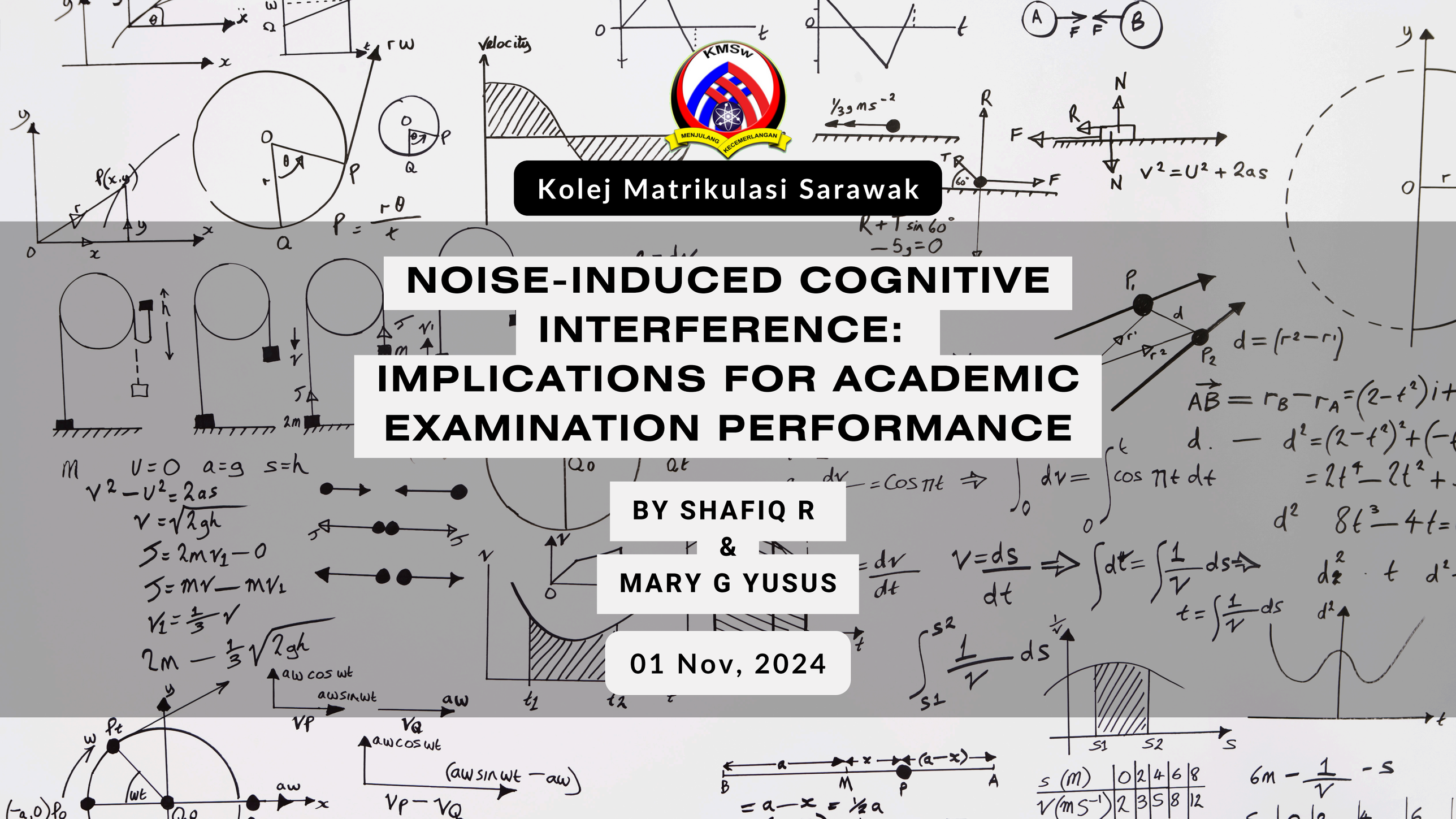

Kolej Matrikulasi Sarawak

NOISE-INDUCED COGNITIVE INTERFERENCE: IMPLICATIONS FOR ACADEMIC EXAMINATION PERFORMANCE

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ABSTRACT

This research investigates the impact of environmental noise levels on students' academic performance, specifically focusing on quiz marks. The study involved 100 students who took quizzes under varying noise conditions categorized as Low, Moderate, and High. Using statistical analyses, including regression analysis, ANOVA, and t-tests, we examined the relationship between noise levels and quiz performance. The results reveal a significant inverse correlation between noise levels and quiz marks. Students in low noise environments scored the highest, with average marks above 85, while those in high noise environments scored the lowest, with average marks around 70. The findings underscore the detrimental effect of high noise levels on academic performance and highlight the importance of maintaining a quiet study environment. These insights can inform educational strategies and environmental design to optimize learning outcomes.

Keywords:
Environmental noise, academic performance, cognitive interference, quasi-experimental design, college students, noise pollution

RESEARCH OBJECTIVES

01

To investigate how different levels of environmental noise (no noise, moderate noise, high noise) impact college students' performance on academic tasks.

02

Evaluate the differences in test scores between students in quiet environments and those exposed to various noise levels.

03

Based on the findings, suggest practical implications for creating conducive learning environments that minimize noise-induced cognitive interference for academic success.

PROBLEM STATEMENT

The increasing prevalence of environmental noise in academic settings raises concerns about its impact on college students' cognitive performance. This study aims to investigate the relationship between varying levels of environmental noise and academic performance, specifically examining how such noise affects students' academic achievement during examinations and academic tasks

METHODOLOGY

Research Design

Type:
Quasi-experimental - random assignment not feasible.

Approach:
Quantitative

Participants

Sample Size:
100 college students.
Sampling Method:
Stratified sampling.
Group 1:
Low Noise Exposure

Group 2:
Moderate Noise exposure

Group 3:
High Noise Exposure

Variables

Variables Independent Variable (IV):
Level of environmental noise

Dependent Variables (DVs):
Test scores

METHODOLOGY

Data Analysis Method

Data Analysis Use ANOVA and t-tests to compare the means of test scores between different noise level groups. Regression analysis to determine if noise exposure predicts lower performance.

RESEARCH RESULTS

Regression Analysis Summary:

OLS Regression Results

Dep. Variable:	y	R-squared:	0.878
Model:	OLS	Adj. R-squared:	0.877
Method:	Least Squares	F-statistic:	705.1
Date:	Sat, 26 Oct 2024	Prob (F-statistic):	1.47e-46
Time:	15:49:13	Log-Likelihood:	-256.49
No. Observations:	100	AIC:	517.0
Df Residuals:	98	BIC:	522.2
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	129.0976	2.030	63.587	0.000	125.069	133.127
x1	-0.7767	0.029	-26.554	0.000	-0.835	-0.719

Omnibus:	15.715	Durbin-Watson:	1.979
Prob(Omnibus):	0.000	Jarque-Bera (JB):	4.886
Skew:	-0.184	Prob(JB):	0.0869
Kurtosis:	1.982	Cond. No.	444.

Regression Analysis (OLS)

The regression model predicts quiz marks based on decibel levels of noise exposure. The summary indicates a high R-squared value of approximately 0.875, which suggests that about 87.5% of the variance in quiz marks can be explained by noise levels.

Each additional decibel in noise level is associated with an average decrease of approximately 0.77 in quiz marks, which is statistically significant ($p < 0.001$). This negative relationship suggests that as noise increases, quiz marks tend to decrease.

Durbin-Watson value of 1.994 (close to 2) indicates no significant autocorrelation among residuals, supporting the validity of the model.

RESEARCH RESULTS

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ANOVA Results (Low, Moderate, High groups):
F-Value: 123.97568092907552
P-Value: 1.893096333268324e-27
```

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T-Test Results (Low vs. High noise levels):
T-Statistic: 16.790473826769585
P-Value: 5.3206359271529166e-21
```

One-way ANOVA

Results:

- F-value: 123.98, indicating a substantial ratio of variance between the groups compared to the variance within the groups. This high F-value suggests that there are significant differences in quiz marks across the noise level categories.
- P-value: 1.89e-27, which is extremely small, indicating that the differences in quiz marks among the Low, Moderate, and High noise groups are statistically significant. Thus, it is highly unlikely that these differences are due to random chance.

RESEARCH RESULTS

```
ANOVA Results (Low, Moderate, High groups):
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P-Value: 1.893096333268324e-27
```

```
T-Test Results (Low vs. High noise levels):
T-Statistic: 16.790473826769585
P-Value: 5.3206359271529166e-21
```

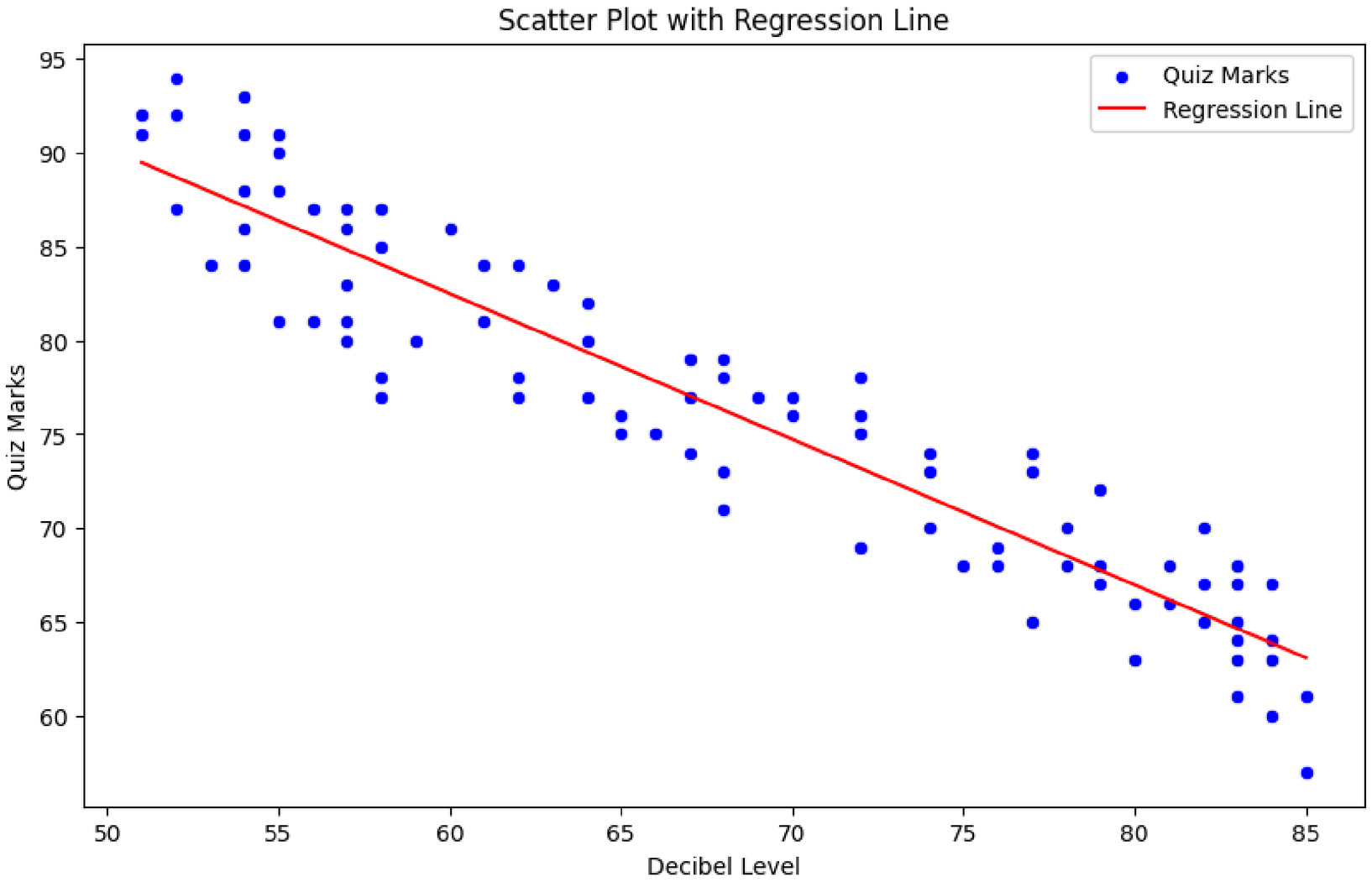
T-Test Results

Results:

- T-statistic: 16.79, which shows a significant difference in mean quiz marks between the Low and High noise groups. A higher t-statistic indicates a larger difference relative to the variability within the groups.

- P-value: 5.32e-21, which is very close to zero, confirming that the difference in quiz marks between Low and High noise levels is statistically significant. This suggests that higher noise levels are associated with a considerable reduction in quiz performance compared to lower noise levels.

RESEARCH RESULTS



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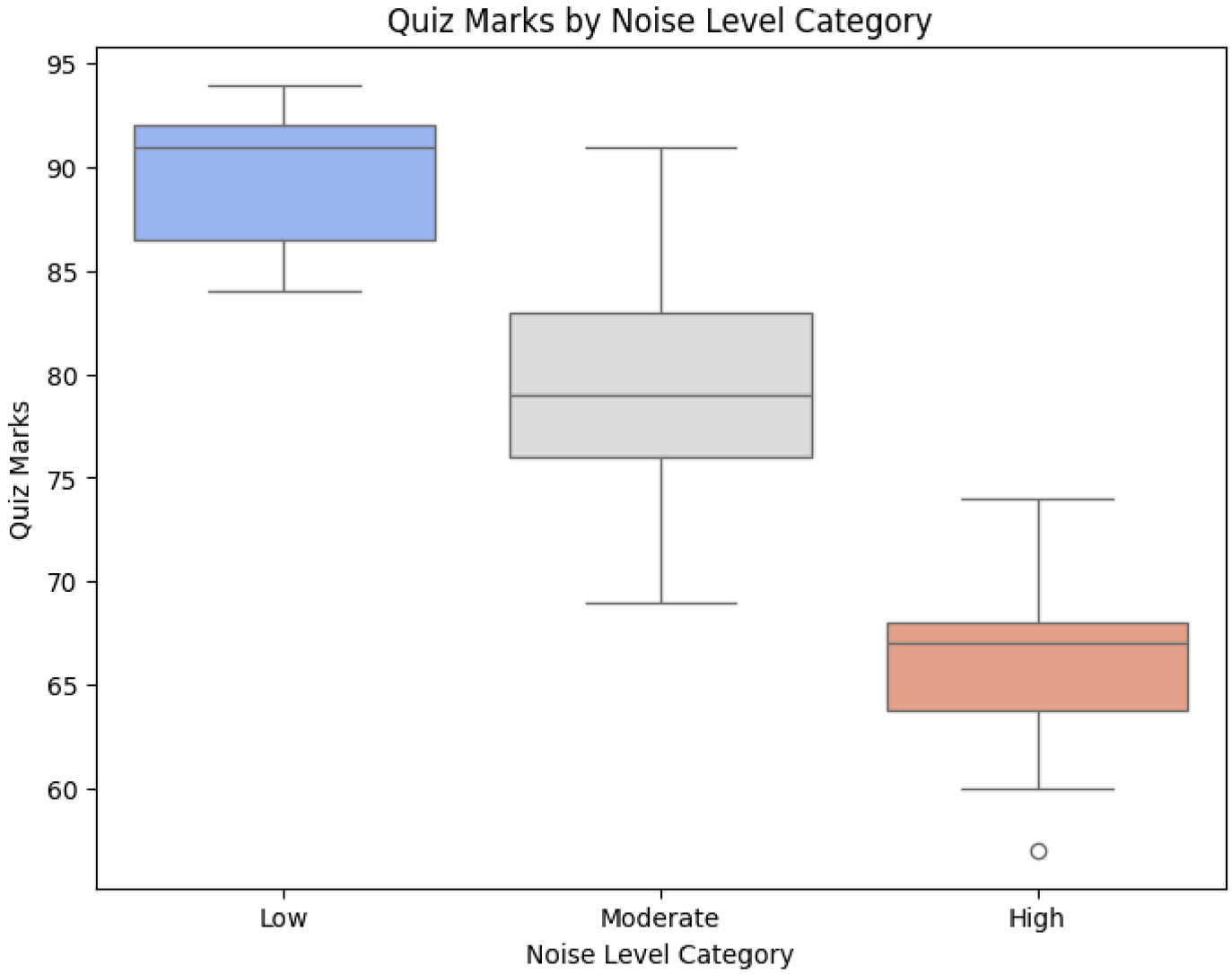

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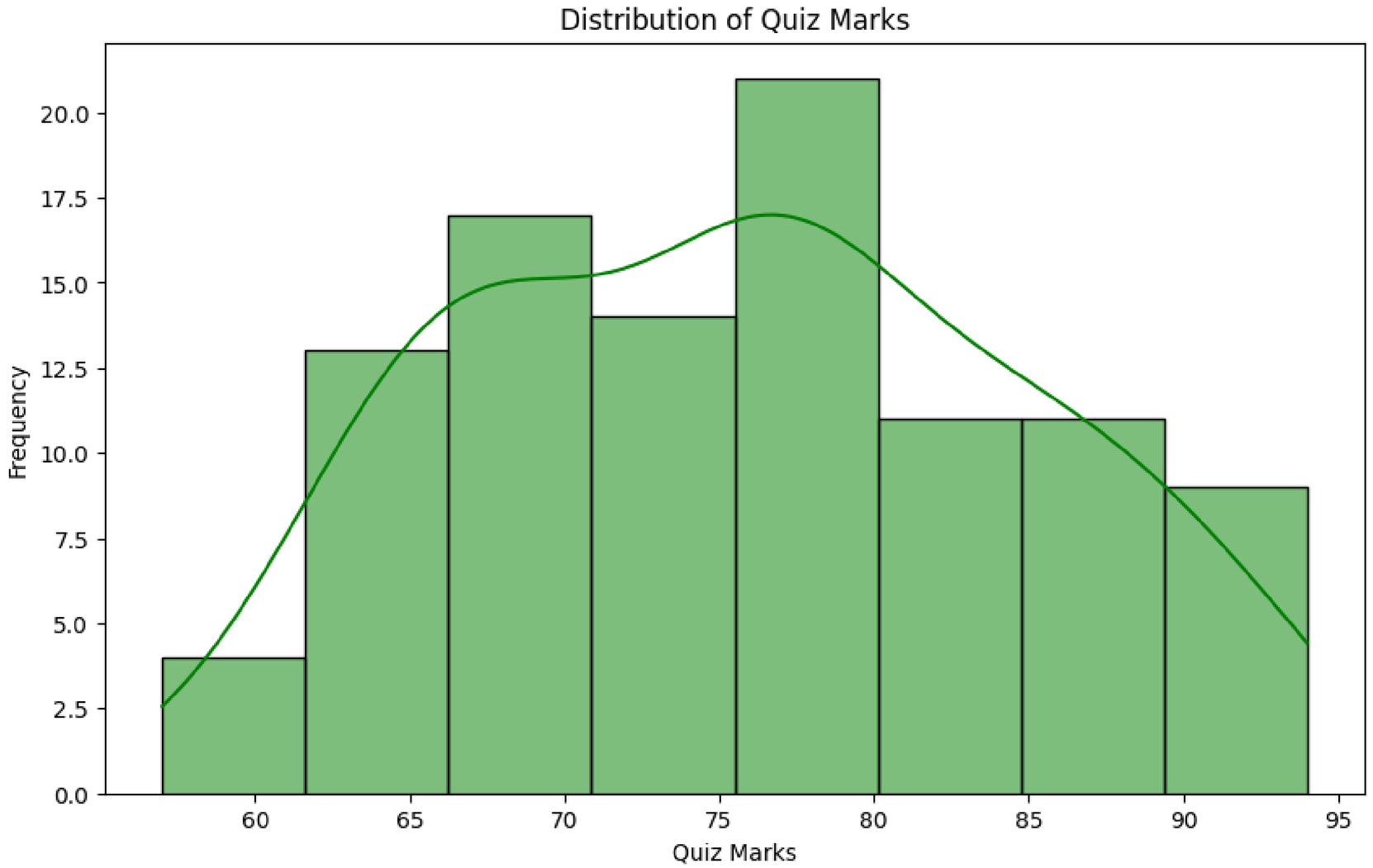

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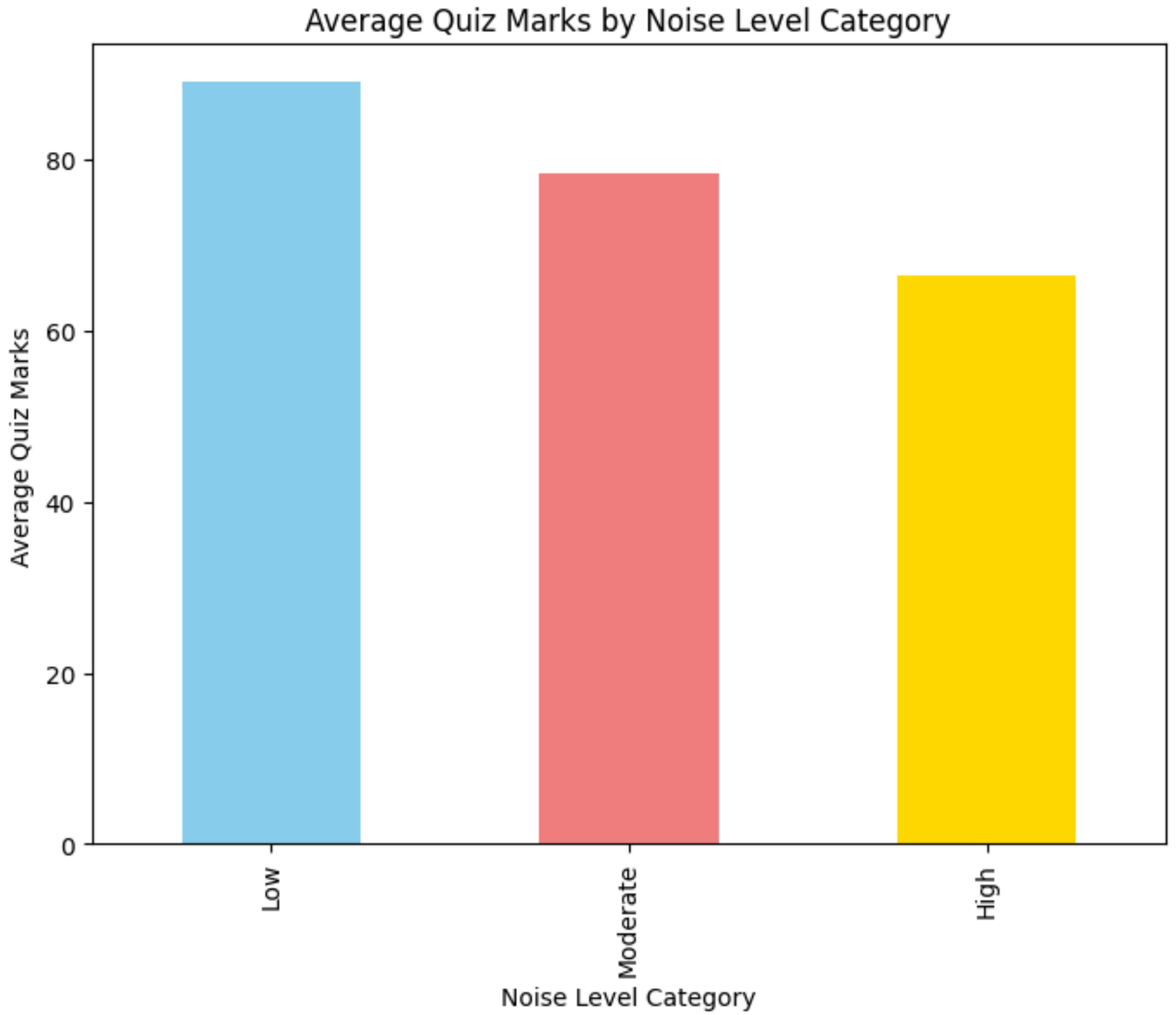

TO CONCLUDE

This study provides compelling evidence that environmental noise levels significantly affect students' academic performance. Through a detailed analysis involving regression, ANOVA, and t-tests, we established a clear inverse relationship between noise levels and quiz marks. Specifically, students exposed to low noise conditions demonstrated superior performance, achieving the highest average quiz marks, while those in high noise environments scored markedly lower.

The implications of these findings are critical for educational settings. They suggest that minimizing ambient noise could be a straightforward yet effective strategy to enhance student learning and performance. Educational institutions should consider implementing noise reduction measures in study and exam areas to create optimal learning environments.

Future research could expand on these findings by exploring the long-term effects of noise exposure on academic performance and by examining potential moderating factors such as individual differences in noise sensitivity. Additionally, interventions aimed at reducing noise in educational environments should be evaluated for their effectiveness in improving student outcomes.

In conclusion, maintaining a low-noise environment is paramount for academic success, and both educators and students should be cognizant of the significant impact of noise on learning and performance.

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THANK YOU

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