THEORY OF PLANNED BEHAVIOR APPLICATION ON MOTORCYCLE RIDER SAFETY BEHAVIOR

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ABSTRACT

In Indonesia, the basis for implementing road safety consists of five pillars which are compiled in the General National Road Safety Plan (RUNK). One of the pillars proclaimed is the behavior of safe road users. This aims as an effort to reduce traffic accidents because road users are the biggest factor in road accidents related to user behavior. The cases of road traffic accidents in Indonesia are dominated by motorcyclists, especially Jakarta, which is one of the cities with a fairly high rate of motorcycle accidents. Because the behavior of road users is closely related to traffic accidents, and also motorcyclists are the users who are involved in the highest traffic accidents, this study explains the factors that determine the safety behavior of motorcyclists in Jakarta. The application of the Theory of Planned Behavior (TPB) is used as a basis for finding the factors that may determine the behavior of the motorcyclist. Furthermore, the research approach used in this study is quantitative with primary data in the form of a closed questionnaire instrument from 230 respondents who ride motorcycles in Jakarta. The data analysis technique used is the Structural Equation Modeling (SEM) approach using the AMOS 22.00 program as a tool in determining the determinants of driver safety behavior. The results of the analysis show that the most dominant direct predictor in determining the safety behavior of motorcyclists in Jakarta is the intention to behave safely. While the indirect factor that determines is the attitude of the driver. The results of the analysis also show that the age of the driver has a significant influence on safety behavior.

Keywords: traffic accident; safety behavior; motorcyclist; theory of planned behavior; structural equation modeling.

Received:	Revised:	Accepted:	Available online:
2021-12-02	2021-12-21	2021-12-30	2022-01-08

INTRODUCTION

Road safety today is an issue that has emerged and has become a global problem. Not only transportation issues, road safety also includes social aspects as evidenced by the idea of the Decade of Action for Road Safety 2011 – 2020 which was immediately declared by the United Nations (UN). In line with the United Nations, the Government of Indonesia through the Ministry of Transportation has prepared the General National Road Safety Plan (RUNK) for 2011 – 2035 with five safety pillars covering road safety management, safe roads, safe vehicles, safe road user behavior, and handling of post-accident victims as a guidelines for policy makers in planning and implementing road safety management. Safety is an effort made in order to overcome traffic accidents caused by various factors including human factors (Sujanto & Mulyono, 2010).

Based on the report of the World Health Organization (WHO), traffic accidents are one of the causes of non-communicable deaths with the highest number (Suprobo, 2016). In Indonesia, deaths caused by road traffic accidents are dominated by motorbikes with the highest involvement reaching 61% and the areas of Jakarta, Bogor, Depok, Tangerang, and Bekasi have more than 70% mortality rates for motorbike riders (Dirjen Bina Marga, 2012).). The data on road accidents in 2018 based on the report of the Indonesian Police Korlantas as much as 73.49% involved motorbikes in the Jakarta area becoming blood with a fairly high number of accidents (Agustina & Lupita, 2019).

One of the previous theories on the causes of accidents is the Domino Heinrich theory which explains five factors that cause accidents and one of them is the human factor. The Warpani grouped the causes of traffic accidents including humans, vehicles, roads, and the environment (Enggarsasi & Sa'diyah, 2017). The percentage distribution of the causes of road traffic accidents in Indonesia is 93.52% of human factors, 2.77% of vehicle factors, 3.32% of road factors, and 0.49% of

pISSN 2302-4240
eISSN 2655-2086
Volume 11, Issue 1, February 2022, pp.198-206
DOI: http://dx.doi.org/10.32832/astonjadro.v11i1

environmental factors (Marsaid et al., 2013). A previous study in the United Kingdom (UK), stated that there was a relationship between a driving style that has low accuracy and the risk of causing traffic accidents mediated by the relationship of driving speed (French et al., 1993) and drivers who smoke and drink alcohol will tend to engage in behaviors that risk causing traffic accidents (Nguyen-Phuoc et al., 2020). Driver's lifestyle also has a significant correlation on risky driving behavior and involvement in traffic accidents (Stanojević et al., 2020). Furthermore, driver behavior and driving style are aspects that are strongly related to traffic accidents (Sabbour & Ibrahim, 2010) and the violation behavior shown while driving has a relationship with risk perception which is a significant predictor of motorcycle involvement in accidents (Cheng et al. , 2015). Thus, one of the factors that cause accidents is the behavior of unsafe drivers (Haryanto, 2016).

Theory of Planned Behavior

There are various theories that are commonly used in determining the factors that have an involvement in safety behavior in driving. One that is often used to explain road safety behavior is the Theory of Planned Behavior (TPB) (Ledesma et al., 2018). The TPB construct is also recommended as one of the theories that promote traffic behavior and safe behavior in crossing the road (Mostafavi et al., 2021). In addition, TPB also shows a function as a good predictor based on competitive behavioral intentions in driving (Li et al., 2016). There is also a construct in the TPB, namely attitudes and subjective norms that have a positive relationship with the intention to use a seat belt while driving (Şimşekoğlu & Lajunen, 2008). All components of TPB are significantly related to the intention to use a helmet as a safe driving behavior (Lajunen & Räsänen, 2004) and in general, TPB is a predictor of intention to commit a violation with adaptive and interactive effects (Castanier et al., 2013).

Based on these previous studies, the TPB construct was used to find the factors that determine the safety behavior of motorcyclists in Jakarta. TPB consists of three independent constructs, namely attitudes, subjective norms, and perceived behavioral control and two dependent constructs including behavioral intentions and behavior (Ajzen, 1991). The components of the TPB are then adapted and adapted to safety behavior. The description of the TPB construct is shown in Figure 1. The hypotheses proposed based on Figure 1 are shown in Table 1.

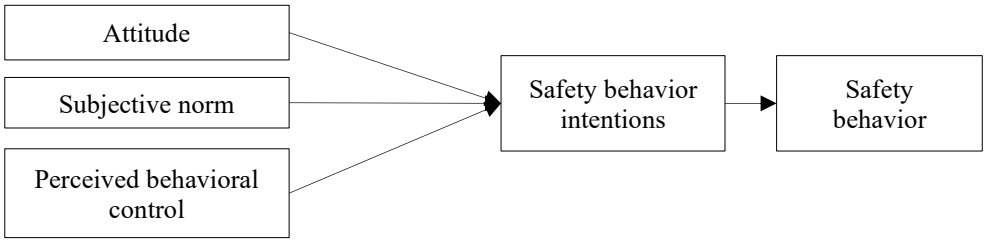

Figure 1. Construct Theory of Planned Behavior on Motorcycle Riders

Table 1. Construct Hypothesis Path

Hypothesis		Path	
H_1	Attitude	→	Safety Behavior Intention
H_2	Subjective Norm	→	Safety Behavior Intention
H_3	Perceived Behavioral Control	→	Safety Behavior Intention
H_4	Safety Behavior Intention	→	Safety Behavior

The information obtained is based on Table 1 based on the TPB construct Figure 1, then the hypotheses in this study are (1) H_1 attitude has a significant influence on safety behavior intention, (2) H_2 subjective norm has a significant influence on safety behavior intention, (3) H_3 perceived behavioral control has a significant influence on safety behavior intention, and (4) H_4 safety behavior intention has a significant influence on safety behavior.

RESEARCH METHODS

Place and time of research

The research location is Jakarta and the research time is May 2021 – July 2021.

Method of collecting data

The method used in the data collection process was the distribution of closed questionnaires which were distributed to 230 respondents who were motorcyclists in Jakarta. Thus, the data used is primary data. Furthermore, the measurement items used refer to the previous literature which is adapted to the context of safety behavior in motorcycle riding. The measurement items are shown in Table 2. The scale used for the measurement items is Likert with 7 levels of alternative answers. Level 1 is used for statements strongly disagree and level 7 for statements strongly agree. The reason for using the Likert scale is because it is more accurate in measuring self-regulated learning (SRL) than multiple choice (Retnawati, 2015), and SRL is the ability to be an active participant in metacognition, motivation, and behavior (Mukhid, 2008). Furthermore, the reason for using 7 levels is because 7 response points are preferred by respondents and have good validity, reliability, discrimination power, and stability (Budiaji, 2013).

Table 2. Constructs and Measurement Items

Constructs	Code	Measurement items	Adaptation
Atitude (ATD)	ATD1	Using safety equipment while riding a motorcycle is very safe.	Brijs et al. (2014)
	ATD2	Using safety gear while riding a motorcycle is a lot of fun.	Wang et al. (2020)
	ATD3	Using safety equipment while riding a motorcycle is a commendable behavior	
Subjective Norms (SNR)	SNR1	The media influences me to behave safely in riding a motorcycle.	Castanier, Deroche & Woodman (2013)
	SNR2	The social environment influences me to behave safely in riding a motorcycle.	Wang et al. (2020)
Perceived Behavioral Control (PBC)	PBC1	I use an SNI helmet when riding a motorcycle even though it is not a traffic order zone.	Brijs et al. (2014)
	PBC2	I have the resources needed to demonstrate safe driving behavior.	Wang et al. (2020)
Safety Behavior Intention (SBI)	SBI1	I intend to use safety equipment when riding a motorcycle.	Brijs et al. (2014)
	SBI2	My intention from now on is not to ride a motorcycle without wearing one of the safety equipment.	
	SBI3	From now on I intend to always obey traffic rules when riding a motorcycle.	
Safety Behavior (SBV)	SBV1	When riding a motorcycle I always use safety equipment.	Developed in this research

pISSN 2302-4240
eISSN 2655-2086

Volume 11, Issue 1, February 2022, pp.198-206
DOI: http://dx.doi.org/10.32832/astonjadro.v11i1

SBV2	When riding a motorcycle I always obey traffic signs.

Data processing

In order to obtain the information needed in this study, a quantitative approach was used to measure the level of influence of the variables formed by the TPB construct based on Figure 1, measured based on Table 2, so that a score was obtained which was then processed with statistical data.

Data analysis

Structural Equation Modeling (SEM) was used as the basis for data analysis using the Analysis of Moment Structure (AMOS) 22.00 program. The SEM stages carried out in this study were Confirmatory Factor Analysis (CFA) for the construct to meet the Good of Fit Index (GOFI) criteria, and continued with hybrid SEM modeling with the maximum likelihood estimation technique.

RESULTS AND DISCUSSION

Characteristics of Respondents

The characteristics asked in the research questionnaire on 230 motorcycle riders in Jakarta and also the responses given are shown in Table 3. From these characteristics, there are 3 characteristics that are used as control variables for the type of dummy in SEM modeling including gender, age, and level of education. education.

Table 3. Characteristics of Respondents

Caracteristic	Observer	Frequency (n=230)	Percentage (%)
Gender	Man	175	76,09
	Women	55	23,91
Age	< 17	1	0,43
	17 - 35 years old	197	85,65
	35-55 years old	32	13,91
Level of education	No school	1	0,43
	Primary school	1	0,43
	Junior high school	6	2,61
	Senior High School	43	18,70
	Diploma	21	9,13
	Bachelor's Degree/equivalent	150	65,22
	> Bachelor's Degree/equivalent	6	2,61
Domicile	Jakarta Barat	43	18,70
	Jakarta Pusat	17	7,39
	Jakarta Selatan	46	20,00
	Jakarta Timur	75	32,61
	Jakarta Utara	13	5,65

	etc	36	15,65
SIM Ownership	Don't have SIM C	18	7,83
	Own	212	92,17
Accident Involvement in the Last 1 Year	0	172	74,78
	1-3	53	23,04
	> 3	5	2,17

Confirmatory Factor Analysis (CFA)

The results of the CFA analysis in this study are shown in Table 4. In CFA, an analysis was also carried out to test the validity and reliability of the constructs using the standardized regression weights of the AMOS 22.00 output. Based on the information presented in Table 4, all TPB constructs have a standard loading value of 0.5, which means that all constructs have good validity. Furthermore, for reliability, only attitude constructs and perceived behavioral control have a value slightly below the recommended 0.7. As for the variance extracted, the construct that has a value slightly below the recommended 0.5 is the attitude construct and the intention of safe behavior. However, overall all constructs have quite good validity and reliability (Haryono, 2016).

Table 4. Results of CFA Analysis

Construct	Items	Standard Loading	Construct reliability	Variance Extracted
Attitude (ATD)	ATD1	0,639	0,667	0,402
	ATD2	0,688		
	ATD3	0,570		
Subjective Norm (SNR)	SNR1	0,884	0,918	0,849
	SNR2	0,957		
Perceived Behavioral Control (PBC)	PBC1	0,712	0,695	0,533
	PBC2	0,748		
Safety Behavior Intentions (SBI)	SBI1	0,622	0,704	0,492
	SBI2	0,589		
	SBI3	0,831		
Safety Behavior (SBV)	SBV1	0,877	0,765	0,623
	SBV2	0,691		

Hybrid Structural Equation Modeling (SEM)

This analysis was carried out after the CFA process on the construct. Analysis of data processing was carried out with a conformity test referring to the GOFI criteria (Haryono, 2016) and statistical tests. The results of SEM modeling on the safety behavior of motorcyclists in Jakarta are illustrated in Figure 2. Furthermore, the results of the conformity test with AMOS 22.00 based on the SEM model in Figure 2 can be seen in Table 5.

ASTONJADRO: CEAESJ
pISSN 2302-4240
eISSN 2655-2086
Volume 11, Issue 1, February 2022, pp.198-206
DOI: http://dx.doi.org/10.32832/astonjadro.v11i1

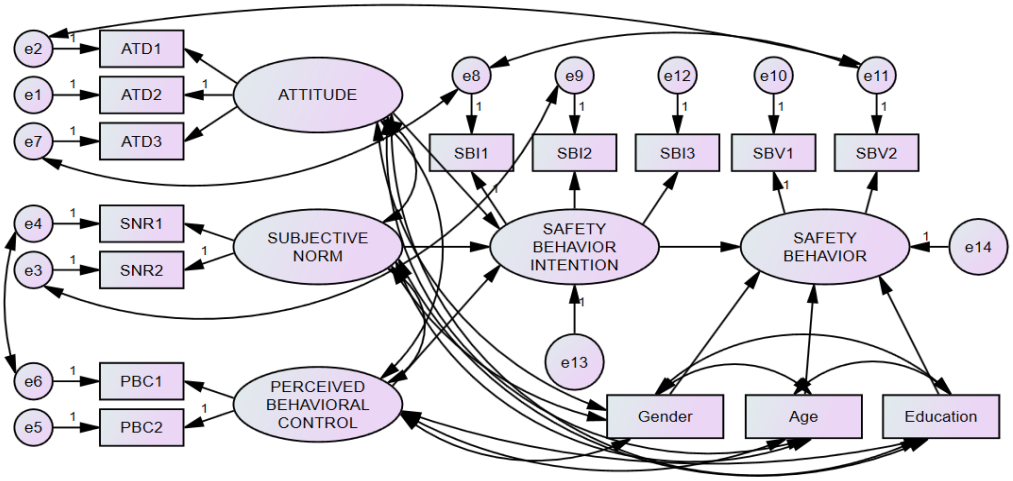

Figure 2. Structural Equation Modeling Motorcycle Rider Safety Behavior

Table 5. GOFI Test Results SEM Model

GOFI	Batasan	Hasil	Kriteria
Chi square statistic (p=5%, df =66)	< 85,964	84,493	Good of fit
Significance probability	≥ 0,05	0,062	Good of fit
CMIN/DF	≤ 2,00	1,28	Good of fit
Goodness of index (GFI)	≥ 0,90	0,956	Good of fit
Adjusted goodness fit index (AGFI)	≥ 0,90	0,919	Good of fit
Tucker lewis index (TLI)	≥ 0,95	0,980	Good of fit
Comparative fit index (CFI)	≥ 0,95	0,967	Good of fit
The Root mean square error of approximation (RMSEA)	≤ 0,08	0,035	Good of fit

Direct and Indirect Influence

Based on the structural model that has met the GOFI criteria in Figure 2, in order to find information on the variables that have the most dominant influence on safety behavior, it is by reviewing the output results at AMOS 22.00. This influence analysis aims to see how strong the influence of one variable on other variables is either directly or indirectly. The interpretation of the results of this influence analysis is meaningful for determining a clear strategy in improving the behavior of road users who are safe, especially motorcycle riders. The findings of the analysis of direct and indirect effects are shown in Table 6 and Table 7.

The findings of the analysis in Table 6, the variable that became the most dominant predictor in influencing the safety behavior of motorcyclists was the intention to behave safely with a statistical value of 0.619. Furthermore, the variable that has a dominant influence on the intention of safe behavior is the attitude of the driver. Table 7 shows that the dominant variable that has an indirect influence on safety behavior is the attitude of the driver. The other variable which also has a positive influence indirectly is subjective norm.

Table 6. Results of Direct Effect Analysis

	PBC	SNR	ATD	SBI	SBV
Safety Behavior Intention	-,023	,062	,546	,000	,000

	PBC	SNR	ATD	SBI	SBV
Safety Behavior	,000	,000	,000	,619	,000

Table 7. Results of Indirect Influence Analysis

	PBC	SNR	ATD	SBI	SBV
Safety Behavior Intention	,000	,000	,000	,000	,000
Safety Behavior	-,014	,038	,338	,000	,000

Table 8 shows the influence of the respondent's characteristics which are used as control variables in modeling based on the Critical Ratio (C.R) and Probability (P) values including gender, age, and education. Based on the P value, only the age variable has a significant influence on safety behavior because it has a P value 0.05 (Haryono, 2016) while gender and education are not significant. The C.R value on the age variable is negative. The meaning of the negative value when associated with a dummy aged < 35 years (value 1) and a dummy aged > 35 years (score 0) is that the behavior of drivers aged > 35 years shows more safe driving behavior than drivers aged < 35 years. The negative CR value is also owned by the sex control variable which is significant if it is associated with the male gender dummy (value 1) and the female gender dummy (value 0) is that female drivers show more safe driving behavior than female drivers. man. Furthermore, the education variable also has a negative C.R value and if it is associated with a dummy of education above high school (value 1) and a dummy of high school education or lower (value 0) informs that the behavior in driving is safer shown by respondents with a high school education or lower. Thus, the level of education does not guarantee safe driving behavior.

Table 8. Results of Analysis of CR and P Control Variables

Path			C.R	P	Description
Gender	→	Safety Behavior	-1,951	0,051	Not significant
Age	→	Safety Behavior	-2,282	0,026	Significant
Education	→	Safety Behavior	-0,125	0,900	Not significant

Hypothesis Test Results

Testing of the 4 hypotheses proposed in Table 1 is to use a t-value and a significance level of 5%. The t-value in the AMOS 22.00 program is the Critical Ratio (C.R) value of the fit model that has been accepted or has met the GOFI test. The research hypothesis is accepted if it has a C.R value 1.957 and a probability (P) 0.05 (Haryono, 2016). The results of the analysis of hypothesis testing by AMOS 22.00 based on the fit model in Figure 2 are shown in Table 9.

Table 9. Hypothesis Test Results

	Path			C.R.	P	Results
H_1	Attitude has a significant influence on safety behavior intention	→	Safety Behavior Intention	4,701	***	Received
H_2	Subjective norms has a significant influence on safety behavior intention	→	Safety Behavior Intention	0,807	0,420	Rejected
H_3	Perceived behavioral control has a significant influence on safety behavior intention	→	Safety Behavior Intention	-0,247	0,805	Rejected

pISSN 2302-4240
eISSN 2655-2086

Volume 11, Issue 1, February 2022, pp.198-206
DOI: http://dx.doi.org/10.32832/astonjadro.v11i1

H_4	Safety behavior intention has a significant influence on safety behavior	→	Safety Behavior	6,863	***	Received

The value of *** in P indicates 0

The information obtained based on Table 9 shows that there are accepted hypotheses and rejected hypotheses. The accepted research hypothesis is H1 which states that attitude has a significant influence on the intention of safe behavior, and H4 which states that the intention of safe behavior has a significant influence on safety behavior.

CONCLUSION

There are various ways that can be done to reduce the rate of road traffic accidents involving motorcyclists and one of them is to demonstrate safe driving behavior. This study found the factors that determine the safety behavior of motorcyclists in Jakarta based on the construct of TPB. The findings of the analysis show that the intention of survival behavior is the most dominant predictor in determining survival behavior directly. The attitude is an indirect determining factor in showing safe behavior while driving. Another finding is that the age of the driver has a significant effect on safety behavior. The model of the TPB construct applied in this study is not fully accepted, however, the TPB construct has a predictor as a determinant of the safety behavior of motorcyclists.

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