

## An Assessment on Driving Behaviourism of Goods Vehicle Drivers in Kerala

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**Abstract :** Road Safety has become a serious issue in this era as the population in terms of both people as well as vehicles has increased to a large extent. The behaviour of drivers is influenced by several factors, which include their socio-economic – demographic factors and vehicle characteristics. Accidents comprising of goods vehicles have been on the surge in Kerala over the years. Even though the numbers of heavy vehicles plying on Kerala roads are less compared to two wheelers and cars, the proportion of crashes involving heavy vehicles is a cause of concern. Fallacious driving behaviourism is generally considered as the leading root of such accidents. The present study intends to investigate the elements involved in the Driver Behaviour Questionnaire (DBQ), then to explore the relationships between the elements of the DBQ and accident involvement. The data were interpreted using percentage analysis. The analysis showed the level of violations, errors, lapses committed by drivers on the basis of driving behaviourism and non –driving behaviourism of the goods vehicle driver.

**Keywords:** Goods Vehicle Accidents, Driving behaviour, Non –driving behavior s.

### 1. Introduction

Road accidents are one of the major challenges for the transportation sector of any country. Every day a large number of people die in road accidents and hence road accident is stated as the primary cause of death in the world. Even though developed countries take effective measures to rectify the problem and to reduce its impacts on economy, the problem is still an unsolved issue in many developing countries like India. As per literatures, fault of drivers constitute 95% of the accidents. Average incidents of accidental deaths per year and annual rate of accident death for decades reveal increasing accident death in India and continuous annual increase in the rate of accident deaths. Since, heavy vehicle occupies a major portion of the road, which in turn results in congestion and other traffic problems, it is essential to carry out a study on the accident records of heavy vehicles. Goods vehicles like Lorries and trucks play a vital role in the movement of goods in India. As the goods vehicle drivers are constrained with time and responsibilities they bear, these heavy vehicles often met with fatal accidents. As per the accident statistics it is evident that two wheelers and four wheelers together constitute more than 70% of the road accidents occurring in a year. It was found that the percentage of goods vehicles involved in accidents is even higher than that of two wheelers and four wheelers. It is thereby evident that the accident statistics of goods vehicles is significant as the other two and should be taken into consideration with equal importance.

Goods vehicles contribute a major share of the fatal accidents and serious injuries in Kerala. Of the total accidents in Kerala, two wheelers constitute more than 50%, followed by four wheelers and heavy vehicles. As goods vehicles like lorry and tippers involves in a high percentage of the fatal accidents and serious injuries in Kerala, and they occupies a large portion of the space, it becomes important to study the perceptions of the drivers and their behavioral aspects during driving, which can be marked as the major reason for their involvement in crashes. The year wise comparison of accident percentage for three major classes of vehicles in Kerala is given in Table 1.

**Table 1**

Year wise comparison of Accident Percentage for the Major Classes of vehicles in Kerala

Year	Vehicle Class	Total Number of Vehicles	Accidents Reported	Accident Percentage (%)
2011-2012	Two Wheelers (Scooter/Motor Cycles)	4127227	17116	0.41
	Cars & Station Wagons	1476029	10106	0.68
	Goods Vehicle (Four wheeler and above)	322450	3392	1.05

Year	Vehicle Class	Total Number of Vehicles	Accidents Reported	Accident Percentage (%)
2012 -2013	Two Wheelers (Scooter/Motor Cycles)	5041495	17448	0.35
	Cars & Station Wagons	1561145	9735	0.62
	Goods Vehicle (Four wheeler and above)	354296	2830	0.80
2013-2014	Two Wheelers (Scooter/Motor Cycles)	5288529	20293	0.38
	Cars & Station Wagons	1806304	10233	0.57
	Goods Vehicle (Four wheeler and above)	373218	2869	0.77
2014-2015	Two Wheelers (Scooter/Motor Cycles)	5828816	20434	0.35
	Cars & Station Wagons	1990840	10726	0.54
	Goods Vehicle (Four wheeler and above)	411347	2817	0.68
2015-2016	Two Wheelers (Scooter/Motor Cycles)	6472335	3538	0.36
	Cars & Station Wagons	2178232	11817	0.54
	Goods Vehicle (Four wheeler and above)	419813	2665	0.63
2016-2017	Two Wheelers (Scooter/Motor Cycles)	7077103	22459	0.32
	Cars & Station Wagons	2383565	11663	0.49
	Goods Vehicle (Four wheeler and above)	438709	2414	0.55
2017-2018	Two Wheelers (Scooter/Motor Cycles)	7796669	24487	0.31
	Cars & Station Wagons	2628005	11682	0.44
	Goods Vehicle (Four wheeler and above)	452535	2501	0.55
2018-2019	Two Wheelers (Scooter/Motor Cycles)	8620681	25972	0.30
	Cars & Station Wagons	2991042	12172	0.41
	Goods Vehicle (Four wheeler and above)	477027	2446	0.51

From the aforesaid table statistics it is evident that the goods vehicle comprising of lorries and tippers involves in a high percentage of the accidents and in this regard, it becomes important to study the perceptions of the drivers and their behavioural aspects during driving, which can be marked as the major reason for their involvement in crashes.

## 2. Scope & Objectives of the Study

Since the primary cause of road accidents is the fault from the drivers, it is necessary to study the behavioral pattern to understand the significant factors of a driver which have high correlation to the crashes. The study focuses on goods vehicles drivers as they have a considerable contribution to many fatal accidents and serious injuries. The behavioral and socio demographic factors of goods drivers which has high influence on the occurrence of accident is analyzed in this study using questionnaire survey in which each driver is asked to fill their personal details as well as certain predetermined questions regarding their driving mannerisms. The scope of the present study is confined to the behaviourism and socio- demographic aspects of goods vehicle drivers within Kerala.

The major objectives of this study are

1. To study the socio –economic and demographic characteristics of goods vehicle drivers.
2. To correlate driving behaviourism and non-driving behaviourism displayed on roads by interpreting the drivers' knowledge, reaction and practice elements.

### 3. Study Approach & Data Collection

There are considerable numbers of studies related to the driver behaviourism and its influence leading to road accidents. And among these, a study by Reason et al, 1990 approach is followed extensively where a measurement scale to review the odd behaviourism will be self – reported by the drivers itself. The present study also has attempted to follow the same approach where a DBQ comprises a set of behavioural attributes and each being categorized under violations, errors and lapses with certain elements that are typically suitable only for Kerala driving road conditions. The primary power of such an approach is that the driver's straight participation in the survey and the misinterpretation can be lessen, provided the drivers participate honestly. The database to be generated from the survey includes the demographic particulars, driving and non driving behaviorism connecting violations, errors & lapses.

**Table 2**  
Basic driver behavioural parameters identified for goods drivers

1	Overloaded trips	12	Overtaking in non-overtaking zones
2	Overtaking through left side	13	Competitive driving
3	Speed limit violation	14	Rash driving
4	Drunk and drive	15	Use of mobile phones when driving
5	Improper headlights	16	Irresponsible driving in hilly areas
6	Driving in prohibited time zones	17	Driving in prohibited areas
7	Disturbing the front moving vehicles	18	Unnecessary use of horns in signals
8	Negotiating curves without reducing speed	19	Negotiating speed regulators without reducing speed
9	Failing to estimate the speed of oncoming vehicles during overtaking	20	Unintentional increase of speed
10	Failing to maintain a safe gap between the front moving vehicles	21	Loosing concentration while driving
11	Driving while feeling sleepy		

There are 51 questioning in the survey related to driving and non- driving mode. The needed sampling was selected based on Bill Godden sample size formula for infinite population. Thus, a total of 1,200 goods vehicles data was taken within Kerala State during the survey. Adequate representations were made in the sample to include routes operated in different terrain conditions viz. plain, rolling and hilly regions and also urban, semi-urban and rural areas. Also, each class of goods vehicle drivers' viz. container trailers, lorry and tipper drivers, tanker lorry drivers and LCV drivers. The reply to the questioning to the survey was different for every participant drivers but the basic elements of their behavioural change were almost similar. It was relevant to figure out those behaviours for selecting the suitable questions to be included in the questionnaire.

### 4. Study Results

The primary data collected from the field were edited, coded and analyzed systematically through electronic data processing. Inline with the DBQ organized for goods vehicle drivers representing at various regions of Kerala, a database of the behaviourism condition of the goods drivers was also developed. And from the database, it could be figured out that according to what the driving behaviour of the goods drivers shift with respect to their differing socio-demographic environment. Following are the output after the analysis from the collected database.

As part of the data processing it was spotted out that the participant drivers was ranged between 20 & 70 years. As moving on, it was found that majority of the participant drivers are educated up to 10<sup>th</sup> grade of school level and only a minute portion are graduates. Again it was noticed that a greater portion of the participant drivers are married and were living with their family. Also, it was noticed that the number of trips and the total distance covered per day jumbled between 0 to 10 numbers and 0 to 500 kms respectively. The details such as driving experience of participant drivers and the number of accidents involved were also spotted during the analysis.

**Table 3**  
Variations of driving and non-driving behavior related to education

Education	Driving			Non Driving	
	Violation	Error	Lapse	Error	Lapse
< 10 <sup>th</sup>	39.7%	61.1%	67.6%	90.7%	65.2%
10 <sup>th</sup> to 12 <sup>th</sup>	43.3%	65.0%	75.6%	79.9%	63.8%

> 12 <sup>th</sup>	33.9%	57.1%	77.3%	89.8%	58.2%
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**Table 4**

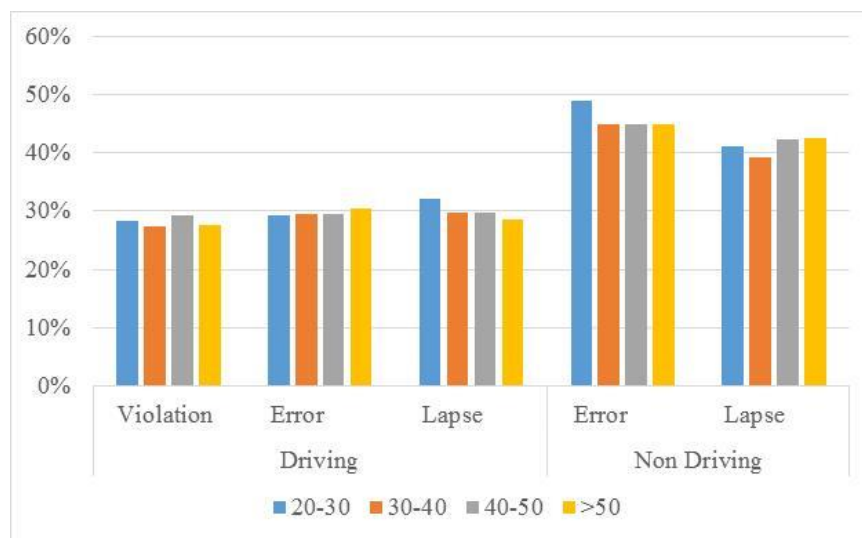
Variations of driving and non-driving behavior based on marital status

Marital Status	Driving			Non Driving	
	Violation	Error	Lapse	Error	Lapse
Married	28.05%	30.03%	29.66%	44.77%	41.30%
Unmarried	27.92%	28.44%	32.55%	49.46%	40.28%

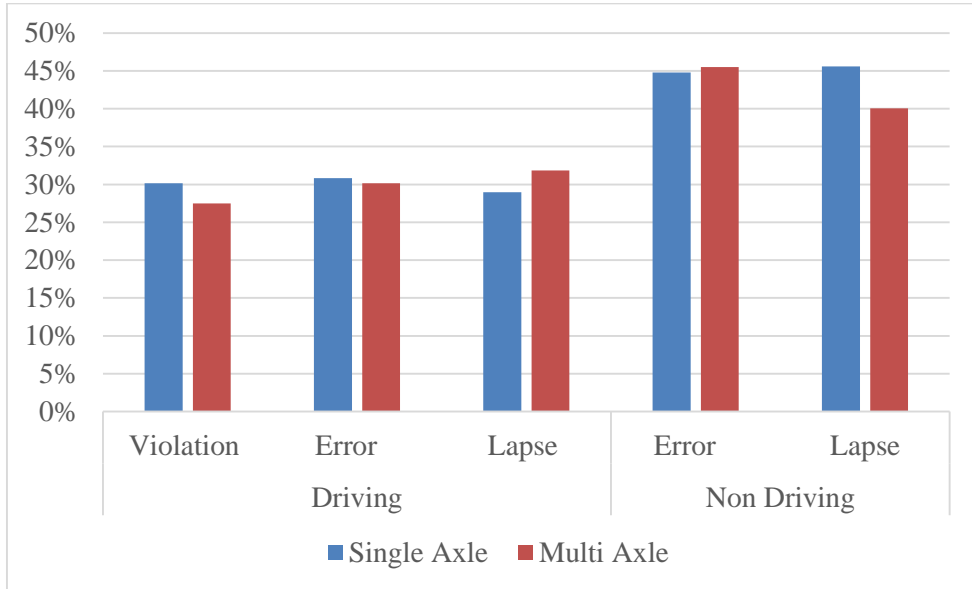
**Table 5**

Variations of driving and non-driving behavior based on trips per day

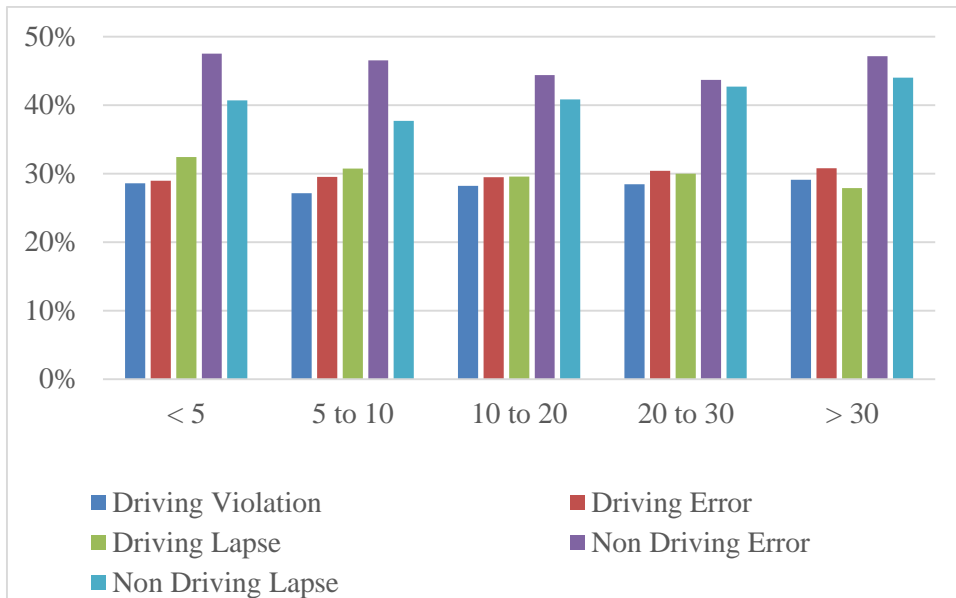
Trip Nos.	Driving			Non Driving	
	Violation	Error	Lapse	Error	Lapse
0 to 4	44.3%	68.4%	72.8%	79.2%	66.5%
4 to 8	32.8%	55.7%	79.1%	81.1%	58.8%
8 to 12	41.6%	60.8%	68.8%	82.4%	61.6%
12 to 16	47.0%	68.9%	72.7%	83.0%	65.0%
16 to 20	40.4%	65.3%	100.0%	81.3%	47.5%



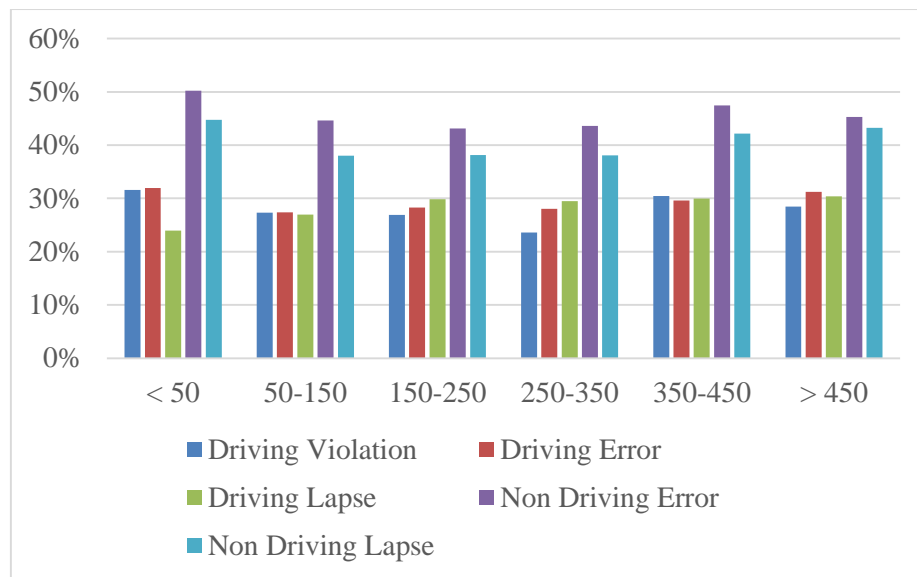
**Figure 1:** Behavioural variation based on driver's age



**Figure 2:** Behavioural variation based on vehicle type



**Figure 3:** Behavioural variation based on driving experience



**Figure 4:** Behavioural variation based on kilometers per day

From the aforesaid detailed analysis of the questionnaire it can be seen that different socio –demographic characteristics of a driver have great impacts on driving behavior ie. a person with a particular set of socio –demographic characteristics is more prone to commit errors than violations. Driving lapses and non-driving errors were highest for drivers in the age group between 20-30 years. Non-driving lapses were least for drivers in the age group between 30-40 years. Violations were higher in case of Single Axle trucks. Driving lapses were higher for Multi Axle trucks whereas non-driving lapses were higher in Multi Axle trucks.

## 5. Conclusion

This work dealt with the study of varying behavioural aspects of goods drivers in Kerala. Some of these aspects of driving behaviour can influence the occurrence of road accidents. The drivers of both single and multi-axle goods carriers registered in Kerala are included in this study. Inline with the analysis, it could be noticed that the driving behaviourism displayed by the goods drivers are matured through years of driving experience and is raised to be highly correlated with the demographic and socio-economic environment of the driver. Experience of the goods driver, kilometers driven per day and vehicle tonnage were found to be the most influencing factors that causes an accident. The database created was completely on drivers’ personal opinion of their driving behaviourism. However, a lot of studies have determined that self-reports of driving correlate well to actual driving behaviourism. There is also a possibility of change their answers deliberately by some of the participant drivers about erroneous or intrusive driving to give a socially acceptable answer. The present study findings will be helpful to understand the behaviourism of the goods vehicles drivers in Kerala where it can be used to disseminate knowledge to user agencies and formulate implementable action plan for the reduction of road accidents due to goods vehicle.

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