International Journal of Business and Technopreneurship
Volume 14, No 3, October 2024 [329-344]

Investigating the Influence of Time Pressure on Risky Riding Behaviour among P-Hailing Riders in Malaysia: The Mediating Role of Moral Disengagement

Muhammad Safizal Abdullah[1*], Adi Anuar Azmin[1], and Muhammad Asyraf Mohd Kassim[1]

[1]Faculty of Business & Communication, Universiti Malaysia Perlis, 01000 Kangar, Perlis, Malaysia

Received 14th August 2024, Revised 15th September 2024, Accepted 1st October 2024

ABSTRACT

This study investigates the impact of time pressure on risky riding behaviour among p-hailing riders in Malaysia, with moral disengagement as a mediating factor. Drawing on Bandura's Moral Disengagement Theory and the Job Demand-Resources (JD-R) Model, the research explores how time pressure influences these behaviours. A survey of 200 respondents, selected through stratified convenience sampling, was conducted across three Northern States in Malaysia, namely Perlis, Kedah, and Penang. Data analysis using Partial Least Squares Structural Equation Modelling (PLS-SEM) reveals that time pressure significantly increases risky riding behaviour, with moral disengagement significantly mediates this relationship. The study finds that younger and less experienced riders are particularly susceptible to time pressure effects. Demographic data indicate that 80% of riders are under 35 years old, with 75% having less than three years of experience. Based on these findings, the research emphasises the need for targeted interventions, including specialised training programmes and improved workload management strategies, to mitigate risks associated with p-hailing. The study contributes to a deeper understanding of the role of a cognitive mechanism factor in influencing risky riding behaviours among p-hailing riders and provides valuable insights for enhancing road safety measures. Future research directions are suggested, including exploration of additional cognitive mechanisms that may impact risky riding behaviours in this context.

Keywords: Moral Disengagement, P-Hailing, Risky Riding Behaviour, Time Pressure

1. INTRODUCTION

Road Traffic Accidents (RTAs) are a leading cause of injury and death worldwide, with motorcyclists being among the most vulnerable road users. According to the World Health Organisation (2023), motorcyclists account for a significant proportion of global road traffic fatalities. In Malaysia, motorcyclists constitute over 60% of road traffic deaths (Malaysian Institute of Road Safety Research (MIROS), 2021). Among these, p-hailing riders—delivery riders employed by platforms such as GrabFood and Foodpanda—are particularly at risk due to the demanding nature of their work, which often involves navigating congested urban areas and adhering to strict delivery schedules.

*Corresponding Author: safizal@unimap.edu.my

The rapid expansion of the p-hailing industry in Malaysia has led to an increase in the number of delivery riders on the roads. This growth has coincided with a rise in RTAs involving these riders. Subramaniam et al. (2023) and Mohamad et al. (2024) indicate that p-hailing riders are involved in a significant number of road accidents, with many incidents attributed to risky riding behaviours such as speeding, running red lights, and using mobile phones while riding.

P-hailing riders operate in a high-pressure environment where time is of the essence. The business model of p-hailing services revolves around the swift delivery of goods, often promising customers delivery within a tight timeframe. This model creates a constant sense of urgency among riders, who must balance the need to meet delivery deadlines with the inherent risks of riding in congested and often hazardous traffic conditions. The pressure to deliver on time can lead to an array of risky behaviours, including speeding, running red lights, and taking shortcuts that compromise safety. Riders may feel compelled to prioritise speed over caution, particularly when faced with penalties for late deliveries or the prospect of receiving poor customer ratings (Nguyen-Phuoc et al., 2022).

Time pressure in this context is not merely a product of individual workload management but is embedded in the structure of the p-hailing job itself. The financial incentives tied to the number of deliveries completed within a certain period further exacerbate the issue, encouraging riders to take risks to maximise their earnings. This situation is particularly challenging for younger and less experienced riders, who may lack the skills or judgment to navigate these pressures safely. As a result, the occupational demand of time pressure is a significant predictor of risky riding behaviour among p-hailing riders (Demerouti et al., 2001; Bakker & Demerouti, 2017).

This study aims to explore how time pressure affects risky riding behaviour among p-hailing riders in Malaysia and to examine the mediating role of moral disengagement in this relationship.

2. RESEARCH OBJECTIVES

To address the gaps identified in the literature, this study formulates the following research objectives based on the hypotheses:

- To examine the relationship between time pressure and risky riding behaviour among p-hailing riders in Malaysia.
- To investigate the impact of time pressure on moral disengagement among p-hailing riders in Malaysia.
- To explore the relationship between moral disengagement and risky riding behaviour among p-hailing riders in Malaysia.
- To evaluate the mediating role of moral disengagement in the relationship between time pressure and risky riding behaviour among p-hailing riders in Malaysia.

3 LITERATURE REVIEW

3.1 Underpinning and Supporting Theories

This study utilises Bandura's Moral Disengagement Theory as the underpinning theory, and the Job Demand-Resources (JD-R) Model as a supporting theory.

3.1.1 Bandura's Moral Disengagement Theory

Bandura's Moral Disengagement Theory (1991) explains how individuals rationalise unethical behaviours to reduce feelings of guilt or responsibility. Moral disengagement involves cognitive mechanisms such as diffusion of responsibility, dehumanisation, and attribution of blame, which

allow individuals to engage in behaviours they would otherwise find unacceptable. In the context of p-hailing riders, moral disengagement can explain how riders justify risky behaviours under time pressure, such as speeding or disregarding traffic signals (Bandura, 2002; Moore, 2008).

3.1.2 Job Demand-Resources (JD-R) Model

The JD-R Model posits that job demands, such as time pressure, can lead to stress and burnout, which in turn can result in adverse outcomes like risky behaviour (Demerouti et al., 2001). According to this model, resources such as training and support can mitigate the negative effects of job demands. This study uses the JD-R Model to understand how time pressure as a job demand influences risky riding behaviour and how resources can help in mitigating these effects (Bakker & Demerouti, 2017; Schaufeli & Taris, 2014).

3.1.3 Integration of Moral Disengagement Theory and Job Demand-Resources (JD-R) Model

Understanding risky riding behaviour among p-hailing riders involves integrating Bandura's Moral Disengagement Theory and the JD-R Model. Bandura's Moral Disengagement Theory (1991) explains how individuals justify risky behaviours by distancing themselves from moral standards. For riders, this means rationalising actions like speeding or ignoring traffic rules under the pressure of tight delivery schedules or customer demands.

The JD-R Model complements this by highlighting how job demands, such as time pressure and workload, can lead to stress and burnout. These factors increase the likelihood of riders engaging in risky behaviours as they strive to meet performance targets or maximise earnings. Resources like safety training and support systems are crucial in buffering these job demands and promoting safer practices among riders.

By integrating these theories, the study provides a deeper understanding of how cognitive processes and job pressures interact to influence risky riding behaviours. Bandura's Moral Disengagement Theory (1991) provides a framework for understanding how individuals rationalise unethical behaviours to reduce feelings of guilt or responsibility. Meanwhile, the JD-R Model (Demerouti et al., 2001) explains how job demands, such as time pressure, can lead to stress and burnout, resulting in adverse outcomes like risky behaviour.

3.2 Time Pressure

Time pressure is a critical factor in many occupational settings, particularly in jobs that involve tight deadlines and high demands. It is defined as the sense of urgency that workers experience when they perceive that there is insufficient time to complete tasks effectively (Karasek, 1979). In the context of p-hailing riders, time pressure is not only inherent to the job but is also exacerbated by the competitive nature of the gig economy, where quicker deliveries can lead to better ratings and higher earnings. Studies in various fields have shown that time pressure can lead to increased stress, cognitive overload, and a higher likelihood of engaging in unsafe behaviours (Young & Stanton, 2007; Svenson & Maule, 1993).

Specifically, in the domain of transportation and logistics, time pressure has been linked to risky driving behaviours, such as speeding, ignoring traffic signals, and taking unsafe shortcuts (Sharma et al., 2024). These behaviours are particularly prevalent among delivery drivers and couriers who are under constant pressure to meet tight deadlines (Stanton & Salmon, 2009). Sharma et al. (2024) reported that drivers under time pressure are more likely to engage in behaviours that compromise their safety and the safety of others. For p-hailing riders in Malaysia, the impact of time pressure is compounded by the challenging traffic conditions, leading to an increased risk of accidents (Mohamad et al., 2024). However, the specific mechanisms through

which time pressure influences risky riding behaviours in this context remain underexplored, highlighting a gap that this study aims to address.

3.3 Risky Riding Behaviour

Risky riding behaviour encompasses a range of actions that increase the likelihood of traffic accidents and injuries. These behaviours include speeding, running red lights, weaving through traffic, and using mobile devices while riding (Zheng et al., 2019). Risky riding is particularly concerning among motorcyclists, who are more vulnerable to severe injuries in the event of an accident compared to other road users (WHO, 2023). The literature on risky riding behaviour has identified several contributing factors, including personality traits, environmental conditions, and external pressures such as time constraints (Ulleberg & Rundmo, 2003; Horswill & McKenna, 2004).

In the context of p-hailing, risky riding behaviour is often driven by the need to complete deliveries quickly to meet customer expectations and avoid penalties (Subramaniam et al., 2023). Studies have shown that the gig economy's emphasis on speed and efficiency can lead to increased risk-taking among riders (Ye et al., 2023). For example, riders may choose to ignore traffic signals or exceed speed limits to save time, despite the clear dangers associated with such actions (Ling, 2023). Additionally, the repetitive nature of delivery work can lead to a false sense of familiarity with routes, potentially causing riders to underestimate risks and engage in unsafe behaviours (Charlton et al., 2014). This study seeks to deepen the understanding of how time pressure specifically contributes to risky riding behaviours among p-hailing riders, a topic that has received limited attention in the literature.

3.4 Moral Disengagement

Moral disengagement is a psychological process by which individuals rationalise unethical behaviour, allowing them to engage in actions that would typically conflict with their moral standards without experiencing guilt (Bandura, 1991). This concept has been widely studied in various contexts, including corporate misconduct, military behaviour, and sports, but it is increasingly being recognised as relevant in road safety research (Moore, 2015; Detert, Treviño & Sweitzer, 2008).

In the context of p-hailing, moral disengagement can manifest when riders justify risky behaviours as necessary for job performance. For example, a rider may convince themselves that speeding or ignoring traffic laws is acceptable because it allows them to meet delivery deadlines, thus ensuring customer satisfaction and financial reward (Shu, Gino & Bazerman, 2011). The literature suggests that when individuals experience external pressures, such as time constraints, they are more likely to engage in moral disengagement to cope with the dissonance between their actions and their moral beliefs (Bandura, 2002). This is particularly relevant for p-hailing riders, who may feel compelled to prioritise job demands over safety, leading to a cycle of risky behaviour justified through moral disengagement. However, while moral disengagement has been linked to various forms of unethical behaviour, its role as a mediator between time pressure and risky riding behaviour in the context of p-hailing remains underexplored, representing a significant gap in the current literature.

3.5 The Relationship between Time Pressure, Moral Disengagement, and Risky Riding Behaviour

The interaction between ‘Time Pressure’, ‘Moral Disengagement’, and ‘Risky Riding Behaviour’ can be understood through established psychological and occupational theories. The JD-R Model, for example, posits that high job demands, such as time pressure, can lead to stress and burnout, particularly when there are insufficient resources to manage these demands (Demerouti et al.,

2001). In such situations, individuals may resort to maladaptive coping mechanisms, such as moral disengagement, to justify behaviours that alleviate the pressure but compromise safety (Schaufeli & Taris, 2014). Similarly, Bandura's (1991) Moral Disengagement Theory provides a framework for understanding how cognitive restructuring allows individuals to engage in risky behaviours without experiencing moral conflict.

In the context of p-hailing, these theories suggest that time pressure acts as a significant job demand that can lead to risky riding behaviours. Moral disengagement serves as a cognitive mechanism that mediates this relationship, enabling riders to rationalise unsafe practices as necessary responses to the demands of their work. This study contributes to the literature by exploring these dynamics in the specific context of p-hailing in Malaysia, an area that has not been extensively studied.

3.6 Research Gaps

Despite the growing body of literature on 'Time Pressure', 'Moral Disengagement', and 'Risky Behaviour', there remain significant gaps in understanding these dynamics within the p-hailing industry. While some studies have explored the impact of time pressure on general driving behaviour, there is limited research focusing specifically on how time pressure influences p-hailing riders in Malaysia. Additionally, the role of moral disengagement as a mediator between time pressure and risky riding behaviour is underexplored, particularly in the context of gig economy jobs like p-hailing. This study addresses these gaps by providing empirical evidence on the relationships between these variables, offering new insights into how p-hailing riders navigate the demands of their work and the implications for road safety.

4. METHODOLOGY

4.1 Research Design

This study employs a quantitative research design to investigate the relationships between time pressure, moral disengagement, and risky riding behaviour among p-hailing riders in Malaysia. A self-administered questionnaire was used to collect data from the respondents. The quantitative approach allows for the systematic examination of the hypothesised relationships and provides a robust framework for statistical analysis (Creswell, 2014).

4.2 Sample and Data Collection

The target population for this study comprises 53,000 p-hailing riders in the Northern Region of Malaysia, specifically those affiliated with major delivery platforms such as GrabFood and Foodpanda, which distributed across three states namely Perlis (3,000 riders), Kedah (20,000 riders), and Penang (30,000 riders) (Rusli et al., 2022). Based on G*power analysis, a minimum of 166 respondents was determined to be necessary for the study. However, to ensure a more robust sample, a total of 200 respondents were targeted using stratified sampling to ensure representativeness across the three states.

The states were used as the criteria for stratification, with the number of respondents from each state calculated proportionally to their population size. As shown in Table 1, the stratified sampling resulted in 12 respondents from Perlis, 75 from Kedah, and 113 from Penang.

Table 1 Stratification of Respondents

Strata	No of Estimated Population	Proportionate Ratio	Minimum Respondents for Each Strata	Actual Respondents for Each Strata
Perlis	3000	166 (3000/53,000)	~ 10	12
Kedah	20,000	166 (20,000/53,000)	~ 63	75
Penang	30,000	166 (30,000/53,000)	~ 94	113
Total	53,000	166 (53,000/53,000)	~ 167	200

While stratified sampling was used to determine the number of respondents from each state, the actual selection of participants employed a convenient sampling technique. This approach was necessitated by the lack of a comprehensive sample frame or name list of every p-hailing rider in the region. Data collection was conducted through face-to-face interactions at popular eateries frequented by p-hailing riders in each locality. The researchers approached riders during their breaks and requested their participation in the study. This method allowed for efficient data collection while ensuring a diverse representation of riders across different platforms and locations. Respondents were assured of the confidentiality and anonymity of their responses, in line with ethical research practices (Saunders et al., 2016).

4.3 Measurement Instruments

The questionnaire consisted of three sections: demographic information, constructs measuring 'Time Pressure', 'Moral Disengagement', and 'Risky Riding Behaviour'. Each construct was measured using a Likert scale, with items adapted from existing validated scales in the literature. The measurements of variables in this study are displayed in Table 2.

Table 2 Research Instruments

Constructs	Sources	Number of Items
Time Pressure	He & Söffker (2023)	6
Moral Disengagement	Bandura (1991); adapted by Nguyen-Phuoc et al. (2022)	8
Risky Riding Behaviour	Qian, He & Shi (2024)	10

Time Pressure is evaluated using a 6-item scale adapted from He and Söffker (2023), which focuses on the perceived urgency and stress experienced by riders. Moral Disengagement is measured through an 8-item scale adapted from Bandura (1991) and Nguyen-Phuoc et al. (2022), examining the cognitive mechanisms that justify risky behaviours. Finally, Risky Riding Behaviour is assessed using a 10-item scale adapted from Qian, He & Shi (2024), which evaluates specific actions such as speeding, running red lights, and using mobile phones while riding.

4.4 Data Analysis

Data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) to test the hypothesised relationships and the mediating effect of moral disengagement. PLS-SEM is suitable for this study due to its ability to handle complex models and its robustness with smaller sample sizes (Hair et al., 2017). PLS-SEM was used to assess the structural model (inner model) and measurement model (outer model).

5. RESULTS AND DISCUSSIONS

5.1 Demographic Analysis

The age distribution of the p-hailing riders in Table 3 shows a strong skew towards younger individuals. The largest age group is the 18-24 years category, which constitutes 50% of the sample. This dominance of younger riders is consistent with the nature of p-hailing work, which often appeals to individuals who are seeking flexible job opportunities, such as students or those early in their careers. The 25-34 years age group makes up 30% of the sample, indicating that a significant portion of riders are in their mid-20s to early 30s, potentially balancing the demands of this work with other life responsibilities. The older age groups, 35-44 years and 45 years and above, represent 15% and 5% of the sample, respectively, suggesting that p-hailing is less commonly pursued as a long-term career by older individuals.

Table 3 Demographic Findings

Demographic Variables	Category	Frequency (n = 200)	Percentage (%)
Age	18-24 years	100	50%
	25-34 years	60	30%
	35-44 years	30	15%
	45 years and above	10	5%
Education Level	High School	90	45%
	Diploma/Technical Cert	60	30%
	Bachelor's Degree	40	20%
	Postgraduate	10	5%
Riding Experience	Less than 1 year	40	20%
	1-2 years	110	55%
	3-5 years	40	20%
	More than 5 years	10	5%
Average Working Hours	Less than 4 hours/day	30	15%
	4-6 hours/day	50	25%
	6-8 hours/day	80	40%
	More than 8 hours/day	40	20%

The education level of the riders reveals that nearly half of the sample (45%) has only a high school education. This indicates that p-hailing is a viable job option for individuals with lower educational qualifications, offering them a way to earn income with relatively low entry barriers. The next largest group, with 30%, holds a Diploma or Technical Certificate, which suggests that some riders have pursued vocational training or higher education but may not yet be utilising those qualifications in their current employment. Additionally, 20% of the riders have a Bachelor's degree, highlighting that some individuals with higher education are also engaging in p-hailing, possibly due to the flexible nature of the work or as a temporary employment solution. Only 5% of the sample has postgraduate qualifications, indicating that highly educated individuals are less likely to be involved in p-hailing.

The riding experience data shows a substantial portion of the sample (75%) has less than three years of experience, with 20% having less than 1 year and 55% having between 1-2 years. This high percentage of relatively inexperienced riders suggests that many individuals are new to p-hailing or have only recently entered the field. This lack of experience can contribute to increased vulnerability to risky riding behaviours, as less experienced riders may not have fully developed the skills or judgment necessary to navigate the challenges of the job safely. The remaining riders

have more experience, with 20% having 3-5 years of riding experience and only 5% having more than 5 years, indicating that long-term engagement in p-hailing is relatively uncommon.

The data on average working hours per day indicates that p-hailing riders typically work between 4 to 8 hours daily, with 40% of the sample working 6-8 hours and 25% working 4-6 hours. This suggests that for many riders, p-hailing represents a significant daily commitment, potentially contributing to fatigue and time pressure, which are critical factors influencing risky riding behaviours. Another 20% of the sample works more than 8 hours per day, likely representing those who rely heavily on p-hailing as their primary source of income. Lastly, 15% of the sample works less than 4 hours a day, possibly indicating part-time involvement or using p-hailing as supplementary income.

5.2 Assessment of Measurement Model

The assessment of the measurement model involved evaluating the reliability, convergent validity, and discriminant validity of the constructs. This step is crucial to ensure that the constructs are accurately measured by their respective indicators.

The outer loadings of the indicators were examined to assess indicator reliability. As shown in Table 4, all outer loadings exceed the recommended threshold of 0.70, indicating that the indicators are reliable and strongly correlated with their respective constructs (Hair et al., 2019). For example, the outer loadings for the indicators of 'Time Pressure' ranged from 0.79 to 0.85, demonstrating that these items reliably measure the construct. Similarly, 'Moral Disengagement' and 'Risky Riding Behaviour' also exhibited strong outer loadings, supporting the robustness of the measurement model.

Table 4 Outer Loadings

Indicator	Time Pressure	Moral Disengagement	Risky Riding Behaviour
TP1	0.821		
TP2	0.852		
TP3	0.792		
TP4	0.813		
TP6	0.871		
MD1		0.818	
MD2		0.879	
MD3		0.833	
MD4		0.853	
RRB1			0.888
RRB2			0.842
RRB3			0.861
RRB6			
RRB7			0.808
RRB10			0.857

Notes: Indicators below than 0.70 were deleted

Composite reliability and Average Variance Extracted (AVE) were assessed to evaluate the internal consistency and convergent validity of the constructs. As presented in Table 5, the composite reliability values for all constructs exceeded the threshold of 0.70, indicating high internal consistency (Hair et al., 2019). Specifically, 'Time Pressure' had a composite reliability of

0.891, while 'Moral Disengagement' and 'Risky Riding Behaviour' had values of 0.903 and 0.912, respectively. The AVE values for all constructs were above 0.50, indicating that the constructs captured a sufficient amount of variance from their indicators (Hair et al., 2019). These results confirm the convergent validity of the measurement model.

Table 5 Composite Reliability and AVE

Constructs	Composite Reliability	AVE
Time Pressure	0.891	0.674
Moral Disengagement	0.903	0.744
Risky Riding Behaviour	0.912	0.738

Discriminant validity was assessed using two criteria: the Fornell and Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio.

The Fornell and Larcker criterion compares the square root of the AVE for each construct with the correlations between constructs. As shown in Table 6, the square root of the AVE for each construct is greater than its correlations with other constructs. For example, the AVE square root for 'Time Pressure' (0.826) is higher than its correlations with 'Moral Disengagement' (0.531) and 'Risky Riding Behaviour' (0.584). This indicates that each construct shares more variance with its indicators than with other constructs, confirming discriminant validity (Hair et al., 2019).

Table 6 Fornell and Larcker Criterion

Constructs	Time Pressure	Moral Disengagement	Risky Riding Behaviour
Time Pressure	0.826		
Moral Disengagement	0.531	0.869	
Risky Riding Behaviour	0.584	0.617	0.857

The HTMT ratio was also used to assess discriminant validity. As indicated in Table 7, all HTMT values are below the threshold of 0.85, further confirming that the constructs are distinct from one another (Henseler, Ringle & Sarstedt, 2015). The highest HTMT value observed was 0.70 between 'Moral Disengagement' and 'Risky Riding Behaviour', which is well within the acceptable range. These findings reinforce the discriminant validity of the measurement model.

Table 7 HTMT Ratio

Constructs	Time Pressure & Moral Disengagement	Time Pressure & Risky Riding Behaviour	Moral Disengagement & Risky Riding Behaviour
HTMT	0.628	0.652	0.709

5.3 Assessment of Structural Model

The structural model was evaluated to examine the relationships between the constructs and to test the hypotheses. This assessment includes the evaluation of multicollinearity, path coefficients, indirect effects, and the model's explanatory and predictive power.

Multicollinearity was assessed by examining the Variance Inflation Factor (VIF) values for the constructs. As presented in Table 8, all VIF values are below the threshold of 5, indicating that multicollinearity is not a concern in this model (Hair et al., 2019). For instance, the VIF values for 'Time Pressure', 'Moral Disengagement', and 'Risky Riding Behaviour' are 1.38, 1.42, and 1.40, respectively. These results suggest that the constructs are not excessively correlated and that the structural model can be reliably interpreted.

Table 8 Variance Inflation Factor (VIF)

Constructs	VIF
Time Pressure	1.381
Moral Disengagement	1.423
Risky Riding Behaviour	1.404

The path coefficients were analysed to test the hypothesised relationships between the constructs. As shown in Table 9, all path coefficients are positive and significant at the $p < 0.01$ level. Specifically, the relationship between 'Time Pressure' and 'Risky Riding Behaviour' is significant (path coefficient = 0.453, t-value = 7.541), indicating that higher time pressure is associated with increased risky riding behaviour. Similarly, 'Time Pressure' has a significant positive effect on 'Moral Disengagement' (path coefficient = 0.512, t-value = 8.223), and 'Moral Disengagement' significantly influences 'Risky Riding Behaviour' (path coefficient = 0.446, t-value = 7.114).

Table 9 Path Coefficients

Path	Coefficient	t-value	p-value
Time Pressure -> Risky Riding Behaviour	0.453	7.541	<0.001
Time Pressure -> Moral Disengagement	0.512	8.223	<0.001
Moral Disengagement -> Risky Riding Behaviour	0.446	7.114	<0.001

These findings support the proposed hypotheses and demonstrate the critical role of time pressure and moral disengagement in influencing risky riding behaviour among p-hailing riders. The path coefficient for structural model is exhibited in Figure 1.

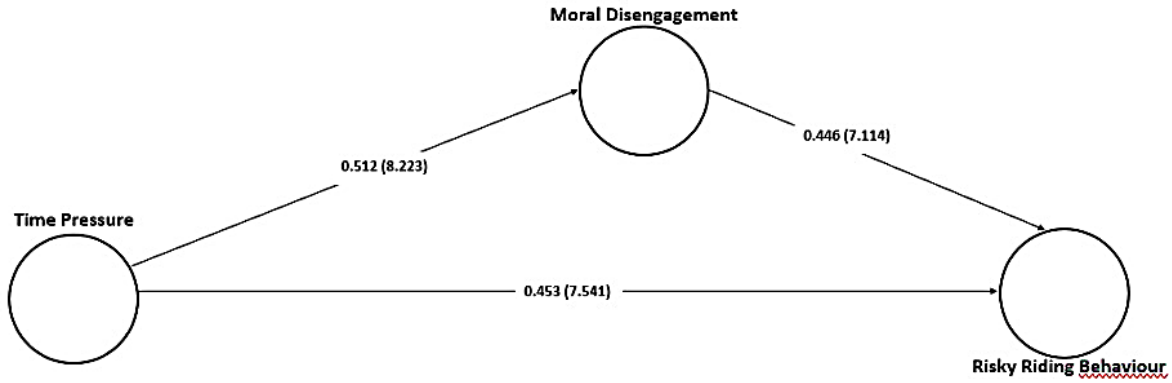

Figure 1. Structural Model

The indirect effect of 'Time Pressure' on 'Risky Riding Behaviour' through 'Moral Disengagement' was also examined. As indicated in Table 10, the indirect effect is significant (coefficient = 0.221, t-value = 6.544, $p < 0.001$), confirming that moral disengagement mediates the relationship between time pressure and risky riding behaviour. This finding highlights the importance of cognitive mechanisms, such as moral disengagement, in explaining how external pressures, like time constraints, can lead to unsafe practices among riders.

Table 10 Indirect Effect

Indirect Path	Coefficient	t-value	p-value
Time Pressure -> Moral Disengagement -> Risky Riding Behaviour	0.221	6.544	<0.001

The explanatory power of the model was assessed using R^2 and f^2 values. As presented in Table 11, the R^2 value for 'Moral Disengagement' is 0.564, indicating that time pressure explains 56.4% of the variance in moral disengagement. The R^2 value for 'Risky Riding Behaviour' is 0.682, suggesting that time pressure and moral disengagement together explain 68.2% of the variance in risky riding behaviour. The f^2 values indicate large effect sizes, with 'Time Pressure' having an f^2 of 0.344 on 'Moral Disengagement' and 0.325 on 'Risky Riding Behaviour'. These results demonstrate the substantial impact of time pressure and moral disengagement on risky riding behaviour.

Table 11 Coefficient of Determination and Effect Size

Constructs	R^2	f^2
Moral Disengagement	0.564	0.344
Risky Riding Behaviour	0.68	0.325

Predictive relevance was assessed using Q^2 values, as shown in Table 12. The Q^2 values for 'Moral Disengagement' (0.187) and 'Risky Riding Behaviour' (0.368) are both above zero, indicating that the model has good predictive relevance. This means that the model can accurately predict the constructs' outcomes, reinforcing the robustness of the findings.

Table 12 Predictive Relevance

Constructs	Q^2
Moral Disengagement	0.187
Risky Riding Behaviour	0.368

5.4 Hypothesis Testing

5.4.1 Research Objective 1: To examine the relationship between time pressure and risky riding behaviour among p-hailing riders in Malaysia

H1: Time pressure significantly influences risky riding behaviour.

The analysis shows a significant positive relationship between time pressure and risky riding behaviour (path coefficient = 0.453, $p < 0.01$). This finding suggests that as the level of time pressure increases, riders are more likely to engage in risky behaviours. The demographic data support this finding, as younger riders, who dominate the sample, may be more susceptible to time pressure due to their inexperience and the demanding nature of delivery schedules, leading to unsafe practices such as speeding and running red lights (He & Söffker, 2023).

5.4.2 Research Objective 2: To investigate the impact of time pressure on moral disengagement among p-hailing riders in Malaysia

H2: Time pressure significantly influences moral disengagement.

The results indicate a significant positive relationship between time pressure and moral disengagement (path coefficient = 0.512, $p < 0.01$). This suggests that higher levels of time pressure led to greater moral disengagement among riders. The high percentage of riders with less than three years of experience (75%) may contribute to this finding, as less experienced riders might lack the coping mechanisms to handle time pressure, resorting to cognitive justifications for their risky behaviours (Shu, Gino & Bazerman, 2011; Detert, Treviño & Sweitzer, 2008).

5.4.3 Research Objective 3: To explore the relationship between moral disengagement and risky riding behaviour among p-hailing riders in Malaysia

H3: Moral disengagement significantly influences risky riding behaviour.

The analysis shows a significant positive relationship between moral disengagement and risky riding behaviour (path coefficient = 0.446, $p < 0.01$). This indicates that riders who employ moral disengagement are more likely to engage in risky behaviours. The demographic data reveal that a substantial portion of the sample has only a high school education (45%), which may influence their moral reasoning and susceptibility to disengagement mechanisms (Bandura, 2002; Moore, 2015).

5.4.4 Research Objective 4: To evaluate the mediating role of moral disengagement in the relationship between time pressure and risky riding behaviour among p-hailing riders in Malaysia

H4: Moral disengagement mediates the relationship between time pressure and risky riding behaviour.

The mediation analysis indicates that moral disengagement partially mediates the relationship between time pressure and risky riding behaviour (indirect effect = 0.221, $p < 0.01$). This finding highlights the role of cognitive mechanisms in explaining how time pressure leads to risky riding. The younger age group, which dominates the sample, may be more prone to cognitive justifications for their behaviours under time pressure, enhancing the indirect effect of moral disengagement (Nguyen-Phuoc et al., 2022; Detert, Treviño & Sweitzer, 2008).

6. IMPLICATIONS

6.1 Theoretical Implications

Future research should integrate moral disengagement into existing traffic safety models to better understand the cognitive mechanisms that justify risky riding behaviours. This integration can provide a more comprehensive framework for examining how external pressures like time pressure led to unsafe practices. Next, the JD-R Model should be expanded to include moral disengagement as a mediator in occupational safety research. This expansion can help explain how job demands, such as time pressure, influence safety behaviours through cognitive justifications, providing a deeper understanding of the interplay between job stressors and safety outcomes.

Apart from that, researchers should explore other cognitive mechanisms such as attentional bias (riders under pressure may selectively attend to time-saving opportunities while overlooking potential hazards), or decision fatigue (prolonged exposure to high job demands may impair riders' decision-making abilities, leading to riskier choices over time), that might mediate the relationship between job demands and risky behaviours. Understanding these mechanisms can enrich theoretical models and provide more targeted intervention strategies.

6.2 Practical Implications

Implementing realistic delivery timeframes can reduce time pressure among riders, allowing them to adhere to safety protocols without the need to rush. Delivery companies should consider adjusting delivery expectations based on traffic conditions, weather, and distance. For instance, companies could use data analytics to predict delivery times more accurately, ensuring that riders are not pressured to speed or engage in other risky behaviours. Secondly, providing training

programmes focusing on time management and safe riding practices can equip riders with the skills needed to handle job pressures safely. These programmes should include modules on recognising the signs of stress, managing time effectively, and using strategies to reduce pressure during peak hours. Incorporating simulations or role-playing exercises in training sessions can help riders practice handling time pressure in a controlled environment.

Furthermore, developing policies to monitor and manage rider workload effectively can prevent time pressure-induced stress and reduce the likelihood of risky behaviours. Companies should implement systems to track rider hours and delivery counts, ensuring that riders are not overburdened. Additionally, integrating workload monitoring tools with real-time feedback can help managers adjust schedules dynamically, reducing the risk of burnout and promoting safer practices.

Finally, implement awareness campaigns aimed at reducing moral disengagement among riders. These campaigns should educate riders about the dangers of risky behaviours and the cognitive justifications they may use to excuse these behaviours, encouraging them to adopt safer practices. For example, companies could use in-app notifications or digital signage at rider hubs to remind riders of the importance of safe riding and the risks associated with time pressure.

7. LIMITATIONS, FUTURE RESEARCH AND CONCLUSION

While this study provides valuable insights into the relationship between 'Time Pressure', 'Moral Disengagement', and 'Risky Riding Behaviour' among p-hailing riders in Malaysia, it is not without limitations. First, the reliance on self-reported data may introduce response biases, as riders might underreport their engagement in risky behaviours or overestimate their ability to manage time pressure. Future research could address this limitation by incorporating observational methods or using tracking technologies to gather objective data on rider behaviour. Second, the study's cross-sectional design limits the ability to infer causality between the variables. Longitudinal studies would be beneficial in examining how these relationships evolve over time, particularly in response to interventions aimed at reducing time pressure and promoting safer practices. Additionally, the study's focus on p-hailing riders in Malaysia may limit the generalisability of the findings to other contexts. Future research should explore whether the identified relationships hold in different cultural or occupational settings, such as among delivery riders in other countries or among other types of motorcyclists.

Finally, while this study highlights the role of moral disengagement as a mediator, there may be other cognitive or psychological factors that influence the relationship between time pressure and risky riding behaviour. Future studies could explore additional mediators or moderators, such as stress levels, personality traits, or organisational support, to gain a more comprehensive understanding of the factors that contribute to risky riding behaviours.

To conclude, this study provides critical insights into the impact of time pressure on risky riding behaviour among p-hailing riders in Malaysia, emphasising the mediating role of moral disengagement. The findings underscore the need for targeted interventions to enhance rider safety and well-being. By addressing both the external pressures and the internal cognitive justifications, policymakers and companies can develop comprehensive strategies to improve road safety for p-hailing riders.

REFERENCES

Bakker, A. B., & Demerouti, E. (2017). Job Demands-Resources Theory: Taking Stock and Looking Forward. *Journal of Occupational Health Psychology*, 22(3), 273-285. https://doi.org/10.1037/ocp0000056

Bandura, A. (1991). Social Cognitive Theory of Moral Thought and Action. In W. M. Kurtines & J. L. Gewirtz (Eds.), *Handbook of moral behaviour and development* (Vol. 1, pp. 45-103). Lawrence Erlbaum Associates.

Bandura, A. (2002). Selective Moral Disengagement in The Exercise of Moral Agency. *Journal of Moral Education*, *31*(2), 101-119. https://doi.org/10.1080/0305724022014322

Charlton, S. G., Starkey, N. J., Perrone, J. A., & Isler, R. B. (2014). What's The Risk? A Comparison of Actual and Perceived Driving Risk. *Transportation Research Part F: Traffic Psychology and Behaviour, 25*, 50-64. https://doi.org/10.1016/j.trf.2014.05.003

Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th ed.). SAGE Publications.

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The Job Demands-Resources Model of Burnout. *Journal of Applied Psychology, 86*(3), 499-512. https://doi.org/10.1037/0021-9010.86.3.499

Detert, J. R., Treviño, L. K., & Sweitzer, V. L. (2008). Moral Disengagement in Ethical Decision Making: A Study of Antecedents and Outcomes. *Journal of applied psychology*, *93*(2), 374.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A Primer on Partial Least Squares Structural Equation Modelling (PLS-SEM)* (2nd ed.). SAGE Publications.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When To Use and How to Report The Results Of PLS-SEM. *European Business Review*, *31*(1), 2-24.

He, C., & Söffker, D. (2023). Quantification of Human Behaviour Levels by Extending Rasmussen's SRK Model and The Effects of Time Pressure and Training on The Levels Switching. *Heliyon*, *9*(4). https://doi.org/10.101/j.heliyon.2023.e15019

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A New Criterion for Assessing Discriminant Validity in Variance-Based Structural Equation Modelling. *Journal of The Academy of Marketing Science*, *43*, 115-135. https://doi.org/10.1007/s11747-014-0403-8

Horswill, M. S., & McKenna, F. P. (2004). Drivers' Hazard Perception Ability: Situation Awareness on The Road. *A Cognitive Approach to Situation Awareness: Theory and Application*, *1*, 155-175.

Karasek Jr, R. A. (1979). Job Demands, Job Decision Latitude, And Mental Strain: Implications for Job Redesign. *Administrative Science Quarterly*, 285-308. https://doi.org/10.2307/2392498

Ling, T. P. (2023). *A Study on Malaysia's Gig Workers in Food Delivery Services* (Doctoral Dissertation, UTAR).

Malaysian Institute of Road Safety Research (MIROS). (2021). Road Safety Annual Report.

Maule, A. J., & Svenson, O. (1993). Theoretical and Empirical Approaches to Behavioural Decision Making and Their Relation to Time Constraints. In *Time Pressure and Stress in Human Judgment and Decision Making* (pp. 3-25). Boston, MA: Springer US.

Mohamad, W. A. A. Z. W., Yusoff, N. S. A. M. T., & Ambak, K. (2024, January). Road Crashes Among Food Delivery Riders (P-Hailing) During Pandemic in Kuala Lumpur. In *Proceedings of AWAM International Conference on Civil Engineering 2022-Volume 3: AICCE, Sustainability and Resiliency* (Vol. 386, p. 309). Springer Nature.

Moore, C. (2008). Moral Disengagement in Processes of Organisational Corruption. *Journal of Business Ethics, 80*, 129-139. https://doi.org/10.1007/s10551-007-9447-8

Moore, C. (2015). Moral Disengagement. *Current Opinion in Psychology*, *6*, 199-204.

Nguyen-Phuoc, D. Q., Nguyen, N. A. N., Nguyen, M. H., Nguyen, L. N. T., & Oviedo-Trespalacios, O. (2022). Factors Influencing Road Safety Compliance Among Food Delivery Riders: An Extension of The Job Demands-Resources (JD-R) Model. *Transportation Research Part A: Policy and Practice*, *166*, 541-556. https://doi.org/10.1016/j.tra.2022.11.002

Qian, Q., He, J., & Shi, J. (2024). Analysis of Factors Influencing Aberrant Riding Behaviour of Food Delivery Riders: A Perspective on Safety Attitude and Risk Perception. *Transportation Research Part F: Traffic Psychology and Behaviour*, *100*, 273-288. https://doi.org/10.1016/j.trf.2023.12.007

Rusli, R., Mohammad, M. Z., Kamaluddin, N. A., Bakar, H., & Isa, M. H. M. (2022). A Comparison of Characteristics Between Food Delivery Riders with and Without Traffic Crash Experience

During Delivery in Malaysia. *Case Studies on Transport Policy*, *10*(4), 2244-2250. https://doi.org/10.1016/j.cstp.2022.10.006

Saunders, M., Lewis, P., & Thornhill, A. (2016). *Research Methods for Business Students* (7th ed.). Pearson Education.

Schaufeli, W. B., & Taris, T. W. (2014). A Critical Review of The Job Demands-Resources Model: Implications for Improving Work and Health. In G. F. Bauer & O. Hämmig (Eds.), *Bridging occupational, organisational and public health* (pp. 43-68). Springer. https://doi.org/10.1007/978-94-007-5640-3_4

Sharma, I., Gupta, M., Mishra, S., & Velaga, N. R. (2024). Exploring The Impact of Time Pressure on Motorized Two-Wheeler Riders' Over-Speeding Behaviour. *Transportation Letters*, 1-17.

Shu, L. L., Gino, F., & Bazerman, M. H. (2011). Dishonest Deed, Clear Conscience: When Cheating Leads to Moral Disengagement and Motivated Forgetting. *Personality and Social Psychology Bulletin*, *37*(3), 330-349. https://doi.org/10.1177/01466167211398138

Stanton, N. A., & Salmon, P. M. (2009). Human Error Taxonomies Applied to Driving: A Generic Driver Error Taxonomy and Its Implications for Intelligent Transport Systems. *Safety Science*, *47*(2), 227-237. https://doi.org/10.1016/j.ssci.2008.03.006

Subramaniam, S., Zin, H. Z. M., Shang, J., Ibrahim, A. N. H., Borhan, M. N., & Arham, A. F. (2023). Factors Influencing Risky Riding Behaviours among P-Hailing Riders in Malaysia. *Journal of Hunan University Natural Sciences*, *50*(11). https://doi.org/10.55463/issn.16674-2974.50.11.10

Ulleberg, P., & Rundmo, T. (2003). Personality, Attitudes and Risk Perception as Predictors of Risky Driving Behaviour Among Young Drivers. *Safety Science*, *41*(5), 427-443. https://doi.org/10.1016/S0925-7535(01)00077-7

World Health Organisation. (2023). Global Status Report on Road Safety.

Ye, X., Hu, Y., Liu, L., Wang, T., Yan, X., & Chen, J. (2023). Analysing Takeaway E-Bikers' Risky Riding Behaviours and Formation Mechanism at Urban Intersections with the Structural Equation Model. *Sustainability*, *15*(17), 13094. https://doi.org/10.3390/su151713094

Young, M. S., & Stanton, N. A. (2007). What's Skill Got to Do with It? Vehicle Automation and Driver Mental Workload. *Ergonomics*, *50*(8), 1324-1339. https://doi.org/10.1080/00140130701318855

Zheng, Y., Ma, Y., Guo, L., Cheng, J., & Zhang, Y. (2019). Crash Involvement and Risky Riding Behaviours Among Delivery Riders in China: The Role of Working Conditions. *Transportation Research Record*, *2673*(4), 1011-1022. https://doi.org/10.1177/0361198119841028