# Analysis of driver behaviours towards road safety measures using DBQ in the Indian context

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**ABSTRACT:** The Driver Behaviour Questionnaire (DBQ) is a universally adopted tool for assessing aberrant driver behaviour. Irrespective of the popularity of the self-report method, the applicability of the DBQ in developing countries like India remained unexamined. The present study aims to analyse the aberrant driver behaviour towards road safety measures using DBQ and investigate demographic variables relationship on aberrant driver behaviour and traffic offences. Exploratory and confirmatory factor analysis supported the original factor structure. Overall, the results showed that the cross-cultural form of the DBQ is a valid and reliable tool for assessing driving behaviour in India. Results provide valuable information about the impact of demographics on driving behaviour, which will help take preventive measures in road design and traffic management in India.

## 1. INTRODUCTION

Road accidents are quite complex due to the presence of mixed vehicular traffic and pedestrians in India. It involves property damages, personal injuries, or even casualties. An accident may be caused due to combinations of several reasons. Elements responsible for traffic accidents may be the road users, defective vehicles, and road conditions. a road user could be a driver, pedestrian, or passenger. Most of the road users are aware of the general rules and safety measures, but the negligence and carelessness on the part of road users cause crashes.

Despite the increase in global motorisation, population, Global Status Report on Road Safety (2013; 2015; 2018) shows that India's number of road traffic deaths were 105724, 137572, 150785, respectively. These numbers have been increasing continuously since 2007. These road traffic injuries cause approximately 3% of GDP loss. According to the Global Status Report of Road Safety 2015, more than 1.2 million people die each year on the world's roads making road traffic injuries a leading cause of death globally. Road traffic injuries have become the leading cause among the age group of 15-29 years and were predicted to be the seventh leading cause of death by 2030. Key facts related to India are presented in Table 1, and Figure 1.

Most of the traffic crashes may be predictable, and preventable, although road traffic injuries have been a leading reason of mortality for many years. Road accidents can be significantly minimised by appropriate means of traffic engineering, and management principles. Also, abnormal driver behaviour has been noticed problematic and therefore, across the globe, extensive research has been conducted to understand driver behaviour. However, driver behaviour is the least investigated and least understood in the Indian context.  This lack of knowledge makes it challenging to train and educate Indian drivers for the challenges they are likely to face on the road. Hence, it is vital to study and classify the aberrant driver aberrant behaviour in the Indian context. Moreover, this classification will help the researcher develop a framework and assist traffic engineers in taking preventive measures in road design and traffic control.

| Particulars | Data |
|---|---|
| Population | 1252139596 |
| Income group | Middle |
| Gross national income per capita | US$ 1570 |
| Total registered vehicles in 2012 | 159 490 578 |
| • Cars and 4-wheeled light vehicles | 38 338 015 |
| • Motorized 2- and 3-wheelers | 115419175 |
| • Buses | 1676503 |
| • Heavy trucks | 4056885 |
| Permanently disabled due to road traffic crash | 2.0–3.0% |
| Reported road traffic fatalities (2013) | 137572 (85% M, 15% F) |
| WHO estimated road traffic fatalities | 207551 |
| WHO estimated rate per 100 000 population | 16.6 |
| Estimated GDP lost due to road traffic crashes | 3.0% |

**Table 1. Key Facts of India as Per Global status report on road safety 2015**

## 2. LITERATURE REVIEW

This section highlights past studies on essential factors that are responsible for crashes and understanding poor driver behaviour. Accident analysis has provided ample evidence of the most common causes of crashes involving overspeeding, drunk driving, distractions, and avoidance of safety measures (Sucha and Seitl 2011). An increase in driving speed (beyond the speed limit and irrespective of the offered environment) magnifies the risk of accident and severity of injury (Meinhard 2020; Hartwig et al. 2020). Moreover, many accident investigations studies have attested that alcohol consumption
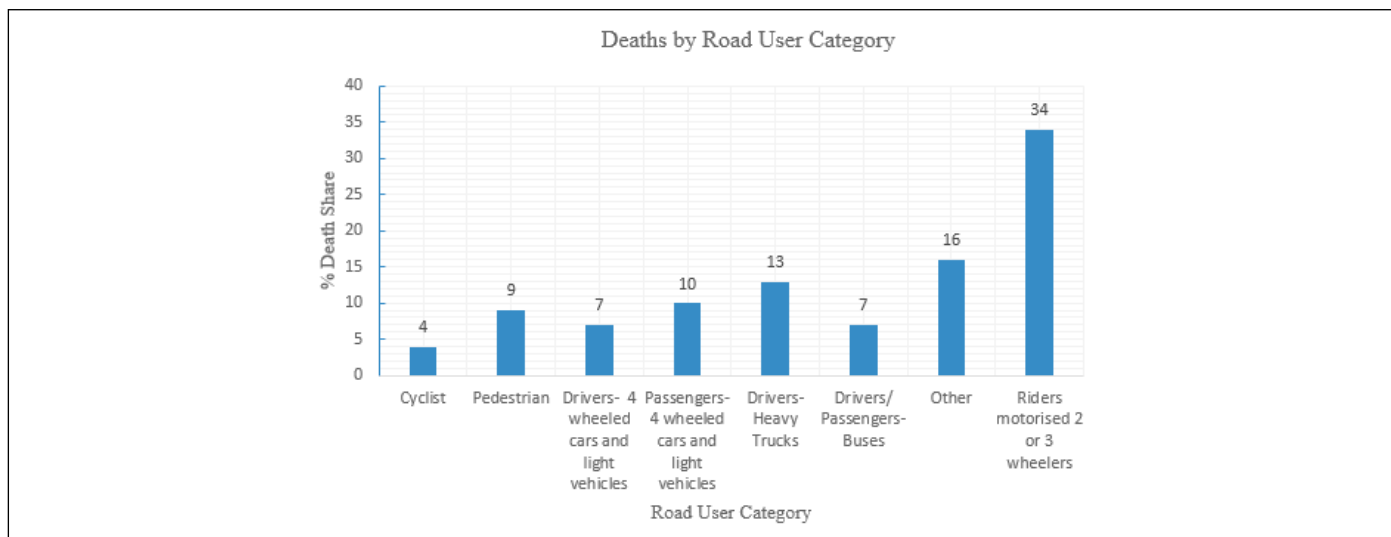
**Figure 1. Deaths by Road User Category (Source: Road Accidents in India; 2015 Transport Research Wing (TRW), Ministry of Road Transport and Highways)**

(while driving) is also one of the severe cause accountable for the accident. It severely reduces the reaction time and blurs the vision due to cosiness. Distraction while driving may also cause significant accidents though it seems to be ignorable. Other prime reasons include ignorance of road intersections, violation of signal rules, and non-compliance with safety measures like wearing helmets and seat belt while driving (Bener et al., 2008).

Reason et al. (1990) developed the original Driver Behavior Questionnaire to assess driving behaviour and grouped behaviour in four categories: slip lapses, error, and violation. DBQ by reason et al. (1990) has become one of the most extensively used instruments to quantify driving style. It is also helpful to analyse the relationship between driving behaviour and crashes involvement (De Winter & Dodou, 2010; Wang & Xu 2019; Farooq, Moslem & Duleba, 2019; Ross et al. 2018).

In past decades, DBQ has become a popular instrument to measure the self-assessed aberrant driving behaviour. For traffic safety, DBQ has been extensively applied in various countries but varies in terms of the number of items and the factorial structures. Based on Manchester DBQ, Xu et al. (2018) developed the Chinese Driving Questionnaire (CDQ), including driving violations particularly relevant in China. Blockey and Hartley (1995) applied DBQ to confirm the distinction between driving errors and violations in Western Australia. Rimmö and Hakamies-Blomqvist (2002) used the instrument to study the relationship between driving exposure, health, and self-reported aberrant driving behaviour of aged Swedish drivers (52 to 92 years). Stanojević et al. (2018) examined 1000 drivers and tested the psychometric properties of DBQ in three countries from South-East Europe (Bulgaria, Romania, and Serbia).

Kontogiannis et al. (2002) used the theory of planned behaviour and surveyed over 1400 drivers in Greece to study the variety of aberrant driving behaviours and confirmed earlier studies in Britain, Australia, and Sweden. Sullman et al. (2002) provide evidence of the robust nature of the DBQ among New Zealand truck drivers. Owsley et al. (2003) used DBQ to estimate driving errors and violations in the USA whereas Bener et al. (2008) examine the relationships between the factors of the DBQ and accident involvement in Qatar and the United Arab Emirates. The investigation concluded that the extent of lapses, errors, and violations is peaked in the UAE compared to Australia and other European countries. Past studies have investigated the psychometric properties and the factorial structure of a cross-cultural ver-

sion of DBQ. Exploratory and confirmatory factor analysis supported the original four-factor structure of reason et al. (1990) study. Niezgoda et al. (2013) also tested the Polish version of DBQ and reported high overall reliability of all scale items. Based on factor loading, driver behaviours were classified as violations, mistakes, inattention, and inexperience. Smorti and Guarnieri (2016) adopt and validate the Italian version of DBQ, and the confirmatory factor analysis results showed that the hypothesised four-factor structure of the DBQ was adequate. The reliability of the scale was also confirmed within the Italian context. Af Wahlberg et al. (2015) commented that a greater level of care should be taken before adopting DBQ in traffic safety research. Also, validation of self-reports should be more comprehensive in the future, considering the possibility of standard method variance.

Studies provide strong support for the original three-factor model consisting of lapses, errors, and violations by Reason (Sucha M et al., 2014; Dobson et al., 1999). However, the factorial structure of DBQ varies between countries and studies. It can be explained by cultural differences, differentiated items description, and analysis methods (Warner et al., 2011; Lawton et al., 1997; and Davey et al., 2007). Nevertheless, most studies report three or four factors structure of DBQ (De Winter & Dodou, 2010). The fundamental distinction between factorial system across studies was the difference in the errors and violations (Blockey and Hartley, 1995; Warner et al., 2011). Past studies also present variations in driving style among subcategories and demographic variables like age, gender, and annual mileage (Reason et al., 1990; Sucha and Cernochova, 2016; Rimmö and Hakamies-Blomqvist, 2002; Žardeckaitė et al. 2018; Havlíčková et al. 2020)

Few studies employed confirmatory factor analysis (CFA) to test the factorial validity (Rimmo, 2002; Özkan et al., 2006). Rimmö (2002) reported a fit of Swedish DBQ across new drivers, inexperienced drivers, young drivers, and experienced drivers. The study's result confirmed that the DBQ structure is relatively stable across subgroups, indicating factorial validity and reliability of the DBQ.

From the extensive literature survey, it can be inferred that there is a dearth of driver behaviour studies in the Indian context. Despite the popularity of the DBQ, no study has tested the fit of the original DBQ model in the Indian context. Hence, the present study's principal aim is to develop the driver behaviour questionnaire (DBQ) exclusively for the Indian context and investigate the applicability of the driver's behaviour towards road safety measures.

## 3. METHODOLOGY

The study aims to examine aberrant driver behaviour towards road safety measures using DBQ. Further, an attempt is also made to investigate demographic variables' relationship on the aberrant driver behaviour and traffic offences. Hence, the Manchester Driver Behaviour Questionnaire (DBQ) was used to examine the self-reported driving experiences of Indian drivers. The authors of this paper have modified the items to make the measures more generalise. Moreover, some of the scale items have been removed due to interpretation difficulties. Hence, the DBQ version in the present study consists of 22 scale items. The authors made efforts to maintain a balance between the original behaviour type and selected scale items. Initial pilot interviews were conducted (20 respondents) to check the reliability of scale items.

The survey includes socio-demographic information such as age, gender, employment, education status, driving experience, the average distance travelled in a day, and vehicle type. Respondents were required to indicate response on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Data was collected from 1569 respondents using a convenience sampling technique between January and October 2016. But due to incomplete responses, only 1412 responses are selected for analysis.

Data analysis was conducted using IBM SPSS 19 and AMOS software. The factorial structure of the DBQ was verified through exploratory factor analysis (EFA). The 22 items of the DBQ were factor analysed using principal components analysis and oblique (varimax) rotation. Further, Confirmatory factor analysis (CFA) was used to evaluate the identified factor structure's adequacy. To measure the relationship of demographics on driving behaviour analysis of variance (ANOVA) was used.

## 4. RESULTS

In the present study, the totals of 1412 individuals having driving experience were considered to study driver behaviour towards road safety measures in the Indian context. Out of the given sample, male and female participants were 1002(71%) and 410(29%) respectively, i.e. in terms of gender, almost 2/3 male 1/3 females actively participated in the study. The study covers a wide range of drivers having diverse demographics profiles. Majority of the driver belongs to the young age group of 16-25 years (58%). There are 23% (324) of the driver were between 26-35 years, 15% (212) were between 36-45 years, and about 4% (57) were more than 46 years of age. 60% of the sample, i.e., 847 participants are employed people, while drivers, students, and business participants share 15% (212), 2% (28), and 23% (325) of the total sample, respectively.

The study includes drivers possessing a wide range of driving knowledge. 34% (480) drivers have more than 20 years of experience, while 29% (409) of participants were driving from 10-20 years. The study incorporated 14% (198) of the driver with 5-10 years of driving experience, and 16% (226) possess 1-5 years of experience.

### 4.1 Factor Structure and Reliability

Descriptive statistics of the scale items are presented in Table-2. Exploratory factor analysis (EFA) indicates variables that can be grouped into a smaller set of underlying factors. The response is subjected to principal component analysis using varimax rotation. The Bartlett test of sphericity was used to test the significant correlations among the variables (Hair et al., 2000).

The exploratory factor analysis (EFA) resulted in a three-factor solution explaining 75% of the total variance (Figure 2,

| Scale items | Variable Name | Mean | SD |
|---|---|---|---|
| 1. Selection of the wrong route due to poor planning. | F_6 | 3.84 | .744 |
| 2. Overtaking a slow-moving vehicle without waiting for the side in a single lane. | F_5 | 3.89 | .740 |
| 3. Entered in a wrong lane in Circle /Choraha | F_4 | 3.77 | .812 |
| 4. After crossing a traffic signal, immediately attempt to achieve a high speed (30-40 kmph). | F_1 | 3.68 | .963 |
| 5. Trying to drive rash/fast with improper switching of gear | I_3 | 3.46 | .931 |
| 6. Usually, switch on the wrong button while driving (light/wiper/indicator) | I_6 | 3.48 | .940 |
| *7. While driving forgot that in which gear you are, so checking or confirming with hand (losing concentration) | I_8 | 3.21 | .564 |
| 8. Failed to read the traffic sign correctly and therefore committing mistakes. | I_2 | 3.71 | .832 |
| *9. Hitting another vehicle during parking operation due to the wrong estimation of space available. | F_7 | 3.11 | .761 |
| 10. Driving at a higher speed than the design speed intentionally in late-night (with high beam) and early morning. | O_2 | 4.03 | .706 |
| 11. Do not give way, when a vehicle is signalling for it. | F_2 | 3.77 | .844 |
| 12. A quick application of brake on a slippery road in the wrong manner. | F_3 | 3.72 | .869 |
| 13. Applying power brake due to mental absence to avoid the collision. | O_7 | 4.00 | .708 |
| 14. Trying to overtake without checking the position of the vehicle coming from the back. Resulting in rear-end collision. | I_1 | 3.38 | .952 |
| 15. Miss judges the speed of vehicle coming from the opposite direction during overtake | I_4 | 3.65 | .852 |
| 16. Do not bother/Noticing that someone is walking behind the car or bus during the back operation of a vehicle. | I_7 | 3.72 | .865 |
| 17. Driving on a road with partial concentration i.e. engage in changing a radio channel, songs or looking at map or phone | I_5 | 3.54 | .918 |
| 18. Irritated being drive slowly, therefore, breaking the lane rule for overtaking | O_3 | 4.04 | .737 |
| 19. The driver tries to reach or cross the signal as soon as possible with the intention of going fast or early. | O_1 | 3.99 | .680 |
| 20. Drink and drive(Crossing legal blood alcohol limit) | O_5 | 4.06 | .697 |
| 21. Intentionally driving in the wrong direction on a one-way road. | O_4 | 4.08 | .700 |
| 22. Get involved in unofficial races with other drivers to chase them | O_6 | 3.93 | .748 |
| *Scale items were omitted later in the factor model because of low loading | | | |

**Table 2. Scale items of the modified DBQ with mean and Standard Deviation (SD)**

| Scale items | Factor 1 (Offence: 7 items) | Factor2 (Fault: 6 items) | Factor3 (Ignorance: 7 items) |
|---|---|---|---|
| O_4 | 0.887 | | |
| O_5 | 0.839 | | |
| O_3 | 0.820 | | |
| O_2 | 0.811 | | |
| O_7 | 0.798 | | |
| O_1 | 0.793 | | |
| O_6 | 0.738 | | |
| F_5 | | 0.922 | |
| F_6 | | 0.890 | |
| F_2 | | 0.858 | |
| F_4 | | 0.796 | |
| F_3 | | 0.767 | |
| F_1 | | 0.747 | |
| I_7 | | | 0.862 |
| I_2 | | | 0.859 |
| I_4 | | | 0.850 |
| I_5 | | | 0.847 |
| I_6 | | | 0.836 |
| I_3 | | | 0.814 |
| I_1 | | | 0.739 |
| Eigen Values | 8.905 | 3.430 | 2.472 |
| % variance Explained | 26.051 | 25.664 | 22.322 |
| Cronbach Alpha | 0.939 | 0.925 | 0.940 |

Note:
1. Kaiser-Meyer-Olkin Measure of Sampling Adequacy.=0.914 and Bartlett's Test of Sphericity Approx. Chi-Square, p<0.05
2. Extraction Method: Principal Component Analysis
3. Rotation Method: Varimax with Kaiser Normalization
4. For the sake of clarity, the factor with loading less than .40 has been omitted.
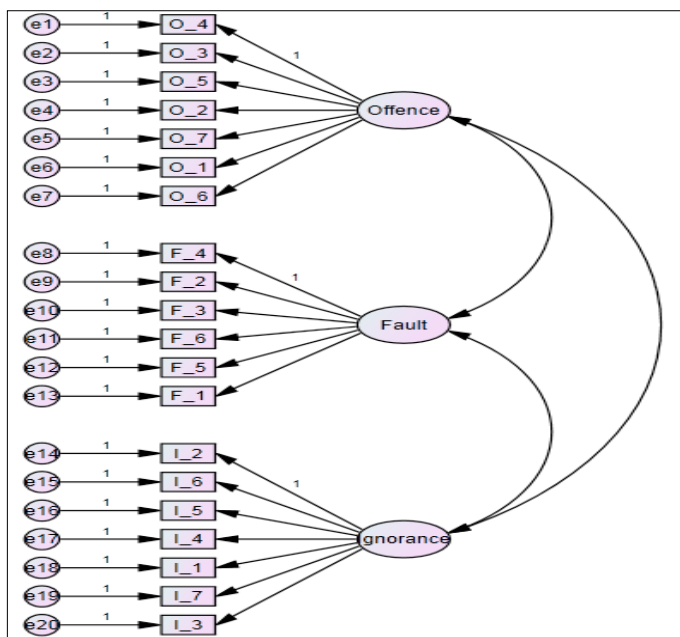
**Table 3. Result of EFA**



**Figure 2. Factor model (measurement model for CFA)**

Table 3). DBQ items have the highest loading on Factor-1 consisting of seven items that accounted for almost 26% of variance represents that the violations involve the definite risk to others. The items loading is extremely high in this factor includes driving in the wrong direction, drink & drive, overtaking, driving at high speed during the night and early morning, applying power brake, jumping or improper crossing of signal, and unofficial races. This factor was named as "offence". Factor-2, called 'Fault' consists of six items that describe 25.6% of the variance. In this factor, items include slips and errors of the highest risk category attempts either intentionally or due to carelessness, for the sack of reaching early or due to avoiding traffic rules and regulations. The items loading in this factor were overtaking in a single lane, selecting the wrong route, do not give way, an entry in the wrong lane, quick application of the brake, and attempting to achieve high speed.

Factor-3 labelled as 'ignorance' includes seven items explaining 22% of the variance. This factor primarily defines the slips and lapses, not causing the risk to others but happened unintentionally. Highest items loading in this factor are the blind reverse operation of vehicles, failed to read traffic sign correctly, overtaking without checking the position of the vehicle coming from the opposite direction, driving with partial concentration, engaged in improper switching of light/wiper/indicator, improper switching of gear and overtaking without checking the speed of vehicle coming from the back.

Internal consistency and reliability of the DBQ scale scores were examined by calculating Cronbach's alpha reliability coefficients (Table-3). Similar to previous research on professional drivers (Dobson et al., 1999; Sullman et al., 2002), the factors appear to exhibit relative internal consistency.

The high factor loading (>0.5) of the observed variables on the same construct shows evidence of convergent validity (Steenkamp and Geyskens, 2006) and discriminant validity of factors has been tested using the correlation matrix presented in Table 4. In all the cases, the coefficient of correlation less than 0.6 indicates a high correlation between the identified factors.

| Particulars | Offence | Fault | Ignorance |
|---|---|---|---|
| Offence | 1.000 | 0.438 | 0.276 |
| Fault | 0.438 | 1.000 | 0.504 |
| Ignorance | 0.276 | 0.504 | 1.000 |

**Table 4. Component Correlation Matrix**

To test the validity of the measurement model resulting from EFA, confirmatory factor analysis (CFA) is used. The validity of CFA is tested by using the goodness of fit index (GFI), adjusted goodness of fit index (AGFI), normed fit index (NFI), comparative fit index (CFI), and root means the square error of approximation (RMSEA). Table 5 displays that these fit indices collectively indicate that the factor model's overall fit is acceptable (Hair, et al., 2000).

| Fit Index | Values | Acceptable levels | Source |
|---|---|---|---|
| GFI | 0.908 | >= 0.90 | Jöreskog. and Sörbom (1993), |
| AGFI | 0.879 | >=0.90 | Bentler PM & Bonett DG (1980) |
| CFI | 0.966 | >=0.90 | Bentler PM & Bonett DG (1980) |
| NFI | 0.946 | >=0.95 | Hu and Bentler (1999) |
| RMSEA | 0.062 | <0.08 | Steiger (1990) |

**Table 5. Goodness of fit indices for Factor model in CFA**

Further, model reliability is tested using composite reliabilities (CR). The values of CR are in the acceptable range for all the constructs (Table-6). The average variance extracted (AVE) for all factors is more significant than 0.5, confirms the convergent validity. The discriminant validity is established as AVE's square root is larger than the correlation coefficients between factors. Hence, it can be concluded that the factor model has a good fit with no reliability and validity concerns.

| Measurement Items | Standard Estimates | Composite Reliabilities (CR) | Average Variance Extracted (AVE) |
|---|---|---|---|
| **Fault** | | 0.918 | 0.657 |
| F_1 <--- Fault | 0.655* | | |
| F_2 <--- Fault | 0.823* | | |
| F_3 <--- Fault | 0.678* | | |
| F_4 <--- Fault | 0.726* | | |
| F_5 <--- Fault | 0.976* | | |
| F_6 <--- Fault | 0.946* | | |
| **Offence** | | 0.936 | 0.677 |
| O_1 <--- Offence | 0.821* | | |
| O_2 <--- Offence | 0.867* | | |
| O_3 <--- Offence | 0.830* | | |
| O_4 <--- Offence | 0.906* | | |
| O_5 <--- Offence | 0.826* | | |
| O_6 <--- Offence | 0.736* | | |
| O_7 <--- Offence | 0.762* | | |
| **Ignorance** | | 0.939 | 0.687 |
| I_1 <--- Ignorance | 0.762* | | |
| I_2 <--- Ignorance | 0.869* | | |
| I_3 <--- Ignorance | 0.850* | | |
| I_4 <--- Ignorance | 0.882* | | |
| I_5 <--- Ignorance | 0.818* | | |
| I_6 <--- Ignorance | 0.788* | | |
| I_7 <--- Ignorance | 0.827* | | |

*Note: The factor loadings are significant at p<0.001*

**Discriminant Validity measures:** Correlation Coefficients with the square root of AVE (diagonal values)

| | Fault | Offence | Ignorance |
|---|---|---|---|
| Fault | *0.810* | | |
| Offence | 0.373 | *0.823* | |
| Ignorance | 0.242 | 0.498 | *0.829* |

**Table 6. Reliability and Validity Measures of Factor model in CFA**

From the sample demographic and analysis of variance (Table 7), it can be identified that age is significantly associated with driving behaviour. The age bracket of 26-45 years represents the worst aberrant driver behaviour in all three categories (offence, fault, and ignorance). More precisely, this peculiar driving behaviour is more critical for 36-45 years. It can also be discovered that the level of offence, fault, and ignorance committed by the driver's age group of 16-25 years is comparatively less. However, drivers that belong to higher age brackets show mature behaviour on the road.

Moreover, data analysis revealed that female drivers are more careful and secure drivers and follow traffic rules to avoid crashes. In terms of occupation, the professional driver shows maximum offence, fault, and ignorance among all other categories of employment viz. students, employed, and

businesspeople. Road users with less driving experience are committing more faults than offences.

| Demographic Dimensions | | N | Mean | | |
|---|---|---|---|---|---|
| | | | Offence | Fault | Ignorance |
| Age (in years) | 16-25 | 819 | 3.77 | 3.68 | 3.43 |
| | 26-35 | 324 | 4.32 | 3.99 | 3.72 |
| | 36-45 | 212 | 4.96 | 4.28 | 4.11 |
| | 46 & Above | 57 | 2.40 | 3.01 | 2.70 |
| | ANOVA (F-Statistics) | | *440.841** | *22.878** | *22.791** |
| Gender | Male | 1002 | 4.30 | 3.98 | 3.74 |
| | Female | 410 | 3.30 | 3.38 | 3.12 |
| | ANOVA (F-Statistics) | | *442.569** | *65.697** | *59.571** |
| Occupation | Driver | 212 | 4.96 | 4.28 | 4.11 |
| | Student | 28 | 2.14 | 2.93 | 2.44 |
| | Employed | 847 | 3.75 | 3.67 | 3.42 |
| | Business | 325 | 4.32 | 3.99 | 3.72 |
| | ANOVA (F-Statistics) | | *387.751** | *21.427** | *23.701** |
| Driving Experience (in years) | <1 | 99 | 4.55 | 3.85 | 3.78 |
| | 1-5 | 226 | 4.21 | 4.05 | 3.69 |
| | 5-10 | 198 | 4.96 | 4.28 | 4.11 |
| | 10-20 | 409 | 3.30 | 3.38 | 3.12 |
| | >20 | 480 | 4.00 | 3.85 | 3.61 |
| | ANOVA (F-Statistics) | | *382.400** | *22.183** | *20.757** |

*p<0.05

**Table 7. Demographic Description With ANOVA**

## 5. DISCUSSION AND CONCLUSIONS

Road traffic injuries are placing a heavy burden on national economies as well as on households. It is particularly true in countries struggling with other development needs, where investment in road safety is not commensurate with the scale of the problem. In a developing country like India, road accidents significantly affect the economically active age group, contributing to the family, society, and the workforce in general. Many families are driven deeper into poverty by the loss of a breadwinner. The economic costs also strike hard at a national level, imposing a significant burden on health, insurance, and legal systems. The crisis can be worse by the expenses of prolonged medical care, or the added responsibility of caring for a family member who is disabled from a road traffic injury.

The present study used a widely accepted self-reported driver behaviour questionnaire (DBQ) to analyse abrupt driving behaviour towards road safety in the Indian context. Conducting a survey and asking how they behave is the simplest way of measuring behaviour effectively. Exploratory factor analysis (EFA) on surveyed data showed that the extracted three-factor, namely offence, fault, and ignorance categorising the degree of aberrant driving behaviours. Further, model reliability and validity are tested using Confirmatory factor analysis (CFA), which is also a good fit for predicting behaviour. The present study's findings emphasise to have a closer look at DBQ as a popular psychometric instrument and accident predictor.

Results from variance analysis confirmed that offence, fault, and ignorance are significantly influenced by road users' personnel trait and driving experience. Driver belongs to a younger age, and less driving experience is reporting less abrupt behaviour. As the age increases the tendency of aggressive violation and adrenaline rush also raised. However, driver above 45 years of age exhibits the best driving maturity among all the age. Male drivers reported a more significant amount of offence, fault, and ignorance than female drivers. It may be due to the higher percentage of professional male drivers travelling longer distances per annum. The study also reveals that females are the comparatively safe drivers than males as they commit more fault than offences.

Long-distance travelling by drivers often results in fatigue issues such as trouble focusing, little attention, head nodding, reduced reaction time, poor judgments, and constant yawning, significantly drifting in lanes. It considerably affects the mental processing and decision-making ability of the driver. Employed and business people are more responsible for committing offence than fault or ignorance, while students are attempting more faults. It may be because students are comparatively free from any stress, strain, or target compared to employed and business people.

Road users who possess driving experience less than one year commit the maximum level of offence among all the driving experience categories. It may be due to a low level of driving experience. It reveals that less experience solo driver behaves unpredictably under the slight change of traffic patterns and situations. Drivers having more than 20 years of experience are attaining maturity in the driving experience. The present study's findings align with the facts presented in the "Road Accident in India (2018)" report. According to the report, most road crashes belong to the driver's age group of 26-35 years (26.4%) and 36-45 years (21.6%).

The results suggest that the driver's assessment of their driving skills is reflected in their aberrant driving behaviours. In practice, the research findings can support the development of targeted interventions aimed at addressing factors contributing to crashes. Utilising the DBQ and other assessment tools can provide a proactive organisational method to investigate the types of behaviours exhibited by drivers and identify specific behaviours associated with offences. Significantly, the use of such measures may help develop targeted interventions for professional drivers aimed at reducing the likelihood of a crash before the event occurs, rather than on the traditional post hoc basis. Findings may also assist implementation authorities because unless the licensing issuing authority and driving schools in India are regulated appropriately, the quality of driver produced by the system will be questioned for the future. Driver attitude and their perception of risk could be included in the training as it seems relevant from the study outcomes.

## 6. FUTURE RESEARCH

The sample of drivers in this study was small and, in the future, a larger, more demographically representative study might reveal more insights between novice and experienced drivers. Future research could verify the possible links between this cross-cultural version of DBQ and road accidents. Concerns also remain regarding the reliability of self-reported behaviour, such as drivers' propensity to provide socially desirable responses. As a result, future research may benefit from linking self-report data with participants' driving records. Investigations should also explain the relation of aberrant driving behaviours with specific personality traits. Additional studies should use qualitative methods such as focus group interviews to get greater insight into the behaviours' thoughts and motivations.

## CONFLICT OF INTEREST STATEMENT

The author(s) declare(s) that there is no conflict of interest.

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