

Distraction and Driving Behavior of Young Indonesian Drivers: An Exploratory Study

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Abstract

Driver distraction was found to be one of the main reasons for the traffic accidents. Latest studies have shown that engaging with distraction while driving will positively affect the driver's driving behavior. However, the effect on young drivers might be varied due to the personality and skill differences. This study aims to explore the Indonesian young driver distraction and its impact on their driving behavior, which is measured using SDDQ (Susceptibility to Driver Distraction Questionnaire) and DBQ (Driver Behavior Questionnaire). A total of 332 participants, divided into different age groups (17-24 years old; 25-44 years old; and 45-64 years old) from all across Indonesia, were voluntarily involved in the study. The result shows that those who often engage in distraction while driving possessed a higher score on aberrant driving behavior. It was also found that young drivers tend to be more distracted while driving than older age groups. In addition, it is proven that age differences affect the driver's perception of distraction, which is in line with the possibility of risky driving behavior.

Keywords

Driver distraction, aberrant driver behavior, age group, young driver.

1. Introduction

Traffic law violations and accidents are common problems that we frequently encounter in every part of the world, including Indonesia. Findings by Jusuf et al. (2017) stated that in 2014, there are roughly 28.000 road accidents occurred in a year. Moreover, the research predicted that shortly, the aggregate would hit 40.000 accidents in a year. Comparatively speaking, the study also found that younger drivers tend to be involved in road accidents (NSHTA, 2016). In addition, Indonesia's Ministry of Transportation admitted that 61% of accidents are strongly related to human error.

Driver distraction is the activity that distracts the driver over its primary duty as a driver (Carney et al., 2018; Regan et al., 2011). Intriguingly, driver distraction, which is arguably one of the human errors, is found to be frequently present in young drivers (McDonald et al., 2014; Mahachandra et al., 2020). The research also stated that engaging in distractive activity while driving will increase the possibility of an accident. Generally, distraction can be divided into four categories: visual distraction, cognitive distraction, auditory distraction, and surrounding distraction (Regan et

al., 2009). For example, distraction could be present in driving by using a phone while driving, presence of passengers, or any other tertiary technological interaction inside the vehicle (Feng et al., 2014; Noble et al., 2021).

Another factor that contributed to the cause of accidents is the driver's behavior on the road. Driving behavior is a form of response by the driver due to the influence of external and internal factors at the moment of driving (Singh & Kathuria, 2021). Driving is indeed a complex activity that requires a decent skill. It involves the driver's physical, cognitive, sensory, and psychomotor simultaneously. Therefore, besides technical driving skills, it is also necessary to possess knowledge, proficiency, and maturity to control oneself in responding to the surroundings while driving. The driver has to control their behavior and emotion regardless of the social and environmental shifts on the road. (Keating & Halpern-Felsher, 2008).

A young driver is viewed as a growing individual, which is in a phase where maturation and development occur in terms of physical, cognitive, and emotional aspects (Scott-Parker, 2017). Compared to other age groups, the young driver possesses risk-taking traits (Masten, 2014). These adolescents also carry a lesser grasp on imminent danger (Wang et al., 2014), and it is easier to fall to distractive driving (Qin et al., 2019).

Numerous researches discussed how a younger driver is involved in most road accidents while understanding the causal factor that played its part in the occurrence. Nonetheless, studies that connects driving behaviour and driving distraction are rarely found, especially in Indonesia. One of them was done by Budiawan et al. (2017) which focuses on discovering the influence of driver's engagement to distraction on bus driver's driving awareness. Later, Mahachandra et al. (2020a) focused on the external distraction effect on car driver's behavior. Another type of distraction was studied by Mahachandra et al., (2020b), which focused on the effect of passenger's presence in a simulated study.

Based on the background and condition of the research and in-depth comprehension on previous studies, this research will aim to understand how drivers in Indonesia, either motorcycle or car driver, respond to distraction while driving. The study is set to view the behaviour of drivers upon responding to distraction such as the presence of passengers, radio, phone calls, texts, etc. In addition, age differences of the driver will also be explored in this study to unveil the behaviour contrast on each age group. The following will be the aim of this exploratory study: 1) To measure the driver's response toward distraction and their driving behaviour using self-reported method; 2) To record the demographic condition, particularly respondent's age to find the impact on self-reported examination; 3) To know the relation between driving behaviour and driving distraction.

2. Literature Review

The base of this research is referring to transportation safety which belongs to the OSH (occupational safety and health) part of ergonomics, whereas OSH is viewed as procedure and system engineered to minimize possibility of accidents regardless its lethality (Pitt & Shew, 2017). The presence of this topic in research hopefully will decrease the mortality rate caused by road accidents (Roger, 2006). Lethal outcome of road accidents might occur because of several factor, such as human factor, road factor, vehicle condition factor, or even natural/climate factor while driving (Enggarsasi & Sa'diyah, 2017).

Driving is considered as a compounded activity which simultaneously involve the psychomotor, cognitive, physical and sensorics aspect of the driver (Keating & Halpern-Felsher, 2008; Parnell *et al.*, 2018; Regan *et al.*, 2009). Activity of driving physiologically included head rotation, hand motion and gestures, eye-gaze dynamics, body movement, and foot dynamics in the same time (Xing et al., 2020). To be bear in mind, it took maturity and comprehension about driving itself so the individual can drive safely while facing the traffic and environment that might occasionally shifts while driving (Wang et al., 2014).

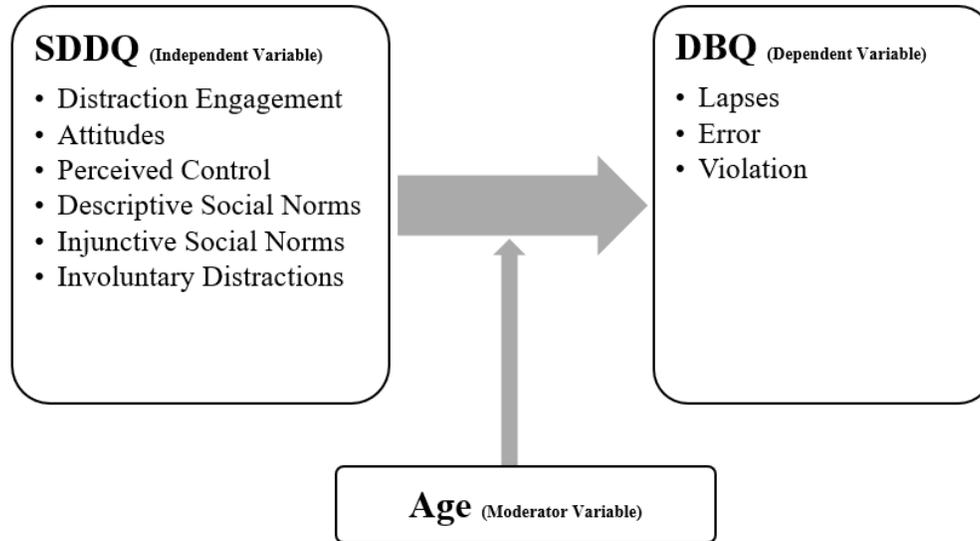


Figure 1. Present Study

The study is set to comprehend how distraction could possibly affecting the aberrant driving behaviour (Figure 1). Demographic data is collected in accordance to previous studies whom evidently found that age is a crucial factor affecting the relationship on both dependent and independent variables. Studies also prove that due to the fact that adolescents is the phase where development, maturation and changes in term of physical, cognitive and mindset occurs, young driver possess higher chance to perform risky driving behavior and often times involved in road accidents. (Regev et al., 2018). On the other hand, engagement on distraction is also a contributing factor that cause road accidents on the young driver (Alderman et al., 2018; Carney et al., 2018).

This study is the first to utilize self-reported method on driving distraction in Indonesia. There are several studies on the same topic which utilize other method such as eye tracking (Le et al., 2020), reaction time (Charlton, 2009), or even accident data research (Curry et al., 2011; Theofilatos et al., 2018). This research is also one of the few researches (Mahachandra et al., 2020b) utilizing self-reported method on driving behaviour. Other studies have shown to use different approach such as reaction time (Tarkowski & Rybicka, 2020) and previous accident research (Curry et al., 2011). In any case, the study on current topic with self-reported method is necessary to unveil any possibilities or rather strengthen the previous findings.

3. Methods

3.1 Participant

Respondent of this research are individuals that is eligible to possess a driving license and is required to fill the survey competently. In a about one month, 359 respondents participated in the research. However, only 332 are considered to be included and is suitable for the research. The respondents are divided into 4 age groups, namely 17-24 years old (n=235), 25-44 years old (n=57), 45-64 years old, and above 65 years old (n=3). The following Table 1 presents the details.

Table 1. Participant by Gender and Age

Sample	Age				Total
	17 - 24	25 - 44	45 - 64	65+	
Number of females	118	18	12	0	148
Number of males	117	39	25	3	184
Total	235	57	37	3	332

3.2 Measures and Statistical Analysis

To collect the necessary data, an online survey was conducted. The three-staged questionnaire was broadcasted online through various platform such as social media, organization announcement, etc. Basic demographic question such as age, gender, education, or even specific demographic question such as license ownership, vehicle type, driving frequency, and accident history will be present in the first stage of the questionnaire. The next two stages are intended to measure driving distraction and driving behaviour.

Measuring the driver distraction on the second stage, Susceptibility to Driver Distraction Questionnaire (SDDQ) taken from research by Feng et al. (2014) will be utilized. About 39 questions in SDDQ will translated beforehand into Bahasa Indonesia as it will be broadcasted for Indonesian. SDDQ will explore thoroughly about an individual’s attitude, perception and engagement on distraction such as phone calls, text & drive, setting the radio, etc. and is measured, using 5 points Likert-like scale. The scale 1 will represent “Never/Strongly Disagree” and the scale 5 will indicate “Very Often/Strongly Agree”. Particularly, for the involuntary distraction, there’s also the scale 0 for “never happened” to accommodate in case the participant never unconsciously distracted. However, the score 0 are not going to be processed.

To measure driving behaviour on the last stage, to examine the aberrant behaviour, the research will make use of Driving Behaviour Questionnaire (DBQ) from Lajunen et al. (2004). Similar to SDDQ, the DBQ questionnaire will be translated and adapted into Bahasa Indonesia in advance. There are 27 questions exploring about how a person engage on a driving error, lapses, and violations. DBQ will use 6 points Likert-like scale where 1 indicates never and 6 represent nearly all the time. For example, violation questions such as “Disregard the speed limit on a residential road”, or even error questions like “On turning left nearly hit a cyclist who has come up on your inside”, as well as questions about lapses that sounds like “Forget where you left your car in a car park” will be present in the questionnaire. Therefore, by analyzing the score, we will have an idea about the respondent’s driving behaviour.

The internal consistency of SDDQ and DBQ scale scores will be assessed by computing Cronbach’s alpha reliability coefficient using IBM SPSS 22. Moreover, as it was prior realized that the data wasn’t normally distributed, in case there are any comparison, correlation or regression examination on the data, non-parametric approach will be used in this research. Multiple regression analysis will be utilized to explore the relationship between driving distraction (SDDQ) and driving behaviour (DBQ) followed by analysis with age as moderator variable.

4. Results and Discussion

4.1 Reliability Analysis

Cronbach’s alpha is observed to know the consistency of each variable from SDDQ and DBQ as shown in Table 2. There is no data that is taken out since respondents are required to fill every question on the form completely. As there are only 3 data for the 65+ age group (Table 1.), therefore, only the other three age group mentioned before was thoroughly analyzed in this research. The test result indicated that all of points analyzed were indeed reliable.

Table 2. Cronbach’s Alpha reliability coefficient of the SDDQ and DBQ

Questionnaire	Variable	Cronbach’s alpha
	Distraction Engagement	0.709
Susceptibility to	Attitudes	0.705
Driver Distraction	Perceived Control	0.760
Questionnaire	Perceived Descriptive Norms	0.834
(SDDQ)	Injunctive Social Norms	0.774
	Involuntary Distraction	0.718
Driving Behaviour	Error	0.798
Questionnaire	Lapses	0.776
(DBQ)	Violation	0.855

In Table 2 we can clearly see that Cronbach’s alpha on every variable is above 0.6, which evidently confirm the reliability and consistency on the data collected by both questionnaires. On SDDQ the lowest number of α is on

the “Attitude” ($\alpha = 0.705$) while DBQ has “Lapses” ($\alpha = 0.776$). Nevertheless, every data on these variables is considered to be reliable.

4.2 Driver Distraction

Result showed that in overall, Indonesian driver had a decent comprehension on distraction. This was due to the fact that in Figure 2, medians of “Distraction Engagement” and overall “Attitude” fall below 3. However, if we parse closely on the respondents’ beliefs, particularly “Perceived Control” and “Injunctive Norms”, both were giving a rather bad indication since the median were about to hit 3, which means it is considered high. Moreover, median of “Perceived Descriptive Norms” soar above 3 which exhibit that Indonesian driver tend to be more affected to be distractive by perceiving other driver’s driving practice (Marulanda et al., 2015).

Feng et al. (2014) stated that the higher value in the attitude and beliefs section might beckon a higher confidence in driving ability. Unfortunately, higher confidence also indicate that there might be unsafe driving behaviour and risk taking, especially on young driver (Keating & Halpern-Felsher, 2008; Regan et al., 2011).

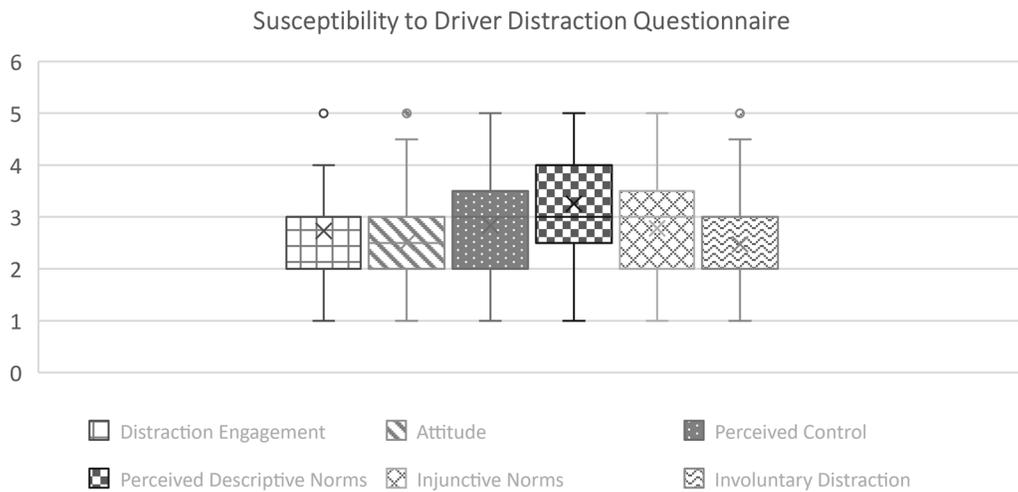
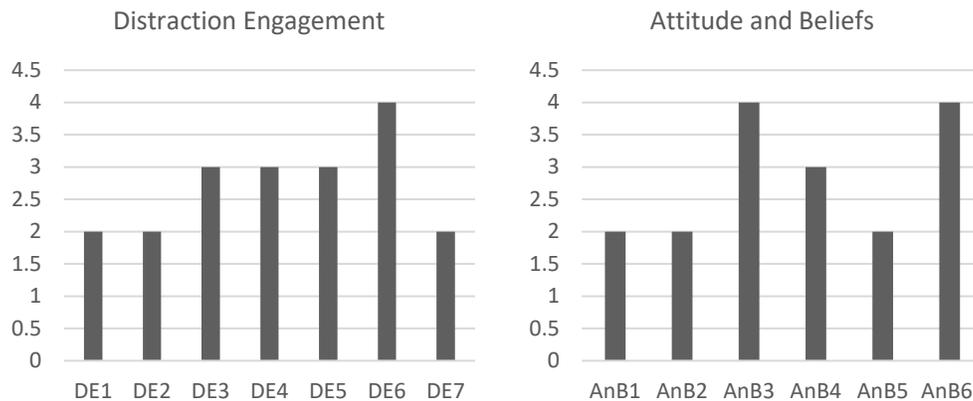


Figure 2. Mapping Median Value of SDDQ Variables



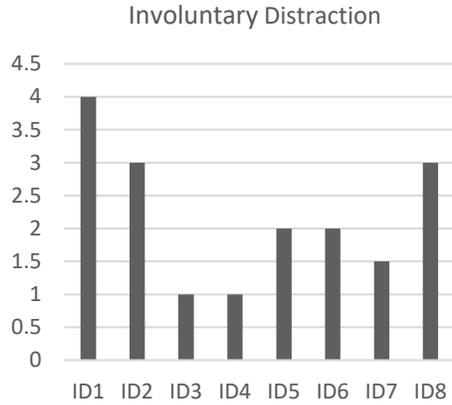


Figure 3. Mapping Median Value of SDDQ Items

If we do an in-depth view on Figure 3, the presence of occupants in the car” or DE6 evinced the highest median among its counterpart. It is aligned with the fact that median on other 6th indicators of attitude and beliefs were high as well. It can be inferred accordingly to Feng’s research that drivers who held higher confidence tend to score lower on that indicator on “Involuntary Distraction”, Hence, retaining the possibility of declining awareness due the presence of passenger. Driver’s awareness could be affected by presence of passenger contingent on their driving experience (Chandrasekaran et al., 2019; Ledesma et al., 2010).

4.3 Driver Behavior

On the other hand, it was found that Indonesian driver relatively had a rather good driving behaviour due to the median score of each variable that fall below 3. Still, comparing to other infringement, “Lapses” contributed the highest number on the median, meaning people tend to carry out lapses. Although violation contributed more number since it has more indicator than other variable (Figure 4.).

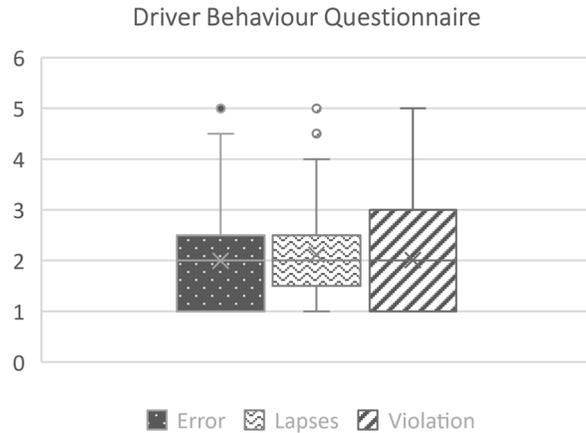


Figure 4. Mapping Median Value of DBQ Variables

On Figure 5, we can discern that 2 lapses indicator that had the highest median was faulty choice of path while going somewhere (L2) and shortfall to remember the road that was just passed (L8).

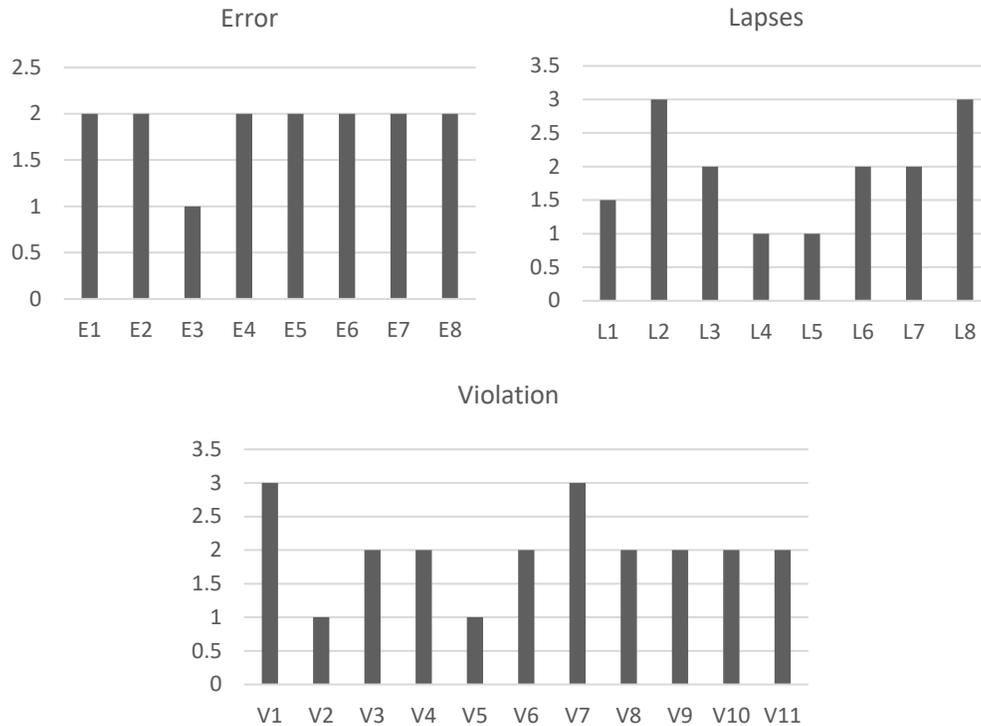


Figure 5. Mapping Median Value of DBQ Items

Infringement in form of lapses refer to the memory insufficiency of the driver (Cordazzo et al., 2014) and is one of the sign that the driver had drawbacks on attention and awareness while driving (Parker et al., 1995). The drawback on attention could also be caused by the presence of occupant, especially if the person is coeval with the driver (Allen & Brown, 2008).

4.4 The effect of driver distraction on driver behavior

Multiple regression analysis showed that there's a causal connection on driver who regularly distracted while driving and aberrant driving behaviour.

Table 3. Multiple Regression Analysis between SDDQ and DBQ

Variable	Unstandardized Beta coefficient	t value	Sig.
constant	0.315	1.340	0.181
Distraction Engagement	0.384	6.668	0.000
Attitude and Beliefs	0.192	2.901	0.004
Involuntary Distraction	0.118	2.580	0.010
F value		38.358	
R Square		2.61%	

Based on Table 3, it was found that there was a significant influence between driver distraction on driving behavior whereas the biggest influence was given by the distraction variable with a non-standard beta coefficient of 0.384 and while also contribute a partial effect with a t-value of 6.668. Driving behaviour was also influenced by attitude and beliefs and unintentional disturbances with a non-standard beta coefficient consecutively 0.192 and 0.118, with t values of 2.901 and 2.580. The regression also indicated that the SDDQ variable simultaneously had an influence on the DBQ variable with an F value of 38.358, whereas the influence of SDDQ on DBQ is 2.61%. In short, the

distraction variables of engagement, attitude and belief, and involuntary disorder could be used as predictors of the driver's self-reported method of distraction on driving behavior in Indonesia.

4.5 Relation driver distraction with the driver age group

Regression analysis with moderator variable was carried out by including the age group to see if age difference had an effect on driver distraction and driving behavior. The calculation is done by comparing the simple regression model on SDDQ to DBQ, with the addition of "age" on its equation. Table 4 shows that there is a significant effect between driver distraction and driving behavior when the age variable is appended.

Table 4. Moderation Regression Analysis with Age Group Variable

Output	Without moderator variable	With moderator variable
R	0.461	0.476
R Square	0.212	0.227
Sig.	0.000	0.000
df	1	3

It was found that the age factor had a greater influence on DBQ as indicated by an increase in R square value. for example, initial regression model with a value of 0.212 became 0.227 when age is taken into consideration. Chen et al. (2016) in their research stated that age can be a significant factor to indicate the driver's involvement in a distraction during driving, moreover, reported using the self-reported method.

Several studies in the past have identified how age factors affected the behaviour of distracted driver such as, the presence of personality and emotional differences between age groups (Lucidi et al., 2019), dissipation on driving experiences that affect understanding of road hazards between age groups (Scott-Parker, 2017; Wang et al., 2014), self-confidence in term of driving ability (Chen et al., 2016), situational awareness of experienced and inexperienced drivers (Chandrasekaran et al., 2019), and how age factor affects the distraction engagement's frequency (Qin et al., 2019).

5. Conclusion

This study aims to explore whether there is an influence on driving behavior in case a driver is involved in distraction and also wanted to discern whether a person's age has an effect if it is used as a moderator variable on driving behavior. Although this research was a limited and subjective research intended to car and motorcycle driver, it was found that each item on the SDDQ and DBQ was able to assess distraction or even driving behaviour quite well.

Based on the data collection and analysis that has been carried out, it was found that in Indonesia, the tendency of a person's driving behavior might be influenced by the driver's involvement in distraction while driving. The respondents of this study were dominated by young Indonesian drivers ranging from 18 – 24 years old. It was also found that the majority of respondents were more often involved in conversations with passengers which resulted in declined driver alertness and lapses in driving.

The existence of the moderator variable also had a significant influence on driving behavior, in which, may occur due to differences in experience and comprehension related traffic hazards. Indeed, it might have an impact on the emergence of risky driving behavior in young Indonesian drivers in line with the increase of accidents. further research could can be done on one vehicle object to increase accuracy of the research. Conducting objective research could also be a choice to better understand other factors that may influence driving behavior.

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