The Effect of Work Stress on The Driving Behavior of Online Motorcycle Taxi Drivers

Manuscript received April 20, 2026; revised July 21, 2026

Renny Septiari*
Dept. of Industrial Engineering
National Institute of Technology (ITN)
Malang, Indonesia
rennyseptiari@lecturer.itn.ac.id

Reiny Ditta Myrtanti
Dept. of Industrial Engineering
National Institute of Technology (ITN)
Malang, Indonesia
reiny@lecturer.itn.ac.id

Sibut
Dept. of Mechanical Engineering
National Institute of Technology (ITN)
Malang, Indonesia
sibut@lecturer.itn.ac.id

Erni Yulianti
Dept. of Master of Civil Engineering
National Institute of Technology (ITN)
Malang, Indonesia
erniyulianti@lecturer.itn.ac.id

***Abstract*—Working as an online motorcycle taxi driver is a job many people do nowadays. The development of digital technology has made working as an online motorcycle taxi driver a new source of hope for job seekers. Various digital services, such as those, are widely available, making this job increasingly popular. Amidst busy activities, online services greatly facilitate the Work of many people. Many online motorcycle taxi drivers currently offer delivery and pickup services. With more and more people doing this job, pressure has ultimately built up on each driver. Due to heavy workloads, some drivers feel stressed. The purpose of this study is to determine whether there is a relationship between workload, work environment, and traffic violations on driving behavior, moderated by the variable of work stress. Data collection was conducted by distributing questionnaires directly for each variable. The respondents who participated in the study were 40 online motorcycle taxi drivers. The results show that there is an influence between workload, work environment, and traffic violations on driving behavior. However, after conducting a moderation test, it turns out that work stress does not moderate the influence of workload on driving behavior.**

Keywords—Digital Technology, Motorcycle, Occupational Stress, Workload.

I. INTRODUCTION

Driving is an activity that requires drivers to perform various tasks simultaneously, making it a multitasking job [[1]. It is considered multitasking because the driver must think and operate the vehicle simultaneously [2]. As a result of multitasking, many drivers lose focus, often thinking about other things or allowing their gaze to be distracted by something more interesting on the road. Driving behavior due to a lack of focus and concentration is influenced by several internal and external factors. Internal factors usually come from the driver themselves, such as poor health or high workloads [3]. As a result of multitasking, drivers' workloads increase significantly when they must perform tasks that require visual attention, such as reading or operating electronic devices, especially on curves [1]. Meanwhile, external factors mostly come from the physical environment surrounding the roads where drivers drive [4].

The growth of online-based transportation has made the Work of online motorcycle taxi drivers more difficult [5]. This is because demand for their services is currently very high due to the many features available in the application, which allow users to access and use them efficiently. On the one hand, the more online services are used, the more income drivers will earn. However, this also hurts them, namely, a high workload. The driving behavior of online motorcycle taxi drivers is greatly influenced by the workload they face. Workload is significantly related to the driving behavior of online motorcycle taxi drivers. High job demands, time pressure, and long working hours contribute to driver fatigue and stress, which ultimately interfere with attention and decision-making while driving [6].

High workloads can cause stress, fatigue, and suboptimal decision-making [7]. A study by [8] found that online motorcycle taxi drivers who work under high pressure tend to violate traffic rules and experience accidents more frequently than those who work under more stable conditions. This study shows that excessive workload can negatively affect driving behavior [8].

A driver's work environment is the highway, where there are many large and small vehicles, pedestrians, and traffic signs that drivers must understand and obey. This work environment, which is sometimes unfavorable and congested, greatly affects drivers' behavior while driving. The physical work environment, such as monotonous road conditions and irregular work schedules, can affect drivers' alertness [9]. An unfavorable work environment causes stress and anger while driving [10]. The work environment significantly influences the driving performance of heavy vehicle drivers in the oil and gas sector [11].

Many people, especially workers, avoid work stress. This is because work-related stress greatly disrupts activities and ultimately affects work performance. Work stress is negatively related to employee performance, job satisfaction, and organizational commitment. High levels of work stress interfere with cognitive function and emotional well-being, ultimately reducing work efficiency and increasing the desire to resign from Work [12]. Work-related stress has a significant negative impact on employee productivity, job satisfaction, and mental health. High levels of work stress are associated with decreased performance and increased absenteeism [13].

In many cases, driving a vehicle can cause stress, especially when the roads are congested and cars are honking their horns in the hope that the traffic jam will soon clear. Stress while driving a vehicle is not only a significant cause of

 EISSN: 2961-872X ●PISSN: 2961-8924●DOI: 10.56741/IISTR.esl.002257

accidents or collisions, but also a risk factor for cardiovascular disease and sudden illness in drivers [14]. There is a link between work stress and aggressive driving behavior, which is a major contributor to traffic injuries and accidents [15]. A conducive driving environment, with roads less congested and fewer vehicles, reduces drivers' stress levels [16].

Based on the studies mentioned above on work stress, it is necessary to determine the relationship between work stress and the behavior of online motorcycle taxi drivers. Several factors underlying the emergence of work stress are workload, work environment, and traffic violations. In addition, the moderating effect of work stress, which is a predictor of driving behavior as shown in Fig 1, will be tested.

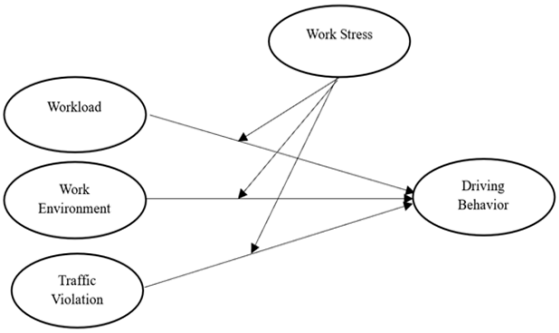


Fig 1. Research Model

From Fig. 1, the following hypotheses are presented:

- H1. Workload affects driving behavior.
- H2. The work environment affects driving behavior.
- H3. Traffic violations influence driving behavior.
- H4. Work stress moderates the relationship between workload and driving behavior.
- H5. Work stress moderates the relationship between the work environment and driving behavior.
- H6. Work stress moderates the relationship between traffic violations and driving behavior.

II. LITERATURE REVIEW

This study discusses the recognition of driving stress by combining EEG and behavioral data to identify driving stress levels. Through feature selection and algorithmic engines, the results show an increase in accuracy of up to 84.93% when combining EEG and behavioral features. The Shapley Additive exPlanation (SHAP) method was used to analyze the relationships among brain activity, behavior, and stress, and to identify fuzzy rules using decision trees. The results of the study also identified changes in the physiology and behavior of drivers under stress with SHAP visualization and decision tree analysis. Changes in the brain and behavior of drivers at different stress levels were also observ, showing correlation between brain activity and driving behavior [17].

This study explores the relationship between driving skills, driving stress, and driving behavior by involving 1,207 licensed drivers. The results show that driving skills influence driving behavior through driving tension, hazard monitoring, and dislike of driving. The findings show that highly skilled drivers exhibit better driving behavior, but also commit more violations. Driving stress was identified as a mediator between driving skills and deviant driving behavior. In addition, driving tension and sensation seeking influence the relationship between driving skills and traffic violations. This study guides reducing deviant driving behavior by focusing on improving driving skills and developing a safety mindset [18].

This study discusses the importance of driving behaviors and the influence of physiological factors, particularly stress. The proposed solution is to use vehicle services that leverage environmental sensing to improve road safety, such as driver-assistance systems to prevent accidents. This research introduces a new approach to identifying driving behavior risks by combining data from subjective reports and physiological measurements (such as heart rate). The proposed model aims to monitor and identify stress in driving behavior. The evaluation results of this study provide a potential overview of how this model can be implemented in vehicle systems to improve road safety, particularly in situations where there is a risk of accidents due to stress or drowsiness [19].

The study examines the impact of person-environment fit and work stress on innovative work behavior in the Thai food industry. The results show a positive relationship between person-environment fit and innovative work behavior, with work stress moderating this relationship. A specific interaction point between job stress levels and person-environment fit was identified. This study integrates the Job Demands-Resources Model with person-environment fit theory to explore the influence of unique stressors in the food industry on innovation. This study also uses industry-specific measures to assess work stress and innovation. Its contribution is to enhance understanding of innovation mechanisms in the food industry and to provide insights to foster employee creativity and to develop tailored theories and methods for the unique challenges in the food industry [20].

This study examines the effect of work stress on risky driving behavior and distractions among food delivery motorcycle riders. Excessive workload and time pressure lead to increased work stress, which, in turn, affects risky driving behavior and distractions. Self-efficacy slightly reduces work stress, but time pressure can amplify the impact of workload on work stress. Additionally, risky driving attitudes also amplify the effect of work stress on dangerous driving behavior and distractions. This research provides new insights into the work stress of food delivery motorcycle riders and the implications of their job characteristics on risky Behavior [21].

III. METHOD

A. Participants

The participants or respondents in this study were 40 male online motorcycle taxi drivers. Data collection was conducted directly with drivers during their breaks or while they waited for their next orders. Face-to-face interviews were necessary because a brief explanation of the questionnaire-filling procedure was provided, which required clarification to help respondents understand the purpose of the questions. Five questionnaires were administered to respondents in this study, each related to a variable in the research model. In addition to explaining the filling procedure, they were also informed of the purpose of this study. It was also conveyed that filling out this questionnaire would be kept confidential regarding the respondent's identity (anonymity), that they had the right to

withdraw at any time, and that there were no right or wrong answers. After respondents completed the questionnaires, the researchers gave them a small token of appreciation for their participation. It took the respondents approximately 45-60 minutes to complete the five types of questionnaires. In this study, mean centering and VIF control will be applied, and all classical assumptions will be strictly met; consequently, the regression model estimates are projected to be stable, valid, and objective despite the limited sample size.

B. Moderating Variable Analysis: Moderating Regression (Interaction Variable)

A moderating variable is a variable that strengthens or weakens the influence of the explanatory (independent) variable on the dependent variable [22].

Moderated regression analysis is a regression analysis that involves moderating variables in constructing the relationship model. Moderating variables can strengthen or weaken the relationship between the predictor and dependent variables. Suppose the moderating variable is not included in the relationship model. In that case, the analysis is conducted solely using regression analysis, meaning that even without the moderating variable, the relationship between the predictor and dependent variables can still be examined. In moderated regression analysis, all regression assumptions apply, meaning they are the same as in ordinary regression.

C. Assessment

A four-point Likert scale was used to assess the questionnaire completed by respondents participating in this study, with the options "strongly disagree; disagree; agree; and strongly agree." The four-point option was chosen to avoid a neutral option that could cause respondents completing this questionnaire to hesitate in their answers. According to [23], the four-point Likert scale is simple and easy for respondents to understand. With only four answer options, the four-point Likert scale allows for more specific and focused data collection. The four-point Likert scale can be used to compare research results with previous studies that used a 4-point Likert scale or other Likert scales. The four-point Likert scale is easier to process and analyze than Likert scales with longer scales. The four-point Likert scale can be used in various types of research, including social, psychological, business, and environmental research.

D. Work Stress

Work stress significantly affects employee performance. Excessive stress can reduce concentration, alertness, and decision-making abilities, all of which are very important in jobs that require precision and safety, such as driving.

Work stress affects the driving Behavior of motorcycle drivers. The incentive structures implemented by delivery platforms, such as online food delivery services, income targets, and penalties for delays, can increase drivers' work stress. In addition, exposure to extreme heat increases the risk of driving behaviors such as high speed and sharp acceleration. These findings emphasize the need to consider work stress and environmental factors in efforts to improve motorcycle driver safety [24].

E. Workload

During dynamic driving, classifying the driver's mental workload is a complex task due to a range of factors, including human, vehicle, road, and environmental factors. Many current studies focus on the impact of single factors, such as physiological signals and lane changes. However, the results are often unsatisfactory because they fail to account for other factors. Drivers completed the NASA-TLX subjective workload questionnaire after the experiment to classify their mental workload levels, and these results were used as labels to develop a multi-factor-based driver mental workload classification model [25].

F. Work Environment

The work environment is one of the factors that influence a driver's performance. This is because a suitable work environment ensures optimal, stable driver performance. The built environment, including road conditions, infrastructure, and urban planning, has a significant impact on driver behavior. Identifying patterns of driver behavior related to the physical environment can provide insights for designing more effective policies to improve traffic safety. It is essential to understand the interaction between drivers and the environment and its impact on decision-making while driving [26].

Various factors, including functional abilities, personality, and the driving environment, influence speed behavior in drivers (elderly). The physical condition of drivers (elderly) and their personal characteristics interact with environmental factors such as roads and weather to influence driving decisions [27]. In other words, the working environment significantly affects a driver's performance.

G. Traffic Violations

There is already ample evidence of traffic violations committed by drivers, both intentionally and unintentionally, which ultimately lead to traffic accidents [28]. The Indonesian National Police Traffic Corps reported that from January to September 2024, there were approximately 1,674,908 cases of violations involving two-wheeled vehicles nationwide. The most prevalent violation was not wearing an SNI-approved helmet, with nearly 438,839 cases, including driving against traffic and violating road markings. In addition, in the field of traffic safety, several studies have found that stress from other sources can spill over into the driving environment, leading drivers to commit violations (Bowen et al., 2020; Rowden et al., 2011). Traffic violations committed by drivers are related to conflicts felt both at Work and at home, which ultimately lead to the intention to commit violations, including stress factors that influence [29].

H. Driving Behavior

Drivers often engage in behaviors that pose a risk to themselves and other road users. Although many unsafe actions are carried out, they are actually actively and consciously aware that they are violating regulations. This results from mistakes caused by a lack of experience, momentary distractions, and inattention. Whether intentional or not, violations of rules and deficiencies in memory, judgment, or situational awareness can and do contribute to traffic accidents [30]. Therefore, a tool is needed to measure this Behavior and the frequency of violations. In 1990, Reason, Manstead, Stradling, Baxter, and Campbell introduced the Driver Behavior Questionnaire, a 50-question instrument completed independently by drivers that assesses the frequency of risky behaviors committed while driving. [31] identified nearly 200 studies that have used the DBQ either partially or in its entirety. [32] stated that the DBQ is

 EISSN: 2961-872X ●PISSN: 2961-8924●DOI: 10.56741/IISTR.esl.002257

one of the instruments that can be used to measure driving behavior.

I. Data Analysis Technique

To test the moderating effect of the Work Stress variable (M) on the relationship between the independent variables (X: Workload, Work Environment, and Traffic Violations) and the dependent variable Driving Behavior (Y), Moderated Regression Analysis was executed. Before constructing the interaction terms (X \times M), a mean-centering procedure was explicitly applied to all independent variables (X) and the moderating variable (M). This process involves subtracting the mean value of each variable from its respective raw scores, utilizing the formula:

$$X(\text{centered}) = X - \bar{X} \quad (1)$$

This mean-centering step was implemented to minimize the threat of multicollinearity, which frequently arises from the multiplication of variables in interaction models, while simultaneously facilitating the interpretation of the regression coefficients and constant values in the analysis output.

J. Harman's Single-Factor Test

Based on the diagnostic results of Harman's Single-Factor Test, this study stated that it is free from the threat of common method bias. Although all variable data were collected simultaneously using self-administered questionnaires from the same online motorcycle taxi driver respondents, method variance did not dominate or distort the relationships between variables in this research model. This is evidenced by the variance explained by a single factor, which was 15.747\%. This figure falls well below the critical methodological threshold of 50\%. Because the variance value is far below 50\%, it proves that no single factor emerged or accounted for the majority of the variance across all research questionnaire items. The result of 15.747\% guarantees that data variance is proportionally distributed to each respective variable construct.

IV. Results And Discussion

A. Validity and Reliability Testing of Research Instruments

Before testing the hypotheses via multiple regression and moderated regression analysis, the validity and reliability of the questionnaire instruments distributed to the 40 online motorcycle taxi driver respondents were evaluated. Validity testing was conducted through corrected item-total correlation analysis. An instrument item was declared valid if its correlation coefficient exceeded the critical r-table value at the specified significance level. Reliability was determined based on the Cronbach's alpha coefficient. The instrument testing results are presented in Table 1 below:

TABLE I. Results Of Validity And Reliability Testing

Research Variable	Correlation Range (r-Value / Validity)	Cronbach's Alpha (Reliability)	Status
Workload	0.740–0.917	0.941	Valid
Work Environment	0.425–0.768	0.757	Valid
Traffic Violation	0.442–0.668	0.722	Valid
Work Stress	0.365–0.825	0.806	Valid
Driving Behavior	0.507–0.809	0.884	Valid

Based on Table I, all questionnaire items across the five variables demonstrated item-total correlation values above the critical r-table threshold ($r > 0.312$ for $N = 40$ and $\alpha = 0.05$), thereby confirming their validity. Meanwhile, the reliability analysis showed that all five variables possessed Cronbach's alpha coefficients exceeding the minimum standard threshold of 0.70. This evaluation proves that all instruments, including the Driver Behaviour Questionnaire (DBQ) used to measure the frequency of risky driving behaviors, exhibit adequate internal consistency and measurement stability. Consequently, the empirical data are appropriate for subsequent multiple regression model testing.

B. Classical Assumption Testing

Before executing the multiple regression analysis to examine the effects of Workload, Work Environment, and Traffic Violations on driving behavior, classical assumption testing—comprising Normality, Multicollinearity, Heteroskedasticity, Linearity, and Autocorrelation tests—was conducted. Full compliance with these five assumptions guarantees that the multiple regression and moderated regression results yield Best Linear Unbiased Estimators (BLUE). Meeting classical assumptions is a mandatory prerequisite for regression results to be valid and generalizable for scientific conclusions [33]. The results are detailed in the tables below:

TABLE II. NORMALITY TEST
One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		40
Normal Parameters[a]	Mean	.0000000
	Std. Deviation	3.13535304
Most Extreme Difference	Absolute	.090
	Positive	.059
	Negative	-.090
Kolmogorov-Smirnov Z		.572
Asymp. Sig. (2-tailed)		.899

a. Test distribution is Normal

Based on Table II, the Asymp. Sig. (2-tailed) value is 0.899. Given that $0.899 > 0.05$, the residual data are normally distributed.

TABLE III. Multicollinearity Test
Coeficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95% Confidence Interval for B		Collinearly Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerence	VIF
1	(Constant)	30.478	14.218		2.144	.039	1.614	59.342		
	Workload	.517	.154	.473	3.360	.002	.205	.829	.905	1.104
	Work Environment	-.505	.196	-.350	2.580	.014	-.903	-.108	.977	1.023
	Traffic Violation	.900	305	.415	2.948	.006	.280	1.519	.905	1.105
	Work Stress	.306	.250	.165	1.224	.229	-.202	.815	.986	1.014

a. Dependent Variable: Driver Behavior

Table III demonstrates that all variables obtained a Tolerance value > 0.10 and a VIF value < 10.00. Thus, it can be concluded that the model does not exhibit multicollinearity.

TABLE IV. HETEROSKEDASTICITY TEST
Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	-3.567	8.009		-.445	.659	-19.826	12.691
	Workload	-.055	.087	.-109	-.636	.529	-.231	.121
	Work Environment	.154	.110	.230	1.392	.173	-.070	.377
	Traffic Violation	-.014	.172	-.014	-.081	.936	-.363	.335
	Work Stress	.094	.141	.110	.668	.508	-.192	.381

a. Dependent Variable: ABS_RES

Table IV indicates that all significance values exceed 0.05. Therefore, the model is free from heteroskedasticity.

TABLE V. AUTOCORRELATION TEST
Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of The Estimate	Duirbin-Watson
1	.610[a]	.372	.301	3.30967	1.810

a. Predictors: (Constant), Work Stress, Workload, Work Environment, Traffic Violation
b. Dependent Variable: Driver Behavior

Using the Durbin-Watson criteria, where no autocorrelation exists if du < d < 4 - du, Table V reveals that the observed value satisfies 1.721 < 1.810 < 2.279, confirming the absence of autocorrelation.

TABLE VI.A. LINEARITY TEST WORKLOAD
ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Driver Behavior*	Between Groups	(Combined)	306.205	15	20.414	1.608	.145
Workload		Linearity	61.295	1	61.295	4.827	.038
		Deviation from Linearity	244.910	14	17.494	1.378	.237
	Within Groups		304.770	24	12.699		
	Total		610.975	39			

Table VI A shows that the Deviation from Linearity F-statistic (1.378) is less than the F-table value (2.13), and the significance value (0.237 > 0.05). This confirms a significant linear relationship between Workload and Driving Behavior.

TABLE VI.B. LINEARITY TEST WORK ENVIRONMENT
ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Driver Behavior*	Between Groups	(Combined)	243.818	11	22.165	1.690	.128
Work Environment		Linearity	47.862	1	47.862	3.650	.066
		Deviation from Linearity	195.956	10	19.596	1.494	.193
	Within Groups		367.157	28	13.113		
	Total		610.975	39			

Table VI B shows that the Deviation from Linearity F-statistic (1.494 < 2.19) and the significance value (0.193 > 0.05). This indicates a significant linear relationship between Work Environment and Driving Behavior.

TABLE VI.C. LINEARITY TEST TRAFFIC VIOLATION
ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Driver Behavior*	Between Groups	(Combined)	107.191	6	17.865	1.170	.346
Traffic Violation		Linearity	37.404	1	37.404	2.450	.127
		Deviation from Linearity	69.787	5	13.957	.914	.484
	Within Groups		503.784	33	15.266		
	Total		610.975	39			

Table VI C shows that the Deviation from Linearity F-statistic (0.914 < 2.50) and the significance value (0.484 > 0.05). This indicates a significant linear relationship between Traffic Violation and Driving Behavior.

EISSN: 2961-872X ●PISSN: 2961-8924●DOI: 10.56741/IISTR.esl.002257

TABLE VI.D. LINEARITY TEST WORK STRESS
ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Driver Behavior*	Between Groups	(Combined)	144.753	8	18.094	1.203	.329
Work Stress		Linearity	11.106	1	11.106	.738	.397
		Deviation from Linearity	133.646	7	19.092	1.269	.297
	Within Groups		466.222	31	15.039		
	Total		610.975	39			

Table VI D shows that the Deviation from Linearity F-statistic (1.269 < 2.32) and the significance value (0.297 > 0.05). This demonstrates a significant linear relationship between Work Stress and Driving Behavior.

C. The Effect of Workload, Work Environment, and Traffic Violations on Driving Behavior

To determine the effects of Workload, Work Environment, and Traffic Violations on Driving Behavior, a multiple regression analysis was conducted. As shown in Tables VII A and VII B, the R^2 value is 0.346, while the adjusted R^2 value is 0.291, meaning that the combined practical contribution of the variables Workload, Work Environment, and Traffic Violations in explaining the variance in Driving Behavior is 29.1% (a moderate effect size). Based on Table VII C, the partial tests show that all three predictors have strong statistical and practical significance:

- Workload is significantly and positively associated with Driving Behavior (β=0.467; t=3.301; p=0.002; 95% CI [0.197, 0.825]).
- Work Environment is negatively associated (β = −0.356; t = −2.610; p = 0.013; 95% CI [−0.914, −0.115]).
- Traffic violations are positively associated (β=0.396; t=2.813; p=0.008; 95% CI [0.240, 1.479]).

The fact that the 95% confidence interval (95% CI) does not cross zero, along with the standardized coefficient (β) values, reinforces the findings that the burden of physical and mental work demands is a dominant factor triggering changes in the driving behavior of online motorcycle taxi drivers on public roads.

TABLE VII.A. COEFFICIENT OF DETERMINATION RESULTS
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of The Estimate
1	.588[a]	.346	.291	3.33245

a. Predictors: (Constant), Traffic Violation, Work Environment, Workload

TABLE VII.B. SIMULTAN F-TEST RESULTS
ANOVA[b]

Model		Sum of Squares	df	Mean Squares	F	Sig.
1	Regression	211.187	3	70.396	6.339	.001[a]
	Residual	399.788	36	11.105		
	Total	610.975	39			

a. Predictors: (Constant), Traffic Violation, Work Environment, Workload
b. Dependent Variable: Driving Behavior

TABLE VII.C. MULTIPLE LINEAR REGRESSION
Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	40.617	11.633		3.491	.001	17.023	64.211
	Workload	.511	.155	.467	3.301	.002	.197	.825
	Work Environment	-.514	.197	-.356	-2.610	.013	-.914	.-115
	Traffic Violation	.859	.305	.396	2.813	.008	.240	1.479

a. Dependent Variable: Driver Behavior

D. Work Stress Moderates The Relationship Between Workload, Work Environment, And Traffic Violations On Driving Behavior.

Specifically, in Table VIII A, the Workload × Work Stress interaction effect was found to be insignificant both statistically and practically (β=0.209; p=0.900; 95% CI [-0.102, 0.115]), confirming the absence of a significant moderating effect: that is, work stress does not moderate the influence of workload on driving behavior.

However, the Work Environment × Work Stress interaction effect was found to be statistically significant (β = −6.535; p = 0.025; 95% CI [−0.401, −0.028]), and the Traffic Violation × Work Stress interaction also showed strong practical significance (β = 6.208; p = 0.012; 95% CI [0.069, 0.522]), so it can be concluded that work stress moderates the effects of work environment and traffic violations on driving behavior. The evaluation of these effect sizes and confidence intervals provides more objective validity that work stress exacerbates driving behavior distortions when drivers are in poor road environments or when committing traffic violations.

TABLE VIII.A. SIGNIFICANCE TESTING FOR MODERATION EFFECTS

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	20.356	14.191		1.434	.161	-.8.549	49.262
	Workload	.228	1.525	.209	.150	.882	-2.879	3.336
	Work Environment	5.860	2.726	4.054	2.148	.039	.306	11.413
	Traffic Violation	-7.599	3.210	-3.505	-2.367	.024	-14.137	-1.060
	Work Stress	.509	.250	.274	2.035	.050	.000	1.019
	Workload*Work Stress	.007	.053	.209	.126	.900	-.102	.115
	Work Environment*Work Stress	-.214	.091	-6.535	-2.344	.025	-.401	-.028
	Traffic Violation*Work Stress	.296	.111	6.208	2.660	.012	.069	.522

a. Dependent Variable: Driver Behavior

TABLE VIII.B. RESULTS OF THE COEFFICIENT OF DETERMINATION ANALYSIS AFTER MODERATION

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.721[a]	.520	.415	3.02789

a.Predictors: (Constant), Traffic Violation*Work Stress, Work Environment, Work Stress, Workload, Traffic Violation, Workload*Work Stress, Work Environment*Work Stress

Based on Table VIII B, including the Work Stress variable as a moderator increased the R^2 value to 0.520, with an Adjusted R^2 of 0.415. This change in effect size (ΔR^2 = 0.174), or 17.4%, practically indicates a significant additional contribution from the interaction of work stress to the variability in the driving behavior of online motorcycle taxi drivers. Thus, it can be concluded that the inclusion of the moderating variable (Work Stress) strengthens the influence of the Work Environment and Traffic Violation variables on the Driving Behavior variable. To visualize how Work Stress modifies the relationship between these variables in practice, a simple slopes analysis was conducted by dividing work stress levels into high (+1 SD) and low (-1 SD) categories.

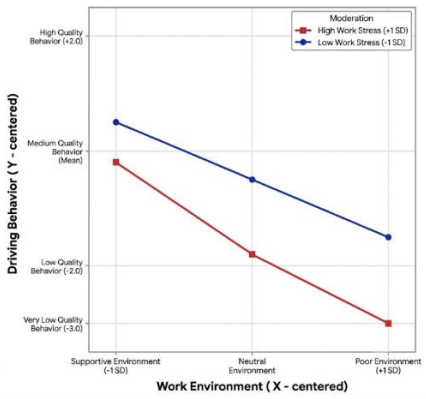


Fig. II. The Effect Of The Work Environment On Driving Behavior, With Work Stress As A Moderating Variable

Figure II shows a line graph indicating that when drivers experience high levels of work-related stress, unfavorable physical road conditions lead to a more drastic and aggressive decline in driving behavior compared to drivers with low levels of work-related stress.

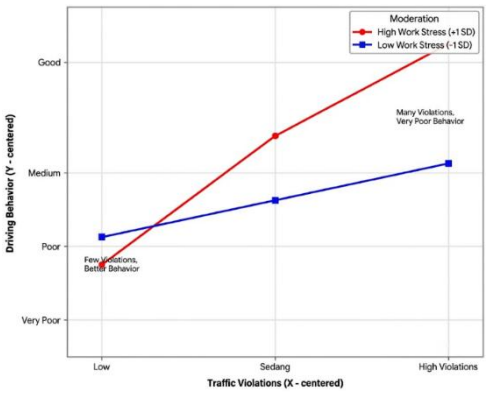


Fig. III. The Effect of the Work Environment on Driving Behavior, with Work Stress as a Moderating Variable

Figure III shows that the slope of the line confirms that the positive relationship between the intensity of traffic violations and deviant driving behavior becomes much steeper—or stronger—when drivers are under high work-related stress. Conversely, under low-stress conditions, the tendency toward deviant driving behavior resulting from traffic violations is relatively flatter.

Based on these two interaction plots, it can be concluded that work-related stress is a crucial moderating factor that amplifies the negative effects of the work environment and the intensity of traffic violations on driving behavior. Therefore, psychological interventions to manage work-related stress among online motorcycle taxi drivers are an important strategic tool for minimizing road safety risks.

IV. CONCLUSION

This study examined the factors triggering deviant driving behavior among 40 online motorcycle taxi drivers, with work-related stress as a moderating variable. All data were found to be valid, reliable, and free from common method bias. The key findings of the statistical analysis include:

1. The combination of workload, work environment, and traffic violations initially explained 34.6% of the variance in driving behavior. After work-related stress was included as a

EISSN: 2961-872X ●PISSN: 2961-8924●DOI: 10.56741/IISTR.esl.002257

moderator, the model's explanatory power increased substantially to 52.0%.

2. Partially, increases in workload and the intensity of traffic violations directly worsened driving behavior on the road.

3. Work-related stress did not moderate the effect of workload on driving behavior. However, work-related stress was found to significantly amplify the adverse effects of the work environment and the intensity of traffic violations, thereby triggering much more aggressive driving behavior when driver stress levels are high.

4. In practical terms, controlling work-related stress levels and managing workload are crucial strategic interventions for ensuring the safety of online motorcycle taxi drivers on the road.

REFERENCES

[1] Heejin Jeong and Yili Liu, "Modeling of Stimulus-Response Secondary Tasks with Different Modalities while Driving in a Computational Cognitive Architecture," Proceedings of the Ninth International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design, 2017.

[2] R. Septiari, R. Ditta Myrtanti, N. Budiharti, and J. Hutabarat, "Disruption of Mobile Phone Use on Safety Riding Behavior of Online Ojek Drivers," YMER, 2023, [Online]. Available: http://ymerdigital.com

[3] Y. Yang, Z. Ye, S. M. Easa, Y. Feng, and X. Zheng, "Effect of driving distractions on driver mental workload in work zone's warning area," Transp Res Part F Traffic Psychol Behav, vol. 95, pp. 112–128, May 2023, doi: 10.1016/j.trf.2023.03.018.

[4] T. M. Pitt et al., "Risky driving behaviors at school drop-off across Canadian municipalities: Findings from the Child Active Transportation Safety and the Environment (CHASE) study," Traffic Inj Prev, pp. 1–5, Apr. 2025, doi: 10.1080/15389588.2025.2478153.

[5] Renny Septiari and Nelly Budiharti, "The correlation of safety riding knowledge and traffic accident rates for online motorcycle taxi drivers in Malang city," World Journal of Advanced Research and Reviews, vol. 16, no. 2, pp. 787–793, Nov. 2022, doi: 10.30574/wjarr..2022.16.2.1244.

[6] M. Zhou, J. Yin, Y. Tang, H. Yi, N. Kong, and K. S. Campy, "What drives the drivers away? An empirical study on the factors influencing the turnover intention of full-time online ride-hailing drivers in China," Transp Res Part A Policy Pract, vol. 186, p. 104134, Aug. 2024, doi: 10.1016/j.tra.2024.104134.

[7] A. J. Porcelli and M. R. Delgado, "Stress and decision making: effects on valuation, learning, and risk-taking," Curr Opin Behav Sci, vol. 14, pp. 33–39, Apr. 2017, doi: 10.1016/j.cobeha.2016.11.015.

[8] Z. Peng, Y. Wang, and L. T. Truong, "Individual and combined effects of working conditions, physical and mental conditions, and risky driving behaviors on taxi crashes in China," Saf Sci, vol. 151, p. 105759, Jul. 2022, doi: 10.1016/j.ssci.2022.105759.

[9] G. J. Casey, T. Miles-Johnson, and G. J. Stevens, "Heavy vehicle driver fatigue: Observing work and rest behaviours of truck drivers in Australia," Transp Res Part F Traffic Psychol Behav, vol. 104, pp. 136–153, Jul. 2024, doi: 10.1016/j.trf.2024.05.016.

[10] S. A. Useche, L. Montoro, J. M. Tomas, and B. Cendales, "Validation of the Cycling Behavior Questionnaire: A tool for measuring cyclists' road behaviors," Transp Res Part F Traffic Psychol Behav, vol. 58, pp. 1021–1030, Oct. 2018, doi: 10.1016/j.trf.2018.08.003.

[11] A.-B. A. Al-Mekhlafi et al., "Risk assessment of driver performance in the oil and gas transportation industry: Analyzing the relationship between driver vigilance, attention, reaction time, and safe driving practices," Heliyon, vol. 10, no. 6, p. e27668, Mar. 2024, doi: 10.1016/j.heliyon.2024.e27668.

[12] B. Chen, L. Wang, B. Li, and W. Liu, "Work stress, mental health, and employee performance," Front Psychol, vol. 13, Nov. 2022, doi: 10.3389/fpsyg.2022.1006580.

[13] E. Timotius and G. S. Octavius, "Stress at the Workplace and Its Impacts on Productivity: A Systematic Review from Industrial Engineering, Management, and Medical Perspective," Industrial Engineering & Management Systems, vol. 21, no. 2, pp. 192–205, Jun. 2022, doi: 10.7232/iems.2022.21.2.192.

[14] J. Ni, J. Chen, W. Xie, and Y. Shao, "The impacts of the traffic situation, road conditions, and driving environment on driver stress: A systematic review," Transp Res Part F Traffic Psychol Behav, vol. 103, pp. 141–162, May 2024, doi: 10.1016/j.trf.2024.04.006.

[15] W. Qiang and F. Li, "Work stressors and aggressive driving: The mediating roles of stress appraisals," Saf Sci, vol. 181, p. 106656, Jan. 2025, doi: 10.1016/j.ssci.2024.106656.

[16] A. Tavakoli, N. Lai, V. Balali, and A. Heydarian, "How are drivers' stress levels and emotions associated with the driving context? A naturalistic study," J Transp Health, vol. 31, p. 101649, Jul. 2023, doi: 10.1016/j.jth.2023.101649.

[17] L. Yang, R. Zhou, G. Li, Y. Yang, and Q. Zhao, "Recognizing and explaining driving stress using a Shapley additive explanation model by fusing EEG and behavior signals," Accid Anal Prev, vol. 209, p. 107835, Jan. 2025, doi: 10.1016/j.aap.2024.107835.

[18] L. Yang, J. Cheng, Z. Wang, and X. Li, "Assessing the relationship between driving skill, driving stress, and driving behavior," J Safety Res, vol. 91, pp. 96–107, Dec. 2024, doi: 10.1016/j.jsr.2024.08.008.

[19] W. D. Scherz, D. Grewe, M. Gaiduk, R. Seepold, and J. A. Ortega, "Identification of Behavioural Driving Risks from Physiological Stress," Procedia Comput Sci, vol. 246, pp. 5151–5159, 2024, doi: 10.1016/j.procs.2024.09.608.

[20] K. Phanniphong, K. Na-Nan, N. Asavanatthakorn, and K. Chuen-u-ra, "Job stress matters: Understanding how job stress moderates the relationship between person-environment fit and innovative work behavior in the Thai food industry," Acta Psychol (Amst), vol. 250, p. 104513, Oct. 2024, doi: 10.1016/j.actpsy.2024.104513.

[21] C.-F. Chen, "Investigating the Effects of Job Stress on the Distraction and Risky Driving Behaviors of Food Delivery Motorcycle Riders," Saf Health Work, vol. 14, no. 2, pp. 207–214, Jun. 2023, doi: 10.1016/j.shaw.2023.03.004.

[22] Solimun, "Solimun-Program Studi Statistika FMIPA UB." Accessed: Nov. 04, 2025. [Online]. Available: https://www.academia.edu/8314503/Solimun_Program_Studi_Statistika_FMIPA_UB_31_V_Analisis_Variabel_Moderasi_Dan_Mediasi

[23] Sugiyono, Metode Penelitian Kuantitatif, Kualitatif dan R&D. 2019.

[24] C.-K. Hsu, "Burning gig, rewarding risk: Effects of dual exposure to incentive structure and heat condition on risky driving among on-demand food-delivery motorcyclists in Kaohsiung, Taiwan," Accid Anal Prev, vol. 210, p. 107841, Feb. 2025, doi: 10.1016/j.aap.2024.107841.

[25] W. Wei, X. Fu, S. Zhong, and H. Ge, "Driver's mental workload classification using physiological, traffic flow and environmental factors," Transp Res Part F Traffic Psychol Behav, vol. 94, pp. 151–169, Apr. 2023, doi: 10.1016/j.trf.2023.02.004.

[26] V. Nicolosi, M. Mameli, S. Shiralizadeh, I. G. Coltea, M. D'Apuzzo, and G. Cappelli, "How does the built environment affect driver behaviours? A methodological framework for large-scale analysis that combines Onboard Diagnostic and Geographical Data to promote Road Safety," Transportation Engineering, vol. 22, p. 100384, Dec. 2025, doi: 10.1016/j.treng.2025.100384.

[27] Y. Zhu, M. Jiang, and T. Yamamoto, "Exploring speeding behaviors of older drivers: Role of functional abilities, personality, and driving environments," Transp Res Part F Traffic Psychol Behav, vol. 113, pp. 34–53, Aug. 2025, doi: 10.1016/j.trf.2025.04.021.

[28] Zhang,Y. Jing, L.,Sun, C.,Fang, J, and Feng,Y, "Human Factors Related to Major Road Traffic Accidents in China." Traffic Injury Prevention, 20(8), 2018, p. 796-800. https://doi.org/10.1080/15389588.2019.1670817

[29] M. Shukri, F. Jones, and M. Conner, "Theory of planned behaviour, psychological stressors and intention to avoid violating traffic rules: A Multi-Level modelling analysis," Accid Anal Prev, vol. 169, p. 106624, May 2022, doi: 10.1016/j.aap.2022.106624.

[29] L. A. de Mattos, R. Rocha, and F. J. de Castro Moura Duarte, "Human error and violation of rules in industrial safety: A systematic literature review," Work, vol. 79, no. 3, pp. 1237–1253, Nov. 2024, doi: 10.3233/WOR-230186.

[30] S. T. D. Cordazzo, C. T. Scialfa, K. Bubric, and R. J. Ross, "The Driver Behaviour Questionnaire: A North American analysis," J Safety Res, vol. 50, pp. 99–107, Sep. 2014, doi: 10.1016/j.jsr.2014.05.002.

[31] S. T. D. Cordazzo, C. T. Scialfa, and R. J. Ross, "Modernization of the Driver Behaviour Questionnaire," Accid Anal Prev, vol. 87, pp. 83–91, Feb. 2016, doi: 10.1016/j.aap.2015.11.016.

[33] Ghozali, Imam, "Aplikasi Analisis Multivariate dengan Program IBM SPSS 25,' Universitas Diponegoro, Semarang, (9) 2018.