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Aggressive Driving and the Risk of Driving toward to Drivers

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Abstract:- Driving is one of the activities carried out by some people to move from one location to another, there are still accidents and violations caused by bad driving behavior. For this reason, this study aims to describe the risk of driving caused by aggressive behavior while driving and driving safety attitudes which are the mediating variables in this study. This study uses a driving simulator and city car driving software. Subjects were divided into two groups, the experimental group and the control group. After using a driving simulator, the subject filled out a driving risk questionnaire and a driving safety attitude scale. The results obtained that there is an influence between aggressive driving and risky driving behavior mediated by attitudes towards driving safety has an influence value of 78.5%.

Keywords:- *Aggressive Driving, Risky Driving Behavior, Attitude Towards Driving Safety.*

I. INTRODUCTION

Driving or driving a vehicle has become an activity carried out by some people in several countries, they use vehicles for their daily activities and to move from one location to another. Driving is a daily activity that many people do in their activities, it is common for individuals to drive themselves or even use other transportation services to move from one location to another.

Road users should respect each other and be able to comply with applicable traffic signs or regulations, but there are some drivers who behave aggressively when he or she is driving [1]. Driving behavior is still one of the occurrences of accidents due to negligence of the driver himself, such as drowsiness and fatigue [2], in addition to the use of cellular phones is one of the causes of accidents [3] [4] [5].

When the driver is driving, the driver tends to have a variety of different behaviors, for example when pressing the gas pedal, pressing the brakes, and even holding the steering wheel [6]. This form of behavior creates risks. When driving occurs, one form of risk that often occurs is accident, namely driver negligence, wrong driving technique, bad driving etiquette, misreading signs, the ability of the driver to control his vehicle, and the vehicle factor is still one of the causes of accidents in Indonesia.

One of the research conducted in October 2020 stated that drivers in Indonesia have a fairly good safety index, this is evidenced by three aspects of measurement, namely knowledge has a percentage value of 86%, attitude aspect is 83% and behavior has a low index of 58% [7]. This behavior is still the main factor for the creation of safe driving behavior for everyone on the highway.

Some drivers lose concentration when driving [8] and lose control of their vehicle [8][4][9][10], this is the cause of the accident. Accidents often occur in two-wheeled vehicles than four-wheeled vehicles. According to the Global Status Report on Road Safety in 2015, almost every year worldwide accidents occur more than 1.25 million people die due to road accidents and occur in almost 90% of countries. Based on this data, it is hoped that each country has a campaign about the importance of safety when driving and makes motorists aware of the road safety [11].

Risky driving behavior is behavior that takes risks while driving, engaging in behaviors such as speeding, driving while doing other things such as drinking and phoning while driving [12]. Drivers not only have risks when driving, but drivers can drive aggressively, such as commenting on other drivers when they are slow-driving, getting angry when traffic jam occurs and drivers often cutting other drivers' lanes when they are in a hurry [13]. Aggressive driving behavior is a type of behavior that can physically or emotionally injure other people, both drivers and pedestrians [14].

Aggressive driving is a way of driving that is based on social interaction and engaging in competitive behavior when driving that can be considered aggressive. In addition, aggressive driving behavior is associated with negative thoughts and emotions that can be related to environmental stress when driving so that drivers drive aggressively [15].

The human error factor of driving behavior is usually dominated by behavior and ability to drive, related to road conditions and infrastructure factors, such as the absence of traffic signs. Various types of human errors such as fatigue, drowsiness, using cell phones, playing music at high volume, talking to other passengers, eating and drinking or using GPS, ignoring applicable signs, not using seat belts, driving at high speed and there are characteristic factors as well as habits of the drivers themselves [2]. This affects attitudes towards driving safety. Safety driving attitude is one of the most popular strategies in promoting road safety,

which aims to change a drivers attitude and provide an understanding of the perceived risk associated with driving [16].

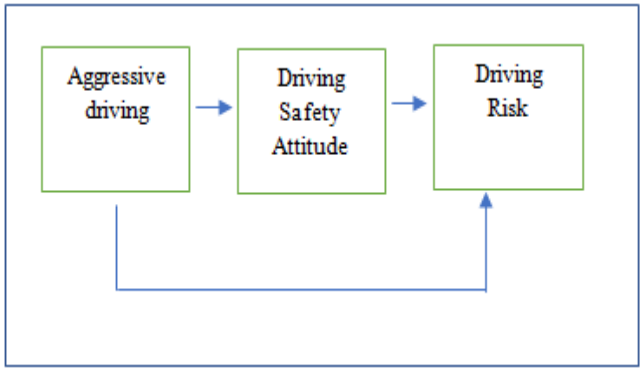

Fig 1. Framework

Based on those statement, Ajzen interested in studying how the important beliefs held by individuals for understanding how they decide to behave and also how their beliefs predict their willing to do subsequently behavior [17]. Acording to Ajzen, Theory Planned Behavior or TPB[17] is aimed at understanding the types of behavior that do not have to be under the control of one's will, basically one's beliefs are structured based on a framework of values and expectations, in other words, one has expectations about what results the individual should get if the individual behaves in a certain way. At the same time, the individual believes about the value of those outcomes for themselves.

Research by Tauhid states that many motorcycle associations or people who have a hobby of driving uphold the value of safety riding while driving. Safe behavior when driving must be fostered from an early age, where drivers are asked to have a safety attitude when driving and drivers are expected to reduce the existing driving risks [18]. States that motorists practice safety driving attitudes such as paying attention to the condition of the machine, the compliance with applicable traffic regulations, the use of driving equipment such as helmet use for motorcycle users or the use of safety belt for car users, and the health of the driver is part of a safety attitude. Driving must be socialized to reduce risks when driving on the highway [18].

Research that has been conducted by Chrisnatalia, Karmilasari & Putri, the initial research was conducted by distributing questionnaires using the google form tool and the results showed that driving safety attitudes and aggressive driving contributed 44.5% to the risky driving behavior and based on data descriptively, drivers who drive themselves have a high risk. An addition to the gender of drivers, both male and female, there is a significant difference regarding the risk of driving because both men and women have the same risk. Previous research was an initial study to determine the description of driving risks for drivers and researchers continued research using driving simulator aids in 2020. The data collection was carried out in the laboratory with the help of software city cay driving 5. These results were to strengthen whether the description in filling out the questionnaire really occurred when testing directly using a driving simulator [19].

Therefore, in this paper, the researcher wants to know whether aggressive driving is the cause of driving risk and whether aggressive driving can be shifted by driving safety attitudes can affect driving risk for drivers.

II. METHOD

A. The Design of The Study

This study designed by using an experimental design, where the subjects were divided into two groups, namely the experimental group and the control group. The experimental group got a density level of 75% and the control group got a density of 50% as when driving normally.

Fig 2. Driving Simulation

Researchers used software city cay driving 5 and used driving simulator tools such as three screens as vehicle windshields, and researchers used Logitech steering wheels and pedals G29 equipment. City Car Driving is a tool designed so that users can experience driving in a big city with a variety of different road situations, traffic density levels, and the types of cars so that makes the driver feel like driving a real situation or realistic car. By using this tool, individuals are invited to learn traffic rules effectively and can improve their driving skills [20].

After the research subjects used the simulator, the driver was asked to fill out a questionnaire on aggressive driving, driving safety attitudes and driving risks.

B. The Simulator Setting

The research was divided into two group. The first group was given treatment with a road density of 75% and the number of pedestrians as much as 75%. This was done to find out how safe the driver was driving his vehicle in traffic jam, crowded situation, and numbers of pedestrians suddenly appeared to cross the street. The second group was treated with a density level of 50% and the number of pedestrians as much as 50%. This is like a normal road condition with a road density which tends to be moderate. Researchers get results from the driving simulator tool in the form of the number of accidents experienced by the subject and the large number of violations occur. The driving simulator is located in one of the rooms at Gunadarma University, Depok, West Java, Indonesia. The simulator is in figure 2

C. Population and Sampling Technique

The population used in this study were drivers who were in the age range of 18-45 years, the researchers used a sample of 30 participants, with the criteria of having a driving license (SIM) for at least 1 (one) year and using a car in daily activities. The 30 research samples were divided into two groups, namely the experimental group and the control group.

D. Measurement Scale

The scale of risky driving behavior has three components in measuring risky driving behavior, namely speed (driving speed), rule violation and self assertiveness [16]. The measurement instruments are Driving Anger Expression Inventory scale with verbal aggressive expression factors, personal physical aggressive expressions, and the use of vehicles to express anger [21]. The attitude scale towards driving safety consists of three dimensions, namely traffic flow vs. compliance with rules, speeding and funriding [16][22].

E. Data Analysis

The data analysis technique used is a regression technique by testing aggressive driving variables that can affect risky driving behavior and testing aggressive driving variables that can affect risky driving behavior which is shifted by safety attitudes in driving.

III. RESULT AND DISCUSSION

Based on the driving simulator data, they are grouped into three things, namely events, accidents and violations. Events are generalized data by the simulator to see the driver's response to various types of pedestrian behavior crossing carelessly, there are other accidents that do not involve the driver, and there are other vehicles that overtake or cut the respondent's path. Accident is a situation that occurs when the driver is driving, either hitting another driver or the respondent hitting a pedestrian. Violations are various types of violations committed by drivers in the simulator. The description is contained in table 1.

Based on the test results that have been carried out by the researcher, the item discrimination power test is obtained by looking at the corrected item-total correlation value. Azwar said that the item discrimination power index is an indicator of alignment or consistency or item function with the overall scale function known as total item consistency [23]. The reliability test in this study was obtained from the Cornbach Alpha variation analysis. The risk of driving has an item discrimination rating of 0.387-0.777 and has a reliability value of 0.904. For the attitude towards driving safety, the item discrimination power value is 0.631-0.866 and the reliability value is 0.949 and the last variable is aggressive driving which has an item discrimination power value of 0.452 and a reliability value of 0.995.

Based on the correlation test and the regression test, the results showed that aggressive driving and risky driving behavior had a correlation value of 0.875 and a significance value of 0.000, which means that aggressive driving and risky driving behavior have a very significant relationship.

Safety driving attitudes and risky driving behavior have a correlation value of -0.840 and have a significance value of 0.000 which means that the driving safety attitudes to the risky driving behavior has a negative relationship and has a regression value of 0.706. This means that driving safety attitudes have an effect of 70, 6% to the risky driving behavior on the car drivers. In addition to aggressive driving, driving safety attitude has a regression value of 0.785.

Based on the results of the hypothesis test, aggressive driving is associated with risky driving behavior, this is because some individuals tend to drive aggressively when driving and the raise risky driving behavior, as did some drivers in Indonesia who tend to do this behavior when they are on the road that tends to in an empty condition or the individual feels rushed for time. Research states that aggressive driving can predict risky driving outcomes such as accidents, receiving a ticket from the police, and suspension of license. Aggressive driving is the risk factors that cause accidents [24]. Based on the results of the simulator, it was found that some drivers who had a driver license for more than 5-10 years avoid few violations, even though they were given a 75% road density. This is because individuals can travel with focus and can avoid the difficulties.

In addition, there is a negative relationship between attitudes towards driving safety and risky driving behavior. These results due to individuals that, in this study, are having a good attitude when driving so that such behavior lowers the risk of accidents occurring. Individuals who drive with focus and calm can reduce driving risk behavior. The results obtained in the use of the simulator are that individuals who focus drive have fewer violations and make fewer mistakes.

In testing the relationship between the mediating variable and the independent variable, it was found that aggressive driving has a negative relationship with driving safety attitudes. It appears because individuals who behave aggressively have low attitudes towards driving safety attitudes. This is evidenced by the driving simulator results that some subjects in the experimental group received violations such as not wanting to give in to other drivers or pedestrians and blocking other drivers. This behavior often occurs when they are on the road. The frequent accidents are caused by drivers who are ignorant to other people such as pedestrians, cyclists, and even other vehicles.

This is like research conducted by Fruhen and Flin which states that car drivers tend to show aggressive driving behavior towards other motorists, cyclists more specifically, but not excessively aggressive behavior towards cyclists [25]. Another study conducted in Vietnam explained that pedestrians are asked to be more inculcated in traffic safety attitudes so that pedestrians can be safer when walking on the highway and do not ignore signs for pedestrians and can

provide input for the government to campaign the safety for pedestrians [26].

Other results show that driving safety attitudes have an effect of 70.6% on risky driving behavior. However, in the simulator it was found that almost all drivers made mistakes, one of which was driving above the driving speed limit. In Indonesia, many drivers drive above the average speed, which is above 80km/hour, this often happens on the roads that look empty so that the driver tend to drive in the high speed. Drivers often ignore the speed limit that has been set by the government. In addition, the Indonesian government tries to reduce and provide a deterrent effect to motorists who drive above the average speed by installing a speed detection device on one of the freeways so that drivers caught by the device will receive a ticket [27].

Based on the results of the regression test between aggressive driving and risky driving behavior that is shifted by attitudes towards driving safety, it shows an influence value of 78.5%. Aggressive driving behavior can be the cause of risky driving behavior and can be reduced by attitudes towards driving safety but aggressive behavior that is still has a high enough value as an influence. This can happen if the driver does not respect himself in order to safely get to the final destination of driving.

IV. CONCLUSIONS AND SUGGESTIONS

The conclusion of this study is the risk of driving has an influence with aggressive driving and driving safety attitudes become a good mediating variable for risky driving behavior. This is evidenced by the acceptance of the hypothesis in this study. Based on the experimental results, there are no significant differences related to violations, accidents, or events recorded in the driving simulator, both in the experimental group and in the control group on the risk of driving.

Suggestions in this study is to multiply more for research subjects used for further experimental research and consider using personality type as one of the independent variables in further research and can add other road settings than highways.

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ATTACHMENT

Table 1. Table of results of driving simulator software

No	Group	Inisial	Results of driving simulator software					
			Event	*n*	*Accident*	*n*	*Violation*	*n*
1	1	TM	Slipped vehicle	2	Accident	2	Crossing the line without breaking	2
			Vehicle accident	3			Running a red light	1
			Crossing the street carelessly	2			Blocking other vehicles	3
							Don't use a signal	4
							It will not budge with another vehicle	1
							Entering/exiting the wrong lane and going against the flow of traffic	2
2	1	T	Vehicle accident	2	Accident	6	Sudden stop	11
			Crossing the street carelessly	1	Pedestrian accident	2	Less/over speed limit	4
							Crossing the line without breaking	2
							Running a red light	1
							Change lane	1
							Blocking other vehicles	1
							Don't use a signal	20
							It will not budge with another vehicle	3
							Entering/exiting the wrong lane and going against the flow of traffic	6
3	1	M	In vehicle skid	1	Accident	3	Sudden stop	3
			Vehicle accident	2	Pedestrian accident	1	Less/over speed limit	13
			Crossing the street carelessly	2			Crossing the line without breaking	5
			Sudden brake	3			Running a red light	1
							Back off	1
							Don't use a signal	12
							It will not budge with another vehicle	1
4	1	R	Sudden brake	2	Accident	4	Sudden stop	4
			In vehicle skid	1	Pedestrian accident	1	Less/over speed limit	23
			Vehicle accident	4			Crossing the line without breaking	1
			Crossing the street carelessly	1			Running a red light	1
							Don't use a signal	11
							Entering/exiting the wrong lane and going against the flow of traffic	2
5	1	N	Diselip kendaraan	1	Accident	3	Sudden stop	2
			Vehicle accident	1			Less/over speed limit	3
			Crossing the street carelessly	3			Crossing the line without breaking	1
							Running a red light	3
							Blocking other vehicles	3
							Don't use a signal	7
							Entering/exiting the wrong lane and going against the flow of traffic	2
6	1	G	Vehicle accident	2	Accident	7	Sudden stop	3
			Crossing the street carelessly	2	Pedestrian accident	1	Less/over speed limit	9
			Sudden brake	2			Crossing the line without breaking	4
							Running a red light	2
							Blocking other vehicles	3
							Don't use a signal	11
							It will not budge with another vehicle	1

No	Group	Inisial	Results of driving simulator software					
			Event	*n*	*Accident*	*n*	*Violation*	*n*
							Entering/exiting the wrong lane and going against the flow of traffic	5
7	1	T	Vehicle accident	1	Accident	1	Less/over speed limit	6
			Crossing the street carelessly	3			Crossing the line without breaking	1
							Back off	2
							It will not budge with another vehicle	1
							Entering/exiting the wrong lane and going against the flow of traffic	1
8	1	Su	Vehicle accident	2	Tidak mengalami Accident	-	Crossing the line without breaking	2
							Running a red light	2
							Don’t use a signal	3
							It will not budge with another vehicle	1
							Entering/exiting the wrong lane and going against the flow of traffic	1
9	1	Da	In vehicle skid	1	Tidak mengalami Accident	-	Crossing the line without breaking	2
			Vehicle accident	1			Running a red light	2
							Not wearing a seat belt	1
							Don’t use a signal	3
							It will not budge with another vehicle	1
							Entering/exiting the wrong lane and going against the flow of traffic	4
10	1	Do	Vehicle accident	3	Tidak mengalami Accident	-	Crossing the line without breaking	2
			Crossing the street carelessly	1			Running a red light	1
			Sudden brake	1			Blocking other vehicles	3
							Don’t use a signal	11
							It will not budge with another vehicle	1
							Entering/exiting the wrong lane and going against the flow of traffic	3
11	1	E	In vehicle skid	1	Tidak mengalami Accident	-	Sudden stop	2
			Vehicle accident	2			Crossing the line without breaking	3
			Crossing the street carelessly	4			Running a red light	1
							Blocking other vehicles	1
							Don’t use a signal	16
							It will not budge with another vehicle	1
							Entering/exiting the wrong lane and going against the flow of traffic	1
12	1	DK	In vehicle skid	1	Accident	2	Less/over speed limit	15
			Vehicle accident	2			Crossing the line without breaking	2
			Crossing the street carelessly	1			Running a red light	1
			Sudden brake	1			Don’t use a signal	11
							It will not budge with another vehicle	1
							Entering/exiting the wrong lane and going against the flow of traffic	2
13	1	NV	Vehicle accident	3	Tidak mengalami Accident	-	Crossing the line without breaking	1
			Crossing the street carelessly	1			Running a red light	1
							Wrong direction signal	1
							It will not budge with another vehicle	1
							Entering/exiting the wrong lane and going against the flow of traffic	1
14	1	JM	In vehicle skid	1	Accident	1	Sudden stop	1
			Vehicle accident	1			Less/over speed limit	11
			Crossing the street	3			Crossing the line without breaking	7

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No	Group	Inisial	Results of driving simulator software					
			Event	*n*	*Accident*	*n*	*Violation*	*n*
			carelessly					
							Running a red light	1
							Change lane	2
							Wrong way	1
							Don't use a signal	8
							It will not budge with another vehicle	2
							Entering/exiting the wrong lane and going against the flow of traffic	6
15	1	IA	Vehicle accident	2	Tidak mengalami Accident	-	Less/over speed limit	7
			Crossing the street carelessly	1			Crossing the line without breaking	1
							Don't use a signal	2
16	2	MF	Vehicle accident	3	Accident	3	Less/over speed limit	23
			Sudden brake	2			Crossing the line without breaking	3
							Blocking other vehicles	1
							Wrong way	1
							Don't use a signal	7
							It will not budge with another vehicle	1
							Entering/exiting the wrong lane and going against the flow of traffic	2
17	2	AL	Vehicle accident	1	Accident	2	Crossing the line without breaking	2
			Crossing the street carelessly	2			Running a red light	1
			Sudden brake	1			Don't use a signal	3
							It will not budge with another vehicle	1
							Entering/exiting the wrong lane and going against the flow of traffic	1
18	2	F	In vehicle skid	1	Accident	2	Crossing the line without breaking	3
			Vehicle accident	1			Don't use a signal	15
			Crossing the street carelessly	2			It will not budge with another vehicle	1
			Sudden brake	1			Entering/exiting the wrong lane and going against the flow of traffic	2
19	2	EV	Vehicle accident	2	Tidak mengalami Accident	-	Crossing the line without breaking	1
			Crossing the street carelessly	1			Running a red light	1
			Sudden brake	1			Wrong way	1
							Don't use a signal	2
							It will not budge with another vehicle	1
							Entering/exiting the wrong lane and going against the flow of traffic	1
20	2	RI	In vehicle skid	1	Accident	1	Less/over speed limit	7
			Vehicle accident	1			Crossing the line without breaking	1
			Sudden brake	2			Blocking other vehicles	1
							Wrong way	1
							Don't use a signal	7
							Entering/exiting the wrong lane and going against the flow of traffic	1
21	2	SI	Vehicle accident	2	Tidak mengalami Accident	-	Sudden stop	2
			Crossing the street carelessly	1			Less/over speed limit	4
							Crossing the line without breaking	1
							Running a red light	1
							Don't use a signal	3
							It will not budge with another vehicle	3
							Entering/exiting the wrong lane and going against the flow of traffic	2

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No	Group	Inisial	Results of driving simulator software					
			Event	*n*	*Accident*	*n*	*Violation*	*n*
22	2	MS	In vehicle skid	2	Accident	1	Less/over speed limit	3
			Vehicle accident	2			Crossing the line without breaking	2
			Crossing the street carelessly	2			Running a red light	2
			Sudden brake	1			Too close to other vehicles	1
							Don't use a signal	3
							Entering/exiting the wrong lane and going against the flow of traffic	1
23	2	RO	In vehicle skid	2	Accident	3	Less/over speed limit	2
			Vehicle accident	2			Crossing the line without breaking	3
			Crossing the street carelessly	1			Running a red light	2
			Sudden brake	1			Don't use a signal	13
							It will not budge with another vehicle	3
							Entering/exiting the wrong lane and going against the flow of traffic	2
24	2	F	In vehicle skid	1	Accident	4	Less/over speed limit	17
			Vehicle accident	2			Crossing the line without breaking	3
			Crossing the street carelessly	1			Running a red light	1
							Don't use a signal	10
							It will not budge with another vehicle	1
							Entering/exiting the wrong lane and going against the flow of traffic	1
25	2	M	In vehicle skid	1	Tidak mengalami Accident	-	Less/over speed limit	5
			Vehicle accident	1			Crossing the line without breaking	2
			Sudden brake	1			Running a red light	1
							Blocking other vehicles	1
							Don't use a signal	13
							It will not budge with another vehicle	2
							Entering/exiting the wrong lane and going against the flow of traffic	1
26	2	K	Vehicle accident	2	Tidak mengalami Accident	-	Sudden stop	1
			Crossing the street carelessly	1			Crossing the line without breaking	1
							Blocking other vehicles	1
							Don't use a signal	1
							It will not budge with another vehicle	2
27	2	AD	In vehicle skid	2	Accident	2	Less/over speed limit	7
			Vehicle accident	3			Crossing the line without breaking	3
			Sudden brake	2			Don't use a signal	6
							It will not budge with another vehicle	2
							Entering/exiting the wrong lane and going against the flow of traffic	2
28	2	AS	Vehicle accident	2	Accident	2	Less/over speed limit	2
			Crossing the street carelessly	2	Pedestrian accident	1	Running a red light	1
							Blocking other vehicles	1
							Don't use a signal	5
							Entering/exiting the wrong lane and going against the flow of traffic	1
29	2	Sar	In vehicle skid	1	Accident	1	Sudden stop	1
			Vehicle accident	1			Crossing the line without breaking	2
			Crossing the street carelessly	1			Running a red light	1
							Not wearing a seat belt	1

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No	**Group**	**Inisial**	**Results of driving simulator software**					
			Event	*n*	*Accident*	*n*	*Violation*	*n*
							Don't use a signal	7
							It will not budge with another vehicle	1
							Entering/exiting the wrong lane and going against the flow of traffic	3
30	2	Dod	Vehicle accident	4	Accident	1	Crossing the line without breaking	4
							Running a red light	1
							Blocking other vehicles	1
							Don't use a signal	6
							Entering/exiting the wrong lane and going against the flow of traffic	2