

Abstract

Title: Examining Whether Growth Mindset and Curiosity Predict Students' Reading Achievement: Evidence from Singapore's PISA 2022 Data

Research Overview: According to the PISA 2022 results, there are performance gaps in reading achievement among students even within high-performing education systems (OECD, 2023a). To address the underexplored role of growth mindset and curiosity in predicting reading achievement, this study applies multiple linear regression using Singapore student data from PISA 2022.

Purpose of Study: Reading literacy is a critical 21st-century skill that enables students to understand, evaluate, and engage with texts across print and digital platforms, supporting knowledge acquisition, goal achievement, and meaningful participation in modern society (OECD, n.d.). Reading skills support comprehension and learning across different content areas, and improving reading literacy is a strong foundation for achievement in every subject and for lifelong learning and development of students (Snow, 2002).

According to the PISA 2022 results, reading achievement among students varies substantially even though they are learning within the same education system and receiving similar classroom instruction, reflecting differences in student performance within and across contexts (OECD, 2023a). This variation raises an important educational question: why do students with similar abilities, potential, and exposure to instruction and education systems show different reading performance?

One reasonable explanation is that students' interest and belief-related behaviors can influence their responses to difficulties, perseverance, and engagement in learning, which can support the observed differences in achievement (Dweck, 2006; von Stumm et al., 2011). Students with a growth mindset demonstrate greater resilience and higher academic achievement (Yeager & Dweck, 2012), and PISA 2018 data revealed that students who disagreed with a fixed-mindset statement scored approximately 31.5 points higher in reading after controlling for socioeconomic background (OECD, 2021). Similarly, curiosity is positively associated with academic performance (von Stumm et al., 2011), and students with higher curiosity demonstrate greater reading achievement than those with lower curiosity (Gurning & Siregar, 2017).

Prior studies have largely focused on the relationship between growth mindset and mathematics, and there is limited research that examines how growth mindset and curiosity jointly predict reading achievement within the highest PISA 2022 reading performance region, Singapore. Therefore, this study examines whether growth mindset and curiosity can predict students' reading achievement using PISA 2022 data from Singapore.

Research Methods: This study used secondary data from the PISA 2022 student questionnaire dataset obtained through the OECD website (OECD, 2023b). The student-level data from Singapore were filtered prior to analysis. Outliers and missing data were examined during the data cleaning process, and missing values in the variables of interest were handled using the Expectation-Maximization (EM) method. All assumptions for multiple linear regression were examined and confirmed to be met. A multiple linear regression analysis in SPSS was conducted on a large sample ($N = 6,606$) to examine whether Growth Mindset (WLE) and Curiosity (WLE) predicted reading achievement (PV1READ).

Results and Discussion: The overall model was statistically significant ($F(2, 6603) = 89.15, p < .001$), explaining approximately 3% of the variance in reading achievement ($R^2 = .03$; adjusted $R^2 = .03$). Both predictors made significant positive contributions to the model. Growth Mindset (WLE) significantly predicted reading achievement ($\beta = .10, t = 8.42, p < .001$), indicating that higher growth mindset was associated with higher reading scores when controlling for curiosity. Curiosity (WLE) also significantly predicted reading achievement ($\beta = .11, t = 9.23, p < .001$), indicating that greater curiosity was associated with higher reading achievement when controlling for growth mindset.

The positive relationship between growth mindset and reading achievement indicates that there is a substantial score gap between students who have a growth mindset and those who do not. Therefore, promoting a growth mindset among students may help them become more persistent, adopt alternative learning strategies, and continue developing their skills when encountering new and challenging texts.

Moreover, the positive relationship between curiosity and reading achievement indicates that there is also a performance gap between students who are curious and those who are not. Creating learning environments that foster curiosity may support students in exploring more

deeply, asking questions, and engaging more actively with reading, ultimately enhancing their reading achievement.

This study contributes to the existing research demonstrating that psychological factors complement cognitive skills in enhancing reading achievement. The findings also support educational practices that promote curiosity and growth-oriented beliefs of students by fostering supportive learning environments. Since the effect size of both predictors is small, other factors such as socioeconomic status, home learning resources, and school-level resources may also contribute significantly to reading achievement. Overall, the results suggest that educators, parents, and policymakers should create environments that support not only the cognitive development of students but also their psychological development, particularly growth mindset and curiosity, to maximize their overall development and academic potential.

Keywords: reading achievement, growth mindset, curiosity, PISA 2022, multiple linear regression