

## Article

# Cultural Capital and Its Impact on Academic Achievement: Sustainable Development of Chinese High School Students

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**Abstract:** The Sustainable Development Goals (SDGs) cannot be realized without equal education. Based on a multiple linear regression model, this study examined the impact of family cultural capital on the academic achievement of high school students, and the variances in the impact of cultural capital on students from different regions and genders. Participants, including 778 students, from two representative regions were selected for the study (393 girls and 385 boys). The results showed that cultural capital promoted high school students' academic success in different ways. Institutionalized cultural capital and embodied cultural capital had a significant impact on students' academic achievements, while objectified cultural capital had no significant impact. This study suggested that cultural capital had an intergenerational effect. The influence of cultural capital on students' achievement in regions and genders was significantly different. The above findings are helpful to further understand the mechanism of the impact of cultural capital on academic achievement and are of great significance to the sustainable improvement of students' academic growth and educational equity.

**Keywords:** SDGs; cultural capital; academic achievement; institutionalized state; embodied state; educational equity



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## 1. Introduction

Countries throughout the world have made significant efforts on a number of fronts since the formulation of the Sustainable Development Goals (SDGs) [1]. However, there is still a long way to go before we can attain inclusive and sustainable development goals. Since 2019, the global crisis has hampered global progress toward sustainable development. Despite these challenging circumstances, the SDGs should serve as our road map for achieving sustainable development by 2030. Regarding the triple bottom line of sustainable development, they continue to be the unique shared language and goal among all UN member nations [2]. Providing quality education for sustainable development and promoting regional and gender equality are important missions of the United Nations Sustainable Development Goals [3]. Equal education is an important component of the SDGs, but little is known about how to achieve equal education opportunities for sustainable development [4]. Cultural capital is generally considered to be an important reference for equality in education and is crucial for achieving sustainable development in education. Family cultural capital is an effective way for individuals to achieve advancement and, more importantly, to promote the academic achievement of their children [5].

Cultural capital was first introduced by Bourdieu; it was introduced as a form of capital, especially and principally as a power resource, a means for groups to retain dominance and obtain prestige [6]. Cultural capital is a scarce resource that plays an important role in students' academic achievement [7,8]. Cultural capital promotes educational success through different channels, and its transmission is characterized by intergenerational

transmission [9]. Unequal parental appropriation of cultural capital can lead to social class differences in educational outcomes [10,11]. Traditional learning forms have been altered as a result of the COVID-19 pandemic [12]. The outbreak of the pandemic has pushed many nations and regions to close schools and opt for online education, posing a significant challenge to the sustainability of education [13]. How to deal with the relationship between equal education and sustainability is an imperative for the development of education in our new era. In this special period, it seems particularly important to study the impact of students' cultural capital on academic achievement.

The family is now incredibly important in determining how students' cultural capital evolves throughout the course of the pandemic, and lockdown may broaden the achievement gap across socioeconomic groups [5]. Therefore, it is imperative to examine the impact of cultural capital on academic achievement for different groups. Researchers have long tried to address the question of what constitutes cultural capital and what the effect of parental education and the family book collection on academic achievement is [6], but little is known about the effect of embodied cultural capital on academic achievement [14]. While past research has answered the question of the overall relationship between cultural capital and academic achievement [10], there is still a need to answer the question of how cultural capital affects academic achievement [15]. Research on regional differences in cultural capital, as well as gender differences, still needs to be given enough attention.

## 2. Literature Review

### 2.1. Cultural Capital Theory

For this study, we adopt the theory of cultural capital as a theoretical framework. When Bourdieu first introduced the concept of cultural capital, it was explained as a form of capital, specifically and primarily as a power resource, a way for groups to maintain dominance and gain status [16]. According to cultural reproduction theory, upper-class families have greater access to cultural resources and are, thus, more likely to achieve academic success [6]. Cultural capital is transferred from parents to children, enabling them to understand the "rules of the game" implicit in the educational system and, thus, contributing to school outcomes [17,18]. DiMaggio indicates that cultural capital is an elite culture that symbolizes a different class of people, and this culture can be translated into academic advantages in the school system [10]. DiMaggio focuses more on the cultural mobility model, which emphasizes the upward mobility of the disadvantaged through the active acquisition of the dominant culture and, to some extent, complements Bourdieu's explanation of the concept of cultural capital [11].

Cultural capital, according to Bourdieu, can be classified into three types: the institutionalized state, the objectified state, and the embodied state. The institutionalized state is the cultural capital that has been validated in the form of academic qualifications such as parental education level [19]. The objectified state is cultural capital that is materially manifested in the process of materialization, such as books, dictionaries, and paintings [7]. The embodied state manifests itself in the form of spiritual and subjective persistent "dispositions", most notably parental support, which includes emotional support and learning techniques such as parenting methods, parental participation, activities, and so on [14]. According to recent research, embodied cultural capital is frequently exhibited through engagement in highbrow culture [20].

Although the concept of cultural capital has an elaborate theoretical foundation, little work has been done on how to measure it [21]. Although Bourdieu proposed a series of cultural capital indicators in his empirical work [16], no "gold standard" indicator of cultural capital has been established [22]. In general, cultural capital theory has been applied mostly to the interpretation of institutionalized and objectified states, with little study on embodied cultural capital. In terms of embodied cultural capital interpretation, the idea of highbrow culture has emerged as a cultural capital variable that explains the effect of student accomplishment [23].

## 2.2. Cultural Capital and Academic Achievement

Past research has shown that cultural capital has a positive effect on educational attainment [11,24]. Cultural capital can be passed on to the next generation through parents and is both a scarce resource and a reward [25]. Recent studies have shown that students' cultural capital absorption can be directly translated into academic skills [26], which in turn leads to academic achievement at school [27]. At the macro level, educational inequality is shaped by the unequal distribution of cultural capital [15].

### 2.2.1. The Institutionalized State

Parental level of educational has been widely recognized as a stronger indicator of students' academic success [28]. Parents with advanced education degrees provide their children with the tools they need to excel in school [29]. Tan, Peng, and Lyu [23] suggested that parental education has the greatest impact on kids' academic progress. Chiang et al. [30] indicated that students' academic success is constantly influenced by their mother's education and their father's work. Students of high socioeconomic standing are more likely to be privileged in school, according to cultural reproduction theory, since their parents utilize their economic capital to develop cultural capital for their children. A recent study indicated that cultural capital mediates the relationship between parental socioeconomic status and student achievement [31].

### 2.2.2. The Objectified State

Cultural capital is usually positively correlated with student achievement; apart from the institutionalized state, the objectified state is also found to be closely related to academic achievement [32]. Using the cultural reproduction theory of Bourdieu and the cultural mobility theory of DiMaggio, some scholars have found that parental reading behavior effectively predicts success in school academic performance, especially for children whose parents have lower levels of education [33]. Kloosterman et al. [34] found significant explanatory power of parental reading on student achievement in the Netherlands. Parental reading habits, rather than arts engagement, influenced children's academic achievement. Parental reading was useful in predicting academic performance, particularly for kids whose parents had poor educational levels [35].

### 2.2.3. The Embodied State

Tan [36] implied that embodied cultural capital played a more important role than other cultural capitals. Embodied cultural capital mainly includes highbrow cultural capital. Jæger [24] used extracurricular activity participation to examine the effects of cultural capital and academic achievement. Students who engage in highbrow cultural activities are more likely to obtain academic achievement [29]. According to Byun, Schofer, and Kim [9], students' embodied cultural capital is an important predictor for academic performance. According to prior studies, highbrow culture has a positive influence on students' literacy and learning development. Highbrow cultural inclination was found to be a significant predictor of cultural capital [37]. Parents offered highbrow cultural resources to their children, which were appreciated and classified as exceptional resources in society. These embodied cultural materials have an effect on one's degree of knowledge [38].

Notably, cultural capital appears to be very important for students' learning results. Although past studies have revealed many effects on students' academic performance, little is known about how cultural capital affects students' academic performance, and further research is needed to determine how cultural capital influences students' academic performance. The link between cultural capital and academic accomplishment has an impact on students' culture reproduction and school success in sustainable learning. As a result, how cultural capital affects academic performance needs to be further explored.

### 2.3. The Present Study

It is crucial to comprehend the mechanisms through which cultural capital and academic accomplishment impact one another since they are in fact connected and significant. Based on earlier research, there are still several areas that need to be examined more thoroughly. Previous research indicated that cultural capital could be categorized into three categories. While the embodied state received less attention, the institutionalized and objectified states were the primary study focuses. Additionally, little attention has been paid to the relationship between cultural capital dimensions and academic success in areas and genders.

Additionally, how can cultural capital impact academic success? Few studies have examined the underlying processes between cultural capital and accomplishment, despite the fact that many studies have demonstrated the importance of cultural capital in academic success. To the best of our understanding, there has not been much research done on the connection between various cultural capital dimensions and academic achievement. Therefore, this study will increase our understanding of the probable mechanisms through which cultural capital influences academic success.

Based on the cultural capital theory, this study attempts to explore the cultural capital effect on students' academic accomplishment, investigating the influencing mechanism of cultural capital on students' learning outcomes. The following research questions were proposed:

- What effect does family cultural capital have on high school students' academic achievement?
- How does family cultural capital impact high school students' academic success by region?
- How does family cultural capital affect high school students' academic success by gender?

Based on the previous literature review and the above research questions, this study proposes the following research hypotheses.

**Hypothesis 1.** *Family cultural capital has a significantly positive effect on students' academic achievement.*

**Hypothesis 2.** *Family cultural capital has a significantly positive impact on students' academic achievement in different regions.*

**Hypothesis 3.** *Family cultural capital has a significantly positive influence on students' academic achievement for different genders.*

## 3. Materials and Methods

### 3.1. Participants

To choose schools and students in China, we followed strict procedures. Two representative high schools in Beijing and the Shandong province in eastern China, both of which have a strong Confucian culture, received the 800 questionnaires in a 1:3 ratio. China's eastern regions are typically well-developed [39]. Confucian culture originated in the Shandong province, and Beijing is China's capital and the country's political, cultural, and educational hub [13]. Confucian culture has a significant influence on both of the sampled areas [40]. The samples are, therefore, somewhat representative when looking at the connection between cultural capital and academic achievement.

A total of 778 participants (from grades ten to twelve) were recruited, with 385 male students (49.5%) and 393 female students (50.5%). Participants included 300 (38.6%) from the capital city Beijing and 478 (61.4%) from the Shandong province. Within 10 min, we completed a paper-based questionnaire survey in the classroom, using one class as a unit. The students who were sampled were informed that their responses would only be used for research purposes, and they were given the same incentives to participate. As a result, study participants could provide truthful responses.

The study was carried out during a COVID-19 lockdown. Our data were gathered while schools were closed, and all of the participants had experienced at least two lockdowns as a result of the pandemic. The information includes in-depth items that address important topics like the institutionalized state, the objectified state, and the embodied state. The questionnaire primarily collected basic information, family information, and academic information from high school students, such as the father's and the mother's education, family book collection, personal talents, frequency of visiting museums/art galleries, frequency of visiting science museums, frequency of attending concerts/plays, frequency of traveling within the city, frequency of traveling outside the city, and frequency of traveling outside the country.

### 3.2. Measures

#### 3.2.1. Dependent Variable

Academic achievement was the main dependent variable of the study and is an important indicator of students' future success. The study collected high school students' final grades in three subjects—Chinese, mathematics, and English—during COVID-19 in 2021 and we standardized the test scores with academic achievement variables ranging from 0–150 points. In addition to the scores of three subjects, the dependent variable also contains the sum of the total score.

#### 3.2.2. Independent Variable

The independent variable was family cultural capital. Based on the cultural capital theory proposed by Bourdieu [18], this study classified family cultural capital into three types: the institutionalized state, the objectified state, and the embodied state. The institutionalized state was defined as the father's education and the mother's education; the objectified state was defined as the family book collection; and the embodied state was defined as personal talent, frequency of visiting museums/art galleries, frequency of visiting science museums, frequency of attending concerts/plays, frequency of traveling within the city, frequency of traveling outside the city, and frequency of traveling out of the country. Given that both Beijing and Shandong are well-developed regions in the east, international exchanges are becoming more frequent as the country opens up to the outside world [41]. Therefore, the frequency variable of outbound travel is added. The basic information for the variables is shown in Table 1, and the descriptive statistics of the variables are shown in Table 2.

**Table 1.** Information for variables.

Variable	Factors	The Variable Name	Description and Coding
Dependent variable	Academic achievement	Score in Chinese, Math, English, and total score	Scores of the three subjects and the total score
Independent variable	Institutionalized state	Father's education	1 = primary school and below, 2 = junior high school, 3 = senior high school/vocational high school, 4 = vocational college, 5 = bachelor's degree, 6 = master's degree, 7 = doctor's degree
		Mother's education	1 = primary school and below, 2 = junior high school, 3 = senior high school/vocational high school, 4 = vocational college, 5 = bachelor's degree, 6 = master's degree, 7 = doctor's degree
	Objectified state	Family collection of books	1 = 0–10 books, 2 = 11–20 books, 3 = 21–50 books, 4 = 51–100 books, 5 = 101–200 books, 6 = 201–300 books, 7 = 301 books or more
		Personal talent	1 = no talent, 2 = 1 talent, 3 = 2 talents, 4 = 3 talents, 5 = 4 talents, 6 = 5 talents, 7 = 6 or more talents
Embodied state	Frequency of museum/art gallery visits	Frequency of museum/art gallery visits Frequency of visits to science museums Frequency of attending concerts/plays Frequency of traveling within the city Frequency of traveling outside the city Frequency of overseas travels	1 = never, 2 = once every 1–2 years, 3 = once a year, 4 = once every 3–6 months, 5 = once every 1–2 months, 6 = at least once a month, 7 = at least once a week
	Frequency of attending concerts/plays		

**Table 1.** *Cont.*

Variable	Factors	The Variable Name	Description and Coding
Control variable	-	Gender	1 = boy, 2 = girl
		Grade	1 = grade 10, 2 = grade 11, 3 = grade 12
		Area	1 = Beijing, 2 = Shandong
		Family income	1 = extremely low, 2 = relatively low, 3 = moderate, 4 = relatively high, 5 = extremely high
		Number of children in family	1 = one child, 2 = two children, 3 = three or more children

**Table 2.** Descriptive statistics of the variables.

Variable	Minimum	Maximum	Mean	SD
Gender	1	2	1.50	0.500
Grade	1	3	1.89	0.827
Area	1	2	2.39	0.487
Family income	1	5	2.87	1.163
Number of children in family	1	3	1.88	0.798
Father's education	1	7	3.68	1.672
Mother's education	1	7	3.40	1.764
Family collection of books	1	7	4.25	2.049
Personal talent	1	7	3.09	1.794
Frequency of museum/art gallery visits	1	7	2.44	1.256
Frequency of visits to science museums	1	7	2.03	1.124
Frequency of attending concerts/plays	1	7	1.92	1.265
Frequency of traveling within the city	1	7	3.73	1.819
Frequency of traveling outside the city	1	7	2.53	1.149
Frequency of overseas travels	1	7	1.55	0.870
Chinese score	11.00	150.00	101.687	14.926
Math score	14.00	150.00	88.038	35.556
English score	20.00	150.00	97.450	31.071
Total score	100.00	450.00	287.175	72.540

### 3.2.3. Controls

The analysis included five control variables. The first control variable in this study was gender (1 = male, 2 = female); the second one was the grade level (1 = grade ten, 2 = grade eleven, 3 = grade twelve); the third one was the region (1 = Beijing, 2 = Shandong); the fourth one was family income (from 1 = extremely low to 5 = extremely high); the last one was the number of children in the household (1 = one child, 2 = two children, 3 = three or more children).

### 3.3. Model Setting

In this study, a multiple linear regression model was built using family cultural capital as the independent variable and student academic accomplishment as the dependent variable. The model was as follows:

$$Y = \beta_0 + \beta_1 Z_i + \beta_2 Z_o + \beta_3 Z_e + \sum_{k=1}^1 \lambda_1 Z_1 + \mu$$

In the model, Y represents the academic achievement of students, including Chinese, math, English and the total score;  $Z_i$  represents the institutionalized state;  $Z_o$  stands for the objectified state;  $Z_e$  refers to the embodied state;  $Z_1$  represents the control variables;  $\mu$  stands for the random error.

## 4. Results

### 4.1. The Relationship between Family Cultural Capital and Academic Performance

Considering the composition of family cultural capital, the institutionalized, objectified, and embodied states were compared with Chinese, math, English, and total score. Table 3 shows the correlation test results. It can be seen that the frequency of the city tour with Chinese, math, English, and total score had the weakest correlation, so it was deleted. Finally, the remaining independent variables were retained for regression analysis with the scores of Chinese, math, English, and the total score, respectively.

**Table 3.** Pearson correlation between family cultural capital and scores (n = 778).

Variable	Total Score	Chinese	Math	English
Father's education	0.646 **	0.427 **	0.601 **	0.616 **
Mother's education	0.665 **	0.427 **	0.626 **	0.630 **
Family collection of books	0.525 **	0.356 **	0.470 **	0.517 **
Personal talent	0.406 **	0.300 **	0.365 **	0.386 **
Frequency of museum/art gallery visits	0.528 **	0.379 **	0.473 **	0.509 **
Frequency of visits to science museums	0.521 **	0.355 **	0.480 **	0.497 **
Frequency of attending concerts/plays	0.464 **	0.333 **	0.433 **	0.428 **
Frequency of traveling within the city	0.153 **	0.098 **	0.134 **	0.156 **
Frequency of traveling outside the city	0.339 **	0.207 **	0.315 **	0.331 **
Frequency of overseas travels	0.403 **	0.263 **	0.391 **	0.367 **

Note: \*\* indicates significant correlation at the 0.01 level (bilateral) and significance (bilateral) is 0.00 for both.

### 4.2. The Influence of Family Cultural Capital on the Academic Achievement

Based on the above model, the influence of various family cultural capitals on the academic achievement of high school students was analyzed, and the results were shown in Table 4. Through statistical analysis, apart from objectified cultural capital, both institutionalized cultural capital and embodied cultural capital had varying degrees of significant effects on high school students' academic achievement.

Among the effects of institutionalized state, the mother's educational level had significant effects on the total score, math score, and English score, but had no significant effect on the Chinese score. Specifically, the influence coefficients of the mother's education on the total score, math score, and English score of high school students were 4.834 ( $p < 0.05$ ), 2.454 ( $p < 0.05$ ), and 1.963 ( $p < 0.05$ ), respectively. Among them, the mother's educational level had the largest positive impact on the total score of high school students and the least positive impact on the English score of high school students. The results indicate that a mother's education level is a key factor in the total score, math score, and English score of high school students, and that a mother's education level can play an important role in improving the scores of high school students.

In terms of the embodied state, personal talent exerted a significantly positive effect on high school students' total scores, Chinese, math, and English scores. In contrast, the frequency of traveling outside the city exerted a negative effect on high school students' total scores, Chinese, math, and English scores, and the frequency of visiting science museums exerted a significantly positive effect on high school students' total scores and English scores. Specifically, the coefficients of personal talent on high school students' total scores, Chinese, math, and English scores were 3.640 ( $p < 0.01$ ), 0.771 ( $p < 0.05$ ), 1.391 ( $p < 0.05$ ), and 1.477 ( $p < 0.01$ ); the coefficients of frequency of traveling outside cities on high school students' total scores, Chinese, math and English scores were  $-4.687$  ( $p < 0.05$ ),  $-1.044$  ( $p < 0.05$ ),  $-1.983$  ( $p < 0.1$ ), and  $-1.660$  ( $p < 0.1$ ). The coefficients of the effects of the frequency of visiting science museums on high school students' scores in total and English were 5.303 ( $p < 0.1$ ) and 2.992 ( $p < 0.05$ ). It shows that personal talent contributes significantly to the improvement of high school students' total scores, Chinese, math, and English scores, while the frequency

of traveling outside cities hampers the school outcomes. Moreover, the frequency of visiting science museums could also improve students' total and English scores.

It should be noted that the father's education in institutionalized cultural capital, family book collection in the objectified state, frequency of visiting museums/art galleries, frequency of attending concerts/plays, and frequency of traveling within the city in the embodied state did not pass the test in the four categories of scores, and the above variables were considered to have insignificant effects on the academic achievement of high school students and are, therefore, not shown in Table 4.

**Table 4.** The influence of family cultural capital on academic achievement.

Variable	Total Score	Chinese	Math	English
Region	77.886 *** (0.522) $p = 0.000$	10.315 *** (0.336) $p = 0.000$	36.628 *** (0.501) $p = 0.000$	30.943 *** (0.484) $p = 0.000$
Grade	−0.323 (−0.004) $p = 0.878$	3.321 *** (0.184) $p = 0.000$	−5.617 *** (−0.131) $p = 0.000$	1.973 ** (0.053) $p = 0.038$
Gender	−4.717 (−0.033) $p = 0.191$	3.250 *** (0.109) $p = 0.001$	−11.963 *** (−0.168) $p = 0.000$	3.996 ** (0.064) $p = 0.014$
Mother's education	4.834 ** (0.117) $p = 0.029$	0.417 (0.049) $p = 0.472$	2.454 ** (0.122) $p = 0.030$	1.963 ** (0.111) $p = 0.049$
Personal talent	3.640 *** (0.090) $p = 0.002$	0.771 ** (0.093) $p = 0.013$	1.391 ** (0.070) $p = 0.021$	1.477 *** (0.085) $p = 0.006$
Frequency of visits to science museums	5.303 * (0.082) $p = 0.050$	1.084 (0.082) $p = 0.127$	1.226 (0.039) $p = 0.375$	2.992 ** (0.108) $p = 0.014$
Frequency of traveling outside the city	−4.687 ** (−0.074) $p = 0.020$	−1.044 ** (−0.080) $p = 0.048$	−1.983 * (−0.064) $p = 0.053$	−1.660 * (−0.061) $p = 0.067$
R <sup>2</sup>	0.573	0.305	0.538	0.526
Adjusted R <sup>2</sup>	0.565	0.293	0.529	0.518
ΔR <sup>2</sup>	0.034	0.031	0.024	0.032
F	72.966	23.907	63.221	60.376
ΔF	6.661	3.796	4.307	5.661

Note: \* indicates  $p < 0.1$ , \*\* indicates  $p < 0.05$ , \*\*\* indicates  $p < 0.01$ ; non-significant variables are not included in the table. The same as below. The three columns of data in the table are: coefficient, standardized coefficient (beta weights), and statistical significance ( $p$  values).

#### 4.3. The Influence of Family Cultural Capital on the Academic Achievement in Different Regions

Based on the above model, the relevant samples of high school students in Shandong and Beijing were estimated separately. The estimation results are shown in Table 5. It was found that the father's education positively influenced the total scores of high school students in Beijing, while the mother's education significantly contributed to the total scores, math scores, and English scores of high school students in Shandong.

For high school students in Shandong province, the results were almost similar to those of the total sample. Except for Chinese scores, their mother's education had a significantly positive effect on their total scores, math, and English scores; personal talents had a significantly positive effect on their total scores, Chinese, math, and English scores; frequency of trips outside the city had a significantly negative effect on their total scores, Chinese, math, and English scores; and frequency of visiting science museums had a significantly positive effect on their total and English scores. The frequency of visiting

science and technology museums also had a significant positive effect on total and English scores, which is consistent with the estimation results of the total sample. On this basis, the frequency of visiting museums and art galleries had a significant effect on Chinese scores.

**Table 5.** The influence of family cultural capital on academic achievement in different regions.

Variable	Beijing				Shandong			
	Total Score	Chinese	Math	English	Total Score	Chinese	Math	English
Grade	−4.084 (−0.095) $p = 0.117$	1.871 ** (0.135) $p = 0.025$	−5.900 *** (−0.235) $p = 0.000$	−0.055 (−0.004) $p = 0.954$	−0.291 (−0.004) $p = 0.924$	3.821 *** (0.223) $p = 0.000$	−6.372 *** (−0.180) $p = 0.000$	2.247 (0.069) $p = 0.119$
Gender	−5.204 (−0.071) $p = 0.258$	3.288 ** (0.138) $p = 0.026$	−9.016 *** (−0.209) $p = 0.001$	0.524 (0.019) $p = 0.757$	−2.346 (−0.021) $p = 0.648$	3.840 *** (0.139) $p = 0.002$	−13.162 *** (−0.231) $p = 0.000$	6.991 *** (0.132) $p = 0.004$
Family income	0.726 (0.014) $p = 0.825$	−1.204 (−0.071) $p = 0.254$	1.023 (0.033) $p = 0.579$	0.907 (0.047) $p = 0.453$	1.509 (0.030) $p = 0.534$	−0.224 (−0.018) $p = 0.704$	0.502 (0.020) $p = 0.676$	1.303 (0.056) $p = 0.259$
Number of children in family	−2.272 (−0.030) $p = 0.630$	−0.241 (−0.010) $p = 0.873$	−2.491 (−0.056) $p = 0.347$	0.460 (0.016) $p = 0.791$	6.390 * (0.076) $p = 0.095$	0.804 (0.039) $p = 0.389$	3.829 ** (0.090) $p = 0.043$	1.748 (0.044) $p = 0.334$
Father's education	4.333* (0.121) $p = 0.091$	0.907 (0.079) $p = 0.269$	2.341 (0.112) $p = 0.103$	1.085 (0.083) $p = 0.249$	1.199 (0.023) $p = 0.726$	−0.245 (−0.019) $p = 0.769$	0.832 (0.031) $p = 0.623$	0.617 (0.025) $p = 0.703$
Mother's education	−1.715 (−0.047) $p = 0.519$	−0.560 (−0.048) $p = 0.512$	−0.870 (−0.041) $p = 0.560$	−0.285 (−0.022) $p = 0.771$	9.121 *** (0.178) $p = 0.006$	0.917 (0.073) $p = 0.252$	5.101 *** (0.196) $p = 0.002$	2.992 * (0.124) $p = 0.056$
Personal talent	1.206 (0.060) $p = 0.361$	0.364 (0.056) $p = 0.390$	0.578 (0.049) $p = 0.435$	0.264 (0.036) $p = 0.587$	6.724 *** (0.183) $p = 0.000$	1.343 ** (0.136) $p = 0.033$	2.373 ** (0.127) $p = 0.010$	2.996 *** (0.173) $p = 0.001$
Frequency of museum/art gallery visits	2.272 (0.071) $p = 0.397$	−0.484 (−0.047) $p = 0.574$	1.872 (0.100) $p = 0.214$	0.884 (0.076) $p = 0.371$	4.410 (0.068) $p = 0.286$	2.158 *** (0.148) $p = 0.003$	0.407 (0.012) $p = 0.842$	1.766 (0.058) $p = 0.368$
Frequency of visits to science museums	1.898 (0.054) $p = 0.513$	0.570 (0.050) $p = 0.540$	0.501 (0.024) $p = 0.758$	0.826 (0.064) $p = 0.439$	8.030 * (0.120) $p = 0.067$	1.191 (0.072) $p = 0.265$	2.146 (0.063) $p = 0.322$	4.485 ** (0.142) $p = 0.033$
Frequency of traveling outside the city	−1.366 (−0.036) $p = 0.608$	0.192 (0.016) $p = 0.822$	0.105 (0.005) $p = 0.944$	−1.664 * (−0.119) $p = 0.091$	−7.828 *** (−0.150) $p = 0.005$	−1.981 *** (−0.155) $p = 0.004$	−3.303** (−0.125) $p = 0.017$	−2.480 * (−0.101) $p = 0.061$
R <sup>2</sup>	0.042	0.051	0.120	0.033	0.137	0.151	0.184	0.131
Adjusted R <sup>2</sup>	−0.002	0.008	0.080	−0.012	0.113	0.127	0.162	0.104
ΔR <sup>2</sup>	0.026	0.014	0.023	0.030	0.118	0.076	0.081	0.096
F	0.964	1.174	2.976	0.734	5.672	6.342	8.073	4.964
ΔF	0.868	0.469	0.832	0.964	7.042	4.629	5.099	5.105

For high school students in Beijing, the results differed significantly from those of the total sample. The frequency of trips outside the city had a significantly negative effect on students' English scores. In addition, the father's education had a significant positive effect on the total scores of Beijing high school students. It indicates that the father's education is an important element in improving the total scores of Beijing students, and fathers with a high level of education tend to be able to provide high quality educational resources for their children, thus ensuring successful learning outcomes. Except for these findings, the rest of the results were not significant.

#### 4.4. The Effect of Family Cultural Capital on the Academic Achievement for Females and Males

Based on the above model, the relevant samples of high school students of different genders were tested. The estimation results are shown in Table 6.

**Table 6.** The effect of family cultural capital on academic achievement for females and males.

Variable	Males				Females			
	Total Score	Chinese	Math	English	Total Score	Chinese	Math	English
Grade	0.583 (0.007) $p = 0.848$	2.221 *** (0.124) $p = 0.006$	−3.776 ** (−0.097) $p = 0.011$	2.139 (0.057) $p = 0.127$	−1.777 (−0.020) $p = 0.543$	4.522 *** (0.252) $p = 0.000$	−8.112 *** (−0.175) $p = 0.000$	1.812 (0.049) $p = 0.161$
Region	76.575 *** (0.496) $p = 0.000$	8.464 *** (0.262) $p = 0.002$	32.280 *** (0.457) $p = 0.000$	35.831 *** (0.525) $p = 0.000$	89.093 *** (0.618) $p = 0.000$	15.147 *** (0.530) $p = 0.000$	45.268 *** (0.613) $p = 0.000$	28.678 *** (0.485) $p = 0.000$
Number of children in family	6.838 (0.065) $p = 0.180$	−0.069 (−0.003) $p = 0.959$	4.207 * (0.088) $p = 0.088$	2.700 (0.058) $p = 0.249$	2.013 (0.025) $p = 0.578$	1.030 (0.064) $p = 0.273$	0.527 (0.013) $p = 0.787$	0.456 (0.014) $p = 0.775$
Father's education	1.826 (0.041) $p = 0.609$	−0.146 (−0.016) $p = 0.876$	1.607 (0.079) $p = 0.352$	0.365 (0.019) $p = 0.824$	5.041 * (0.119) $p = 0.070$	1.106 (0.131) $p = 0.126$	1.982 (0.091) $p = 0.186$	1.953 (0.112) $p = 0.112$
Personal talent	4.101 ** (0.104) $p = 0.014$	1.033 ** (0.124) $p = 0.018$	1.634 ** (0.090) $p = 0.042$	1.434 * (0.082) $p = 0.060$	3.181 * (0.077) $p = 0.074$	0.571 (0.069) $p = 0.215$	0.622 (0.029) $p = 0.515$	1.987 ** (0.116) $p = 0.012$
Frequency of visits to science museums	9.689 ** (0.155) $p = 0.023$	1.603 (0.122) $p = 0.152$	3.492 * (0.122) $p = 0.090$	4.594 ** (0.166) $p = 0.019$	−1.381 (−0.021) $p = 0.702$	−0.455 (−0.034) $p = 0.627$	−1.602 (−0.047) $p = 0.410$	0.676 (0.025) $p = 0.672$
Frequency of traveling outside the city	−8.677 *** (−0.140) $p = 0.004$	−1.839 ** (−0.142) $p = 0.020$	−3.677 ** (−0.130) $p = 0.012$	−3.160 ** (−0.116) $p = 0.022$	−0.223 (−0.003) $p = 0.934$	−0.401 (−0.031) $p = 0.568$	−0.016 (0.000) $p = 0.991$	0.194 (0.007) $p = 0.871$
R <sup>2</sup>	0.551	0.296	0.497	0.514	0.616	0.344	0.576	0.556
Adjusted R <sup>2</sup>	0.535	0.271	0.480	0.497	0.603	0.321	0.561	0.541
ΔR <sup>2</sup>	0.065	0.072	0.055	0.048	0.017	0.014	0.011	0.027
F	35.026	11.977	28.232	30.145	46.733	15.249	39.455	36.462
ΔF	5.925	4.216	4.526	4.037	1.911	0.928	1.123	2.586

For male students, personal talent had a significantly positive effect on their total scores, Chinese, math, and English scores. In addition, the frequency of visiting science museums had a significantly positive effect on male students' total scores, math, and English scores. However, the frequency of traveling outside the city had a significantly negative effect on their total scores, Chinese, math, and English scores.

For female students, their father's education had a significantly positive effect on their total scores, which was consistent with the estimation results of the sample of high school students in Beijing. In addition, personal talent had a significantly positive effect on both the total and English scores of female students.

## 5. Discussion

### 5.1. The Influence of Family Cultural Capital on Students' Academic Achievement

This study found that family cultural capital had a significant effect on high school students' academic achievement, thus validating the relevant findings of previous studies [18,36,42]. We discovered a high intergenerational transfer of cultural capital. Parents with a high level of education gave their children the resources they needed to succeed in school. Participants who participated in highbrow cultural activities were more likely to achieve success in school [29]. Jæger and Karlson [15] suggested that parents' cultural capital positively influenced the likelihood of their children completing college education and that parents were able to translate their cultural strengths into strengths for their offspring, thus helping their children achieve better academic success.

#### 5.1.1. Institutionalized State Had a Significant Effect on Students' Academic Achievement

In terms of institutionalized cultural capital, a mother's education positively influenced students' math scores, English scores, and overall scores, except for Chinese scores. The higher the mother's education, the stronger this effect was. The findings mirrored the

study of Kraaykamp and van Eijck [29], which found that parents' institutionalized cultural capital had a considerable impact on their children's schooling levels.

In general, in most Chinese families, mothers are significantly more present with their children than fathers [43]. Thus, mothers play a decisive role in their children's home education. Some studies have shown that the more mothers are present, the higher the academic achievement of students [44]. Mothers with higher levels of education, representing higher levels of knowledge and advanced family education methods, can bring better educational conditions for their children and play a significant role in intergenerational transmission [44,45]. Therefore, the mother's influence on her children's academic achievement appears to be more direct, and the higher the mother's education, the higher the academic achievement of her children. As a result, mothers' positions in education should be acknowledged and their beneficial contributions to children's education should be made. The involvement of fathers in their children's development should be adequately increased to balance the contribution of parental education, since fathers also play a significant role in education [46].

#### 5.1.2. Embodied State Had a Significant Effect on Students' Academic Achievement

In terms of embodied state, personal talent had a significantly positive effect on high school students' academic achievement. The findings supported the research of Byun, Schofer, and Kim [9], who found that the embodied cultural capital of Japanese students was significant for predicting academic success.

Personal talent had a significantly positive effect on high school students' academic achievement, and high school students' personal strengths as well as skills had a positive effect on enhancing interest in learning and maintaining academic passion, which in turn motivated learning [47]. The study validated previous research that highbrow culture had a catalytic effect on students' literacy and learning enhancement. Highbrow cultural orientation was an important indicator of cultural capital [37]. Parents provided their children with high-quality cultural resources that were valued and categorized as superior resources in society. These superior cultural resources, ultimately, influenced learners' level of knowledge [38].

The frequency of visiting science museums had a positive effect on high school students' overall scores and English scores. Science museums contain a wealth of knowledge that has a positive effect on both knowledge enrichment and literacy improvement [48]. At the same time, much of the knowledge in science museums is related to the STEM curriculum, and visiting the science museums not only increases students' scientific knowledge but also promotes the competence of science and technology literacy, thus positively affecting their learning outcomes [49]. Most contemporary science and technology exhibits are accompanied by English explanations [50]. Science communications are inseparable from the use of English, and most articles in high school English reading are also about science and technology topics [51]. Therefore, students can improve their English directly and indirectly by visiting a science museum.

The frequency of traveling outside cities had a significantly negative effect on students' academic achievement. Traveling outside the city could distract students from their studies, and the fatigue of the round-trip journey directly affects study efficiency, which in turn has a negative impact on academic achievement [52]. Home quarantine is generally required when leaving a city and returning from a trip out of town during the COVID-19 outbreak [5]. Although students who are isolated at home can study online, they lose the opportunity to learn and interact with teachers and fellow students [53]. As a result, this can significantly cut down on the efficiency of learning and affect the student's academic achievement.

#### 5.1.3. Objectified State Had No Significant Effect on Students' Academic Achievement

This study measured the objectified state of cultural capital by family book collection, and according to the results of the study, there was no significant effect of family book collection on the academic achievement of students. In other words, the supply of books in

the family collection does not affect the test scores of high school students. The results of this study validated the research of DiMaggio [11]. It suggested that a book collection does not affect academic achievement in high socioeconomic environments but is important for students' academic achievement in low socioeconomic status environments. Beijing is the premier region in China, Shandong is located in the eastern part of China, and both regions have a dominant economic development status [13,54]. Therefore, the sample selected for the study was in a high socioeconomic setting, and family book collection did not pose a significant effect on academic achievement. This study contradicts the study of Byun, Schofer, and Kim [9], which found that parental objectified cultural capital improved children's academic performance in South Korea. Objectified cultural capital, unlike embodied or institutionalized cultural capital, may be transmitted quickly. This transmissibility, however, only pertains to the material thing itself and not to the manner in which the spiritual object moves. The results paralleled previous findings that the ownership of cultural objects did not suggest a high level of cultural understanding [29].

Furthermore, the study's sample data were collected during the COVID-19 pandemic, which significantly altered students' learning styles. Since the outbreak of the COVID-19 pandemic, online learning has become the main method of learning for students during the lockdown [55]. With UNESCO's advocacy, most countries have closed their schools in favor of online teaching and learning [56,57]. In addition, with the rapid development of online teaching, the paper version of books has gradually begun to decrease. As a result, book collections are no longer a significant determinant in students' academic success while learning online. At this age, learning is highly dependent on parental support and supervision, and learning environments [58]. The conventional sources of cultural wealth, including family book collections, have a very limited function in this situation.

## 5.2. *The Influence of Family Cultural Capital on Students' Academic Achievement in Different Regions*

### 5.2.1. *Fathers' Education Had a Significant Effect on the Overall Scores of Beijing Students*

This study indicates that the father's education positively affects the total score of high school students in Beijing, and that the father's education plays an important role in improving children's academic achievement. Beijing, as China's premier region, has an extremely high level of educational resources in the country and has obvious advantages in economic, technological, and cultural aspects [13]. Beijing has an assignment system for selecting schools for students in compulsory education [59], so the main conditions that may influence children's education in Beijing are housing and parents' jobs [60]. School district housing is a prerequisite for school selection for most children, and for some students, parental occupation can also provide some preference in school selection [59]. Past studies indicated that a father's education contributed greatly to children's learning outcomes [46]. The results echoed previous findings that a father's education played a key role in the educational achievement of students in Beijing.

In accordance with the prior studies, more cultural possessions were owned by students whose parents had greater levels of education and whose father held a better position in the workforce. Greater education levels in parents are associated with higher occupational position [29]. Thus, families in this economic and social environment test the father's overall ability, especially his education, even more. All other things being equal, a higher father's education means a higher standard of living for the family, a higher socioeconomic status, and an expansion of social and educational resources, which can lead to better housing and better educational opportunities for the children [46,59]. This implies that the father's education can provide more direct or indirect assistance to the children's education and aid in their academic success.

### 5.2.2. *Mothers' Education Had a Significant Effect on Shandong Students' Math, English and Total Scores*

The results showed that the mother's education had a significant impact on the total scores, math, and English scores of Shandong high school students. The significant effect

of a mother's education indicates that a mother's education is a key factor in students' school success. The academic performance of urban students is more influenced by the socioeconomic status of their families [61]. Compared to students in Beijing, the educational resources are relatively balanced, and the cost of education is relatively lower because it does not depend so much on the economic and social resources of prominent parents. Past studies have shown that parental companionship determines a child's educational success [47]. Mothers are more willing to choose to accompany their children, and that maternal education is laying a solid foundation for the quality of education [43]. Therefore, the higher the mother's education, the more likely it is to promote the educational success of high school students.

#### 5.2.3. Embodied State Had a Significantly Negative Effect on Beijing Students

In the case of Beijing high school students, the frequency of trips outside the city had a significantly negative effect on high school students' English scores. When analyzing the learning and assessment patterns of Beijing high school students, it is easy to see that the English test has a total score of 150 points, with 50 points for listening and speaking, accounting for one third of the total score, and that the English listening and speaking test is in the form of a computer-based test, which requires students to continuously practice on the computer [62]. Frequent out-of-town trips deprive students of the opportunity to practice on the computer, and they will gradually become rusty in the listening and speaking situations, thus losing the advantage of learning English. Overall, frequent out-of-town trips deprive students of the language environment for English learning, which in turn affects English learning performance. As for Chinese and math, although students are not in school, they can still use online learning and communicate with teachers and classmates, which has little impact on learning outcomes.

#### 5.2.4. Embodied State Had a Significant Effect on Shandong Students

For high school students in Shandong, personal talent positively influenced both the outcome of individual subjects and overall performance, suggesting that high school students in Shandong who mastered a personal talent could produce their school success. The frequency of visiting museums and art galleries had a significant positive effect on Chinese scores. Visiting museums and art galleries is a kind of highbrow culture that can visualize the charm of humanities knowledge [51], help high school students improve their Chinese language skills and cultural awareness, and, thus, help improve their Chinese performance.

As with the total sample parameters, the frequency of visiting science museums had a significant effect on the total score and English scores of Shandong students. Moreover, science activities are mostly involved in multiple subjects and English is an important medium for science exhibitions. Visiting science museums helps students to accumulate comprehensive knowledge and improve their English proficiency [48].

Additionally, traveling outside the city had a substantial detrimental impact on each participant, much like with the characteristics of the whole sample. This demonstrates that for Shandong students, leaving the city might have a detrimental effect on their academic performance. Students in Shandong will do worse academically if they leave their city, particularly in light of the COVID-19 pandemic. Therefore, during the school closure period, it is ideal for Shandong's high school students to remain in the city.

Based on the above findings, the aspects of embodied cultural capital have a greater influence on academic accomplishment among Shandong high school students than among Beijing high school students. In other words, in terms of highbrow culture, high school students from Shandong have a substantially greater influence on academic accomplishment than Beijing high school students. As a result, instruction needs to be adapted to the learning preferences of students from various geographic locations.

### 5.3. The Influence of Family Cultural Capital on Students' Academic Achievement for Different Genders

#### 5.3.1. The Father's Education and Students' Personal Talent Had a Positive Effect on the Academic Achievement of Female Students

The study found that institutionalized cultural capital had a strong intergenerational effect on female high school students and that a father's education has a positive effect on girls' overall scores. The findings were in line with the father's gendered cultural capital from the study of Sheng [63]. The results of this study confirmed that the father's education level influenced the school success of his daughter [64]. Therefore, the role of fathers in their daughters' education is highlighted here; the higher the level of a father's education, the more beneficial it is for their daughters' educational growth. Therefore, fathers take on a higher responsibility in terms of their educational qualifications. As fathers, it is undoubtedly very beneficial for their daughters to upgrade their educational level.

Moreover, quality education promotes human capital enhancement, and upgrading education level is an effective way to enhance human capital, which leads to economic rewards and decent jobs, thus reducing poverty and gender inequality [2]. Therefore, the father's education plays a role in laying the foundation for his daughter's human capital enhancement. Fathers' educational advancements contribute to their daughters' future educational gains and girls' educational sustainability. At the same time, the personal talents of girls could be properly cultivated, the competence to appreciate highbrow culture could be cultivated, and the embodied cultural capital of girls could also be enhanced, thus promoting gender equality in education.

#### 5.3.2. The Institutionalized State and Embodied State Had Different Effect on Male Students' Academic Achievement

Institutionalized cultural capital had no significant effect on the academic achievement of male high school students, which meant that both their fathers' education and their mothers' education did not play a significant role in the academic achievement of male high school students. The personal talent and the frequency of visiting science museums had a positive effect on the performance of male students. Therefore, the personal talents of male students could be highly developed. Previous research suggested that boys were more interested in science and technology subjects than girls and had an advantage in academic performance in STEM subjects [65]. Boys tend to choose science and technology subjects, while girls tend to choose liberal arts and social science subjects [66,67]. Therefore, the development of personal talents and increasing the frequency of science museum visits could effectively contribute to the academic achievement of boys.

At the same time, educators should promote girls' interest in science and technology and increase the proportion of girls in STEM education, as increased gender equality could also promote boys' academic development [66]. In addition, out-of-town travel had a negative impact on male students. Therefore, out-of-town travel by male students should be reduced, especially during the COVID-19 pandemic, and reducing unnecessary mobility could effectively reduce its negative impact on male students' academic performance.

## 6. Conclusions

In summary, this study investigated the effects of family cultural capital on high school students' academic success and the differences by region and by gender. Cultural capital contributed to high school students' academic success in different ways. The study found that institutionalized and embodied cultural capital played a major intergenerational role in children's school success, while the role of objectified cultural capital did not. The effects of cultural capital on high school students' academic success differed by region and by gender. The school success of students in Beijing was highly influenced by their fathers' education, whereas students' achievement in Shandong was significantly influenced by their mothers' education. Highbrow culture had a more significant impact on students in Shandong than students in Beijing. Out-of-town travel had a negative effect on high school students in both regions. Meanwhile, girls' academic achievement was dependent on their

fathers' education level, while boys were not influenced by their parental education level. Highbrow culture had a greater impact on boys than on girls.

This study has made three main contributions. First, most of the early studies of cultural capital were conducted in English-speaking countries with Euro-American cultural backgrounds. Cultural capital has rarely been studied in countries where English is not spoken, especially in developing countries. This study provides a valuable reference for scholars around the world because it investigates the relationship between cultural capital and academic achievement of high school students in non-English-speaking countries. The second contribution is a theoretical breakthrough. The study conducts a theoretical breakthrough in the effect of embodied cultural capital on academic achievement. This study also provides evidence that cultural capital is a multifaceted construct that contributes differently to the impact of student achievement and that the impact varies across regions and across genders. More specifically, this study selects the same cultural capital indicator measurement strategy to make meaningful comparisons between cultural capital and achievement across two regions and across students of different genders. It contributes to the in-depth study of cultural capital theory. The third innovation considers the impact of the COVID-19 pandemic and educational sustainability. This study investigates the cultural capital of high school students and their academic achievement during the school closure and explores the specific impact of cultural capital on student learning outcomes in different dimensions. This has implications for the study of cultural capital and the sustainability of education equality under uncertain conditions.

Based on the above findings, we draw the following implications: First, given the important role of cultural capital in influencing academic success, from the perspective of educational equity and sustainability, we should help students whose cultural capital is disadvantaged. The nation and educational administrations should support children from poor families based on financial aid bonuses to compensate for the lack of educational resources in cultural capital. At the same time, schools and families should actively guide students' independent development, enhance their internal drive and motivation to learn, and promote the willpower and sustainability of personal learning [68,69]. This will enhance the individual's human capital and get rid of the current unfavorable situation of cultural capital effect.

Second, families with disadvantaged cultural capital could draw on other resources to make up for the lack of cultural capital in their families. Schools could offer individualized courses, such as science classes, and art and aesthetic classes, to promote the highbrow culture for the disadvantaged groups. What is more, parents should spend more time with their children. Both parents should be responsible for their children's education, and apart from financial support, they should also invest in education and time. We should strengthen the importance of cultural capital, so that cultural capital can really play a role in children's growth.

Third, we should adopt different educational approaches for students from different regions and genders, and tailor education according to their needs. Depending on the impact of the different dimensions of cultural capital, we should promote regional and gender equity in education from a sustainable development perspective. In addition to this, schools and parents should develop different approaches and multiple evaluations for students. In cases of school closure and home study, schools should make appropriate examination reforms to assess students in multiple ways.

## 7. Limitations and Future Work

This study investigated the effect of family cultural capital on academic achievement among high school students in the context of the COVID-19 pandemic. The effect of non-pandemic conditions was not considered. Future research could compare the differences in the effects of cultural capital on students' academic achievement across time. In addition, the study took high school students in Beijing and Shandong as samples but did not involve students in central or western regions, especially those with weak cultural capital and

economically underdeveloped regions. Future studies could compare the eastern, central, and western regions. Finally, the objectified cultural capital considered in this study was mainly the number of books in the family collection, and the scope of objectified cultural capital in the future could include more aspects, such as electronic resources. Under the influence of the lockdown, parental companionship education plays the role of an emerging cultural capital, which can be explored in future studies.

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