

THE DIFFERENCES OF DRIVING BEHAVIOUR, EXPERIENCE AND PREVIOUS TRAFFIC INCIDENT INVOLVEMENT BETWEEN GENDER IN MALAYSIA

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Abstract: *The number of cars in Malaysia has gone up because of better living conditions that come with economic growth. The consequence is that there are more drivers on the road than ever before, increasing the likelihood of traffic mishap, in addition to making traffic control difficult. The study intended to examine potential gender differences concerning driving behaviour, experience, and previous traffic incident involvement in Malaysia. The Driving Behaviour Questionnaires was used to collect data that covers three out of four factors such as violations, errors and lapses. Descriptive and independence t-tests were used in the study. Significant differences were observed in the gender mean scores for all five items. While the effect sizes for all the items were small except for lapses which showed no effect. The study's findings are projected to shade lights to policymakers in formulating the best traffic strategies to develop public confidence and to promote driver's accountability on the road. With that, this will make the journeys safer and less risky to everyone. Last but not least, this paper presents the limitations and implications of the research.*

Keywords: *Driving behaviour, Experience, Previous Traffic Incident Involvement, Test of differences, Gender*

Introduction

Malaysia continues to face a high burden of road trauma each year. As reported by Ministry of Transport Malaysia, between January to October 2024 alone, the country recorded 532,125 crashes and 5,364 fatalities, with motorcyclists and pillion riders accounting for about two-thirds of deaths by 68% (Bernama, 2024). Recent analyses of 2012 until 2022 police data also show that motorcycles remain the most involved road user group and that crash concentrations are highest in densely populated states especially Selangor. Year 2018 until 2021 has recorded 19,077 injury-related cases with 3,965 deaths among male drivers whereas 3,992 injury and 574 deaths among female drivers in the same timeframe. This shows that male drivers experienced about 2.4 times more accident involvement than female drivers. These figures clearly illustrate a substantial gender gap in both accident involvement and fatal outcomes.

In August 2025, the Works Minister, citing MIROS findings from more than 500,000 investigated cases, stated that over 80% of accidents were attributable to driver behaviour, compared with roughly 12–13% to road factors. This aligns with global evidence that individual risk-taking and rule violations are the main determinants. Globally, men are consistently overrepresented in severe outcomes and exhibit higher risk-taking tendencies including alcohol-positive rates and aggressive driving, while women typically show more compliance and self-regulation. These patterns that may translate into different exposure and crash involvement profiles in Malaysia. (Malay Mail, 2025)

Within Malaysia, earlier empirical work suggests that both gender and driving experience shape offence patterns and risky behaviours, yet most local studies predate major post-2020 shifts in exposure and recent safety initiatives. Consequently, there is a timely need to re-examine how driving behaviour, accumulated experience, and prior incident involvement differ by gender in the current Malaysian context and how these differences relate to contemporary crash risks and policy targets under Malaysia Safety Policy. This study addresses that gap by updating evidence on gendered driving behaviours and incident experience and previous traffic incident involvement between gender to inform targeted enforcement, education, and engineering countermeasures in Malaysia.

Literature Review

Driving behaviour

Driving behaviour is a primary determinant of road crash risk worldwide. It has been reported that most traffic accidents are associated with drivers' inappropriate on-road driving behaviours (Pakgohar et al., 2011, Singh, 2018). The WHO's recent Global Status Report (2023) highlights behavioural factors, including speeding, driving under the influence of alcohol, failure to use or wear helmets, and distraction, as the most consistently associated risks to global fatalities, which have only slightly decreased to 1.19 million each year. In Malaysia, recent analyses have identified similar behavioural concerns. The Ministry of Transport highlights that signal violations, inattention, and risk-taking behaviours significantly contribute to crash frequency and severity (Bernama, 2024; The Star, 2024). These findings reinforce the understanding that human behaviour remains the predominant determinant of crash risk as compared to infrastructure or vehicle-related issues.

Theoretical and empirical research provides additional understanding of the factors that drive risky driving behaviour. A recent meta-analysis conducted by Zhao et al. (2024) revealed that the Theory of Planned Behaviour (TPB) effectively predicts various unsafe driving behaviours,

such as speeding, seat-belt omission, and mobile phone usage, by connecting attitudes, subjective norms, and perceived behavioural control to actual driving behaviours. According to Ajzen (1991), behaviour is primarily shaped by three constructs, including attitudes (personal evaluation of the behaviour), subjective norms (perceived social pressures), and perceived behavioural control (PBC) (belief in one's ability to perform the behaviour). These aligned results highlight the significance of personal decision-making processes in influencing driving outcomes and the necessity of addressing high-risk behaviours in safety interventions.

Recent studies have also emphasised the importance of technology and behavioural feedback in decreasing unsafe driving behaviours. A systematic review conducted by Guo et al. (2025) indicated that feedback via apps and monitoring within vehicles notably enhanced driver behaviour by decreasing instances of speeding and harsh braking. Another systematic review by Liu et al. (2023) in Accident Analysis & Prevention has synthesized findings from studies on real-time monitoring of driver distraction, providing comprehensive insights into current technologies and their effectiveness. These findings indicate that technology-driven interventions, combined with law enforcement and public education, have offered an effective pathway toward improving driving behaviour.

Driving behaviour across gender

Cullen et al. (2021) observed that young men are at increased risk of crashes, and this risk persists as they get older and gain more driving experience. Despite a lower risk of crash, women are at a higher risk of crash-related injury requiring treatment and hospitalisation. Males are frequently involved in accidents linked to dangerous driving habits, such as speeding (Kelley-Baker & Romano, 2010); violations and driver faults due to a lack of attention and impatience (Al-Balbissi, 2003); and alcohol-impaired driving (Amarasingha & Dissanayake, 2014; Tsai et al., 2010). Wei et al. (2025) found that driving behaviour is significantly affected by visual visibility, driver's gender, and driving experience.

Most studies indicate that female drivers are more likely to regulate their behavior than male ones, while younger and older drivers are more self-regulated than the middle-aged (Charlton et al., 2006, Choi et al., 2013). The rear-end collision risk of an experienced driver is higher than that of a new driver, and the rear-end collision risk of a female is higher than that of a male when travelling in light fog (Wei et al., 2025). In a naturalistic driving study conducted in Malaysia, Al-Hussein et al. (2021) found that female drivers drove faster than male drivers. Male drivers, on the other hand, steered more aggressively than female drivers. These differences in men's and women's risk of crash and injury signal the need for a better understanding of how sex and gender may contribute to risk of crash and injury across the life-course experience.

Experience

The researchers found that as drivers gain more years of driving experience, their hazard perception improves, leading to a decline in risky driving manoeuvres. Chen et al. (2022) highlighted that experienced drivers display better self-regulation skills and are more likely to adapt their driving style according to weather or traffic conditions. Drivers with driving experience of less than one year are more likely to be involved in risky driver behaviour factors (Farooq & Juhász, 2020).

However, long years of experience in driving do not determine the drivers' road safety. A longitudinal study by Gómez and Al-Khalifa (2023) revealed that overconfidence among highly

experienced drivers can lead to complacency and increased risk-taking, such as using mobile devices while driving or ignoring traffic signals. Studies have demonstrated that novice drivers respond slower to hazards than experienced drivers (Crundall et al., 2012). This suggests that experience must be paired with ongoing awareness and education to maintain safe driving standards.

Further research has explored how experience interacts with other factors such as gender, personality traits, and cognitive abilities. In a recent study, Patel et al. (2025) analyzed driving simulator data and concluded that while experienced drivers typically score higher on safe behaviour indices, individual differences still account for a significant portion of the variance in driving performance. They argue that experience should be viewed as a moderating factor rather than a sole predictor of safe driving behaviour. The literature suggests that combining driver experience with continuous training and technological support systems may offer the most effective approach to improving road safety.

Previous Traffic Incident Involvement

Research over the past few years has highlighted a strong connection between previous traffic incident involvement and subsequent driving behavior. Previous involvement in traffic incidents has been consistently linked to risky and aggressive driving behaviours. Research indicates that drivers who have experienced crashes are more likely to exhibit persistent risky behaviours, including speeding, tailgating, and aggressive overtaking. Drivers who have experienced collisions or near-miss events tend to either adopt more cautious driving habits or, in some cases, develop maladaptive behaviors such as anxiety or overcompensation. According to Adavikottu and Velaga (2021), the crash involvement model showed that aggressive drivers were 2.79 times more likely to be involved in road crashes than cautious drivers.

However, there were sufficient numbers of females involved as drivers in any crash and in injury crashes, and only high levels of aggression predicted being involved in a crash, while alienation predicted involvement in injury crashes (Gulliver & Begg, 2007). After adjusting for demographics and driving exposure, men had significantly higher crash rates across multiple categories compared to women, but were less likely to be involved in crashes resulting in hospitalisation (Cullen et al., 2021). These findings highlight that previous crash involvement is not only a marker of risk but also a potential indicator of ongoing behavioural patterns that vary across demographic groups. Understanding these links is crucial for developing targeted interventions to improve road safety.

Methodology

The sample for this study was acquired through convenient sampling in August-September 2023, whereby respondents were contacted via WhatsApp group using an online link. The sample size was calculated based on the number of licensed drivers in Malaysia in 2020 at 15.8 million (Mamat, 2021). First, the G*Power 3.1 software (Faul et al. 2009) was employed to determine the sample size, return with a minimum number of respondents of 45 required for the study. This value was obtained based on a medium effect size of 0.15, significance level of 0.05, and statistical power of 0.8 with four predicting factors. After screening for blank and straight-lining responses, all the respondents are usable, resulting in a final accepted response of 421. This sample size selected was also justified by Roscoe's (1975) rule of thumb, stating that most studies should have those greater than 30 respondents but fewer than 500.

The distributed questionnaire consisted of two segments: Section A on basic demographics, including two questions on years of driving experience and frequency of traffic incidents involvement. While section B addressed driver's driving behaviour through three dimensions: Violations, Errors and Lapses). This section incorporated a 7-point Likert scale with 1-Never, 2-Rarely (less than 10% of the time, 3-Occasionally (about 30% of the time), 4-Sometimes (about 50% of the time), 5-Frequently (about 70% of the time), 6-Usually (around 90% of the time) and 7-all the time. The questionnaires were adapted and adopted from Jomnonkwao et al. (2022).

The test of independence was performed to determine if there were differences in mean scores for 3 dimensions in Driving Behaviour, Driving Experience and Previous Incident Involvement in traffic between male and female. The method employed for the analysis was the independent t-test, followed by calculating the effect size (eta squared). Eta squared represents the ratio of variance in the dependent variable that is explained by the independent variable (Pallant, 2001). The study applied Cohen (1988) criteria to interpret the strength of the effect size.

Analysis

Table 1: Demographic of respondents

	items	N = 421	%
Gender	Female	205	48.7
	Male	216	51.3
Age	<18	2	0.5
	18-24	301	71.5
	25-34	42	10.0
	35-44	23	5.5
	45-54	41	9.7
	55-64	10	2.4
	>65	2	0.5
vehicle type	Car	298	70.8
	SUV	24	5.7
	Van/Minivan	3	0.7
	Motorcycle	94	22.3
	Truck/Lorry	1	0.2
	None	1	0.2

As shown in Table 1, with 421 respondents in this study, females represent 48.7%, while males account for 51.3%. Most respondents were aged 18-24 (71.5%), with cars being the most often driven vehicle, followed by motorcycles at 22.3%.

Table 2: Descriptive and Normality for Driving Behaviour

	Mean	SD	skewness	kurtosis
V1- You turn left on a main road toward oncoming vehicles without reducing your speed or stopping your car at "STOP" signs.	2.30	1.763	1.527	1.313
V2- You take a chance and going through lights that have turned yellow before turning red.	2.74	1.653	0.983	0.064

V3- You drive against the flow of traffic or going the wrong way on a one-way street.	1.60	1.218	2.581	6.545
V4- You drive on the hard shoulder of roads.	1.71	1.184	2.047	4.182
E1- You ignore the "GIVE WAY" sign when driving on narrow roads and not letting a driver from the other lane proceed	1.72	1.354	2.239	4.633
E2- You do not stop the car at pedestrian crossings to allow people to cross a road	1.77	1.486	2.234	4.267
E3- You overtake in a prohibited area, on a narrow road, or where signs prohibiting overtaking are present	1.80	1.271	2.003	3.935
L1- You forget about the current gear the vehicle is in and check it with your eyes or hands	2.06	1.395	1.601	2.164
L2- You doze off while driving	2.30	1.370	1.413	1.967
L3- You intend to turn on the widescreen wiper but turning on the light instead or vice versa	2.24	1.449	1.351	1.219
L4- You forgot the car park position, such as at the department store	2.43	1.530	1.117	0.410

The descriptive analysis in Table 2 was conducted to examine the basic statistical data from the sample of 421 individuals. The primary criteria are that the data must have a normal distribution, with skewness below 3.0 and kurtosis below 10.0 (Klien, 2011). The mean values of the driving behaviors variable range from 1.60 to 2.74, the standard deviation spans from 1.184 to 1.763, skewness varies between 0.983 and 2.581, and kurtosis lies between 0.064 and 6.545. Consequently, it was confirmed that all the items in the study had a normal distribution.

Next, the study investigated whether there were mean differences in the 3 dimensions of driving behaviour, driving experience and previous traffic incident involvement based on gender. To achieve this objective, two sample mean hypothesis test was employed and the results were presented in Table 3.

Table 3: Analysis of Gender Differences in the Driving Behaviour, Driving Experience and Previous Incident Involvement

Variables	Male	Female	t-value	p-value
Violations	2.265	1.920	3.272	<0.001***
Errors	1.932	1.607	2.884	0.004***
Lapses	2.357	2.163	1.660	0.098*
Driving Experience	3.55	2.89	4.377	<0.001***
Previous Involvement	1.78	1.45	3.992	<0.001***

Note: p < 0.1*, p < 0.01***

For the first driving behaviour dimension i.e. Violations, there were significant differences in the scores for males (M=2.265, SD=1.172), and females [M=1.920, SD=0.973; $t(419)=3.272$, $p<0.001$]. There were significant differences in the mean scores for males (M=1.932, SD=1.263), and female [M=1.607, SD=1.033; $t(419)=2.884$, $p=0.004$] regarding Errors, the second dimension. As for third dimension, Lapse, it was found that there were significant differences in the mean scores for males (M=2.357, SD=1.327), and female [M=2.163, SD=1.049; $t(419)=1.660$, $p=0.098$]. The extent of the differences in the means for violation, errors and lapse were 0.024, 0.02 and 0.006 respectively. These implied that the effect sizes were rather minor, suggesting that just 2.4%, 2.0% and 0.6% of the variance in violation, errors and lapse respectively could be explained by gender.

Meanwhile, driving experience indicated that there were significant differences in the mean scores for males ($M=3.55$, $SD=1.433$), and female [$M=2.89$, $SD=1.638$; $t(419)=4.377$, $p<0.001$]. Similarly, with regards to Previous incident Involvement, there were significant differences in the mean scores for males ($M=1.78$, $SD=0.959$), and female [$M=1.45$, $SD=0.660$; $t(419)=3.992$, $p<0.001$]. The size of the differences in the means for driving experience and previous incident involvement were 0.04 and 0.03 respectively. These indicated that the effects were slightly higher, implying that there was 4% and 3% of the variance in driving experience and previous incident involvement respectively might be attributed to gender.

Discussion and Conclusion

The study compared the mean scores of 3 dimensions in Driving Behaviour, Driving Experience and Previous Incident Involvement to gender. The results of test of differences showed that there were significant different on gender for all the items. In term of the effect size, it was rather minor for the 3 dimensions of driving behaviour and slightly higher on Driving Experience and Previous Incident Involvement on gender. Based on the findings, the study outlined recommendations to various public sectors and policymakers in Malaysia, such as the Road Transport Department and the Ministry of Transport, to help reduce future accidents and improve traffic safety in Malaysia.

The result of this study demonstrated that there are significant differences exist between gender and driving behaviour, driving experience, and prior involvement in traffic incidents. The findings have been supported by Wei et al. (2025) about driving behaviour and by Isah et al. (2017) for the last two variables. Most studies agree that male drivers engage in riskier and more aggressive driving behaviours, whilst female drivers tend to be more careful and safety-conscious. While driving experience lessens dangerous behaviours in both genders, although males remain more risky overall. Males are regularly reported to be more involved in traffic mishaps (accidents, violations, and near misses) throughout multiple countries. Females often exhibit fewer violations and less involvement, which is frequently associated with more cautious and safety-oriented attitudes.

This research, although providing important perspectives on gender variations in driving behaviour in Malaysia, has some limitations. The dependence on self-reported information via the Driving Behaviour Questionnaire (DBQ) might have caused bias, as respondents may downplay risky actions or exaggerate favourable ones. Moreover, the research focused on three of the four DBQ factors, which may restrict a complete evaluation of driving behaviour. The cross-sectional design limits the capacity to determine causation between gender, experience, and involvement in accidents. The minimal effect sizes noted, with one factor displaying no impact, imply that the practical relevance of the results might be restricted. The research also overlooked contextual elements like road conditions or enforcement levels, which are recognized to affect driving behaviour.

The study's findings indicate that traffic safety campaigns (by JPJ or MIROS) and driver education programs should prioritise all drivers particularly the young ones. This can be done by emphasise risk-awareness training, especially during the initial licensing phase. Awareness programs can be customised for certain demographic groups; for instance, campaigns highlighting the long-term consequences of risky driving may appeal more to young men, whilst those focussing on protection and safety may be more effective for women. Likewise, authorities (JPJ & PDRM) might establish a points-based "early warning system" requiring repeat offenders, particularly young men, to participate in retraining driving courses.

Furthermore, explicitly correlating JPJ's KEJARA demerit system with insurance rates would create economic incentives to reduce risky behaviour. In addition, the road safety education delivered during the driving schools' training should be revised and the study plan also should be added with a more comprehensive road safety module for the better road safety behaviour in the future

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