

MEDIATION EFFECT OF DRIVING BEHAVIOR ON PERSONALITY INFLUENCE TOWARD DRIVING OUTCOMES IN INDONESIA

Siti Haerani¹, Indrianty Sudirman¹, Wardhani Hakim¹,
A Sugeng Sapta Adji², Rika Dwi Ayu Parmitasari³,
Nasaruddin Amin³, Elsian Huberta Aponno³, Zany Irayati Aunalal³

***Abstract:** Traffic accident needs to gain serious attention. Although it has been a social and economic issue almost in all parts of the world instead of showing decreasing rate, describing a significant increase. Moreover, personality, as the distinguisher of each individual in behaving, is considered having a big role in establishing driving behavior in South Sulawesi. This research was conducted in order to know the effect of mediating variables driving behavior on personality influence on driving outcomes where motorists were injured and treated at a hospital or health center in Makassar during certain period of months into the study population. The approach used is a quantitative approach in conducting the data analysis, inferential statistical analysis methods of analysis used to test the hypothesis of the research is Structural Equation Modeling (SEM). The results of the analysis suggest that there are significant direct influence between variable Personality of the Driving Behavior (M) and Driving Outcomes. Similarly, to for influence between the Driving Behaviour Outcomes were also significant addition there are also variable Driving Behaviour mediating effect on the influence of the Personality of the Driving Outcomes.*

***Keywords:** Mediation, Personality, Driving Behaviour, Driving Outcomes*

1. INTRODUCTION

Traffic accident needs to gain serious attention. Although it has been a social and economic issue almost in all parts of the world instead of showing decreasing rate, describing a significant increase. According to the data of World Health Organization (WHO), in the area of Southeast Asia, there are 34 fatalities in every hour due to traffic accident. The expense incurred by the accident reaches 14 billion US Dollars and is

¹ Lecturer, Department of Management, Faculty of Economic and Business, University of Hasanuddin, Makassar, Indonesia

² Lecturer, Kopertis Wilayah IX, Makassar, Indonesia

³ PhD Student, Department of Management, Faculty of Economic and Business, University of Hasanuddin, Makassar, Indonesia

expected to increase to 144 percent in the next two decades. Seeing this condition, without any real action, in 2020, traffic accident will be the killer number 3 in the world.

In Indonesia, based on the data of Indonesian National Police, there are 30 people died due to traffic accident. The rate of case in 2011 was 109.776 cases with mortality rate of 31.186 people (35% of the prevalence rate). Meanwhile, in 2012, the death prevalence was 27.441 people, which meant 39% of the prevalence rate. This incident is an analogy of iceberg emerging to the surface. We absolutely cannot escape of the transportation aspect, in which the vital role in supporting social and economic activities becomes the backbone. Therefore, this traffic accident issue evidently gives significant impact to different aspects of life.

According to Korlantas Polri (2010) and traffic accident unit (2009), that the main cause of the accident is: undisciplined action of the driver, unskilled driver, being emotional, being sleepy; speeding, not considering proper distance with other vehicle, not feasible vehicle; flat tire, slippery and broken road; unclear vision, intoxicated due to alcohol or drugs. Based on the data, it is seen that seven of 10 causes are human error.

Driving behavior between males and females differs seen from mobility, consciousness and fatigue aspects. Males tend to have high mobility level compared to females. Moreover, seen from consciousness and fatigue aspects, working females apparently complain more often compared to males. A study in Sweden, conducted to 1180 employees, it was found that a woman with low economic status was 1,4 times more likely to complain about fatigue compared to females with other social and economical strata, although this relationship was males. Moreover, males, particularly in Indonesia, as the head of family has mobility and longer working hour compared to the females, so that the possibility of fatigue greater than males. This surely influences how a person behaves when driving.

Risky behavior when driving, beside being affected by demographical factor, such as: age, gender, social and economical status, marriage status and ethnic/race, personality factor has direct contribution to risky behavior in driving (Dahlen et al., 2005). The personality factors are Anxiety, Anger, Excitement-Seeking, Altruism, and Normlessness. Those factors are sometimes known as Big Five personality factors, comprising: Anxiety (Neuroticism), Anger (Neuroticism), Excitement-Seeking (Extraversion), and Altruism (Agreeableness).

Observing the condition above, there is a predisposition that the high rate of traffic accident and violation in South Sulawesi, is triggered by people' driving behavior. Given that the big number of people deployed in 24 cities/regencies with 4 different ethnics, rapid economical growth, even exceeding Indonesian economical growth, are quite great demographical factor affecting the people' driving behavior. Moreover, personality, as the distinguisher of each individual in behaving, is considered having a big role in establishing driving behavior in South Sulawesi.

Based on the background and phenomenon above, the objective of this study is to investigate the effect of people's personality factor on driving behavior and the impact on the traffic accident and violation in the province of South Sulawesi. Originality for this paper shows: (1) Using driving behaviour as mediation effect for relationship between personality influence and driving outcomes, (2) Location of study as originality (no previous research for this relationship).

2. THEORETICAL BACKGROUND

2.1. Personality

McCrae in Robert Kreitner & Angelo Kinicki (2001) defines personality as the combination of stable physical and mental characteristics defining identity on an individual. These characteristics includes how a person's appearance, thought, action and emotion which are the results of genetic and environmental influences interact to each other. One dimension of personality mostly used in studies about behavior is Five Factor Model (FFM) and also known as The Big Five dimension. The dimension is Extraversion, agreeableness, conscientiousness, emotional stability and openness to experience.

Five Factor Model (FFM) has been used to predict different types of behavior, including driving behavior and accident involvement. Arthur and Graziano (1996) in Philipp Yorck Herzberg (2009) showed significant inverse relationship between conscientiousness and accident due to mistakes or violation. In the study conducted by Arthur & Doverspike in 2001 (Philipp Yorck Herzberg, 2009), accident found negatively correlated with Conscientiousness. Interestingly, accident data of the study conducted by Arthur et al., 2001 (Philipp Yorck Herzberg, 2009) was different with this relationship, that was yielding positive relationship with Extraversion. Other studies performed by Booth-Kewley and Vickers (1994) in Philipp Yorck Herzberg (2009) demonstrated that conscientiousness, neuroticism and agreeableness also significantly related to driving risk-taking. Meanwhile, Ulleberg and Rundmo (2003) in Philipp Yorck Herzberg (2009) also showed that the aspects of Extraversion, Agreeableness, and Neuroticism significantly related to driving behavior risk. On the other hand, agreeableness is the only dimension with negative correlation significant to the number of traffic violations, and accidents in the study conducted by Cellar, Nelson, and Yorke (1996) in Philipp Yorck Herzberg (2009). It is also noteworthy that several studies failed to associate FFM characteristics with criteria/driving rules (for example: Garrity & Demick, 2001). In brief, consistent pattern of relation has been found between Consciousness and driving behavior. Nevertheless, there has not been any consistent and clear pattern related to other FFM dimensions.

2.2. Driving Behaviour

Speed as the core of driver's behavior will show the type of driver's behavior. Driver's aggressive behavior is the behavior which commonly drives in high speed, too close

to the vehicle before it, not complying the rules, and often unreasonably changing lanes (UNESCE, 2004). This aggressive driving behavior is often performed by drivers over time and the drivers are mostly not aware of the behavior. In Global Web Conference on aggressive driving issue in Canada in 2000, aggressive driving behavior is defined as a driving behavior which intentionally increases the risk of collision and is motivated by impatience, annoyance, hostility, and attempt to save time (UNESCE, 2004).

Risky driving behavior can be characterized by several harmful actions or violations. Driving with the thought of themselves, speeding, and violating rules are the examples of risky driving behavior. Speeding is often investigated by Aarts and Van Schagen (2006) and Lam (2003) (Machin and Sankey, 2008). Speeding is even considered as one of accident contributors in highway regardless the driver's age and the skill (Elliott *et al.*, 2004). In addition, risky driving behavior will trigger bigger traffic risk and is possible to get police pursuit on the violation. Therefore, there is a predisposition that speeding is performed to avoid the possibility to be arrested by the police (McKenna and Horswill, 2006). Speeding will lead the drivers to other violations to avoid problem with the authorities.

A study conducted by Reason *et al.* (1990) showed that driving behavior can be seen through 4 factors that are errors, lapses, aggressive violations and ordinary violations. Aggressive violation is defined as a violation involving emotional and interpersonal component. Meanwhile, ordinary violation is defined as a violation without aggressive attitude with the indication of intention (Kontoyiannis *et.al*, 2002 in Constantinou, *et.al*, 2011). Based on the preceding study, it was found that traffic violation is the best prediction to reflect driving behavior and the level of negative driving outcomes (Parker *et. al*, 1995, Sumer, 2003, and Constantinou *et.al*, 2011). Thus, lapses (failure in memory and focus causing accident) and errors (driver's mistake) are included in unintended driving (Constantinou *et.al*, 2011). Based on the previous studies concerning driving behavior, this study will employ indicator shown in the study by Machin and Sankey (2008), Sumer (2003) and UNESCE (2004). Risky or aggressive driving behavior will be measured by looking at speed choice and traffic violations including errors and concentration failure.

2.3. Driving Outcomes

The outcome of negative driving is the impact of negative driving behavior. The results of negative driving include accidents and traffic violation as the result of negative driving behaviors (Constantinou, 2011). The relation between skill, behavior and accident rate is a complex relation. Driving behavior has a proximal relationship with accident or violation rate. There are even several factors such as demography (Claret *et.al*, 2009) and personality (Sumer, 2003 and Vivoli *et. al*, 2006) which also has distal relationship with accident rate or traffic violation rate.

Risky or harmful driving behavior is assumed to directly affect the risk of accident. In addition, the risk of accident is also magnified by the high traffic violation. Reason

et al. (1990) showed that aggressive and ordinary violations are the basic factor of risky driving dimension. Traffic violation is even considered as the best prediction of the rate of possible accident (Parker, *et. al.*, 1995). Moreover, traffic violation performed is encouraged or affected by the driver's behavior. If the driver chooses to do risky behavior in highway, then it will magnify the possibility of traffic accidents (Sumer, 2003) and give driving negative outcome (Constantinou *et. al.*, 2011).

Based on the facts about accidents and traffic violations above, UNESCO since 2004 has started to do campaign of driving safety and the measure is often performed by other countries. The strategy of driving safety in highway aims at reducing traffic accidents by using reconstruction of safety in highway, prevention campaign and legal reinforcement and traffic rules (Constant, *et. al.*, 2008). Behavior toward driving safety is proven to have relation to driving behavior, speeding, and reporting accident. Even the attitude of considering driving safety is not only shown through driving behavior, speeding, and reporting accident, but also encouraged by motivational and psychological factors such as driver's ability and ability to catch safe driving method (Constant, *et. al.*, 2008).

3. METHODOLOGY

This research was conducted in order to determine the moderating effects of age on the relationship of personality variables, driving behavior and driving outcomes. This research was conducted in the city of Makassar, the capital town of South Sulawesi province with the highest rate of traffic accidents when compared to the Regency / City in Makassar Affairs. The population of the study was the motorcyclist in a traffic accident during the last three years, either getting hospital treatment or not. The sample was selected intentionally (purposive sampling) of 311 respondents. Data is collected by questionnaire, the results are then analyzed using (1) the analysis of descriptive statistics were intended to determine the frequency distribution of the answers from the questionnaire, and (2) inferential statistical analysis is Structural Equation Modeling (SEM) which is intended to test the research hypothesis. Diagram concept Structural Equation Modeling (SEM) as follows:

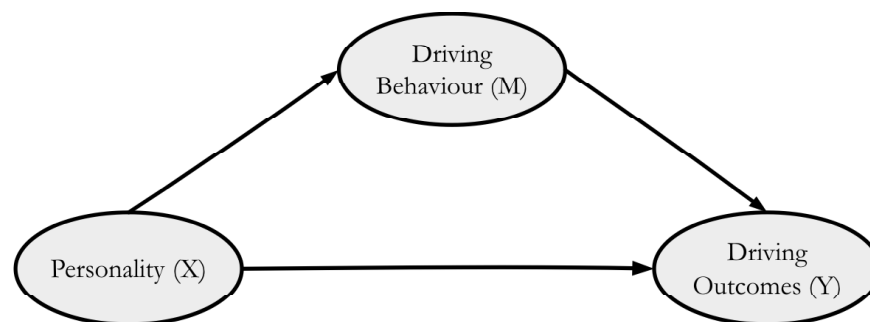


Figure 1: Conceptual Framework

4. RESULT AND DISCUSSION

4.1. Measurement Model

The following table presents average value and outer loading of each indicator in every research variable. According to Table 1, it is obtained result that all indicators significantly measure each of its variables. The analysis result also shows that the strongest indicator as the measuring instrument of Personality (X) is the indicator of Agreeableness (X2) with loading factor value is 0.605 and the mean is 3.600. In Driving Behaviour (M) variable, it is known that the strongest indicator as the measuring instrument is Speed Choice (M.1) with loading value of 0.891 and mean value of 3.370. In Driving Outcomes (Y) variable, it is known that the strongest indicator as the measuring instrument is Accident Rate (Y.1) with loading value of 0.834 and the mean value is 3.040.

Table 1
Average Value and Outer Loading Every Indicators

<i>Variable</i>	<i>Indicator</i>	<i>Mean</i>	<i>Loading factor</i>	<i>p. value</i>
Personality (X)	Ekstraversion (X1)	3.890	0.578	0.000
	Agreeableness (X2)	3.600	0.605	0.000
	Conscientiousness (X3)	3.910	0.559	0.000
	Emotional Stability (X4)	3.370	0.545	0.000
	Openness to Experience (X5)	3.930	0.553	Fix
Driving Behaviour (M)	Speed Choice (M.1)	3.370	0.891	Fix
	Traffic Violations (M.2)	2.320	0.602	0.000
Driving Outcomes (Y)	Accident Rate (Y.1)	3.040	0.834	Fix
	Violation Rate (Y.2)	2.060	0.796	0.000

4.2. Analysis Result: SEM

Testing Assumptions SEM

The assumption to fulfill before performing SEM analysis is normality assumption, the unavailability of outlier and linearity. Assumption of multivariate normality is tested by the help of software AMOS 6. The result of normality test results the value of critical ratio of 0.275 with critical value of Z-count for α 5% is 1.96. Since the absolute value of CR for multivariate is $1.814 < 1.96$. then multivariate normality assumption is fulfilled. To test the availability of outlier, it can be seen by mahalanobis distance (Md). Mahalanobis distance is evaluated using the value of 66.619. From Mahalanobis distance to the farthest observation point is with Md value = 50.948. If compared to the value 66.619, then it can be concluded that all observation points are not outlier. Linearity assumption test is undertaken by using Curve Fit method. The test result of linearity shows all significant linear models for the Sig value < 0.05 so that it can be concluded that linearity assumption has been fulfilled.

Goodness of Fit

The examination of goodness of fit model in SEM can be seen from predictive-relevance (Q2) value. Q2 value is counted based on Q2 value of each endogen variable as follows: The result of estimation shows predictive-relevance value of 0.8097 or 80.97% is high value, so the feasible model is said to have relevant predictive value. Predictive relevance value of 80.97% indicates that data heterogeneity explained by SEM model established is 80.97% or in other words the information contained in the data, 80.97% can be explained by the model. Meanwhile, the rest of 19.03% is described by other variables (which is not contained in the model) and error.

SEM Analysis

In the second part of SEM analysis is the interpretation of structural model. Structural model presents the relationship between research variables. The coefficient of structural model suggests the magnitude of relationship between variables. There is a significant effect between variables, if P-value < 0.05. In SEM, it is known two effects which are direct effect and indirect effect. The analysis result is summarized in Table 2 and Figure 1 for direct effect and Table 3 for indirect effect.

Table 2
Structural Model SEM: Direct effect

No	Relationship	Coefficient	P-value	Conclusion
1	X toward M	0.307	0.000	Significant
2	X toward Y	0.254	0.003	Significant
3	M toward Y	0.178	0.037	Significant

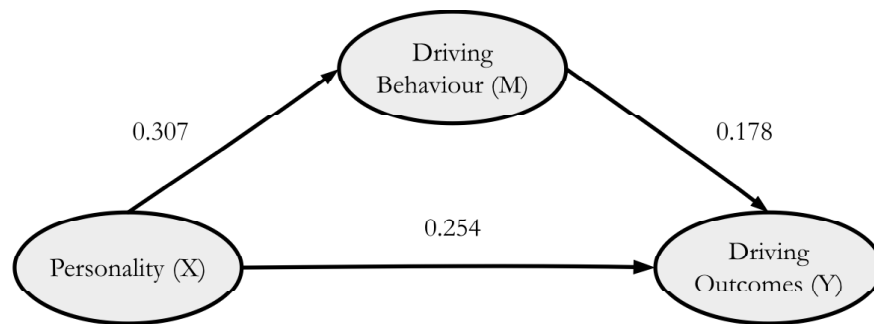


Figure 2: SEM Structural Models: Direct effect

According to Table 2 and Figure 2 it is seen that there is significant direct effect between Personality variable and Driving Behavior (M) or Driving Outcomes (Y). Positive direct effect coefficient indicates that the better the Personality variable, the better the effect on Driving Behavior (M) and Driving Outcomes (Y). It is also applicable to the effect of Driving Behavior to Driving Outcome (Y) which is also significant and

positive so that the better the Driving Behavior, the better the Driving Outcome. This finding means that a good personality, characterized mainly by the easy nature of compromise, give in and respect for others (agreeableness), broad-minded, meticulous and earnest in their work (performing responsibilities as well as possible, to act according to the rules, consider all risks before acting, make a good plan before work), stable emotions (calm, relaxed, forgiving) and open to the experience, will tend to behave in a safe and careful driving and no violation of traffic signs. Safe behavior, careful and not commit a traffic violation will be allowed be spared riders of various accident risk, legal risk or financial risk or other material (Haerani, Sudirman & Hakim, 2016).

The study's findings actually support the findings of previous research, among others such as Arthur and Graziano (1996) in the Philipp Yorck Herzberg (2009) and Arthur & Doverspike 2001 (Philipp Yorck Herzberg, 2009), although the researchers have simply tried to see partially respectively -masing personality type to the driving behavior such findings that the crash was found negatively correlated with Conscientiousness, but the associated positive with Extraversion. Similarly, the findings of Booth-Kewley and Vickers (1994) in the Philipp Yorck Herzberg (2009) showed that conscientiousness, neuroticism and agreeableness also significantly associated with risk-taking drive, Ulleberg and Rundmo (2003) in the Philipp Yorck Herzberg (2009) also showed that aspects of Extraversion, Agreeableness, and Neuroticism significantly related traffic risk behaviors, but this study does not support a finding found no association of personality (FFM properties) with criteria in rules of driving.

Mediation test is obtained from several analyses of direct effect establishing mediation. Here is presented the result of mediation test by using Sobel test:

Table 3
Structural Model Mediation SEM Results

Mediation	Testing Relationship	Coefficient	CR	P-value
M	X toward Y	0.055	2.036	0.042

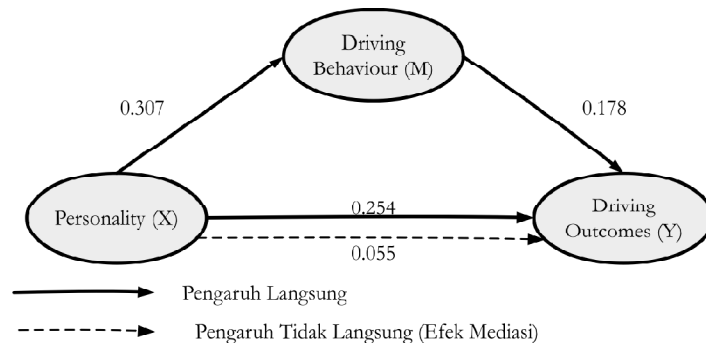


Figure 3: Mediation Effect on Driving Behavior Influence of Personality on Driving Outcomes

The result of Sobel Test in Table 4 and Figure 2 shows that Indirect Effect Coefficient of 0.055, and CR value of $2.036 > 1.96$ and P-value of $0.042 < 0.05$ indicates that Driving Behaviour (M) mediates the influence of Personality on Driving Outcomes (Y). Given that positive coefficient indicates that the higher the Personality, the higher the Driving Outcomes (Y), if it is mediated by Driving Behavior (M) which is increasingly high. Therefore, Driving Behavior (M) as the mediator variable of the relationship of Personality to Driving Outcomes (Y). Facts on the ground indicate that the results of driving will be better characterized by reduced levels of accidents, legal risk, financial risk or other material if the rider has a personality that is good then supported by the behavior of safer driving, be careful and do not commit a traffic violation.

Based on the analysis result, it can be concluded that there is significant direct influence of Personality variable to Driving Behavior (M) and Driving Outcomes. Positive coefficient indicates the better the Personality, the better the Driving Behavior and the Driving Outcomes. It is also applicable to the influence of Driving Behavior which is also significant and positive indicating the better the Driving Behavior then better the Driving Outcomes. Moreover, it is also found mediation effect of Driving Behavior variable on the influence of Personality to Driving Outcomes.

5. CONCLUSIONS AND RECCOMENDATIONS

Based on the analysis result, it can be concluded that there is significant direct influence of Personality variable to Driving Behavior (M) and Driving Outcomes. Positive coefficient indicates the better the Personality, the better the Driving Behavior and the Driving Outcomes. It is also applicable to the influence of Driving Behavior which is also significant and positive indicating the better the Driving Behavior then better the Driving Outcomes. Moreover, it is also found mediation effect of Driving Behavior variable on the influence of Personality to Driving Outcomes.

Recommendation for riders to improve personality implies that good personality, characterized mainly by the easy nature of compromise, give in and respect for others (agreeableness), broad-minded, meticulous and earnest in their work (performing responsibilities as well as possible, to act according to the rules, consider all risks before acting, make a good plan before work), stable emotions (calm, relaxed, forgiving) and open to the experience, will tend to behave in a safe and careful driving and no violation of traffic signs. Safe behavior, careful and not commit a traffic violation will be allowed be spared riders of various accident risk, legal risk or financial risk or other material.

References

- Constant, A., (2008), *The Recent Dramatic Decline in Road Mortality in France*, Health Education Research, Vol. 23 No. 5, pp. 848-858.
- Constantinou, Elena, *et al.*, (2011), *Risky and Aggressive Driving in Young Adults: Personality Matters*, Accident Analysis and Prevention 43, pp. 1323-1331.

- Dahlen, E. R. (2005), Cognitive emotion regulation in prediction of depression, anxiety, stress, and anger. *Personality & individual differences*, 39, 1249-1260.
- Elliott, M.A. (2004), *Applications of the theory of planned behaviour to drivers' speeding behaviour*, Department of Transport (Ed.), Behavioural Research in Road Safety, Fourteenth Seminar, London. DFT Publications, pp. 157-169.
- Haerani, S, Indrianty S & Hakim, W., (2016), *Indonesian Impact of Driving Conduct Against Accidents and Traffic Violations In Makassar (Perspective Study of Organizational Behavior Science) (In Indonesian Dampak Perilaku Berkendara Terhadap Kecelakaan Dan Pelanggaran Lalu Lintas Di Kota Makassar (Kajian Dari Perspektif Ilmu Perilaku Organisasi))*, Lembaga Penelitian Universitas Hasanuddin, Unpublished.
- Herzberg Philipp Yorck, (2009), Beyond "accident-proneness": Using Five-Factor Model Prototype To Predict Driving Behaviour. *Journal of Research in Personality*, Vol. 43, pp. 1096-1100.
- Kreitner, Robert., and Kinicki, Angelo. (2001), *Organizational behaviour*. Sixth Edition. New York : McGraw-Hill.
- Machin, M Anthony and Sankey, Kim, (2008), Relationships Between Young Drivers' Personality Characteristic, Risk Perceptions and driving Behaviour, *Accident Analysis and Prevention* 40, pp. 541-547.
- McKenna, Frank P. and Horswill, Mark P. (2006), Risk taking from the participant's perspective: The case of driving and accident risk. *American Psychological Association*. Vol. 25: 2.
- Parker, D., Reason, J. T., Manstead, A. S. R., and Stradling, S. G. (1995), "Driving errors, driving violations and accident involvement." *Ergonomics*, 38(5), 1036-1048.
- Reason, James, (1990), Errors and Violations on the Roads: A Real Distinction, *Ergonomics*, Vol. 33, Nos 10/11, pp. 1315-1332
- UNESCE, (2004), *Road Safety Campaigns*, <http://www.unece.org/trans/roadsafe/rsrcsc.htm>