The Driver Attitude Questionnaire to Examine Driving Behaviour in Sargodha City

Malik Muneeb Abid[1], Muhammad Adnan[2], Bilal Hussain[2], Muhammad Iqbal[3], Ashok Kumar[2]

[1]Department of Civil Engineering, Wah Engineering College, University of Wah, Pakistan
[2]Department of Civil Engineering, University of Sargodha, Pakistan.
[3] Department of Computer Science, Bahria University, Karachi, Pakistan

Corresponding author: First Author (e-mail: muneeb.abid@wecuw.edu.pk).

ABSTRACT

The behavior of drivers is regarded as the most significant contributory factor in road traffic accidents in Pakistan. Personal attitudes are key determinant of driving behaviours. This research aims to identify the key socio-cognitive determinants of driving in response to the lack of road safety research in the country. The methodology based on interviews, to generate an data for Attitudinal Questionnaire (AQ) and a modified Driver Behaviour Questionnaire (DBQ) focusing on intentional traffic violations. The study obtained self-reports of attitudes, norms, perceived control and opinion of drivers regarding a number of road traffic violations and enforcement as well as their behaviours. The responses to the statements in the questionnaires were first factor analyzed to identify underlying attitudinal and behavioural constructs. The collective results from the study indicate that the behaviours of drivers are interpretable in relation to their attitudes. Specifically, attitudes towards enforcement and rule-compliance appear to be the strongest determinant of behaviours of drivers in Sargodha. Finally, the research findings are used to recommend targeted as well as general information-based road safety solutions.

Keywords: Driver Behavior Questionnaires, Driver Behavior Attitude, Driver Behavior

1. INTRODUCTION:

This study provides the different factors which are highly affected by the driver's attitude. Developing countries are being more affected by the road accidents, for instance, in some cases traffic accidents in developing countries have become more deadly than the diseases that historically affected the population [1]. Deaths are expected to increase by as much as 80%, and decline by almost 30% in high-income [2]. The health, social and economic impacts of accidents are the leading cause of traumatic brain injury in the world. Road traffic accidents (RTA) gave negative social, physical and psychological effects [3]. A study on psycho-social impact of accidents in Sweden has reported a high rate of complication where half of the respondents were found to have travel anxiety for two years after an accident [4]. Results showed that 16% of people injured in RTAs could not return to their ordinary jobs, while a third reported a reduction in the leisure-time activities [5]. Road Traffic accidents are attributed to many factors including road, vehicle and human factors. These contributory factors combine in a way that leads to a road user failing to cope in a particular situation. The research literature generally agrees that human factors are one of the most dominant factors in understanding the chain of events leading to an accident and indicates driver malfunctioning as the prime contributory factor in road accidents [6-10].

The paper is organized as follows: after brief introduction and literature in first part, section II presents the methodology adopted. Section III describes the results with conclusion in the final section.

2. METHODOLOGY

Data is collected through a questionnaire. The questionnaire is based on two parts, the first part aims to explore and study the aggressive behavior of drivers. The second part aims to collect data about accidents and its main causes that will be related to drivers' behaviors. The collected data will be used to analysis the behavior of drivers on road.

Information will be gathering by surveying, questionnaire method. A questionnaire is a written list of questions, the answers to which will be recorded by respondents. To make a questionnaire the following things could be on mind that questionnaire is easy to understand, the questions are clear, Also, the layout of questionnaire should be such that to be easy to read and pleasant to eye. For collecting the data about driver behaviour the survey was done at different places of Sargodha city.

2.1. DATA COLLECTION

For collecting the data about driver behaviour the survey was done at different places of Sargodha city. Information collected by surveying, through a questionnaire method. A questionnaire is a written list of questions. We went to General Bus Stand to collect the data through questionnaire which is easy to understand the questions are clear. The questions are in their National language so, there is no difficulty to understand the questions and they give easily answers of that particular questions. For this purpose, we also collect information from Al-Shehbaz travels, Niazi express Terminal and some other places (Marked in Figure I). All the data is collect through primary method of data collection.

Information will be gathering by surveying, a questionnaire method. A questionnaire is a written list of questions, the answers to which will be recorded by respondents. In a questionnaire respondents read the questions, interpret what is expected and then write down the answers. In the case of questionnaire, as there is no one to explain the meaning of questions to respondents,

It is important that:

- The questions are clear.
- Easy to understand.
- Also, the layout of questionnaire should be such that to be easy to read and pleasant to eye.
- The sequence of the questions should be easy to follow.
- The questions are in their own (Urdu) language.

A questionnaire should be developed in an interactive style. This means respondent should feel as if someone is talking to them. In a questionnaire, a sensitive question or a question respondent may feel hesitant about answering should be prefaced by an interactive statement explaining the relevance of the question.

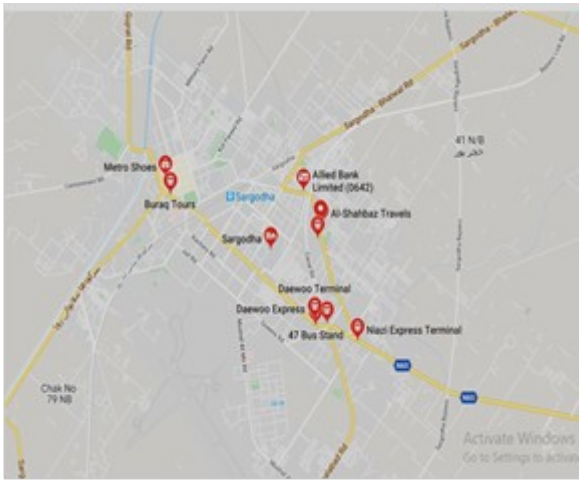

Figure 1. Bus Stands for Sargodha City (Data Collection Points)

ABBREVIATIONS AND ACRONYMS

DB	Driver Behaviour
DBA Attitude	Driver Behaviour
DBQ Questionnaire	Driver Behaviour
RTA Accident	Road Traffic
RTI	Road Traffic Injury

3. RESULTS

Details the results of the study. The results of the study revealed the reported attitudes of drivers towards traffic risks related to road safety. Table I showed the information of driver behaviour questionnaire items with responses and the frequency levels related to road safety subjects in Sargodha. Mostly local drivers that they 'never' involve in the driving safety issues with a high frequency but for some item in driver behaviour questionnaire (DBQ), the drivers selected only 'sometimes' with high percentage such as disregard speed limits Q18 (46%), failing to use of personal intelligent system Q3 (62.25%), driving too closely Q12 (53%) and check sides mirror before changing lines Q5(59.25%). While, comparatively higher percentage of professional drivers stated that they 'often' involved in the driving safety issues on DBQ. With high percentage such as jumping the queue when traffic jams Q11 (57.25%), Some road safety subjects were respected in sample of respondents in which they selected 'never' such as failing to yield pedestrian rules Q9 (68%) and failing to apply brakes rules Q17 (18%) . when we asked question from drivers are they eating and drinking while driving Q20 (41%) most of they are answered yes. In question 15 the answer of yes to no lies between (31.25%-34.25%) respectively. Majority of drivers follow the rule on red light that is Q2 (50%). These results can also help to evaluate the traffic safety issues from one to twenty based on risk level. The designed questionnaire is as follows in Table I:

Table 1. Designed Questionnaire and the Options

Sr. No	Some Question about to check the driver behavior on way.	Yes 1	Often 2	Some-time 3	No 4
1	Disregard the speed limits late at night or early in the morning.	14.5	10.75	22.75	52
2	Cross a junction knowing that the traffic lights have already turned red.	6.25	18.25	25.5	50
3	Get involved with unofficial 'races' with other drivers	7.25	7.75	22.75	62.25
4	Sound your horn to indicate your annoyance to another driver.	24.25	12.75	20.5	42.5

5	Fail to check your rear-view mirror before pulling out or changing lanes.	8.75	8.75	23.25	59.25
6	Attempt to overtake someone that you hadn't noticed to be signaling a left/right turn.	10.5	10.75	16.25	62.
7	Forget where you left your car in the car park.	8.75	7.5	21	62.75
8	Under estimate the speed of an oncoming vehicle when overtaking.	9.5	9	19.25	62.25
9	Fail to notice that pedestrians are crossing when turning into a side street from a main road.	9	4.75	18.25	58
10	Passing someone's vehicle on the right-hand side.	52.25	28	7.25	2.
11	Jumping the queue when traffic jams.	57.25	16.25	13.25	3.25
12	Drive with enough safety margin.	53	19	16.75	1.25
13	No slow down at the intersection.	49.25	28.25	13.75	8.7
14	Take more passengers than allowed.	27.75	6.75	15.5	60
15	Talk to passengers while driving.	31.25	19.25	15.25	34.25
16	Speed up at traffic lights at a green /yellow phase.	15.5	18.5	17.75	48.25
17	Fail to see passengers at a stop and have to brake strongly.	18.75	16.5	22.75	42
18	Exceed the speed limit to catch up or avoid being late.	15	15.5	23.5	46
19	Get into the wrong side at a road or approaching a road junction.	12.5	15.75	24.5	47.25
20	Eating and drinking while driving.	41.5	29.25	18.5	10.75

Based on the data collected from the interviews, the analysis conducted is shown in the following table II I shows the age and experience of the participants.

Table 2. Age * Experience Cross Tabulation Count

Age	Experience				Total
	<2 Years	2-4 Years	5-9 Years	>10 Years	
18-24 Years	33	47	39	5	124
25-39 Years	6	58	83	16	163
40-59 Years	0	5	30	75	110
>60 Years	0	0	0	3	3
Total	39	110	152	99	400

Table 3 shows the age and education of the participants:

Table 3. Age * Education Cross Tabulation Count

		Education				
		Middle	**Metric**	**>Metric**	**Nothing**	**Total**
Age	**18-24 Years**	7	12	104	1	124
	25-39 Years	52	55	39	17	163
	40-59 Years	39	18	13	40	110

>60 Years	0	0	0	3	3
Total	98	85	156	61	400

Question 12: the driver is observing the enough safety margins is taken as the dependent variable (binary: yes or no) and all other variables are taken as independent.

The case processing summary is shows in the following table 4:

Table 4. Case Processing Summary

		N	Marginal Percentage
Drive with enough safety margin.	Yes	378	94.5%
	No	22	5.5%
Age	18-24 Years	124	31.0%
	25-39 Years	163	40.8%
	40-59 Years	110	27.5%
	>60 Years	3	0.8%
Experience	<2 Years	39	9.8%
	2-4 Years	110	27.5%
	5-9 Years	152	38.0%
	>10 Years	99	24.8%
Education	Middle	98	24.5%
	Metric	85	21.3%
	>Metric	156	39.0%
	Nothing	61	15.3%
	Yes	81	20.3%
Disregard the speed limits late at night or early in the morning?	Often	48	12.0%
	Some time	66	16.5%
	No	205	51.3%
Cross a junction knowing that the traffic lights have already turned red.	Yes	23	5.8%
	Often	45	11.3%
	Some time	99	24.8%
	No	233	58.3%
Get involved with unofficial 'races' with other drivers	Yes	41	10.3%
	Often	31	7.8%
	Some time	87	21.8%
	No	241	60.3%
Sound your horn to indicate your annoyance to another driver.	Yes	157	39.3%
	Often	48	12.0%
	Some time	66	16.5%
	No	129	32.3%
Fail to check your rear-view mirror before pulling out or changing lanes.	Yes	46	11.5%
	Often	36	9.0%
	Some time	94	23.5%
	No	223	55.8%
	13.00	1	0.3%
Attempt to overtake someone that you hadn't noticed to be signaling a left/right turn..	Yes	26	6.5%
	Often	28	7.0%
	Some time	75	18.8%
	No	271	67.8%
Apply sudden brakes on a slippery road, or steer wrong way in a skid.	Yes	47	11.8%
	Often	40	10.0%

	Some time	110	27.5%	Take more passengers than allowed.	Yes	78	19.5%
	No	202	50.5%		Often	51	12.8%
	44.00	1	0.3%		Some time	116	29.0%
Under estimate the speed of an oncoming vehicle when overtaking.	Yes	52	13.0%		No	155	38.8%
	Often	33	8.3%	Talk to passengers while driving.	Yes	121	30.3%
	Some time	87	21.8%		Often	56	14.0%
	No	228	57.0%		Some time	119	29.8%
Fail to notice that pedestrians are crossing when turning into a side street from a main road.	Yes	25	6.3%		No	104	26.0%
	Often	34	8.5%	Speed up at traffic lights at a green /yellow phase.	Yes	65	16.3%
	Some time	86	21.5%		Often	36	9.0%
	No	255	63.8%		Some time	118	29.5%
Passing someone's vehicle on the right-hand side.	Yes	205	51.3%		No	181	45.3%
	Often	78	19.5%	Fail to see passengers at a stop and have to brake strongly.	Yes	98	24.5%
	Some time	68	17.0%		Often	58	14.5%
	No	48	12.0%		Some time	98	24.5%
	41.00	1	0.3%		No	146	36.5%
Jumping the queue when traffic jams.	Yes	195	48.8%	Exceed the speed limit to catch up or avoid being late.	Yes	132	33.0%
	Often	80	20.0%		Often	53	13.3%
	Some time	85	21.3%		Some time	81	20.3%
	No	39	9.8%		No	134	33.5%
	41.00	1	0.3%	Get into the wrong side at a road or approaching a road junction.	Yes	47	11.8%
No slow down at the intersection.	Yes	250	62.5%		Often	41	10.3%
	Often	63	15.8%		Some time	155	38.8%
	Some time	57	14.3%		No	157	39.3%
	No	29	7.3%	Eating and drinking while driving.	Yes	109	27.3%
	11.00	1	0.3%		Often	42	10.5%

	Some time	120	30.0%
	No	129	32.3%
Valid		400	100.0%
Missing		0	
Total		400	
Subpopulation		388[a]	

a. The dependent variable has only one value observed in 388 (100.0%) subpopulations.

Model fitness is depicted in the following table 5:

Table 5.Model Fitting Information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	170.386			
Final	.000	170.386	71	.000

In order to get the model for the data collected. We have following assumptions:

- Ho= The null hypothesis is that all parameters of that effect are 0
- H1= Alternate hypothesis is that all parameters effect is 1.
- If $p < 0.05$ so we reject the null hypothesis it means that the considered variable has effect on the dependent variable.

Based on the data it can be found from the following table 1.6 that experience, education, Q1, Q2, Q3, Q5, Q6, Q9, Q11, Q13, Q16, Q17,Q19 and Q20 do not affect the dependent variables (Table 6).

Table 6. Likelihood Ratio Tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	Df	Sig.
Intercept	.000a	.000	0	.
Age	.000b	.	3	.
Experience	.000b	.000	3	1.000
Education	5.627c	5.627	3	.131
Q.1	.000b	.000	3	1.000
Q.2	.000b	.000	3	1.000
Q.3	5.626c	5.626	3	.131
Q.4	17.672c	17.672	3	.001
Q.5	.000b	.000	4	1.000
Q.6	5.471c	5.471	3	.140
Q.7	15.746c	15.746	4	.003
Q.8	.000b	.	3	.
Q.9	2.262c	2.262	3	.520
Q.10	16.059c	16.059	4	.003
Q.11	.000b	.000	4	1.000
Q.13	.000b	.000	4	1.000
Q.14	8.238c	8.238	3	.041
Q.15	8.031c	8.031	3	.045
Q.16	7.118c	7.118	3	.068
Q.17	.000b	.000	3	1.000
Q.18	17.393c	17.393	3	.001

Q.19	5.914c	5.914	3	.116
Q.20	6.079c	6.079	3	.108

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

b. The log-likelihood values are approaching zero. There may be a complete separation in the data. The maximum likelihood estimates do not exist.

c. Unexpected singularities in the Hessian matrix are encountered. This indicates that either some predictor variables should be excluded or some categories should be merged.

4. CONCLUSIONS

This work applied several unique datasets and a number of new methodologies to investigate two broad themes in the road safety literature. These relate to the frequency and magnitude of risky driving behaviour within day-to-day driving, outside of a controlled laboratory environment, and its association with drivers 'risk perceptions, concerns of injury, confidence in their driving skills and personalities. The second theme relates to how the extent of risky driving behaviour can be reduced by making drivers both aware of what they are doing and providing a financial incentive to change behaviour. In the process of investigating these issues, this thesis makes a number of contributions to research and practice which can be applied to evaluate changes in driver behaviour for road safety outcomes.

5. REFERENCES

[1] Tamakloe R, Das S, Aidoo EN, Park D. Factors affecting motorcycle crash casualty severity at signalized and non-signalized intersections in Ghana: Insights from a data mining and binary logit regression approach. Accident Analysis & Prevention. 2022 Feb 1;165:106517.

[2] Kurjak A, Stanojević M, Dudenhausen J. Why maternal mortality in the world remains tragedy in low-income countries and shame for high-income ones: will sustainable development goals (SDG) help?. Journal of Perinatal Medicine. 2022 Jun 1.

[3] DestinaVarghese D, Rema MK. Post-Traumatic Stress Disorder And Quality Of Life Among Road Traffic Accident Survivors. Journal of Positive School Psychology. 2022 Jul 18:8329-35.

[4] Üzümcüoğlu Y, Özkan T, Lajunen T, Morandi A, Orsi C, Papadakaki M, Chliaoutakis J. Life quality and rehabilitation after a road traffic crash: A literature review. Transportation research part F: traffic psychology and behaviour. 2016 Jul 1;40:1-3.

[5] Andersson AL, Bunketorp O, Allebeck P. High rates of psychosocial complications after road traffic injuries. Injury. 1997 Oct 1;28(8):539-43.

[6] Useche SA, Cendales B, Montoro L, Esteban C. Work stress and health problems of professional drivers: a hazardous formula for their safety outcomes. PeerJ. 2018 Dec 20;6:e6249.

[7] Atalar D, Thomas P. Powered two-wheeler crash scenario development. Accident Analysis &

Prevention. 2019 Apr 1;125:198-206.

[8] Khan K, Zaidi SB, Ali A. Evaluating the nature of distractive driving factors towards road traffic accident. Civil Engineering Journal. 2020 Aug 1;6(8):1555-80.

[9] Nævestad TO, Phillips RO, Laiou A, Bjørnskau T, Yannis G. Safety culture among bus drivers in Norway and Greece. Transportation research part F: traffic psychology and behaviour. 2019 Jul 1;64:323-41.

[10] Hu W, Cicchino JB. An examination of the increases in pedestrian motor-vehicle crash fatalities during 2009–2016. Journal of safety research. 2018 Dec 1;67:37-44