THE EXCLUSIVENESS OF GROWTH MINDSET:

EXAMINING THE INTERPLAY BETWEEN CULTURAL CAPITAL, ACADEMIC PERFORMANCE, AND GROWTH MINDSET AMONG ADOLESCENTS

by

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ABSTRACT

Data from the 2018 Programme for International Student Assessment (PISA) were analyzed to gain understanding into the role of a growth mindset in the connection between cultural capital and academic performance among Western 15-year-olds (N = 212,027), which is currently lacking within academia. Results from multiple linear regression analyses and a moderated mediation analysis find that (i) cultural capital is a significant predictor of students' academic performance, demonstrated that (ii) it is partially mediated by a growth mindset, and illustrated that (iii) this mediation is strengthened—albeit very little—by teacher practices after controlling for gender, immigrant background, socioeconomic status, age, and grade. These findings contribute to the broader field of educational sociology by offering insights that propose specific directions for future research and contain targeted policy recommendations, both aimed at mitigating educational inequalities in Western countries. Limitations are discussed.

Keywords: academic performance; cultural capital; educational inequalities; growth mindset; teacher practices.

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Introduction

The degree to which egalitarian promises of social mobility and equality of opportunity made during the post-World War II period in Western democracies have been carried out thoroughly in the present is a hotly debated topic within academia.

While some publications suggest that nowadays most people are better off than their parents (OECD, 2017a, 2018), others contend that in this day and age, upward social mobility has stagnated or even declined, particularly in the US and Eastern Europe, which is weakened by surging economic insecurity and increasing wealth inequalities (Breen, 2004; Breen & Müller, 2020). In other words, working-class kids still get working-class jobs (Willis, 1978). Moreover, children from socioeconomically disadvantaged backgrounds still receive the least opportunities (OECD, 2022).

Interestingly, education is the key driver of social mobility and equality of opportunity (Breen, 2004), and hence is scrutinized extensively in this study. To promote social mobility and equality of opportunity, various educational policies are in place, such as free high-quality education for minors and financial support for socioeconomically disadvantaged students concerning tertiary education. Nonetheless, students' academic performance is significantly, consistently, and cross-culturally associated with both their socioeconomic status (White, 1982; Sirin, 2005) and their cultural capital (Jæger, 2011)—i.e., the gathering of cultural assets that people possess, such as knowledge, skills, and other cultural resources that assist individuals in achieving social status and success in society (Bourdieu, 2018a). This particular inequality is worrying because academic achievement is associated with higher income, improved health, and higher quality of life (OECD, 2018).

Yet, fundamental questions remain partially unanswered: What are the underlying mechanisms explaining the link between cultural capital and academic performance? Are there any undiscovered determinants of educational success at play? The Programme for International Student Assessment (PISA), serving as the study's data source, is particularly interested in uncovering critical factors for educational success. In this context, PISA incorporated the psychological concept of a growth mindset in its 2018 assessment (OECD, 2021), which is the belief that a person's intelligence can be developed through effort, effective strategies, and support from others (Dweck, 2006).

Following up on this, the academic literature lacks a comprehensive exploration and explanation of the specific role a growth mindset plays in the dynamic between cultural capital and academic achievement (Yeager & Dweck, 2020). This gap underscores the need for further investigation into whether a growth mindset acts as a mediator in shaping how cultural capital influences students' academic performance. Such investigation sheds light on how psychological beliefs about intelligence development may contribute to the translation of cultural capital into academic success.

Moreover, there has not been significant scholarly focus on the specific role played by teachers in shaping and fostering these mindsets. Teachers, as influential figures in the educational environment, can potentially wield a significant influence on students' attitudes, beliefs, and approaches to learning,

as illuminated by (Scheerens et al., 2013). Accordingly, teacher practices might function as a moderator in the potential relationship between cultural capital and growth mindset.

Therefore, this study focusses on (i) the relationship between cultural capital and academic performance (ii) the mediating role of a so-called growth mindset and (iii) the potential moderating effects of teacher practices on this mediating relationship, by striving to answer the following research question: *To what extent is the relationship between cultural capital and academic performance among 15-year-olds mediated by the demonstration of a growth mindset, and is this mediating relationship moderated by teacher practices?* This question is answered based on four yet to be mentioned hypotheses.

Through a comprehensive approach, this study aims to provide an elaboration on the relationship between cultural capital and academic performance by emphasizing the mediating role of a growth mindset and the moderating role of teacher practices. This holds scientific relevance in academic discourse as the explication of whether Bourdieu's line of thought is illuminated by the psychological concept of growth mindset remains uncertain (Bourdieu, 2018a; Dweck, 2006). Additionally, the specific characteristics of school effectiveness that contribute to this relationship are relatively unknown (Scheerens et al., 2013). Thus, this study is relevant for professionals in education as it contributes to our understanding of the intersection between sociological and psychological frameworks within educational contexts.

In terms of societal relevance, if the aforementioned relationship is mediated significantly by a growth mindset, and subsequently is understood well by practitioners and policymakers, effective social policies can be designed to foster equality of opportunity. Practical implications include the implementation of growth mindset interventions in elementary and secondary schools, particularly aimed at socioeconomically disadvantaged students (Paunesku et al., 2015; Schmidt et al., 2017). This has the potential to reduce educational inequality of opportunity, and in turn, may contribute to the fulfilment of egalitarian promises made many decades ago.

Theoretical Framework

Cultural Capital

Bourdieu's renowned theory of cultural and social reproduction (2018a) aims to explain the connection between an individual's starting and ultimate social class (i.e., social immobility) and does so by theorizing about the impact of cultural capital on academic performance. In particular, the notion of cultural capital, as put forth by Bourdieu (2018a), pertains to a set of cultural traits, including skills, values, attire, habits, possessions, linguistic abilities, qualifications, and so on, which an individual obtains by belonging to a specific social class. These resources assist individuals in achieving social status and achievement in society.

This is related closely to a person's habitus, which can be defined as the comprehensive set of factors and life experiences (e.g., family background and cultural practices) that shape an individual's

tastes and associated behavior patterns. In other words, it denotes the manifestation of cultural capital in a person's physical being. Moreover, distinct social classes bestow individuals with varying levels and forms of cultural capital, which in turn molds their habitus. For instance, people from affluent backgrounds may have more extensive access to high culture, thereby forming their tastes and associated behavior patterns. Conversely, people from lower social classes may have fewer opportunities to engage with high culture, resulting in the development of distinct tastes and distinct behaviors that are associated with those tastes (Bourdieu, 1977).

According to an English study (N = 465), two of Bourdieu's main theoretical claims hold true empirically (Sullivan, 2001). First, children inherit their parents' cultural capital, Namely, cultural capital and linguistic ability are passed down from parents to children within the household, since no school effect has been observed. In addition, cultural capital is more prevalent among higher social classes and higher parental education (Sullivan, 2001).

Lastly, Bourdieu highlights that cultural capital is imparted through the process of socialization and is utilized as a means of excluding individuals belonging to lower social classes (Bourdieu, 2018a).

Cultural Capital and Academic Performance

Moreover, in the 1970s Bourdieu attempted to explain the connection between children's cultural capital and educational outcomes and theorized that culturally privileged parents supply their children with the necessary attitudes, information, abilities, and dispositions to feel at ease and familiar with educational institutions. This ease and familiarity can improve children's academic performance (Xu & Hampden-Thompson, 2012).

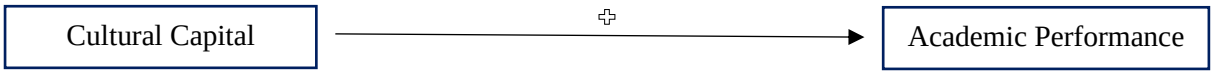
In particular, the use of correct language and a sophisticated accent, which is reserved only for those who possess cultural capital, are often viewed as more intelligent and are subsequently highly valued in educational systems (Bourdieu, 2018b). Others contend that the link between cultural capital and academic performance can be attributed to a preference for high culture in the educational curriculum, which tends to align with the dominant culture (Sullivan, 2008).

Multiple quantitative studies indeed show that children's cultural capital has positive effects on children's educational outcomes, N = 2,906, N = 465, N = 12,686, $N \approx$ 180,000; N = 6,471 respectively (DiMaggio & Mohr, 1985; Sullivan, 2001; Jæger, 2011; Xu & Hampden-Thompson, 2012; Breinholt & Jæger, 2020). However, according to some of these studies, this statistically significant effect is fairly modest (Sullivan, 2001; Jæger, 2011).

Therefore, hypothesis 1 proposes the following: the possession of cultural capital is positively associated with academic performance (see Graph 1).

Graph 1

Hypothesis 1



However, even after accounting for cultural capital, social class still considerably influences academic achievement. Therefore, using cultural reproduction alone to explain the educational attainment gap between social classes is insufficient (Sullivan, 2001), as socioeconomic status (SES) also plays a part. Namely, two meta-analyses covering approximately 250 studies show that a moderate relationship exists between SES and academic performance by reporting mean correlations of .343 and .299 respectively (White, 1982; Sirin, 2005). Hence, SES is used as a control variable.

Furthermore, it is suggested that there may be a stronger correlation between cultural capital and academic performance in countries with higher income levels than in those with lower income levels. This is because wealthier countries typically have more well-established educational systems and cultural norms that place greater priority on academic accomplishments and educational qualifications (Bourdieu & Passeron, 1990). Since all OECD members are considered high-income economies (OECD, 2023a), the scope of this study is, therefore, limited to OECD countries. Lastly, there is no theoretical basis to presume that there is a distinction in correlation between OECD countries.

Cultural Capital and Growth Mindset

Cultural capital can take various forms, including embodied (e.g., skills, language, habits, preferences), objectified (e.g., pictures, books, art, instruments), and institutionalized (e.g., credentials) (Bourdieu, 1986).

Embodied cultural capital allows individuals to define their authentic selves, including various mindsets they possess, which is the result of continuous education from various sources such as community, family, and schooling, throughout one's life (Bourdieu, 1986). In fact, it is suggested that every individual has the potential to break free from the cycle of cultural reproduction by altering their mindset or shifting their self-definition (Dweck, 2006). This brings us to a so-called growth mindset.

A growth mindset is the idea that a person's intelligence and qualities can be developed through practice, effort, effective strategies, and support from others. This is opposed to a fixed mindset, which assumes that intelligence and talents are determined at birth and that these traits—and not practice for example—are responsible for success. Individuals with a growth mindset tend to welcome challenges and use setbacks as opportunities to gain experience and achieve greater success, which creates a love for learning. Conversely, those with a fixed mindset tend to avoid challenges and seek approval (Dweck, 2006).

The link between cultural capital and a growth mindset is twofold. Firstly, the adoption of a particular mindset is, as previously indicated, intrinsically tied to one's self-definition, which is in turn part of embodied cultural capital, thus establishing a profound connection (Bourdieu, 1986). Secondly, exposure to cultural resources both within and outside the home expands individuals' access to high-quality education, mentors, and networks that nurture personal growth and development, which promotes the adoption of a growth mindset (Bourdieu, 1986; Sullivan, 2001; Dweck, 2006).

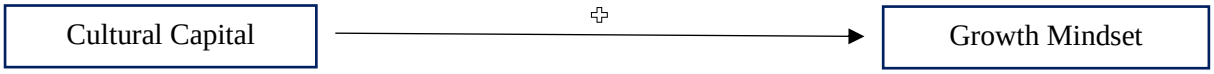
Conversely, individuals with limited cultural capital may not have as many opportunities to develop a growth mindset because they have had fewer growth-related experiences and resources at their disposal. These individuals are, therefore, likely to adopt a fixed mindset (Dweck, 2006).

Neuroscientists support the concept of a growth mindset. Namely, they affirm that the brain undergoes growth akin to other muscles through training. Research indicates that adopted twins typically exhibit greater intelligence than their siblings raised by their biological parents. This distinction seems linked to the higher educational attainment (i.e., institutionalized cultural capital) of adoptive parents, highlighting how the environment we grow up in matters more than our genes (Kendler et al., 2015).

To sum up, both embodied cultural capital its influence on one's self-definition and growth-related cultural resources may lead to the development of a growth mindset, which is supported by the discipline of neuroscience. Therefore, hypothesis 2 proposes the following: the possession of cultural capital is positively associated with a growth mindset (see Graph 2).

Graph 2

Hypothesis 2



Growth Mindset and Academic Performance

Interestingly, students with a growth mindset report greater motivation to master tasks, account for greater self-efficacy, establish learning objectives that are more challenging for their personal growth, attach greater importance and value to the school, are less likely to experience fear of failure, and report academic resilience more often than students with a fixed mindset (Ng, 2018; OECD, 2021). Furthermore, after participating in a six-week growth mindset intervention, 14-year-olds (N = 356) experienced an increase in feelings of control and engagement during science classes. Additionally, their levels of skill and learning remained consistent throughout the intervention period. Students who did not receive the growth mindset intervention displayed decreases in their control, skill levels, engagement, and learning (Schmidt et al., 2017). In another growth mindset intervention experiment, students are told that when they try hard things outside their comfort zone and persist, the neurons in the brain can form stronger connections, ultimately leading to increased intelligence over time. The students who learn this lesson show a big improvement in their math grades (Blackwell et al., 2007).

One possible explanation for these abovementioned associations puts forward that the presence of growth mindsets is closely linked to individuals' adaptive reactions to mistakes (Dweck, 2006). Namely, electrophysiological research—i.e., a subfield of neuropsychology that measures the electrical activity of neurons in the brain—shows that growth-minded individuals' brains are more aware of and pay more attention to their mistakes and demonstrate greater accuracy after making mistakes than their

fixed-minded counterparts (*N* = 25). Correspondingly, growth-minded people view mistakes as opportunities to learn and get better and therefore learn from their mistakes (Moser et al., 2011). This empowers personal growth and development, resulting in various aforementioned positive outcomes (Dweck, 2010a). In contrast, individuals with a fixed mindset interpret mistakes as a lack of competence (Moser et al., 2011). Particularly, having a fixed mindset causes students to perceive challenges as intimidating because they doubt their fixed abilities are sufficient to meet the demands. Additionally, it makes mistakes and failures disheartening because they interpret these setbacks as unfavorable reflections of their fixed intelligence, leading to negative self-evaluations (Dweck, 2008).

For growth-minded people, on the other hand, there is an actual incentive to learn. Namely, one's full potential, whatever it may be, can be achieved through learning. In other words, one is only eager to learn if it bears fruit in the future (Dweck, 2010b). This eagerness to learn relates to both academic expectations and academic performance. Namely, students with a growth mindset are more likely to expect to complete a university degree (Outes-Leon et al., 2020; OECD, 2021), which could translate into a self-fulfilling prophecy (Tauber, 1997), and attain higher academic scores, *N* = 168,203 and *N* = 54,382 respectively (Claro et al., 2016; Outes-Leon et al., 2020).

Specifically, a meta-analysis by Sarrasin et al. (2018) looked at teaching the idea of neuroplasticity—i.e., the brain's ability to change and improve as a result of learning (Kania et al., 2017)—as a way to instill a growth mindset in students. It shows that such interventions have a positive impact on students' motivation, academic performance, and brain activity. Additionally, it also finds that such interventions are particularly advantageous for underprivileged students, particularly in terms of their performance in mathematics, where the effect size is notably large at .78 (Sarrasin et al., 2018). Similarly, among students who are in jeopardy of high school dropout (*N* = 1,594), implementing growth mindset interventions results in greater grade enhancements in essential academic subjects compared to their average and well-performing peers (Paunesku et al., 2015). The adoption of a growth mindset is, therefore, associated with improved academic achievements. Hence, it is advised that teachers and parents celebrate trying. By doing so, students acquire the skill of learning (Dweck, 2006).

In sum, among students the demonstration of a growth mindset equals the understanding that intelligence is malleable and leads to increased school-related motivation, ambition, effort, resilience, control, and engagement, elevated expectations about completing a university degree, and higher academic performance, especially among the underprivileged. It is further suggested that viewing mistakes as opportunities rather than discouragements plays a vital role in these associations.

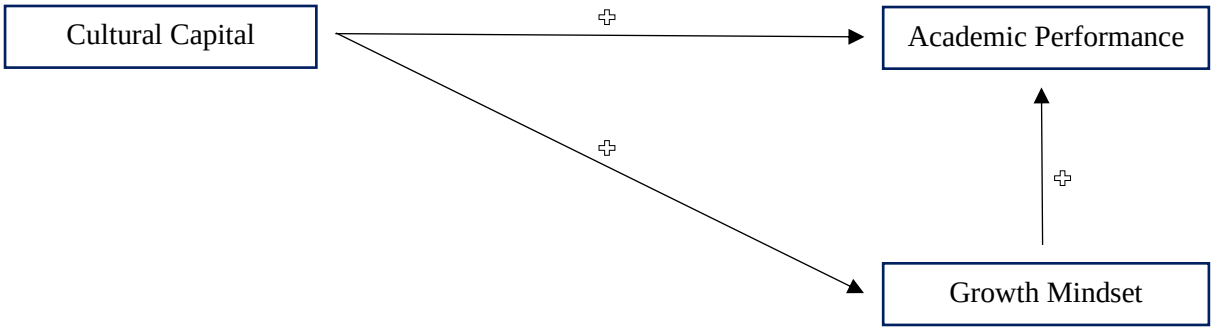
It follows that a growth mindset is hypothesized to mediate the relationship between cultural capital and academic performance, such that individuals with higher levels of cultural capital may be more likely to develop a growth mindset, which in turn may lead to greater academic success. For example, individuals with cultural capital may believe that intelligence and ability can be developed through effort and practice more often than individuals without cultural capital and, consequently, may

be more likely to engage in learning activities, persist in the face of difficulty, and seek out challenges, all of which are associated with improved academic performance (Blackwell et al., 2007).

Therefore, hypothesis 3 proposes the following: the positive relationship between cultural capital and academic performance is positively mediated by a growth mindset (see Graph 3).

Graph 3

Hypothesis 3



Teacher Practices

In addition to examining the relationship between cultural capital, growth mindset, and academic performance, this study proposes that teacher practices play a role too.

In general, teacher practices contribute to students' academic achievements. Namely, an analysis of 155 studies on school effectiveness shows that the influence of teaching time on the performance of primary and secondary school students are relatively modest but significant, with an effect size of .15 (Scheerens et al., 2013). Particularly, the perception of students towards their teachers' fixed or growth mindsets holds significant importance. Namely, students who receive instruction from growth-minded teachers expect to have better psychological well-being, higher academic performance, and greater interest in the course, $N = 172$ (LaCosse et al., 2021). This is confirmed by other studies too (Muenks et al., 2020; Canning et al., 2022). Therefore, it can be inferred that the inclusion of growth-minded teaching behaviors is highly relevant to the present study.

According to Kroeper et al. (2022), students ($N = 186$) have identified three teaching behaviors out of 119 that strongly link to teachers' growth mindset. These behaviors comprise (i) emphasizing the importance of learning, (ii) providing chances for feedback from the teacher, (iii) offering additional assistance to students experiencing difficulties, which align to the indices of (i) teacher support, (ii) teacher feedback, and (iii) adaptive instruction (OECD, 2021). Hence, this study consolidates these three indices into a variable labelled 'teacher practices', which is analyzed in relation to a growth mindset.

Interestingly, a study shows that teacher practices affect students' growth mindset, $N = 2{,}907$ (Kraft, 2017). Furthermore, the demonstration of a students' growth mindset is intrinsically linked to their motivation (Dweck, 2016; Ng, 2018). It follows that the latter is positively influenced by teacher practices. Namely, teacher support, teacher feedback, and adaptive instruction are significant predictors

of student motivation throughout the academic year, N = 144 and N = 100 and N = 40 respectively (Skinner & Belmont, 1993; Zacharias, 2007; Wong & Wong, 2021).

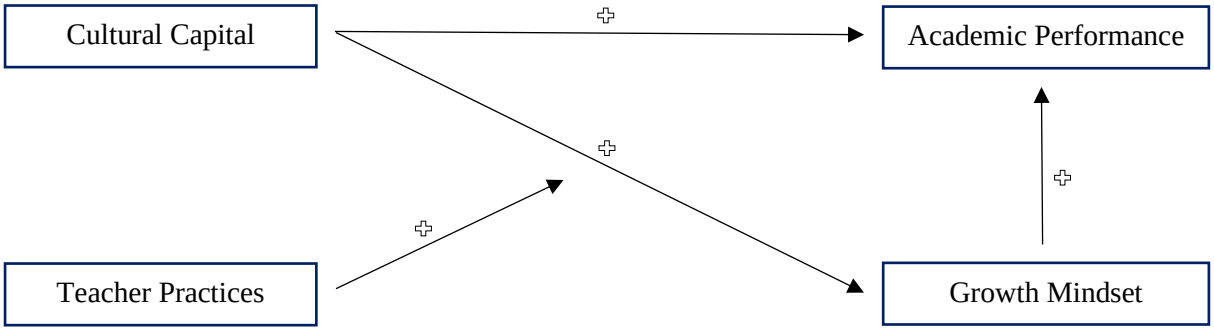
According to Bourdieu's line of thought, however, teachers find it easier to communicate with students who belong to elite social groups, and they tend to provide them with more attention and specialized support. By the same token, teachers perceive these students as more intelligent or talented compared to students who do not possess cultural advantages (Kingston, 2001).

When following Bourdieu's reasoning, teacher practices—including teacher support, teacher feedback, and adaptive instruction—that contribute to students' intrinsic motivation and growth mindset may especially be valuable for culturally privileged students (Kroeper et al., 2022; OECD, 2021). In other words, if teacher practices increase, the positive relationship between cultural capital and growth mindset gets stronger.

Therefore, hypothesis 4 proposes the following: the positive relationship between cultural capital and growth mindset is positively moderated by teacher practices (see Graph 4).

Graph 4

Hypothesis 4



Overall, it is hypothesized that (H1) the positive relationship between cultural capital and academic performance is (H2+H3) positively mediated by a growth mindset, and (H4) the positive relationship between cultural capital and growth mindset is strengthened by teacher practices, such as providing necessary support, feedback, encouragement, and adaptive instruction (Kroeper et al., 2022; OECD, 2021).

Finally, students' age, grade, and gender are important predictors of academic performance, while immigrant background is a principal predictor of cultural capital and therefore function together with SES as control variables (OECD, 2020b).

Research Design

Methodology

This study used a quantitative approach, a correlational research design, and a secondary data analysis to test the aforementioned conceptual model in general and to test the four hypotheses about relationships between multiple variables in particular.

Sample and Data Collection Methods

The sample for this study was drawn from the PISA (Programme for International Student Assessment) 2018 dataset and included 212,027 15-year-old students from 37 countries, since only OECD member countries were analyzed.[1] Accordingly, the population to which it was generalized comprised 15-year-old students from these 37 countries (OECD, 2016). PISA is a global questionnaire conducted by the Organisation for Economic Co-operation and Development (OECD) and assesses the knowledge and skills of adolescent students in reading, mathematics, and science, as well as their ability to apply their knowledge and skills to real-world problems (OECD, 2020a).

Variables

The dependent variable in this study was participants' academic performance of educational achievement. This scale was measured by three weighted factor scores of standardized performance scores of language, mathematics, and science, which ensured the validity and reliability of the measure. OECD's average of these performance scores equaled 500, while its standard deviation was equivalent to 100 (OECD, 2020a). The standardized scores varied between -3.69 and 3.45.

The independent variable in this study was the amount of cultural capital that participants possess. This index was measured by cultural possessions at home, which is a valid way of measuring cultural capital (Sieben & Lechner, 2019). The questionnaire included six item parameters for cultural possessions at home, which assessed the presence of classic literature, artworks, books of poetry, and books on art, music, or design, and the number of books as well as musical instruments that participants had in their home (OECD, 2020a). The standardized scores varied between -2.75 and 2.35.

The mediator in this study was participants' growth mindset. It was measured by one item parameter, namely "your intelligence is something about you that you can't change very much". Students who disagreed or strongly disagreed with this statement were regarded as having a growth mindset. Conversely, students who agreed or strongly agreed with this assertion were perceived as having a fixed mindset (OECD, 2020a). The unstandardized scores varied between .00 and 3.00. Moreover, although being exceeded by multi-item parameters in terms of predictive validity (Diamantopoulos et al., 2012), past studies confirmed the validity of using single-item parameters (Gardner et al., 1998; Bergkvist & Rossiter, 2007), such as the single-item life satisfaction scale (Cheung & Lucas, 2014). However, the justification for using a single-item measure from studies on

[1] For a list of participating countries in this study, see Appendix A.

life satisfaction may not fully transfer to the domain of mindset beliefs. Moreover, the single-item growth mindset parameter's focus on intelligence alone may oversimplify the multifaceted nature of the construct, which typically includes beliefs about the malleability of various abilities and skills (Dweck, 2006). This conceptual narrowness raises concerns about the measure's ability to capture the broadness and depth of the growth mindset construct adequately, which is a limitation of this study.

The moderator involved teacher practices. This index comprised three dimensions; teacher support; teacher feedback, and adaptive instruction (OECD, 2020a). Every dimension contained its own item parameters, which can be found in Appendix B. Teacher practices consisted of ten indicators, which secured validity. The unstandardized scores varied between .00 and 3.00.

Socioeconomic status (SES), in PISA known as economic, social, and cultural status (ESCS), was one of the control variables in this study. In PISA, ESCS was computed by attributing equal weight to the three standardized components of ESCS, namely parents' highest level of education, parents' highest occupational status, and (both cultural and non-cultural) household possessions. In this study, however, cultural household possessions were not part of SES, to prevent that indicators of cultural capital and SES overlapped (OECD, 2020a). The other control variables consisted of gender, immigrant background, age, and grade (see Appendix B). Dummy variables were created to represent gender and immigrant background, while age was treated as a ratio variable and grade was considered an index.

Lastly, PISA has been conducted seven times in total, meaning that certain variables and scales have been used repeatedly. This produced consistent results over time and across different populations, which assures reliability.

Data Analysis Methods

The data analysis for this study included multiple linear regression analyses using SPSS to test hypotheses 1 and 2. By way of explanation, since the control variables were independent variables too it was multiple. Moreover, to examine hypotheses 3 and 4, a moderated mediation analysis was conducted by making use of model 4 and 7 of the Process macro in SPSS (Hayes, 2017). These analyses, which all included bootstrapping[2], determined whether (i) there was a significant indirect effect of the independent variable on the dependent variable through the mediator, and (ii) whether the relationship between the independent variable and the mediator was moderated by the moderator (Hayes, 2017).

In addition, five control variables were analyzed. In particular, the relationship between the mediator and the control variables was scrutinized. This enabled the isolation of core variables, which helped to produce more accurate outcomes by diminishing the chance of false or deceptive correlations (Field, 2013).

Furthermore, the analysis involved a comparison of outcomes across the 37 participating countries. To account for variations between these countries, country dummy variables were employed

[2] The bootstrap method has been used to construct accurate confidence intervals of the observed effects (Efron & Tibshirani, 1993).

as covariates in the SPSS Process macro. This approach aimed to incorporate the country-level grouping into the overall analysis. Country dummy variables are binary indicators that represent the different countries within the dataset. Their inclusion as predictors in the analysis enabled the exploration of how relationships between variables differ across various OECD countries.

Ethics and Privacy Implications

As a researcher, I am dedicated to adhering to the highest ethical standards and safeguarding the privacy and rights of my research subjects. First, participants in this study were informed about voluntary participation, were given the opportunity to decline participation in the study at any time and were provided with an informed consent form which included the purpose of the study. Therefore, there is no question of misleading in any way. In addition, all data collected from participants in this study was completely anonymized by the OECD (2017b). Moreover, the data was only used for the purposes of research and was not kept longer than necessary (Bryman, 2016).

Results

Descriptive Statistics

Table 1 presents the descriptive statistics for the variables included in the analysis. The sample consisted of 212,027 participants, with an approximately equal gender distribution (51.2% female, 48.8% male). The mean age of the participants was 15.8 years (SD = 0.3). Approximately 67.2% of the sample was 15 years old, while 32.8% of the sample was 16 years old. Moreover, 77.0% of the participants were enrolled in 10th grade, 14.8% belonged to 7th, 8th, or 9th grade, and 8.2% represented students in 11th, 12th, or 13th grade. Among the participants, 88.6% were of native origin, while 11.4% possessed an immigrant background.

Table 1

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Academic Performance	212,027	-3.69	3.45	.0647	.9731
Cultural Capital	212,027	-2.75	2.35	.0309	1.0007
Growth Mindset	212,027	.00	3.00	1.7610	.8971
Teacher Practices	212,027	.00	3.00	1.6421	.6774
Gender (=Female)	212,027	.00	1.00	.5051	.4999
Immigrant Background	212,027	.00	1.00	.1317	.3382
SES	212,027	-6.95	49.21	21.4399	8.6588
Age	212,027	15.08	16.33	15.7954	.2898
Grade	212,027	-3.00	3.00	-.0922	.5333
Valid N (listwise)	212,027				

Countries with the highest ratios of culturally privileged children were Iceland, New Zealand, Australia, and Ireland. On the contrary, the lowest amounts of aggregate cultural capital were observed in Turkey, Mexico, France, and Colombia.

Moreover, the best performing OECD countries in terms of academic performance were Estonia, Japan, Korea, Canada, and Finland. The lowest-performing OECD countries in terms of academic performance were Colombia, Mexico, Chile, Greece, and Turkey.

Regarding the statement, "your intelligence is something about you that you can't change very much," 62.8% of the participants expressed disagreement or strong disagreement, indicating a belief in a growth mindset. On the other hand, 37.2% were regarded as having a fixed mindset. Moreover, in Austria, Denmark, Estonia, Germany, Iceland, Ireland, Latvia, Lithuania, and the United Kingdom, the belief in a growth mindset was particularly strong.

Lastly, the best performing OECD countries in terms of teacher practices were New Zealand, United Kingdom, Australia, and Chile.

Assumptions

For robust regression, mediation, and moderation analyses, seven crucial assumptions were considered. Firstly, the reliability of scales/indexes, including cultural capital, academic performance, teacher practices, and SES, was confirmed with Cronbach's Alpha coefficients ranging from .70 to .96, denoting acceptable to excellent internal consistency (OECD, 2020b). Moreover, academic performance, teacher practices, and SES were transformed into principal component scores, revealing high coherence within these linear components through factor analyses (see Table C1 and C2 in Appendix C). The absence of multiple components in each scale/index further emphasized their reliability (Field, 2013).

Additionally, confirming a linear relationship between the dependent and independent variables was achieved through a scatterplot depicting cultural capital on the x-axis and academic performance on the y-axis (see Graph C1).

The third assumption was about multicollinearity and referred to the situation where the independent variables correlated strongly with each other. This involved evaluating tolerance values (> 0.2) and VIF values (< 5), which were met by all independent variables, including cultural capital, growth mindset, teacher practices, and control variables (see Table C3). Weak to moderate interrelations between variables reaffirmed this (see Table C4).

Another assumption was that residuals were independent of the predicted values, meaning that residuals did not correlate with the independent variable. The scatterplots showed that the residuals and the predicted values were uncorrelated, indicating that the model worked equally well for respondents with low cultural capital as it did for respondents with high cultural capital (see Graph C2 and C3).

Homoscedasticity, ensuring uniform variance of residuals for different predicted values, was demonstrated by proportional residual plots (see Graph C4 and C5). The cloud around 0 on both axes indicated proportionality, ruling out heteroscedasticity.

In addition, normal distribution of residuals was confirmed through P-P Plots (see Graph C6 and C7), histograms, and analysis of skewness and kurtosis values for each non-binary variable. Only the age variable reported abnormal kurtosis, signifying potential outliers (see Table C3). Meeting the Central Limit Theorem's criterion for normality with a sample size over 30 observations too, the study fulfilled the assumption of normality (Field, 2013).

Lastly, Cook's values confirmed the absence of influential cases, satisfying the last assumption and ensuring the fulfillment of all necessary conditions.

Hypothesis 1

The first multiple linear regression aimed to examine the relationship between cultural capital (predictor variable) and academic performance (dependent variable), while controlling for gender, immigrant background, SES, age, and grade. The analysis was conducted in two models: model 1 included only cultural capital, while model 2 incorporated both cultural capital and the control variables (see Table 2). This approach allowed for studying the effects independently.

Table 2

Regression Analysis: The Effect of Cultural Capital on Academic Performance

	Model 1			Model 2		
	b	SE	Beta	b	SE	Beta
Constant	0.056 ***	(.002)		-0.228 *	(.097)	
Cultural Capital	0.276 ***	(.002)	0.285	0.157 ***	(.002)	0.162
Gender (=Female)				-0.013 ***	(.003)	-0.007
Immigrant Background				-0.100 ***	(.005)	-0.035
SES				.279 ***	(.000)	0.264
Age				-0.023 ***	(.006)	-0.007
Grade				0.400 ***	(.003)	0.219
R^2		.081			.208	
N		212,027			212,027	

Note. *p < .05. **p < .01. ***p < .001.

The results indicated that overall model 1 and model 2 were significant, as evident from the high F-values and low p-values: F(1.212025) = 21753.45, p < .001, and F(6.212020) = 11880.20, p < .001, respectively.

After controlling for gender, immigrant background, SES, age, and grade, cultural capital was found to be positively correlated with academic performance, t(212020) = 93.86, p < .001, with an unstandardized regression coefficient (b) of 0.157 (see Table 2). This suggested that a 1-point increase in cultural capital (on a 6-point scale) is corresponding to a 0.157-point increase in academic

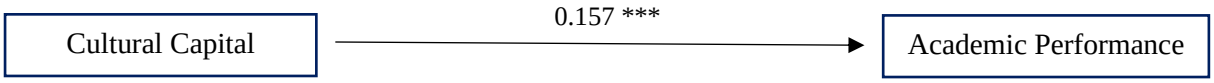
performance (on an 8-point scale). Additionally, the 95% confidence interval (CI) of the b coefficient was relatively narrow, ranging from 0.148 to 0.166.

Moreover, model 2 exhibited an R-squared value of .209 (see Table 2), indicating that cultural capital and the control variables collectively explained 20.9% of the variance in academic performance. Model 2 outperformed model 1, which explained only 8.1% of the variance (R^2 = .081).
Additionally, the correlations between the variables were found to be significant (see Table C4).

Thus, these findings align with hypothesis 1, which posits that cultural capital is a significant predictor of academic performance (β = 0.162, p < .001, b = 0.157). In particular, after controlling for all the control variables, for every 1-unit increase in cultural capital a 0.17-unit increase in academic performance was reported (see Graph 5).

Graph 5

Hypothesis 1



Note. *p < .05. **p < .01. ***p < .001. The coefficient is unstandardized.

Furthermore, when comparing the relative importance of the variables, the results indicated that the control variable SES exerted a stronger effect on academic performance (β = 0.264, p < 0.001) compared to the predictor variable cultural capital (β = 0.162, p < 0.05). In other words, although cultural capital is playing a role in predicting students' academic performance, SES had greater influence on students' academic performance levels. Moreover, the control variable grade too had a larger effect on academic performance (β = 0.219, p < 0.001) compared to cultural capital (β = 0.162, p < 0.001).

Hypothesis 2

The second multiple linear regression performed related to the effect that cultural capital had on the demonstration of a growth mindset. In this analysis five control variables were also included. Model 1 contained only cultural capital and model 2 consisted of cultural capital and the control variables (see Table 3).

Table 3

Regression Analysis: The Effect of Cultural Capital on Growth Mindset

	Model 1			Model 2		
	b	SE	Beta	b	SE	Beta
Constant	1.760 ***	(.002)		1.362 ***	(.109)	
Cultural Capital	0.085 ***	(.002)	0.094	0.066 ***	(.002)	0.073
Gender (=Female)				0.030 ***	(.004)	0.017
Immigrant Background				0.069 ***	(.006)	0.024
SES				0.047 ***	(.002)	0.048
Age				0.023 ***	(.007)	0.008
Grade				0.045 ***	(.004)	0.027
R^2		.011			.019	
N		212,027			212,027	

Note. *p < .05. **p < .01. ***p < .001.

The analysis showed that model 1 was overall significant, F(1.212025) = 1894.12, p < .001. Model 2 also appeared to be significant overall, F(6.212020) = 452.84, p < .001.

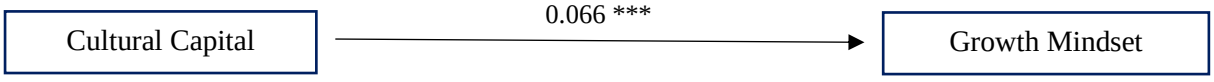
After taking into account gender, immigrant background, SES, age, and grade, a positive correlation between cultural capital and growth mindset was observed, t(212020) = 31.05, p < .001, with an unstandardized regression coefficient (b) of 0.066 (see Table 3). This implied that for every one-point increase in growth mindset (on a 4-point scale), there was a corresponding increase of 0.066 points in academic performance (on an 8-point scale). In addition, the 95% confidence interval of b was rather narrow [0.046; 0.086].

In addition, the R Squared of model 2 was .019 (see Table 3). This illustrated that 1.9% of the variance in growth mindset could be explained with cultural capital and the control variables. This was more than model 1 explained (R^2 = .011). Thus, both models explain very little of the variance in growth mindset. Finally, the correlations between the variables were also significant (see Table C4).

The findings suggest that it is reasonable to accept hypothesis 2. Thus, the results of the study indicate that cultural capital is a significant, albeit a weak, predictor of growth mindset (β = .073, p < .001, b = 0.066). Particularly, after controlling for all the control variables, for every 1-unit increase in cultural capital a 0.066-unit increase in growth mindset was reported. Moreover, when examining the relative importance of the variables, the findings revealed that cultural capital exerted a stronger impact on growth mindset in comparison to all the control variables (see Graph 6).

Graph 6

Hypothesis 2



Note. *p < .05. **p < .01. ***p < .001. The coefficient is unstandardized.

Hypothesis 3

Based on the previous analysis, it became evident that cultural capital is positively related to academic performance. The third hypothesis included the mediating effect of a growth mindset that may play a role in this. This is tested using the PROCESS macro model number 4 (Hayes, 2017).

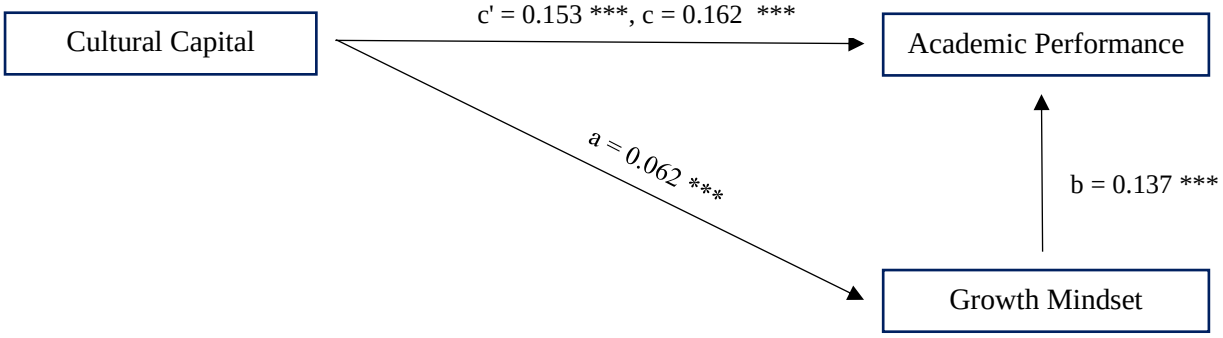
To be able to safely assume that there was a mediation effect, five conditions had to be met (Hayes, 2017). First, X (cultural capital) had to be a significant predictor of Y (academic performance). Results demonstrated this relationship, b = .153, t(212020) = 75.90, p < .001. In addition, X (cultural capital) had to be a significant predictor of M (growth mindset), which was indeed the case, b = 0.066, t(212020) = 31.05, p < .001. Third, M (growth mindset) had to be a significant predictor of Y (academic performance), which the analysis confirmed, b = 0.137, t(212020) = 66.40, p < .001. It was also stated that the predictive value of X on Y had to decrease if the mediator was added to its regression model, and this was observed (b = 0.153 < 0.162). The last condition included the necessity for a significant indirect effect of M on the relationship between X and Y. This was confirmed by the analysis since the regression coefficient (b) was 0.009 (p < .001), and the 95% confidence interval was situated between 0.008 and 0.010. The indirect effect was therefore significant (Hayes, 2017).

It is worth noting that approximately 94% of the effect that cultural capital exerted on academic performance operated directly, and 6% of the effect was mediated through the demonstration of a growth mindset. Therefore, it was a partial mediation with a small effect size.

Given that all five conditions necessary for mediation were met, it was concluded that there was indeed a mediation effect. Consequently, hypothesis 3 can be accepted based on these findings (see Graph 7). Therefore, it can be assumed that the effect that cultural capital had on academic performance is mediated by the demonstration of a growth mindset (b = 0.009, p < .001).

Graph 7

Hypothesis 3



Note. *p < .05. **p < .01. ***p < .001. R^2 (path a) = .013, R^2 (path b + c'): .224. The coefficients are unstandardized.

Hypothesis 4

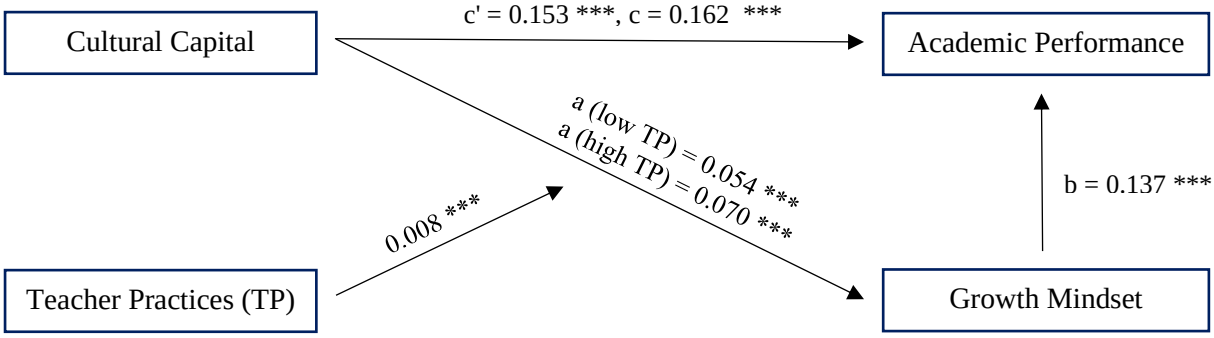
The proposed moderated mediation model was examined using the PROCESS macro model number 7 (Hayes, 2017). This model specifically tests the scenario where teacher practices moderate the impact of path a in the mediation process.

First, relationships between X (cultural capital) and Y (academic performance), X and M (growth mindset), and M and Y have already been reported (see Graph 7). Moreover, teacher practices were found to moderate the effect of path a, b = 0.008, t(212019) = 4.16, p < .001. Additionally, the overall moderated mediation model was supported with the index of moderated mediation = 0.001 (95% CI = 0.001; 0.002). The exclusion of zero from the confidence interval suggested a significant moderating effect of teacher practices on the effect that cultural capital had on growth mindset (Hayes, 2017).

The conditional indirect effect was strongest among individuals with high teacher practices (1 SD above the mean of teacher practices), with an effect size of 0.010 (SE < 0.001, 95% CI = 0.009; 0.010), and was weakest among those with low teacher practices (1 SD below the mean of teacher practices), with an effect size of 0.007 (SE < 0.001, 95% CI = 0.006; 0.008). In other words, when examining the effects on path a based on varying levels of teacher practices, a less robust (yet still significant) association between cultural capital and growth mindset was observed for individuals with low teacher practices (b = 0.053, t = 18.12, p < .001), in comparison to those with high teacher practices (b = 0.070, t = 23.62, p < .001), which is visualized in Graph 8 and 9. It is worth noting that a 1 SD change in teacher practices altered the effect size of path a by 13%, which is considered to be a moderation with a small effect size.

Graph 8

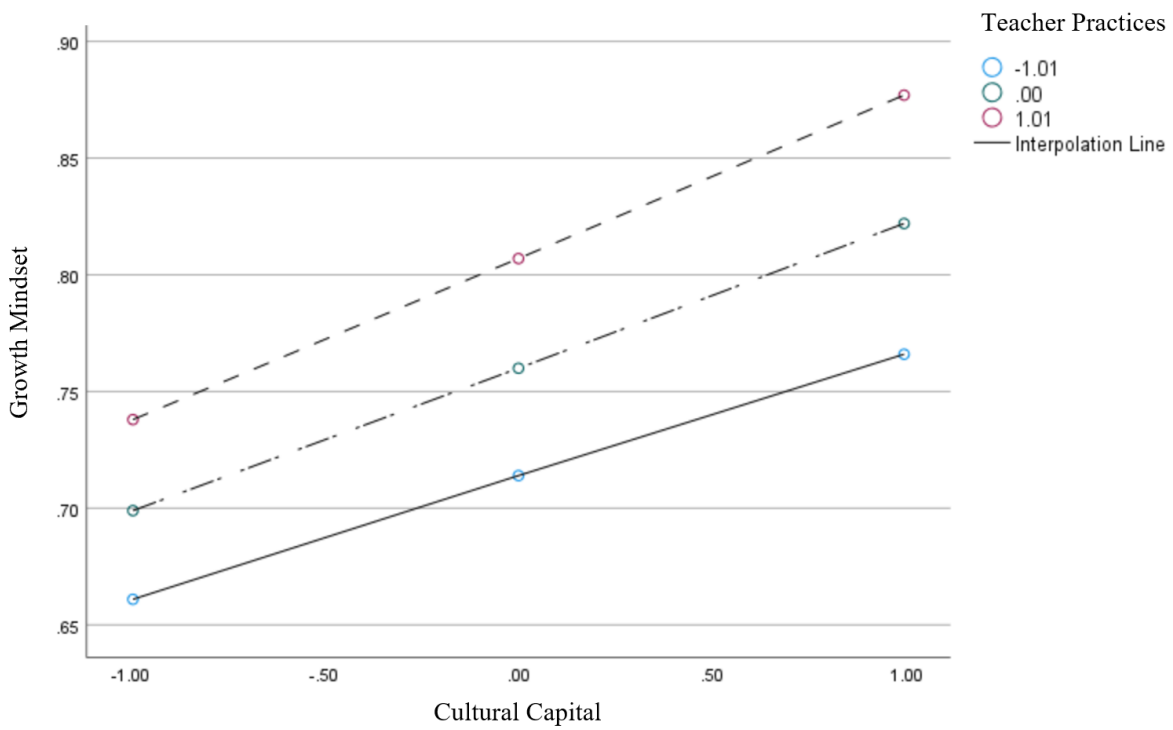
Hypothesis 4



Note. *p < .05. **p < .01. ***p < .001. Conditional indirect effects of cultural capital on academic performance via growth mindset, at high (+1 SD) and low (-1 SD) teacher practices. R^2 (path a) = .016, R^2 (path b + c') = .225, R^2-chng = .001. The coefficients are unstandardized.

Graph 9

The Conditional Effect of Cultural Capital on Growth Mindset



Based on the findings, it can be deduced that hypothesis 4 is supported. The study results demonstrate that the relationship between cultural capital and growth mindset is strengthened by teacher practices ($b = 0.008$, $p < .001$).

Moreover, the results of the moderated mediation analysis using Model 7 in the Process macro in SPSS revealed no significant inter-country differences. Namely, analyzing the country dummy variables did not yield any substantial variations across countries. Furthermore, within each OECD country, the results were found to be significant. This suggested that the effects, as shown in Graph 8, were consistently present within each country, regardless of their overall differences. Thus, these findings implied that the moderated mediation held true within the context of individual OECD countries and did not differ substantially across these countries.[3]

Discussion

Interpretations and Implications

The findings of this study offer valuable understanding regarding the intricate relationship between cultural capital, academic performance, growth mindset, and teacher practices. Nevertheless, it is important to approach the results with care because of the constraints present in the current research. This section first presents interpretations and implications of the results, along with a reflection of the

[3] For the full SPSS syntax used in this study, see Appendix D.

research methodology, considering its limitations complemented with various directions for future research. The section concludes by suggesting specific policies for policymakers and practitioners.

By adopting a comprehensive approach, the aim of this study was to provide insight into a particular psychological process, namely a growth mindset, involved in the relationship between cultural capital and academic performance, which is currently lacking within academia. Therefore, the focus of this study was: (i) confirming the connection between cultural capital and academic performance, (ii) exploring the mediating influence of a growth mindset, and (iii) exploring the moderating effects of teacher practices on this mediating relationship. In brief, the findings of this study affirm the aforementioned propositions. Namely, this study finds that (i) cultural capital is a significant predictor of students' academic performance, demonstrate that (ii) it is partially mediated by a growth mindset, and illustrate that (iii) this mediation is strengthened—albeit very little—by teacher practices after controlling for gender, immigrant background, SES, age, and grade.

In particular, cultural capital is found to be a significant predictor of academic performance, with a positive, moderate relationship between the two variables. This is in line with many previous studies (DiMaggio & Mohr, 1985; Sullivan, 2001; Jæger, 2011; Xu & Hampden-Thompson, 2012; Breinholt & Jæger, 2020). These results harmonize with the claims of Bourdieu (2018b) that parents from culturally privileged backgrounds equip their children with the essential attitudes, knowledge, skills, and dispositions (e.g., a sophisticated accent) that make them feel comfortable and acquainted with educational institutions. These attributes are highly valued within educational systems and positively impact children's academic accomplishments (Xu & Hampden-Thompson, 2012).

Moreover, cultural capital is found to be a significant predictor of growth mindset too. The relationship between these variables is positive and weak to moderate in magnitude. By way of explanation, when children have exposure to cultural resources, such as high-quality education, mentors, and networks, it enhances their personal growth. As a result, children from culturally privileged backgrounds are more likely to define themselves in a growth-oriented manner compared to those from culturally underprivileged backgrounds. This distinction in self-definition, which is part of one's embodied cultural capital, plays a significant role in the development of a growth mindset (Bourdieu, 1986; Sullivan, 2001; Dweck, 2006). Therefore, it is unsurprising that the findings suggest that cultural capital's influence on the development of a growth mindset seems to be substantial.

Furthermore, the study indicates that the relationship between cultural capital and academic performance is partially mediated by the demonstration of a growth mindset, such that culturally favored students may be more likely to develop a growth mindset than those from culturally deprived backgrounds, which in turn may lead to greater academic accomplishments. This is line with findings indicating that the belief that intelligence is malleable results in enhanced motivation, self-efficacy, ambition, effort, academic resilience, prioritization of education, and engagement in relation to academic goals and accomplishments, and reduced fear of failure (Ng, 2018; OECD, 2021). This is

explained by neuropsychologists Moser et al. (2011); namely, crucial in facilitating these connections is the perception of mistakes as opportunities for growth rather than setbacks.

Fourth and finally, the findings reveal that teacher practices strengthen—albeit very little—the relationship between the possession of cultural capital and the manifestation of a growth mindset. This is due to a combination of a positive teacher bias towards culturally privileged students (Kingston, 2001) and positive, growth-related effects of good teacher practices Kroeper et al., 2022). Constructive teacher feedback, for example, may help students to understand that academic improvement is possible through, among other things, learning from mistakes (Dweck, 2016; Kraft, 2017). However, the moderating effect of teacher practices observed in the study is very small, yet significant due to the large sample size. Considering this, it is important to approach practical recommendations regarding teacher practices with modesty.

The findings of this study carry significant implications for both the academic community and educational practitioners. Firstly, the confirmed positive link between cultural capital and academic performance emphasizes the enduring impact of socio-cultural factors on educational outcomes. This underscores the need for educational policymakers to address disparities arising from diverse cultural backgrounds for equitable opportunities. One effective approach is the adoption of culturally responsive teaching, which integrates students' cultural backgrounds, experiences, and perspectives into both the curriculum and instructional methods (Gay, 2018).

Additionally, the identified role of a growth mindset as a mediator in this relationship suggests the potential for interventions aimed at mindset development to narrow achievement gaps, especially for students from culturally disadvantaged backgrounds. Initiatives focused on instilling a belief in the malleability of intelligence, emphasizing effort, and reframing mistakes as opportunities for growth could prove instrumental in narrowing achievement gaps (Dweck, 2010b; Dommett et al., 2013; Sarrasin et al., 2018).

Moreover, the subtle yet significant role of teacher practices in moderating the relationship between cultural capital and a growth mindset highlights the influence of educators. Recognizing this impact suggests a need to increase teacher education (Scheerens & Blömeke, 2016), refine teaching methods, and encourage the creation of an environment that promotes a growth-oriented perspective (Kroeper et al., 2022). However, the modest impact of teacher practices also urges caution, emphasizing the need for practitioners to acknowledge the limitations of teacher practices alone in mitigating broader socio-cultural influences.

Limitations and Future Research

While the findings of this study provide valuable insights, it is essential to acknowledge its limitations. First, the mediator variable, growth mindset, was measured using a single-item parameter, which may not completely capture the intricate and multifaceted nature of the concept. Although past studies have confirmed the validity of using single-item parameters (Gardner et al., 1998; Bergkvist &

Rossiter, 2007; Cheung & Lucas, 2014), this is still up to debate. Namely, it is argued that Bergkvist and Rossiter's (2007) study must be approached with prudence because the authors applied an inappropriate testing procedure (Sarstedt & Wilczynski, 2009). Moreover, the same researchers demonstrated that multi-item measures outperform single items to a significant degree regarding reliability and criterion validity (Sarstedt & Wilczynski, 2009). Future studies should employ a validated multi-item growth mindset scale, which would enhance the study's ability to accurately assess participants' beliefs and strengthen the investigation into the role of growth mindset as a mediator.

Additionally, the cross-sectional design of the study limited the ability to make causal claims about the relationships observed. Longitudinal studies would be beneficial in determining the temporal order (X precedes Y) and thus causality (X affects Y).

Existing literature suggests that a growth mindset and/or a growth mindset intervention tend to be particularly beneficial for underprivileged students (Paunesku et al., 2015; Sarrasin et al., 2018). However, it is important to note that this study did not confirm this finding, representing a limitation of the current research.

Underprivileged students often face cumulative disadvantages, a phenomenon in education where certain individuals or groups experience a compounding series of disadvantages over time, resulting in persistent disparities in educational outcomes. This encompasses early disadvantages such as low SES, limited cultural capital, restricted access to quality preschool education, inadequate healthcare, or discrimination. For instance, a child starting school with limited exposure to educational resources may encounter challenges in developing foundational skills, leading to difficulties in subsequent grades (Bauman et al., 2006).

Additionally, cumulative disadvantage can influence the development of a growth mindset, potentially fostering learned helplessness or a fixed belief that success is beyond one's control. To address this, growth mindset interventions provide a positive and empowering framework that has the potential to break the cycle of disadvantage. These interventions may help students in envisioning a future where they can overcome barriers and achieve their goals. (Dweck, 2006; Bauman et al., 2006). Consequently, future research should delve into the specific impact of growth mindset interventions on underprivileged students (King & Trinidad, 2021; Shope, 2022).

The study results did not provide insight into the specific teacher practices that positively impact the development of a growth mindset. Namely, the research did not identify which component of teacher practices—whether it be teacher support, teacher feedback, or adaptive instruction—held the greatest influence on growth mindset. This lack of distinction is recognized as a methodological constraint in the study and should be researched thoroughly in future studies.

Furthermore, the influence of a renowned teacher practice—a so-called process praise—on the development of a growth mindset remains unclear. According to Haimovitz and Dweck (2017), praising a child's intelligence or competence when they succeed may suggest to them that these traits are fixed, which fosters a fixed mindset. Yet, when faced with challenges or setbacks and maintaining the belief

that their ability is unchangeable, they might perceive it as limited and feel unable to make progress. On the other hand, praising the process that has led to success, such as hard work or tactics, is thought to convey that intelligence and competencies can be developed, which fosters a growth mindset. Emphasizing the process also offers a guide for improvement when tasks become difficult (Haimovitz & Dweck, 2017).

Recent research on the home environment reveals a connection between parents' consistent use of person or process praise and their children's future mindsets (Gunderson et al., 2013; Pomerantz & Kempner, 2013). In one study, parents' use of process praise when their children were 1–3 years old predicted the children's growth mindset and willingness to face challenges five years later (Gunderson et al., 2013). Another study focused on 8- to 10-year-olds showed that mothers' frequent use of person praise predicted their children's fixed mindset six months later, even after considering their initial mindset (Pomerantz & Kempner, 2013).

Thus, these studies show that linking the process (e.g., effort or tactics) to a result (e.g., learning or achievement) can encourage the development of a growth mindset (Haimovitz & Dweck, 2017). This particular teacher practice to foster a growth mindset has not been scrutinized in this study, which is considered to be a limitation. Future research should aim to (i) validate the connection between process praise, whether from teachers or parents, and children's growth mindsets, and (ii) explore the correlation between parents' cultural capital and the nature of their process praise toward their children.

Recommendations

Building upon both the findings of this study and the aforementioned proven efficacy of growth mindset interventions (Sarrasin et al., 2018), it is presumed that children have the right to be in environments that facilitate growth, and it is recommended that educational policymakers consider developing and implementing three-session growth mindset interventions in secondary schools in OECD countries. By fostering a growth mindset culture in schools, educators can empower students, irrespective of their economic or cultural capital, to embrace challenges, persist through setbacks, and develop a love for learning. As such, implementing growth mindset interventions at a systemic level can lead to more equitable educational outcomes (Dweck, 2010b). These interventions are replicable, meaningful, and based on solid theoretical foundations (Yeager & Dweck, 2020).

Particularly, in multiple experimental studies three-session growth mindset interventions have been employed at secondary schools, predominantly in 9th grade, which in most cases comprised a single 45-minute online, self-administered session (Aronson et al., 2002; Good et al., 2003; Blackwell et al., 2007; Paunesku et al., 2015; Brougham & Kashubeck-West, 2017). By way of explanation, students (i) were exposed to neuroscientific information about the brain's ability to grow, (ii) were asked to summarize this information, and (iii) were presented with a scenario involving a fictional student who was discouraged and started to develop self-doubt regarding their academic abilities and were then tasked with providing advice to this student based on the information they had just taken in.

In the control groups, students were given three similar tasks to complete. However, these materials centered around functional localization in the brain, rather than brain plasticity. As a result, they did not contain the crucial message that intelligence can be developed (Paunesku et al., 2015). Moreover, these interventions have proved to be effective (Yeager et al., 2019).

To sum up, due to its effectiveness, feasibility, and scalability in terms of addressing academic underachievement, three-session growth mindset interventions in secondary schools are advised (Paunesku et al., 2015; Yeager et al., 2019). At the same time, it is crucial to evaluate the effectiveness of these interventions and refine them based on feedback and evidence from further research.

Moreover, the efficacy and scalability of growth mindset interventions in elementary schools is still a subject of debate. According to a recent review conducted by Savvides and Bond (2021), only two out of the ten examined studies offered enough information to allow for the replication of the interventions they employed. However, the outcomes of these studies were either statistically insignificant (Truax, 2018) or potentially biased due to a small sample size of 14 participants (Schrodt et al., 2019). Therefore, it is advised to conduct further research on this particular subject matter before making any policy recommendations.

Lastly, despite being meticulously developed and requiring significant effort, growth mindset interventions targeted at teachers have shown limited (Porter et al., 2022) or no effectiveness thus far (Rienzo et al., 2015; Foliano et al., 2019; Yeager & Dweck, 2020), and are therefore not recommended.

Conclusion

The purpose of this comprehensive research was to enhance our understanding of a specific psychological mechanism, namely a growth mindset, involved in the connection between cultural capital and academic achievement—addressing a gap in current academic knowledge.

In summary, the findings show that (i) cultural capital significantly predicts students' academic performance, reveal that (ii) this relationship is partially mediated by a growth mindset, and demonstrate that (iii) teacher practices slightly enhance this mediation, even when adjusting for variables such as gender, immigrant background, SES, age, and grade. Therefore, the answer to the research question is as follows: The relationship between cultural capital and academic performance among 15-year-olds is mediated by the demonstration of a growth mindset—albeit little—and this mediating relationship is moderated by teacher practices—albeit very little. In other words, culturally privileged students are more likely to develop a growth mindset—thus are more likely to persevere through challenges, view effort as a path to improvement, and bounce back from setbacks—than those from culturally underprivileged backgrounds, which in turn leads to greater academic accomplishments. This dynamic, in turn, is strengthened by teacher practices.

This aligns with previous research showing that culturally advantaged parents, by providing essential attributes, such as a refined accent, contribute significantly to their children's comfort in educational settings and academic success. Moreover, from a Bourdieusian perspective, these findings

underscore the importance of growth-related cultural resources and embodied cultural capital in fostering a growth mindset. Namely, when children have exposure to cultural resources, such as high-quality education, mentors, and networks, it enhances their personal growth, facilitates a growth-oriented self-definition (i.e., embodied cultural capital), and subsequently opens the door for a growth mindset, which, in turn, is positively associated with academic performance. One explanation for the positive relationship between a growth mindset and academic performance is as follows: students who view mistakes as opportunities for growth, rather than setbacks, develop a love for challenges and acquire the skill of learning.

Furthermore, it is recommended that the implementation of three-session growth mindset interventions in secondary schools across OECD countries based on the positive outcomes observed in various experimental studies. These interventions, typically delivered online and self-administered, focus on conveying information about the brain's ability to grow, asking students to summarize this information, and engaging them in scenarios to provide advice to fictional discouraged peers. The control groups receive similar tasks but centered around brain functional localization instead of brain plasticity. The effectiveness, feasibility, and scalability of these interventions in addressing academic underachievement are highlighted, emphasizing the importance of fostering a growth mindset for equitable educational outcomes. This is seen as a partial solution to the broader problem of educational inequalities. However, the efficacy and scalability of such interventions in elementary schools are still debated, with a call for further research before making policy recommendations.

In conclusion, this study enriches our understanding of the interplay between cultural capital and academic achievement among adolescents, elucidating the pivotal role played by a growth mindset. These insights underscore the imperative for ongoing educational research and targeted interventions to ensure educational equity and student success. It also stresses that establishing environments that foster a growth mindset among educators can pave the way for educational equality and can contribute to the fulfilment of egalitarian promises made many decades ago in Western democracies.

Conflicts of Interest: The author declares no conflict of interest.

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Appendices

Appendix A

List A1

List of Participating Countries[4]

1. Australia
2. Austria
3. Belgium
4. Canada
5. Chile
6. Colombia
7. Czech Republic
8. Denmark
9. Estonia
10. Finland
11. France
12. Germany
13. Greece
14. Hungary
15. Iceland
16. Ireland
17. Israel
18. Italy
19. Japan
20. Korea
21. Latvia
22. Lithuania
23. Luxembourg
24. Mexico
25. Netherlands
26. New Zealand
27. Norway
28. Poland
29. Portugal
30. Slovak Republic
31. Slovenia
32. Spain
33. Sweden
34. Switzerland
35. Turkey
36. UK
37. United States

[4] As of 2018, Costa Rica was not yet member of OECD and therefore has not participated in this study (OECD, 2023b).

Appendix B

Table B1

Operationalization of the Dependent Variable (Academic Performance of Educational Achievement), Independent Variable (Cultural Capital), Mediator (Growth Mindset), Moderator (Teacher Practices), and Control Variables (Gender, Immigrant Background, SES, Age, and Grade)

Variable	Dimensions	Indicators	Values
Academic Performance	Reading	Performance score	μ=500, σ=100
	Mathematics	Performance score	μ=500, σ=100
	Science	Performance score	μ=500, σ=100
Cultural Capital	Cultural possessions	Classic literature	Binary (i.e., yes/no)
		Books of poetry	Binary
		Works of art	Binary
		Books on art, music, or design	Binary
		Musical instruments	Four ordinal categories
		Books	Six ordinal categories
Growth Mindset	-	Your intelligence is something about you that you can't change very much.	4-point L. scale
Teacher Practices	Teacher support	The teacher shows an interest in every student's learning.	4-point L. scale
		The teacher gives extra help when students need it.	4-point L. scale
		The teacher helps students with their learning.	4-point L. scale
		The teacher continues teaching until the students understand.	4-point L. scale
	Teacher feedback	The teacher gives me feedback on my strengths in this subject.	4-point L. scale
		The teacher tells me in which areas I can still improve.	4-point L. scale
		The teacher tells me how I can improve my performance.	4-point L. scale
	Adaptive instruction	The teacher adapts the lesson to my class's needs and knowledge.	4-point L. scale
		The teacher provides individual help when a student has difficulties understanding a topic or task.	4-point L. scale
		The teacher changes the structure of the lesson on a topic that most students find difficult to understand.	4-point L. scale

Gender	-	Are you female or male?	Binary (1 = female, 0 = male)
Immigrant Background	-	In what country were you and your parents born?	Binary (i.e., immigrant / non-immigrant students)
SES	Parents' highest level of education	Educational qualifications	Seven ordinal categories based on International Standard Classification of Education (ISCED)
	Parents' highest occupational status	Parents' highest occupational status	Ordinal score on the International Socio-economic Index of Occupational Status (ISEI)
	Non-cultural household possessions	A room of your own	Binary (i.e., yes/no)
		A link to the Internet	Binary
		<Country-specific wealth item 1>	Binary
		<Country-specific wealth item 2>	Binary
		<Country-specific wealth item 3>	Binary
		Televisions	Four ordinal categories
		Cars	Four ordinal categories
		Rooms with a bath or shower	Four ordinal categories
		Smartphones	Four ordinal categories
		Computers	Four ordinal categories
		Tablet computers	Four ordinal categories
		E-book readers	Four ordinal categories
Age	-	The difference between the year and month of the testing and the year and month of a student's birth.	Ordinal score
Grade	-	It specifies whether a student is in the grade level that most students in the country are in (represented by a value of 0), or if they are in a grade level that is above or below the modal grade in the country.	Ordinal score

Appendix C

Table C1

Component Matrixes of Factor Loadings, Based on Principal Component Analysis of Academic Performance, Teacher Practices, and SES

	C1		C1		C1
READ	.955	TEACHSUPP	.785	PARED	.809
MATH	.952	PERFEED	.781	HISEI	.809
SCIE	.973	ADAPTIVITY	.843	WEALTH	.691

Note. C = component.

Table C2

Eigenvalues of the Components from the Principal Component Analysis

	Eigenvalue	
	Component 1	Component 2
Academic Performance	2.766	-
Teacher Practices	1.937	-
SES	1.787	-

Note. Eigenvalues < 1 are omitted.

Graph C1

Linear Relationship between X (cultural capital) and Y (academic performance)

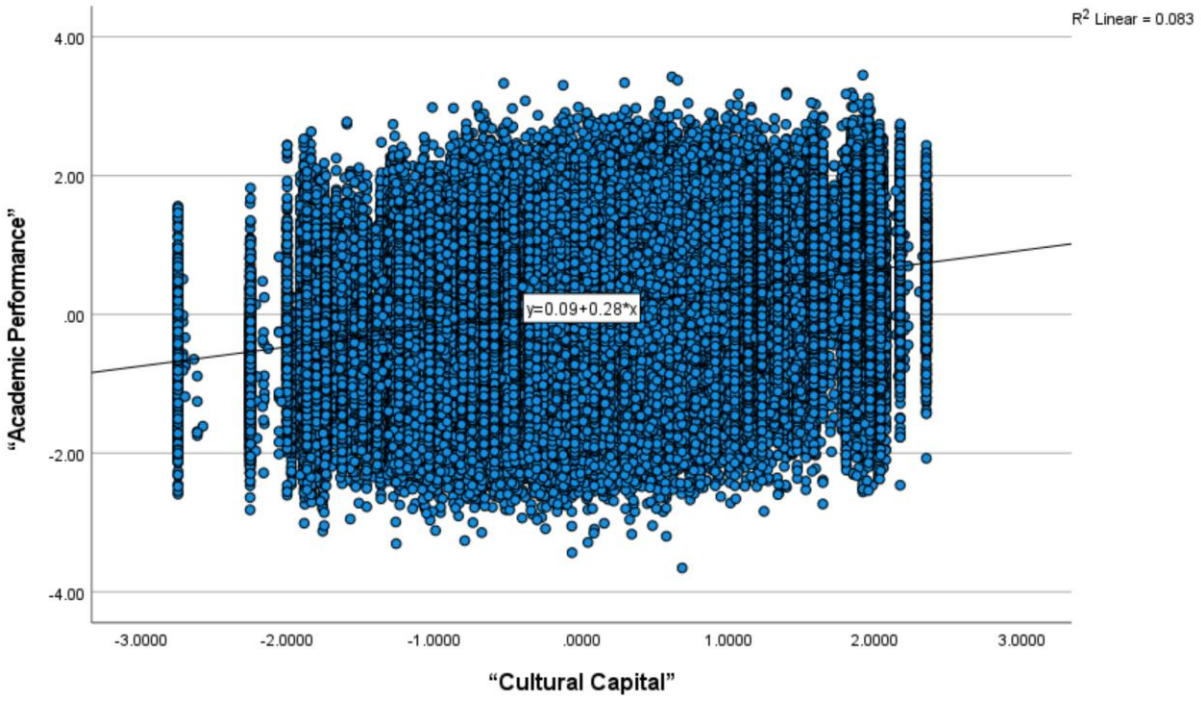


Table C3

Descriptive Statistics, Including Multicollinearity and Normality Statistics

	N	Min.	Max.	Mean	SD	Tolerance	VIF	Skewness	Kurtosis
Academic Performance	212,027	-3.69	3.45	.0647	.9731	-	-	-.090	-.444
Cultural Capital	212,027	-2.75	2.35	.0309	1.0007	.836	1.196	.015	-.252
Growth Mindset	212,027	.00	3.00	1.7610	.8971	.985	1.016	-.251	-.711
Teacher Practices	212,027	.00	3.00	1.6421	.6774	.989	1.011	-.040	-.177
Gender (=Female)	212,027	.00	1.00	.5051	.4999	.987	1.013	-	-
Immigrant Background	212,027	.00	1.00	.1317	.3382	.995	1.005	-	-
SES	212,027	-6.95	49.21	21.4399	8.6588	.825	1.212	-.552	.014
Age	212,027	15.08	16.33	15.7954	.2898	.931	1.074	.011	-1.093
Grade	212,027	-3.00	3.00	-.0922	.5333	.906	1.104	-.770	3.889
Valid N (listwise)	212,027								

Table C4

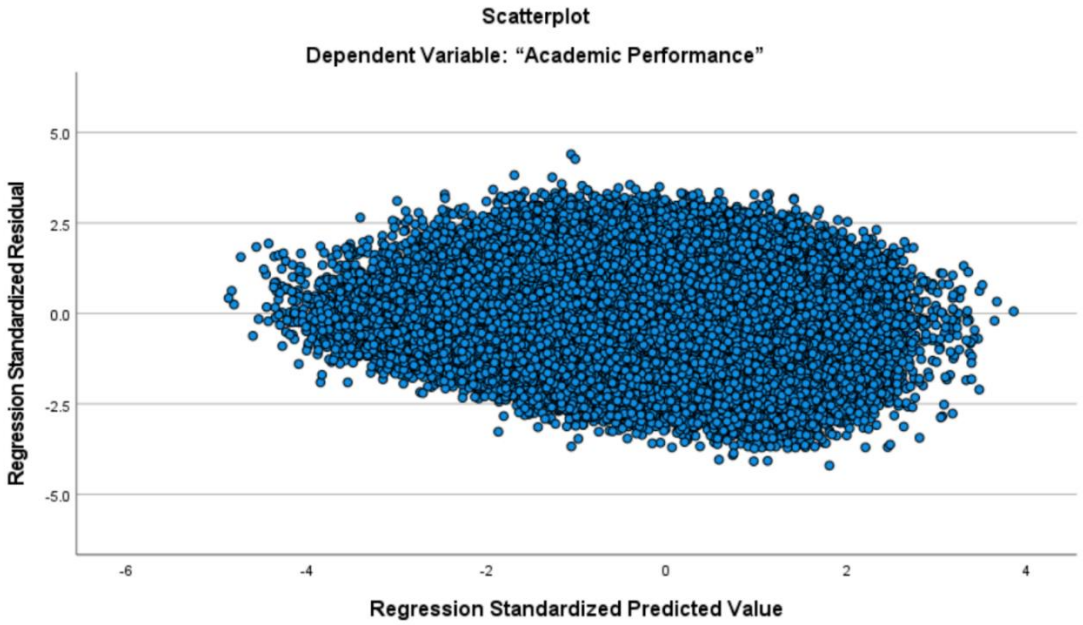
Pearson's Interrelations

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Academic Performance	1								
2. Cultural Capital	.277 **	1							
3. Growth Mindset	.177 **	.104 **	1						
4. Teacher Practices	.008 **	.036 **	.001	1					
5. Gender (=Female)	.039 **	.063 **	.014 **	-.013 **	1				
6. Immigrant Background	-.085 **	.011 **	.024 **	.007 **	-.004 **	1			
7. SES	.361 **	.396 **	.115 **	-.034 **	-.025 **	.062 **	1		
8. Age	.044 **	-.004 **	.015 **	-.007 **	.000	.006 **	-.013 **	1	
9. Grade	.289 **	.100 **	.051 **	-.027 **	.062 **	.007 **	.208 **	.240 **	1

Note. *p < .05. **p < .01 (2-tailed).

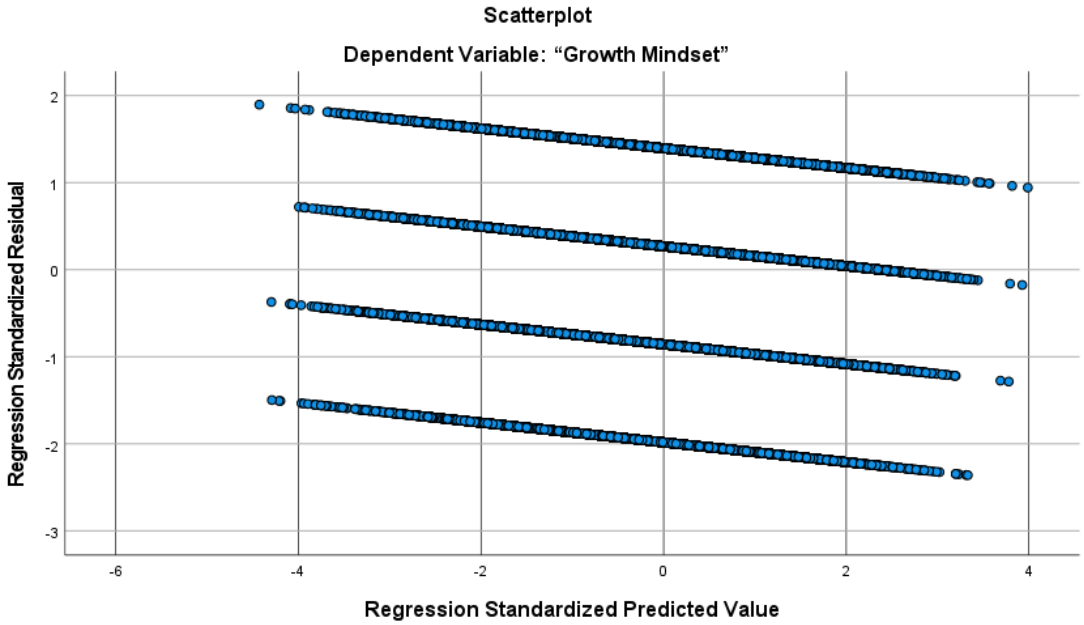
Graph C2

Scatterplot of the Predicted Value and Residual, X = Cultural Capital and Y = Academic Performance



Graph C3

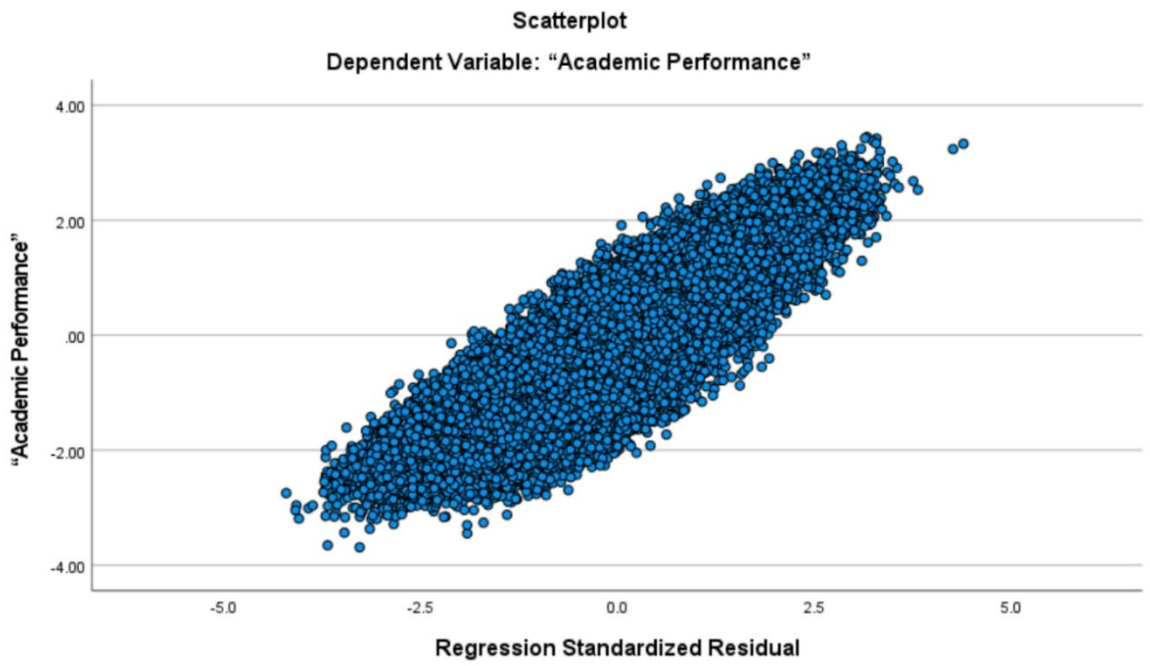
Scatterplot of the Predicted Value and Residual, X = Cultural Capital and Y = Growth Mindset



Graph C4

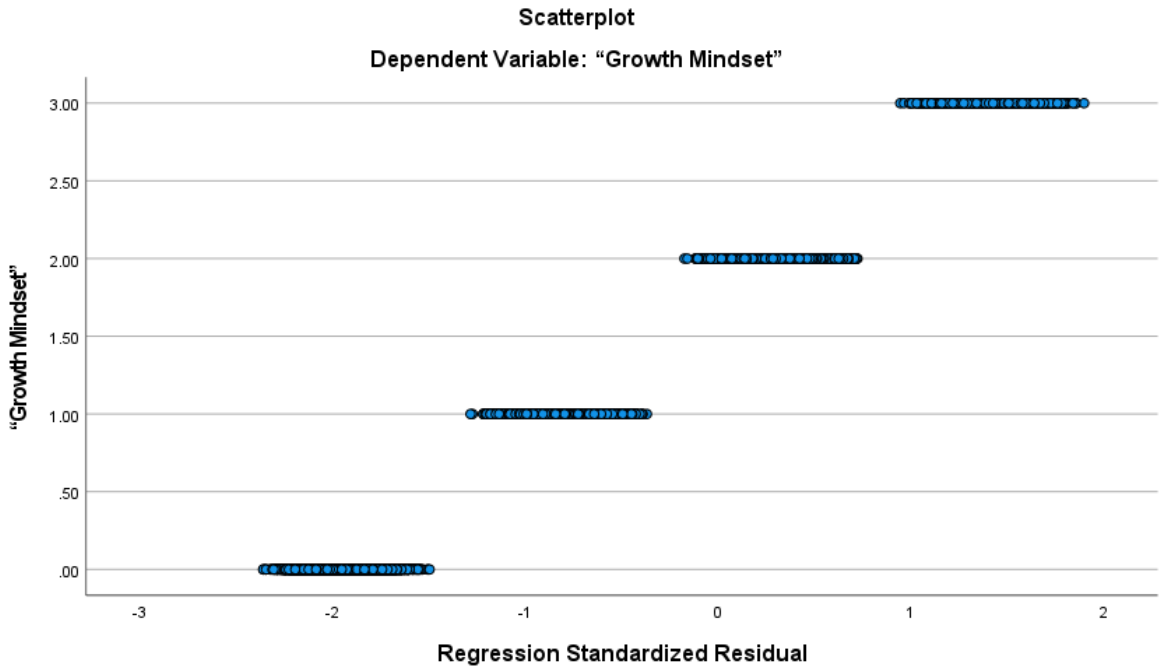
Scatterplot of the Dependent Variable (Academic Performance) and Residual

Charts



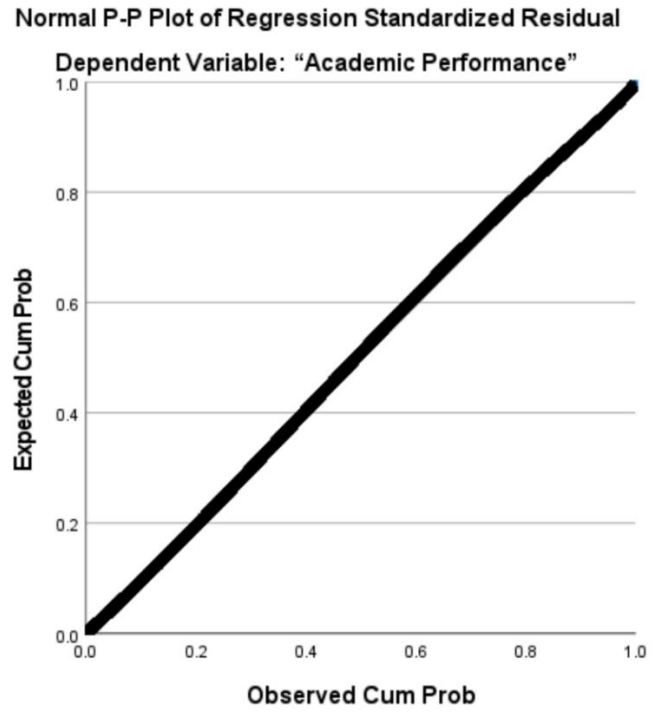
Graph C5

Scatterplot of the Dependent Variable (Growth Mindset) and Residual



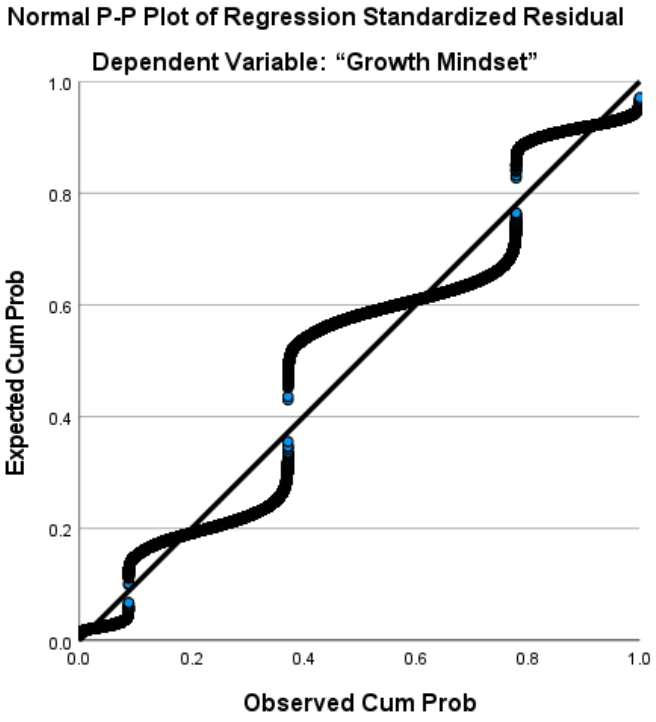
Graph C6

P-P Plot of Cultural Capital



Graph C7

P-P Plot of Growth Mindset



Appendix D

SPSS Syntax

```
* Select DataSet1.
DATASET ACTIVATE DataSet1.

* Select OECD countries.
USE ALL.
COMPUTE filter_$=(OECD).
VARIABLE LABELS filter_$ 'OECD (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.

* Index for cultural capital.
Variable labels CULTPOSS “Cultural Capital”.

* Average variable for reading.
COMPUTE READ =
MEAN(PV1READ,PV2READ,PV3READ,PV4READ,PV5READ,PV6READ,PV7READ,PV8REA
D,PV9READ,PV10READ).
EXECUTE.

* Average variable for math.
COMPUTE MATH =
MEAN(PV1MATH,PV2MATH,PV3MATH,PV4MATH,PV5MATH,PV6MATH,PV7MATH,PV8M
ATH,PV9MATH,PV10MATH).
EXECUTE.

* Average variable for science.
COMPUTE SCIE =
MEAN(PV1SCIE,PV2SCIE,PV3SCIE,PV4SCIE,PV5SCIE,PV6SCIE,PV7SCIE,PV8SCIE,PV9SCIE
,PV10SCIE).
EXECUTE.

* Factor analysis for reading, math, and science combined.
FACTOR
  /VARIABLES READ MATH SCIE
  /MISSING LISTWISE
  /ANALYSIS READ MATH SCIE
  /PRINT UNIVARIATE INITIAL EXTRACTION
  /CRITERIA FACTORS(1) ITERATE(25)
  /EXTRACTION PC
  /ROTATION NOROTATE
  /SAVE REG(ALL)
  /METHOD=CORRELATION.

* Scale for academic performance (reading + math + science).
COMPUTE ACADPERF=FAC1_1.
Variable labels ACADPERF “Academic Performance”.

* Scale for fixed mindset.
RECODE ST184Q01HA (1=0) (2=1) (3=2) (4=3) (ELSE=SYSMIS) INTO FIXED_M.
```

```
Variable labels FIXED_M “Fixed Mindset”.

* One-item parameter for growth mindset.
RECODE FIXED_M (0=3) (1=2) (2=1) (3=0) (ELSE=SYSMIS) INTO GROWTH_M.
Variable labels GROWTH_M “Growth Mindset”.

* Factor analysis for teacher support, teacher feedback, and adaptive instruction combined.
FACTOR
  /VARIABLES TEACHSUP PERFEED ADAPTIVITY
  /MISSING LISTWISE
  /ANALYSIS TEACHSUP PERFEED ADAPTIVITY
  /PRINT UNIVARIATE INITIAL EXTRACTION
  /CRITERIA FACTORS(1) ITERATE(25)
  /EXTRACTION PC
  /ROTATION NOROTATE
  /SAVE REG(ALL)
  /METHOD=CORRELATION.

* Index for teacher practices (teacher support + teacher feedback + adaptive instruction).
COMPUTE TEA_PRAC=FAC1_2.
Variable labels TEA_PRAC “Teacher Practices”.

* Dummy variable for gender (male = 0 and female = 1).
Recode ST004D01T (1=1) (2=0) (else=sysmis) into FEMALE.
Variable labels FEMALE “Gender (=Female)”.

* Dummy variable for immigrant background (native = 0 and immigrant background = 1).
Recode IMMIG (1=0) (2,3=1) (else=sysmis) into MIGRANT.
Variable labels MIGRANT “Immigrant Background”.

* Factor analysis for parents’ highest level of education, parents’ highest occupational status, and
non-cultural household possessions combined.
FACTOR
  /VARIABLES PARED HISEI WEALTH
  /MISSING LISTWISE
  /ANALYSIS PARED HISEI WEALTH
  /PRINT UNIVARIATE INITIAL EXTRACTION
  /CRITERIA FACTORS(1) ITERATE(25)
  /EXTRACTION PC
  /ROTATION NOROTATE
  /SAVE REG(ALL)
  /METHOD=CORRELATION.

* Index for SES (parents’ highest level of education + parents’ highest occupational status + non-
cultural household possessions).
COMPUTE SES=FAC1_3.
Variable labels SES “Socioeconomic Status”.

* Variable for students’ age.
Variable labels AGE “Age”.

* Variable for students’ grade.
Variable labels GRADE “Grade”.

* Scatterplot of X (cultural capital) and Y (academic performance).
```

```
GRAPH
  /SCATTERPLOT(BIVAR)=CULTPOSS WITH ACADPERF
  /MISSING=LISTWISE.

* Dummy variables for countries.
SPSSINC CREATE DUMMIES VARIABLE=CNTRYID
ROOTNAME1=LAND
/OPTIONS ORDER=A USEVALUELABELS=YES USEML=YES OMITFIRST=NO.

* Specific variable to make the sample size for all the variables.
COMPUTE TEST=CULTPOSS + ACADPERF + GROWTH_M + TEA_PRAC + FEMALE +
MIGRANT + SES + AGE + GRADE.
EXECUTE.

compute notpresent=0.
if missing(TEST) notpresent=1.

FREQUENCIES VARIABLES notpresent.

USE ALL.
COMPUTE filter_$=(notpresent = 0).
VARIABLE LABELS filter_$ 'notpresent = 0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.

* Descriptives of all variables without covariates.
DESCRIPTIVES VARIABLES=CULTPOSS ACADPERF GROWTH_M TEA_PRAC
  /STATISTICS=MEAN STDDEV MIN MAX KURTOSIS SKEWNESS.

* Descriptives of all variables with covariates.
DESCRIPTIVES VARIABLES=CULTPOSS ACADPERF GROWTH_M TEA_PRAC FEMALE
MIGRANT SES AGE GRADE
  /STATISTICS=MEAN STDDEV MIN MAX KURTOSIS SKEWNESS.

* Custom tables to analyze inter-country differences of descriptive statistics
CTABLES
  /VLABELS VARIABLES=CNTRYID CULTPOSS ACADPERF GROWTH_M TEA_PRAC
DISPLAY=LABEL
  /TABLE CNTRYID BY CULTPOSS [MEAN] + ACADPERF [MEAN] + GROWTH_M [COUNT
F40.0] + TEA_PRAC [MEAN]
  /CATEGORIES VARIABLES=CNTRYID ORDER=A KEY=VALUE EMPTY=INCLUDE
  /CATEGORIES VARIABLES=GROWTH_M ORDER=A KEY=VALUE EMPTY=EXCLUDE
  /CRITERIA CILEVEL=95.

* Descriptives of interrelations between all nine variables.
CORRELATIONS
  /VARIABLES=CULTPOSS ACADPERF GROWTH_M TEA_PRAC FEMALE MIGRANT SES
AGE GRADE
  /PRINT=TWOTAIL NOSIG FULL
  /MISSING=PAIRWISE.

* Multiple linear regression analysis including bootstrapping with X (cultural capital), Y (academic
performance), and control variables.
```

```
BOOTSTRAP
  /SAMPLING METHOD=SIMPLE
  /VARIABLES TARGET=ACADPERF INPUT=  CULTPOSS FEMALE MIGRANT SES AGE
GRADE
  /CRITERIA CILEVEL=95 CITYPE=PERCENTILE  NSAMPLES=1000
  /MISSING USERMISSING=EXCLUDE.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ACADPERF
  /METHOD=ENTER CULTPOSS
  /METHOD=ENTER FEMALE MIGRANT SES AGE GRADE
  /SCATTERPLOT=(ACADPERF ,*ZRESID)
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS NORMPROB(ZRESID).
```

** Multiple linear regression analysis including bootstrapping with X (cultural capital), Y (growth mindset), and control variables.*

```
BOOTSTRAP
  /SAMPLING METHOD=SIMPLE
  /VARIABLES TARGET=GROWTH_M INPUT=  CULTPOSS FEMALE MIGRANT SES AGE
GRADE
  /CRITERIA CILEVEL=95 CITYPE=PERCENTILE  NSAMPLES=1000
  /MISSING USERMISSING=EXCLUDE.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT GROWTH_M
  /METHOD=ENTER CULTPOSS
  /METHOD=ENTER FEMALE MIGRANT SES AGE GRADE
  /SCATTERPLOT=(GROWTH_M ,*ZRESID)
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS NORMPROB(ZRESID).
```

** Graph of the moderated mediation.*

```
DATA LIST FREE/
   CULTPOSS   TEA_PRAC   GROWTH_M   .
BEGIN DATA.
     -.992     -1.006      1.661
      .000     -1.006      1.714
      .992     -1.006      1.766
     -.992       .000      1.699
      .000       .000      1.760
      .992       .000      1.822
     -.992      1.006      1.738
      .000      1.006      1.807
      .992      1.006      1.877
END DATA.
GRAPH/SCATTERPLOT=
 CULTPOSS WITH     GROWTH_M BY       TEA_PRAC .
```