

## The Effect of Supervised Riding on Young Motorcyclists' Riding Behaviour

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**Abstract:** This study was conducted to investigate the effect of informal supervised riding on 204 young novice motorcyclists' riding behaviour through face-to-face interview. Our analysis demonstrated that, there was a significant difference in the normalized scores of the riding behaviour for those receiving informal supervision ( $M=62.176$ ,  $SD=15.943$ ) than those who do not receive supervision ( $M=56.472$ ,  $SD=15.921$ );  $t(202)=2.200$ ,  $p=0.029$ . Young novice motorcyclists who received informal supervised riding generally exhibit safer riding behaviour than those who do not receive supervision. Moreover, our study also showed that supervised riding was only effective in prohibiting 'speed violations' and 'stunts' amongst young novice motorcyclists, whereas 'traffic errors', 'control errors' and 'safety equipment usage' between young novice motorcyclist were not significantly different between the two groups. The results from this study provide useful insights to the policy makers if formal supervised riding would be implemented in Malaysia in the future.

**Keywords:** Supervised Riding; Young Novice Motorcyclists; Motorcycle Rider Behaviour Questionnaire

### 1. INTRODUCTION

Young novice drivers including motorcyclists generally over-represented and experience significantly greater risk in road crashes and injuries than older and more experienced drivers (Elvik, 2010). The main contributory factor to this situation is that they are immature, overconfidence, inattention, more likely to take risks and inexperience in driving (Williams, 2006; Huang and Winston, 2011; Williams et al., 2012) because they are still developing their psychomotor, visual and hazard perception skills associated with driving. In Malaysia, road traffic accident statistics show that 60% of the total road fatalities was contributed by motorcyclists (The Chartered Institution of Highways and Transportation, 2009) and 50% of the victims were young novices (Malaysia Institute of Road Safety Research, 2011). This alarming situation indicated that it is vital to design special interventions targeted to reduce their risks.

Graduated driver licensing (GDL) program has been implemented in many countries, such as the United States, Canada and Australia, in consequence to reduce the crash risk

among young novice drivers and motorcyclists (Langley, et al, 1996; Reeder et al., 1999; Begg and Stephenson, 2003). Under this program, young novices are restricted expressway, night time and unsupervised driving and riding during early stages. Parents play a substantial role in imposing and enforcing driving restrictions on their teens. They are engaged in teaching their teens driving from the beginning and setting rules to restrict their teens' access to vehicles. Previous studies had indicated that strict parental supervision and monitoring is one of the key protective factors against young novice risky driving behaviour (Hartos et al., 2001, Hartos et al., 2002). A growing of literature suggested that a higher parental supervision and monitoring were associated with a lower likelihood of traffic violation conviction and motor vehicle crashes among the young novice drivers (McCartt et al., 2003; Simons-Morton et al., 2006a; Simons-Morton et al., 2006b; Simons-Morton and Quimet, 2006; Brookland and Begg, 2011; Scott-Parker et al., 2012; Taubman-Ben-Ari and Katz-Ben-Ami, 2012).

Due to cultural and licensing policy variation between Malaysia and countries that implemented the supervised driving, it would be useful to investigate the suitability and potential of it. This information would be useful for policy maker if supervised driving would be implemented officially in Malaysia as an action plan to reduce road traffic accidents and injuries among young novices in future. In this study, we conduct questionnaire survey to obtain riding information between two groups of young novice motorcyclists who received and do not receive informal supervised riding<sup>1</sup> after they obtained the probationary driving license<sup>2</sup> in Malaysia. We adopted the Motorcycle Rider Behaviour Questionnaire (MRBQ) developed by Elliot et al. (2007) for measuring the behaviour of young novice motorcyclists. The objectives of this study was twofold, first, to investigate the effect of informal supervised riding on young novice motorcyclists riding behaviour and secondly, to evaluate the category of riding behaviour (i.e. traffic error, speed violations, stunts, safety equipment usage and control errors) that could be improve under supervised riding.

## 2. THE STUDY DESIGN

Traditionally, researchers relate road traffic accidents and injuries with demographic factors (i.e. age and gender) and environmental or situation variables (i.e. road type and exposure). In more recent studies, researcher looks into the behaviours and psychological factors, which also emerged as an important elements that predict the road traffic accidents and injuries. In this study, we adopted the Motorcycle Rider Behaviour Questionnaire (MRBQ) developed by Elliot et al. (2007) to investigate the behaviour between two groups of young novice motorcyclists through self-reported questionnaire survey. Risky riding behaviours among motorcyclists that leads to increase risk on the road could be distinguish into five factors, i.e. traffic errors, speed violations, stunts, safety equipment usage and control errors. This five risk factors were determined to be the main contributory factors to road traffic accidents amongst experienced motorcyclists in the United Kingdom (Elliot et al., 2007) and Turkey (Özkan et al., 2012). A study in Australia by Sakashita et al. (2014) using MRBQ recently revealed that instead of five-factors, only four-factors, i.e. errors, speed violations, stunts and

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<sup>1</sup> Supervised riding generally involves two modes, (a) young novice motorcyclists accompanied by a supervisor on another motorcycle where they still solely in control of the vehicle they ride, (b) young novice motorcyclists accompanied by a pillion supervisor where they require additional skills to fetch a pillion rider.

<sup>2</sup> Young novice motorcyclists in Malaysia is eligible to sit for the probationary driving license test at a minimum age of 16 years old provided the applicant has passed the Highway Code test, attended a 6 hours theory course, taken a riding course of a minimum 6 hours, completed a qualifying test and Road Transport Department driving test. The probationary driving license will last for 2 years before the applicant can apply for a competence driving license. (Road Transport Department Malaysia, 2014)

safety equipment usage that predict the likelihood of a road traffic accidents among young novice motorcyclists. The variation between the European studies and Australia study were related to the cultural and licensing policy variation in those countries (Sakashita et al., 2014).

Errors (traffic errors and control errors) are deficiency related to perceptual, attentional and information processing abilities (i.e. under estimate the speed of an oncoming vehicle when overtaking) that are potentially dangerous for the person who produces them and others. Violations (speed violations and stunt) are deliberate behaviours associated with social and motivational factors (i.e. disregard the speed limit of a motorway) which endanger oneself and others. Failure to use safety equipment (i.e. not wearing a helmet while riding) are behaviour that is unsafe which could cause injuries to oneself and others when road traffic accidents occurred. A growing of literature on behavioural studies (Reason et al., 1990; Lajunen et al., 2004; Özkan et al., 2006; Elliot et al., 2007, Özkan et al., 2012; Sakashita et al., 2014) had demonstrated that self-reported errors, violations and safety equipment usage could be used to predict road traffic accidents and injuries among young novices. However, multiple studies (Reason et al., 1990; Parker et al., 1995) also indicated that errors, violations and safety equipment usage have different psychological origins and consequently demand different mechanism to rectify them. Therefore, the potential of supervised riding in reducing errors, violations, and promotion of safety equipment usage amongst young novice motorcyclists was one of the interest in this study.

### 3. METHODOLOGY

We designed a questionnaire to obtain information such as details about informal supervised riding and riding behaviour amongst young novice motorcyclists. The questionnaire for this study was translated into the Malay languages to take into account of the local language and norms. It was then piloted and reviewed before administration. The data were collected from individuals throughout Malaysia during face-to-face interviews from April to June of 2014. The survey was conducted by the researchers and used a random selection of 250 individuals.

The questionnaire survey consisted of five parts. The first part involved an eligibility screening to determine the eligibility of the respondents to participate in the survey. At the eligibility screening, only respondents who aged between 16-20 years old, having a valid probationary motorcycle licence (B or B2) at least 3 months to not more than 1 year from the date of survey, ride a motorcycle were surveyed. Those who possessed a valid probationary driving licence but never ride a motorcycle were excluded. The second part gathered the respondents' riding information such as whether they own a motorcycle and how far they ridden a motorcycle. The third part of the questionnaire collected information on the supervised riding, only respondents who received informal supervised riding after receiving probationary driving license have to complete this section. Several questions asked the respondents about their views and opinions towards the supervised riding and a perceptive question about the supervised riding they received. The fourth part of the questionnaire was the Motorcycle Rider Behaviour Questionnaire (MRBQ) adopted from Elliot et al. (2007). The last part of the questionnaire collected information on the demographics of the respondents.

The questionnaire on the supervised riding was framed as, *Has any of your family members with riding experience supervised you after you obtained your probationary license? The form of supervision I mean here is voluntary where he/ she escort or guide you in riding.* The respondents may answer *Yes* or *No*. The respondents who answer *No* will proceed to the fourth part of the questionnaire survey on the MRBQ while those answering *Yes* will answer

all questions in the Questionnaire survey. The next question asked the respondent about their supervisor and was framed as, *Who is that person?* The question on the perceived supervision was framed as, *Imagine that you are riding out of 10 trips, how many trips that your supervisor will accompany you in riding?* The respondents were then required to rate how often the supervised riding occurred in the following scenario on a 5-points scales (1, always, 2, often, 3, sometimes, 4, seldom, 5, never), i.e. (a) supervised riding to school/ work; (b) supervised riding to nearby location for eating/ shopping etc; (c) supervised riding to meet up with friends; (d) supervised riding to some road where the rider is unfamiliar with; (e) supervised riding to somewhere that the rider has never been to; (f) supervised riding at night; (g) supervised riding for long journey; (g) supervised riding during bad weathers. Several questions asked the respondents about their views and opinion towards supervised riding and were frame as *Do you think it is important to have your (family) supervised you in riding?*, *Do you think your riding skills improve after the supervised riding session?*, *Overall, how long your (family) supervise you until you can handle the vehicle alone?*

Meanwhile, in the MRBQ section, the respondents have to answer 43-items describing specific behaviour while riding a motorcycle which could be differentiated into 5 groups of 'traffic errors', 'speed violations', 'stunts', 'safety equipment usage' and 'control errors'. The respondents were required to indicate how often they engage these behaviour on a 6-point scales (1, nearly all the time, 2, frequently, 3, quite often, 4, occasionally, 5, hardly ever, 6; never). The last part of the questionnaire survey collect demographic information such as gender, marital status, education level, income and occupation of the respondents.

Statistical analyses were used to assess the results of the current study using SPSS (version 16) and included the following:

- (a) factor analysis was used to analyse the riding behaviour amongst young novice motorcyclists,
- (b) t-tests were utilized to examine the differences in the riding behaviour between two groups of young novice motorcyclists (with supervised riding and without supervised riding).

#### **4. RESULTS**

The total number of motorcyclists recruited for the questionnaire survey was 250. Following the removal of cases containing missing values and exclusion criteria, the final sample contained 204 motorcyclists. A summary of respondents' demographic characteristics is presented in Table 1. Most respondents were 18 years old (89.2%), male (84.8%), single (100.0%), and with secondary education (100.0%). Majority of the respondents (55.9%) has a self-reported riding experience of below 500 km prior the time of survey and only 24.5% of them receive supervision after obtaining the probationary driving license. For those receiving supervised riding, 88.0% of them rated supervised riding is important and 100% of them agreed that their riding skills improve after supervised riding. Generally, young novice motorcyclists received supervised riding with a minimum of 1 day, maximum of 180 days, with mean of 15.6 days and a standard deviation of 28.5 days.

Table 1: Demographic characteristics of respondents

Variables	Description	N = 204
Age	Age of respondents	
	Minimum	17
	Maximum	20
	Mean	18.01
	Standard deviation	0.391
Gender	Gender of respondents	
	Male	84.8%
	Female	15.2%
Education	Highest education level attained by respondents	
	Primary education	0%
	Secondary education	100%
	Tertiary education	0%
Marital	Marital status of respondents	100%
	Single	0%
	Married	
MRBQ	Normalized score on motorcycle rider behaviour questionnaire (MRBQ)	
	Minimum	1
	Maximum	100
	Mean	57.87
	Standard deviation	16.076
SRDay	No. of days receiving supervised riding	
	Minimum	1
	Maximum	180
	Mean	15.56
	Standard deviation	28.467
ImpSR	Importance of having supervised riding	
	Yes	88.0%
	No	12.0%

Table 2: Frequency of riding motorcycles amongst two groups

Frequency of riding motorcycle	Informal Supervised Riding		Total
	With supervision	Without supervision	
Every day	8.3	43.1	51.5
4-6 days a week	8.3	17.6	26.0
1-3 days a week	5.9	9.8	15.7
Less than once a week	2.0	4.9	6.9
Total	24.5	75.5	100.0

As indicated in Table 2, 51.5% of the respondents reported riding motorcycle everyday, while 26.0% and 15.7% reported riding motorcycle 4-6 days a week and 1-3 days a week.

Only 6.9% of the participants reported riding motorcycles less than once a week. Referring to Table 3, majority (53.4%) of the respondents do not own a motorcycle. This could also possibly explained why not all motorcyclists ride motorcycle everyday. Considering the motorcycle riding experience as shown in Table 4, 55.9% of the respondents reported they have ridden less than 500 km, while only 12.7% of them reported ridden a motorcycle for more than 5000 km from the day they obtained their probationary driving license. Usually motorcycle is used for short distance travel than long distance travel, thus, this results is within expectation. Nevertheless, most of the young novice motorcyclists do not own a vehicle, so it is expected that they could only ride a motorcycle belongs to their family members.

Table 3: Motorcycle ownership amongst two groups

Motorcycle Ownership	Informal Supervised Riding		Total
	With supervision	Without supervision	
Own a motorcycle	11.8	34.8	46.6
Do not own a motorcycle	12.7	40.7	53.4
Total	24.5	75.5	100.0

Table 4: Motorcycle riding experience amongst two groups

Frequency of riding motorcycle	Informal Supervised Riding		Total
	With supervision	Without supervision	
Less than 500 km	15.7	40.2	55.9
501 – 1000 km	2.5	12.7	15.2
1001 – 5000 km	4.9	11.3	16.2
More than 5000 km	1.4	11.3	12.7
Total	24.5	75.5	100.0

Table 5: Self-reported supervised riding scenarios

Supervised riding scenarios	Frequency of supervised riding			
	Frequently	Sometimes	Seldom	Never
(a) To school/ work	24%	14%	14%	48%
(b) To nearby location for eating/ shopping/ etc.	36%	26%	20%	18%
(c) When young novice motorcyclist ride to meet up with friends	20%	16%	16%	48%
(d) To location where young novice motorcyclist unfamiliar with	60%	22%	6%	12%
(e) To location where young novice motorcyclist never been to	64%	16%	10%	10%
(f) Riding at night	46%	26%	10%	18%
(g) When young novice motorcyclist need to ride long journey	54%	16%	10%	20%
(h) During bad weathers, i.e. rain storms	64%	14%	12%	20%

The supervised riding scenarios were presented in Table 5. Supervised riding more commonly took place under scenarios such as when young novice motorcyclists ride to a location they never been to (64%), during bad weathers (64%), and when young novice motorcyclists ride to a location where they unfamiliar with (60%). Most young novice motorcyclists reported that supervised riding never took place in the following scenarios, i.e. ride to school/ work place (48%) or when young novice motorcyclists rides to meet up with friend (48%).

Before exploring the factor structure of the MRBQ amongst young novice riders, the fit of the 43-items of the MRBQ was tested with principal component analysis with varimax rotation of Kaizer Normalisation. A five-factor solution with 34-items of the MRBQ was found to be the most interpretable one in the sample. The five factor structure was found to be in the same line with the previous study conducted by Elliott et al. (2007) and Özkan et al. (2012). Thus, the original factor labels were also used in the present study. As presented in Table 6, the first component included 11 items that seem to reflect mostly traffic errors, and thus, was labelled as “traffic errors”. This factor excluded four items (i.e. not notice a pedestrian waiting to cross at a zebra crossing, or a pelican crossing that has just turned red; pull out on to a main road in front of a vehicle that you had not noticed, or whose speed you have misjudged; exceed the speed limit on a country/ rural road and disregard the speed limit late at night or in the early hours of the morning) than the original factor structure suggested by Elliot et al. (2007).

The second component consists of 8 items related to stunts, so it was labelled as ‘stunts’. This factors has additional four items, three originally from speed violations items (i.e. ride between two lanes of fast moving traffic; get involved in unofficial ‘races’ with other riders or drivers; and ride so fast into a corner that you scare yourself) and a dropped item (i.e. ride when you suspect you might be over the legal limit for alcohol) in Elliot et al. (2007) study. The third component consisted of seven items and seems to be related to speed violations and thus was labelled as ‘speed violations’. The third component was quite similar to original components except the following factors (i.e. get involved in unofficial ‘races’ with other riders or drivers; and ride so fast into a corner that you scare yourself) were excluded but two factors originally in the traffic errors component were included (i.e. exceed the speed limit on a country/ rural road and disregard the speed limit late at night or in the early hours of the morning).

The fourth components was labelled as ‘safety equipment’ and it consisted 5 factors similar to the original factors proposed by Elliot et al. (2007) except the following 3 factors (i.e. wear no protective clothing; wear bright/ fluorescent strips/ patches on your clothing and use dipped headlights on your bike) were excluded. All safety equipment factors were then transform to reverse scale for easy interpretations of the results. The last component is the copy of the original control errors components which consists of 4 factors and thus was labelled as ‘control errors’. A total of 9 factors, originally in Elliot et al (2007) study were excluded from the factor analysis. This include 2 traffic errors’ factors (i.e. not notice a pedestrian waiting to cross a zebra crossing, or a pelican crossing that has just turned red; and pull out on to a main road in front of a vehicle that you had not noticed, or whose speed you have misjudge), 3 safety equipment’s factors (i.e. wear no protective clothing; wear bright/ fluorescent strips/ patches on your clothing; and use dipped headlights on your bike) and 4 dropped factors (i.e. have trouble you’re your visor or goggles fogging up; driver deliberately annoys you or puts you at risk; wear a leather one-piece suit; and wear bright/ fluorescent clothing).

The total variances explained by the following factors in the study were 16.6% (traffic errors), 14.4% (stunts), 12.7% (speed violations), 10.3% (safety equipment), and 6.7%

(control errors), respectively. Reliability scores for traffic errors, stunts, speed violations, safety equipment, and control errors were 0.903, 0.905, 0.892, 0.868, and 0.723 respectively (see Table 6 for detailed information).

Table 6: Principal components analysis (varimax rotation) of the 34 MRBQ items and mean and standard deviation statistics for composite scales

Items	Factors				
	I Traffic errors	II Stunts	III Speed violations	IV Safety device	V Control errors
9. Attempt to overtake someone that you had not noticed to be signalling a right turn	0.730	0.201	0.155	-0.085	0.155
5. Miss "Give Way" signs and narrowly avoid colliding with traffic having the right of way	0.673	0.109	0.237	-0.135	0.108
10. When riding at the same speed as other traffic, you find it difficult to stop in time when a traffic light has turned against you	0.653	0.198	0.179	-0.086	0.271
7. Queuing to turn left on a main road, you pay such close attention to the main traffic that you nearly hit the vehicle in front	0.653	0.236	0.104	-0.107	0.223
13. Ride so fast into a corner that you feel like you might lose control	0.623	0.297	0.225	-0.059	0.104
1. Fail to notice that pedestrians are crossing when turning into a side street from a main road	0.602	0.351	0.189	-0.129	-0.178
8. Distracted or pre-occupied, you belatedly realise that the vehicle in front has slowed and you have to brake hard to avoid a collision	0.577	0.126	0.261	-0.104	0.156
11. Ride so close to the vehicle in front that it would be difficult to stop in an emergency	0.576	0.394	0.096	-0.080	0.053
12. Run wide when going round a corner	0.551	0.262	0.342	0.010	0.155
2. Not notice someone stepping out from behind a parked vehicle until it is nearly too late	0.547	0.440	0.222	-0.171	-0.127
6. Fail to notice or anticipate that another vehicle might pull out in front of you and have difficulty stopping	0.512	0.225	0.213	-0.129	0.111
25. Intentionally do a wheel spin	0.288	0.730	0.044	-0.123	0.111
21. Get involved in unofficial 'races' with other riders or drivers	0.117	0.712	0.201	-0.161	0.026
23. Attempt to do, or actually do, a wheelie	0.325	0.694	0.099	-0.156	-0.054
22. Ride so fast into a corner that you scare yourself	0.270	0.672	0.153	0.000	0.175
26. Unintentionally do a wheel spin	0.256	0.647	0.277	-0.251	0.031
24. Pull away too quickly and your front wheel comes off the road	0.346	0.644	0.181	-0.172	0.047

41. Ride when you suspect you might be over the legal limit for alcohol	0.349	<i>0.547</i>	0.082	-0.239	0.087
16. Exceed the speed limit on a motorway	0.350	0.084	<i>0.796</i>	-0.070	0.091
17. Exceed the speed limit on a residential road	0.252	0.280	<i>0.762</i>	-0.085	0.073
14. Exceed the speed limit on a country/ rural road	0.329	-0.017	<i>0.742</i>	-0.053	0.090
15. Disregard the speed limit late at night or in the early hours of the morning	0.448	0.062	<i>0.731</i>	-0.072	0.035
18. Race away from traffic lights with the intention of beating the driver/rider next to you	0.102	0.344	<i>0.683</i>	0.025	0.211
19. Open up the throttle and just 'go for it' on country roads	0.034	0.408	<i>0.649</i>	-0.030	0.260
20. Ride between two lanes of fast moving traffic	0.162	0.556	<i>0.568</i>	-0.047	0.065
28. Wear protective trousers (leather or non-leather)?	-0.129	-0.134	-0.021	<i>0.859</i>	0.014
29. Wear a protective jacket (leather or non-leather)?	0.004	-0.146	-0.081	<i>0.827</i>	0.011
27. Wear riding boots?	-0.028	-0.131	-0.109	<i>0.780</i>	0.042
30. Wear body armour (elbow pads, shoulder pads, knee pads, etc)	-0.218	-0.200	0.011	<i>0.765</i>	-0.029
32. Wear gloves?	-0.199	-0.050	-0.001	<i>0.700</i>	-0.109
36. Change gear when going round a corner or bend	0.093	-0.038	0.140	0.095	<i>0.759</i>
35. Brake or throttle-back when going round a corner or bend	0.127	-0.029	0.237	-0.042	<i>0.742</i>
38. Skid on a wet road or manhole cover	0.253	0.337	0.136	-0.071	<i>0.595</i>
37. Find that you have difficulty controlling the bike when riding at speed (e.g. steering wobble)	0.446	0.218	-0.062	-0.149	<i>0.545</i>
Explained variance	16.6	14.4	12.7	10.3	6.7
Cronbach's alpha	0.903	0.905	0.892	0.868	0.723
Mean <sup>a</sup>	4.553	4.982	4.458	2.319	4.087
SD <sup>a</sup>	1.455	1.426	1.512	1.610	1.644

Note: Figures in italics indicate factor loadings of 0.5 or better used to produce the composite scale which it loaded on to sample mean and standard deviation for the concerning factor.

<sup>a</sup> Sample mean and standard deviation for composite scale relating to factor.

To examine the effect of informal supervised riding on young novice motorcyclists' behaviour, independent samples t-tests were conducted at a 95% confidence interval. The behaviour of young novice motorcyclists was computed by adding all scores from the 5 components, i.e. traffic errors, stunts, speed violations, safety device and control errors. For the 5 components and also the overall behaviour (MRBQ) were then converted to a normalized scores between 1 and 100 for easy interpretation. Normalize score of 1 indicate poor riding behaviour while normalize score of 100 indicated good riding behaviour. Results of the t-test were given in Table 7.

Table 7: T- tests on young novice motorcyclists riding behaviour

Variable	Mean (S.D.)		t-value	p
	With supervision (n = 50)	Without supervision (n = 154)		
Traffic errors	59.328 (19.996)	57.971 (18.987)	0.433	0.665
Stunts	61.539 (15.707)	55.213 (17.090)	2.318	0.021*
Speed violations	59.060 (14.332)	54.175 (14.310)	2.096	0.037*
Safety equipment	35.723 (20.977)	35.510 (19.190)	0.067	0.947
Control errors	60.955 (19.984)	60.955 (19.910)	0.000	1.000
MRBQ	62.176 (15.943)	56.472 (15.921)	2.200	0.029*

\* p-value significant at  $p < 0.05$

In general, no significant difference were observe between traffic errors ( $t_{202} = 0.433$ ,  $p > 0.05$ ), safety device ( $t_{202} = 0.067$ ,  $p > 0.05$ ) and control errors ( $t_{202} = 0.000$ ,  $p > 0.05$ ) among young novice motorcyclists in their riding behaviour. This shows that informal supervised riding could not improve the behaviour of young novice motorcyclists in terms of traffic errors, safety equipment usage and control errors. However, the statistical analysis indicated that supervised riding prohibit risky behaviour among young novice motorcyclists in terms of stunts ( $t_{202} = 2.318$ ,  $p < 0.05$ ) and speed violations ( $t_{202} = 2.096$ ,  $p < 0.05$ ). Similarly, at 95% confidence interval, young novice motorcyclists receiving supervised riding exhibit better overall normalized score in MRBQ compared to young novice motorcyclists who do not received supervised riding ( $t_{202} = 2.318$ ,  $p < 0.05$ ). In summary, informal supervised riding could improve the behaviour of young novice motorcyclists, however, only risky behaviour such as speed violatons and stunts could be prohibited and no significant effects on traffic errors, control errors and safety equipment usage.

#### 4. DISCUSSIONS AND CONCLUSIONS

The present study investigated the effect of informal supervised riding on young novice motorcyclists riding behaviour and evaluated the types of riding behaviour that could be improve under supervised riding amongst young novice motorcyclists in Malaysia. Generally, informal supervised riding in Malaysia prevent risky riding behaviour amongst young novice motorcyclists. The young novice motorcyclists who received supervision has higher self-reported MRBQ normalized score than those who do not receive supervision. This shows that supervised riding improve the riding behaviour of young novice motorcyclists. Finding from this study was consistent with previous study that stated strict supervision and monitoring could prohibit risky behaviour among young novice drivers (Hartos et al., 2000; Hartos et al., 2001, Hartos et al., 2002; Simons-Morton et al., 2006c;). As supervised riding provides opportunity for young novice motorcyclists to gain experience before they could ride independently, it is recommended that young novice motorcyclists to be coach in order to promote safe riding behaviour amongst them. However, our study also indicated that not all aspect of riding behaviour could improve after supervised riding. The intention to commit speed violations and stunts could be prohibited under supervised riding but traffic errors, safety equipment usage, and control errors could not be improve solely with the implementation of supervised riding. This indicated that other road safety initiatives or interventions should be design to improve these aspects on young novice motorcyclists. The results from this study provide useful insights to the policy makers if formal supervised riding

would be implemented in Malaysia in the future.

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## **REFERENCES**

- Begg, D., and Stephenson, S. (2003). Graduated driver licensing: the New Zealand experience. *Journal of Safety Research*, 34(1), 99– 105.
- Brookland, R. and Begg, D. (2011). Adolescent, and their parents, attitude towards graduated driver licensing and subsequent risky driving and crashes in young adulthood. *Journal of Safety Research*, 42: 109-115.
- Elliot, M.A., Baughan, C.J., Sexton, B.F. (2007). Errors and violations in relation to motorcyclist' crash risk. *Accident Analysis and Behaviour*, 39, 491-499.
- Elvik, R. (2010). Why some road safety problems are more difficult to solve than others? *Accident Analysis and Prevention*, 42(4), 1089-1096.
- Hartos, J.L., Eitel, P., Haynie, D., Simons-Morton, B.G. (2000). Can I take the car? Relations among parenting practices and adolescent problem-driving practices. *Journal of Adolescent Research*, 15(3), 352-367.
- Hartos, J.L., Eitel, P., Simons-Morton, B.G. (2001). Do parent-imposed delayed licensure and restricted driving reduce risky driving behaviors among newly licensed teens? *Prevention Science*, 2, 113-122.
- Hartos, J.L., Eitel, P., Simons-Morton, B.G. (2002). Parenting practices and adolescent risky driving: a three month prospective study. *Health Education & Behavior*, 29, 194-206.
- Huang, P. and Winston, F. (2011). Young drivers. *Handbook of Traffic Psychology*. Academic Press, Norfolk, VA USA, pp. 315–338.
- Lajunen, T., Parker, D., Summala, H. (2004). The Manchester Driver Behaviour Questionnaire: a cross-cultural study. *Accident Analysis and Prevention*, 36(2), 231-238.
- Langley, J.D., Wagenaar, A.C. and Begg, D.J. (1996). An evaluation of the New Zealand graduated driver licensing system. *Accident Analysis and Prevention*, 28(2), 139-146.
- Malaysia Institute of Road Safety Research (MIROS). (2011). ADSA fact sheet volume 1: motorcycle.
- Ministry of Transport Malaysia (MOT). (2011). Transport statistics.
- McCartt, A.T., Shabanova, V.I., Leaf, W.A. (2003). Driving experience, crashes, and traffic citations of teenage beginning drivers. *Accident Analysis and Prevention*, 35, 311-320.
- Özkan, T., Lajunen, T., Summala, H. (2006). Driver behaviour questionnaire: a follow up study. *Accident Analysis and Prevention*, 38, 386–395.
- Özkan, T., Lajunen, T., Doğruyol, B., Yildirim, Z., Coymak, A. (2012). Motorcycle accidents, rider behaviour , and psychological models. *Accident Analysis and Prevention*, 49, 124-132.
- Parker, D., Reason, J.T., Manstead, A.S.R., Stradling, S.G. (1995). Driving errors, driving violations and accident involvement. *Ergonomics* 38 (5), 1036–1048.
- Reason, J., Manstead, A., Stradling, S., Baxter, J., Campbell, K., (1990). Errors and violations: a real distinction? *Ergonomics*, 33, 1315-1332.
- Reeder, A.I., Alsop, J.C., Langley, J.D., Wagenaar, A.C. (1999). An evaluation of the general effect of the New Zealand graduated driver licensing system on motorcycle traffic crash

- hospitalisations. *Accident Analysis and Prevention*, 31, 651-661.
- Road Transport Department Malaysia. (2014). Application for new driving license. <http://www.jpj.gov.my/permohonan-lesen-belajar-memandu> (accessed on 1.12.14)
- Sakashita, C., Senserrick, T., Lo, S., Boufous, S., de Rome, L., Ivers, R. (2014). The motorcycle rider behaviour questionnaire: psychometric properties and application among novice riders in Australia. *Transportation Research Part F*, 22, 126-139.
- Simons-Morton, B.G, Hartos, J.L. and Beck, K.H. (2003). Persistence of effects of a brief intervention on parental restrictions of teen driving privileges. *Injury Prevention*, 9, 142–146.
- Simons-Morton, B.G., Hartos, J.L., Leaf, W.A., Preusser, D.F. (2006a). The effect on teen driving outcomes of the checkpoints program in a statewide trial. *Accident Analysis and Prevention*, 38, 907-912.
- Simons-Morton, B.G., Hartos, J.L., Leaf, W.A., Preusser, D.F., (2006b). Do recommended driving limits affect teen reported tickets and crashes during the first year of teen independent driving? *Traffic Injury Prevention*, 7, 1–10.
- Simons-Morton, B.G., Hartos, J.L., Leaf, W.A., Preusser, D.F. (2006c). Increase parent limits on novice young drivers cognitive mediation of the effect of persuasive messages. *Journal of Adolescent Research*, 21 (1), 83-105.
- Simons-Morton, B. and Quimet, M.C. (2006). Parent involvement in novice teen driving: a review of the literature. *Injury Prevention*, 12, 130–137.
- Simons-Morton, B. (2007). Parent involvement in novice teen driving: rationale, evidence of effects, and potential for enhancing graduated driver licensing effectiveness. *Journal of Safety Research*, 38, 193–202.
- Scott-Parker, B., Watson, B., King, M.J. and Hyde, M.K. (2012). “They’re lunatics on the road”: Exploring the normative influences of parents, friends, and police on young novices’ risky driving decisions. *Safety Science*, 50: 1917-1928.
- Taubman-Ben-Ari, O. and Katz-Ben-Ami, L. (2012). The contribution of family climate for road safety and social environment to the reported driving behaviour of young drivers. *Accident Analysis and Prevention*, 47: 1-10.
- Taubman-Ben-Ari, O. (2010a). Young drivers’ attitudes toward accompanied driving: a new dimensional measure. *Accident Analysis and Prevention*, 42, 1009-1017.
- Taubman-Ben-Ari, O. (2010b). Attitudes toward accompanied driving: the views of teens and their parents. *Transportation Research Part F*, 13, 269-276.
- Taubman-Ben-Ari, O. (2011). The contribution of perceived parental and familial characteristics to attitudes toward accompanied driving among young drivers. *Accident Analysis and Prevention*, 42, 1720-1729.
- The Chartered Institution of Highways and Transportation. (2009). Malaysian transport fact 2009.
- Williams, A. (2006). Young driver risk factors: successful and unsuccessful approaches for dealing with them and an agenda for the future. *Injury Prevention*, 12, 4-8.
- Williams, A.F., Tefft, B.C., and Grabowski, J.G. (2012). Graduated driver licensing research, 2010-present. *Journal of Safety Research*, 43, 195–203.