

Correlation between Type-A Personality and Risky Driving Behavior

Ari Widyanti and Frisca Sutanto

Department of Industrial Engineering, Bandung Institute of Technology (ITB),
Ganesa 10, 40132 Bandung, Indonesia

Abstract: Traffic accidents are the third largest causes of death in Indonesia in the past 3 years according to the WHO. The 80% of traffic accidents are caused by human error. One of the factors associated with human error is personality. The aim of this study was to investigate the correlation between type-A personality with risky driving behavior. A total of 113 respondents who were young driver fill in Manchester Driver Behavior Questionnaire (MDBQ) which is used to investigate risky driving behavior that are aggressive violation, ordinary violation, errors and lapses. Glazer personality-type questionnaire was used to assess type-A personality. Respondents are also asked to perform driving task in driving simulator. In this simulator, the respondents were asked to simulate driving task using city car driving software for 1 h and scores of violations committed during driving was recorded. There is a significant positive correlation between high-A personality type with ordinary violations and lapses. Aggressive violations and violation committed while driving task is also likely to increase from the low-A personality type to high-A personality type. Implication of the study is discussed.

Key words: Traffic accident, type-A personality, risky driving behavior, driving simulation, Manchester Driver Behavior Questionnaire (MDBQ)

INTRODUCTION

Traffic accidents are the third largest cause of death in Indonesia in the past 3 years according to the World Health Organization. In Harvenda, it is said that there are 3 main causes of traffic accidents that are the human, the environment and vehicles. Of the three factors, the human factor becomes the biggest cause of traffic accidents in Indonesia. Not only in Indonesia but also similar facts are also found in other countries. For example, based on a study of 2041 cases of traffic accidents in England, Sabey and Taylor (1980) concluded that the human factor is an element which contributes to 95% of accidents. According to Sabey and Taylor (1980), the human factor that most contributes to traffic accidents is driving behavior.

Behavior is a person's response or reaction to the stimulus or stimuli from the outside or environment (Notoatmodjo, 2003). According to Green and Kreuter (1991), human behavior is determined by three factors, namely predisposing factors, enabling factors and reinforcement factor. In the predisposing factors, the attitude is one of the elements in it which is a determinant of behavior as it relates to perception, personality and motivation.

In the context of traffic accidents, relation between personality types with risky driving behaviors is primarily concerned as an effort in reducing traffic accidents. There are several theories explaining the personality type. One is the theory of personality type-A developed by Friedman and Rosenman (1974). Someone who has a type-A personality usually has excess sweat and high vigilance, hyperactive, angry and aggressive (especially in upset conditions). Type-A people usually also a perfectionist, less tolerant to faults, having low self-esteem and compulsive (Matthews, 1982).

There are many research investigate relation between type-A behavior and risky driving behavior. Research conducted by Nabi *et al.* (2005) in France showed that the driver of type-A has high risk of traffic accidents. Boyce and Geller (2000) also suggests that personality type-A tends to drive at high speed and driving the short distance to other vehicles (close following). Magnavita *et al.* (1997) in his study in Italy also stated that the personality type-A risk of traffic accidents is high. Ferreira *et al.* (2009) described that psychological variables (e.g., personality) have a significant effect on the driving behavior. Furthermore, McNally and Stone (2001), Gulliver and Begg (2007). Yang *et al.* (2013) also stated that personality is one of the

factors that contribute to traffic accidents. However, several studies show the absent of significant correlation between type-A behavior and risky driving behavior as well as correlation between type-A personality with traffic accidents. For example, a study conducted by Fatima showed no association between type-A personality with traffic accidents that occurred in Pakistan.

The inconsistency in the relation between type-A personality and traffic accidents is described by Yang *et al.* (2013). Yang *et al.* (2013) explains that the lack of consistently result may due to the neglect of accident data in the link between personality type with risky driving behavior as well as because of the small number of data.

This research was conducted with the aim of observing the type-A personality correlation with risky driving behavior in Indonesia. This study is primary important because Gulliver and Begg (2007) stated that cultural factors will affect personality as well as risky driving behavior, therefore it is necessary to conduct research on the different culture and different countries. Compared with previous research, this study is not only focusing on aggressive behavior but also measuring ordinary violations, errors and lapses. In addition, measurement of driving behavior is not only based on a questionnaire that is subjective based on the perception of respondents as conducted in the mentioned studies but also using a driving simulator so that real driving behavior can be assessed.

MATERIALS AND METHODS

One hundred and thirteen university students in Bandung (mean age = 21, SD = 1, 60 female, 53 male) who have a driver's license and have driving experience for at least 1 year are involved in the study. Respondents were filling out Glazer questionnaire and Manchester Driver Behavior Questionnaire and participate in simulated driving. Respondents must have a healthy physical condition and not in taking the prescribed drugs and should follow the provisions not to consume alcohol and nicotine in a certain period of time before using the simulator.

Type-A personality are identified using Glazer questionnaire (Friedman and Rosenman, 1974). Driving behavior is assessed using the Manchester Driver Behavior Questionnaire (MDBQ) (Ozkan *et al.*, 2006) as well as during task in driving simulator. Glazer questionnaire contains of 20 statements behavior. Respondents were asked to give respond on a Likert scale ranging from 1-7 (strongly disagree) for each statement. The final results of questionnaires is in the form of a score of personality types. Because of this questionnaire

was in English, the questionnaire was adapted through back translation method Brislin (1970), Widyanti *et al.* (2011, 2013a, b), validity content is used to test the validity of this personality type questionnaire. To test the reliability of the questionnaire, consistency reliability is used with Cronbach's alpha coefficient.

The Manchester Driver Behavior Questionnaire (MDBQ) consist of 27 statements. Respondents were asked to give respond using a Likert scale from 1 (never) to 6 (always). Score driving behavior is divided into four dimensions, namely aggressive violations (3 statements), ordinary violations (8 statements), errors (8 statements) and lapses (8 statement). Example of aggressive violations is such as honking to show anger at the other driver. Ordinary violations relating to violations because the rush such as breaking the speed limit. Example of errors is such as not seeing the rearview mirror before overtaking or changing lanes. Example of lapses is such as bumping into something not previously seen.

The final results of the questionnaire are the scores for each dimension. This questionnaire has been adapted into Indonesian and have passed the test validity and reliability testing (Perry and Baldwin, 2000). This questionnaire is one of the most widely implemented questionnaire to determine the risky driving behavior.

Simulator used in this study is using city car driving software, Logitech G27 and projectors for displaying simulation. In the simulator, several variables that can be set include: the type of car used (matic/manual), road conditions and the weather. Route of simulation is similar with common traffic condition in Bandung City that is 90% of traffic density, 30% of pedestrian density with normal climate. To minimize learning effect, learning period is given as long as respondent's want. Overall duration of driving simulation is 1 h. In the end violation score is recorded. Respondents were asked to drive in accordance with a predetermined route.

RESULTS AND DISCUSSION

Type-A personality scores are divided into three classes using the concept of percentiles (Table 1). Scores respondents less equal to the 25th percentile inserted into the lower class (low-A type), scores of respondents who are between the 25th percentile and 75th get into the middle class (moderate-A type) and a score greater equal to the 75th percentile into the upper class (high-A type) (Nabi *et al.*, 2005). Risky driving behavior based on MDBQ can be seen in Fig. 1-5. Results of the Kruskal-Wallis test showed that there was no significant

Table 1: Type-A personality categories

Variable	Low (<84)	Moderate (84-97)	High (>97)
No. of respondents	32 (18 female)	51 (26 female)	30 (16 female)

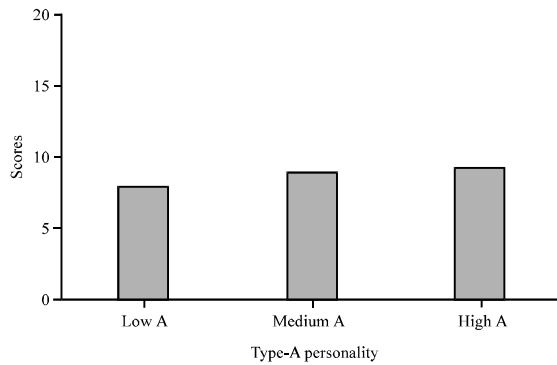


Fig. 1: Aggressive violations scores based on A personality

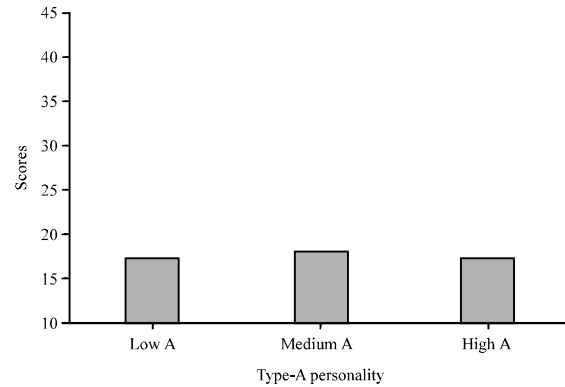


Fig. 4: Lapses scores based on type-A personality

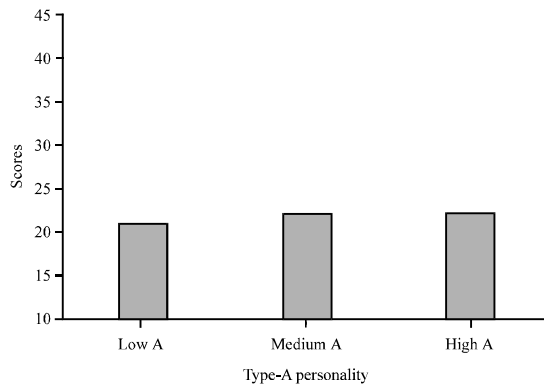


Fig. 2: Ordinary violations scores based on type-A personality

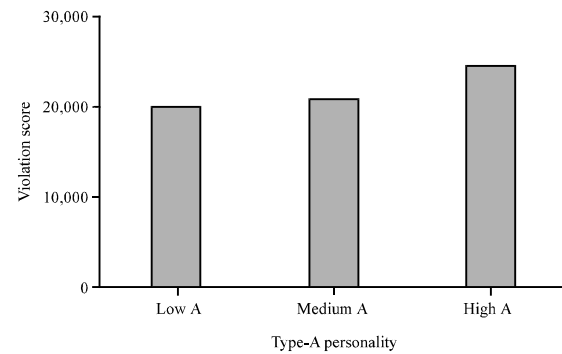


Fig. 5: Violation scores of driving simulation based on type-A personality

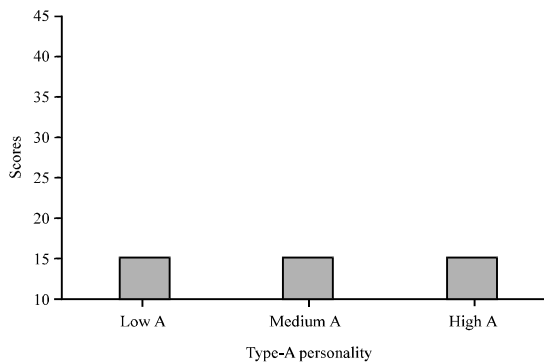


Fig. 3: Error scores based on type-A personality

difference between aggressive violations, ordinary violations, errors and lapses among different type-A personality (all $p > 0.05$). In addition, there was also no significant difference on violence committed in driving simulator among different type-A personality ($p > 0.05$). Although, there were no significant differences between each of the variables, there is a tendency of increasing of

Table 2: Result of Spearman correlation test

Variables	Parameters	Type-A personality		
		Low A	Medium A	High A
Aggressive violation	r_s	0.234	-0.169	0.025
	p	0.198	0.237	0.897
Ordinary violation	r_s	-0.023	-0.015	0.379*
	p	0.901	0.917	0.039
Error	r_s	-0.142	-0.205	0.206
	p	0.439	0.150	0.275
Lapses	r_s	-0.049	-0.227	0.410*
	p	0.791	0.109	0.024
Violation score in driving simulator	r_s	-0.205	0.156	0.247
	p	0.260	0.274	0.188

type-A personality from low to high in relation with risky driving behavior. The higher levels of type-A personality, the higher risky driving behavior and driving violence committed.

Spearman correlation test were applied to see correlation between personality type with driving behavior (i.e., aggressive violations, ordinary violations, errors and lapses) and violation committed in driving simulator variables as can be seen in Table 2. There was a significant correlation between high type-A personality

and ordinary violations. One example of ordinary violations is ignoring the speed limit in a residential street. The results were consistent with the results of research that have been done before. Nabi *et al.* (2005) states that people with type-A personalities are more likely to undertake risky driving behaviors such as speeding because of the type-A do have characteristics of a hurry. Type-A people also tend to be impatient with unproductive time and if there is a delay. In addition, Perry and Baldwin (2000) also indicated that characteristics of a hurry or urgency is a major contributor to the decline of driving performance that lead to the risk of traffic accidents.

There was also a significant correlation between high type-A personality and lapses. Lapses is a condition where a person fails to think or act in a way that should be for a short time and make a mistake or when someone is acting bad state for a short time (Ozkan *et al.*, 2006). Examples of lapses while driving is wrong to read the signs and get out of a round in the wrong way. By doing such errors and driving with a rush, the high type-A will be driving in a hurry.

Result of this study could be used as input for the various parties in order to reduce the number of traffic accidents in Indonesia. For drivers, by understanding the personality owned especially if they have a high type-A personality, anticipation can be done by avoiding risky behaviors that are often carried out by the drivers with high type-A personality. Results of this study can also be used as input to government policy and the selection of driving safety content. In a study conducted by Shofi (2015), Perry and Baldwin (2000) it was stated that safety driving content of campaign will determine whether the behavior desired could be developed. Widyanti *et al.* (2014) also found effectiveness of behavior approach in other field of application in Indonesia. Furthermore, Yang *et al.* (2013) also underlined that considering personality and behavior in safety driving content is a very important thing. Gulliver and Begg (2007) also stated that to develop interventions that will effectively target the high-risk group, personality that engaged in the risky driving behavior need to be elucidated and taken into account in developing such a campaign (Ferreira *et al.*, 2009).

This study has several limitations. The amount of sample that is not balanced between low, medium and high type-A personality. Although, there is no reason to think that this composition will change the result since the number of data is enough, it would be better to have similar composition of each categories of type-A. Analysis based on gender differences is not

conducted in this study since there is no hypothesis and studies state that gender will influences the type-A behavior.

CONCLUSION

There was a positive correlation between high type-A personality with violations and lapses. Additionally, aggressive violation and violation committed during driving simulation were also increasing from low to high type-A personality. Result of this study supports the hypothesis that the higher type-A personality, the higher the risk driving behavior.

REFERENCES

- Boyce, T.E. and E.S. Geller, 2002. An instrumented vehicle assessment of problem behavior and driving style: Do younger males really take more risks?. *Accid. Anal. Prev.*, 34: 51-64.
- Brislin, R.W., 1970. Back-translation for cross-cultural research. *J. Cross Cult. Psychol.*, 1: 185-216.
- Ferreira, A.I., L.F. Martinez and M.A. Guisande, 2009. Risky behavior, personality traits and road accidents among university students. *Eur. J. Educ. Psychol.*, 2: 79-98.
- Friedman, M. and R.H. Rosenman, 1974. *Type-A Behavior and Your Heart*. Alfred A. Knopf Publishing Company, New York, USA., Pages: 84.
- Green, L.W. and M.W. Kreuter, 1991. *Health Promotion Planning: An Educational and Environmental Approach*. 2nd Edn., Mayfield Pub. Co., USA., ISBN: 9780874847796, Pages: 506.
- Gulliver, P. and D. Begg, 2007. Personality factors as predictors of persistent risky driving behavior and crash involvement among young adults. *Inj. Prev.*, 13: 376-381.
- Magnavita, N., R. Narda, L. Sani, A. Carbone and G. Lorenzo *et al.*, 1997. Type-A behaviour pattern and traffic accidents. *Br. J. Med. Psychol.*, 70: 103-107.
- Matthews, K.A., 1982. Psychological perspectives on the type-A behavior pattern. *Psychol. Bull.*, 91: 293-323.
- McNally, I.M. and M. Stone, 2001. *Cross-Cultural Models of Road Accident Risk: Personality, Behavioral, Cognitive and Demographic Predictors*. University of Central Lancashire, Preston, England, UK.,.
- Nabi, H., S.M. Consoli, J.F. Chastang, M. Chiron, S. Lafont and E. Lagarde, 2005. Type-A behavior pattern, risky driving behavior and serious road traffic accidents: A prospective study of the GAZEL cohort. *Am. J. Epidemiol.*, 161: 864-870.

- Notoatmodjo, S., 2003. Education and Health Behavior. Penerbit Rineka Cipta, Jakarta, Indonesian.
- Ozkan, T., T. Lajunen and H. Summala, 2006. Driver behaviour questionnaire: A follow-up study. *Accid. Anal. Prev.*, 38: 386-395.
- Perry, A.R. and D.A. Baldwin, 2000. Further evidence of associations of type-A personality scores and driving-related attitudes and behaviors. *Perceptual Motor Skills*, 91: 147-154.
- Sabey, B.E. and H. Taylor, 1980. The known risks we run: The highway. Transport and Road Research Laboratory. Crowthorne, England.
- Shofi, A.Z., 2015. Driving behavior intervention in adolescents as efforts reduce traffic accidents figures. Masters Thesis, Bandung Institute of Technology, Bandung, Indonesia.
- Widyanti, A., 2011. Cultural influences on the measurement of mental workload. *Ergon.*, 54: 509-518.
- Widyanti, A., A. Johnson, D. de Waard, 2013a. Adaptation of the rating scale mental effort (RSME) for use in Indonesia. *Int. J. Ind. Ergon.*, 43: 70-76.
- Widyanti, A., D.D. Waard, A. Johnson and B. Mulder, 2013b. National culture moderates the influence of mental effort on subjective and cardiovascular measures. *Ergon.*, 56: 182-194.
- Widyanti, A., I. Sunaryo and A. Kumalasari, 2014. Reducing the dependency on rice as staple food in Indonesia-a behavior intervention approach. *J. ISSAAS.*, 20: 93-103.
- Yang, J., F. Du, W. Qu, Z. Gong and X. Sun, 2013. Effects of personality on risky driving behavior and accident involvement for Chinese drivers. *Traffic Inj. Prev.*, 14: 565-571.