The Road User Behaviour of Early-Stage Young Driver in Semarang

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Abstract: The Driving style is the manner of the person decides to drive or to their customary driving mode. Where driver behaviour is a contributory factor in over 90 percent of crashes. One of the major characters that have been shown to predict risky driving behaviour is age. Young driver are often less concerned with the probability of the risks caused by traffic situations and more often involved in traffic accident. Young driver risky behaviour is a major factor that leads to higher accident rates and injuries. Hence the study to understand young driver is necessary to be able to propose a countermeasure. In this study, an analysis of the characteristics of young driver will be undertaken to assess driving behaviour and the tendency towards road safety. The focus of this study is was on the individual profile behaviour that associated with greater involvement in driving violations, errors and lapses by using Driver Behaviour Questionnaire. The result of this study confirmed a five factor solution i.e. “Minor Intentional Violations" (25,59%), “Risky Error” (6,06%), “Lapses” (5,39%), “Dangerous Intentional Violations” (5,01%) and “Straying, and Loss of Orientation” (4,57%) When the 28 items were ranked according to their rated mean frequencies, the two most frequently occurring behaviours were: "Sound your horn to indicate your annoyance to another road user" and "Overtake a slow driver on the inside". On the contrary, the least frequent attitude conducted were "drinking alcohol when driving"

1 INTRODUCTION

Worldwide traffic accidents have resulted in 1.25 million deaths, as well as 20 - 50 million casualties, and is the first cause of death for people aged 15-29 years, out performing deadly diseases such as HIV / AIDS, meningitis, and heart disease (WHO, 2015). In Semarang the number of traffic accidents tend to increase every year. The number of accidents occurred in year 2013 reached 957 events with the loss value reached Rp 1,438,200,000,-.

The traffic system can be described as the relation and interaction among road users, roadway and vehicles. Subsequently, according to Tight (2012), a road traffic accident came as the result from a combination of aspects related to a road system component, the users, the environment, vehicles and the way they interact. Prior research suggests that driver behaviour is a contributory factor in over 90 percent of crashes (Petridou and Moustaki, 2001). The human factor in driving is referring to driving skills and driving style. Driving style is the manner of the person decides to drive or to their customary driving mode, including features such as speed, gap, and characteristic levels of attentiveness and assertiveness (Elander et al., 1993).

Basic demographics and behaviors also have long been cited as major causes of risky driving and traffic accident (Holland et al., 2010). One of the major characters that have been shown to predict risky driving behaviour is age (e.g., Shinar and Compton, 2004). Young risky driver behavior such as speeding is a major factor that leads to higher accident rates and injuries (Laapotti et al., 2001; Vassallo et al., 2007). Further in various countries it has been established that young novice driver are more often involved in traffic accident (OECD, 2006; Subramanian, 2006). Also it has been put forward that young drivers are often less concerned with the probability of the risks caused by traffic situations (Deery, 1999). Further in Central Java, Directorate of Traffic Central Java Police stated that that most of the traffic accidents that occurred involved young drivers aged between 16 and 20 years.

In behavioral studies, personality is perceived as distal predictor of behavior that will be more stable over time, and tend difficult to alter by behavior-change interventions (Fishbein and Cappella, 2006).

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However, attitudes that characterize affective evaluation to a certain object, person, or problem, are more temporary thus can be easier to change with intervention and subsequently produce long lasting alterations in behavior (Bohner and Dickel, 2011; Petty et al., 1997). Hance behaviour change is expected to reduce the number of traffic accidents and therefore suitable approaches campaign to promote traffic safety is significant.

In a study of young drivers Ulleberg and Rundmo (2003) it showed that the effect of personality traits, such as altruism, anxiety, normlessness, sensation-seeking, aggression on risky driving was mediated by the driver's attitudes toward traffic safety. In this study, an analysis of the characteristics of early stages young driver will be undertaken to assess driving behaviour and their tendency towards road safety. The focus of this study was on the individual profile behaviour that associated with greater involvement in driving violations, errors and lapses by using Driver Behaviour Questionnaire. The result of this study will assist road management agencies in making better-informed safety-related decisions on regulation and penalty, as well as designing road safety campaigns.

2 LITERATURE REVIEW

2.1 The Driver Behaviour Questionnaire (DBQ)

Driver Behaviour Questionnaire is one the most widely used measures to assess self reported driving behaviours (Lajunen et al., 2004). The purpose of the DBQ findings is that increasing the understanding between behavioral traits of the driver with the risk of possible accident will optimize the countermeasure designed to improve road safety.

The questionnaire contains of 28 items categorized as bad driving behavior. The association of each main type of bad driving including violations, error, and lapses. The difference of both lapses and error with violation is that violations have an element of deliberation whereas lapses and errors are unintentional faults and that they do not reflect what the driver expected. On the contrary, violations involve at least one intentional choice of action.

The driver who cross a junction knowing that the traffic lights have already turned against and disregard the speed limit on a motorway is behaving deliberately, while fail to check your rear-view mirror before pulling out is an inadvertence. The ratting were then use to assess which types of behaviour the group of early stages driver are more often involved in. Because of its distinction then the countermeasure will also be different. If the behaviour were more related to. Lapses or error that associated with poor cognitive resources and information processing, thus the training designed to increase skill levels is suggested. On the contrary if the driver behaviour were more involved to violations such training will has little effect on the behavioural change, and so it must be addressed by persuading drivers not behave in risky driving (Parker et al., 2000).

3 RESEARCH METHODOLOGY

3.1 Participant

A total of 272 participants completed the questionnaire in their class- rooms during school hours. The sample was drawn from 4 high schools in the area of Semarang. 272 participants consist of 63% girls and 37% boys with an age range between 15 until 18 years old. In the research found that the there were 213 participates classified as early stage driver, and the rest are intermediate stage driver.

3.2 Driving-Related Measures

The Driver Behavior Questionnaire (DBQ) was used in this study, with 28 statement items related to driving behavior, participants being asked to respond to each item by showing how often they behaved as shown and answered on five-point Likert scales ranging from "never" (1) to "always" (5). The items consists of eight errors and eight lapses, eight ordinary violations and four aggressive violations developed by Lawton et al. (1997) and used in several studies carried out in different countries (e.g., Gras et al., 2006; Özkan et al., 2006b).

Participants were also asked to estimate their driver experience by year or month. Moreover, they were asked to indicate if they have ever received any violation tickets.

3.3 Attitude towards Road Safety

18 items attitudes scale was included to measure participants road-safety attitudes related to driving. All items were answered on five-point response scales ranging from "never" (1) to "always" (5), with high scores indicating a positive attitude toward traffic safety (i.e., wearing helmet when driving).

Table 1: Items from the driver behaviour questionnaire (DBQ) in descending order of mean and Standard Deviation score.

Q no	Item	Mean	Std. Deviation	Variance
26	Sound your horn to indicate your annoyance to another road user	3.0331	1.15049	1.324
20	Overtake a slow driver on the inside	3.5074	0.9907	0.981
8	Realize that you have no clear recollection of the road along which you have just been traveling	3.6360	1.0849	1.177
2	Intending to drive to destination A, you “wake up” to find yourself on the road to destination B	3.9559	0.9556	0.913
16	Underestimate the speed of an oncoming vehicle when overtaking	3.9669	0.95798	0.918
17	Pull out of a junction so far that the driver with right of way has to stop and let you out	3.9743	0.96588	0.933
6	Forget where you left your car in a car park Misread the signs and exit from a roundabout on the wrong road	3.9890	0.99624	0.992
23	Cross a junction knowing that the traffic lights have already turned against you	3.9926	0.97947	0.959
21	Race away from traffic lights with the intention of beating the driver next to you	4.0699	1.00492	1.01
24	Disregard the speed limit on a motorway	4.1029	0.95492	0.912
4	Switch one thing, such as the headlights, when you meant to switch on something else, such as the wipers	4.1213	0.95854	0.919
7	Misread the signs and exit from a roundabout on the wrong road	4.1287	0.82957	0.688
9	Queuing to turn left onto a main road, you pay such close attention to the main stream of traffic that you nearly hit the car in front of you	4.1728	0.83926	0.704
18	Disregard the speed limit on a residential road	4.1765	0.98237	0.965
11	Fail to check your rear-view mirror before pulling out, changing lanes, etc.	4.1875	0.95167	0.906
5	Attempt to drive away from the traffic lights in third gear	4.1985	1.01879	1.038
12	Brake too quickly on a slippery road or steer the wrong way in a skid	4.2574	0.80126	0.642
3	Get into the wrong lane approaching a roundabout or a junction	4.2647	0.83939	0.705
22	Drive so close to the car in front that it would be difficult to stop in an emergency	4.2794	0.79381	0.63
28	Become angered by a certain type of a driver and indicate your hostility by whatever means you can	4.2831	0.9395	0.883
15	Attempt to overtake someone that you had not noticed to be signaling a right turn	4.2941	0.89375	0.799
19	Stay in a motorway lane that you know will be closed ahead until the last minute before forcing your way into the other lane	4.3382	0.89871	0.808
1	Hit something when reversing that you had not previously seen	4.4118	0.81018	0.656
13	On turning left nearly hit a cyclist who has come up on your inside	4.4191	0.74453	0.554
14	Miss “Give Way” signs and narrowly avoid colliding with traffic having right of way	4.5147	0.71345	0.509
27	Become angered by another driver and give chase with the intention of giving him/her a piece of your mind	4.5699	0.82996	0.689
10	Fail to notice that pedestrians are crossing when turning into a side street from a main road	4.5846	0.71374	0.509
25	I’m drinking while driving	4.9559	0.23893	0.057

3.4 Statistical Analysis

SPSS 16.0 software, was used to identify the correlation of driver behaviour and the attitude towards road safety. Finally, an external validation of a cluster solution is obtained using significance tests on relevant criteria variables not used to generate the cluster solution. In particular, one-way analysis of variance and chi-square tests were utilized.

4 RESULTS AND DISCUSSION

From a total of 272 persons, it was found that 95.955 % were classified as a good driving behaviour because they are classified as never making errors or violations on the highway, while 4.045 % classified as almost never making errors or violations on the highway. This indicates that, at early stages driver are rarely intend to violate the traffic rules.

While on a scale attitude towards road safety, it was found that 73.897 % of students on Semarang

Table 2: Item and Conclusion driver behaviour questionnaire (DBQ).

Factor	Q no	Item	
1	023	Cross a junction knowing that the traffic lights have already turned against you	Ordinary Violation
	020	Overtake a slow driver on the inside	Ordinary Violation
	021	Race away from traffic lights with the intention of beating the driver next to you	Ordinary Violation
	005	Attempt to drive away from the traffic lights in third gear	Lapses
	024	Disregard the speed limit on a motorway	Ordinary Violation
	022	Drive so close to the car in front that it would be difficult to stop in an emergency	Ordinary Violation
	016	Underestimate the speed of an oncoming vehicle when overtaking	Errors
	015	Attempt to overtake someone that you had not noticed to be signaling a right turn	Errors
	007	Misread the signs and exit from a roundabout on the wrong road	Lapses
	017	Pull out of a junction so far that the driver with right of way has to stop and let you out	Ordinary Violation
2	013	On turning left nearly hit a cyclist who has come up on your inside	Errors
	012	Brake too quickly on a slippery road or steer the wrong way in a skid	Errors
	014	Miss “Give Way” signs and narrowly avoid colliding with traffic having right of way	Errors
	003	Get into the wrong lane approaching a roundabout or a junction	Lapses
	019	Stay in a motorway lane that you know will be closed ahead until the last minute before forcing your way into the other lane	Ordinary Violation
	018	Disregard the speed limit on a residential road	Ordinary Violation
	004	Switch one thing, such as the headlights, when you meant to switch on something else, such as the wipers	Lapses
3	001	Hit something when reversing that you had not previously seen	Lapses
	009	Queuing to turn left onto a main road, you pay such close attention to the main stream of traffic that you nearly hit the car in front of you	Errors
	002	Intending to drive to destination A, you “wake up” to find yourself on the road to destination B	Lapses
4	028	Become angered by a certain type of a driver and indicate your hostility by whatever means you can	Aggressive Violations
	027	Become angered by another driver and give chase with the intention of giving him/her a piece of your mind	Aggressive Violations
5	011	Fail to check your rear-view mirror before pulling out, changing lanes, etc.	Errors
	006	Forget where you left your car in a car park Misread the signs and exit from a roundabout on the wrong road	Lapses

were always obeying road safety rules, 18.015 % of students are classified as often in obeying road safety rules. This shows that students in Semarang have a positive attitude towards road safety.

Table 1 displays the means, standard deviations and rankings (by mean) for all DBQ items. While this sample of drivers reported each of the error and lapses items in the DBQ more frequent, they reported ordinary violations at the same time, with lower frequencies. For this sample the least frequently reported item was aggressive violation.

The highest mean was for the item 'Sound your horn to indicate your annoyance to another road user" categorized as Lapses, 'Overtake a slow driver on the inside' that categorized as ordinary violations, and 'Realize that you have no clear recollection of the road along which you have just been traveling' which considered as error. Meanwhile, the three items with the lowest mean, were 'I'm drinking while driving', 'Fail to notice that pedestrians are crossing when turning into a side street from a main road' and 'Become angered by another driver and give chase with the intention of giving him/her a piece of your mind' that categorized as Aggressive Violation, Ordinary violations and Error subsequently.

The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were used to examine the appropriateness of using exploratory factor analysis (EFA). The KMO was 0.91 and Bartlett's test of sphericity was significant (<0.001), suggesting that the data were appropriate to factor analyze. Therefore, data from the 1111 students for the 42 ARBQ items were subject to principal axis factoring (PAF) with Varimax rotations to explore the factor structure of the scale (Table 3). The scree plot suggested three or five potential factors.

The scree plot (Figure 1) specified that the items behaviour were best fitted by a five-factor solution. The highest factor accounted for 25.59% total variance was minor intentional violations. Factor 2 that accounted for 6.06% was Risky Error. Factor 3 accounted for 5.39% was Lapses. Factor 4 Dangerous Intentional Violations, which accounted for 5.01% of total variance. And the least factor Straying, and Loss of Orientation with 4.57% from total variance. The highest loadings for all factor can be seen in Table 2.

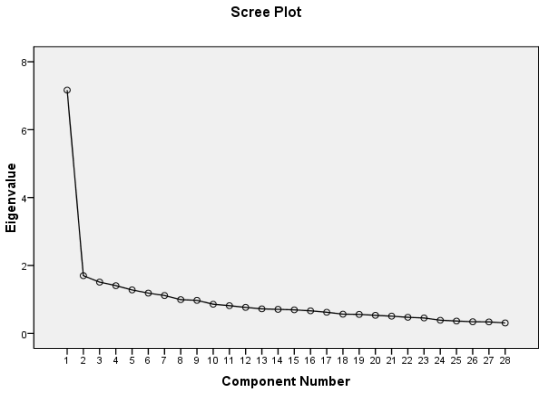

Figure 1: The scree plot for DBQ items.

Taking into account the attitude of early stage driver toward road safety with their behavior profile, it can be seen from table 3 that Lapse and Error only have least correlation with their attitude. Whereas the relationship is higher for Aggressive Violations. This state can be occurs because even though the attitude towards road safety is high, they cannot prevent unintentional mistakes such as 'Misread the signs and exit from a roundabout on the wrong road' or 'Fail to notice that pedestrians are crossing when turning into a side street from a main road'. Meanwhile for this attitude rather have an influence on intentional offenses, for example 'Become angered by another driver and give chase with the intention of giving him/her a piece of your mind'. However, interestingly the attitude to traffic safety also only has little impact because this early stage driver with a new driving on ordinary violations even though it is considered as intentional action. This might happen experience only perform positive attitude towards traffic safety because they were still afraid and choose to be cautious.

Table 3: Profile Corelation on safety attitude.

	Mean	SD	Minimum	Maximum	Kolmogorov	R Square	Result
Lapses	32.7059	4.14874	20	40	1.231	0.010	1.0 %
	62.7500	9.45586	26	86	1.399		
Errors	34.3971	3.91474	21	40	2.075	0.001	0.1 %
	62.7500	9.45586	26	86	1.399		
Ordinary Violations	32.4412	4.79047	18	40	1.006	0.006	0.6 %
	62.7500	9.45586	26	86	1.399		
Aggressive Violations	16.8419	2.09744	10	20	2.304	0.079	7.9 %
	62.7500	9.45586	26	86	1.399		

5 CONCLUSION

From the DBQ Profiling, the two items that the early stages drivers are more frequent done was 'Sound your horn to indicate your annoyance to another road user' and 'Overtake a slow driver on the inside'. Where those two items are categorized as Lapses, Ordinary Violation. Whereas the two items with the lowest mean, were 'I'm drinking while driving', and 'Fail to notice that pedestrians are crossing when turning into a side street from a main road' that categorized as Aggressive Violation and Ordinary violations. The result of this study confirmed a five factor solution ie "Minor Intentional Violations" (25.59%), "Risky Error"(6.06%), "Lapses"(5.39), "Dangerous Intentional Violations"(5.01%) and "Straying, and Loss of Orientation" (4,57%). Furthermore, as a whole the driver attitude towards safety are only has little impact on their profile behavior since they perform positive attitude towards traffic safety simply because they were still anxious and choose to be cautious.

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