Proceedings of the Eastern Asia Society for Transportation Studies, Vol.11,2017

A Study of Social Norms and Motorcycle Helmet Use Intentions among Student Riders in University: A comparison of the Theory of Reasoned Action and the Theory of Planned Behavior

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Abstract: The first aim of the present study was to explain knowledge and beliefs of students who are motorcycle riders and to explain the variables affecting motorcycle helmet use intentions by using The Structural Equation Model (SEM). The third aim of the present study was to study the psychological factors influencing the helmet use intentions of Khon Kaen University students in Thailand, using the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB) Traffic psychology modules including Attitude (ATT), Injunctive norm (ISN), Descriptive norm (DSN), Capacity (CPBC) and Autonomy (APBC) which were used to determine motorcycle helmet use intentions. The SEM was used to examine and explain helmet use intentions. The results indicated that the TRA and TPB could explain 25% and 38% of the variance of intentions. The outcome of this study is useful for responsible agencies to determine the required traffic safety strategies in order to reduce the injury severity of motorcycle riders within the university.

Keywords: Theory of Planned Behaviour, the Structural Equation Model, Descriptive Norm, Injunctive Norm, Helmet.

1. INTRODUCTION

Motorcycles are used for transportation and sport activities in ASEAN countries. The correlation between high fatality rates, among motorcyclist, and low helmet use illustrate the problem. This was also confirmed with the percentage of motorized 2-3 wheelers-related deaths data, recorded from the WHO Road Traffic Injury Prevention Global Status Report on road safety, as show in Figure 1. Head injury is one of the most frequent injuries that result from motorcycle accidents (COST (2001); Fernandes, Rr.F. & Alves, D. (2013)). However, there are clear indications that helmets can reduce the accident severity of head (Branas C.C.&Knudson M.M. (2001);Shao-Hsun Keng (2005);Hill P.S.et al. (2009);DeMarco A.L.et al. (2010);Erhardt T.et al. (2016);Roszalina Ramli&Jennie Oxley (2016)). Shinji Nakahara et al. (2005) This research shows that riding with no helmet or while intoxicated can explain the increased fatality risk (Increased risk among those aged 20–39 years.), suggesting that safety enforcements should be targeted specifically among teens. Helmet research can be studied in several ways such as the use of predictive logistic regression, or the description of wearing a helmet in Michigan, USA (Buckley, L. et al. (2016)) and also use hierarchical regression to prediction or description of wearing a helmet for workers in Yazd, Iran (Ali, M. et al. (2011)) etc., is based on variations in interest and storage characteristics. The TPB can explain psychological variables (ATT & SN & PBC) that affect helmet wearing behavior. A sample

study of helmet use behaviors among hired motorcycle riders in Iran (Ali, M. et al. (2011)) or a study of motorcycle helmet use among young adults in Cambodia (Brijs, K. et al. (2014)).

1.1 Study area and background

Khon Kaen University is a large university consisting of government sectors and educational institutions with its mass number of educational establishments, hospital, department stores, and residences. There is an extensive use of motorcycle transportation daily; students do not wear helmets while driving. Therefore, this study investigates how to reduce the severity of road accidents among student riders.

1.2 Objectives

This study aims to investigate the influence of psychological factors, including attitudes, norms and behavioral control of teen drivers' intention toward helmet use. The findings should provide practical information for more effective measures for increase helmet use in Khon Kaen University, Thailand.

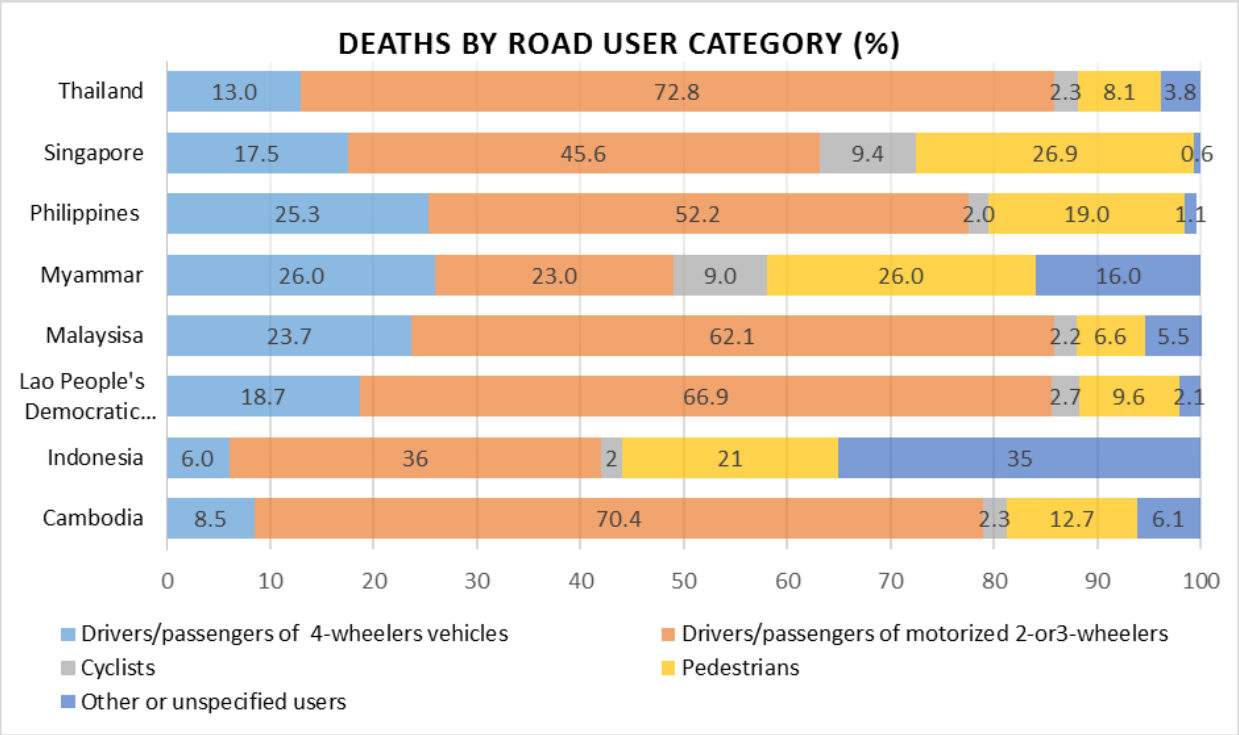

Figure 1 Deaths by road user category of ASEAN countries (WHO (2015)).

2. LITERATURE REVIEW

The Theory of Reasoned Action (TRA) was developed by Martin Fishbein and Icek Ajzen, 1975. This theory provides a framework to study attitudes toward behaviors as shown in Figure 2. The intention affected from two factors include attitude towards the behavior and subject norm. Attitude towards the behavior (ATT) is determined by behavior belief. That is the overall person's general feeling to their behavior. Subject norm (SN) is determined by normative belief that is person's perceptions from people who are important to them. Next, Icek Ajzen developed The Theory of Planned Behavior (TPB) from the Theory of Reasoned Action (TRA) which expands the intention affected from two factors to three factors including attitude towards the behavior, subject norm (The subject norm can divided into two groups which are Injunctive norm (ISN) and Descriptive norm (DSN) by Martin Fishbein and Icek Ajzen (2010)) and perceived behavioral control as shown in Figure 3. Attitude towards the behavior and Subject norm are determined by following the Theory of Reasoned Action (TRA). The difference between TRA and TPB was the Perceived Behavioral Control (PBC). Perceived Behavioral Control (PBC) is determined by Control belief that is feeling difficult or easy to perform behavior. (The Perceived behavioral control can divided into two groups: Capacity (CPBC) and Autonomy (APBC) by Yi-Shih Chung (2015))

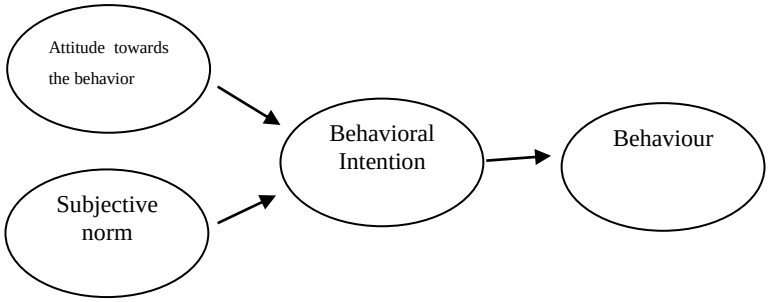

Figure 2 the Theory of Reasoned Action (TRA)

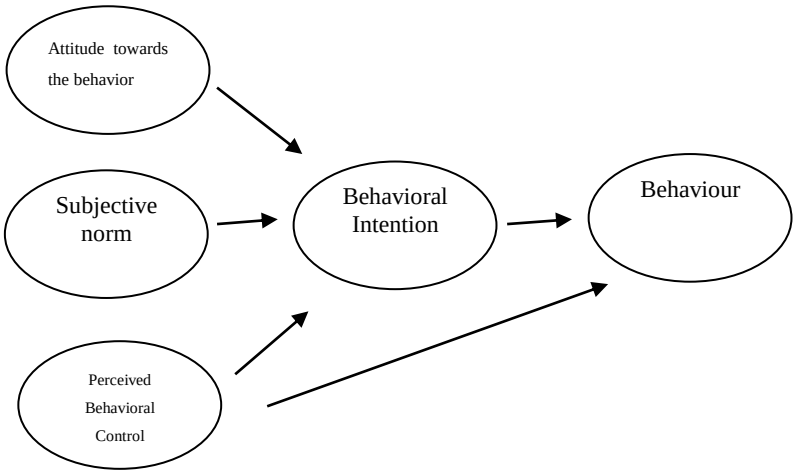

Figure 3 the Theory of Planned Behavior (TPB)

The previous study, Attitude towards of motorcycle riders, could explain the helmet use intentions and behavior, similar to other studies in Malaysia and Cambodia (Ambak, K. et al. (2011); Brijs, K. et al. (2014)). Subject norm of motorcycle riders could explain the helmet use intentions and behavior similar with past research study in Iran and Vietnam (Ali, M. et al.

(2011); Trinh, T.A. et al. (2016)). Perceived behavioral control of motorcycle riders could explain the helmet use intentions and behavior similar with past research study in Iran and Cambodia (Ali, M. et al. (2011); Brijs, K. et al. (2014))

Therefore, we employ the TPB and TRA to explain intention of helmet use. Accordingly, we propose the following hypothesizes:

H_1: Attitude variable is positively related to the intention of helmet use.

H_2: Injunctive norm variable is positively related to the intention of helmet use.

H_3: Descriptive norm variable is positively related to the intention of helmet use.

H_4: Autonomy variable is positively related to the intention of helmet use.

H_5: Capacity variable is positively related to the intention of helmet use.

H_6: Intention variable is positively related to the helmet use behavioral variable.

Based on the aforementioned literature review, following are our study models and hypothesizes show in Figure 4

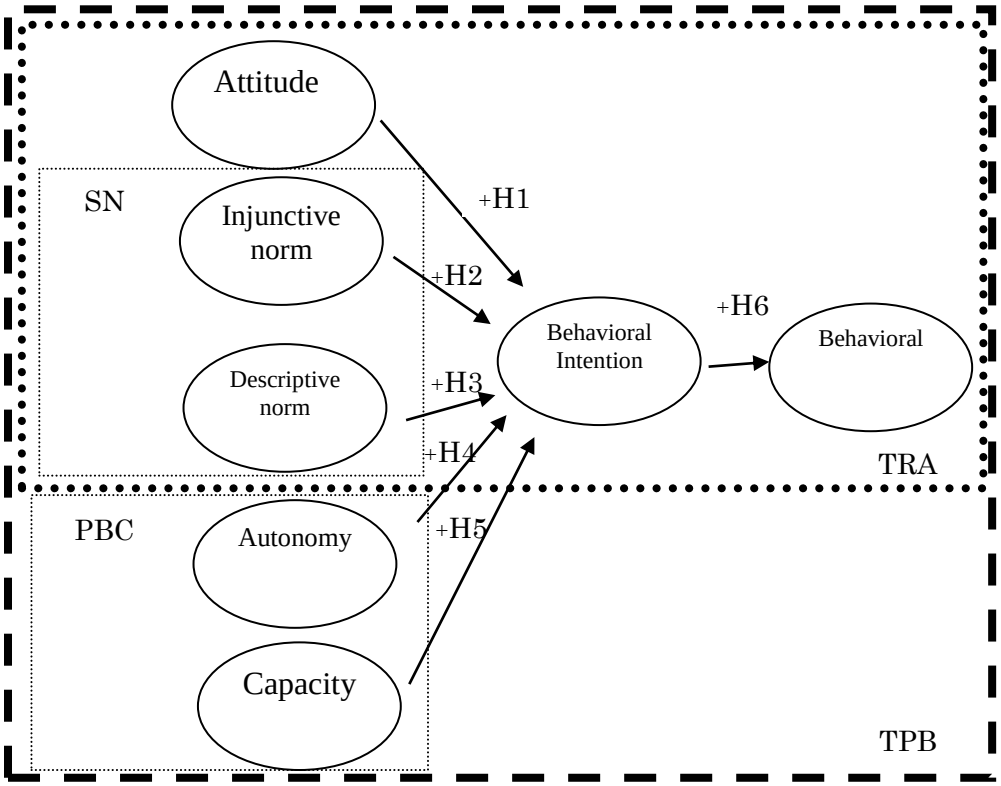

Figure 4 Proposed study framework.

3. METHODOLOGY

3.1 Participants and procedure

Participants are students of Khon Kaen University (KKU). Firstly, the introduction about the road accident of perceived severity was given. Secondly, the researcher collected data by means of a structured group interview. They self-reported on a series of items related to their personal helmet use as shown in Figure 5. Finally, a total of 177 respondents completed the questionnaire.

Figure 5 Data collection

3.2 Measures

Table 1 shows the measurement items and scales, this study developed the psychological questionnaires examining behavior by TRA and TPB as a frame of reference. For example, Injunctive Norm group and Descriptive Norm group. When we consider in detail about the ISN group, found that Item: ISN2 has the highest score. It is known that the motorcycle riders often think that their parents are worried about them not wearing a helmet. In the DSN group, found that Item DSN2 has the highest score; the environment surroundings of the riders and their friends always wear a helmet while riding motorcycle.

Table 1 Concepts and scales.

Item	Scoring	M	SD
Attitude (ATT)			
ATT1 Wearing a helmet, it would be un/good	1 = bad : 5 = good	4.67	0.67
ATT2 Wearing a helmet, it would be un/safe	1 = un safe: 5 = safe	4.62	0.75
ATT3 Wearing a helmet, it would be un/suit	1 = un suit : 5 = suit	4.63	0.75
ATT4 Wearing a helmet, it would be un/benefits	1 = harmful : 5 = benefits	4.65	0.69
ATT5 Wearing a helmet, it would be un/should do	1 = should do not : 5 = should do	4.68	0.69

Subject norm (SN)			
Injunctive Norm (ISN)			
ISN1 I think people who are important for me (Parent/friend/relative) would think I need….	1 = disagree : 5 = agree	4.46	0.85
ISN2 I think people who are important for me (Parent/friend/relative) would think I should…	1 = disagree : 5 = agree	4.52	0.79
ISN3 I think people who are important for me (Parent/friend/relative) would think I support …..	1 = disagree : 5 = agree	4.50	0.81
Descriptive Norm (DSN)			
DSN1 My parent wear a helmet when driving...	1 = disagree : 5 = agree	4.46	0.85
DSN2 Most of my friends wear a helmet when driving...	1 = disagree : 5 = agree	4.52	0.79
DSN3 Most of peoples wear a helmet when driving...	1 = disagree : 5 = agree	4.50	0.81
Perceived Behavioral Control (PBC)			
Autonomy (APBC)			
APBC1 Whether or not I perform wear a helmet is completely up to me.	1 = disagree : 5 = agree	4.40	0.75
APBC2 How much control do you have over whether you perform wear a helmet when driving...?	1 = no control : 5 =complete control	4.37	0.83
APBC3 The number of events outside my control which could prevent me from performing wear a helmet…..	1 = numerous : 5 = very few	3.06	1.49
Capacity (CPBC)			
CPBC1 Wearing a helmet, it would be	1 = Not sure : 5 = confident	4.36	0.82
CPBC2 Wearing a helmet, it would be	1 = very hard : 5 = very easy	4.41	0.85
CPBC3 Wearing a helmet, it would be	1 = impossible : 5 = possible	4.44	0.73
CPBC4 Wearing a helmet, it would be	1 = Not can : 5 = can	4.55	0.71
Intention (IN)			
IN1 Next 3 months, I will wear a helmet when driving...	1 = disagree : 5 = agree	4.07	0.97
IN2 Next 3 months, I want wear a helmet when driving...	1 = disagree : 5 = agree	4.11	0.95
IN3 Next 3 months, I intention wear a helmet when driving...	1 = disagree : 5 = agree	4.07	0.92
Bahavioral (B)			
B How often you wear a helmet when driving...	1 = Never : 5 = Always	3.63	1.21

3.3 Data analysis

The analysis of the results was divided into two parts)Adapted step study from Tankasem P. et al. (2016)(. Overall, the model fit was evaluated against the number of recommended fit statistics and fit indices based on Hair et al. (2010) and Awang, H.Z. (eds.).The first analysis was a factor analysis on latent variables (ATT, ISN, DSN, PBC and IN) given by questionnaire. Reliability of the latent variables was analyzed by three indices including: Cronbach's α, Construct Reliability (CR) and Average Variance Extracted (AVE). The

relationship between TRA's/TPB's latent variables (ATT, ISN, DSN, APBC&CPBC) and IN was examined by a correlation coefficient. All variables were analyzed based on a hypothetical model, based on TPB, by confirmatory factor analysis (CFA). The final part used the Structural Equation Modeling (SEM) to analyze all variables. Respondent's factors (ATT, ISN, DSN, APBC&CPBC) were positively related to the behavioral intention of helmet use in university.

4. RESULTS

4.1 Sample demographic

The participants 41.8 percent were male, 58.2 percent were female. Their averages age is 19.31(1.65) years and participants have averages experience riding is 5.65(3.33) years with participants have averages the number of accident experience is 1.28(1.60) time. And also data shows in Table 2

Table 2 Sample demographic

Variables	Categories	Frequency	Percentage
Gender	Male	74	42
	Female	103	58
Age (year)	< 19	53	30
	19-20	97	55
	> 20	27	15
Have a helmet	Yes	126	71
	No	51	29
Have a rider license	Yes	111	63
	No	66	37
Riding experience (year)	≤ 5	85	48
	> 5	92	52
No. of Accident experience (Time)	Never	64	36
	≤ 3	101	57
	> 3	12	7
Accident Severity (Maximum)	Never	64	36
	1. property damage Only	9	5
	2.Slightly Injured	92	52
	3.Seriously Injured	12	7

4.2 Validity of measurement model

The results of reliability and validation estimation were presented in Tables 3 and 4. They show that all values of reliability and validation followed a good rule of internal consistency and rule of thumb, suggesting adequate convergence In other words, Cronbach's α, refers to consistent answers from identical group questions (e.g., Items for Descriptive Norm measure) of the respondents. The values threshold of 0.7 is acceptable. For construct reliability (CR) and average variance extracted (AVE), the values refer to a representative value of the latent variable or unobserved variable which should be a value over 0.6 and 0.5, respectively (Awang, H.Z. (eds.)). As a result, these values indicate latent variables of TRA model and TPB model, which are good reliable representative values to explain the Intention model.

Table 3 Reliability scales of TRA model

Variable	items	Factor loadings	Cronbach's α	CR	AVE
1.Attitude (ATT)	ATT1	0.824	0.93	0.93	0.75
	ATT2	0.906			
	ATT3	0.873			
	ATT4	0.903			
	ATT5	0.837			
2.Injunctive Norm (ISN)	ISN1	0.828	0.90	0.90	0.74
	ISN2	0.874			
	ISN3	0.883			
3.Descriptive Norm (DSN)	DSN2	0.874	0.76	0.87	0.78
	DSN3	0.895			
4.Intention (IN)	IN1	0.900	0.91	0.92	0.80
	IN2	0.892			
	IN3	0.897			

- Not relevant; Factor loadings > 0.7; $\alpha > 0.7$; CR ≥ 0.6; AVE ≥ 0.5; (KMO = 0.820, $p < 0.001$)

Table 5 shows that all latent variables (ATT, ISN & DSN) had a correlation with the IN variable at 0.1% level of significance. The IN variable of TRA model has the highest correlation coefficient with ISN.As Table 6 shows also all latent variables (ATT, ISN, DSN, APBC & CPBC) had a correlation with the IN variable at 0.1% level of significance. The IN variable of TPB model has the highest correlation coefficient with ISN.

Table 4 Reliability scales of TPB model

Variable	items	Factor loadings	Cronbach's α	CR	AVE
1.Attitude (ATT)	ATT1	0.798	0.93	0.86	0.72
	ATT2	0.891			
	ATT3	0.849			
	ATT4	0.883			
	ATT5	0.823			
2.Injunctive Norm (ISN)	ISN1	0.806	0.89	0.87	0.70
	ISN2	0.837			
	ISN3	0.877			
3. Descriptive Norm (DSN)	DSN2	0.892	0.76	0.87	0.78
	DSN3	0.875			
4. Autonomy (APBC)	APBC1	0.734	0.61	0.77	0.64
	APBC2	0.861			
5. Capacity (CPBC)	CPBC2	0.780	0.82	0.79	0.57
	CPBC3	0.753			
	CPBC4	0.733			

6.Intention (IN)	IN1	0.874	0.91	0.91	0.77
	IN2	0.884			
	IN3	0.889			

- Not relevant; Factor loadings > 0.7; $\alpha > 0.7$; CR ≥ 0.6; AVE ≥ 0.5; (KMO = 0.835, $p < 0.001$)

Table 5 correlation matrix TRA model

Factors	No. of items	1	2	3	4
1.Attitude (ATT)	5	1			
2.Injunctive Norm (ISN)	3	0.455**	1		
3.Descriptive Norm (DSN)	2	0.090	0.228*	1	
4.Intention (IN)	3	0.235**	0.459**	0.288**	1

- Not relevant; ** Significant at 0.1% level; * Significant at 5% level.

Table 6 correlation matrix TPB model

Factors	No. of items	1	2	3	4	5	6
1. Capacity (CPBC)	3	1					
2. Autonomy (APBC)	2	0.586**	1				
3. Injunctive Norm (ISN)	2	0.595**	0.392**	1			
4. Attitude (ATT)	5	0.634**	0.383**	0.455**	1		
5. Intention (IN)	3	0.421**	0.492**	0.460**	0.231*	1	
6. Descriptive Norm (DSN)	2	0.092	0.070	0.228*	0.088	0.288*	1

- Not relevant; ** Significant at 0.1% level; * Significant at 5% level.

4.3 Test of a structural model

We present the indexes in Structural Equation Model and factors influencing the indexes with standardized path coefficients. The most often indicated number of recommended statistics and indices in Tables 7 and 8 are fitted for the SEM based on Hair Jr et al. (2010). Therefore, model fits between the theoretical constructs and observation constructs. We carried out SEM was first carried out for independent TRA, TPB and extended TPB models. The results of the TRA model showed the adequate fit to the data ($\chi 2$= 91.911*; df* = 69; $\chi 2$/ *df* = 1.33; p = 0.034; GFI = 0.936; CFI = 0.986; RMSEA = 0.043). The results of the TPB model showed the adequate fit to the data ($\chi 2$= 196.799*; df* = 131; $\chi 2$/ *df* = 1.50; p = 0.000; GFI = 0.901; CFI = 0.969; RMSEA = 0.053).

Table 7 Explanatory power and fit index of models.

Model fit	**Recommended value**	**Model TRA**	**Model TPB**
$\chi 2$		91.911	196.799
df		69	131
Chi-square/df	< 3.0	1.33	1.50
p-value	> 0.05	0.034	0.000
GFI	> 0.90	0.936	0.901
CFI	> 0.90	0.986	0.969
RMSEA	< 0.08	0.043	0.053

Figures 6 and 7 show the result of structural models with standardized path coefficients for TRA model and TPB model, respectively. All model fit for the two models could pass a number of recommended fit indices. TRA model and TPB model could explain 25% and 38% of variance for helmet use intentions, respectively. The TRA model found that Injunctive Norm (ISN) and Descriptive Norm (DSN) was the most significant and highly influential factor, respectively. For the TPB model PBC and ISN were significant factors related to helmet use intention of motorcycle riders in university. As depicted in Figures 6 and 7 TPB had superior model fit than TRA (Paul J.et al (2016)) and had better explanation of variance ($R^2 = 0.38$) than TRA ($R^2 = 0.25$).

Table 8 SEM results of TRA & TPB model.

Paths	**Coefficients (β)**	**Direct effect**	**Hypothesis Supported**
Model $_{TRA}$			
ATT → IN (+)	0.04	0.04	No
ISN → IN (+)	0.40	0.39**	Yes
DSN → IN (+)	0.20	0.21*	Yes
IN → B (+)			
Model $_{TPB}$			
ATT → IN (+)	-0.02	-0.02	No
ISN → IN (+)	0.30	0.25*	Yes
DSN → IN (+)	0.20	0.22*	Yes
APBC → IN (+)	0.40	0.36*	Yes
CPBC → IN (+)	0.10	0.14	No
IN → B (+)	0.50	0.51**	Yes

- Not relevant; Factors influencing and standardized path coefficients;** Significant at 0.1% level; * Significant at 5% level.

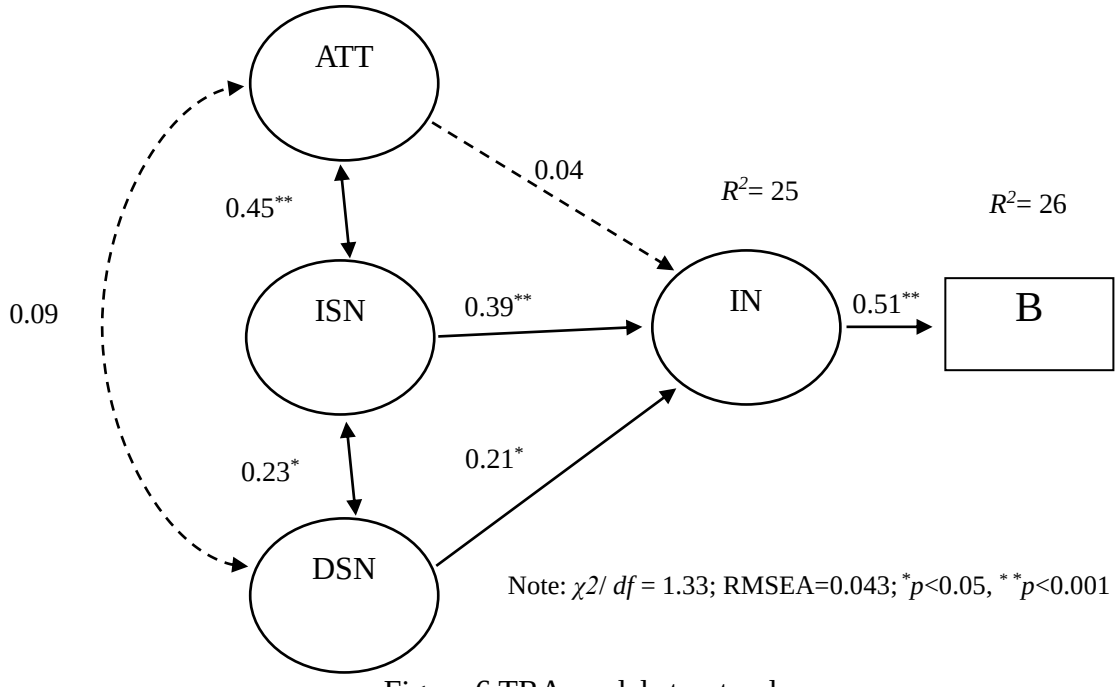

Figure 6 TRA model structural.

5. DISCUSSION

The results were consistent with the findings of previous studies on helmet use intentions in which the most significant factor of intention (IN) was Perceived Behaviour Control (PBC) (Brijs, K.et al. (2014)) and (ISN) for TPB model (Frances V. O'Callaghan & Sarah Nausbaum (2006); Ali, M.et al. (2011)). Furthermore, we found that Attitude (ATT) is non-significant to helmet use intentions for TPB&TRA model.

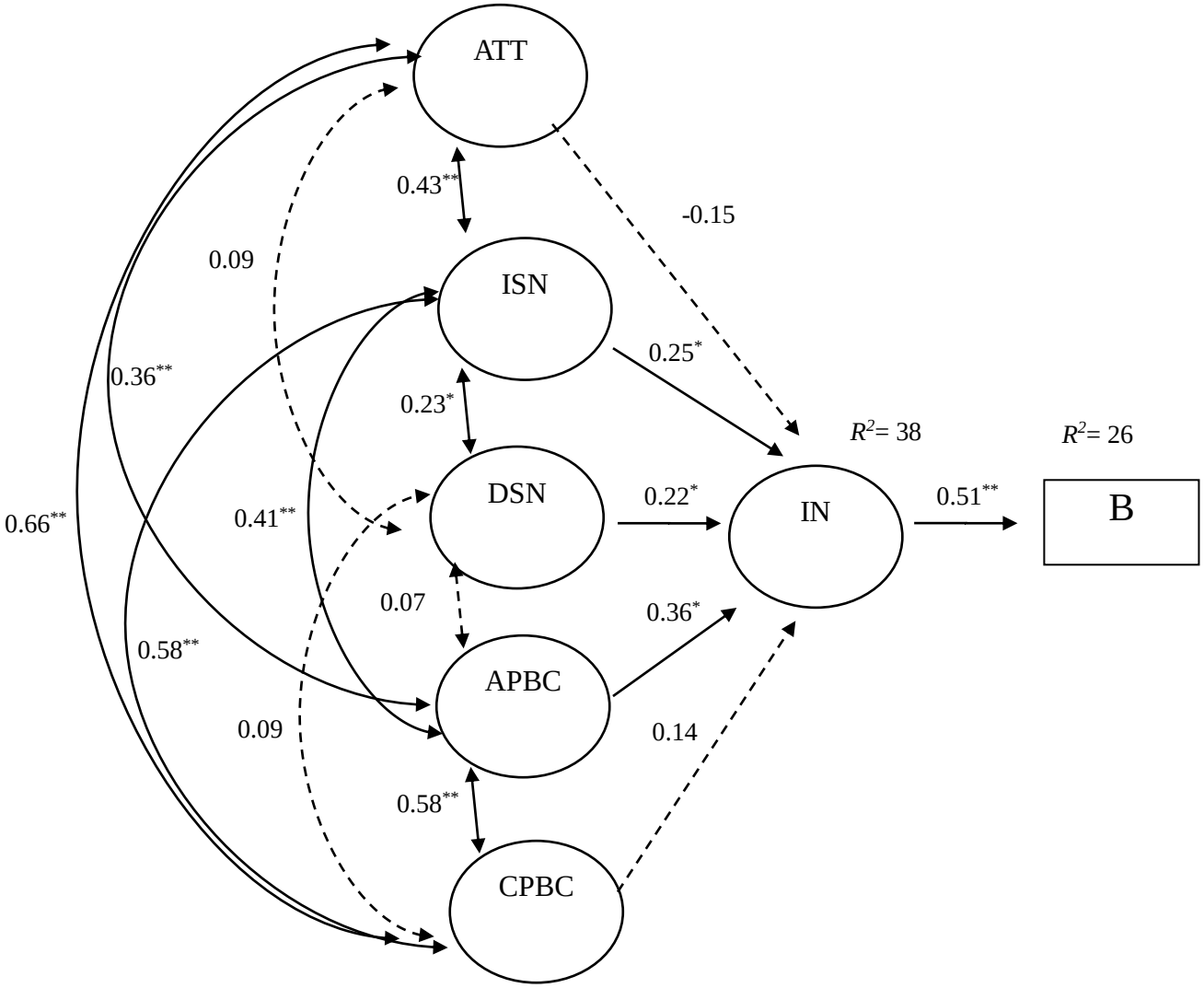

Figure 7 TPB model structural.

5.1 Subject norm

In the present study, social norms have become significant and affect the intention of helmet use, becoming apparent in Perceived Behaviour Control (PBC). However, there were some studies that found DSN and ISN were the highest influencing factors that could explain 25% and 38% of variance of helmet use intention by TRA model and TPB model. Therefore, the

higher the influence of social norms, the more budget to support the behaviour intention (Everett, S.A.et al. (1996); Sonja E. Forward (2009); Chan, C.D.et al. (2010); Haqverdi, M.Q.et al. (2015)). The practical implication of this study divided the SN into two variables ISN and DSN, which can explain the helmet use intention behaviors simulate in SN. When compared between TRA and TPB to describe whether cases 'have or haven't' in measurement or controls using helmet in the study area.

When we consider in detail the ISN group, found that it is known that the motorcycle riders often think that their parents, friends or relatives are worried about them and want them to wear helmets while driving. In the DSN group, the study found that the environment surroundings of the riders and other peoples always wear a helmet while riding motorcycle.

5.2 Perceived Behaviour Control

In this study, perceived behavioral control is significant and affects the intention to helmet use, becoming apparent in Autonomy (APBC) and Capacity (CPBC). We found that CPBC was the non-significant to helmet use intentions for TPB model. Also APBC was the high-significant to helmet use intentions. Therefore, APBC can explain for helmet use intentions on this study.

5.3 TPB Vs. TRA

The previous study could explain 46%(TRA) and 49%(TPB) of variance for predict Indian consumer's green product purchase intention (Paul, J.et al. (2016)) or 47%(TRA) and 58%(TPB) of variance for helmet use intention (Ali, M.et al. (2011)), while this study also showed PBC & ISN was most significant and highly influential which could explain 38%(TRA (25%) and TPB (38%)). Helmet use intention (IN) was also the highest influencing factor, which could explain 38% of variance for behaviour intention. Therefore, TPB can better explain behavior than TRA.

6. CONCLUSION

The objectives of this study are to examine and compare psychological factors influencing the helmet use intentions of motorcycle riders in university under the framework of TRA and TPB. These results confirm the hypothesis (H_2 and H_3) that the psychological factors of TRA (Injunctive norm (ISN) and Descriptive norm (DSN) can explain behaviour Intention (IN), as stated by the TRA and confirm the hypothesis that the psychological factors of TPB (Injunctive norm (ISN), Descriptive norm (DSN) and Autonomy (APBC). According to the TPB, the actual behaviour would be adapted by changing their intentions (Martin Fishbein and Icek Ajzen (2010)).The result found that Attitude (ATT) was the non-significant factor, while ISN and DSN were significant factors for TRA, also ISN, DSN and APBC were significant factors for TPB, especially for APBC, which was the highest factor placing an influence on helmet use intention in the model. However, TRA & TPB model shows attitude (ATT) was the not significant to intention (IN) factor. On the other hand, the suggestion that changing the norm (DSN & ISN) and perceived behavioural control of motorcycle riders are about influencing people or social pressure. This suggestion is key to being in tune with norms. These findings suggest that changing the social attitude and perceived behavioral control for motorcycle riders about riding helmet use in university can reduce the rate of fatality among student motorcyclists.

7. SUGGESTION BASED ON RESULTS

Motorcycle riders are required to follow the instructions shown below, for suggest some concrete transport measures based on this research output.

1) Implement university road safety action plan (Helmet use 100%).
2) Set up the safe motorcycle riders in university areas.
3) Campaign to promote safer riding behaviors among student riders.

8. ACKNOWLEDGEMENT

This research received a Research Fund for Supporting Lecturer to Admit High Potential Student to Study and Research on His Expert Program Year 2016, Graduate School, Khon Kaen University, Khon Kaen, Thailand and also a support by the Asian Transportation Research Society)ATRANS(.

REFERENCES

Ajzen, I.,Fishbein, M. (1980) *Understanding Attitudes and Predicting Social Behavior*. Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

Ajzen, I. (2005) *Attitudes, Personality and behavior*. New York, USA.

Åberg, L. (2001) Attitudes. *Traffic Psychology Today*, 119-135.

Ali, M., Saeed, M.S., Ali, M.M., Haidar, N. (2011) Determinants of helmet use behaviour among employed motorcycle riders in Yazd, Iran based on theory of planned behaviour. *Injury*, 42, 864-869.

Ambak, K., Ismail, R., Abdullah, A. R, Borhan, N.M. (2011) Using structural equation modeling and behavioral sciences theories in predicting helmet use. *International Journal on Advanced Science, Engineering and Information Technology*, Vol. 1, No. 6.

Awang, H.Z. (eds.). *Structural Equation Modeling Using AMOS*.

Buckley, L., Bingham, C.R., Flannagan, C.A., Carter, P.M., Almani, F., Cicchino, J.B. (2016) Observation of motorcycle helmet use rates in Michigan after partial repeal of the universal motorcycle helmet law. *Accident Analysis and Prevention*, 95, 178-186.

Branas, C.C., Knudson, M.M. (2001) Helmet laws and motorcycle rider death rates. *Accident Analysis and Prevention*, 33, 641-648.

Brijs, K., Brijs, T., Sann, S., Trinh, T.A., Wets, G., Ruiter, R.A.C. (2014) Psychological determinants of motorcycle helmet use among young adults in Cambodia. *Transportation Research Part F*, 26, 273-290.

Chan, D.C., Wu, A.M., Hung, E.P. (2010) Invulnerability and the intention to drink and drive: An application of the theory of planned behavior. *Accident Analysis and Prevention*, 42, 1549-1555.

Chung, Y. (2015).Seemingly irrational driving behavior model: The effect of habit strength and anticipated affective reactions. *Accident Anaalysis and Prevention*, 82, 79-89.

COST327. (2001) *Motorcycle safety helmets: Final report of the action*. European communities, Belgium.

DeMarco, A.L., Chimich, D.D., Gardiner, J.C., Nightingale R.W., Siegmund, G.P. (2010) The impact response of motorcycle helmets at different impact severities. *Accident Analysis and Prevention*, 42, 1778-1784.

Everett, S.A., Price, J.H., Bergin, D.A., Groves B.W. (1996) Personal Goals as

Motivators: Predicting Bicycle Helmet Use in University Students. *Journal of Safety Research*, 27(1), 43-53.
Erhardt, T., Rice, T., Troszak, L., Zhu M. (2016) Motorcycle helmet type and risk of head injury and neck injury during motorcycle collisions in California. *Accident Analysis and Prevention*, 86, 23-28.
Forward, S.J. (2009) The theory of planned behaviour: The role of descriptive norms and past behaviour in the prediction of drivers' intention to violate. *Transportation Research Part F*, 12, 198-207.
Fishbein, M., Ajzen, I. (2010) *Predicting and changing behavior: the reasoned action approach*. New York.
Fernandes, Rr.F., Alves, D.(2013) Motorcycle helmets-A state of the art review. *Accident Analysis and Prevention*, 56, 1-21.
Hair , J.F., Black, W.C., Babin, B.J., Anderson, R.E. (2010) *Multivariate Data Analysis a global perspective 7th ed*. New Jersey.
Hill, P.S., Nnh, A.D., Khuong, T.A., Dao, H.L., Hoang, H.T.M., Trinh, H.T., Nguyen, L.T.N., Nguyen, P.H. (2009) Mandatory helmet legislation and the print media in Viet Nam. *Accident Analysis and Prevention*, 41, 789-797.
Haqverdi, M.Q., Seyedabrishami, S., Groeger, J.A. (2015) Identifying psychological and socio-economic factors affecting motorcycle helmet use. *Accident Analysis and Prevention*, 85, 102-110.
Keng, S.H. (2005) Helmet laws and motorcycle fatalities in Taiwan. *Accident Analysis and Prevention*, 37, 349-355.
O'Callaghan, F.V., Nausbaum, S. (2006) Predicting Bicycle Helmet Wearing Intention and Behavior among Adolescents. *Journal of Safety Research*, 37, 425-431.
Paul, J., Modi, A., Patel, J. (2016) Predicting green product consumption using theory of planned behavior and reasoned action. *Journal of Retailing and Consumer Services*, 29, 123-134.
Ramli, R., Oxley, J. (2016) Motorcycle helmet fixation status is more crucial than helmet type in providing protection to the head. *Injury*, 47, 2442-2449.
Rice, T.M., Troszak, L., Ouellet, J.V., Erhardt, T., Smith, G.S., Tsai, B. (2016) Motorcycle helmet use and the risk of head, neck, and fatal injury: Revisiting the Hurt Study. *Accident Analysis and Prevention*, 91, 200-207.
Nakahara, S., Chadbunchachai, W., Ichikawa, M., Tipsuntornsak, N., Wakai, S. (2005) Temporal distribution of motorcyclist injuries and risk of fatalities in relation to age, helmet use, and riding while intoxicated in Khon Kaen, Thailand. *Accident Analysis and Prevention*, 37, 833-842.
Trinh, T.A., Le, T.P.L. (2016) Motorcycle Helmet Usage among Children Passengers: Role of Parents as Promoter, Paper presented at Sustainable Development of Civil, Urban and Transportation Engineering Conference, Procedia Engineering, 142, 10-17.
Tankasem, P., Satiennam, T., Satiennam, W. (2016) Cross-cultural differences in speeding intention of drivers on urban road environments in Asian developing countries. *International Journal of Technology*, 7, 1187-1195.
Tankasem, P., Satiennam, T., Satiennam, W. (2016) Psychological factors influencing speeding intentions of car driver and motorcycle riders in urban road environments. *International Journal of Technology*, 7, 1179-1186.
World Health Organization. (2015) *Global Status Report on Road Safety 2015*. Geneva, Switzerland.