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FACTORS AFFECTING HIGH SCHOOL AND UNIVERSITY STUDENTS TO SPEEDING

Faktor-Faktor Yang Mempengaruhi Pelajar dan Mahasiswa Melakukan Speeding

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Abstract

This study aims to find factors influencing students to do speeding in Yogyakarta Special Region. 179 respondents filled in on-line and off-line questionnaires to determine options or probabilities of speeding up on a variety of different road / environmental conditions. Cross tab tests and ordered logistic regression are adopted to analyze influencing factors (both internal and external). 3 of 18 predictor variables do not affect speeding behavior, and those are driving experience, road separator, and speed limit signs. While the age, education, and police presence are negatively correlated with speeding behavior, it means that the older, and the higher a person's education and the presence of police, people tend not to have speeding behavior. The other research result is the level order of the influencing factor of speeding (predictor variables).

Keywords: speeding, cross tabulation, ordered logistic regression, factor

Abstrak

Penelitian ini bertujuan menemukan faktor – faktor yang mempengaruhi pelajar dan mahasiswa melakukan *'speeding'* atau ngebut di Daerah Istimewa Yogyakarta. Sebanyak 179 responden mengisi kuesioner *on-line* maupun *off-line* untuk mengetahui pilihan-pilihan atau probabilitas melakukan ngebut untuk berbagai kondisi jalan/lingkungan yang berbeda. Uji cross tab dan regresi logistik ordinal digunakan untuk menganalisis faktor-faktor (baik internal maupun eksternal) yang berpengaruh. Dari 18 variabel predictor, 3 diantaranya tidak berpengaruh, yaitu: pengalaman berkendara, pemisah jalan dan rambu batas kecepatan. Sementara variable usia, pendidikan dan keberadaan polisi berkorelasi negative terhadap perilaku ngebut, artinya semakin bertambah usia, dan makin tinggi pendidikan seseorang serta adanya polisi mendorong orang untuk tidak ngebut. Dihasilkan juga urutan tingkat pengaruh masing-masing faktor *(variable predictor)*.

Kata kunci: ngebut, tabulasi silang, regresi logistik ordinal, faktor

INTRODUCTION

According to WHO (2018), traffic accidents inroads is the eighth cause of human death. Within the years 2000 – 2016, the number of the death toll due to these accidents continues to increase; however, the death toll decreases (person per 100,000). A similar condition has been recorded by IRTAD (2018). This circumstance can indicate the efforts of improving road safety in which has not effectively decline these road casualties. Furthermore, this causes a setback to the UN's target of Sustainable Development Goals (SDGs), which aims to reduce accidents by 50% in the period of 2010 – 2020. IRTAD's statement (2018) has enclosed the fact that fatal casualties on the road occur more frequently in urban areas, while highways are the safest road option with the least fatalities recorded.

In accordance to WHO (2018), from the collected data of road accidents, most of the victims are younger population, especially ages 5 – 29 years, whereas IRTAD (2018) noted the age range of 15 – 24 years. The vulnerability of this age range is twice as much as the other age ranges. Raj, et al. (2011), has described the same context in Tamil Nadu, India, which is worsened by the driving behavior of the younger population, with the lack of traffic signs familiarity and understanding, as well as low helmet usage rate.

Based on the implication of the vehicle type, accidents on a global level is dominated by four-wheeled vehicles but also balanced with two-wheeled vehicles as well as pedestrians. Meanwhile, cyclists constitute the lowest rate of casualties. Nevertheless, if seen from South East Asia, most accidents occur upon two-wheeled vehicles, which consist of 43%. This condition is of course correlated with the dominance of motorcycles. Motorcycles are vehicles which are mostly used in such developing countries (WHO, 2018).

Traffic accidents are often associated with wrongful driving, speeding, and also not taking the right choices in driving themselves (Parker et al., 1995). Driving with high speeds has a significant impact on accident fatalities (Elvik et al., 2004). The research result of GRSP (2008) showed that the majority of susceptible road users (e.g., pedestrians) survive when having an accident with a vehicle impact speeding less than 30 km/h, while most die due to the effects of vehicles traveling more than 30km/h. The act of speeding in youngsters in Egypt can be depicted from the driving of medical students between 40 – 240 km/h, with an average of 126.4 km/h. The significant factors which increase the chance of road accidents include; using headphones while driving, speeding, ignoring traffic signs as well as being involved in reckless driving (Sabbour and Ibrahim, 2015). These aspects represent human factors, which is road user behavior while driving. Other than human factors, there are also vehicle factors, roads, and environments, which can lead to becoming the cause of road accidents (Austroads, 2016).

Speeding or driving above the speed limit is often a danger not only to the drivers but other road users as well. Conforming to Ellison and Greaves (2014), 20% of drivers all over the world have surpassed the speed limit by 10 km/h. This speeding behavior varies based on the speed zone. Frequently, the act of going over the speed limit occurs within the speed limit zone of 100 – 110 km/h. However, a more worrying circumstance arises within the speed limit zone of 40 – 50 km/h in urban home areas. When seen from the gender perspective, the action of speeding seems to be more common amongst men rather than women. Women between the age of 46-65 years old, however, have opposing intuition from speeding (Ellison and Greaves, 2014).

Based on the accident data from Directorate of Traffic Unit Indonesian National Police (2019), motorcycles are considered to be having accidents summing up to 73.85%. This shows that motorcycles as a majority vehicle used in Indonesia do not give a high safety rate. Although numerous factors affect motorcycle accidents, the data has clearly shown that these vehicles are the most prone to accidents. The age group that dominates as the road casualties are 15 to 24 years of age. This age group has had 2000 lives as casualties in 2019. Therefore, this indicates that the common fatality consists of young people having a high school to university student status.

Yogyakarta, as a student city with a population of 420,000 students in 2018, is also entangled with road safety issues. Within the recent five years, the number of road accidents has escalated 45%, with 5,061 road accident cases during 2018. The increase also impacts the number of deaths, which also increased to 53% from 2014. From this matter, it was documented that the death toll in Daerah Istimewa Yogyakarta Province was 2,102 within the last five years. Meanwhile, seriously injured individuals have declined by almost three times from 2014, but minorly injured constantly escalate to 35%. Based on the data from the Directorate of Traffic Unit Regional Police DIY, the sum of casualties within one semester of 2019 was 2018 individuals. The highest rate of these casualties were office employees as many as 985 people; secondly, university students 180 people and the rest were other than these group of people such as civil employees or laborers. On the other hand, the people who caused the accidents were 1361 individuals; the highest group of people were office employees summing up to 721 people. Next, the second and the third highest group of people were high school students, 260 people, and university students 147 people, respectively.

The general description of accidents shows that groups of young people, especially students of high school and university, are prone to become victims of accidents, as well as culprits. Dominating the roads, motorcycle use, and the tendency to drive at high speeds have worsened road safety. Many factors that play a part in influencing the occurrence of traffic accidents that involve young individuals have been researched with the focus of their behavior. Internal factors (individuals character) and external factors (road and environment conditions) that affect the accidents involving these young groups have not been done much prior. This investigation will identify the factors that affect high school and university students who tend to speed, which are one leading cause of traffic accidents. As educated individuals, high school and university students should become role models for other road users to obey traffic signs.

LITERATURE REVIEW

Ordered Logistic Regression

Ordered Logistic Regression is a logistic regression modeling for predictor-response with the non-binary categorical, ordinal response (ordinal category with category sum of more than two). Ordered logistic regression is also an expansion from logistic regression binary with ordinal scale response variable, which consists of three or more categories. The used model for ordinal logistic regression is cumulative logit. Generally, the formula of cumulative chance $P(Y \leq j \mid x_i)$ is as below;

$$P(Y \leq j|x_i) = \pi(\text{x}) = \frac{\exp(\beta_{0j}+\sum_{k=1}^{p}\beta_k x_{ik})}{1+\exp(\beta_{0j}+\sum_{k=1}^{p}\beta_k x_{ik})} \quad (1)$$

where $x_i = (x_{i1}, x_{i2}, \cdots, x_{ip})$ is the (i) observation value (i = 1, 2, …, n) from each variable p predictor variable.

Estimation of the regression parameter was done by deciphering in using logit transformation from $P(Y \leq j \mid x_i)$.

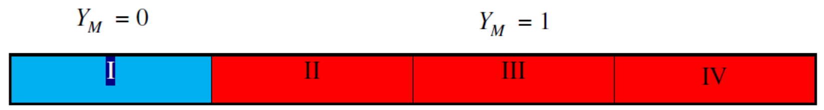
$$LogitP(Y \leq j|x_i) = \ln\left(\frac{P(Y\leq j|x_i)}{1-P(Y\leq j|x_i)}\right) \quad (2)$$

Equation 3 can be derived from substituting equation 1 and equation 2.

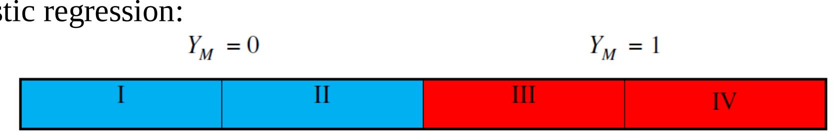
$$LogitP(Y \leq j|x_i) = \beta_{0j} + \sum_{k=1}^{p}\beta_k x_{ik} \quad (3)$$

with β_k value for each k = 1, 2, …, p for each ordinal logistic regression model is the same. If owned by predictor-response data with an ordinal categorical response with four categories, which are j = I, II, III, and IV, therefore, logistic regression is usually done three times toward predictor value set which is the same, but response I vs. II-III-IV, category response I-II vs. III-IV, and category response I-II-III vs. IV (**Error! Reference source not found.**). All three cutoff point responses will be the constant estimator within each model.

First logistic regression:



Second logistic regression:



Third logistic regression:

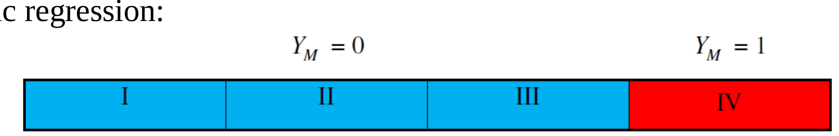


Figure 1. Ordinal logistic regression for the response with 4 ordinal categories
Source: Harlan, J (2018)

As a result, the three regression model will be derived with the estimation of the regression coefficient, which is the same (due to the use of the same predictor value set), but using different constants (due to using different cutoff response points). The three models are usually acknowledged as one regression model as below;

- First model :

$$LogitP(Y \leq I|x_i) = \beta_{0-I} + \sum_{k=1}^{p} \beta_k x_{ik} \quad (4)$$

- Second model :

$$LogitP(Y \leq II|x_i) = \beta_{0-II} + \sum_{k=1}^{p} \beta_k x_{ik} \quad (5)$$

- Third model :

$$LogitP(Y \leq III|x_i) = \beta_{0-III} + \sum_{k=1}^{p} \beta_k x_{ik} \quad (6)$$

Cumulative changes from the three models are;

$$P(Y \leq I|x_i) = \frac{\exp(\beta_{0-I} + \sum_{k=1}^{p} \beta_k x_{ik})}{1+\exp(\beta_{0-I} + \sum_{k=1}^{p} \beta_k x_{ik})} \quad (7)$$

$$P(Y \leq II|x_i) = \frac{\exp(\beta_{0-II} + \sum_{k=1}^{p} \beta_k x_{ik})}{1+\exp(\beta_{0-II} + \sum_{k=1}^{p} \beta_k x_{ik})} \quad (8)$$

$$P(Y \leq III|x_i) = \frac{\exp(\beta_{0-III} + \sum_{k=1}^{p} \beta_k x_{ik})}{1+\exp(\beta_{0-III} + \sum_{k=1}^{p} \beta_k x_{ik})} \quad (9)$$

Based on the three cumulative chance in the equation (7) – (9), probability can be taken for each response category as follows;

$$P(Y = I|x_i) = \frac{\exp(\beta_{0-I} + \sum_{k=1}^{p} \beta_k x_{ik})}{1+\exp(\beta_{0-I} + \sum_{k=1}^{p} \beta_k x_{ik})} \quad (10)$$

$$P(Y = II|x_i) = \frac{\exp(\beta_{0-II} + \sum_{k=1}^{p} \beta_k x_{ik})}{1 + \exp(\beta_{0-II} + \sum_{k=1}^{p} \beta_k x_{ik})} - \frac{\exp(\beta_{0-I} + \sum_{k=1}^{p} \beta_k x_{ik})}{1 + \exp(\beta_{0-I} + \sum_{k=1}^{p} \beta_k x_{ik})} \quad (11)$$

$$P(Y = III|x_i) = \frac{\exp(\beta_{0-III} + \sum_{k=1}^{p} \beta_k x_{ik})}{1 + \exp(\beta_{0-III} + \sum_{k=1}^{p} \beta_k x_{ik})} - \frac{\exp(\beta_{0-II} + \sum_{k=1}^{p} \beta_k x_{ik})}{1 + \exp(\beta_{0-II} + \sum_{k=1}^{p} \beta_k x_{ik})} \quad (12)$$

$$P(Y = IV|x_i) = 1 - \frac{\exp(\beta_{0-III} + \sum_{k=1}^{p} \beta_k x_{ik})}{1 + \exp(\beta_{0-III} + \sum_{k=1}^{p} \beta_k x_{ik})} \quad (13)$$

Parameter Test

The model which has been obtained needs to be significantly tested on the β coefficient toward the response variable, which is with simultaneous testing and partial testing.

1. Simultaneous test

   This test is carried on to check the meaning of the β coefficient toward the response variable concurrently by using the statistics test.

   Hypothesis:

   $H_0 : \beta_1 = \beta_2 = \ldots\ldots = \beta_k = 0$

   H1 : at least one $\beta k \neq 0$; k = 1, 2, …, p

   Statistic testing utilized is testing statistics G or *Likelihood Ratio Test*. Test statistics - G was employed to test the role of the explanatory variable within the simultaneous model (Hosmer and Lemeshow, 1989). This test is to compare the complete model (model with a predictor variable) toward the model with only constant (model without predictor variable) to identify if the model merely with the constants is significantly superior to the complete model with the equation as follows:

$$G = -2ln\left[\frac{Likelihood\ (Model\ B)}{Likelihood\ (Model\ A)}\right] \quad (14)$$

   The criteria take in real extent α then H_0 is rejected if $G > \chi^2_{(\alpha,v)}$ where v the amount of predictor variable or *p-value* < α.

2. Partial test

   This testing is used to check the meaning of β coefficient partially using statistic testing.

   $H_0 : \beta_k = 0$

   H1 : $\beta k \neq 0$; k = 1, 2, …, p

   This statistic testing being used is Wald statistic testing. According to Kleinbaum and Klein (2002), Wald testing can be utilized to test when only one parameter is being examined. Wald statistic testing is calculated by dividing the estimated parameters by default error from the estimated parameter.

$$W = \frac{\widehat{\beta_k}}{SE(\widehat{\beta_k})} \quad (15)$$

   This criterion takes real standard α then H_0 is rejected if $|W| > Z_{\alpha/2}$ or $W^2 > \chi^2_{(\alpha,v)}$ where v is the number of predictor variables or *p-value* < α.

The Goodness of the Fit Test Model

This testing is executed to analyze the compatibility toward a model. Hence, the hypothesis:

H_0: model according to data

H_1: model is not according to data

Statistic testing used is deviance. Deviance is a measurement of model compatibility (*goodness-of-fit*; GOF), which is common to be used as a logistic regression model. Deviance is based on the criteria of the likelihood ratio to compare the current model (model without explanatory variable). Deviance statistic testing is defined with the formula:

$$D = -2\sum_{i=1}^{n}\left[y_{ij}ln\left(\frac{\hat{\pi}_{ij}}{y_{ij}}\right) + (1-y_{ij})ln\left(\frac{1-\hat{\pi}_{ij}}{1-y_{ij}}\right)\right] \quad (16)$$

Whereas $\hat{\pi}_{ij} = \hat{\pi}_j(x_i)$ is an observation opportunity from -i to -j. Deciding criteria taken into account is rejecting H_0 if $D > \lambda^2_{(df)}$. df is the degree of freedom, which in this testing is J-(k+1) where J is the covariate quantity, and k is the total predictor variable. The bigger the deviance value or, the smaller the *p-value* indicates the probability the model does not correspond with the data.

RESEARCH METHOD

Data Source

Data used within the research constitute primary data collected through online and offline questionnaires toward high school and university students who ride motorcycles in Daerah Istimewa Yogyakarta Province. The total correspondents are 179 students having 2,864 lines of aggregate data.

Research Variables

Response Variable

Response variables used in this investigation are the choices made by the correspondents when given a scenario of a circumstance of four categories which are:

1. will not drive the vehicle faster (will not speed)
2. may not drive the vehicle faster (may not speed)
3. may drive the vehicle faster (my speed)
4. will drive the vehicle faster (will speed)

Predictor Variable

Predictor variable, which is used within the study, is exhibited in Table 1 below.

Table 1. Predictor variable

Variable	Notation	Level
INTERNAL FACTORS		
Gender	X_1	0 = Female; 1 = Male
Age	X_2	0 = 0-19; 1 = 20-24; 2 = 25-29, 3 = 30+
Education level	X_3	0 = middle school; 1 = high school; 2 = university
Driving experience	X_4	0 = < 3 yrs; 1 = 3 - 5 yrs; 2 = 6 - 10 yrs; 3 = >10 yrs
Driving license ownership	X_5	0 = do not have a driving license; 1 = have a driving license
Place of origin	X_6	0 = DIY; 1 = Java; 2 = Outside Java
EXTERNAL FACTORS		
Time pressure	X_7	0 = not in a rush; 1 = in a rush
Weather	X_8	0 = raining; 1 = sunny/clear sky
Road width	X_9	0 = narrow; 1 = wide
Road alignment	X_{10}	0 = windy/elevated; 1 = straight/flat
Road surface	X_{11}	0 = bad (many holes); 1 = good (smooth)
Road divider	X_{12}	0 = no road divider; 1 = with road divider
Roadside obstacle	X_{13}	0 = high; 1 = low
Traffic volume	X_{14}	0 = congested; 1 = uncongested
Road lighting	X_{15}	0 = dark; 1 = bright
Speed limit sign	X_{16}	0 = no speed limit sign; 1 = with speed limit sign
Police presence	X_{17}	0 = no police; 1 = police presence
Vehicle type	X_{18}	0 = low CC vehicles; 1 = high CC vehicles

Data Collecting Methods

Data collection was completed by distributing stated preference questionnaires online and offline with 16 different circumstance scenarios and a total of 18 variables, consisting of 6 internal predictor variables and 12 external predictor variables from each respondent. A scenario decision was made with an *orthogonal design* that is available on SPSS.

Data Analysis

The analysis started with examining respondents' characteristics using descriptive analysis using cross-tabulation. The next step was determining the ordinal logistic regression model to obtain the factors that affect the choice of speeding. The first step was to decide the direction, portion, and relation significance between the predictor variable with the response variable both simultaneously and partially. The analysis was completed by ordinal logistic regression analysis to estimate the regression coefficient to define the course and importance from the effect, as well as counting the Odds Ratio value to examine the amount of influence from each predictor variable toward the response variable of choice to speeding. The next step was to verify the model compatibility by utilizing the deviance test and calculating as well as interpreting model classification exactness.

RESULTS AND DISCUSSION

Relationship Analysis by Cross Tabulation (Crosstab)

Relationship analysis amongst variables was used to identify and indicate whether the existing variables can interplay each variable. This analysis was done by using crosstabs, which was then processed with a statistic tool, namely the chi-square testing, to quantify the presence of a significant relationship between the tested variables.

Chi-Square testing was completed to recognize if there is a relation/association evident. Hence, the hypothesis is as below:

H0: No relation between the line and column.

H1: Relation between the line and column is evident.

Statistic testing used in this analysis was Pearson Chi-Square.
The table following describes the analysis result of cross-tabulation on internal factors concerning gender, age, education level, driving experience, driving license, and place of origin. Therefore the result of the testing is presented in Table 2 below.

Table 2. Internal factor cross-table analysis

Variable	Category		Response				Total	Pearson Chi-Square	p-value	Conclusion
			1	2	3	4				
Gender (X_1)	Female	0	300	425	207	28	960	65.099	,000	Correlation evident
	Male	1	408	765	623	108	1904			
	Total		708	1190	830	136	2864			
Age (X_2)	<20	0	332	543	401	84	1360	88.807	,000	Correlation evident
	20-24	1	192	439	318	43	992			
	25-29	2	65	113	56	6	240			
	30 +	3	119	95	55	3	272			
	Total		708	1190	830	136	2864			
Education level (X_3)	Middle school	0	10	28	23	3	64	18.169	,006	Correlation evident
	High school	1	166	269	242	27	704			
	University	2	532	893	565	106	2096			
	Total		708	1190	830	136	2864			
Driving experience (X_4)	< 3 yrs	0	133	175	128	28	464	32.474	,000	Correlation evident
	3 - 5 yrs	1	182	322	248	48	800			
	6 - 10 yrs	2	223	459	294	48	1024			
	> 10 yrs	3	170	234	160	12	576			
	Total		708	1190	830	136	2864			
Driving license ownership (X_5)	Do not own driving license	0	130	82	96	12	320	59.737	,000	Correlation evident
	Own driving license	1	578	1108	734	124	2544			
	Total		708	1190	830	136	2864			

Variable	Category		Response 1	Response 2	Response 3	Response 4	Total	Pearson Chi-Square	p-value	Conclusion
Place of origin (X_6)	DIY	0	303	401	314	38	1056	21.665	,001	Correlation evident
	Java	1	277	552	350	69	1248			
	Outside Java	2	128	237	166	29	560			
	Total		708	1190	830	136	2864			

Based on the analysis result above, it can be stated that all internal factors correlate with the responses of speeding.

Furthermore, the cross-table analysis was also carried out to discover the relationship between external factors with the responses of speeding. Analysis result of Table 3 indicates that only road dividers as the only factor that does not possess correlation with the response of speeding.

Table 3. External factor cross table analysis

Variable	Category		Response 1	Response 2	Response 3	Response 4	Total	Pearson Chi-Square	p-value	Conclusion
Time pressure (X_7)	Not in a rush	0	452	649	269	62	1432	167.848	,000	Correlation evident
	In a rush	1	256	541	561	74	1432			
	Total		708	1190	830	136	2864			
Weather (X_8)	Raining	0	386	615	382	49	1432	22.996	,000	Correlation evident
	Sunny/clear sky	1	322	575	448	87	1432			
	Total		708	1190	830	136	2864			
Road width (X_9)	Narrow	0	349	654	385	44	1432	33.121	,000	Correlation evident
	Wide	1	359	536	445	92	1432			
	Total		708	1190	830	136	2864			
Road alignment (X_{10})	Windy/elevated	0	369	618	407	38	1432	29.828	,000	Correlation evident
	Straight and flat	1	339	572	423	98	1432			
	Total		708	1190	830	136	2864			
Road surface (X_{11})	Bad (many holes and bumps	0	391	624	374	43	1432	37.045	,000	Correlation evident
	Good (smooth)	1	317	566	456	93	1432			
	Total		708	1190	830	136	2864			
Road divider (X_{12})	Undivided	0	349	621	406	56	1432	7.039	,071	No correlation
	Divided	1	359	569	424	80	1432			
	Total		708	1190	830	136	2864			
Roadside obstacle (X_{13})	High	0	374	610	403	45	1432	19.269	,000	Correlation evident
	Low	1	334	580	427	91	1432			
	Total		708	1190	830	136	2864			

Variable	Category		Response 1	2	3	4	Total	Pearson Chi-Square	p-value	Conclusion
Traffic volume (X_{14})	Congested	0	372	600	417	43	1432	20.316	,000	Correlation evident
	Uncongested	1	336	590	413	93	1432			
	Total		708	1190	830	136	2864			
Road lighting (X_{15})	Dark	0	387	591	399	55	1432	12.411	,006	Correlation evident
	Bright	1	321	599	431	81	1432			
	Total		708	1190	830	136	2864			
Speed limit sign (X_{16})	No speed limit sign	0	350	619	412	51	1432	10.570	,014	Correlation evident
	With speed limit sign	1	358	571	418	85	1432			
	Total		708	1190	830	136	2864			
Police presence (X_{17})	No police	0	316	561	457	98	1432	47.016	,000	Correlation evident
	Police presence	1	392	629	373	38	1432			
	Total		708	1190	830	136	2864			
Vehicle type (X_{18})	Low CC vehicle	0	381	593	411	47	1432	17.180	,001	Correlation evident
	High CC vehicle	1	327	597	419	89	1432			
	Total		708	1190	830	136	2864			

Ordinal Logistic Regression Analysis

This analysis was aimed to identify the direction, significance, and how strong the relationship is between the internal and external factors toward response variables. In estimating regression coefficient was used with the maximum likelihood method. The obtained ratio would be tested for its significance both simultaneously and partially, or in other words, to verify the predictor variable on the apparent or unapparent effect toward response variable both simultaneously and partially. Further is the approximation of the regression coefficient.

Table 4. Parameter regression estimation stage 1

		Estimate	Std. Error	Wald	df	p-value	Explanation
Threshold	[Y = 1]	0,467	0,194	5,797	1	0,016	
	[Y = 2]	2,480	0,200	154,010	1	0,000	
	[Y = 3]	4,982	0,220	512,733	1	0,000	
Location	X_1	0,607	0,079	58,831	1	0,000	significant
	X_2	-0,279	0,048	33,352	1	0,000	significant
	X_3	-0,254	0,075	11,384	1	0,001	significant
	X_4	0,036	0,047	0,565	1	0,452	not significant
	X_5	0,431	0,118	13,363	1	0,000	significant
	X_6	0,167	0,049	11,500	1	0,001	significant
	X_7	0,858	0,072	144,041	1	0,000	significant

		Estimate	Std. Error	Wald	df	p-value	Explanation
	X_8	0,344	0,070	24,024	1	0,000	significant
	X_9	0,242	0,070	11,946	1	0,001	significant
	X_{10}	0,256	0,070	13,325	1	0,000	significant
	X_{11}	0,429	0,070	37,290	1	0,000	significant
	X_{12}	0,107	0,070	2,325	1	0,127	not significant
	X_{13}	0,247	0,070	12,414	1	0,000	significant
	X_{14}	0,210	0,070	8,952	1	0,003	significant
	X_{15}	0,258	0,070	13,517	1	0,000	significant
	X_{16}	0,110	0,070	2,453	1	0,117	not significant
	X_{17}	-0,471	0,070	44,739	1	0,000	significant
	X_{18}	0,236	0,070	11,339	1	0,001	significant

From the analysis above, the result obtained was partial with three insignificant variables (*p-value*$\geq \alpha$=0,05) therefore eliminated from the model. The variables were not substantial within the Wald test; based on the *p-value*, these three variables have value above α = 0.05. Meanwhile, simultaneous testing used the *Likelihood Ratio Test* (as seen in Table 5) exhibiting concurrently, the 18 predictor variables affect the response variable. The outcome was shown with the value $G>\lambda^2_{(\alpha=0,05;v=18)}$ or *p-value*=0,000<α=0,05. Due to 3 inconsiderable variables (p-value$\geq$ α=0,05) hence those variables needed to be excluded from the model. The way of ruling out this variable is known as backward elimination.

Analysis result of ordinal logistic regression after eliminating three insignificant variables can be seen in Table 5.

Table 5. Simultaneous testing model stage 1

Model	-2 Log Likelihood	Chi-Square	df	p-value
Intercept Only	4.973,30			
Final	4.523,90	449,40	18	.000

Table 6 illustrate that partially all parameter estimation are significant (p-value< α=0,05).

Table 6. Parameter regression estimation stage 2

		Estimate	Std. Error	Wald	df	p-value	Explanation
Threshold	[Y = 1]	0,344	0,187	3,391	1	0,066	
	[Y = 2]	2,355	0,192	149,763	1	0,000	
	[Y = 3]	4,851	0,213	520,989	1	0,000	
Location	X_1	0,617	0,078	62,867	1	0,000	significant
	X_2	-0,257	0,039	43,202	1	0,000	significant
	X_3	-0,248	0,075	10,999	1	0,001	significant

	Estimate	Std. Error	Wald	df	p-value	Explanation
X_5	0,442	0,117	14,259	1	0,000	significant
X_6	0,165	0,049	11,251	1	0,001	significant
X_7	0,860	0,071	144,817	1	0,000	significant
X_8	0,342	0,070	23,749	1	0,000	significant
X_9	0,241	0,070	11,795	1	0,001	significant
X_{10}	0,256	0,070	13,295	1	0,000	significant
X_{11}	0,427	0,070	36,951	1	0,000	significant
X_{13}	0,246	0,070	12,291	1	0,000	significant
X_{14}	0,209	0,070	8,913	1	0,003	significant
X_{15}	0,253	0,070	13,069	1	0,000	significant
X_{17}	-0,467	0,070	43,949	1	0,000	significant
X_{18}	0,233	0,070	11,024	1	0,001	significant

Subsequently, the next testing shows that the simultaneous β coefficient is significant toward the ordinal logistic model. Calculation result conveys data that the model with a mere intercept produces two log-likelihood value of 3,937.82, while if the predictor variable is included within the model, hence two log-likelihood amount depletes to 3,493.62. This reduction is significant with a *p-value* at 0,000 which rejects H_0; consequently, simultaneous β coefficient value is substantial toward the ordinal logistic model

Table 7. Simultaneous test model 2

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	3.937,82			
Final	3.493,62	444,20	15	.000
Link function: Logit.				

The goodness of fit test was also done with the deviance test, and the result showed that hypothesis zero is accepted (*p-value*=0,988 > α = 0,05), which means that the model is corresponding to the data.

Table 8. The goodness of fit test model 2

	Chi-Square	df	Sig.
Pearson	2.383,16	2.478	0,912
Deviance	2.268,43	2.478	0,999

The next step was to calculate the *Odds Ratio* value to identify the magnitude of predictor variable effect toward the response variable as below.

Table 9. Odds ratio value

Variable	Estimate	Odds Ratio	Variable	Estimate	Odds Ratio
X7	0,860	2,364	X9	0,241	1,272
X1	0,617	1,853	X18	0,233	1,262
X5	0,442	1,556	X14	0,209	1,179
X11	0,427	1,533	X6	0.165	1.179
X8	0,342	1,408	X3	-0,248	0,781
X10	0,256	1,288	X2	-0,257	0,774
X15	0,253	1,288	X17	-0,617	0,627
X13	0,246	1,278			

It can be concluded that from 18 predictor variables tested, and there are three insignificant variables toward speeding response in real, which was driving experience (X_4), availability of road divider (X_{12}), and presence of speed limit signs (X_{16}). If seen from the perspective of influence, 12 variables have positive impact toward the act of speeding which are X_1, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{13}, X_{14}, X_{15}, X_{18} and three variables that have negative impression toward the act of speeding which are X_2, X_3, X_{17}. Positive impact interprets that each value increase in predictor variable will affect the value increase of the response variable, whereas negative impact implies that each value increase in predictor variable will impact the reduction of value on a response variable. If examined from the amount of influence (seen from Odds Ratio), variable X_7 (time pressure), is an external variable that mostly gives effect on the response of speeding, while variable X_1 (gender) is the internal variable that mainly impacts on the speeding response. A probability value of speeding response from drivers in a rush is 2,364 times more than the condition where the driver is not in a hurry, and the probability value of speeding for men is 1,853 times more than female.

CONCLUSION

Three variables do not affect the speeding response, and those are driving experience, presence of road divider as well as speed limit signs. This shows that the bravery for a driver to speed is not based on the experience of driving. Of course, this behavior is apprehensive, dangerous, and is worsened by the fact that traffic signs (speed limit) and the road facilities (median) do not affect giving caution to the drivers. This finding is appropriate with the field conditions where there are many traffic violations on speeding. The lower and the higher the education level of a driver is, as well as the presence of police on the roads will lessen the probability of the driver to speed. Therefore, the role of police as the regulators and supervising the streets is urgently needed, meaning road users would incline to speed without the presence of the police.

Meanwhile, the fact that men (internal factor) have the tendency to speed rather than women and within the condition of being in a rush (external factor) is the main aspect of speeding. Whoever is in a hurry would become uneasy, unfocused with the road situation, the mind would wander and would quickly become careless when anticipating the road. Overall, it can be concluded that the awareness of driving safely amongst high school and university students is still low. Time pressure is the most influential aspect of speeding. Consequently, there needs to be an effort to escalate the mindfulness of driving the middle of the younger population more excitingly, according to the spirit and the character of youngsters. Law enforcement, which is more strict, as well as consistent, would inflict a positive impact on the handling of diminishing the act of speeding.

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