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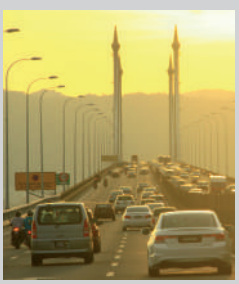

Research Report

Riding Anger in Relation to Experiencing of Road Crashes among Motorcyclists

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Abstract

In Malaysia, more than 60% of the fatalities involving road crashes were motorcyclists. It is believed that riding anger to be significantly related to road crashes such as near misses, loss of concentration, tailgating and losing control of the vehicle. The main objective is to explore riding anger in relation to experiencing of road crashes among motorcyclists. The research is conducted using a semi-quantitative approach to measure the riding anger of motorcyclists while riding on the road. In total, 407 respondents participated in this study. The result showed unsafe driving or riding situation were the most commonly reported with riding anger (M=4.36). It means that respondents were most annoyed and irritated while facing these situations. Illegal driving or riding (M=4.29) and inconsiderate (M=4.11) were the next most common types of situation. This was followed by road condition and design (M=3.77), traffic obstruction (M=3.76), rudeness (M=3.72), slow driving or crossing (M=3.32) and rainy condition (M=3.10). Enforcer presence was the lowest score to be anger among riders with the average mean 2.78. Besides that, the finding showed only two (2) subscales appear to be significant with crash involvement which unsafe driving/crossing and rainy condition.

1. Introduction

In Malaysia, motorcyclists have been known to record the highest fatality rate in road accidents every year. According to the Royal Malaysia Police (2015), a total of 6,706 people died in road accidents compared to 6,674 deaths the year before. Around 62.6% of the deaths involved motorcyclists in the year 2015. According to Krystek and Kastner (2004), road transport is the most dangerous form of travel. Travel by car has a 20 times higher risk of death compared to travelling by plane or train, and motorcycling increases the risk of death by 395 times.

Anger is an emotional state that may range in intensity from mild irritation to intense fury and rage. Anger has physical effect including raising the heart rate and blood pressure and the levels of adrenaline and noradrenaline (Clausen, 2007). Research found anger to be significantly related to crash, such as: near misses, loss of concentration, tailgating and losing control of vehicle (Sullman, Gras, Cunill, Planes & Font-Mayolas, 2007; Underwood, Chapman, Wright & Crundall, 1999).

Very few research has been done on riding anger among motorcyclists compare to driving anger either in Malaysia or overseas. Research by the AAA Foundation for Traffic Safety (1997) shows that driving anger has been identified as a predictor of traffic crashes. Studied conducted by Mesken, Hagenzieker, Rothengatter and De Waard (2007) found that anger has a strong relationship with excessive speeds. Besides that, anger has also been found to have a relationship with near crashes (Underwood, Chapman, Wright, & Crundall, 1999).

Many research has established that personality traits such as anger is associated with driver aggression (Bone & Mowen, 2006; Hennesy, Wiesenthal & Kohn, 2000; Krahe, 2005). Research done by Haque, Chin and Lim (2010) shows that motorcyclists who have been involved in crash score higher in aggressiveness and high risk taking. Aggressive riding indices had significantly higher scores on thrill seeking, greater intentions to

engage in future risk taking, and lower safety attitude scores (Rowden, Watson, Haworth, Lennon, Shaw & Blackman, 2016).

The purpose of this research is to establish the level of riding anger among motorcyclists in Malaysia. Furthermore, the research aims to find out whether riding anger is correlated to the experiencing of road crashes among motorcyclists.

1.1 Objectives

This study is aimed to explore riding anger in relation to experiencing of road crashes among motorcyclists which can be achieved by the following objectives:

i. To determine riding anger level among riders in Klang Valley
ii. To examine the relationship between riding anger and experiencing of road crashes among motorcyclists.

1.2 Scope of the Study

The scope of this study is to determine riding anger in relation to experiencing of road crashes among motorcyclists in Klang Valley.

1.3 Limitation of the Study

A limitation of this study is that the findings are based on a self-reported survey instead of an actual on-road observation among motorcyclists to provoke anger while riding. Therefore, it is unknown as to the extent to which this respective self-reported behaviour corresponds to actual riding behaviour.

2. Literature Review

Despite the extensive literature have been devoted to improve motorcycle safety, only a few studies attempt to correlate riding behaviour with crash risk. Consistent with the literature in the driving aggression area (Rowden, Watson, Haworth, Lennon, Shaw & Blackman, 2016; Rotton, Gregory & Van Rooy, 2009; Van Rooy, Rotton & Burns, 2006; Deffenbacher, Oetting & Lynch, 1994), there is evidence that general tendency to aggression is associated with aggressive riding behaviours and with crash risk.

According to Deffenbacher, Oetting and Lynch (1994) study on the development of a driving anger scale, six (6) reliable subscales involving hostile gestures, illegal driving, police presence, slow driving, discourtesy, and traffic obstructions were all correlated positively, suggesting a general dimension of driving anger as well as anger related to specific driving-related situations. Men were more angered by police presence and slow driving whereas women were more angered by illegal behaviour and traffic obstructions, but differences compensated so there were no gender differences on total score. In conclusion, driving anger may have potential value for research on accident prevention and health psychology.

Haque, Chin and Lim (2010) indicate that two (2) behavioural factors, namely aggression and risk-taking as significant contributors to the crash involvement of Singaporean motorcyclists. Impulsive sensation-seeking behaviour has been found to have no significant association with the vulnerability of motorcyclists. However, the impulsive sensation is strongly associated with aggression and risk-taking behaviours.

Results from a study by Rowden, Watson, Haworth, Lennon, Shaw and Blackman (2016) found that the scores for the composite driving aggression scale were significantly higher than on the composite riding aggression scale. Participants who scored at the 85th percentile or above for the aggressive driving and aggressive riding indices had significantly higher scores on thrill-seeking, greater intentions to engage in future risk-

taking, and lower safety attitude scores than other participants. In addition, participants with the highest aggressive driving scores also had higher levels of self-reported past traffic offences than other participants. This study examined differences in self-reported aggression as a function of two (2) vehicle types: passenger cars and motorcycles.

Based on Von Below (2013), the study was to gain more detailed information about 1,000 German motorcyclists' and to investigate psychological aspects associated with the risk of accidents. The research found that within the previous three years, about 10% of the sample has been involved in at least one motorcycle accident. Between the age groups, there are significant differences in the accident rate. The highest accident rate was found for young adults between 18 and 24 years (16.9%). A cluster analysis based on personality traits revealed five (5) subgroups within the whole sample which include a) altruism; b) anxiety; c) hostility; d) excitement seeking, and e) normlessness. One of these clusters has by far the highest accident risk for this personality type (characterised by young person's scoring high on excitement seeking, hostility and normlessness, and low on altruism) the accident involvement rate is 23%.

Results from study by Wong, Chung and Huang (2010) conclude three primary personality traits of 683 young motorcyclists aged between 18 and 28, namely sensation seeking, amiability and impatience. While amiable riders represent a group of relatively mature and safe riders, the sensation-seeking riders are extremely self-confident, comfortable with unsafe riding and interested in the utility gained from it. The sensation-seeking ones also are highly aware of traffic conditions, which may lower the chances of getting into an accident, but the accident could be extremely severe if it ever occurs. Impatient riders, having low riding confidence and traffic awareness deficiency, also seek utility from certain risky riding behaviours.

3. Methodology

In this section, the method to examine the riding anger level among riders in Klang Valley was described in detail. It consists of several elements including the research design and sampling, instrument, procedure and data analysis.

3.1 Research Design and Sampling

This research is conducted using a semi-quantitative approach based on a self-reported questionnaire. The semi-quantitative was carried out by a survey to collect data among motorcyclists to provoke anger while riding. The target population for this study comprised road users who own a valid riding licence.

3.2 Instrument

In this study, the questionnaire has been adapted and adopted from Driving Anger Scale (DAS; Deffenbacher et al., 1994) to measure the self-reported frequency of riding anger. Participants were asked to rate how angry they would become if they came across various situations likely to provoke anger while riding. Rating rate is made upon a five-point scale (1 = not angry, 5 = very angry).

Through the questionnaire, 60 situations were grouped under into the nine (9) subscales, namely: traffic obstruction. Road condition and design, illegal driving, unsafe driving/crossing, discourtesy, hostile gestures, slow driving/riding/crossing, rainy condition and police/enforcers presence. The reliability test was done on 31 participants during the pilot test for Malaysian studies and the result found that overall riding anger reliability value α=0.933. For each construct reliability result as below:

No.	Construct	α value
1	Traffic obstruction	0.778
2	Road condition and design	0.856
3	Illegal driving/riding	0.807
4	Unsafe driving/crossing	0.551
5	Inconsiderate	0.922
6	Rudeness	0.919
7	Slow driving/crossing	0.875
8	Rainy condition	0.814
9	Enforcer presence	0.918

3.3 Procedure

Questionnaires were collected on an individual basis from eight (8) different companies including private sectors and government sectors; namely PERODUA, TOYOTA, MARDI, MPOB, MPKJ, DBKL, Lembaga Kemajuan Ikan Malaysia and Pejabat RELA Putrajaya. In total, 407 motorcyclists in Klang Valley were involved in this study.

3.4 Data Analysis

Data collected from this research has been analyzed using the Statistical Package for Social Science (SPSS). Descriptive statistics such as mean, percentage, Standard Deviation will be used while inferential statistics such as correlation Pearson will be used to achieve the objectives of the research.

4. Results and Discussion

Results of this study were presented in three (3) parts: demographics, riding anger level among riders and relationship between riding anger and experiencing of road crashes among motorcyclists.

4.1 Demographics

Information related to demographics was obtained from Part A in the questionnaire. 407 participants were recruited from eight (8) local agencies in Klang Valley. All of the participants were aged between 19 and 59 with mean age of 35 years old. Majority of them were males (86.5%) and worked in the private sector (69.8%). Most of them have tertiary education background (51.1%) and experienced rider (more than 10 years; 69.8%). Table 1 summarised the participant's demographic information.

Table 1 Respondents' demographic

Item	n	%	Item	n	%
Gender			**Age group**		
Male	352	86.5	Below 21 years	8	2.0
Female	55	13.5	21 – 30 years	133	32.7
Work sector			31 – 40 years	173	42.5
Government	123	30.2	41 – 50 years	54	13.3
Private	284	69.8	51 years & above	39	9.6
Education level			**Marital status**		
Primary	6	1.5	Single	116	28.5
Secondary	193	47.4	Married	282	69.3
Tertiary	208	51.1	Divorcee/Widow	9	2.2

Capacity engine				Riding experience		
Below 250 cc	388	95.3		5 years & below	43	10.6
Not more than 500 cc	7	1.7		6 – 10 years	80	19.7
More than 500 cc	12	2.9		11 – 20 years	192	47.2
				21 years & above	92	22.6

4.2 Riding Anger Level among Riders in Klang Valley

The mean score for nine (9) construct was displayed in Table 2. Unsafe driving or crossing situation were the most commonly reported with riding anger. The mean score for this was 4.35 suggesting that respondents were most annoyed in this situation. Tasca (2000) in his review of literature on aggressive driving cited a survey by the Steel Alliance-Canada Safety Council. The survey asked the drivers' views on speeding within the context of aggressive driving, and the results found that 30% of the respondents indicated that changing lanes without signalling is a form of aggressive behaviour.

Illegal driving or riding (mean=4.29) such as "someone uses mobile phone while driving or riding" was the next most common types of situation. However, a study on the effect of mobile phone use and aggression on speed selection by young drivers by using a driving simulator found that there was no significant interaction effect between driving anger expression and mobile phone use while driving (Gauld, Lewis, Haque & Washington, 2014). This were followed by inconsiderate (mean=4.11), road condition and design (mean=3.77), traffic obstruction (mean=3.75), rudeness (mean=7.72), slow driving or crossing (mean=3.33) and rainy condition (mean=3.10). Enforcer presence was the lowest score to be anger among riders with a mean of 2.78.

The mod of the 60 situations riding the anger scale was presented in Table 2. The highest scoring items overall were from illegal driving or riding subscale. The top three (3) were: "someone is driving or riding in opposite traffic", "someone cuts thru traffic jam by using emergency lane or shoulder" and "someone makes an illegal U-turn". Meanwhile, the top three (3) items for unsafe driving or crossing were: "someone suddenly changing lane without signal", "driver makes a turn without signal" and "vehicle in front of you

suddenly stopped". The scores on these between 4 to 5 suggesting these behaviours are highly associated with motorcyclists' anger.

According to the nationwide survey conducted by the Steel Alliance-Canada Safety Council and reviewed by Tasca (2000), 87% of the respondents indicated that passing on the shoulder of the road is an aggressive form of driving. The scores on these between 3.74 to 4.68 suggesting these behaviours are highly associated with anger. For inconsiderate subscale, the top three items were: item "Someone drives on the opposite road using high beam headlight at night", item "other vehicle did not let you pass even after signal has been given" and item "someone overtakes in front of you in a dangerous way". The scores on these between 4 to 5 suggesting these behaviours are highly associated with anger.

In further agreement with previous research (Sullman & Stephens, 2013), where item responses are replaced by weighted mean response values ranging from 1 (representing mild responses) to 7 (severe aggressive responses). The top three (3) were: a reversing car forcing the driver to make an emergency brake, "You are driving your car down a two-lane road. Without warning, another car pulls out in front of you from a car park". You had to brake suddenly to avoid hitting it" (M = 2.65); and a car merging in front of the driver during congestion "You are driving your vehicle in a traffic jam in the far left-hand lane. Out of nowhere, a car comes up from behind on the shoulder and attempts to squeeze in front of you" (M = 2.45), or in a parking lot "You are in a full parking lot. You see a driver leaving and you put on your indicator to signal you intend to take the parking space. As the other driver pulls out, a second driver cuts in front of you from the other side and takes the parking space" (M = 2.40).

Next, the top three (3) items for road condition and design subscale were "Drain/sewage without cap near motorcycle lane or shoulder", "Blocked view by branch/bushes at motorcycle lane/shoulder" and "Hit on hole or puddle on road". The scores on these between 4 to 5 suggesting these behaviours are highly associated with anger. As for the traffic obstruction, the top three (3) items were: "Vehicle stopped at emergency lane or shoulder without distress-signal", "Others were squeezed to you as there was road

construction in front" and "A group of cyclists is in front of you". The scores on these between 3 to 5 suggesting these behaviours are highly associated with anger.

For rudeness subscale, the top three (3) items were item "someone makes an obscene gesture towards you", "Someone yells at you" and "Someone honks at you". The scores on these between 4 to suggesting these behaviours are highly associated with anger.

In slow driving or crossing subscale, the top three (3) were: item "Someone drives too slow from the traffic", item "Someone takes so much time to park their vehicle" and item "Vehicle in front takes time to move once the traffic light turns green". The scores on these between 3 to 4 suggesting these behaviours are highly associated with anger.

As for rainy condition, the top three (3) were: item "No suitable stop during rain for motorcyclist", item "Trapped in traffic congestion during rainy days" and item "Have to stop at traffic light during rain". The scores on these were three (3) suggesting these behaviours are highly associated with anger.

The item means in enforcer presence display the low scoring items. Among this item, the top three were: item "enforcement officer pulls you over", item "enforcement officer is watching traffic from a hidden position" and item "Enforcement officer is driving next to you". The scores on these between three (3) suggesting these behaviours are m associated with anger.

Overall, there were no items that scored below 2 and thus, most of the situation will lead to anger among riders.

Table 2 Riding anger scale means and standard deviations

Overall construct (α=0.966, mean=3.76)		
Traffic obstruction (α=0.834, mean=3.75)	**Mod**	**%**
A rock was flung from other vehicle	3	30.2
Riding behind a vehicle that emits thick smoke	4	37.3
Riding behind a large truck	4	31.4

Vehicle stopped at emergency lane or shoulder without distress-signal	5	51.8
Vehicle blocked your way during traffic jam	5	39.3
A group of cyclists is in front of you	3	43.5
Others were squeezed to you as there was road construction in front	5	45.2
Falling object from a vehicle in front of you	5	39.3
Hit by scraps of rupture tyre	5	34.2
Animal crossed over in front of you suddenly	3	36.1
Road condition and design (α=0.912, mean=3.77)	**Mod**	**%**
No motorcycle lane or road shoulder provided	3	35.1
Pavement on the road was higher than the ground	4	31.7
Traffic light was disfunction	4	30.7
Crossed over on slippery road	4	31.4
Hit on hole or puddle on road	5	38.3
Misleading signage	4	38.1
Divider or signage was placed too near the motorcycle lane or road shoulder	4	37.1
Crossed over on bumpy roads	4	33.4
Drain/sewage without cap near motorcycle lane or shoulder	5	42.0
Blocked view by branch/bushes at motorcycle lane/shoulder	4	38.8
Crossed over at motorcycle lane or shoulder with sand or blocked by object	4	36.6
Encounter road construction and detour without signage	5	37.1
Illegal driving/riding (α=0.854, mean=4.29)	**Mod**	**%**
Someone runs a red light or stop sign	5	47.4
Someone is driving way over the speed limit	4	37.3
Someone makes an illegal U-turn	5	59.2
Someone is driving or riding in opposite traffic	5	77.4
Someone uses mobile phone while driving or riding	5	54.8
Someone cuts thru traffic jam by using emergency lane or shoulder	5	66.1
Someone overtakes at double line area	5	42.0
Unsafe driving/crossing (α=0.836, mean=4.35)	**Mod**	**%**
Someone is weaving in and out of traffic from your lane	4	38.6

Someone suddenly changing lane without signal	5	66.6
Driver makes a turn without signal	5	68.8
Vehicle in front of you suddenly stopped	5	62.4
Pedestrian crossed over in front of you out of nowhere	5	46.4
Inconsiderate (α=0.895, mean=4.11)	**Mod**	**%**
Someone drives behind you using high beam headlight at night	5	41.5
Someone drives too close behind your motorcycle	4	40.3
Someone drives on the opposite road using high beam headlight at night	5	50.9
Someone speeds when you try to pass them	4	38.8
Someone overtake in front of you in a dangerous way	5	46.2
Spills with water as other vehicle run over a puddle	4	33.2
Heavy vehicle speeds beside your motorcycle	5	44.0
Other vehicle did not let you pass even after signal has been given	5	48.2
Rudeness (α=0.870, mean=3.72)	**Mod**	**%**
Someone makes an obscene gesture towards you	5	60.4
Someone yells at you	5	38.3
Someone honks at you	4	33.4
Someone gives you high light beam	3	30.2
Someone looking angrily at you	4	29.0
Someone plays with the pedal while waiting for the traffic light to turn green	3	30.2
Slow driving/crossing (α=0.838, mean=3.33)	**Mod**	**%**
Someone drives too slow from the traffic	4	33.9
Someone takes so much time to park their vehicle	3	32.4
Pedestrian cross the road too slow	3	29.7
Vehicle in front takes time to move once the traffic light turns green	4	35.1
Rainy condition (α=0.876, mean=3.10)	**Mod**	**%**
No suitable stop during rain for motorcyclist	3	30.5
Have to stop at traffic light during rain	3	28.0
Trapped in traffic congestion during rainy days	3	30.2
Stop at the zebra crossing since the light is red while raining	3	27.8
Enforcer presence (α=0.896, mean=2.78)	**Mod**	**%**
Enforcement officer pulls you over	3	30.2

Enforcement officer is driving next to you	3	29.5
Enforcement officer is watching traffic from a hidden position	3	30.0
Road block conducted by the enforcement officer	3	26.5
Enforcement officer order you to make ways for the VIP	5	26.5

4.3 Relationship between Riding Anger and Experiencing of Road Crashes among Motorcyclists

The relationship between riding anger mean score for the nine (9) subscales were compared between those who had been involved in a road accident over past six (6) months and those who had not (Table 3). Out of nine (9) subscales tested, only two (2) subscales appear to be significant with crash involvement which unsafe driving/crossing and rainy condition. This indicates that respondents who likely to show anger with unsafe driving or riding, those are the one who has crash experience rather than those who did not. Statistics from the Statistical Report Road Accident (Royal Malaysian Police, 2015) showed that 1.55% of the drivers involved in a road crash were because of dangerous driving. However, for rainy condition, those who likely to portray anger in this situation were among those who did not experience crash as compared who have crash experience. According to Wickens et al. (2016), drivers with minor aggression reported that no odds of collision involvement (OR = 0.65, $p < .001$), whereas drivers reported both minor and serious driver aggression had increased odds of collision involvement (OR = 1.78, $p = .03$).

Table 3 Riding anger by crash involvement

	Crash involvement mean (SD)		t	p
	Yes	No		
Traffic obstruction	3.76 (.678)	3.73 (.636)	.412	.681
Road condition and design	3.79 (.737)	3.74 (.747)	.675	.500
Illegal driving/riding	4.30 (.649)	4.25 (.650)	.777	.438
Unsafe driving/crossing	4.40 (.632)	4.24 (.721)	2.24	.026*
Inconsiderate	4.11 (.687)	4.11 (.725)	.029	.997
Rudeness	3.68 (.904)	3.78 (.779)	-1.07	.286

Slow driving/crossing	3.33 (.937)	3.33 (.917)	-.018	.986
Rainy condition	3.03 (1.055)	3.25 (1.022)	-2.022	.044*
Police/enforcers presence	2.80 (1.115)	2.73 (1.097)	.641	.522

**significant at level 0.05*

5. Conclusion and Recommendations

This study measures the riding anger level from questionnaires collected from a sample of motorcyclist in Klang Valley. The riding anger level was presented using the mean score of the rating rate of five-point scale (1 = not angry, 5 = very angry). The questionnaires consist of sixty (60) situations likely to provoke anger while riding motorcycle, which grouped into the nine (9) riding anger subscales.

The top three (3) situations that will lead to riding anger are: *someone suddenly changing lane*, *driver makes a turn without signal*, and *someone cuts thru traffic jam by using emergency lane or shoulder.* Among the nine (9) riding anger subscales, the unsafe driving/crossing subscale has the highest score.

The relationship between the riding anger mean score for the nine subscales and road accident over the past (6) six months were also examined using t-test. The result from the analysis showed that crash involvement was significant with two (2) subscales related to the unsafe driving/crossing and rainy condition.

Findings from this study note that the unsafe driving/crossing not only evoke anger amongst Malaysian motorcyclists, but it also contributes to a significant correlation with their crash involvement. Unsafe driving/crossing such as changing lane, making a turn without signal, make a sudden stop or dash-out crossing are the unexpected situations for the motorcyclist that required an immediate response. Study on how riding anger would have affected motorcyclists' response time is still limited. Thus, further research needs to be undertaken to investigate how riding anger could affect their response time and riding aggressiveness that might lead to an accident.

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Research Report

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