
Speeding Behavior Among Young Motorcyclists: The Role of Theory of Planned Behavior Variables and Willingness

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Article Info

Article history:

Received 20/02/2022

Revised 28/02/2022

Accepted 12/03/2022

Keywords:

Speeding behavior;

Young motorcyclists;

Theory of planned behavior;

Willingness

ABSTRACT

Speeding behavior is one of the factors that can cause traffic accidents. To date, empirical studies that examine psychological model in the context of speeding behavior among young motorcyclists in Indonesia are scarce. This study aims to examine the effect of the Theory of Planned Behavior (TPB) variables, namely, Intentions, Attitudes, Perceived Norms, and Perceived Behavioral Control, and Willingness as additional variables on the frequency of riding motorcycle over the speed limit among young motorcyclists in Ponorogo, East Java. This study used a quantitative-correlational design. The subjects of this study were young motorcyclist (16-23 years-old, N = 301) living in Ponorogo. Data collection was carried out using the Intention, attitude, perceived norm, and perceived behavioral control scale and the willingness scale. Data analysis was carried out using hierarchical multiple regression analysis using SPSS. The results showed that intention, perceived behavioral control, and willingness had a significant effect on the frequency of riding a motorcycle over the speed limit. In addition, attitudes, perceived norm, and perceived behavioral control significantly influenced intention to speed. Based on the above findings, it can be concluded that the Theory of Planned Behavior (TPB) and willingness variables have a significant influence on speeding behavior among young motorcyclists in Ponorogo, with which willingness has the largest influence.

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BACKGROUND

In the last decade motorcycles have become the most popular vehicle in Indonesia. Based on data from Badan Pusat Statistik (2018), the number of motorcycles continued to increase by 7.40% between 2013 and 2017, reaching 113 million units in 2017. However, the increase in the use of motorcycles was also accompanied by an increase in the number of accidents. Data from 2004-2014 shows that motorcycle accidents are the main contributor to deaths in road accidents and the majority of motorcycle riders involved in these accidents are at a young age, namely in the category of teenagers and early adults (Badan Pusat Statistik, 2018). Without serious intervention, the number of deaths due to accidents among motorcycle users is predicted to reach 65,000 in one year by 2035 (Jusuf et al., 2017).

The human factor is one of the common causes of accidents. These factors include unintentional errors such as slipping and slipping and intentional traffic violations such as driving over the speed limits speeding. Previous research has shown that driving over the speed limit or speeding has been a major factor in motorcycle accidents (Elliott et al., 2007; Haworth, Greig, & Nielson, 2009). A survey among Indonesian motorcyclists also found that speeding is one of the most frequent violations of traffic laws by motorists (Susilo et al., 2015). However, the psychological factors that drive motorcyclists to violate the speed limit have not been widely studied.

The Theory of Planned Behavior or what is usually abbreviated as TPB is one of the theoretical models that has been widely used to explain behavior. This theory assumes that the intention or intention which is defined as readiness to take action is the main driving factor of behavior. Intention itself is influenced by three variables, namely attitudes, perceived norm,

and perceived behavioral control. Attitude i.e., affective and cognitive evaluation of the individual towards behavior, whereas perceived norm (PN) i.e., perceived social pressure to perform or not to perform a certain behavior while perceived behavioral control (PBC) is perception of ability or capacity to perform behavior and personal control over behavior (Fishbein & Ajzen, 2010).

The TPB model has been extensively tested for its influence in explaining various behaviors such as healthy behavior (McEachan et al., 2016), smoking cessation intentions (Chiu et al., 2019), and medication adherence (Ariansyah & Setiawan, 2022). TPB has also been widely applied to understand driving behavior, especially to study risky car driving behavior. The TPB variable has been shown to have a significant effect on the intention to violate the speed limit on rural roads (Forward, 2009), using a telephone while driving (Bazargan-Hejazi et al., 2017; Rowe et al., 2016; Walsh et al., 2008), driving under the influence of alcohol (Moan, 2013), driving over the speed limit (Castanier et al., 2013; Cestac et al., 2011; Elliott, Armitage, et al., 2007; Jovanović et al., 2017; Rowe et al., 2016), texting while driving (Nemme & White, 2010). Specifically, regarding speeding among motorcyclists, several studies have fully proven the TPB hypothesis, while several other studies have provided partial evidence. For example, a study among an Australian sample to predict speeding intentions was in line with TPB theory, showing that the three components of TPB namely attitudes, subjective norms, and perceived behavioral control significantly influence the intention to speed over the limit (Tunnick et al., 2012). Another study conducted in the UK found that only attitudes and perceived behavioral control had a significant effect on the intention to drive more than 70 miles per hour on the highway (Chorlton et al., 2012;

Elliott, 2010). Meanwhile, recent research has shown that group attitudes and norms are predictors of intention to go more than 90 km/h (Eyssartier et al., 2017).

Although the results of previous studies have generally demonstrated the utility of TPB to explain overspeed driving behavior, there is a large amount of variance in speeding intentions and behavior remains unexplained by TPB-based variables. To overcome this, other variables can be included in the TPB model because the TPB is open to other additional variables according to Ajzen (2011). One of the variables that can be added to predict behavior is willingness. According to Gibbons et al., (2009) willingness is an individual's openness to perform certain behaviors as a reaction to a triggering situation even though there is no previous intention. In contrast to the intention that implies the intentional existence of an action, willingness is an automatic reaction due to the encouragement of the surrounding environment to take an action (Gerrard et al., 2008). Previous studies on car users have shown that willingness has been shown to be a correlated factor with illegal driving behaviors such as texting while driving and speeding (Preece et al., 2018), and involvement in illegal driving (Harbeck & Glendon, 2018).

It should be noted that, the above studies were almost all conducted in the context of car drivers and in developed countries. So far, there has been no empirical research that examines psychological theoretical models in the context of speeding behavior among young motorists in developing countries such as Indonesia. Departing from the existing gaps in the literature, this study intends to examine the role of the TPB variables, namely intentions, attitudes, perceived norms, and perceived behavioral control, as well as the willingness variable as an additional variable to driving behavior above

the speed limit in young motorcycle users in Ponorogo. This research can theoretically complement the previous literature on TPB and driving behavior above the speed limit, especially in the context of motorcycle riders. Practically, this research can be used as a basis for developing psychological interventions on speeding behavior among young motorcyclists.

METHODS

Design

This study is a quantitative-correlational study. This study was conducted in Ponorogo, East Java. The independent variables in this study were intentions, attitudes, perceived norm, and perceived behavioral control, while the dependent variable in this study was the frequency of driving motorcycle over the speed limit in the past month.

Subject

The subjects of this study were selected randomly (random sampling) from undergraduate students at the State Institute for Islamic Study (IAIN) of Ponorogo. They were invited to fill out a questionnaire in the General Psychology class and then asked to share the questionnaire link with their fellow students. Because this study measured motorcycle riding behavior, students who were unable to ride a motorcycle were not eligible to participate in this study. Data collection was carried out between August 2020 - November 2020. In total 301 participants filled out the questionnaire completely (Male= 83 and female = 218, Aged 16-23 years-old, $M_{age} = 18,47$, $SD_{age} = 0,84$). In terms of riding experience, more than half of the participants have driving experience of more than 4 years (64.5%), and most of them are daily motorbike users (75.2%). In terms of accident records, 69.8%

of participants admitted that they had never been involved in an accident.

Data Collection

Data was collected using the intention scale, perceived norm, perceived behavioral control and the frequency scale for driving exceeding the speed limit based on the TPB measurement guidelines (Fishbein & Ajzen, 2010). For the TPB variable, the type of scale used is a Likert scale with a 7-point answer range ranging from 1 (strongly disagree) to 7 (strongly agree). First, the intention scale to measure the intention to drive over the speed limit consists of four items. An example of an item is "I intend to ride a motorcycle over the speed limit". The internal reliability of this intention scale is quite good, namely Cronbach's $\alpha = 0.856$, while the item-total correlation value is between 0.374 to 0.806. Furthermore, the attitude scale consists of measuring cognitive and affective assessments of driving behavior above the speed limit consisting of six items. One example of the item is "Riding a motorbike over the speed limit would be fun." The internal reliability of this intention scale is quite good, namely Cronbach's $\alpha = 0.856$, while the item-total correlation value is between 0.374 to 0.806. Third, the perceived norm scale is used for subjective or descriptive perceived social pressure which consists of five items. An example of an item is "My parents let me ride a motorbike over the speed limit". The reliability coefficient of this perceived norm scale is slightly above the minimum limit, namely Cronbach's $\alpha = 0.659$. The perceived behavioral control over driving over the speed limit was measured by a scale consisting of four items. An example of an item is "Riding a motorbike over the speed limit is an easy thing for me". The internal consistency of this scale is quite good with Cronbach's α coefficient = 0.829, while the item-total correlation value is between 0.374 to 0.806.

Meanwhile, the willingness scale was used to measure the participants' willingness to ride a motorbike over the speed limit as a reaction to social situations that triggered them to do so. This scale consists of three items adapted from Elliott et al. (2017). The items were "'Suppose you were late (to work, to college or to an appointment) in the past month, how willing are you to drive over the speed limit', the responses ranged from 1=not at all willing to 7=very willing;" "Would you be willing to go faster than the speed limit if you were in a hurry?" (Answer response 1 = not at all willing to 7 = very willing); "If other drivers around you drive over the speed limit, to what extent are you willing to also drive faster than the speed limit?" (Answer response 1 = not very willing to 7 = very willing)." The internal consistency of these items is quite good (Cronbach's alpha = 0.829), while the value of the item-total correlation is between 0.374 to 0.806.

Furthermore, in this study, driving behavior exceeding the speed limit was measured in the context of frequency, namely how often participants drove over the speed limit in the past month. The criteria for driving behavior above the speed limit are defined according to the Indonesian Traffic Regulations (DPR-RI, 2009). Therefore, riding over the speed limit is measured by an item, namely "In the past month, how often have you ridden a motorcycle exceeding the speed limit >80 KM/hour, >50 KM/hour on urban roads, and >30 KM. /hour on residential roads". Responses to these items range from 1-7, ranging from Never (1) to All Time (7).

Data Analysis

Data were analysed using SPSS Version 22 Software (IBM Corp, Armonk, NY). After performing descriptive statistical analysis, Pearson correlation analysis was performed to see the relationship between all variables. Then, Hierarchical Linear Regression was

performed to see the effect of TPB and additional variables on riding over the speed limit. The order of variables included in the stratified linear regression analysis followed the standard TPB and additional variables. The original variables from the TPB model were entered into step 1, namely intentions, attitudes, perceived norm, and perceived behavioural control, while the variables outside the model, namely willingness, were entered into step 2. The results of the

analysis were considered significant at $p < 0.05$.

RESULTS

Before performing multilevel linear regression analysis, Pearson analysis was conducted to see the correlation between the variables in this study and to detect multicollinearity.

Table 1. Descriptive Statistics and Pearson Correlation between Variables

Variables	1	2	3	4	5	6
1 Speeding	-					
2 Intentions	0.48**	-				
3 Attitudes	0.45**	0.59**	-			
4 Perceived Norms	0.36**	0.48**	0.58**	-		
5 Perceived Behavioral Control	0.51**	0.55**	0.60**	0.56**	-	
6 Willingness	0.55**	0.54**	0.47**	0.50**	0.57**	-
Mean	2.93	9.25	15.99	13.90	12.40	11.43
SD	1.39	4.84	7.58	5.12	5.18	4.07
N	301	301	301	301	301	301

Significance: ** $p < 0.01$, * $p < 0.05$

The results of the Pearson correlation analysis are presented in Table 1. These results indicate that the correlation coefficient between variables is below 0.80 so that multicollinearity is not found. Each independent variable is also significantly correlated with the frequency of driving over the speed limit. Thus, each independent variable can be included in the multilevel regression analysis. The results of hierarchical multiple analysis regression on the effect of the TPB variable and willingness on the frequency of riding over the speed limit can be seen in table 2. In Model 1, the TPB variables together had a significant effect on riding over the speed limit, $R^2 = 0.325$, $F(4, 296) = 35.658$, $p < 0.01$.

Among the variables in model 1, intention ($\beta = 0.234$, $p < 0.01$) and Perceived Behavioral Control ($\beta = 0.286$, $p < 0.01$) became variables that have a significant effect on riding over the speed limit. In model 2, the addition of the willingness variable can significantly explain the variance in speeding (R^2 change = 0.059, $F(5, 295) = 36.864$, $p < 0.01$). willingness in model 2 of hierarchical multiple regression had the strongest effect among the other variables ($\beta = 0.321$, $p < 0.01$), followed by perceived behavioral control ($\beta = 0.191$, $p < 0.01$) and intention ($\beta = 0.145$, $p < 0.01$). Meanwhile, attitudes and perceived norms did not have a significant effect on riding over the speed limit.

Table 2. The results of hierarchical multiple on the effect of variables TPB and Willingness Variables on Speeding behaviour

Predictor	B	R ²	ΔR ²
Model 1		0.325	0.325**
Intention	0.234**		
Attitudes	0.122		
Perceived Norm	0.033		
Perceived Behavioral Control	0.286**		
Model 2		0.385	0.059**
Intention	0.145*		
Attitudes	0.115		
Perceived Norm	-0.028		
Perceived Behavioral Control	0.191*		
Willingness	0.321**		

N = 301

Significance: ** $p < 0.01$, * $p < 0.05$

In accordance with the TPB theoretical model, multiple regression analysis was also carried out to see the effect of attitudes, perceived norms, and perceived behavioral control on the intention to ride over the speed limit. The results of the analysis are presented in table 3. The results showed that the three variables had a significant

effect on the intention, $R^2 = 0.421$, $F(3, 297) = 71.973$, $p < 0.01$. Attitude became the variable that has the strongest influence ($\beta = 0.366$, $p < 0.01$) on the model. Perceived behavioral control ($\beta = 0.264$, $p < 0.01$) and perceived norm ($\beta = 0.121$, $p < 0.01$) also had a significant effect.

Table 3. The results of hierarchical multiple regression analysis on the effect of the TPB variables on the Intention

Predictor	β	R ²
		0.421**
Attitudes	0.366**	
Perceived Norms	0.121*	
Perceived Behavioral Control	0.264**	

Note. N = 301

Significance: ** $p < 0.01$, * $p < 0.05$

DISCUSSION

Based on the results of data analysis, in general the Theory of Planned Behavior model has a significant role in explaining speeding behavior among young motorcyclists in Ponorogo. In addition, willingness also becomes a significant additional variable that strengthens the TPB model. These findings confirm the existing literature on the role of the TPB model in explaining various behaviors such as healthy behavior (McEachan et al., 2016),

medication adherence (Arliansyah & Setiawan, 2022), to dangerous driving behavior (Cristea & Gheorghiu, 2016; Eyssartier et al., 2017). From the results of the study, there are several interesting findings that can be discussed in addition to these general findings.

First, willingness become additional variable that significantly influences driving behavior beyond the speed limit. Indeed, it has the strongest influence among other variables. This finding is in line with previous

research showing that willingness has a significant effect on texting behavior while driving and speeding (Preece et al., 2018), and involvement in traffic violations (Harbeck & Glendon, 2018). Willingness reflects the extent to which an individual is ready to perform a certain behavior in reaction to a triggering situation even though there was no prior intention. Willingness is different from intention where willingness is more of an automatic reaction due to the surrounding environment to take an action while intention is an intention or intention from the start to take an action (Gerrard et al., 2008). This means that the driving behavior that riding over the speed limit among young riders is more influenced by situations such as rushing an appointment or situations where the riders around them are also riding their motorbikes fast.

Second, perceived behavioral control has also been shown to have a direct influence on riding beyond the speed limit. This finding is in line with current meta-analyses and the TPB framework which show that perceived behavioral control can have both direct and indirect effects on behavior (Fishbein & Ajzen, 2010; McEachan et al., 2011; McEachan et al., 2016). Perceived behavioral control describes the extent to which an individual believes that what he is doing is truly in accordance with his abilities or capacities (Fishbein & Ajzen, 2010). In terms of riding over the speed limit, a strong perceived behavioral control indicates that the individual feels it is easy and confident to drive over the speed limit. The stronger the belief in his or her ability to drive over the speed limit, the more often the individual will drive over the speed limit.

Third, although intention has a weaker influence on driving behavior beyond the speed limit, this variable still has a significant independent effect. This shows that driving exceeding the speed limit also departs from intention or intentional. The results of this

study also confirm the utility of the Theory of Planned Behavior where the variables of attitude, perceived norm, and perceived behavioral control become variables that affect intentions. This finding is in line with the findings of various previous studies showing the role of attitudes, perceived norms, and perceived behavioral control in forming risky driving intentions such as intentions to such as intentional fast driving on rural roads (Forward, 2009), intention to use telephone while driving (Bazargan-Hejazi et al., 2017; Rowe et al., 2016; Walsh et al., 2008), intention to drive while drinking (Moan, 2013), and intention to drive a car over the speed limit (Castanier et al., 2013; Cestac et al., 2011; Elliott et al., 2013; Elliott, Armitage, et al., 2007; Jovanović et al., 2017; Rowe et al., 2016). These findings indicate that the intention to drive over the speed limit arises from the presence of a positive view or attitude in which individuals may find driving above the speed limit a pleasurable thing and may not be too dangerous. In addition, these young drivers also feel that most people their age also drive more than the speed limit (perceived norm).

The implications of the results of this study include those interventions to prevent speeding behavior among adolescent motorcyclists need to be carried out in an integrated manner. Speeding behavior prevention programs can be included in the school curriculum in the form of driving training that must be followed by students. This is because most motorcycle riders in Indonesia start learning to ride a motorcycle at school age. Typically, the program will target cognitive attitudes, asking participants to identify the negative effects of overspeed driving. Equally important, young drivers need to learn proper theoretical principles in safe driving as well as practical skills. As a consequence of long practical experience with riding a motorcycle, young people tend to

overestimate their riding skills (Chung, 2015). They may not realize that the way they ride violates safety principles. Adequate training in both theoretical and practical driving skills is also important to target perceived behavioral control.

In addition, intervention programs need to target attitude change. This is because attitude also plays a role in shaping the intention to drive over speed. Young motorists need to inculcate a negative attitude towards speeding behavior by presenting videos of the dangers of accidents that cause fear for participants. This is believed to be able to change attitudes and affective intentions. Although presenting fear has been considered effective in many health behavior interventions (Tannenbaum et al., 2015), such techniques need to be used with caution to prevent ineffectiveness (Carey et al., 2013) or a boomerang effect (Ruiter et al., 2014). To change the intention and behavior of disobedient driving, research results from Rhodes (2015) show that messages that scare with moderate intensity are more effective than messages that are very frightening.

This study has two main limitations. First, the sample of this study may not be representative enough to describe actual speeding behavior among adolescent motorcyclists. Although the sample size was statistically sufficient for multiple regression analysis, this study recruited only participants from a small town in East Java. There may be different factors influencing speeding behavior between motorcycle users living in small cities and those living in large cities because different areas have different road infrastructure and traffic characteristics which may have implications for different speed choices. Another weakness lies in measuring speeding behavior. Driving behavior exceeding the speed limit in this study was measured by a self-report scale. Participants may give

normative answers which may lead to bias, or they may not even be able to accurately estimate and report their riding speed.

CONCLUSION AND RECOMMENDATION

From the results of this study, it can be concluded that the TPB variables, namely intentions, attitudes, perceived norms, and perceived behavioral control, as well as an additional variable, namely willingness, have been shown to have a significant influence on riding behavior exceeding the speed limit in young motorcycle users in Ponorogo.

Based on the limitations of this study, further research needs to involve more participants from different geographic areas to be more representative. In addition, future research needs to use more sophisticated tools that allow actual speed recording such as using a mobile phone application. Such a tool is very useful for objective behavior measurement.

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