DBA AFRICA MANAGEMENT REVIEW

VOLUME 12 NO 4
2022

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A QUARTERLY PUBLICATION OF THE DEPARTMENT OF BUSINESS ADMINISTRATION, FACULTY OF BUSINESS AND MANAGEMENT SCIENCES
UNIVERSITY OF NAIROBI

ISSN NO: 2224-2023

http://uonjournals.uonbi.ac.ke/ojs/index.php/DBAAMR ISSN - 2224-2023
October 2022 Vol 12 No 4 Pgs 1-19

DBA Africa Management Review

Received Date
30/04/2022
1st Review
06/06/2022
2nd Review
19/09/2022
Accepted Date
07/10/2022

GENDER AND EMPLOYED DRIVERS INFLUENCE ON RISK-TAKING BEHAVIOUR IN ROAD TRAFFIC VIOLATIONS

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Abstract

Previous studies that often express traffic safety as the "inverse of accidents" have recently been criticized by researchers who claim that traffic safety is more than the mere absence of accidents. Further criticism of these past studies is that they often look for associations between self-reports similar to the driver behaviour questionnaire (DBQ) and accidents. The focus of this study shifted from counting accidents to investigating and quantifying unsafe behaviours as violations. The study adopted a descriptive study approach using a cross-sectional survey. The population was conveniently selected as the drivers of the 12,376 buses and matatus in Nairobi. A convenience sample of 1000 drivers was randomly chosen. Out of the 1000 issued questionnaires, only 716 were returned completed, representing a 72% response rate, and used in the analysis. The t-test was used to study the support for this research hypothesis. The t-test was used to determine if there was a significant difference between the average Road Traffic Violations of employed and that of driver-owners. A similar test was carried out to determine if there was a significant difference between the average Road Traffic Violations of male and female drivers. The findings establish that gender, employee status, and experience predicted the respondents' score on the DBQ variables of traffic violations and the number of accidents. The study revealed that males had a higher traffic violation score than females. In addition, employed drivers had a higher traffic violation score than vehicle owner-drivers. The study concludes that employed drivers have an increased road traffic violation tendency, and male drivers have higher scores in road traffic violations. Consequently, this paper recommends further examination of the psychological and contextual factors that influence employed drivers' higher road traffic violations. This study's limitation was that it did not include government-employed and school bus drivers.

Keywords: Aggressive driving, Road Traffic Accidents (RTA), Driver Behaviour Questionnaire (DBQ), Gender, Traffic violations.

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Introduction

Previous studies that often express traffic safety as the "inverse of accidents" have recently been criticized by researchers who claim that traffic safety is more than the mere absence of accidents (Oppenheim, Oron-Gilad, Parmet, & Shinar, 2016). Plankermann et al. (2013) maintain that studying accidents as a subject is insufficient for illuminating driving behaviour. Driver behaviour denotes what drivers have a habit of doing in usual situations within their performance parameters and assuming their wishes, motivation, and goals (Xing, Lv, & Cao, 2020). On the other hand, traffic violations may be defined as the operation of a motor vehicle, motorcycle, or any other driven motorized machine that threatens or is likely to jeopardize the safety of other persons or property. Some driver behaviours that relate to traffic violations include exceeding the designated speed limit, following other motorists too closely, failure to follow traffic control devices such as yield signs, stop signs, traffic signals, railroad grade cross signals, and erratic or unsafe lane changes (Miles & Johnson, 2003; NTSA, 2015). This study investigated the influence of gender and employed driver variables on DBQ variables of traffic violations. Research has shown that road traffic violations are related to the more significant issue of road traffic injuries (Bachani, Koradia, Herbert, Mogere, Akungah, & Nyamari, 2012). The aim of this study was thus to investigate whether the two categorizations of drivers, owner-drivers and employed drivers, can be used to predict drivers' road traffic violation tendency, as measured by the driver behaviour questionnaire (DBQ). Additionally, the study also investigated the influence of gender on road traffic violations. It was hypothesized that:

i. Employed drivers will score higher on the DBQ compared to drivers who own the vehicle they drive, and
ii. Male drivers will score higher than female drivers on the DBQ.

Literature Review

This section presents the literature review, a process of reading, analysing, evaluating, and summarizing scholarly materials about this study topic Gender and Employed Drivers Influence on Risk-Taking Behaviour in Road Traffic Violations. The review starts with a theoretical foundation, followed by a review of works done on the study objectives: Driver Behaviour Questionnaire (DBQ) Variables, Gender Influence on Aggressive Violations, and Driver Employment Category.

Theoretical Foundation

Icek Ajzen developed the theory of planned behaviour (TPB) to predict human behaviour in 1985 (Ajzen, 1991). The TPB suggests that an individual's behaviour, subjective norm, and perceived behavioural control influence behavioural intentions. Since its introduction, the theory has, by any objective measure, become one of the most frequently cited and influential models for predicting human social behaviour (Ajzen, 2011). The TPB propositions are that volitional human behaviour is a function of the intention to perform the behaviour and perceived behavioural control (PBC). The degree to which PBC influences behaviour, directly or indirectly through intention, is theorized as influenced by the degree of actual control over that behaviour. Finally, attitudes, subjective norms, and PBC are assumed to be based on the strength and evaluation of accessible behavioural, normative, and control beliefs (Sniehotta et al., 2014).

Prior studies demonstrate that much of the variability in observed behaviour is not explained by the measures of the TPB. A good example is the problem of inclined abstainers. The individuals who form an intention and subsequently fail to act have been a recognized limitation of the TPB that remains unaccounted

for by the theory (Orbell & Sheetan, 1998). While this study agrees with this criticism, the researcher advances the debate by focusing on two additional weaknesses of the theory's application: validity and utility.

The critical problem is that some of the TPB theory's suggestions are false. A good example is that the TPB mediation assumptions conflict with evidence. In particular, beliefs are often found to predict behaviour over and above intentions (Conner et al., 2013). Additionally, Conner et al. (2013) argue that the TPB assumption that all theory external influences on behaviour are mediated through the TPB is empirically and conceptually undefended and has been false. For example, there is reliable confirmation that age, socio-economic status, physical health, mental health, and environmental features predict empirically measured physical activity when TPB predictors are controlled for (Sniehotta et al., 2013). Sutton (2002) states that the TPB has lost its utility because it fails to help practitioners to develop helpful interventions. Further, it does not offer itself well to experimental tests and does not provide explanatory hypotheses that would differ in a meaningful way from other prevalent theories. Despite the above criticism, the TPB has an equal measure of proponents, including the following that are expounded in the paragraphs that follow: Cheng et al. (2015), Forward (2008), Ersan et al. (2018), Oppenheim et al. (2016), Mannering (2009) and Wishart et al. (2006). For the reasons advanced by these proponents, the researcher still found it helpful for this study.

The theory of planned behaviour (TPB) postulates that behaviour ranges from intent, which in turn is an outcome of social psychological constructs of attitudes, perceived behavioural control, and subjective norms (Ajzen, 1991). This means that attitudes denote the positive or negative assessment of the expected consequences following the behaviour in question (Chen et al., 2016). Ajzen's theory of planned behaviour is the most frequently used theoretical model to envisage violations as willingly committed behaviours (Forward, 2009). Disregarding the speed limit is the most frequently reported violation. In Austria, for example, inappropriate speed is one of the key causes of road traffic crashes. The study by Ersan et al. (2018) established that 13.6 % of all road traffic injuries and 24 % of all road traffic fatalities were caused by the inappropriate speed in Austria. According to Oppenheim et al. (2016), some drivers are confident that they can speed and still drive safely. Moreover, it is natural to believe that speeding will get you to your destination faster (Mannering, 2009). Speeding is associated with beliefs that curtail the perception of risk. The OECD (2018) asserts that with practice and experience, over speeding worsens the misconception that the driver has increased control. Thus, to reduce the number of violations, one must pay attention to the stimulus behind unsafe driving behaviour. The illumination of road users' attitudes is required before developing effective remedies (Wishart, Freeman, Davey, Rowland, & Barraclough, 2014). This study used the theory of planned behaviour to expose road users' attitudes.

Driver Behaviour Questionnaire (DBQ) Variables

Previous research exploring human factors in driving underscores the associations between personal characteristics such as personality components, gender, age, education and experience, and aberrant driver behaviour (Rowe et al., 2015). Several studies have examined personality components related to accident proneness, such as risk-taking (Bachani, Koradia, Herbert, & Mogere, 2012). Others investigated attention disorders and the effect of fatigue, aggression, and violence (Perepjolkina & Reņģe, 2011). Some researchers have highlighted specific

personality traits, such as sensation seeking (Oppenheim et al., 2016), as relevant to aberrant driver behaviour. Still, others have studied the influence of passion on driver behaviour (Philippe et al., 2009).

According to Özkan and Lajunen (2005), the driver behaviour questionnaire (DBQ) created a possible turning point in constructing a comprehensive model for everyday driving behaviour. The DBQ was based on the main distinction between errors and violations, which were assumed to have different psychological origins and demand different modes of remediation (Reason et al., 1990). Errors were differentiated into slips, lapses (resulting from action), and mistakes (errors of intention). While lapses essentially involve memory failures, slips are related to attention deficits. Mistakes are further divided into two subcategories, that is, rule-based mistakes and knowledge-based mistakes (Reason, 2016). Existing literature distinguishes between various types of violations, including ***aggressive*** as compared with ***ordinary*** violations or ***unintended*** in relation to ***deliberate*** violations (Harrison, 2009). Nevertheless, researchers generally agree that road traffic violations are motivational, intentional acts that are influenced by peoples' personality and attitudes (Oppenheim et al., 2016). Notably, this view gained massive popularity 28 years after DBQ was introduced by Reason et al. (1990) persuasive article. Oppenheim et al. (2016) posit that at least 174 studies have used the DBQ or an amended version. The road violations tendency based on Reason et al. (1990) questionnaire has been distinguished in different ways. For example, Rowe et al. (2015) used three questions representing ordinary violations as one factor and eight questions for aggressive violations, slips, and errors. Reason et al. (1990) assert that errors are associated with an individual's mental processes, while violations are about the social setting in which they happen. Prior studies claim that errors may be reduced by reskilling drivers and using memory aids. On the other hand, violations can only reduce by effective change of users' motives, attitudes, beliefs, and norms and by cultivating the overall safety culture (Lindgren et al., 2007).

Gender Influence on Aggressive Violations

The term gender refers to the social-constructed roles and behaviours of men and women, and to the relations between men and women, in specific economic, social, cultural, and political contexts (Randriamaro, 2005). Gender refers to the culturally defined roles, responsibilities, attributes, and entitlements associated with being (or being seen as) a woman or man in a given setting, along with the power relations between and among women and men (Shawar & Shiffman, 2020). While a greater account is increasingly being taken of gender in a variety of areas, little progress has been made in this respect in the transport sector (Duchène, 2011). The literature on gender differences in aggressive road traffic violations is very widespread, yet, fewer studies have concentrated on such differences in driving (Oppenheim et al., 2016). Men and women exhibit different driving behaviours that affect their attitudes, safety, and insurance risk. Many factors underpin these differences, including neurochemical structures and hormonal processes shaped by evolution and global socialization practices. Each plays a part in explaining why men and women drivers have very different records in relation to accidents and insurance claims. Differences between male and female drivers in terms of crash rates are evident in a wide range of countries, including the United States of America, Europe, Asia, and Africa, with males being significantly more at risk than females (Marsh, 2004). Despite these assertions, research on differences between male and female drivers with regard to road traffic aggressive behaviour is still inadequate (Jiménez-Mejías et al., 2016, Mateos-Granados et al., 2021).

Aggression can be defined as any behaviour directed at causing physical or mental injury (Allen & Anderson, 2017). Two definitions of aggression in driving are proposed, encompassing the range of possible aggressive behaviours in road driving. These may include crossing red lights, following too closely to a lead vehicle, honking, exceeding speed limits, cutting across one or more lanes in front of other vehicles, et cetera (Constantinou et al., 2011). The first definition of aggression in driving includes what would generally be classified as extreme behaviour. These are acts of murder, suicide, and wilful and malicious assaults (physical or psychological). The second definition encompasses the concept of risk-taking. This driving behaviour is aggressive in appearance but does not necessarily imply intent to cause harm, although it may subsequently put other road users at risk (Grey et al., 1989). According to the World Health Organization (2015) report, about three-quarters (73%) of all road traffic fatalities are men. This agrees with the findings by Singh et al. (2014) and with the male preponderance (89.6%). Driving behaviour differences between males and females persist even after modifying for differences in mileage. Some prior studies posit that male drivers are involved in more accidents, road traffic violations and receive more traffic fines and fines, while female drivers have fewer errors (Reason et al., 1990).

Recent research established that collisions involving female drivers result in more non-fatal injuries per accident and that the gender gap in non-fatal injuries is diverging over time. However, crashes involving male drivers result in more fatalities per accident, and the gender gap in fatalities is converging over time (Hailemariam et al., 2020). However, the role of gender and age in the risk of road traffic injury (RTI) has not been fully explored, and there are still significant gaps with regard to how environmental factors, such as road type, affect this relationship, including mobility as a measure of exposure (González-Sánchez et al., 2021). Moreover, there is just scanty literature on the role of gender on employed and owner-drivers, particularly in developing countries, including Kenya (Soro et al., 2020). This research is an effort to fill the gap by investigating the influence of gender on road traffic aggressive behaviour. In this study, gender is operationalized by the dichotomous variable, thus taking the value 1 for males and 2 for females. The hypothesis for the study was:

H1: Female drivers will be involved more in road traffic aggressive violations than male drivers.

Driver Employment Category

This research adopted the driver employment category to be drivers employed by companies, individuals, government agencies, or Saving and Credit Cooperative Organisations (SACCOs), which provide vehicles and support the costs related to their operations. Owner-drivers are self-employed businesspersons who possess their own vehicles, fully support the costs of their equipment, fuel, and carry passengers or freight on a contractual basis either with companies or directly with clients. Subcontractor drivers do not possess any vehicles and are hired by vehicle companies, SACCOs, or owner-drivers for specific tasks or periods (Soro et al., 2020). This research focused on the driver employment category variable to answer the question: Do employed drivers have a higher likelihood of traffic road violations than owner-drivers? The driver employment category variable was operationalized in the driver behaviour questionnaire by asking the drivers to tick as appropriate whether they were employed or were the owners of the vehicles they drive.

Recent research in Australia revealing results from an unconditional logistic regression posited that owner-drivers had lower odds of crash involvement than employee drivers (Soro

et al., 2020). However, the Australian research focused only on drivers employed on heavy long-distance vehicles. This research focused on drivers of private cars, taxis, minibuses/buses, and trucks. Moreover, their sample size of drivers was 108,780, while this study had 700 cases. Research in the United States of America was investigating the variables Safety performance (SP) as a number of crashes, proportions of driver and vehicle out-of-service rates, and Employment type (ET) as employee drivers proxied by the ratio of owned tractors to the total number of owned and leased tractors, established that the use of employee drivers is associated with poor safety performance (Cantor, 2016). On the contrary, the research by Monaco and Williams (2000) used 1997 cross-sectional survey data from 573 United States of America (USA) Heavy Vehicles drivers. In their study, the variables Safety performance (SP) was used as a dummy variable for crash involvement, moving violation, and logbook violation over the past 12 months. On the other hand, they used Employment as a binary indicator, taking the value 1 for owner-drivers and 0 for employee drivers, respectively. They found that there was no difference in terms of crash involvement and logbook violations and that owner drivers have more moving violations than employee drivers. The above studies on the influence of the driver category were based in the USA, unlike the current research that focused on traffic violations in Kenya. Additionally, the need to obtain additional knowledge and clear the contradictions in the cited findings on the results on the driver category and influence on road traffic violations was necessary. Thus, this study investigated the driver category under the hypothesis:

H2: There is no significant difference between employed and owner-drivers in the number of road traffic violations.

Methodology

This section presents the research methodology, which is how this study's research problem was solved systematically. First, the study population is identified, followed by calculating suitable sample size. Finally, the materials used in the study, the research procedures that were followed, and the data analysis that was done are articulated in this section.

Participants

The population was conveniently selected to be the drivers of 12,376 buses and matatus in Nairobi (JAICA, 2006). The sample size for this study was determined by applying the simplified formula developed by Yamane, (1973):

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$$n = \frac{N}{1 + N(e^2)}$$

Where n is the sample size, N is the population size, and e is the level of precision. When this formula is applied to the population in this study 12,376, Equation 2 Formula is obtained as follows:

$$n = \frac{N}{1 + N(e^2)} = \frac{12{,}376}{1 + 12{,}376(0.05)^2}$$
$$= \frac{12{,}376}{31.94} = 387 \text{ Drivers}$$

The sample size also is often increased by 30% to compensate for nonresponse (Israel, 2003).

Additionally, Taherdoost, (2018) asserts that larger sample sizes reduce sampling error. Based on these two premises, a sample of 1000 drivers were randomly selected from the population in addition to available time and cost resources. Out of the 1000 issued questionnaires, a total of 716 drivers licensed to drive on Kenyan roads volunteered to participate in the study. The response rate was

72%. There were 615 (85.4%) males and 105 (14.6%) females. Fincham (2008) stated that response rates approximating 60% for most research should be the researchers' goal. Consequently, the response rate in this study at 72% is adequate and justifiable as acceptable. The average age of the sample was 38 years (range 36-45 yrs.). Participants were located throughout Nairobi in matatu and bus termini, taxi bays, and commercial trucks toll stations. The largest proportion of vehicles driven by participants was reported to be matatu/minibus/buses at 42.36%, followed by taxis at 27.63%, trucks at 16.52%, and private cars at 13.47%. Further, 33.9% of the respondents owned the vehicles they drove, while 66.1% were employed. Of the respondents, 26.3% were aged between 20-35 years, 46.0% were in the 36-45 age bracket, 22.2% were between 46-55 years, 5.4% in the 46-65 age bracket and 0.1% belonged to ≥66 age bracket. The gender distribution was 85.4% males and 14.6% females. It is observed from these demographics of the respondents that the largest group of drivers are employees, male, and below 45 years of age.

Materials

Driver Behaviour Questionnaire (DBQ)

The DBQ has undergone several modifications over time and currently measures four or three aspects of driving behaviours: lapses, Highway Code violations (for example, speeding), errors, and aggressive violations (Wåhlberg et al., 2015). This study adopted the version advocated by Lajunen et al. (2004), which consisted of 27 items. In addition, this research made minor re-wording or rephrasing modifications in order to make the questionnaire more representative of the Kenyan driving conditions. Data about driving behaviour was collected using a self-reported cross-sectional questionnaire that included the extended driver behaviour questionnaire (Reason et al., 1990; Rowe et al., 2015). The extended DBQ included 27 items. The variables measured were aggressive violations (3 items), ordinary violations (8 items), slips (8 items), and errors (8 items), respectively. In addition, respondents were required to indicate on a five-point scale (0 = never to 5 = nearly all the time) how often they commit each of the ordinary violations, aggressive violations, and slips.

Demographic Variables and Measures

Previous research has established that the DBQ is stout to minor modifications to some items in order to mirror precise cultural and environmental contexts (Ozkan & Lajunen, 2005). Consequently, a number of socio-demographic questions were encompassed in the questionnaire to determine participants' age, gender, highest education level, marital status, driving experience, number of road accidents from when one became a driver, years elapsed from last road accident, average annual mileage/kilometers, category of vehicle (including private car, taxi, matatu 14-seater, matatu mini-bus, bus, commercial pick-up, lorry, and trailer). There was an item on the driver's occupation that asked the respondents whether they were the owner or employee and the frequency of driving within an hour, day, week, or month. The comprehensive questionnaire contained 38 items, including demographic questions.

Research Procedures

Questionnaire Development

A questionnaire is used to collect the data required by the researcher to aid in answering the research questions of the study as objectively as possible and without irritating or annoying the respondents, whilst minimizing the likelihood of an error occurring at any stage in the data collection and analysis process (Brace, 2018). The questionnaire was invented by Sir Francis Galton, a British anthropologist, explorer, and statistician, in the late 1800s as a

research instrument consisting of a set of questions (items) intended to capture responses from respondents in a standardized manner (Roopa & Rani, 2012). Questions may be unstructured or structured. Unstructured questions ask respondents to provide a response in their own words, while structured questions ask respondents to select an answer from a given set of choices. A questionnaire forms the backbone of any survey, and its success lies in its design. A questionnaire is, therefore, a list of mimeographed or printed questions that are completed by or for a respondent to give their opinion on specific issues or topics (Saunders et al., 2019). This research used semi-structured questions for the demographic part and structured questions for the driver behaviour part.

Instrument Reliability

A research construct is said to be reliable if it provides the same set of scores for a group of subjects upon repeated testing (Bamberger, 2017). Reliability measures the extent of random variance in an observed score (Taherdoost, 2018b). Reliability refers to the level of consistency with which the tool measures a given attribute (Mohajan, 2017). As Saunders et al. (2019) pointed out, it is important to test whether the research instrument produces steady results at various conditions and at different timings, for example, with various respondents. Although there are several measures of instrument reliability, this study used internal consistency reliability to judge the reliability of the tool by estimating how consistent the results are for different items of the same construct. Internal consistency reliability is expressed using the statistical test Cronbach's alpha (α), which is deemed acceptable if the value is 80% or above (Roopa & Rani, 2012). This study measured instrument reliability using Cronbach's alpha (α).

Instrument Validity

Although there are several instrument validities tests, this research adopted the construct validity measure. Construct validity is the degree to which an instrument measures the trait or theoretical construct that it is intended to measure (Bolarinwa, 2016). Construct validity tests the systematic variance in an item corresponding to the target construct (Markus & Lin, 2012). Thus, construct validity is commonly defined as the degree to which a concept attains empirical and theoretical meaning within the overall structure of one's theory (Strauss, 2009). It may also be understood as the extent to which the measures represent the true score intended for a concept and actually reflect the concept proposed to operationalize (Grimm & Widaman, 2012). Validity is the degree to which the data gathered reflects the researched phenomenon (Bamberger, 2017). In this research, items used for the constructs were adapted from prior research to ensure construct validity wherever possible. The instruments used by other DBQ questionnaires were psychometrically sound and have been applied in several studies. This study adopted these measuring items with necessary modifications and aligned them with the study context.

Ethical Procedures

Ethical considerations that influence research are critical aspects to take into account in any study (Cuervo-Cazurra et al., 2017). In relation to this study, several ethical issues were critical. Since this study was founded on primary data, the researcher made sure the data collected could not be manipulated to attain findings that would be founded on subjectivity. The research proposal and the questionnaire were submitted to the Institutional Review Board (IRB) for review and approval. This was necessary before undertaking the pilot study.

Other ethical considerations for the study included privacy, courtesy, and consent during the collection of data. Primary data collection involved interaction with individuals, and thus, there were concerns for ethical considerations. As a first step, respondents were assured of the data's privacy and confidentiality in data collection. Second, respondents were aptly informed of the needs of the research and its contents for them to make an informed decision on inclusion in the study.

Questionnaire administration

Five research assistants were trained on research protocols in sampling and conversation with willing participants. They were also trained on how to use a letter of introduction, a consent form, and the self-administered study questionnaires. In this training, each assistant was given the mapping out of the city target areas and assignments. The research assistants were to agree with the willing participant if to wait as they filled in the questionnaire or whether to come back at a later time. When each questionnaire was collected, the researcher gave it a code on the top that indicated the city area, questionnaire number, and research assistant's initials.

Data Analysis

Saunders et al. (2019) state that data analysis alludes to the use of interpretation to make meaning from the collected data to determine a consistent pattern and summary of the relevant inferences from given research. The data analysis process involved data cleaning and preparation, assessing model assumptions, descriptive statistics, and logistic regression analysis, as discussed herein.

Data preparation involved a process of cleaning and transforming the raw data. This is a necessary step prior to data processing and analysis. It often involves reformatting data, making corrections, and combining data sets to enrich the data. Data preparation usually includes standardizing data formats, enriching source data, and/or removing outliers. Data obtained was first cleaned by removing the unanswered or incomplete questionnaires. The cleaned questionnaires were then coded and analysed using Statistical Package for the Social Sciences (SPSS) version 25 to obtain both descriptive and inferential statistics. Finally, imputation was used to take care of missing data Mohajan (2017) revealed that using different estimation methods could replace missing data; this study will adopt the "Missing Values Analysis" add-on module.

Statistical Package for Social Sciences (SPSS) version 25 was used to analyse the data. To determine the significance of the differences between the mean values of two continuous variables, the student-t-test was used. The differences were confirmed using the non-parametric Mann-Whitney test (A. Bener et al., 2013). Chi-square and Fisher's exact tests (two-tailed) were done to test for differences in the proportions of categorical variables between two or more groups. Reliability coefficients were calculated to measure the internal consistency of the DBQ scale scores using Cronbach's alpha. Further, Pearson's correlation coefficient was used to assess the relationship's strength between more than two factors. The significance level of $p<0.05$ was considered as the cut-off value. The analyses for this study followed what was used by Lajunen et al. (2004) and Rowe et al. (2015).

Results and Findings

This section presents the study results and findings. It starts by presenting demographic profiles of respondents, followed by results on gender influence on road traffic violations.

Demographics

The sample of 716 drivers was composed of 611 male and 105 female respondents. A significant difference was observed in the mean age of male (37.17 ± 0.27) and female (25.9 ± 2.0) drivers (p=0.000). Thus, male and female drivers found a significant (Chi Square (X2)=31.563, df=4, p=0.003) difference in age. It is observed that, on average, male drivers are more than 11 years older than female drivers.

Gender Influence on Road Traffic Violations

Table 1 displays the number of male and female drivers' mean value of the DBQ variables of aggressive violation, ordinary violations, slips, and errors. It also shows the standard deviation and standard error for these variables within the categories defined by the grouping variable (males and females). From the analysis, the female drivers presented a lower mean for all the DBQ variables. Table 1 shows that the Aggressive average violation for males was 2.5058, and that of females was 1.9157. For ordinary violations, the mean was 2.0332 for males and 1.2722 for females. Further, the average slips were 1.3729 for males and 1.3133 for females. Finally, the average for errors is 1.8371for males and 1.3312 for females. An independent t-test was then performed to check whether the differences were statistically different.

Table 1: Descriptive statistics for DBQ variables of the drivers surveyed according to gender (N=716)

DBQ Variables		N	Mean	Std. Deviation	Std. Error
Aggressive Violation	Male	611	2.5058	1.60662	.06500
	Female	105	1.9157	1.58477	.15466
	Total	716	2.4192	1.61589	.06039
Ordinary Violations	Male	611	2.0332	1.51677	.06136
	Female	105	1.2722	1.13984	.11124
	Total	716	1.9216	1.49141	.05574
Slips	Male	611	1.3729	1.33291	.05392
	Female	105	1.3133	1.15235	.11246
	Total	716	1.3641	1.30742	.04886
Errors	Male	611	1.8371	1.46848	.05941
	Female	105	1.3312	1.08557	.10594
	Total	716	1.7629	1.42942	.05342

The results of the independent t-test to check whether the differences between male and female drivers' DBQ violations were statistically different is shown in Table 2. Starting with the DBQ variable aggressive violations (AV), Levene's Test of Equality of

Variances (an assumption of the independent t-test) is that the two groups, males and females, have a similar dispersion of aggressive violations (otherwise known as homogeneity or equality of variance). The results for aggressive violations (AV) in columns 3 and 4 indicate (F=0.329, Sig= 0.567) that the F statistic is not significant. Hence, we take the null hypothesis where equal variances are assumed. Further, using row one results in columns 5 to 7, we find that (t=3.484,df=714, Sig (2 –tailed)) p=0.001<0.05. The significance level (also called the probability or p-value) tells us that the results of equal variance assumed have not occurred by chance. Consequently, the results enable us to conclude that there is no significant difference between male and female drivers, as indicated in Table 1 where the aggressive violations mean for males is 2.5058, and mean for females is 1.9157.

Examining the results of the DBQ variable, ordinary violations (OV), Levene's Test of Equality of Variances results for ordinary violations row in columns 3 and 4 indicate (F=34.683, Sig 0.000) that the F statistic is significant. Hence, we take the alternative hypothesis where equal variances are not assumed. Further, using row two results in columns 5 to 7, we find that (t=5.999, df=714.174, Sig (2 –tailed)) p=0.000<0.05. The significance level (also called the probability or p-value) tells us that the results of equal variance assumed have not occurred by chance. Consequently, the results enable us to conclude that there is a significant difference between males and females, as indicated in Table 1 where the mean of ordinary violations for males is 2.0332, and the mean for females is 1.2722. Male drivers have a higher rate of ordinary violations.

Table 2: T-Test results for drivers surveyed according to gender (N=716)

DBQ Variables		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	T	Df	Sig. (2-tailed)
AV	Equal variances assumed	.329	.567	3.484	714	.001
	Equal variances not assumed			3.517	143.220	.001
OV	Equal variances assumed	34.683	.000	4.907	714	.000
	Equal variances not assumed			5.990	174.174	.000
SL	Equal variances assumed	4.245	.040	.431	714	.667
	Equal variances not assumed			.478	155.916	.634
ER	Equal variances assumed	28.825	.000	3.375	714	.001
	Equal variances not assumed			4.165	176.713	.000

Examining the results of the DBQ variable slips, Levene's Test of Equality of Variances results for slips row in columns 3 and 4 indicate (F=4.245, Sig 0.040) that the F statistic is significant. Hence, we take the alternative hypothesis where equal variances are not assumed.

Further, using row two results in columns 5 to 7, we find that (t=0.478, df=155.916, Sig (2 – tailed)) p=0.0634>0.05. The significance level (also called the probability or p-value) tells us that the results of equal variance are not assumed to have occurred by chance. Consequently, we reject the alternative hypothesis and take the assumed null hypothesis of equal variances. The results enable us to conclude that there is no significant difference between male and female drivers as indicated in Table 1 where the mean for males is 1.3729, and the mean for females is 1.3133.

Examining the results of the DBQ variable errors, Levene's Test of Equality of Variances results for errors row in columns 3 and 4 indicate (F=28.825, Sig 0.000) that the F statistic is significant hence we take the alternative hypothesis where equal variances are not assumed. Further, using row two results in columns 5 to 7, we find that (t=4.165, df=176.713, Sig (2 –tailed)) p=0.000<0.05. The significance level (also called the probability or p-value) tells us that the results of equal variance not assumed have not occurred by chance. The results of Table 2 have supported the hypothesis that equal variances cannot be assumed for male and female drivers, where the average error for males is 1.8371, and that for females is1.3312. Thus, it can be deduced that male drivers have a higher rate of driving errors than females.

Driver Category Influence on Road Traffic Violations

Table 3 displays the number of owners and employed drivers' mean value of the DBQ variable aggressive violation, ordinary violations, slips, and errors. It also shows the standard deviation and standard error for these variables within categories defined by the grouping variable (owner and employed drivers). The employed drivers had a higher mean for all the analysed DBQ variables. The owner-drivers presented a lower mean for all the DBQ variables from the analysis. The results of Table 2 show that the Aggressive average violations for diver-owners were 2.3323, and that of employed ones was 2.4642. Additionally, the mean of ordinary violations for driver-owners was 1.6501and that of employed ones was 2.0620. Further, the average for driver-owners was 1.1434 while that of employed ones was 1.4783. Finally, the average number of errors for driver-owners was 1.4697, and that of employed was 1.9145. An independent t-test was then performed to check whether the differences were statistically different.

Table 3: Descriptive statistics for DBQ Variables of the drivers surveyed according to Driver Category (N=716)

DBQ Variables	Driver Category	N	Mean	Std. Deviation	Std. Error
Aggressive Violation	Owners	244	2.3323	1.67379	.10715
	Employed	472	2.4642	1.58507	.07296
	Total	716	2.4192	1.61589	.06039
Ordinary Violations	Owners	244	1.6501	1.47812	.09463
	Employed	472	2.0620	1.48034	.06814
	Total	716	1.9216	1.49141	.05574
Slips	Owners	244	1.1434	1.37729	.08817
	Employed	472	1.4783	1.25613	.05782
	Total	716	1.3641	1.30742	.04886
Errors	Owners	244	1.4697	1.44249	.09235
	Employed	472	1.9145	1.40023	.06445
	Total	716	1.7629	1.42942	.05342

The results of an independent t-test to check whether the differences between male and female drivers' DBQ violations were statistically different are shown in Table 4. Starting with the DBQ variable, aggressive violations (AV), Levene's Test of Equality of Variances (an assumption of the independent t-test) is that the two groups, males and females, have a similar dispersion of aggressive violations (otherwise known as homogeneity or equality of variance). The results for aggressive violations (AV) in columns 3 and 4 indicate (F=2.185, Sig. 0.140) that the F statistics are insignificant. Hence, we take the null hypothesis where equal variances are assumed. Further, using row one results in columns 5 to 7, we find that (t=-1.035, df=714, Sig (2 – tailed)) p=0.301>0.05. The significance level (also called the probability or p-value) tells us the results of equal variance assumed have not occurred by chance. Consequently, the results enable us to take the null hypothesis and conclude that there is no significant difference between owner and employed drivers, as indicated in Table 3 where the means for aggressive violations owners are 2.3323, and employed drivers are 2.4642, respectively.

Examining the DBQ variable ordinary violations (OV), Levene's Test of Equality of Variances (an assumption of the independent t-test) is that the two groups, owners and employed drivers have a similar dispersion of ordinary violations. The results for ordinary violations (OV) row in columns 3 and 4 indicate (F=.273, Sig.=0.602) that the F statistic is not significant hence we take the null hypothesis where equal variances are assumed. Further, using row one results in columns 5 to 7, we find that (t=-3.531, df=714, Sig (2 –tailed)) p=0.000<0.05. The significance

level (also called the probability or p-value) tells us the results of equal variance assumed to have occurred by chance. Consequently, the results enable us to take the alternative hypothesis and conclude that there is a significant difference between owner and employed drivers as indicated in Table 3 where the means for ordinary violations, owners are at 1.6501 and employed drivers at 2.0620, respectively.

Analysing the DBQ variable slips (SL), Levene's Test of Equality of Variances (an assumption of the independent t-test) is that the two groups, owners and employed drivers, have a similar dispersion of slips. The results for slips in columns 3 and 4 indicate (F=0.712, Sig=0.399) that the F statistics is not significant hence we take the null hypothesis where equal variances are assumed. Further, using row one results in columns 5 to 7, we find that (t=-3.271, df=714, Sig (2 –tailed)) p=0.001<0.05. The significance level (also called the probability or p-value) tells us the results of equal variance assumed to have occurred by chance. Consequently, the results enable us to take the alternative hypothesis and conclude that there is a significant difference between owner and employed drivers, as indicated in Table 3 where the means for slips for owners are 1.1434 and for employed drivers are 1.4783, respectively.

Looking at the DBQ variable errors (ER) in Table 4, Levene's Test of Equality of Variances (an assumption of the independent t-test) is that our two groups, owners and employed drivers have a similar dispersion of errors. The results for the errors row in columns 3 and 4 indicate (F=0. 002, Sig=0.966) that the F statistics are insignificant. Hence, we take the null hypothesis where equal variances are assumed. Further, using row one results in columns 5 to 7, we find that (t=-3.987, df=714, Sig (2 –tailed)) p=0.000<0.05. The significance level (also called the probability or p-value) tells us the results of equal variance assumed to have occurred by chance. Consequently, the results enable us to take the alternative hypothesis and conclude that there is a significant difference between owner and employed drivers as indicated in Table 4 where the means for errors, owners is 1.4697 and employed drivers is 1.9145 respectively.

Table 4: T-Test results for drivers surveyed according to Driver Category (N=716)

DBQ Variable		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
AV	Equal variances assumed	2.185	.140	-1.035	714	.301
	Equal variances not assumed			-1.018	468.577	.309
OV	Equal variances assumed	.273	.602	-3.531	714	.000
	Equal variances not assumed			-3.533	492.069	.000

SL	Equal variances assumed	.712	.399	-3.271	714	.001
	Equal variances not assumed			-3.177	453.634	.002
ER	Equal variances assumed	.002	.966	-3.987	714	.000
	Equal variances not assumed			-3.950	478.779	.000

Discussions

The question of gender role in traffic violations has been of interest to many researchers for the last two decades (Hailemariam et al., 2020, Oppenheim et al., 2016, Awialie Akaateba & Amoh-Gyimah, 2013, Al-Balbissi, 2003). The findings in this study are with the findings of Al-Balbissi (2003), who established that male accident rates are significantly higher. This trend is consistent throughout all the analyses since higher accident rates imply higher traffic violations. Further, Oppenheim et al (2016) state that gender roles predicted respondents' scores on the DBQ traffic violation variables. This finding is consistent with the findings of this study. The pattern of road traffic violations differs between male and female drivers. This finding differs from that of Bener et al. (2008). The difference could be due to the sample source, where for this study, the majority were public transport vehicle drivers, while in Qatar, the researchers used private vehicle drivers. However, the findings of this study concur with those of Perepjolkina and Reņģe (2018).

The influence of driver employment type has been of interest to researchers (Soro et al., 2020). Soro et al. (2020) found that owner-drivers had lower odds of crash involvement than employee drivers, agreeing with the results established in this study. The results from this study show that road traffic violation behaviours are high among the surveyed employed drivers compared to owners. Since in Kenya's public transport sector, the majority of the drivers are employed, this could be the primary reason for the high incidence of road traffic accidents in the country.

Conclusion and Recommendations

The study findings illuminated a significant difference between male and female drivers, whereby male drivers exhibited more road traffic aggression in their driving behaviour. Based on this finding, recommendations for further research on masculinity and femininity factors that contribute to this difference would be appropriate. As an intervention measure, male-driver education is required to mitigate the high rate of traffic violations.

Employed drivers showed significant aggression using DBQ items such as aggressive violation, ordinary violation, slips, and errors. Based on this finding, a recommendation for further study would be on the contextual factors that make employed drivers exhibit more aggression on the road. A change in policy on driver violations can be introduced whereby every violation accrues violation points on the driver's license. In this case, there should be a driver violation threshold for warning, probation, suspension, and discontinued from public transport employment. Additionally, further study is required to overcome the limitation of not including government-employed drivers and school bus drivers. The former and the latter recommendations may require further research too.

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