Questionnaire (ARQ) which yields information relating to risk judgements

in three areas (i.e. thrill seeking risk behaviours, reckless rebellious risks and antisocial risks). From this study, it is found that risky driving has significant relationship with road accident proneness meanwhile the limitation that was identified is this study was conducted among single category of respondents (e.g. adolescents from secondary schools) rather than combining all ages of respondents so that this study will be more comprehensive.

Additionally, [24] have administered a study to describe the attitude of mobile phone usage while driving among educated young adults in Klang Valley, Malaysia. About 188 college and university students with age range from 18 -25 years' old with most of them have reported to drive a car frequently and have a valid driving licence between three to five years old had participated in this study [24]. This study had resulted to about 60 percent of the participant used mobile phones while driving and male driver were found to have used phones more often while driving on urban road. [24] added that the attitude of using mobile phones while driving increases the risk of a driver to be involved in accident related outcomes (e.g. road accidents and near misses).

However, there are some limitations that can be recognized in [24]. One of the limitation is this study was conducted among single category of respondents (e.g. university and college students) same as the previous research [21], [23], [4], [7]. Next, this study focuses on only one attitude of risky driving (e.g. mobile phone usage) rather than integrating several attitudes such as not wearing seatbelt, micro sleep and driving under/with the influence of substances.

In the nut shell, there are several key limitations that were identified in above researches. First, road accident proneness was examined based on only one predictor in each study, instead of examining the effects of several predictors on road accident proneness. Second, most of the studies mentioned above focused on only one group of drivers, for example, young drivers aged 18 until 25 years old rather than focusing on all range of ages. Third, there is no any further explanations were discussed on the effect of the predictors towards road accident proneness as a result, the driver will unable to tolerate with traffic laws, being indifferent to the rights of others, preoccupation with fantasy of satisfaction, fear of loss of love and support, inability to tolerate tension, poor self-control, guilt-proneness have been reported to occur frequently and could end up with road accident.

Considering the existing limitations, the current study will integrate all the predictors (driver's personality, driving anger and risky behaviour) in one framework and examine their effects on road accident proneness in order to bridge the limitations in past literatures. Consequently, as

described graphically in Figure 1, the author proposed.

Proposition 1: Driver's personality, driving anger and risky driving have significant relationship with road accident proneness.

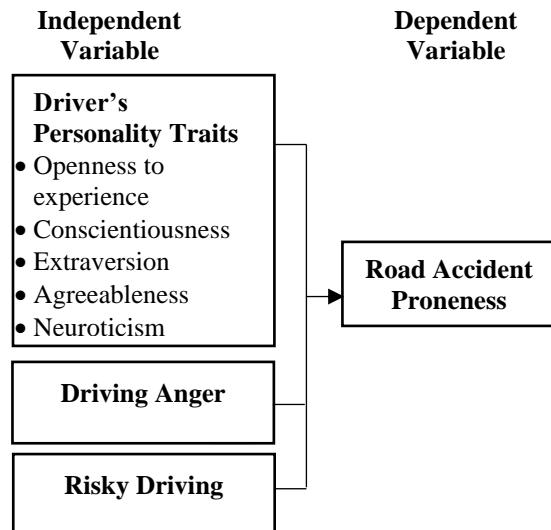


Figure 1. Direct effects of driver's personality, driving anger and risky driving on road accident proneness

4.2 Aggressive Driving as Potential Mediator Between Driver's Personality Traits, Driving Anger, Risky Driving and Road Accident Proneness

On the other hand, several literatures suggested that aggressive driving may mediate the relationship between driver's personality, driving anger, risky driving and road accident proneness [5], [8] and [20]. In particular, in view of existing literature, it is expected that aggressive driving would affect the individuals' driving propensity that is engaged with their personality, anger and risky driving as well as road accident proneness. To demonstrate support to the proposed mediator, this research needs to support the relationship between the predictor variables (driver's personality, driving anger and risky driving) and aggressive driving as well as the relationship between aggressive driving and the criterion variable (road accident proneness). The following section suggests the possible mediator of aggressive driving in greater detail.

To a large extent, the interest of studying road accident proneness in this research is driven by the impact of aggressive driving in predicting a variety of driving personalities, behaviours and attitudes that are important to drivers alike. aggressive driving has been linked to increasing number of road accidents in a country [5] and [20]. Thus, preventing aggressive driving may result not only in improving drivers' behaviours and attitudes

towards their driving style; but also in reducing road accidents.

Aggressive driving would affect the individuals' driving style in relation to driver's personality, driving anger, risky driving and road accident proneness. Therefore, this study suggests that aggressive driving is essential to be tested as a mediator. Specifically, this study attempts to examine the roles of aggressive driving as a mediator in the effects of driver's personality, driving anger and risky driving towards road accident proneness.

Proposition 2: Aggressive driving mediates the relationship between driver's personality, driving anger and risky driving towards road accident proneness.

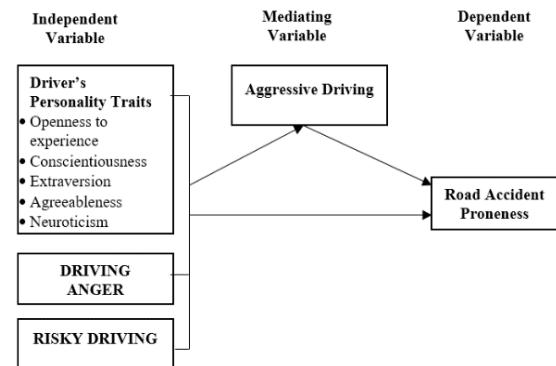


Figure 2. Conceptual framework of road accident proneness through aggressive driving and driver's personality, driving anger and risky driving.

5.0 Proposed Framework

Extensive studies have been done to understand the influence of human factors on road accident proneness [21], [22], [23], [4], [7] and [24]. However, these associations possibly are subject to mediating variable such as aggressive driving (Chraif et al., 2016). There has been further exploration on the influence of driver's personality, driving anger and risky driving on road accident proneness; still, empirical research is limited on the outcome of aggressive driving as the intervening variable between driver's personality, driving anger and risky driving with driver's road accident proneness.

Moreover, these studies mostly focused on driver's frequencies involving in road accident such as major or minor accidents and near misses while it has been argued that road accident proneness is critically important where it should be deliberated in the aspect of accident involvement together with near misses. This designates the essential of understanding the influence of driver's personality traits, driving anger and risky driving on

comprehensive road accident proneness through aggressive driving. The need for further investigation on these related essential aspects is expressed in Figure 2.

Referring to the earlier clarification and discussion, Figure 2 demonstrates the need for further examination related to the human's factor especially on the relationship among driver's personality traits, driving anger and risky driving with road accident proneness. Further, it is important to investigate aggressive driving as mediating mechanism to the relationship between driver's personality traits, driving anger and risky driving with road accident proneness. Additionally, by utilizing the General Aggression Model (GAM), the driver's frequency involving in road accident such as major or minor accidents and near misses should be further analysed in order to understand the notion of road accident proneness. Hence, it is clearly explained that it is essential to investigate the relationship of driver's personality traits, driving anger and risky driving with road accident proneness through aggressive driving.

6.0 Conclusion

From the extensive review of the literatures, this study intends to explore the influence of driver's personality traits, driving anger and risky driving along with aggressive driving on road accident proneness to reduce the road accident among car drivers. It is recommended that the driver which portrays good driving behaviours will exhibits low aggressive driving which then results to low road accident proneness. Therefore, this proposed framework is needed to be examined for further understanding. The proposed framework will be tested in research program conducted by first author in Malaysia. The result of the particular research is expected to provide further understanding of road accident proneness and aid the development of effective intervention in road safety.

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