



# Aggressive Driving: Mediating Effect of Support for Counter Measures

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The purpose of the study is to inquire into what extent factors like driving anger, behavior pattern, situational factors and support for counter measures affect drivers who drive aggressively on the road. 383 people were randomly selected to be the respondents in this study. Data collection was made via questionnaires. In measuring the hypotheses, PLS software was utilized. The results show significant positive association of behavioral pattern with aggressive driving behavior. The second hypothesis confirmed a positive relationship among driving anger and aggressive driving behavior. The third hypothesis also confirmed positive significant association involving situational factors and aggressive driving behavior. The fourth hypothesis showed a negative relationship between support for counter measures and aggressive driving behavior. Result in hypothesis 5 shown an insignificant relationship between behavioral pattern and support for counter measures. Hypothesis 6 confirmed positive significant association between driving anger and support for counter measures. Hypothesis 7 result shows negative significant relationship relating to situational factors and support for counter measures. Three hypotheses measured the mediation effect. Hypothesis 8 was found to have no mediation effect of support for counter measures among the relationship between behavioral pattern and aggressive driving behavior. There is a mediation effect of support for counter measures among the relationship of driving anger and aggressive driving behavior as disclosed in hypothesis 9. The investigation of hypothesis 10 exposed a significant mediating effect of support for counter measures in the relationship between situational factors and aggressive driving behavior. A future study is suggested in order to identify further factors that associate with aggressive driving behavior such as driving attitudes, styles and habits.



**Key words:** *Driving anger, behavior pattern, situational factors and support for counter measures.*

## **Introduction**

Since independence in 1957, Malaysia has gone through a substantial era of economic and industrialization development and growth in population resulting in motorization expansion increasing yearly. Motorization expansion has resulted in increased incidence of road accidents. A study of road safety found that human error contributed to 65% of accidents, 20% to 30% of accidents were caused by environment factors and vehicle factors contributed 3% to 13% of accidents (Brown, 2005). Consequently, most of the accidents are caused by human error and poor condition of vehicles. Although the government provides the best roads in the world, it was difficult to change the attitude of drivers with respect to cautious driving. One domain of violent behavior that has gained media attention is driver aggression, in extreme form, referred to as road rage or reckless driving. Although there are various definitions of driver aggression, there is an overlapping concept between driver aggression, road rage and reckless driving (Lajunen et al., 1998; Shinar, 1998).

## **Literature review**

Aggressive driving behavior is referred to in this study as “any behavior intended to physically, emotionally, or psychologically harm another within the driving environment” (Hennessy & Wiesenthal, 2001, p.661). Bandura (1983) defined aggression as “behavior that results in personal harm and physical injury” (p. 17). As such, harm can be physical or emotional including verbal abuse. According to Deffenbacher (2001), anger on the road can be observed through aggressive acts like tailgating, hostile gestures, and elevated blood pressure. Aggression definition by Baron and Richardson (1994) is “any form of behavior directed toward the goal of harming or injuring another living being who is motivated to avoid such treatment” (p. 7). Moreover, they emphasized some significant aspects foundational to this definition: 1) considering aggression as a behavior rather than as an emotion, 2) actions intended to be harmful, 3) both acts of aggression and unsuccessful attempts in harming are considered acts of aggression, 4) harming comprises non-physical acts including humiliation, 5) the direction of aggression is on the human and not on the inanimate objects and 6) victims display the tendency to avoid the harm.

Mizell (1997) explained aggressive driving as the episode of a motorist or passenger in a state of impatience or rage deliberately attempting to injure or kill other road users during for example, a traffic deviation. The definition concentrates toward the behavior that aims to physically harm, or fatally injure another person.



Sukhai, Seedat, Jordaan and Noah (n.d.) stated that aggressive behavior can be assessed at four levels: (1) non-threatening demonstration of anger like complaining and yelling at one's self, (2) aggressive driving like showing anger or using horns in response to the other motorist, (3) mild road rage including intimidating behavior like trying to cut another motorist off, and (4) extreme road rage that is a directly offensive act such as quarrelling with another motorist.

In the self-reported study by Lajunen and Parker (2001) on impulsiveness, general aggressiveness, and driver anger, it was found that respondents admitted that the extent of their aggressive response depended on other drivers' reckless driving and unsafe traffic violations and that they acted aggressively very frequently.

AAA Foundation for Traffic Safety study in 2008 revealed that although people view aggressive driving as a dangerous traffic safety problem, almost 50% of the respondents reported that they speed in excess of over 15 mph of on major highways speed limit and 15% confessed they exceed over 15 mph above the speed limit in the neighborhood streets. This study reported the drivers' aggressive acts in driving could be categorised as beating the yellow light-58%, sounding the horn against another drivers -41%, coercing another drivers in speeding -26% , driving too close behind -22%, and intentionally driving against the traffic lights-6%.

Bakou, Chliaoutakis, Darviri, Demakako, Koumaki and Tzamalouka (2002) conducted a study to identify whether driving aggression contributed to car crashes among young drivers. They interviewed through a self-reported car crash questionnaire using a sample of 356 young drivers in the age range of 18 to 24 years. Based on the research, two factors were identified as relevant to two types of aggressive behaviour: irritability while driving and driving violations. In their multivariate model, they showed joyriding and irritability are the major factors involved in car crash cause among young drivers. Based on this study, public policies can be developed as proactive intervention to reduce car crashes and fatalities on the roads.

Deffenbacher et al. (1994) in the definition of driving anger emphasise the personality attribute related to rage or anger traits and its effect on response to the road situations. Previous researchers (Deffenbacher, 2001; Deffenbacher, 2003; Deffenbacher, Lynch, Oetting, and Yingling, 2001) proposed rage and anger initiated aggressive driving behavior when drivers face frustration situation such as been trapped in a traffic jam or are caught driving behind slow vehicles. Deffenbacher et al. (2000) have shown that drivers who have higher level anger personality traits will demonstrate higher levels of rage or anger and anxiety in response to road situations. Their findings also show that young drivers of a



median age of 19 tend to demonstrate anger attributes through speeding in low resistance traffics limitations over short distances. (Deffenbacher, 2003).

The common term used in referring all characteristics of any situation faced by the drivers is a situational factor. It can be an indirect characteristic for examples, road-type, road congestion degree, or it can be as a result of direct causes, for example, road provoking behavior (O'Barien, 2011; Ali, 2013). Ulleberg (2004) identified factors that may lead drivers toward aggression, among them are anonymity, crowded roads, poor communication and the type of car. Congested roads may generate aggressive behavior through stress and frustration as a result of drivers having their need for mobility disillusioned (Bjornskau, 1994; Shinar, 1998), especially when impediments in traffic are perceived as unnecessary and unexpected (Bjornskau, 1994).

Cyclists using the roads may, from drivers' perspective, be perceived as unnecessary and somewhat unexpected obstacles and, might, as such be a source of frustration. Also, it has been argued that poor communication in the traffic situation makes it difficult for drivers, in presuming the perspective of the other road users', which thus increases a driver's hostile appraisal other road users' behavior, which, in turn, may lead to aggression (Mesken, Hagenzieker, & Rothengatter, 2003).

AAA Foundation for Traffic Safety (2009) studies from 2003 to 2007 reported some common aggressive actions, which were speeding (30.7%), reckless driving (7.4%), and going against the traffic signs, traffic controlling devices (6.6%). A 1985 study by Kumar, using crash report data from British and American found the most significant crash factors for drivers involved in accidents were: driver' solely factors (57%), roadway and driver combination factors (27%), vehicle and driver combination factors (6%), roadway, driver, and vehicle combination factors (3%), vehicle' solely factors (2%) and roadway and vehicle combination factors (1%). This study also found factors like fault due to driver's alcohol consumption and other human factors contribute wholly or partly to nearly 93% of collisions (Harry & Reagan, 1995).

Cognitive neo-association theory highlighted the cognitive input such as anger provoking situation, situation factors traits and depression to the occurrence of strong emotions in influencing the possibility of aggressive behaviour (Berkowitz, 1989, 1990, 1993).

A counter measure is defined as an action that is proposed to stop or prevent something bad happening or a dangerous situation developing (Sukhai, Seedat, Jordaan, & Noah, n.d.). Law enforcement agencies must establish law enforcement programs that aim at educating aggressive drivers to make the roads safer. The goal is increasing awareness through

education and enforcement for drivers who demonstrate dangerous behaviors on the road and thus reduce the number of incidents. Sukhai, Seedat, Jordaan, and Noah (n.d.) discovered almost 44% of motorists supported legislation and enforcement measurement to deal with aggressive behavior. To intensify enforcement, a media campaign and education must be included in the program.

## Research methods

### Research Framework

Figure 1 below is the study's measurement model. As can be observed, the research focused on whether factors like driving anger, support for counter measures, and situational factors affect drivers' driving behavior.

From the research framework in Figure 1, there were seven direct hypotheses:

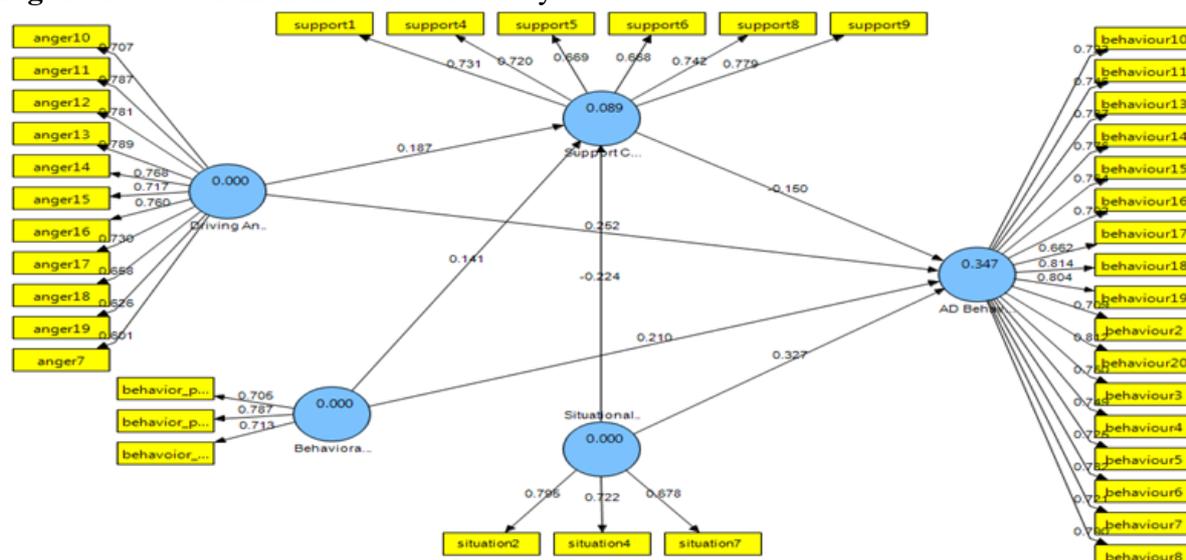
Hypothesis 1 – 4: There is a significant relationship between IVs (behavior pattern, driving anger, situational factors, support for counter measures) and aggressive driving behavior.

Hypothesis 5 - 7: There is a significant relationship between IVs (behavioral pattern, driving anger, situational factors) and support for counter measures.

The following were mediating hypotheses:

Hypothesis 8 - 10: Support for counter measures mediates the relationship between IVs (behavioural pattern, driving anger, situational factors) and aggressive driving behaviour.

**Figure 1.** Measurement model of the study





### ***Sample***

The target population are all drivers on the Peninsular of Malaysia. A sample size of 30 is utilized as a cutoff value as the sampling distribution of 30 or more is regarded as normally distributed (Dawson & Trapp, 2004). The sample size was 382 drivers according to the population identified from Road Transport Department. Over-sampling was used in order to accelerate amount of response, thus, 600 questionnaires were distributed.

The sample size was collected using convenience sampling as the actual number of drivers who drive to work around all the targeted area could not be identified by the Road Transport Department. The questionnaires were given to drivers who passed by these areas during their normal day. Further samples were taken from participants who had been involved in commuting accidents and who attended safety and health seminars.

### ***Data Analysis***

Analysis of data was performed using statistical analysis from the Statistical Package for Social Science (SPSS) version nineteen and Partial Least Structural Equation Modeling (PLS-SEM) version 2.2.

### **Findings**

#### ***Background of respondents***

The frequency analysis was performed on gender, age, ethnic group, education, occupation, work shift and own vehicle. The gender composition shows that 60 percent were male respondents, while 35.3 percent were female. The composition of the highest age group was from 25-29 years which was 25 percent while the lowest was from less than 20 years which was only 0.4 percent. The Malays were ranked as the largest number of respondents at 77 percent, followed by Chinese 8.6 percent, Indian 8.1 percent and others with 6.3 percent. In relation to the academic background, respondents with a college degree were the most with 49.9 percent. The largest group in occupation was from executive level at 33 percent. Respondents that work in shift hour were only 11.5 percent and most of them were working normal shift with 2.3 percent. The data shows that most of the respondents had their own vehicle which was about 84.6 percent.



### ***Evaluation of Measurement Model***

The study employed Smart PLS version 2.2 to analyze data. There was a two-staged processes involved: the assessment of the reliability and validity of the measurement model and the assessment of the structural model. Figure 1 above shows the study's framework which indicates the loading for each item and beta values. The first step of the measurement model evaluate construct reliability, discriminant validity, and the composite reliability of all the latent constructs (Hair, Ringle, & Sarstedt, 2013). In the second step, the structural model measured the proposed structural relationships between the latent constructs (Hair et al., 2013; Ali, 2017).

To examine the convergent validity, factor loadings, composite reliability (CR) and the average variance extracted (AVE) were determined. As the recommended value of AVE to be over 0.50 and CR is more than 0.70, in this study all of the constructs fulfilled the specified thresholds of established criteria, i.e., CR ranging between 0.776 and 0.957 and AVE ranging between 0.517 and 0.570 shown in Table 1. Factor loading of each item is more than 0.60 shows that more than half of the variance in the observed variable is explained by the constructs and any loadings below 0.5 were deleted.

In PLS path model, the composite reliability is more appropriate to perform. This is due to Cronbach's alpha which tends to underestimate the internal consistency reliability of latent variables and tends to provide a conservative measurement in PLS-SEM (Wong, 2013). CR has been proposed because it addresses the fact that indicators have different loadings and can be interpreted in a similar way like Cronbach's alpha (Henseler et al., 2009). Therefore, CR values in this study provide a better estimate of variance shared by the respective indicators (Hair et al., 2014). AVE value greater than 0.5 specifies that the latent constructs can describe more than half of its indicators on average (Hair, Ringle, & Sarstedt, 2011; Henseler et al., 2009).

Discriminant validity was obtained by evaluating the correlation between the latent variables along with the square root of AVE (Fornell & Larcker, 1981). Agreeing to this criterion, the squared root of the AVE is calculated which should be greater than each of the construct correlations (Hair et al., 2014). Table 2 below shows all the square root of the AVE values is larger than other correlations values among the latent variable, indicating well-established discriminant validity. It is concluded from the findings that the data set satisfactorily met the basic assumptions of measurement model.

**Table 1:** Results Summary for Reliability and Validity of Constructs

Construct	Scale Type	Item	Loadings	AVE	CR
Aggressive Driving Behavior	Reflective	behavior10	0.723	0.57	0.957
		behavior11	0.746		
		behavior13	0.787		
		behavior14	0.776		
		behavior15	0.764		
		behavior16	0.702		
		behavior17	0.662		
		behavior18	0.814		
		behavior19	0.804		
		behavior2	0.709		
		behavior20	0.812		
		behavior3	0.75		
		behavior4	0.749		
		behavior5	0.725		
		behavior6	0.782		
		behavior7	0.721		
behavior8	0.79				

Construct	Scale Type	Item	Loadings	AVE	CR
Behavior Pattern	Reflective	behavior_pattern2	0.705	0.542	0.78
		behavior_pattern8	0.787		
		behavior_pattern3	0.713		
Driving Anger	Reflective	anger10	0.707	0.523	0.923
		anger11	0.787		
		anger12	0.781		
		anger13	0.789		
		anger14	0.768		
		anger15	0.717		
		anger16	0.76		
		anger17	0.73		
		anger18	0.658		
		anger19	0.626		
		anger7	0.601		
Situational Factors	Reflective	situation2	0.795	0.537	0.776
		situation4	0.722		
		situation7	0.678		

Support for Counter Measures	Reflective	support1	0.731	0.517	0.865
		support4	0.72		
		support5	0.669		
		support6	0.668		
		support8	0.742		
		support9	0.779		

*Note: AVE (Average Variance Extracted) = (summation of the square of the factor loadings)/ {(summation of the square of the factor loadings) + (summation of the error variances)}; Composite Reliability (CR) = (square of the summation of the factor loadings)/ {(summation of the square of the factor loadings) + (summation of the square of the error variances)}.*

**Table 2:** Fornell-Larcker Criterion Analysis for Checking Discriminant Validity

	<b>AD Behavior</b>	<b>Behavioral Pattern</b>	<b>Driving Anger</b>	<b>Situational Factors</b>	<b>Support Counter</b>
<b>AD Behavior</b>	<b>0.755</b>				
<b>Behavior Pattern</b>	0.395	<b>0.736</b>			
<b>Driving Anger</b>	0.372	0.397	<b>0.723</b>		
<b>Situational Factors</b>	0.467	0.324	0.201	<b>0.733</b>	
<b>Support Counter</b>	-0.117	0.143	0.198	-0.141	<b>0.719</b>

*Note: Diagonals (in bold) represent the square root of AVE while the other entries represent the correlation. AD Behavior – Aggressive Driving Behavior; Support Counter – Support for Counter Measures*

### **Assessment of Structural Model**

Once the validity of the measurement model was established, the next step was to test the hypotheses relationships among the variables. The first step then was to analyze the model fit by determination of R<sup>2</sup> values, (coefficient of determination), and Stone-Geisser's predictive relevance (Q<sup>2</sup>). R<sup>2</sup> explains the percentage of variance explained by independent variables on the dependent variable, and Q<sup>2</sup> explains the overall predictive power of the research model. It is suggested that to make a meaningful interpretation, the value of R<sup>2</sup> should be at least 10 per cent that demonstrated substantive explanatory power, which is 0.347 and Q<sup>2</sup> explains predictive relevance of the endogenous variable considering Q<sup>2</sup> values larger than 0, which is 0.196 assessed by Stone-Geisser's predictive relevance using by blindfolding procedure.

The next step was to test the hypotheses by producing the path coefficients, as shown in Figure 2 below. Table 3 below specifies the result of testing the direct hypotheses formulated in this study. The results from the output of the algorithm and bootstrapping PLS-SEM confirmed that behavioral pattern ( $\beta = 0.210$ ,  $t = 4.678$ ,  $p < 0.01$ ); driving anger ( $\beta = 0.252$ ,  $t = 5.404$ ,  $p < 0.01$ ); and situational factors ( $\beta = 0.327$ ,  $t = 7.273$ ,  $p < 0.01$ ); have a positive significant relationship with aggressive driving behavior, whereas support for counter measures ( $\beta = -0.150$ ,  $t = 3.387$ ,  $p < 0.01$ ) has a negative relationship with aggressive driving behavior.

The results also confirmed that there is a positive significant association between driving anger ( $\beta = 0.187$ ,  $t = 2.818$ ,  $p < 0.01$ ) and negative significant relationship between situational factors ( $\beta = -0.224$ ,  $t = 3.929$ ,  $p < 0.01$ ) and support for counter measures, whereas behavioral pattern and support for counter measures had insignificant relationship ( $\beta = 0.141$ ,  $t = 1.885$ ,  $p < 0.05$ ) as shown in Table 3. Therefore, only one of seven direct hypotheses, was not supported.

**Table 3:** Direct Relationship between Independent Variable, Support for Counter Measures and Aggressive Driving Behavior

Hypotheses	Relationship	Beta	SE	t-value	Decision
H1	<b>Behavioral Pattern -&gt; AD Behavior</b>	0.210	0.045	4.678**	Supported
H2	<b>Driving Anger -&gt; AD Behavior</b>	0.252	0.047	5.404**	Supported
H3	<b>Situational Factors -&gt; AD Behavior</b>	0.327	0.045	7.273**	Supported
H4	<b>Support Counter -&gt; AD Behavior</b>	-0.150	0.044	3.387**	Supported
H5	<b>Behavioral Pattern -&gt; Support Counter</b>	0.141	0.075	1.885	Not Supported
H6	<b>Driving Anger -&gt; Support Counter</b>	0.187	0.066	2.818**	Supported
H7	<b>Situational Factors -&gt; Support Counter</b>	-0.224	0.057	3.929**	Supported

Note \* $p < 0.05$  ( $t = 1.96$ ); \*\* $P < 0.01$  ( $t = 2.58$ )

To examine the effect of mediating, the significance of the relationship between variables must be assessed. Table 4 below displays three hypotheses proposed, only two hypotheses met the requirement to establish the effect of mediation due to their significant indirect effects. The result revealed that there is a significant mediating effect of support for counter

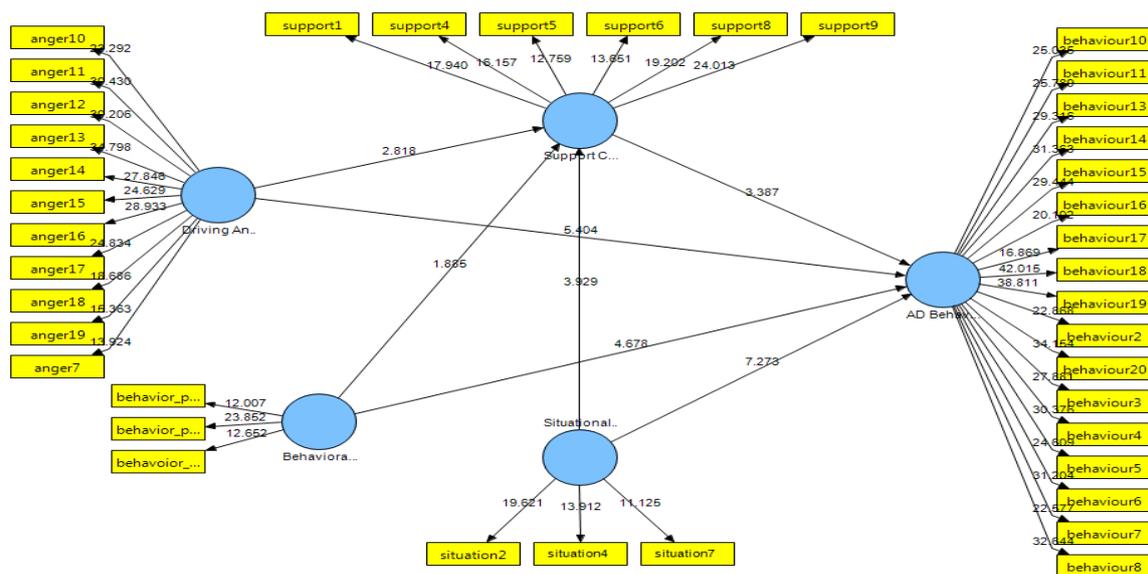
measures in the relationship between driving anger ( $\beta = -0.028$ ,  $t = -2.093$ ,  $p < 0.05$ , 95% Boot CI: LL = -0.054, UL = -0.002) and aggressive driving behavior as well as between situational factors and aggressive driving behavior ( $\beta = 0.034$ ,  $t = 2.719$ ,  $p < 0.01$ , 95% Boot CI: LL = 0.009, UL = 0.058). Thus, hypothesis 9 and 10 was supported whereas hypothesis 8 was found to be no mediation effect of support for counter measures in the relationship between the behavioral pattern and aggressive driving behavior ( $\beta = -0.021$ ,  $t = -1.599$ ,  $p < 0.05$ ), as shown in Table 4.

**Table 4:** Summary of Mediation Results

Hypotheses	Indirect Effect	SE	t-value	Bootstrapped Confidence Interval (Boot CI)		Decision
				95% LL	95% UL	
H8 (BP->SC->AD)	-0.021	0.013	-1.599	-0.047	0.005	Not Supported
H9 (DA->SC->AD)	-0.028	0.013	-2.093*	-0.054	-0.002	Supported
H10 (SF->SC->AD)	0.034	0.012	2.719**	0.009	0.058	Supported

Note: \* $p < 0.05$  ( $t = 1.96$ ); \*\* $P < 0.01$  ( $t = 2.58$ ); AD – Aggressive Driving Behavior; SC – Support for Counter Measures; DA - Driving Anger; SF - Situational Factors; BP - Behavioral Pattern

**Figure 2.** Direct Path Coefficient of the Structural Model (Bootstrapping).





## Discussion and Conclusion

This study found that there is a positive connection between behavior pattern and aggressive driving behavior. A way of acting by an individual toward a given object or in a given situation has been referred to in this article as a behavior pattern (Hermann et al., 2004), or as defined by Montag & Comrey (1987) as the locus of control. Larson & Merritt (1991) suggested cognitive failures while Zuckerman (1979) placed emphasis on looking for sensation. Nevertheless, it is suspected that Type-A behavior patterns have historically been related to dangerous driving behavior and are a significant factor in many road accidents. The study found a positive connection between rage or anger in driving and aggressive driving behavior. A study conducted by Lawton and Nutter (2002) further indicated that personality types with higher rage or anger would possibly be aggressive in driving in contrast to other drivers in the same situations which is also consistent with Iversen and Rundmo's (2002) findings.

This study found a positive connection between situational factors and aggressive driving behavior. Ecological and situational factors will influence behavior in aggressive involvement. Driver aggressive behavior can be caused by a combination of a traffic jam and the pressures of the urgency time (Shinar & Compton, 2004). This study further found a negative relationship between support for counter measures and aggressive driving behaviour and this finding is coherent with earlier studies. Nearly all law enforcement authorities verified that the behavior of the driver at the scene did not affect the offense with which they were charged, nevertheless the behavior of the driver at the scene played an important aspect in the charging decision by prosecutors. Generally, law enforcement authorities do not believe in the need for changes in the law or existing penalty as it would necessitate more tickets being issued for aggressive offences in driving (Keith, 2003). Wilde (1971) reported that the attempts to influence driver's attitudes in reducing crash rates through publicity campaigns have failed. This was also supported by Henderson (1971) who stated that society maintains a basic faith in the power of education in influencing mankind's behavior. Henderson (1971) argues that society should endorse the enforcement to have effective counter measures. Nevertheless, it is confirmed that there are certain driver types that will still misbehave even though there are enforcement programs, more warnings and the threat of tougher sentences.

This study showed an insignificant relationship between behavior pattern and support for counter measures. Nevertheless, results showed a positive significant relationship between driving rage or anger and support for counter measures while a negative significant result was found for the relationship between situational factors and support for counter measures. This



study is coherent with Phillips, Ulleberg and Vaa (2011) research on “meta-analysis of the effect of road safety campaigns on accidents”.

Further, this study found no mediation effect of support for counter measures in the relationship between behavioral pattern and aggressive driving behavior. Nevertheless, the result also disclosed a mediation effect of support for counter measures in regard of the relationship between driving anger and aggressive driving behavior. It was also found that there is a significant mediating effect of support for counter measures in regard to the relationship between situational factors and aggressive driving behavior. This result is coherent with Wark, Lucke, and Raub (2002), who found from previous studies that situational factors like jammed highways, noisy roadways and hot temperatures lead to aggressive driving.

Future research in driving aggression is suggested to compare factors across occupations such as taxi, lorry or bus drivers rather than individual driver who are rushing to work. Future research is also needed to identify more factors that have a relationship with aggressive driving behavior, such driving attitudes, styles and habits as potential variables for aggressive driving.

Two recommendations are made to reduce aggressive driving and tackle the issues outlined in this article: firstly a public education program that includes promotion of the use of public transportation, a solution to aggressive driving in response to traffic jams and bad weather and secondly, government provision of anger management counselling to reduce situational factors and promote the Graduated Driver Licensing (GDL) to tackle the issue.

## REFERENCES

- AAA Foundation for Traffic Safety (2008, July 10). *2008 Traffic safety culture index*. Washington, DC. Retrieved from <http://www.aaafoundation.org/pdf/2008TSCIndexFinalReport.pdf>
- AAA Foundation for Traffic Safety (2009, August 10). *Aggressive driving: Research update*. Retrieved from <http://www.aaafoundation.org/pdf/AggressiveDrivingResearchUpdate2009.pdf>
- Ali, A. (2013). How to Differentiate between ‘Leadership’ and ‘Management’ Function in Organization: A Review of Scholarly Thoughts. *International Journal of Economics Business and Management Studies*, 2(1), 38-44.



- Ali, H. E. (2017). Phase Transfer Synthesis of Novel Based Surfactants: Role of Biocorrosion Inhibition. *Global Journal of Social Sciences Studies*, 3(1), 43-55.
- Bandura, A. (1983), *Psychological Mechanisms of Aggression*, In R. G. Geen and E. Donnerstein (Eds.), *Aggression: Theoretical and empirical reviews* (pp. 1-40), New York: Academic Press.
- Bakou, V., Chliaoutakis, J. E., Darviri, C., Demakakos, P., Koumaki, M., & Tzamalouka, G. (2002). Aggressive behavior while driving as a predictor of self-reported car crashes. *Journal of Safety Research*, 33, 431-443.
- Baron, R.A., & Richardson, D.R. (1994). *Human aggression* (2nd ed.). New York: Plenum Press
- Berkowitz, L. (1989). Frustration-aggression hypothesis: Examination and reformulation. *Psychological Bulletin*, 106, 59-73.
- Berkowitz, L. (1990). On the formation and regulation of anger and aggression: A cognitive-neoassociationistic analysis. *American Psychologist*, 45, 494-503.
- Berkowitz, L. (1993). *Aggression: Its causes, consequences, and control*. New York: McGraw-Hill.
- Bjornskau, T. (1994). Why are the 'safest' norms, attitudes and types of behavior not typical for the safest drivers? *Transport Reviews*, 2, 169-181.
- Brown, I. D. (2005, November 25). *Road safety research report no. 60: Review of the 'looked but failed to see' accident causation factor*. Retrieved from [http://www.dft.gov.uk/pgr/roadsafety/research/rsrr/theme2/coll\\_reviewofthelookedbutfailedtoewofthelookedbutfailedto4755.pdf](http://www.dft.gov.uk/pgr/roadsafety/research/rsrr/theme2/coll_reviewofthelookedbutfailedtoewofthelookedbutfailedto4755.pdf)
- Dawson, B. & Trapp, R. G. (2004). *Basic & Clinical Biostatistics* (4<sup>th</sup> ed.). Lange Medical Books/McGraw-Hill, New York
- Deffenbacher, J. L. (2001). Driving anger: Correlates of a test of state trait theory. *Personality and Individual Difference*, 31, 1321-1331.
- Deffenbacher, J. L. (2003). Anger, aggression and risky behavior: A comparison of high and low anger drivers. *Behavior Research and Therapy*, 41, 701-708.



- Deffenbacher, J. L., Huff, M. E., Lynch, R. S., Oetting, E. R., & Salvatore, N. F. (2000). Characteristics and treatment of high anger drivers. *Journal of Counseling Psychology*, 47,5-17. doi:10.1037/0022-0167.47.1.5.
- Deffenbacher, J. L., Lynch, R. S., Oetting, E. R., & Yingling, D.M. (2001). Further evidence of reliability and validity for the driving anger expression inventory. *Psychological Reports*, 89,535-540.
- Deffenbacher, J. L., Oetting, E. R., & Lynch, R. S. (1994). Development of a driving anger scale. *Psychological Reports*, 74,83-91. doi:10.2466/pr0.1994.74.1.83.
- Fornell, C., & Larcker, D. F. (1981). *Evaluating Structural Equation Models with Unobservable Variables and Measurement Error*. *Journal of Marketing Research* (18:1), pp. 39-50.
- Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2014). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Sage Publications, Inc.
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a Silver Bullet. *Journal of Marketing Theory and Practice* 19 (2): 139-151.
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2013). Editorial-partial least squares structural equation modeling: Rigorous applications, better results and higher acceptance. *Long Range Planning*, 46(1-2), 1-12.
- Harry, L., & Jerry, A., Reagan. (1995). Interactive highway safety design model: Accident predictive module. *Public Roads Magazine*.
- Henderson, M. (1971). *Human factors in traffic safety: A reDDraisal [Report NO. 1/71]*. Roseberry, New South Wales: Traffic Accident Research Unit, Department of Motor Transport.
- Hennessy, D. A., & Wiesenthal, D. L. (2001). Gender, driver aggression, and driver violence: An applied evaluation. *Sex Roles*, 44, 661 – 676.
- Henseler, J., Ringle, C., & Sinkovics, R. (2009). The use of partial least squares path modeling in international marketing. in: Sinkovics, R. R. / Ghauri, P. N. (eds.), *Advances in International Marketing*, 20, 277–320.



- Hermann, N., Silla, M.C., Jean-Francois, C., Mireille, C., Sylviane, L., & Emmanuel, L. (2004). Type a behavior pattern, risky driving behaviors, and serious road traffic accidents: A prospective study of the GAZEL cohort. *American Journal of Epidemiology*, 161(9). doi: 10.1093/aje/kwi110.
- Iversen, H., & Rundmo, T. (2002). Personality, risky driving and accident involvement among Norwegian drivers. *Personality and Individual Differences*, 33(8), 1251-1263. [http://dx.doi.org/10.1016/S0191-8869\(02\)00010-7](http://dx.doi.org/10.1016/S0191-8869(02)00010-7)
- Jermisittiparsert, K., Siam, M., Issa, M., Ahmed, U., & Pahi, M. 2019. "Do Consumers Expect Companies to Be Socially Responsible? The Impact of Corporate Social Responsibility on Buying Behavior." *Uncertain Supply Chain Management* 7 (4): 741-752.
- Keith, A. L. (2003). *The status of court-based aggressive driving programs in Virginia: A report to the Virginia Department of Motor Vehicles* (co-authored with Victor E. Flango and Donald Cullen). Williamsburg, V.A: The National Center for State Courts.
- Kumar, A. (1985). Attitude organization and the attitude-behavior relation: A critique of Bagozzi and Bumkrant's reanalysis of Fishbein and Ajzen. *Journal of Personality and Social Psychology*, 49, 33-46.
- Lajunen, T., Parker, D., & Stradling, S. G. (1998). Dimensions of driver anger, aggressive and highway code violations and their mediation by safety orientation in UK drivers. *Transportation Research Part F*, 1, 107-121.
- Lajunen, T., & Parker, D. (2001). Are aggressive people aggressive drivers? A study of the relationship between self-reported general aggressiveness, driver anger and aggressive driving. *Accident Analysis and Prevention*, 33, 243–255.
- Larson, G.E., & Merritt, C.R. (1991). Can accidents be predicted: An empirical test of the cognitive failures questionnaire? *Applied Psychology*, 40, 37–45.
- Lawton, R., & Nutter, A. (2002). A comparison of reported levels and expression of anger in everyday and driving situations. *The British Journal of Psychology*, 93(3), 40- 423.
- Madrid, D., Ahmed, U., & Kumar, R. (2019). EXAMINING THE IMPACT OF CLASSROOM ENVIRONMENT ON ENTREPRENEURSHIP EDUCATION: CASE



OF A PRIVATE UNIVERSITY IN BAHRAIN. *Journal of Entrepreneurship Education*, 22(1), 1-8.

Mesken, J., Hagenzieker, M. P., & Rothengatter, J. A. (2003, December). Personal versus situational factors in the elicitation of anger. *Paper presented at the ECTRI-FERSI Young Researchers Seminar*. Bron, France.

Mizell, L. (1997). *Aggressive driving*. In: *AAA foundation for traffic safety, aggressive driving: Three studies*. Washington, D.C. Retrieved from <http://www.aaafoundation.org/resources/index.cfm?button=agdrtext>

Montag, I., & Comrey, A.L. (1987). Internality and externality as correlates of involvement in fatal driving accidents. *Journal of Applied Psychology*, 72, 339-43.

O'Brien, J. (2011). *Citizenship & person-centred work*. Toronto: Inclusion Press.

Phillips, R. O., Ulleberg, P., & Vaa, T. (2011, May). Meta-analysis of the effect of road safety campaigns on accidents. *Accident Analysis & Prevention*, 43 (3), 1204 – 1218.

Shinar, D. (1998). Aggressive driving: The contribution of the drivers and the situation. *Transportation Research Part F*, 1(2), 137-160. doi: 10.1016/S1369-8478(99)00002-9.

Shinar, D., & Compton, R. (2004). Aggressive driving: An observational study of driver, vehicle, and situational variables. *Accident Analysis and Prevention*, 36, 429-437.

Sukhai, A., Seedat, M., Jordaan, E. & Noah, M. (n.d.). *Aggressive road behaviors in South Africa*. Retrieved from <http://www.mrc.ac.za/policybriefs/roadrage.pdf>

Ulleberg, P. (2004). *Aggressive driving – a literature review*. Oslo, Norway: Institute of Transport Economics.

Wark, R. I., Lucke, R. E., & Raub, R. A. (2002, June). *Toward developing strategies to control aggressive driving: An introduction*. Retrieved from <http://safety.transportation.org/htmlguides/AggDrvr/app06.htm>

Wilde, G.J.S. (1971). *Verbal ratings of estimated danger by drivers and passengers as a function of driving experience*. Report prepared for the road and motor vehicle traffic safety division. Ottawa, Canada: Ministry of Transport.



Wong, K. K. (2013). Partial Least Squares Structural Equation Modeling (PLS-SEM) Techniques Using SmartPLS. *Marketing Bulletin*, 24, Technical Note 1, 1-32.

Zuckerman, M. (1979). *Sensation seeking: Beyond the optimal level of arousal*. Hillsdale, NJ: Lawrence Erlbau.