

# Short Research Report Summary

## Introduction

This study aims to analyze the factors affecting reading achievement among Turkish students using data from PISA 2022. The focus is on examining socio-economic, demographic, and emotional variables to understand their influence on student performance. By using a comprehensive regression approach, this report contributes to evidence-based educational insights.

## Methodology

Dataset: PISA 2022 (Turkey subset)

Software: R (RStudio)

Sampling: Stratified sampling by gender and school type

Variables:

Dependent Variable: PV1READ (Reading performance)

Independent Variables: Book count, parental education, gender, school type, emotional indicators (BELONG, FEELSAFE, etc.)

Statistical Techniques:

Descriptive analysis

Correlation matrix

Multiple linear regression (Model 5)

Residual diagnostics (normality, homoscedasticity)

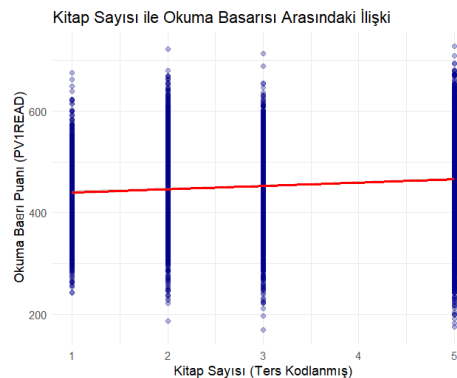
## Findings

- **Book Count (recoded)** → Positive effect (Beta = +7.99,  $p < 0.001$ )

*What it means:* Students with more books at home tend to score higher in reading. Access to books encourages reading habits and strengthens academic performance.

Figure 1

Relationship between Book Count and Reading Performance (PV1READ).

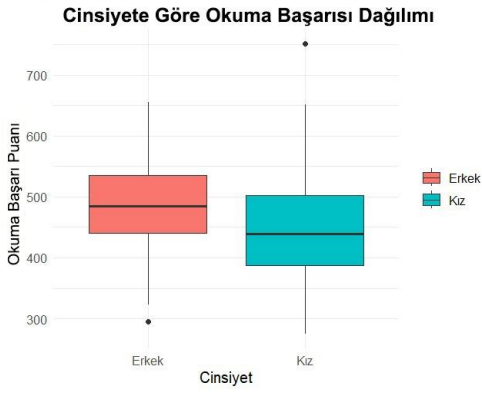


- **Mother's Education** → Strong positive effect (Beta = +82.21,  $p < 0.001$ )

*What it means:* Students whose mothers are more educated perform significantly better in reading. Maternal education plays a crucial role in shaping learning environments and supporting academic development.

Figure 2

Reading Performance Distribution by Gender.

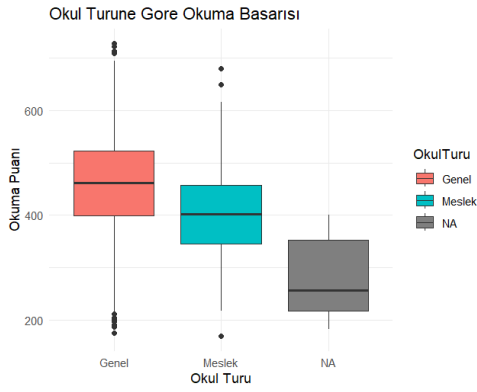


- **School Type (Vocational)** → Negative effect (Beta = -35.86,  $p < 0.001$ )

*What it means:* Students in vocational schools scored on average 35.86 points lower than students in general high schools. This may reflect curriculum differences, academic focus, or disparities in educational support.

Figure 3

Reading Performance by School Type (General vs Vocational).



- **Gender (Female)** → Negative effect (Beta = -23.84,  $p < 0.001$ )

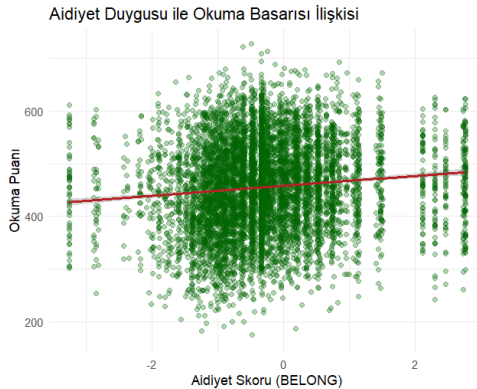
*What it means:* In this dataset, female students scored lower than males in reading. Although this contradicts global trends, it may be a sample-specific result and should be interpreted with caution.

- **Sense of Belonging (BELONG)** → Positive effect (Beta = +7.30,  $p < 0.001$ )

*What it means:* Students who feel a greater sense of belonging at school tend to perform better in reading. A positive school climate fosters motivation, engagement, and achievement.

Figure 4

Scatter plot showing Sense of Belonging and Reading Performance.



**-R-squared = 0.0828** (Model explains approx. 8.3% of variance)

What it means: The model accounts for 8.3% of the variation in reading scores. Although modest, this is considered acceptable in educational and social research, where multiple complex factors influence outcomes.

**-Non-significant:** Father's education, FEELSAFE, ANXMAT, FEELLAH

What it means: These variables did not show a statistically significant impact on reading performance in the model. Their effects may be limited or not clearly observable in this sample

## Residual Diagnostics

Residuals vs Fitted Plot: Supports linearity and constant variance

Histogram: Bell-shaped distribution

QQ Plot: Normality confirmed (minor tail deviations)

Figure 5

Residuals vs Fitted Values: Checking Linearity and Homoscedasticity.

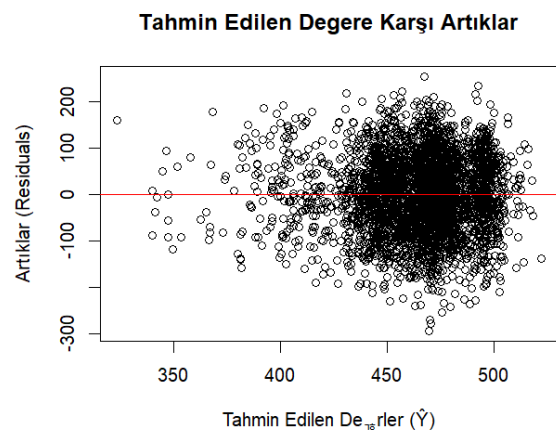


Figure 6

Histogram of Residuals: Distribution Approximates Normality

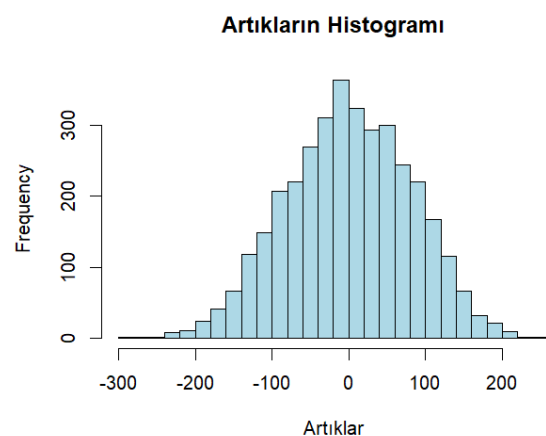
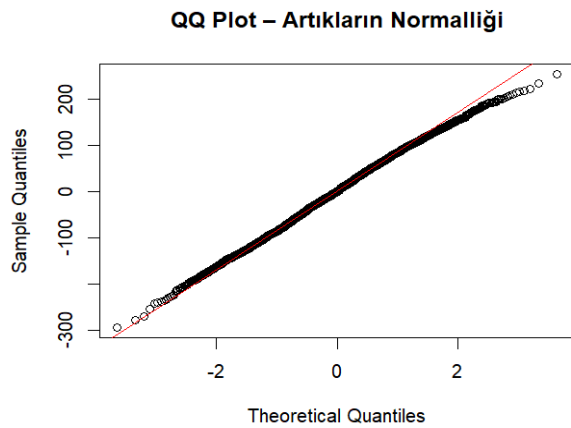


Figure 7

QQ Plot of Residuals: Slight Deviations at Tails



Conclusion: Model assumptions are largely met.

## Conclusion & Discussion

The study highlights that maternal education, book access, school type, gender, and emotional connection to school significantly affect students' reading achievement.

Students with greater book access, a stronger sense of belonging, and more educated mothers tend to perform better.

Students in vocational schools and female students, in this model, showed lower average performance.

Among emotional factors, only sense of belonging had a statistically significant effect.

## Educational Implications

Promote reading culture at home

Strengthening emotional support in schools

Provide targeted academic support in vocational schools

Invest in parental education and engagement programs

## References

All references and theoretical frameworks will be cited according to APA 7th edition guidelines in the full report.