Does Students' Socioeconomic Status Moderate the Relationship between Growth Mindset and Learning Achievement: Evidence from PISA 2018 for Kazakhstan

Nazym Smanova, Gulmira Smanova

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Nazym Smanova — PhD, Senior Analyst, National Center for Education Research and Evaluation "Taldau" named after A. Baitursynuly. Address: 29/1 Konayev St., 010000 Astana, Kazakhstan. E-mail: nazym.smanova@iac.kz. ORCID: https://orcid.org/0000-0002-0330-4873 (corresponding author)

Gulmira Smanova — Chief Expert, National Academy of Education named after Y. Altynsarin (Astana, Kazakhstan). E-mail: gulmira.kaldybaykyzy@gmail.com

Abstract

Multiple studies demonstrate a positive association between having a growth mindset and learning achievement. However, recent research reveals that several aspects might moderate this relationship, such as psychological factors, the socioeconomic background of families, sense of belonging to school community, or school characteristics. The present study examines how socioeconomic status (SES) moderates the relationship between growth mindset and academic performance in reading drawing on a nationally representative sample of Kazakhstani students from the PISA 2018 database. The findings suggest that the socioeconomic status of students is a significant moderator in the relationship between growth mindset and learning achievement. The results show that beliefs about growth mindset account for higher learning achievement among both high and low-SES students in Kazakhstan. The last section discusses the policy implications these results have for Kazakhstan.

Keywords

learning achievement, growth mindset, fixed mindset, socioeconomic status, PISA, Kazakhstan

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The concept of growth mindset originates from the earlier incremental theories of intelligence, which assume that someone's basic abilities are malleable and can be developed [Dweck, Chiu, Hong, 1995; Chiu, Hong, Dweck, 1997; Dweck, 2008]. Numerous studies il-

lustrate the positive effects of growth mindset on higher learning achievement [Blackwell et al., 2007; Romero et al., 2014; Yeager, Dweck, 2012], human resource development [Han, Stieha, 2020], decreased stress, anxiety, and depression [Shroder et al., 2017; Schleider, Weisz, 2018], high work engagement [Zheng et al., 2019] and considerable career success [Burnette et al., 2020]. Most frequently, effects of growth mindset have been studied in educational context [Sisk et al., 2018; Paunesku et al., 2015; Yeager et al., 2019]. Moreover, the recent Programme for International Student Assessment (PISA) evaluated 15-year students' beliefs about growth mindset within its wellbeing framework for the first time [OECD, 2019a]. Its results suggest that growth mindset is one of the factors positively associated with academic resilience [Schleicher, 2019]. Specifically, across OECD countries, students who disagreed or strongly disagreed with the statement "Your intelligence is something about you that you can't change very much" scored on average 32 points higher in reading than those who agreed or strongly agreed with the statement [OECD, 2019b]. At the same time, some studies find no robust evidence to support the claim that growth mindset interventions improve learning outcomes [Corradi et al., 2019; Li, Bates, 2020]. In addition, some metanalytical studies [Sisk et al., 2018] revealed inconsistent effect sizes of growth mindset interventions on academic achievement indicating the need to consider under what conditions and for whom growth mindset interventions might be beneficial.

In this regard, some authors report that several factors might moderate the relationship between growth mindset and academic achievement, including psychological factors [Tempelaar et al., 2014; Wang et al., 2020], the socioeconomic background of families [Destin et al., 2019; Sisk et al., 2018], formal resources of the school [Yeager et al., 2019], peer norms [Yeager et al., 2019], teacher beliefs [Blackwell et al., 2007; Seaton, 2018]. Amongst these studies, the idea that the relationship between beliefs about intelligence and academic achievement can be sensitive to the socioeconomic background of students has received special attention [Sisk et al., 2018]. Building on the prior body of research, this study explores the moderating effect of students' socioeconomic status (SES) on the relationship between their beliefs about mindset and learning achievement drawing on PISA 2018 data for Kazakhstan. The effects of low socioeconomic status on learning achievement have been evident across international large-scale assessments conducted in the country. These results show that family background remains an important factor of learning achievement of Kazakhstani students [Muratkyzy, 2020]. For example, according to PISA 2018, socio-economically advantaged students outperformed disadvantaged ones in reading by 40 score points [Avvisati et al., 2019]. Mo-

reover, the recent review of the results of PIAAC and ICILS revealed that the education of parents and the number of books at home are common SES variables that have an impact on the learning achievement of Kazakhstani students [Irsaliyev, 2020]. In fact, there are wide disparities in the distribution of income in Kazakhstan [OECD, World Bank, 2015]. It is not surprising given the country's large territory (ninth in the world) and uneven spread of its population [Kopeyeva, 2019]. In 2019, 4.2% of the 18.6 million population lived below the national poverty line[1], one million of those being children[2]. Given the gravity of the problem, which significantly undermines the state principle of equal access to quality education [Nurbayev, 2019], the socioeconomic status of students has been identified as a national challenge. In 2020, the President of Kazakhstan claimed that "socioeconomic status should not affect one's access to quality education"[3]. In this context, little has been written on how in the country "undergoing transition from a collectivist to individualized mindset" [Winter et al., 2020] the intersection between a person's socioeconomic status, learning achievement and beliefs about mindset might play out.

1. Literature Review

1.1. What Is Growth Mindset?

The concept of growth mindset originated in Dweck's earlier research on implicit theories of intelligence [Dweck, Chiu, Hong, 1995; Chiu, Hong, Dweck, 1997]. According to Dweck [2008], growth mindset suggests that one's intelligence can be developed and improved upon with appropriate effort. In contrast, a fixed mindset refers to the belief that human qualities are not malleable since they are "carved in stone" [Ibid]. Most importantly, Dweck's [2008] point that "everyone can grow through application and experience" has gained special attention in educational context. Internationally, educators, increasingly focused on improving students' learning outcomes through raising their growth mindsets and academic achievement, have been designing school-based interventions [Sisk et al., 2018]. Furthermore, numerous studies have provided evidence on positive effects of growth mindset on learning achievement. For example, Mueller and Dweck [1998] revealed a positive effect of mindset development on students' academic achievement among

[1] Asian Development Bank (2020) Basic Statistics 2020: https://www.adb.org/publications/basic-statistics-2020 (accessed 20.08.2024).

[2] Aitenova S. Children Are Not a Priority: What Is Wrong with the Poverty Reduction Policy in Kazakhstan? Ekonomist.kz, 2021, May 8 (In Russian): https://ekonomist.kz/aitenova/deti-politika-sokrashcheniya-detskoj-bednosti/ (accessed 20.08.2024).

[3] Satubaldina A. (2020) Tokayev chairs third meeting of national Council of public trust to restructure education system: https://astanatimes.com/2020/05/tokayev-chairs-third-meeting-of-national-council-of-public-trust-to-restructure-education-system/ (accessed 20.08.2024).

American primary school students. A similar effect was observed for seventh graders in the study by Blackwell, Trzesniewski and Dweck in 2007. They discovered that the belief that intelligence is malleable held by junior high school students predicted an upward trajectory in grades over the two years, while the conviction about a fixed mindset predicted a flat one. A study conducted in Norway explored how schools can increase students' perseverance and performance in math by shaping students' mindsets through web-based mindset intervention and found positive effects [Bettinger et al., 2018]. Analyzing PISA 2018 data for the Philippines, Bernardo [2020] found that holding a growth mindset was positively associated with performance in mathematics and science. In addition, several meta-analyses revealed positive effects of growth mindset on academic achievement [Sisk et al., 2018; Moreau et al., 2018]. For example, examining the effectiveness of mindset interventions on academic achievement and potential moderating factors, Sisk et al. [2018] supported the specific points of Dweck's theory that academically vulnerable and disadvantaged students benefit from mindset interventions. It should be noted that there is extremely scarce research exploring the relationship between psychological factors and academic achievement in the context of Kazakhstan. Drawing on TIMSS 2007 data, Omoeva [2012] examined the correlation between the use of student-centred instructional methods in teaching mathematics and science, and achievement of fourth graders in these subjects and found no statistically significant relationship with student achievement. Shaikhina [2017] explored the relationship between social competence, emotional intelligence and academic achievement of students studying at a highly selective school in Kazakhstan. She revealed that the students with better self-control and well-being performed better academically. Similarly, Fillipova et al. [2019] found a statistically significant correlation between emotional intelligence competencies and academic achievement of students among undergraduate students at two Kazakhstani universities.

At the same time, other studies find no robust evidence to support the claim that beliefs about growth mindset improve learning achievement. For example, Bahnik and Vranka [2017] found a negative association between growth mindset and scholastic aptitude test scores of university applicants. Similarly, a growth mindset intervention at a university with a diverse student population showed meaningful differences in students' academic success in neither the intervention groups nor the control ones [Brez et al., 2020]. Interestingly, having a growth mindset is not strongly associated with academic performance in East Asian countries. For example, growth mindset and reading performance were found unrelated in Hong Kong and even negatively associated in Beijing, Shanghai, Jiangsu, and Guangdong [OECD, 2019b]. In this regard, Zhao [2020] argues

that growth mindset does not have much to do with high performance of some educational systems and calls for not "rushing to teach growth mindset to every student in every country".

Other scholars [Sisk et al., 2018; Yeager et al., 2019] note that it is important to understand contextual factors in explaining the effects of growth mindset on academic achievement. For example, Corradi et al. [2019] investigated the mediating function of growth mindset between academic achievement and contextual factors, such as minority background and academic validation, drawing on data obtained through a survey conducted at one Belgian university. They suggest that academic achievement depends on "more than whether students are located on the positive or negative side of the mindset spectrum". Chen and Pajares [2010] found that the relationship between growth mindset and science grades of middle school students was mediated by motivational factors, such as task or learning achievement goals. On the other hand, Govorova et al. [2020] note that lower growth mindset and less life satisfaction are related to the fear of failure. In other words, when students do not believe that their learning efforts are source of success, they tend to feel incompetent and untalented when faced with failure.

According to Dweck[4], the idea of growth mindset had been misconceptualised among individuals and within organizations. The first misunderstanding pertains to conceiving growth mindset as being open-minded and flexible. The next misconception is related to understanding growth mindset as rewarding and praising students' efforts instead of focusing on the learning process. Another misconception which prevails among teachers is that instilling growth mindset is all about telling students that they can reach any goals. However, according to Dweck, without creating appropriate learning environment, where students are not judged and receive constant feedback, mere belief in students' ability to fulfil their potential would not be enough.

1.2. Growth Mindset and Socioeconomic Status

The increasing body of research suggests that the socioeconomic background of families influences the development of students' mindsets in systematic ways with consequences for academic outcomes [Destin et al., 2019]. For example, according to PISA 2018, in contrast to socio-economically advantaged students, disadvantaged ones were more likely to believe that their intelligence cannot change much over time [OECD, 2019b]. In a similar line, Claro et al. [2016] analysed the relationship between SES, mindset, and test scores among a national sample of high school students

[4] Dweck C. (2016) What Having a "Growth Mindset" Actually Means. Harvard Business Review: https://hbr.org/2016/01/what-having-a-growth-mindset-actually-means (accessed 20 August 2024).

in Chile. They revealed that students from lower-income families were less likely to hold a growth mindset than their wealthier peers, further noting that "those who did hold a growth mindset were appreciably buffered against the deleterious effects of poverty on achievement". Drawing on data from a nationally representative sample of ninth-grade students in U.S. public schools, Destin et al. [2019] found that the connection between mindset and academic achievement was consistent across students from different socioeconomic backgrounds. They revealed that there were fewer individuals with fixed mindsets among students from higher income families than among those from low-income ones. In another study, Bernardo [2020] demonstrated that a positive association between growth mindset and learning achievement is observed only among higher SES students with a nonsignificant relationship between growth mindset and learning among lower SES students. In contrast, Hwang et al. [2019] found that white students and students from higher socioeconomic backgrounds tend to have fixed mindset about their math abilities more often than non-whites and students from lower socioeconomic backgrounds do. They suggest that other contextual factors might play a critical role in shaping fixed mindsets. Given the heterogenous outcomes demonstrated by various studies, Sisk et al. [2018] examined the effect of mindset interventions on academic achievement and potential moderating factors. Their meta-analysis supports the following tenet of the growth mindset theory: economically disadvantaged students may benefit from growth mindset interventions. Consistent with this claim, Yeager et al. [2019] showed that growth mindset intervention delivered online had positive effects on lower-achieving students' grades and increased their enrolment in advanced mathematics courses in the United States. In a similar line, Johnson et al. [2020] found that impacts of randomized controlled trial interventions on growth mindset targeting 2,097 lower secondary schools in Indonesia were stronger for disadvantaged students.

2. Present study

This study aims to examine the relationship between growth mindset, achievement, and SES by drawing on a nationally representative sample of 15-year-old Kazakhstani students included in the PISA 2018 database. According to PISA 2018 results, more than half (55%) of Kazakhstani students hold a growth mindset which is below the OECD average (63%) [Avvisati et al., 2019]. Notably, these students scored 29 points higher in reading literacy than their peers who have a fixed mindset after accounting for students' and schools' socioeconomic profile. However, the country report does not explain the reasons behind having different mindsets among Kazakhstani students.

In view of the above, this study examines the relationship between SES, growth mindset, and reading achievement drawing on PISA 2018 data for Kazakhstan. To do so, multiple regression analysis was conducted to test the moderator effects. Interpretation of the results of regression analyses which examine a moderator effect is usually based on the following: (a) interpreting the effects of the predictor and moderator variables, (b) testing the significance of the moderator effect, and (c) plotting significant moderator effects [Frazier et al., 2004]. Accordingly, the following research questions will guide the study:

1. How does holding a growth mindset explain variations in reading performance?
2. Is there a significant interaction effect between a growth mindset and students' SES?
3. How does the relationship between holding a growth mindset and reading performance change depending on students' SES?

3. Methods and Data

The data for this study were obtained from the Kazakhstan sample in the OECD PISA 2018 database. In total, 19,507 students, in 616 schools, completed the PISA assessment in Kazakhstan.

3.1. Growth Mindset

This study focuses on the cognitive dimension of PISA wellbeing framework, which is growth mindset. In 2018, PISA asked students whether they agreed with the following statement: "Your intelligence is something about you that you can't change very much". It is a four-point Likert-type question with values ranging from 1 (strongly disagree) to 4 (strongly agree). Students who agreed or strongly agreed with the statements were categorized as having a fixed mindset, while those who disagreed or strongly disagreed with it were categorized as having a growth mindset. The score was reverse coded so that higher values indicate the growth mindset and lower values indicate the fixed one.

3.2. Socioeconomic status

PISA measures students' socioeconomic status (SES) through a composite index of economic, cultural, and social status (ESCS) derived from questions about home possessions, parents' education level and occupation. The index was constructed as the arithmetic mean of these three indicators after their imputation and standardization [Avvisati, 2020]. Its average is 0 and standard deviation is 1 across OECD countries. According to PISA, a socio-economically advantaged student is a student in the top quarter of the ESCS in his or her own country/economy, while a socio-economically disad-

vantaged student is one in the bottom quarter of that index in his or her own country/economy [OECD, 2019b]. The term "SES" is used throughout the paper, which is identical to the ESCS index.

3.3. Covariates

As discussed earlier, the relationship between growth mindset and learning achievement may be accounted for by mediating factors, including motivational ones. In PISA 2018, the students with a growth mindset reported greater motivation to master tasks and self-efficacy, set more ambitious learning goals for themselves [Schleicher, 2019]. According to Bernardo et al. [2015], some motivational factors (the sense of self, facilitating conditions, and achievement goals) were found to be associated with the students' science achievement in the Philippines. Zhen et al. [2022] found that growth mindset intervention significantly improved Chinese students' maths achievement, with intrinsic motivation playing a partial mediating role.

In this study, the index of learning goals (MASTGOAL), which is also part of the PISA 2018 wellbeing framework, is used for the analysis as a covariate. PISA 2018 asked students to report how true ("not at all true of me", "slightly true of me", "moderately true of me", "very true of me", "extremely true of me") the following statements are for them: "My goal is to learn as much as possible"; "My goal is to completely master the material presented in my classes"; "My goal is to understand the content of my classes as thoroughly as possible". These statements were combined to create an index of learning goals, whose average is 0 and standard deviation is 1 across OECD countries. Positive values in this index mean that the respondent has more ambitious learning goals than an average student in OECD countries.

Furthermore, student gender was seen to be an important predictor of academic performance. PISA has consistently found significant gender disparities in achievement, with girls outperforming boys in reading and, to a lesser extent, boys outperforming girls in mathematics [OECD, 2019a]. These covariates are controlled to account for their potential confounding effects on this study.

3.4. Learning achievement

The PISA 2018 survey focused on reading, along with mathematics, science, and global competence as minor areas of assessment. The present study views students' learning achievement in reading as a dependent variable. According to the PISA 2018 Assessment and Analytical Framework [OECD, 2019c], reading literacy is defined as students' capacity to understand, use, evaluate, reflect on, and engage with texts to achieve one's goals, develop one's knowledge and potential, and participate in society. The reason for focusing on rea-

ding achievement can be explained by the fact that success in reading provides a foundation for achievement in other subject areas and for a full participation in adult life [OECD, 2010].

3.5. Analysis

This study draws on multiple regression analysis to test the hypotheses on interaction effects. In terms of software, the International Association for the Evaluation of Educational Achievement (IEA) International Database (IDB) Analyzer was employed, which allows to compute standard errors and statistics considering complex sampling design, replicate weights, and plausible values reported in PISA 2018 database.

The study carefully followed the procedure outlined by Frazier et al [2004]. First, for the purposes of analysis, growth mindset scores, students' SES, gender, and index of learning goals were standardized to a national average so that they had a mean of 0 and a standard deviation of 1. Standardizing a predictor variable has several benefits as it ensures comparability of different measures and makes the effects of the predictor more easily interpretable.

Further, a cross-product term was created for interaction between standardized SES and growth mindset. Then gender, the index of learning goals, students' SES, the variable of growth mindset and interaction term between growth mindset and SES were added to the model. After a significant interaction effect was revealed, two series of additional regression analysis was performed by creating new variables for low and high SES. Further, graphical representations of simple slopes were created.

4. Results

The general descriptive statistics are presented in Tables 1 and 2. In Table 3, Pearson correlations are summarized for ten plausible values of reading based on the IEA IDB Analyzer for SES and Mastery goal orientation variables. The point biserial and polyserial correlations were calculated accordingly for gender and growth mindset using R. As illustrated in Table 2, male students made up 51.4% of the PISA sample of Kazakhstani students while their female counterparts accounted for 48.6%. In general, some 12.2% of Kazakhstani students strongly believe in the innate and unchangeable nature of intellect. In contrast, another 17.9% of students firmly believe that someone's inner capacities are malleable. Furthermore, consistent with prior research, students' growth mindset was correlated with learning achievement (r = 0.25). The positive values indicate that the students who disagreed or strongly disagreed with the statement "Your intelligence is something about you that you can't change very much" demonstrate higher reading achievement. At the same time, the students' SES is positively correlated with reading achievement (r = 0.21).

Table 1. **Descriptive statistics for independent and dependent variables**

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Mastery goal orientation	18183	–3.05	1.30	–0.07	1.01
SES	19451	–5.50	5.23	0.13	1.01
Reading	19507	154	746	404	86.98

Table 2. **Descriptive statistics for independent variables**

Variables	Categories	N	Percent
Gender	Female	9576	48.6
	Male	9931	51.4
Growth mindset (Your intelligence is something about you that you can't change very much.)	Strongly agree	2020	12.2
	Agree	5617	32.8
	Disagree	7152	37.1
	Strongly disagree	3915	17.9

Table 3. **Correlations**

Dependent variable	Gender	Mastery goal orientation	SES	Growth mindset
Reading	0.16	–0.06	0.21	0.25

Table 4 provides a summary of the results of multiple regression analysis. The regression coefficients and their respective standard errors were computed ten times for reading and then averaged using the IEA IDB Analyzer. The results show that growth mindset has significant positive effects on learning achievement in reading, with a standardized coefficient 0.19. It suggests that one standard deviation increase in growth mindset is associated with a 0.19 standard deviation increase in reading score, when all other variables are held constant. Students who believe that their intelligence can change over time score around 15 points more in reading than those who do not think so at the average level of the other variables in the model. The SES measure has a similar effect on students' reading performance. In general, 12% in the reading scores is explained by the model.

With regard to the second research question, the analysis shows that there was a significant interaction effect between growth mindset and SES value. The standardized coefficients associated with the interaction term was $B = 0.03$.

To understand the pattern of this interaction, simple slopes tests were conducted further as they provide additional information not produced within the full interaction term model. To do so, predicted values for learning achievement in reading were computed for two representative groups, who scored 1 standard devia-

Table 4. **Summary of results of multiple regression analysis (average of ten plausible values)**

Variables	$R^2 = 0.12$				
	B	SE	B	SE	*t*-value
Constant	390.66	1.35			
Gender	–13.80	0.79	–0.18*	0.01	–18.46
Mastery goal orientation	–5.46	0.84	–0.07*	0.01	–6.66
SES	14.26	1.13	0.19*	0.01	13.75
Growth Mindset	14.83	0.95	0.19*	0.01	17.16
Interaction of Growth Mindset and SES	2.43	0.84	0.03*	0.01	2.91

Note: *$p < 0.05$.

tion above and below the mean of the moderator variable, which is the SES. Predicted values were obtained for each group by multiplying the respective unstandardized regression coefficients for each variable by 1 (the code for high levels) and –1 (the code for low levels) and adding the constant. For example, to obtain the predicted reading score for students who score 1 standard deviation above the mean on SES, we multiplied the unstandardized coefficient for SES (*B* = 14.26) by 1, multiplied the unstandardized coefficient for growth mindset (B = 14.83) by –1, multiplied the unstandardized coefficient for the interaction term (*B* = 2.43) by the product of the SES and growth mindset codes (in this case, 1*–1 = –1), and added the constant (390.66).

To better understand the relationship between growth mindset and learning outcome at these two values of SES, the significance of slopes for each group was tested. This was maintained by creating two additional variables for high and low SES using IBM SPSS software and thereby conducting two series of additional regression analysis using new variables, growth mindset and their interaction in the IDB Analyzer software. The new variables were created by adding and subtracting 1 from the standardized SES value to represent the higher and lower ends of the scale.

Further analysis demonstrated that there was a significant positive slope for both high and low-SES students (see Table 5). Specifically, the slope of growth mindset for students whose SES were 1 SD above the mean was ß = 12.68, $p < 0.05$. In a similar line, for those whose SES was 1 SD below the mean, the gradient of simple slope was ß = 17,71, $p < 0.05$, which implies that the effect of growth mindset on students' reading proficiency was steeper for low-SES students than that for high-SES students.

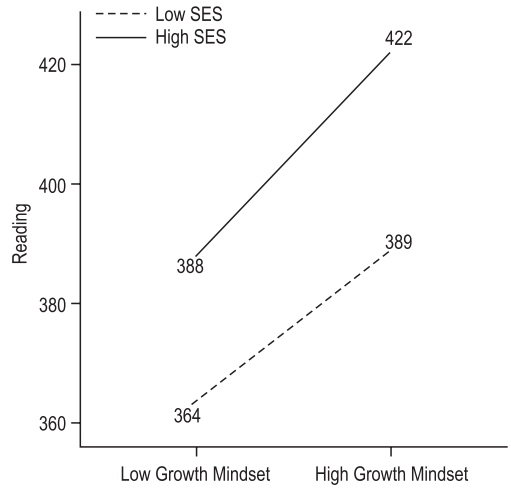
Table 5. **Summary of results of linear regression analysis (average of ten plausible values)**

	High SES			Low SES		
Variables	R^2 = 0.08			R^2 = 0.08		
	β	SE	B	B	SE	B
Constant	374.57	1.56		403.02	2.00	
SES	14.22	1.16	0.18*	14.22	1.16	0.18*
Growth Mindset	12.68	1.35	0.16*	17.71	1.19	0.23*
Interaction of Growth Mindset and SES	2.51	0.87	0.05*	2.51	0.87	0.04*

Note: *p < 0.05.

The interaction effect is more clearly demonstrated in graphic representations. In Figure 1, the performance scores were plotted for high-SES and low-SES students at low (1 SD) and high (1 SD) levels of growth mindset. As illustrated, the two slopes are significantly different (t = 2.80, p < 0.05) from each other, with the gradient representing low-SES students locating at lower levels. Holding growth mindset in combination with high socioeconomic background is associated with the highest test scores.

Fig 1. **Graphic representations of moderating effect of SES on relationship between growth mindset and learning proficiency**



These findings imply that the relationship between growth mindset and learning achievement does not vary depending on students' SES. Thus, having a growth mindset is positively associated with learning achievement in reading for both lower and higher SES students, and this impact is stronger for disadvantaged students.

4.1. Limitations

It should be noted that this study has several limitations. The first limitation is related to the way students' growth mindset is assessed in PISA study, where the measure of growth mindset has ordinal distribution and limited scale points. While fewer scale points are said to be more valid, especially for surveys administered for younger population [OECD, 2019c], according to Gehlbach [2015], limited response options may also preclude one from expressing his or her own opinion. In this regard, several researchers have proposed to provide response options, which uncover the underlying construct instead of the Likert-type agree-disagree response anchors [Gehlbach, 2015]. In addition, PISA uses a sample of large target population. Besides its many advantages, including high statistical reliability, a large sample also bears the p-value problem, which can quickly approach zero. It means that researchers might find the results of no practical significance [Lucas6 Shmueli, 2013].

Secondly, this study supports some earlier research [Bernardo, 2020] calling upon for a nuanced understanding of the relationship between growth mindset and learning achievement in specific educational contexts. In fact, results of this study demonstrate that beliefs about growth mindset account for higher learning achievement among both low and high-SES students supporting the growth mindset theory [Dweck, 2008]. Equally, a lack of growth mindset significantly lowers learning achievement of both advantaged and disadvantaged students. In line with Sisk et al. [2018], this study suggests that future research should focus on other concurrent factors which may mediate the relationship between growth mindset and learning achievement, including psychological factors, school climate, teacher beliefs, and cultural context. For example, Costa and Faria [2018] and Bernardo et al. [2021] found that specific cultural factors may account for variations in the growth mindset effect. This is in line with the recent study on school engagement in Kazakhstan, which found that socio-cultural factors such as influence of peers, teachers and parents as well as kin relationships are equally important as individual elements for student school engagement in a country transiting from a collectivist to individualized mindset [Winter et al., 2020]. In this regard, we can speculate that students' fixed mindset is related to a lower level of social support from peers, teachers, and parents, which should be addressed in the future research.

Third, this study focuses only on the concept of growth mindset within the general PISA 2018 wellbeing framework. PISA 2018 defines three dimensions of well-being, including self, school environment, and out-of-school environment [OECD, 2019c]. The findings of this study are insufficient to draw any conclusions regarding the state of wellbeing of Kazakhstani students. Given the wide range of available data for the country, further research is neces-

sary to make a comprehensive understanding of Kazakhstani students' wellbeing in connection with other concepts identified in PISA. Besides PISA data, further empirical research is necessary, which should address how specific growth mindset interventions might work in the context of Kazakhstan. In this sense, such research may construct a more accurate picture of the state of beliefs about mindsets among Kazakhstani students and its effects on educational outcomes.

5. Discussion

This study attempted to contribute to the body of research exploring the relationship between growth mindset, socioeconomic status and learning achievement drawing on a nationally representative sample of 15 years old Kazakhstani students. By doing so, it aimed to broaden the existing literature bringing previously unexplored context of Kazakhstan into the growth mindset scholarship. In line with prior research [Claro et al., 2016; Destin et al., 2019; Bernardo, 2020], the findings illustrate that beliefs about mindsets explain a small but statistically significant proportion of variations in learning achievement in reading. In this regard, this study supports the growth mindset theory [Dweck, 2008], concluding that different degrees of agreement with the statement "Your intelligence cannot change" can significantly alter educational outcomes of students.

Further, we were particularly interested in understanding to what extent students' socioeconomic status moderates the relationship between their beliefs about growth mindset and learning achievement. In line with the existing body of scholarship [Claro et al., 2016], this study found significant interaction effects between growth mindset and students' SES. It means that holding either growth mindset or fixed mindset in combination with students' socioeconomic status significantly predicts learning achievement in reading.

Consistent with previous research, it was revealed that beliefs about growth mindset account for higher learning achievement among both low and high-SES students. Likewise, beliefs about fixed mindset explain lower learning achievement of both low and high-SES students. In other words, the more students from both low and high SES agree with the statement "Your intelligence cannot change", the lower scores they demonstrate. This corroborates with the study by Destin et al. [2019], who revealed significant and consistent relationship between mindset and academic achievement across students from different socioeconomic backgrounds.

These findings have several implications for educational policy and practice in Kazakhstan. It might seem obvious for policymakers to start with designing universal educational remedies to transform beliefs about mindset of students from various socioeconomic backgrounds. This would imply developing a wide range

of "cost-effective" and "scalable" psychological interventions [Yeager et al., 2019; Yeager and Dweck, 2012] targeting students from both lower and higher socioeconomic backgrounds so that students equally improve learning achievement. However, in the long-term perspective, it means that students from higher SES families would always outperform their peers from socially vulnerable families [Claro et al., 2016]. This observation is critical for national education policy. For the country to solve issues caused by growing social inequality, it needs national programs specifically targeting low-SES students so that they can overcome constraints associated with poverty. In this sense, this study should be treated as a starting point for setting the country's educational agenda on broader issues, such as ensuring students' general wellbeing and social inclusion in the education system. These must be considered while devising strategic educational programs and conceptual documents, teacher professional standards and teaching materials, school curriculum, and similar items. Most importantly, educators and policymakers should not be confined within the "deficit thinking" model, which assumes that students' low academic achievement is due to personal mindsets only, and address achievement gaps by "fixing" the students beliefs rather than fixing the social inequalities [Gorski, 2017]. As discussed earlier, Kazakhstan witnesses wide disparities in the geographic and personal distribution of income. Consequently, low achievement of Kazakhstani students' may be due to root causes of poverty.

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