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Helmet Usage among Adolescents in Rural Road from the Extended Theory of Planned Behaviour

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Abstract: Motorcyclists are more prone to crash injuries than car drivers because motorcycles are unenclosed, leaving riders vulnerable to contact hard road surfaces. This study was conducted based on safety helmet issues among adolescents. Theory on behavioral sciences like Theory of Planned Behaviour (TPB) is useful in understanding why adolescent motorcyclist regardless helmet safety usage. A cross-sectional study was carried out with a sample size of 288 adolescents was chosen in this study. The data collected were carried using a questionnaire survey. The descriptive analysis shows, more than half of respondents are those aged between 17 to 18 years old. Majority (80%) of them do not have motorcycle licenses. This means that they are riding a motorcycle without a basic knowledge of road traffic regulations. Over 65% respondents were riding a motorcycle every day or almost daily during the last 12 months. The correlation analysis shows, there are strong positive relationship between intention and behaviour of respondent. Sometimes they wear helmets, however rarely to wear helmets especially in a short distance (less than 2 km). In addition, the hierarchical multiple regression analysis shows all variables including descriptive norm were found significant ($p < 0.05$), except perceived behaviour control shows insignificant relationship to intention to use a safety helmet. As conclusion, attitude, subjective norm and intention remained a significant predictor of behaviour. However, perceived behaviour control and descriptive norm were not significant in predicting such behaviour (safety helmet usage).

Key words: Motorcyclist, adolescents, theory of planned behaviour, helmet use, hierarchy multiple regression

INTRODUCTION

Malaysia has a complete land transportation network that link among cities and towns. Passenger transport may be public, where operators provide scheduled services, or private vehicle. According to Ministry of Transport Malaysia, in year 2010 a total numbers of registered shows the private transport are 498,041 for motorcycle and 585,304 for car respectively (Ministry of Transport Malaysia, 2010). This statistics shows the private vehicle contributes about 93.5% of total vehicle registered in that year. Its reveals that private vehicle is favored and preferable mode of transportation in the country. The impact from this scenario, it contributes to congestion and accident rates (Nurdden *et al.*, 2007; Abbas *et al.*, 2012). It is very important for Malaysia to have a very safe and comfort road to users as one of the criteria in order to archive Vision 2020 in the near future.

Furthermore, increasing the number of private vehicles, the accident rate increased correspondingly.

Ironically, motorcyclists are more prone to crash injuries than car drivers because motorcycles are unenclosed, leaving riders vulnerable to contact hard road surfaces (Ambak *et al.*, 2009, 2010a, b). In Ops Sikap 24 which held between 23 August 2011 to 6 September 2011, a number of 289 fatal were recorded and 178 of them were motorcyclists' rider and pillion (Royal Malaysia Police, 2011). This amount accounted for 62% of fatal accidents in the period. Based on the increasing number of road accident among motorcyclist indicates the need for a study on the practice of safety helmet usage among motorcyclist. Wearing a motorcycle helmet can reduce the risk of death from a motorcycle crash (Hefny *et al.*, 2012). So, what were the contributing factors that affect the usage of safety helmet among motorcyclist? These are some gaps that should be investigated using the behavioral sciences approach especially in traffic safety behavior.

The Theory of Planned Behavior (TPB) is an extension of the theory of reasoned action (Ajzen, 1991).

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The TPB has been applied extensively and successfully to the prediction of a variety of behaviours such as social science, transportation, education and health. For example, truck driving behaviour (Poulter *et al.*, 2008), bicycle helmet use among teenagers (Lajunen and Rasanen, 2004), motorcyclists' intention to speed (Elliott, 2010), speeding behaviour of riders of heavy motorcycle (Chen and Chen, 2011) and predicting proper safety helmet usage (Ambak *et al.*, 2011a, b). However, in several study showed that it is needed to add the social influence (descriptive norm) as an element in TPB (Hamilton and White, 2008; Ravis and Sheeran, 2003; Moan and Rise, 2011).

Therefore, this study was aimed to investigate the factors affecting why most adolescents (school students) are not wearing a safety helmet by using Theory of Planned Behavior. Also, to introduce additional variable namely social influences (descriptive norm) in Theory of Planned Behaviour model as extended version.

QUESTIONNAIRE DESIGN AND MEASUREMENT

The most important part of the Theory of Planned Behaviour is how the questions were developed to describe the factors. According to Ajzen (2002), the behaviour of interest is defined in terms of its Target, Action, Context and Time (TACT) elements. All the questions in this questionnaire was taken and processed based on previous research.

This study was conducted on September 2011 to June 2012. The respondents in this study were secondary school students which was selected school (name of each school is not reveals, confidential). Then, the data were collected in classrooms by teachers. Every student in the school received a questionnaire and the teachers told the students about the purpose of the study ("to investigate the wearing helmet behaviour among adolescents"). The students were assured about anonymity and confidentiality (students did not write their names to the forms) and were asked to fill the forms carefully and honestly. Survey time was between 25-35 min. All respondents returned a completed questionnaire. Since the aim of the study was to investigate reasons for not using a helmet when riding a motorcycle, all the students who have experience in riding a motorcycle were asked. The population of this study was selected among the adolescents at rural area in Batu Pahat, Johor, Malaysia.

The beginning expectation adolescents involve in this study was targeted to be 500 samples. There are several studies that using lesser sample are; public attitudes towards motorcyclists' safety by Musselwhite *et al.* (2012) using (N = 228), motorcycle

rider intentions by Tunnicliff *et al.* (2012) using (N = 233), safety helmet usage by Ambak *et al.* (2011a, b) using (N = 292), truck driver behaviour using by Poulter *et al.* (2008) using (N = 232) and rider intention to accelerate (N = 110) by Elliott (2010).

In this study, we used quantitative method (statistical analysis) to quantify the variables in the model (TPB) to be highlighted as a strong predictor. The details analysis includes descriptive statistics, reliability (coefficient alpha), correlation and hierarchical multiple regression. The analyses of data were then using software called Statistical Package for Science Social (SPSS) version 19.

RESULTS AND DISCUSSION

This section is explain about the result from descriptive, correlation and hierarchical multiple analysis. Then, a detail discussion on the finding is explained and highlighted.

Descriptive analysis: Table 1 shows the descriptive analysis on adolescent motorcyclists' characteristic. From the descriptive analysis, more than half (57.3%) respondents who participated in this survey are those aged 17 to 18 years old. Most respondents (55.7%) who have experience riding a motorcycle for more than 4 years. More than 80% of them do not possess a motorcycle license. A study carried by Ambak *et al.* (2011a) showed there were about 20% respondents who do not possess any driving license. This is critical, meanings that they are riding a motorcycle without a basic knowledge of road traffic regulations. It is to be considered they are riding in a risky behavior not only for their self, perhaps other road users. Alarmingly, over 65% of them were rode a motorcycle in every day or almost daily during the last 12 months. Sometimes they wear helmets, however rarely wear helmets especially in short distance (within less than 2 km). Kulanthayan *et al.* (2000, 2001) also mentioned that a short distance (<2 km) will affect the compliance of proper safety helmet usage. Apart, type of road also affected the usage of safety helmet, particularly on rural road, local road and as well in district level (Li *et al.*, 2008a, b; Kanitpong *et al.*, 2008; Keng, 2005). However, Hung *et al.* (2006) claimed in their study it was found that National road shows higher safety helmet usage compared to others provincial and district road.

Correlation analysis: Correlation is to measure the strength of the relationship between two or more variables. From Table 2 shows there is a moderate positive relationship between intention and behaviour of

Table 1: Socio-demographic of respondents

Description	No.	%	Description	No.	%
Age (years)			Type of license		
14-15	27	9.4	Full license	7	6.9
15-16	92	31.9	Probation license	28	9.7
17-18	165	57.3	Learning license	20	2.4
19-20	1	0.3	None	233	80.9
Above 20	3	1.0	Total	288	100.0
Total	288	100.0	Accident experience		
Gender			Never	147	51.0
Male	160	56.0	Yes, less than 2 years ago	90	31.3
Female	128	44.0	Yes, within 2 to 5 years ago	39	13.5
Total	288	100.0	Yes, within 5 to 10 years ago	7	2.4
Riding experience (years)			Yes, more than 10 years ago	5	1.7
Less or equal to 2	51	17.7	Total	288	100.0
2-4	76	26.4	Riding frequency		
4-6	103	35.8	Once a month or less	24	8.3
6-8	49	17.0	2-3 times a month	20	6.9
More than 8	9	3.1	Once or two times a week	21	7.3
Total	288	100.0	At least 3 times a week	35	12.2
			Every day or almost everyday	188	65.3
			Total	288	100.0

Table 2: Correlation between each variable

Variable	Statistic	Variable					
		Attitude	Subjective norm	Perceived behaviour control	Descriptive norm	Intention	Behaviour
Attitude	Pearson correlation Sig. (2-tailed)	1					
Subjective norm	Pearson correlation Sig. (2-tailed)	-0.265**	1				
Perceived behaviour control	Pearson correlation Sig. (2-tailed)	0.425**	-0.026	1			
Descriptive norm	Pearson correlation Sig. (2-tailed)	-0.130*	0.446**	0.058	1		
Intention	Pearson correlation Sig. (2-tailed)	-0.233**	0.351**	-0.032	0.380**	1	
Behaviour	Pearson correlation Sig. (2-tailed)	-0.345**	0.393**	-0.150*	0.266**	0.430**	1

**Correlation is significant at the 0.01 level (2-tailed), *Correlation is significant at the 0.05 level (2-tailed), ve -: Value is mean indirect relationship between variables in the TPB model

respondent ($r = 0.430$) and found statistically significant at 5% significant level ($p < 0.05$). Those who have intention to wearing a helmet while riding motorcycle are tending to do it. Also, a positive relationship between subjective norm ($r = 0.393$, $p(0.000) < 0.01$) and descriptive norm ($r = 0.266$, $p(0.000) < 0.01$) with behaviour. This is means by seeing the people around the respondent, it will reflect their behaviour. Similarly, Ambak *et al.* (2011b) and Lajunen and Rasanen (2004) stated in their study, subjective norm shows there is a positive relationship and statistically significant factor in the Theory of Planned Behavior model.

Also, Table 3 demonstrates some insignificant item. For example, the correlation between perceived behaviour control and subjective norm found to be insignificant with $r = -0.260$ and $p(0.664) > 0.05$, descriptive norm with $r = 0.580$ and $p(0.328) > 0.05$ and intention with $r = -0.320$ and $p(0.593) > 0.05$. This finding in line with the studied done by Ambak *et al.* (2010a, b) and Lajunen and Rasanen (2004).

Table 3: Model summary of multiple regressions toward intention

Model	R	R ²	Adjusted R ²	SE of estimate
1	0.383 ^a	0.147	0.137	0.79161
2	0.454 ^b	0.206	0.195	0.76478

^aPredictors: (Constant), perceived behaviour control, Subjective norm, attitude, ^bPredictors: (Constant), perceived behaviour control, subjective norm, attitude, descriptive norm

Regression analysis predicting intention: A hierarchical multiple regression analysis was performed to examine the proposed predictors toward intention. The standard TPB variables were entered at Step 1 and additional predictor; descriptive norm entered at Step 2. Table 3 shows the model summary of multiple regressions toward intention. Table 4 shows the summary of ANOVA analysis toward intention.

The Step 1 variables (R2) accounted for 15% of the variance in intentions, $F(3, 284) = 16.25$, $p < 0.001$, with two TPB predictors (attitude and subjective norm) reported as significant. The Step 2 variables significantly accounted

Table 4: Summary of ANOVA analysis toward intention

ANOVA ^c					
Model	Sum of squares	df	Mean square	F	Sig.
Step 1^a					
Regression	30.551	3	10.184	16.251	0.000
Residual	177.969	284	0.627		
Total	208.520	287			
Step 2^b					
Regression	42.995	4	10.749	18.377	0.000
Residual	165.525	283	0.585		
Total	208.520	287			

^aPredictors: (Constant), Perceived behaviour control, subjective norm, attitude, ^b Predictors: (Constant), perceived behaviour control, subjective norm, attitude, descriptive norm ^cDependent variable: Intention

Table 5: Hierarchical multiple regression coefficient toward intention

Model	Coefficients ^a				
	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
Step 1					
(Constant)	3.023	0.275		10.980	0.000
ATT	-0.132	0.048	-0.173	-2.740	0.007
SN	0.285	0.053	0.307	5.370	0.000
PBC	0.050	0.061	0.050	0.816	0.415
Step 2					
(Constant)	2.492	0.290		8.596	0.000
ATT	-0.120	0.047	-0.158	-2.589	0.010
SN	0.174	0.057	0.188	3.082	0.002
PBC	0.025	0.059	0.024	0.414	0.679
DN	0.286	0.062	0.274	4.613	0.000

^aDependent variable: Intention, PBC: Perceived behaviour control, SN: Subjective norm, ATT: Attitude, DN: Descriptive norm

for an additional 6% of the variance in intentions, $F(4, 283) = 18.38, p < 0.001$.

Table 5 shows the hierarchical multiple regression coefficients toward intention. At step 1, attention and subjective norm were significant and the perceived behaviour control was insignificant towards intention. In step 2, attitude, subjective norm and descriptive norm were significant and perceived behaviour control was not significant towards intentions.

Hierarchical multiple regression analysis predicting behaviour:

An additional regression analysis was conducted to explore the effect of descriptive norm towards behaviour. Intention, attitude, subjective norm and perceived behaviour control were entered at Step 1 and additional descriptive norm entered at Step 2. Table 6 shows the model summary of multiple regressions toward behaviour. Table 7 shows the summary of ANOVA analysis toward intention.

As shown in Table 6 and 7, Step 1 explained a significant proportion of variance (30%), $F(4, 283) = 29.69, p < 0.001$, with attitude, subjective norm and intention reported as significant. Step 2 accounted same of the variance (30%) in behaviour, $F(5, 282) = 23.76, p < 0.001$.

Table 6: Model summary of multiple regressions toward behaviour

Model	R	R ²	Adjusted R ²	Std. Error of the estimate
1	0.544 ^a	0.296	0.286	0.80259
2	0.544 ^b	0.296	0.284	0.80352

^aPredictors: (Constant), intention, perceived behaviour control, subjective norm, attitude ^bPredictors: (Constant), intention, perceived behaviour control, subjective norm, attitude, descriptive norm

Table 7: Summary of ANOVA analysis toward behaviour

ANOVA ^c					
Model	Sum of Squares	df	Mean Square	F	Sig.
Step 1^a					
Regression	76.493	4	19.123	29.688	0.000
Residual	182.295	283	0.644		
Total	258.788	287			
Step 2^b					
Regression	76.716	5	15.343	23.764	0.000
Residual	182.073	282	0.646		
Total	258.788	287			

^aPredictors: (Constant), intention, perceived behaviour control, subjective norm, attitude, ^bPredictors: (Constant), intention, perceived behaviour control, subjective norm, attitude, descriptive norm, ^cDependent variable: behaviour

Table 8: Hierarchical multiple regression coefficient toward behaviour

Model	Coefficients ^a				
	Unstandardized coefficients	Std. Error	Standardized coefficients	t	Sig.
Step 1^a					
(Constant)	1.536	0.333		4.611	0.000
ATT	-0.160	0.049	-0.189	-3.246	0.001
SN	0.243	0.056	0.235	4.314	0.000
PBC	-0.061	0.062	-0.054	-0.0983	0.327
INT	0.336	0.060	0.302	5.588	0.000
Step 2^b					
(Constant)	1.492	0.342		4.362	0.000
ATT	-0.160	0.049	-0.188	-3.236	0.001
SN	0.231	0.060	0.223	3.822	0.000
PBC	-0.064	0.062	-0.057	-1.027	0.305
INT	0.326	0.062	0.293	5.228	0.000
DN	0.040	0.068	0.034	0.587	0.558

^aDependent Variable: Behaviour (BHV), Predictor: ATT: Attitude, PBC: Perceived behaviour control, SN: Subjective norm, INT: Intention, DN: Descriptive norm

Attitude, subjective norm and intention remained a significant predictor of behaviour. However, perceived behaviour control and descriptive norm were not significant toward behaviour. Similarly these finding are found in (Ambak *et al.*, 2011a, b; Lajunen and Rasanen, 2004). Contradict finding is found in Ali *et al.* (2011) studied that perceived behaviour control also found statistically significant.

Table 8 shows the hierarchical multiple regression coefficients toward behaviour. At step 1, intention, attitude and subjective norm were found statistically significant ($p < 0.05$). However, perceived behaviour control was found statistically insignificant ($p > 0.05$) towards behaviour. In step 2, only attitude, subjective

norm and intention were found statistically significant ($p < 0.05$). Again, perceived behaviour control and descriptive norm were not significant towards intentions.

This study demonstrates that all the preceding factors in TPB are within the average mean score (greater than 3) between agreed (5) and disagreed (1) using 5-point Likert scale. Correlation analysis shows there are strong positive relationship between intention ($r =$ -and behaviour of respondent. Those who have intention to wearing a helmet while riding motorcycle are tending to do it. There is a positive relationship between subjective norm and descriptive norm with behaviour. That means by seeing the people around the respondent, it will reflect their behaviour. As mentioned in many studies (Ambak *et al.*, 2011b; Ali *et al.*, 2011; Lajunen and Rasanen, 2004).

By using the hierarchical multiple regressions, researcher found that all variable including descriptive norm were found significant except perceived behaviour control toward the intention with the subjective and descriptive norm have a very strong significant number. However, attitude, subjective norm and intention remained a significant predictor of behaviour but perceived behaviour control and descriptive norm were not significant toward behaviour.

CONCLUSION

It is vital to concern on safety helmet usage among the adolescent especially in rural area, whereby there is lack of enforcement activity has been carried out. Even though, the respondents have good enough knowledge and attitude regarding the importance of safety helmet. However, when it's translated into their daily practices might be the other way around. Its can be concludes that adolescents are easily influenced by attitude and their surroundings either from the family or close friends (subjective norm) and other people (descriptive norm) in the intention to do something. Nevertheless, when it is translated into action, they are still under the influence of attitude, intention and the immediate the influence of the family (subjective norm). Strictly on law enforcement of motorcycle helmet is needed in order to tackle the problem regarding the improper behaviour of wearing motorcycle safety helmet among the adolescent.

FUTURE WORK

This study presents part of result for on going research to develop a behavioral intention model toward proper helmet usage among adolescents motorcyclist in school. Future research needs to focus on how to educate the adolescents to ensure they are willing to wear safety helmet. This approach should be done by inculcate and advocates the adolescents to have a mind set as a safety

culture in their daily practice, even for a short trips. Parents should be aware and feel concerns to their children by showing a good example and good practice (i.e to use a safety helmet). This because adolescents are easily influenced by the behaviour performed by the person close to them. A similar study could be conducted to other road users behaviour especially for pedestrian to cross a over-bridge, the usage of seat belts, lane discipline (i.e overtaking, turn left or right maneuvers), the usage of signal when do the turning maneuvers and many more.

Also, the usage of extended theory of planned behaviour can be further tested. For instance, any additional psychological factor such as past behaviour, sensation seeking (Cestac *et al.*, 2011) and group norms (Baker and White, 2010; Johnston and White, 2003).

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