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ORIGINAL ARTICLE

The Relationship between Loneliness, Self-Efficacy, and Satisfaction with Life in Left-Behind Middle School Students in China: Taking Binhai County of Jiangsu Province as an Example

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Abstract.

Objective: To explore the relationship between loneliness, self-efficacy, and satisfaction with life of Left-behind middle school students in China.

Methods: A cluster random sampling method was used to study students from Left-behind middle schools in Binhai County of Jiangsu Province. The loneliness scale, general self-efficacy scale, and satisfaction with life scale were used to conduct questionnaire surveys.

Results: Compared with non-left behind middle school students, Left-behind middle school students had higher loneliness, lower self-efficacy, and satisfaction with life. There were significant gender differences in loneliness and satisfaction with life of the two types of students. Whether to live in school or not had an insignificant impact on the loneliness and satisfaction with life of Left-behind middle school students. Loneliness had a significant negative predictive effect on the satisfaction with Left-behind middle school students' life and self-efficacy. In predicting satisfaction with life by loneliness, self-efficacy generally played a part of the mediating role, which could partially buffer the adverse effects of loneliness on student satisfaction with life.

Conclusion: The mental health of left-behind middle school students should arouse the common concern of family, school and society. Try to do some intervention counseling in reducing the experience of loneliness and enhancing the sense of self-efficacy to improve their satisfaction with life and maintain a positive mental state.

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***Keywords**: Left-Behind Middle School Students; Loneliness; Self-Efficacy; Satisfaction with life*

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***Conflict of Interests**: None.*

Introduction

WITH the continuous development of China's industrialization and urbanization, many rural surplus laborers have poured into cities to look for jobs far away from their hometown, forming a "migrant worker wave" phenomenon. However, because they are restricted by the household registration (Hu Kou) policy, economic conditions, employment environment, urban enrollment conditions, and other factors, they usually do not bring their children with them into the city and can only leave them at the location of the household registration (Jiang, 2016; Tang et al., 2018). This makes it difficult for parents who are migrant workers to have the opportunity to accompany and take care of their children, resulting in the phenomenon of long-term separation of children from their parents during their growth (Zhao et al., 2017). In other words, the phenomenon of the "migrant worker wave" in contemporary China has formed a particular social group: Left-behind Children. According to the "Opinions on Strengthening the Care and Protection of Left-behind Children in Rural Areas" issued by the State Council in 2016, when both or one of the parents go out to work, and the other has no guardianship capacity, minors under 16 are Left-behind children. The long-term separation of parent and child and the lack of family education have brought many adverse effects on the life, learning, and growth of children Left-behind. Compared with non-left behind children, Left-behind children are more likely to have bad emotional and behavioral problems (Cheng & Sun, 2015; He, 2012) and lower satisfaction with life (Wei, 2015). This has gradually attracted attention from society, schools, and families. Left-behind children's mental health is becoming a critical public health issue in China. According to official statistics, from 2010 to 2014, approximately 61 million children in China were Left-behind in rural areas by their migrant parents. It accounts for nearly 22% of the country's total children (Yuan & Wang, 2016). As of 2016, the Ministry of Civil Affairs data showed that there were 9.02 million Left-behind children in rural areas across the country. This shows that governments at all levels in China have made great efforts to reduce the number of Left-behind children. Also, scholars have launched a lot of investigation and research. By 2020, searching for the "China National Knowledge Infrastructure (CNKI)" with "Left-behind children" as the keyword, a total of 6,752 entries have been retrieved, which has doubled compared to 2017 (Fu & Ling, 2017). It shows that Chinese academic circles have been paying attention to Left-behind children. However, in previous studies, more attention has been paid to Left-behind children's negative tendency, such as the adverse effects of Left-behind on their academic development and the unhealthy psychological and behavioral phenomena of Left-behind children (Yu & Zhang, 2010). In the past five years, researchers have gradually begun to focus on the positive psychological development of children Left-behind (Shao et al., 2018), which has made the research in this field more comprehensive.

Under the influence of positive psychology, the Dual-Factor Model of Mental Health (DFM) has broken through the previous psychopathological indicators as the only standard for measuring mental health, incorporating the concept of subjective well-

being (Greenspoon & Saklofske, 2001). This covers life satisfaction, positive and negative emotions (Diener, 2000). Among which life satisfaction can better reflect the subjective well-being of Chinese people (Sun et al., 2010) and can replace subjective well-being as a positive indicator of middle school students' mental health (Hai et al., 2015). Therefore, this study uses life satisfaction as a measure of Left-behind middle school students' mental health. The satisfaction with students' lives is the subjective evaluation of the individual's life based on the standard set by themselves (Zhong et al., 2007). Studies have shown that satisfaction with life is closely related to students' anxiety, depression, and other harmful emotions, as well as problem behaviors such as dropouts (de Vasconcelos, 2020; Han & Zhang, 2020). Therefore, further exploration of the influencing factors and mechanism of satisfaction with Chinese life Left-behind children is of great value to their physical and mental health and academic education.

Satisfaction with life is the core indicator of subjective well-being (Cowen, 1994). Many studies have shown that loneliness negatively predicts subjective well-being and is a significant predictor (Arslan, 2020; Rew, 2002). Due to the particularity of Left-behind children's family status, the academic community pays more attention to their unique loneliness. Studies have shown that 50% of Left-behind children are lonely for a long time, and loneliness is their most common emotional experience (Zhou & Yao, 2011). The loneliness of Left-behind children is significantly higher than that of non-left behind children (Fan et al., 2017; Ren & Shen, 2008). However, another study found that compared with non-left behind children, children's loneliness experience did not increase significantly (Wang et al., 2011; Zhang et al., 2012). Therefore, there is controversy about the loneliness research of Left-behind children, and it is necessary to explore the loneliness of Left-behind children further.

Most studies show that loneliness and life satisfaction are significantly negatively correlated; that is, loneliness significantly negatively predicts life satisfaction (Salimi, 2011; Su, 2016). However, some studies show that loneliness is positively correlated with life satisfaction (Turan, 2020), which may because studies were based on senior people (Ye et al., 2016; Zou & Yang, 2017). However, Turan et al. used college students as the research object. So far, the relationship between loneliness and satisfaction with life of different groups may have different results. Previous studies have ignored the relationship between loneliness and satisfaction with the life of the select group of Left-behind children. Therefore, this research explores the relationship between loneliness and satisfaction with life of Left-behind children and then provides a theoretical basis for improving life satisfaction.

Left-behind children are in a disadvantaged situation of being separated from their parents for a long time. They may be more likely to have destructive emotions and problem behaviors. However, not all children will have these bad problems. Researchers have gradually realized that unfavorable environments do not necessarily lead to developmental disadvantages; some children develop very well, facing the same pressure. In contrast, others develop poorly (Zhang et al., 2012), and then the Theory of Children's Resilience Development (Zeng & Li, 2003). The theory's core point is that when an individual is in a disadvantaged situation, the individual's psychological resili-

ence can help him cope with pressure or adversity and develop and grow. Risk factors hinder the development of children's psychological resilience, while protective factors can reduce children's unfavorable environments and ultimately promote psychological resilience. Many researchers currently divide protective factors into individual factors, family factors, and non-family factors (Zhang, 2015). Existing empirical studies have shown that self-efficacy, as an essential protective factor of psychological resilience, can predict psychological resilience development (Chu et al., 2013). Bandura believes that self-efficacy is a hierarchical structure composed of general self-efficacy and task-related self-efficacy. The former is at the top, which refers to the general belief that an individual has in order to deal with challenges from different environments successfully or to deal with new things (Ersan et al., 2018; Li et al., 2019); the latter is at the bottom, which refers to the individual A specific belief that oneself can engage in specific activities related to a specific field of behavior (Li et al., 2019). Previous studies on middle school Left-behind children's self-efficacy paid more attention to task-related self-efficacy, such as emotional regulation self-efficacy, learning efficacy (Wang et al., 2017; Zhao & Wang, 2015), to middle school Left-behind. There are few studies on the general self-efficacy of children. However, task-related efficacy cannot represent general efficacy. Therefore, it is necessary to study the general self-efficacy of Left-behind middle school students to distinguish it from task-related self-efficacy.

Self-efficacy is an essential part of the social cognitive theory. As an external factor affecting mental health, self-efficacy has attracted more and more attention from scholars. Its relationship with mental health has been demonstrated in theoretical and empirical studies. At the theoretical level, both Health Belief Model and Protection Motivation Theory regard self-efficacy as a crucial factor affecting individual mental health (Babazadeh et al., 2016; Holden, 1991), and Social Cognitive Theory also proposes to have high self-efficacy of individuals present a higher level of positive factors for mental health (Silva, 2015). At the practical level, many studies have found a close connection between self-efficacy and mental health. The specific manifestation is that individuals with high self-efficacy tend to show higher levels of positive factors of mental health (satisfaction with life, self-esteem, and positive emotions), but low levels of negative factors (loneliness, depression, and negative emotions) (Li et al., 2019). Specifically, loneliness is negatively correlated with general self-efficacy (Dussault & Deaudelin, 2001; Yang et al., 2011; Zhou, 2014), and loneliness predicts self-efficacy (Al Khatib, 2012). There is a positive correlation between self-efficacy and satisfaction with life (Tan, 2008); self-efficacy positively predicts life satisfaction (Cikrikci & Odaci, 2015; Liang et al., 2019). Therefore, based on the theory of children's psychological resilience and previous related studies, this study predicts that general self-efficacy, as a protective factor affecting Left-behind children's loneliness, will mediate between loneliness and satisfaction with life.

In sum, there is a close relationship between loneliness, general self-efficacy, and satisfaction with life. However, whether there are differences in the loneliness of Left-behind children and non-left behind children is still controversial. Research on the relationship between loneliness and self-efficacy varies from group to group. There is

no research on loneliness and self-efficacy of middle school Left-behind children at the same time. Based on previous studies, only the primary school was examined, or the sample's age range was extensive. However, the mechanism of satisfaction with life of Left-behind children in adolescence in the middle school was not explored. Therefore, we focus our research on the middle school segment, explore the connection and difference between Left-behind middle school students and non-left behind middle school students in loneliness, general self-efficacy, and satisfaction with life, and further explore whether general self-efficacy is in loneliness Play an intermediary role with satisfaction with life. To deepen and promote the mental health education of Left-behind middle school students and promote their satisfaction with life to provide a scientific and practical theoretical basis. This study was reviewed by the Academic Ethics Committee of the School of Psychology, Nanjing Normal University. The questionnaires used in this study are all published results and do not involve any infringement.

Methodology

Research Object

In Binhai County, Jiangsu Province, four middle schools were randomly selected to conduct online questionnaire surveys, and the questionnaires were distributed by random cluster sampling. There were 4,513 people in this survey, and 4,229 valid questionnaires were returned, with an effective response rate of 93.71%. Among them, 977 children were Left-behind, and 3252 children were non-left behind, with an average age of (13.99±1.1) years old. In all Left-behind children, 502 were boys (51.4%) and 475 were girls (48.6%); 559 (57.2%) were live-in-school, 418 (42.8%) were non-school-livings; 236 (24.2%) were only children, 741 were non-only children (75.8%).

Research Tool

1. The Loneliness Scale: This study uses the third edition of the "UCLA loneliness scale," which Russell compiled in 1978 and was revised in 1995 by the domestic scholar Professor Dengfeng Wang. The scale has 20 items, and the score is divided into four levels: never, rarely, sometimes, and always. Scores above 44 points are high loneliness, 39-44 points are generally upper loneliness, 33-38 points are middle loneliness, 28-32 points are generally lower loneliness, and less than 28 points are low loneliness. The Cronbach α coefficient of this scale is 0.846.
2. Self-Efficacy Scale: Schwarzer compiled the general self-efficacy scale (GSES) used in this study in 1981, and it was revised to include ten items. The scale uses the Likert four-point method (1 = completely incorrect, 4 = completely correct), with a total score of 10-40 points. The higher the score, the higher the level of self-efficacy.
3. Satisfaction with Life Scale: This study uses the "Adolescent Student Satisfaction with life Scale" compiled by domestic scholar Xinggui Zhang et al. It con-

Table 1. Comparison of Loneliness, General Self-Efficacy, and Satisfaction with Life Between Left-Behind and Non-Left-Behind Middle School Students.

	Left-Behind Middle School Students (n = 977)	Non-Left-Behind Middle School Students (n = 3,252)	*t*	*Cohen' sd*
Loneliness	41.99 ± 9.47	40.70 ± 9.61	3.69***	0.14
General Self-Efficacy	23.68 ± 5.75	24.15 ± 5.70	-2.28*	0.08
Satisfaction with Life	176.08 ± 29.00	180.11 ± 28.00	-3.91***	0.14

*Note: *P < 0.05, **P < 0.01, ***P < 0.001.*

tains 36 items in 6 dimensions: the friendship satisfaction dimension and the family satisfaction dimension each contain seven items, the academic satisfaction dimension and the school satisfaction dimension each have six items, and the freedom satisfaction dimension and the environmental satisfaction dimension each have five items. The scale uses the Likert 7-level scoring method (1 point: strongly disagree; 2 points: disagree; 3 points: somewhat disagree; 4 points: neither agree nor disagree; 5 points: somewhat agree; 6 points: agree; 7 points: strongly agree). The dimensional coefficients and test-retest reliability of the scale are all above 0.62.

Statistical Analysis

The data were analyzed by SPSS17.0 statistical software. Quantitative data are expressed as Mean ± SD, and *t*-test, analysis of variance, and correlation analysis were performed between variables to clarify the relationship between loneliness, general self-efficacy, and satisfaction with life. According to Zhonglin Wen's three-step method, the intermediary effect test procedure is performed to test the relationship between the variables in turn (Wen et al., 2004), that is, loneliness is used as the independent variable, self-efficacy is generally the intermediary variable, and satisfaction with life is the dependent variable. Moreover, perform sequential regression analysis. $P < 0.05$ is considered statistically significant.

Results

Overall Situation

The results showed that Left-behind middle school students' loneliness was higher than that of non-left behind middle school students. Simultaneously, self-efficacy and satisfaction with life were lower than those of non-left behind middle school students, and both had statistical significance (**Table 1**).

Table 2. Demographic Variables Analysis of Loneliness of Left-Behind and Non-Left-Behind Middle School Students.

		Loneliness			
		Left-Behind Middle School Students	**Non-Left-Behind Middle School Students**	***t***	***Cohen' sd***
Gender	Male	41.27 ± 8.8	39.88 ± 9.11	3.03**	0.16
	Female	42.75 ± 10.07	41.65 ± 10.07	2.09*	0.11
	t	-2.46*			
	Cohen' sd	0.16			
Live in School	Yes	41.77 ± 9.16	42.01 ± 9.84	-0.42	0.03
	No	42.28 ± 9.87	40.42 ± 9.54	3.70**	0.19
	t	-0.84			
	Cohen' sd	0.05			
Only Child	Yes	41.87 ± 9.16	40.55 ± 9.30	1.81	0.14
	No	42.03 ± 9.57	40.03 ± 9.57	3.25***	0. 21
	t	-0.23			
	Cohen' sd	0.02			

*Note: *P < 0.05, **P < 0.01, ***P < 0.001.*

Analysis of Loneliness on Various Demographic Variables

Survey results showed (**Table 2**):

1. The loneliness of girls Left-behind was higher than that of boys, and it was statistically significant. Whether it was a boy or a girl, the Left-behind's loneliness was generally higher than that of the non-left behind, and both were statistically significant.
2. The loneliness of non-live-in-school students Left-behind middle school students was higher than that of live-in-school, but it was not statistically significant. Among live-in-school students, the Left-behind's loneliness was slightly lower than that of the non-left behind, but it was not statistically significant. Among non-live-in-school students, the Left-behind's loneliness was higher than that of the non-left behind, and it was statistically significant.
3. The loneliness of non-only children among Left-behind middle school students was higher than that of only children, but it was not statistically significant. Among only children, the Left-behind's loneliness was slightly higher than that of the non-left behind, but it was not statistically significant. Among non-only children, the Left-behind's loneliness was higher than that of the non-left behind, and it was statistically significant.

Table 3. Demographic Variables Analysis of General Self-Efficacy of Left-Behind and Non-Left-Behind Middle School Students.

		General Self-Efficacy			
		Left-Behind Middle School Students	**Non-Left-Behind Middle School Students**	***t***	***Cohen' sd***
Gender	Male	23.85 ± 8.53	24.35 ± 5.78	-1.68	0.08
	Female	23.49 ± 5.66	23.93 ± 5.59	-1.49	0.08
	t	0.98			
	Cohen' sd	0.06			
Live in School	Yes	24.04 ± 5.75	23.97 ± 5.60	0.23	0.01
	No	23.19 ± 5.72	24.19 ± 5.72	-3.33**	0.18
	t	2.29*			
	Cohen' sd	0.15			
Only Child	Yes	23.99 ± 6.05	24.37 ± 5.83	-0.83	0.06
	No	23.58 ± 5.65	24.11 ± 5.67	-2.27*	0.09
	t	0.96			
	Cohen' sd	0.07			

*Note: *P < 0.05, **P < 0.01, ***P < 0.001.*

Analysis of General Self-Efficacy on Various Demographic Variables

Survey results showed (**Table 3**):

1. The self-efficacy of Left-behind boys was slightly higher than that of Left-behind girls, but it was not statistically significant. Whether it was a boy or a girl, the self-efficacy of Left-behind was generally slightly lower than that of non-left behind, but no statistical significance existed.
2. The self-efficacy of live-in-school students among Left-behind middle school students was higher than that of non-live-in-school students, and it was statistically significant. Among live-in-school students, the Left-behind self-efficacy was slightly higher than that of non-left behind, but it was not statistically significant. Among non-live-in-school students, the Left-behind's self-efficacy was lower than that of the non-left behind, and it was statistically significant.
3. The self-efficacy of the only child Left-behind middle school students was slightly higher than that of the non-only child, but it was not statistically significant. Among the only children, the Left-behind's self-efficacy was slightly lower than that of the Left-behind, but it was not statistically significant. Among non-only children, the Left-behind's self-efficacy was lower than that of the non-left behind, and it was statistically significant.

Table 4. Demographic Variables Analysis of Satisfaction with Life of Left-Behind and Non-Left-Behind Middle School Students.

		Satisfaction with Life			
		Left-Behind Middle School Students	**Non-Left-Behind Middle School Students**	***t***	***Cohen' sd***
Gender	Male	177.60 ± 27.46	181.32 ± 26.80	-2.73**	0.14
	Female	174.48 ± 30.50	178.70 ± 29.28	-2.71**	0.14
	t	1.68			
	Cohen' sd	0.11			
Live in School	Yes	177.39 ± 29.22	180.11 ± 27.41	-1.62	0.10
	No	174.33 ± 28.65	180.11 ± 28.14	-3.90***	0.20
	t	1.64			
	Cohen' sd	0.11			
Only Child	Yes	176.76 ± 29.64	179.58 ± 28.33	-1.25	0.10
	No	175.86 ± 28.81	180.21 ± 27.95	-3.73***	0.15
	t	0.42			
	Cohen' sd	0.03			

*Note: *P < 0.05, **P < 0.01, ***P < 0.001.*

Analysis of Satisfaction with Life on Demographic Variables

Survey results showed (**Table 4**):

1. The satisfaction with boys' lives was slightly higher than that of girls Left-behind, but it was not statistically significant. Whether it was a boy or a girl, the satisfaction with life of the Left-behind was lower than that of the non-left behind, and both had statistical significance.
2. The satisfaction with life of live-in-school students among Left-behind middle school students was higher than that of non-live-in-school students, but it was not statistically significant. Among live-in-school students, the satisfaction with life of the Left-behind was lower than that of the non-left behind, but it was not statistically significant. Among non-live-in-school students, the satisfaction with life of the Left-behind was lower than that of the non-left behind, and it was statistically significant.
3. The satisfaction with the only child Left-behind middle school students was higher than that of the non-only child, but it was not statistically significant. Among only children, the satisfaction with life of the Left-behind was slightly lower than that of the non-left behind, but it was not statistically significant. Among the non-only children, the satisfaction with life of the Left-behind was lower than that of the non-left behind, and it was statistically significant.

Table 5. Correlation Analysis of Loneliness, General Self-Efficacy, and Satisfaction with Life of Left-Behind Middle School Students.

	General Self-Efficacy	Loneliness
Satisfaction with Life	0.43**	-0.62**
Friendship Satisfaction	0.43**	-0.47**
Family Satisfaction	0.31**	-0.51**
Academic Satisfaction	0.43**	-0.97**
Free Satisfaction	0.34**	- 0.42**
School Satisfaction	0.23**	-0.53**
Environmental Satisfaction	0 .17**	-0.52**
Loneliness	-0.21**	1.00

*Note: *P < 0.05, **P < 0.01, ***P < 0.001.*

Correlation Analysis of Loneliness, General Self-Efficacy, and Satisfaction with Life of Left-behind Middle School Students

Table 5 shows that Left-behind middle school students' general self-efficacy is positively correlated with satisfaction with life. The same is true for all dimensions of satisfaction with life. Generally, self-efficacy is negatively correlated with loneliness. There is a negative correlation between loneliness and satisfaction with life and a negative correlation in specific dimensions.

Loneliness and Satisfaction with Life: Analysis of the Mediation Effect of General Self-Efficacy

According to the results of the correlation analysis, it was found that there is a negative correlation between loneliness and satisfaction with life in Left-behind middle school students, a positive correlation between self-efficacy and satisfaction with life, and a negative correlation between loneliness and self-efficacy. However, the causal relationship between the three was not clear. Therefore, the procedural test method was used to verify further whether there was a mediating effect (Wen et al., 2004).

Step 1. Take loneliness as the independent variable and satisfaction with life as the dependent variable to investigate loneliness's regression analysis on life satisfaction. The results showed that loneliness could predict life satisfaction, and the net explanation of variance was 37.8%.

Step 2. Take loneliness as the independent variable and general self-efficacy as the dependent variable to investigate loneliness's regression analysis on general self-efficacy. The results showed that loneliness could predict general self-efficacy, and the net explanation of variance was 5.5%, $P < 0.01$.

Table 6. The Mediating Role of Left-Behind Middle School Students' General Self-Efficacy in Loneliness and Satisfaction with Life (R Value).

	Predictor Variable	Outcome Variable	R^2	*F*	*β*	*t*
1st Step	Loneliness	Satisfaction with Life	0.38	2,571.93***	-0.62	-50.71***
2nd Step	Loneliness	General Self-Efficacy	0.06	245.44***	-0.23	-15.67***
3rd Step	Loneliness	Satisfaction with Life	0.47	1,837.81 ***	-0.54	-47.01***
	General Self-Efficacy				0.30	26.20***

*Note: *P < 0.05, **P < 0.01, ***P < 0.001.*

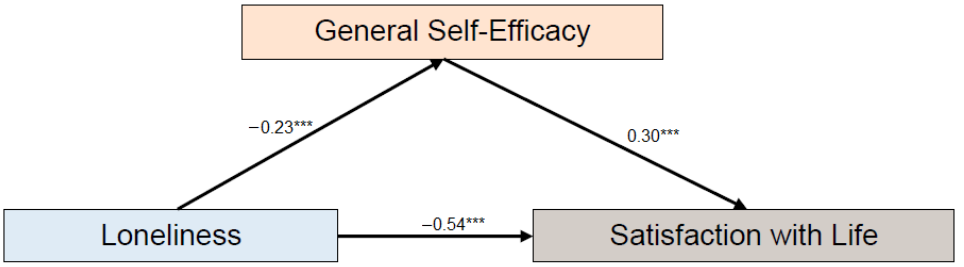

Figure 1. The Mediating Role of General Self-Efficacy between Loneliness and Satisfaction with Life.

Step 3. Use loneliness and general self-efficacy as independent variables and satisfaction with life as dependent variables to test the former's regression analysis. It was found that after introducing the general self-efficacy into the equation, the main effect of loneliness on satisfaction with life increased (from β = -0.62 to β = -0.54), and the net explanatory amount of variance increased to 46.5%. This showed that general self-efficacy plays a mediating effect between loneliness and satisfaction with life. The results are shown in **Table 6** and **Figure 1**.

Discussion

Analysis of the Results of the Loneliness in Left-behind Middle School Students

This study shows that the loneliness of Left-behind middle school students is significantly higher than that of non-left behind middle school students. This once again verifies that children Left-behind will experience more loneliness (Ren et al., 2020). Left-behind Due to long-term separation from their parents, children significantly lack emotional communication with their parents. Their personalities tend to become introverted, withdrawn, and have low gregariousness (Liu et al., 2007). They tend to feel lonely.

What is more noteworthy is that the loneliness of Left-behind girls is significantly higher than that of Left-behind boys, which is different from previous studies (Ren et al., 2020). Due to the unique delicate and sensitive emotional characteristics of girls' gender, their performance in adolescence becomes more apparent, making them more prone to mood swings when encountering frustration or stress, thus exhibiting symptoms such as anxiety, tension, and depression. The particular living state of Left-behind is more likely to lead to their lonely inner experience.

When investigating the impact of live-in-school on the loneliness of Left-behind middle school students, this study showed a phenomenon that was rarely involved in previous studies, that is, the loneliness of Left-behind live-in-school students was lower than left-behind non-live-in-school students and non-left behind live-in-school students. This is somewhat inconsistent with previous studies. When surveyed with general rural elementary and middle school students, the loneliness of live-in-school students was significantly higher than that of non-live-in-school students (Huang et al., 2009), which may be due to Huang et al. did not distinguish between Left-behind and non-left behind status. Another reason for the low loneliness of students who were left-behind live-in-school may be that their live-in-school experience has increased the interaction with peers and the integration in the group, to some extent, alleviated their loneliness.

Although the loneliness of Left-behind live-in-school students is lower than that of Left-behind non-live-in-school students and non-left behind live-in-school students, there is a difference between them. It is not significant. This may be due to the uneven collection of Left-behind and non-left behind samples in this study. Besides, the difference in the effects of live-in-school and only-child status on the Left-behind loneliness was not statistically significant. However, it can be seen from the data that the loneliness of live-in-school Left-behind students was lower than non-live-in-school Left-behind students, and the loneliness of only-child Left-behind students was lower than non-only-child Left-behind students. This result may be related to that live-in-school increases the chances of peer interaction; that is, more companions reduce the loneliness experience of live-in-school Left-behind students. Students with only children Left-behind became the only concern of parents. Multiple children would weaken parents' attention to a child, resulting in slightly higher loneliness of students who were not only-child Left-behind than those who are only-child Left-behind.

Analysis of General Self-Efficacy Results of Left-behind Middle School Students

This study also found significant differences in general self-efficacy between Left-behind middle school students and non-left behind middle school students, consistent with previous studies (Zhao et al., 2012). Specifically, Left-behind middle school students' general self-efficacy was significantly lower than that of non-left behind middle school students. Moreover, this study further found that the self-efficacy of live-in-school Left-behind students is higher than that of non-live-in-school Left-behind students. This shows that live-in-school has a positive effect on the self-efficacy training and development of Left-behind middle school students. This is similar to the results of the aforementioned loneliness. Live-in-school students study and live with their peers for a long time and spend relatively little time alone. In addition, teachers and live-in-school students get along day and night, to a certain extent, to make up for the lack of parents' absence, and their care and encouragement will also make Left-behind children more confident (Qi & Yang, 2013).

Analysis of the Results of Satisfaction with Life in Left-behind Middle School Students

Also, Left-behind with previous studies, the satisfaction with life Left-behind loneliness above was significantly lower than that of non-left behind ones (Su, 2017). We believe that the right family education environment is also an essential impact on children's satisfaction with life, especially parents' companionship and care (Song et al., 2018). Children in the Left-behind state lack family support and timely empathy and supervision from their parents, which will undoubtedly increase the emotional distress and various pressures of Left-behind children (Wen & Lin, 2011), thereby reducing the happiness of Left-behind students sense. Although the parents and the student may not separate around all the year-round, the parents can communicate with the children regularly through the Internet media, inquire about the children's learning and living conditions, partially compensate for the lack of parent-child communication and parental companionship of the Left-behind children, and improve their physical and mental development and social adaptation (Niu et al., 2019).

Analysis of the Mediating Role of General Self-Efficacy between Loneliness and Satisfaction with Life

This study explored the relationship between the loneliness of Left-behind middle school students, general self-efficacy, and satisfaction with life through intermediary analysis and found that Left-behind middle school students' loneliness can directly negatively predict satisfaction with life. This is consistent with previous studies on the elderly population (Wang & Yao, 2020), but it is different from the university student population (Turan, 2020). This may be due to the difference between the Left-behind children and the elderly passively facing the lack of family intimacy (Ye et al., 2016). At the same time, because one or both parents are not around, the interaction between the Left-behind child and the parent is reduced, which is not conducive to the formation of a secure attachment relationship, and it will also negatively affect the Left-behind

child to form a favorable and trustworthy relationship with other people such as peers and teachers (Ren, 2020). When the Left-behind middle school students with higher loneliness are subjectively evaluating their living conditions, they do not get enough support from others and cannot meet their psychological expectations; they are likely to generally show a low level of life satisfaction. Secondly, generally, self-efficacy plays a part in the intermediary role between loneliness and satisfaction with life. In other words, the loneliness of Left-behind middle school students will affect their satisfaction with life, part of which is generated through general self-efficacy mediation. According to Bandura's self-efficacy theory, other factors that affect self-efficacy include support from others, mental state, and personality. Loneliness belongs to the individual's internal psychological state and is an essential factor affecting self-efficacy (Yong & Du, 2019). Also, multiple studies have found that damaging loneliness may cause depression, low self-esteem, and shyness, and other psychological and behavioral manifestations (Dai et al., 2017; Li et al., 2013), and tend to withdraw and deny themselves, thereby reducing self-efficacy, which impact on life satisfaction. Also, loneliness negatively predicts general self-efficacy, and general self-efficacy positively predicts satisfaction with life, which fully supports the theory of children's psychological resilience. That is, general self-efficacy, as a protective factor, can help Left-behind children actively cope with loneliness caused by disadvantaged situations; at the same time, this also suggests that we can improve children's satisfaction with life the general self-efficacy of Left-behind children.

Significance and Application Value of the Study

The mental health of children Left-behind in China has been a hot issue that society has paid close attention to in recent years. This problem's emergence and response are related to all aspects of family, school, and society. According to the results of this study, the loneliness experience of Left-behind middle school students is reduced. At the same time, their self-efficacy is improved, which can effectively improve their satisfaction with life. In order to realize this vision, some work can be done from the following aspects.

1. **School Level.** The emphasis is on creating a harmonious campus and class atmosphere to form a good relationship between peers and teachers. Consider carrying out group counseling activities to enhance the self-esteem and self-confidence of Left-behind middle school students. It can also help Left-behind middle school students actively cope with bad emotional experiences such as loneliness and anxiety through case consultation and behavior modification. According to this study's results, choosing boarding schools for Left-behind middle school students may be a useful measure because boarding schools generally implement closed management, which has a good supervision effect on Left-behind children. Moreover, it can reduce the bad behavior problems caused by an unsupervised state. For live-in-school students, the time spent with peers and teachers is significantly longer. The school teacher temporarily assumes the role of "surrogate parent," supervises students' learning while tak-

ing care of their lives, and can promptly find out their learning, life, and psychological problems and provide help and guidance, so the support from peers and teachers can significantly reduce the loneliness of the Left-behind students.

2. **Family Level.** Left-behind children's parents cannot be with them, but they should try their best to contact the child, strengthen communication with the child, and understand their problems and needs. The object of this research is Left-behind, middle school students. The physiology and psychology of children of this age are undergoing tremendous changes, and they are prone to deviations in their outlook on life and values. They tend to keep some troubles and confusions in their hearts. On the one hand, parents must understand the physical and mental changes of children during a particular period, and on the other hand, they must spare no effort to provide them with timely help. Although the barrier of physical distance, in reality, cannot make parent-child closer contact, with the help of some modern communication tools, it is still possible to maintain close contact with children at a psychological distance. Even if just listen to children's confession is a great relief and support to them.
3. **Individual Level.** According to the well-known psychologist Erikson's theory of personality development, children in middle school are in puberty, and their instincts will bring some problems. It is incredibly easy to feel confused when facing new social requirements and social conflicts. The biggest crisis at this stage is self-identity and role confusion. It is even more critical for Left-behind middle school students to learn to understand themselves from multiple angles correctly. By participating in some beneficial group activities to expand their friends, they accumulate more positive emotional experience, based on proper attribution to face the negative emotions in their lives. Of course, students must also learn to seek all kinds of social support activities and use others' power to gain personal growth, improving self-efficacy.

There are still some shortcomings in this research that need to be improved in future research. First of all, this study adopts a cross-sectional design to reveal the simultaneity relationship between loneliness, general self-efficacy, and life satisfaction. Studies have shown that loneliness has a significant upward trend in adolescence. Adolescents in grades 7 and 8 spend more time alone than children in grades 5 and 6, and their attitude towards being alone is more favorable (Liu et al., 2013). Therefore, it is necessary to adopt a tracking design in the future to examine the development and changes of Left-behind children's loneliness, general self-efficacy, and satisfaction with life over a more extended period, as well as possible dynamic connections, in order to fully and deeply clarify the impact of loneliness on satisfaction with life of children of a certain age in the context of Left-behind. Secondly, this study only reveals the influence of general self-efficacy on satisfaction with life. According to Bandura's self-efficacy theory, self-efficacy is affected by individual success experience, others' substitution experience, verbal persuasion, and physical and emotional states. In the future, based on existing research, tentative interventions can be made on the general self-efficacy of

Left-behind children to clarify the mechanism of general self-efficacy between loneliness and satisfaction with life more clearly and comprehensively.

Conclusions

This study draws the following conclusions:

1. The loneliness experience of Left-behind middle school students is significantly higher than that of non-left behind middle school students. The loneliness experience of girls is significantly higher than that of boys.
2. The general self-efficacy of Left-behind middle school students is significantly lower than that of non-left behind middle school students. The self-efficacy of live-in-school Left-behind students is significantly higher than that of non-live-in-school Left-behind students.
3. The level of satisfaction with Left-behind middle school students' life is significantly lower than that of non-left behind middle school students. However, there is no significant difference in factors such as gender, live-in-school, an only child.
4. Loneliness negatively predicts general self-efficacy and satisfaction with the life of Left-behind middle school students. General self-efficacy plays an intermediary role in the relationship of loneliness, predicting satisfaction with life.

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ARTICLE

School Governance Structure and Its Impact on Student Performance: A Comparative Study between Four Provinces of China and the PISA2015 High-Scored Countries/Economies

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Abstract*. Improving the school governance structure and establishing a modern school system are the current research focuses in elementary and middle school management. Through a comparative analysis of the school governance structure of four provinces and cities in China (Beijing-Shanghai-Jiangsu-Guangdong, BSJG) and PISA2015 high-scored countries/economies, we found that the school autonomy in seven major aspects including "teacher selection, teacher dismissal, evaluation policy, enrollment policy, textbook selection, curriculum content, and curriculum design" in BSJG schools was significantly lower than that of high-scored countries/economies. The average decision-making of BSJG principals and teachers in various affairs was also substantially lower than the high-scored countries/economies. The multilevel analysis found that the impact of school governance structure on student performance presented different patterns between BSJG and high-scored countries/economies. Therefore, China needs to (i) expand the autonomy of school management further and establish a new government-school relationship; (ii) give priority to curriculum management and ensure its autonomy in schools; (iii) improve the principal accountability system, and strengthen the principal's power and responsibility in school management; (iv) strengthen democratic management, thereby promoting teachers' participation in the decision-making of school affairs.*

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Introduction

GOVERNANCE structure refers to the relationship between various interest groups in a public or private organization. It achieves the balance of relations by allocating power and operating mechanisms to ensure the organization's effective operation (Wang, 2007). In China, research on governance structure originated in the field of corporate management. After the "*Decision of the Central Government on Several Issues Concerning the Establishment of a Socialist Market Economic System*" was issued in the 1990s, many large and medium-sized state-owned enterprises were reorganized into corporate enterprises. And then the establishment of an effective corporate governance structure is the core of the corporate reform (Ma, 1994), so improving the corporate governance structure and establishing a modern corporate system have gradually become hot issues in the field of corporate management. With the strengthening of theoretical research, the improvement of legal policies, and the vigorous promotion of practice, a consensus has been reached on the ideal governance structure. It is believed that the ideal governance structure should be a relationship with clear responsibilities and rights, mutual restriction and balance, and mutual assistance based on clear property rights (Wu, 1996; Zheng & Wang, 2000; Yuan, 2000). However, in practice, due to various subjective and objective reasons, the governance structure of many companies is still far from the ideal state.

In elementary and middle school management, China has been implementing the principal accountability system since 1985. In May 1985, the *"Central Government's Decision on Educational System Reform*" required that "schools should gradually implement the principal accountability system, and schools with conditions should establish a small, prestigious school committee chaired by the principal as a review body. It is necessary to establish and improve the faculty representative assembly system with teachers as the main body and strengthen democratic management and supervision." (Central Government of China, 2017) The "*China Education Reform and Development Program*" issued by the Central Government and the State Council in 1993 pointed out the principal accountability system should be implemented in all elementary and middle schools. "The principal must fully implement the nation's educational policy and rely on faculty and staff to run the school." (Central Government of China, State Council, 2017) Since then, various related policy documents have been reiterated to adhere to and improve elementary and middle school principals' principal accountability system. Therefore, the principal accountability system outlines China's elementary and middle school governance structure's basic framework.

Compared with the principal accountability system under the party branch's leadership, the elementary and middle school government structure overcomes the non-separation of party and government, separation of powers and responsibilities, and the low quality and efficiency decision-making (Xiao, 1985). However, it needs to be pointed out that with the deepening of reforms; this governance structure has gradually exposed some urgent problems to be solved. It mainly includes (Chen, 2002; Feng, 2005; Chai, 2009): (i) the elementary and middle school principal is generally appointed

by the superior administrative department or the government and is responsible to the superior, so they must manage the school per the educational administrative department's regulations. The school lacks autonomy. The power of the principal is relatively limited. Moreover, it is difficult for the principal to be genuinely responsible for school affairs. (ii) In some schools' actual operations, the principal's power is too concentrated and lacks adequate supervision. Then "rule by the voice of one man alone" or "patriarchy" management appeared. (iii) The internal democratic management mechanism of some schools is not sound. The power of teachers, students, parents, and members of the public to participate in school governance is not fully protected. Their voices are blocked; thus, the school power relationship is unbalanced, and the school loses development vitality.

In recent years, with the release of the "*Outline of China's Medium* and *Long-term Educational Reform and Development Plan* (2010-2020)" (hereinafter referred to as the "*Outline of the Plan*"), we have promoted the separation of government and schools and the separation of management and running schools and expanded the autonomy of schools. Improving elementary and middle school principals' principal accountability system, restructuring the school governance structure, and establishing a modern school system has gradually become the research focus in elementary and middle school management. Many studies have centered on related topics such as principal accountability system, modern school system construction, separation of management and operation, expansion of school autonomy, and school governance structure. However, after an in-depth analysis, it is found that the existing research mostly adopts speculative research or a standardized research paradigm, lacking the support of empirical data and preliminary quantitative analysis. This has led to an in-depth analysis of the nature of the problem, the degree of performance and related factors, and the suggestions provided lack pertinence. What is the distribution of power in the management practice of elementary and middle schools in China? How much autonomy is the school running? How does this governance structure affect student performance? This study intends to use the extensive sample data of PISA2015 to compare the governance structure of Beijing-Shanghai-Jiangsu-Guangdong (BSJG) middle schools with high-scored countries/economies for quantitative analysis of its impact on student performance. It is hoped that some experience can be used to solve the problems that need to be solved and provide opinions and suggestions on the continuous improvement of the school governance structure and the construction of a modern school system in China.

Methods

Data Sources

The Program for International Student Assessment (PISA) is a multinational student ability evaluation project coordinated and implemented by the Organization for Economic Co-operation and Development (OECD). This project evaluates 15-year-old school students in participating countries/economies to see if they have the knowledge and skills required to enter society. The PISA test is implemented every three years.

The test content includes science, mathematics, and reading, but each assessment has a different focus. The focus of the PISA2015 test is scientific literacy. The OECD announced the test results of PISA2015 at the end of 2016, and at the same time, published the data, coding tables, and technical reports on the official website (http://www.pisa.org/pisa). This study selected BSJG data and high-scored countries/economies data from the PISA2015 student database and school database for in-depth analysis.

Participants

Participants in this study included two groups of 15-year-old school students and school leaders. Schools include junior high schools, high schools, complete high schools, vocational high schools, etc. We collectively refer to the heads of all these schools as the principals. Participants are from BSJG and PISA2015, high-scored countries/economies. High-scored countries/economies refer to countries or economies where students' scores in science, mathematics, and reading are significantly higher than the average level of OECD countries in the PISA2015 test. These countries include Belgium, Denmark, Estonia, Finland, Germany, and Ireland, The Netherlands, Norway, Poland, Slovenia, Canada, Australia, New Zealand, Japan, South Korea, and partner countries/economies such as Singapore, Hong Kong, and Macau. BSJG and the countries mentioned above/economies had a coverage rate of more than 91.38% for 15-year-old students in the region, and the coverage rate of the principal sample was more than 78.57%.

Variable Selection

Our study first described the power distribution of major business decision-making in BSJG and PISA2015 high-scored countries/economies, aiming to reflect the outline of the school's governance structure, and then conducted a multilevel analysis using the scientific literacy test scores of 15-year-old students as the dependent variable. This is to observe the impact of governance structure on student development. The selected variables are as follows.

The Power Value of Principals, Teachers and Other Subjects in Determining Major School Affairs

Who decides and is responsible for the school's significant affairs reflects the school's governance structure. In the PISA2015 school questionnaire, the principal was asked to answer who has the most power in major issues' decision-making process. The options were principals, teachers, school councils, local education bureaus, and the state. For the convenience of calculation and analysis, the school's total power was determined to be 100%, which was redistributed to each decision-making body based on the principal's answer. Take "determining course content" as an example. If a principal answered that only teachers had decision-making power, then teachers in this school had 100% decision-making power to determine the curriculum content and other subjects had 0%.

If the principal responded that the course's content was determined by the principal, teachers, and the school councils, then each subject was assigned a power value of 33% accordingly. Therefore, in each country/economy, as long as each subject's average power value is calculated, the outline of the schools' governance structure in that country/economy can be drawn.

Student Scientific Literacy Test Scores

In this study, the scientific literacy test scores represent the level of student development. This is mainly because the main test area of PISA2015 was science. The scientific literacy test is well representative after rigorous design and reliability and validity analysis. The test scores were equalized and converted into an average score of 500 points in the PISA scientific literacy test of OECD countries in 2006 and a standard deviation of 100 points.

Individual Variables Affecting Students' Scientific Literacy Test Scores

The PISA2015 student questionnaire collected sociodemographic variables and measured students' non-cognitive performance in terms of intrinsic motivation, beliefs, and participation. Based on the PISA questionnaire framework and related research findings, we selected the student's gender, grade, and PISA index of economic, social, and cultural status (ESCS) from the sociodemographic variables. In the non-cognitive performance, we selected the instrumental motivation that reflects students' external motivation and the variables of scientific pleasure and scientific self-efficacy that reflect the internal motivation of students. These non-cognitive variables were all measured by Likert scale as continuous variables and expressed in standard scores. In the multilevel analysis, the variables selected above were used as control variables to enter the regression analysis model.

Data Analysis

First, SPSS20.0 was used to sort out and filter the data, get the sample data of China's four provinces and cities and PISA2015 high-scored countries/economies, and perform descriptive statistics and difference testing. Then HLM7.01 software was used to explore the impact of school governance structure on student performance through multilevel analysis.

Results

Power Distribution in School Governance Practice

The distribution of power in the school's significant affairs' decision-making reflects the relationship between various stakeholders inside and outside the school and reflects the school's governance structure. The PISA2015 school questionnaire enumerated 12 significant issues such as teacher selection and dismissal, determination of teacher starting salary, teacher salary increase, proposed school budget, and decision on budget al-

location, and asked the principal who has the authority to make decisions on these matters in the school. Based on the principal's answer, we calculate the power distribution of BSJG and PISA2015 high-scored countries/economies schools in various decisions. The results are shown in **Table 1**.

The analysis of various subjects' power distribution found that: (1) BSJG principals have relatively limited decision-making power, and the principal accountability system is not fully functional. In BSJG, principals' average decision-making power in various affairs is 13.28%, while the average decision-making power of principals of PISA2015 high-scored countries/economies is 39.09%. After the difference test, the difference between the two reached a very significant level ($T = 25.19$, $p < 0.001$). In high-scored countries/economies, the principal had decision-making power in eight matters, including teacher selection, teacher dismissal, school budget, budget allocation, student discipline, student evaluation policy, student enrollment policy, and curriculum setting. Over 33% had dominant powers, but BSJG principals had no dominant powers in all 12 matters. (2) The decision-making power of BSJG teachers is relatively small. In BSJG, teachers' average decision-making power was 7.44%, which is significantly lower than in high-scored countries/economies ($T = 19.13$, $p < 0.001$). Teachers of high-scored countries/economies had dominant powers in selecting teaching materials, determining course content, and formulating student evaluation policies, but BSJG teachers had no dominant power in these matters. (3) BSJG school governance emphasizes collective decision-making, and the decision-making power of the school councils is relatively large. The BSJG School Councils had the supreme power in determining budget allocation, formulating student discipline, and student evaluation policies. The overall average decision-making power was 28.1%. This was not only higher than the decision-making power of the principals of the four provinces (cities) but also significantly higher than the decision-making power of the school council of high-scored countries/economies ($T = -14.00$, $p < 0.001$). (4) The local education bureau of BSJG has the dominant power in school affairs decisions. The supreme power of the BSJG Local Education Bureau is mainly manifested in the selection of teachers, the dismissal of teachers, the determination of teachers' starting salary, the determination of teachers' salary increase, the formulation of student enrollment policies, the selection of teaching materials, the determination of course content and the determination of course openings, etc. The average decision-making power in various matters was 46.27%. In comparison, the decision-making power of the local education bureau in high-scored countries/economies was only 19.03%, which only has the supreme power in determining the starting salary of teachers and determining the amount of teacher salary increase.

A Comparative Analysis of the Dimensions of School Autonomy

By adding the powers of the principal, teachers, and school council, the value obtained can reflect the school's degree of autonomy. The results are shown in **Table 2**. We found that the autonomy of BSJG schools is relatively low. The average autonomy of BSJG schools in various affairs is 48.8%, while the average autonomy of high-scored countries/economies schools is 68.5%. There is a statistically significant difference be-

Table 1. Power Distribution of Various Entities in Major Affairs Decision-Making (%).

	Four provinces (cities) in China					PISA2015 High-Scored Countries / Economy				
	Principal	Teacher	School Council	Local Education Bureau	Country	Principal	Teacher	School Council	Local Education Bureau	Country
Teacher selection	21.36	4.44	26. 52	47.28	0 .41	62.96	5.47	8.24	18.87	4. 46
Teacher dismissal	13.19	1.36	21.01	61.90	2.54	47.29	0.84	11.85	32.45	7.57
Determine the starting salary of teachers	3.72	0.46	10.61	75.36	9.85	11.78	0. 41	6.02	34. 35	47. 44
Determine the salary increase for teachers	4.80	0.84	17.70	65.98	10.68	13.37	0 .58	6.42	33. 40	46.23
Propose school budget	18.67	2.26	34.76	42.83	1. 49	40.90	3.91	17.96	29.65	7.58
Determine budget allocation	25.49	4.71	56.65	12.46	0 .68	62.37	8.98	20.09	7.32	1. 25
Establish student discipline	21.63	18.85	49.04	8.36	2.12	43.98	30.91	15.13	6.83	3.15
Develop student evaluation policy	19.22	22.56	43.68	12.79	1.76	36.60	35.08	9.86	9. 11	9.35
Formulate student admissions policies	13.05	3.11	24.49	58.94	0. 41	68.23	6.87	6.30	12.07	6.52
Textbook selection	4.80	8.83	12.82	68.27	5.28	20.38	62.87	6 .95	3.47	6.34
Determine course content	5 .77	14.11	16.34	51.88	11.90	15.83	47.29	4 .56	9.22	23.08
Determine course opening	9.74	7.14	20.13	49.63	13.35	44.53	25.80	10.88	6.70	12. 08
Mean	13.28	7.44	28.10	46.27	4.92	39.09	19.03	10.34	16.92	14. 61

tween the two. BSJG schools have more than 50% of the decision-making power in five matters, including teacher selection, school budget proposal, budget allocation, formulation of student discipline, and student evaluation policies. In high-scored countries/economies, in addition to determining the starting salary of teachers and determining the amount of salary increase for teachers, schools have more than 50% power in most affairs, and their autonomy was sufficient. The significance test of the difference in the ratio found that the autonomy of BSJG schools in seven significant issues, including teacher selection, teacher dismissal, evaluation policy, enrollment policy, selection of teaching materials, curriculum content, and curriculum establishment is very significantly lower than that of high-scored countries/economies. Among them, BSJG and high-scored countries/economies have the most considerable difference in autonomy in selecting textbooks, courses, and enrollment policies, with 63.7%, 44.2%, and 40.7%.

Table 2. Analysis of School Autonomy in Major Affairs Decision-Making (%).

	Four Provinces (Cities) of China	High-Scored Countries/Economies	T	P-Value
Teacher Selection	52.3	76.7	9.1	0.000
Teacher Dismissal	35.6	60.0	8. 5	0.000
Teacher Starting Salary	14.8	18.2	1. 6	0.116
Teacher Salary Increase	14.8	18.2	1. 6	0.116
School Budget	55.7	62.8	2.6	0.010
Budget Distribution	86.9	91.4	2.5	0.0 12
Student Discipline	89.5	90.0	0.4	0.723
Evaluation Policy	88.5	81.5	- 2.2	0.031
Enrollment Policy	40.7	81.4	14 .9	0.000
Textbook Choose	26.5	90.2	26.5	0.000
Course Content	36.2	67.7	12.6	0.000
Course Open	37.0	81.2	19.3	0.000
Average Autonomy	48.8	68.5	16.4	0.000

Note: P value is accurate to three decimal places, 0.000 means P value is less than 0.0005.

The 12 significant issues listed in the PISA2015 questionnaire can be divided into three dimensions. The first is the resource allocation dimension, including teachers' appointment and dismissal, determining the starting salary and salary increase of teachers, proposing school budgets, and allocating budgets. The second is the dimension of course management, including course offerings, teaching materials selection, and course content determination. The third is student management's dimension, including the formulation of student evaluation policies, student enrollment policies, and discipline. Further, statistics on schools' autonomy in each country/economy were made according to the country-division dimension. The results are shown in **Table 3**.

It is demonstrated that: (i) High-scored countries/economies had relatively high school autonomy in the three dimensions. The exception was that the autonomy scores of Canada, Germany, and South Korea in resource allocation were lower than BSJG; Canada and Norway had lower autonomy in student management than BSJG. (ii) BSJG schools had the lowest autonomy in curriculum management, with a power value of only 33.33%, which was lower than all high-scored countries/economies. The average scores between the two were very significant, with a power value difference of 46.35%. (iii) In high-scored countries/economies, running a school in the dimension of resource allocation was lower than that of curriculum management and student management, while in BSJG, the autonomy of running a school in the dimension of resource allocation was relatively higher than that of course management. (iv) In the Netherlands, the three dimensions' autonomy received the highest scores, all of which scored more than 90%. New Zealand, Estonia, Denmark, Hong Kong (China), and Macau (China) also scored higher than 70% in all three dimensions. They could be classified as typical

Table 3. Sub-Dimension Analysis of School Autonomy of Each Country/Economy (%).

	Resource Allocation				Course Management				Student Management			
	Principal	Teacher	Sch. Council	Sch. Autonomy	Principal	Teacher	Sch. Council	Sch. Autonomy	Principal	Teacher	Sch. Council	Sch. Autonomy
Belgium	36.90	1.75	15.07	53.72	21.87	48.87	7.02	77.77	46.16	25.48	16.56	88.21
Denmark	53.42	3.67	14.25	71.34	28.10	46.65	10.44	85.20	52.88	19.03	16.27	88.18
Estonia	59.56	4.39	8.59	72.53	39.57	43.31	13.14	96.02	53.05	23.37	16.24	92.66
Finland	44.68	2.00	2.33	49.01	26.20	53.52	1.25	80.97	48.80	29.06	2. 54	80.39
Germany	16.31	3.44	7 .13	26.88	25.36	36.38	17.48	79.22	47.72	30.37	10.88	88.97
Ireland	24.22	0.88	25.01	50.12	20.82	52.89	11.18	84.88	38.42	21.95	35.31	95.68
Netherlands	63.44	4.75	24.47	92.67	35.17	57.72	4.52	97.41	71.54	21.61	6.14	99.29
Norway	52.73	1.44	2. 53	56. 71	33.93	39.99	1 .16	75.09	39.12	19.44	6.72	65.29
Poland	50.54	1.35	1. 04	52.93	30.12	50.49	5.34	85.95	44.50	41.72	9.73	95.95
Slovenia	45.26	1 .79	13.26	60.31	13.23	43.79	7.62	64.63	35.98	33.87	5 .80	75. 65
Canada	29.20	2.67	7.60	39.47	25.15	28. 17	2 .12	55.44	43.53	14.59	5 .53	63. 65
Australia	46. 73	4.58	8.35	59. 65	24.00	57.23	1.99	83.23	56.07	26.96	5.03	88.07
new Zealand	47.08	4.60	22.73	74.41	22.30	71.59	2.25	96.15	56.93	20.29	14.30	91.53
Japan	28.19	1.52	16.61	46.32	62.72	27.62	2. 19	92.54	81.86	15.67	1.28	98.81
Korea	18.34	6.30	7.69	32.33	26.16	54.96	14.27	95.39	55.48	28.58	6.90	90.97
Singapore	24.34	2.25	19.38	45.97	16.90	23.48	41.13	81.51	39.71	9.49	36. 44	85.65
China Hong Kong	37. 68	14.73	24.12	76.53	23.81	66.53	5.64	95.99	43.83	47.84	5.42	97.09
Macao, China	52.75	3.02	33.98	89. 75	31.63	45.89	14.84	92.36	44.14	33.09	18.70	95.93
High score country average	39.71	3.39	11.69	54.79	26.94	45.31	7.43	79.68	49.65	24.24	10.45	84.35
Four provinces (cities) of China	14.56	2.35	28.06	44.97	6.81	10.07	16.45	33.33	17.82	14.86	39.16	71.85

high-autonomy countries/economies. (v) In Japan, the resource allocation dimension's autonomy score was low, equivalent to the BSJG level, but the autonomy score on the curriculum management and student management dimensions was relatively high, both more significant than 90%. Therefore, Japan is a country with low autonomy in resource allocation and high autonomy in curriculum and student management. Besides, Finland, Singapore, Germany, and South Korea also belong to this type.

The Relationship between School Governance Structure and Student Performance

Which one has the advantage of large or smaller school autonomy? To explore the impact of school governance structure on student performance, we conducted a multilevel analysis. The method is as follows: First, take the scientific literacy performance of 15-

year-old students in BSJG and PISA2015 high-scored countries/economies as the dependent variable, and divide the variables that affect the performance of students' scientific literacy into two layers. The first level was set as student-level variables, and the second level was school-level variables. After establishing the zero model without adding any predictor variables, we found that the BSJG inter-school variation was 5,770.10, the intra-school variation was 5,075.71, and the intra-class correlation coefficient 1 (ICC (1)) was 0.53. The inter-school variation of PISA2015 high-scored countries/economies was 3,481.17, the intra-school variation is 6,049.54, and the ICC (1) value was 0.37. The inter-school variation reached a significant level, indicating that the data has a nested structure and was suitable for multilevel analysis. Next, variables such as gender, grade, SECS, instrumental motivation, scientific pleasure, scientific self-efficacy, and other student-level variables were added to the model to establish a random coefficient model. Finally, under the premise of considering and overcoming multicollinearity, three variables, including resource allocation autonomy, the autonomy of curriculum management, and the autonomy of student management, which reflect the school's governance structure, were also added to the model to establish a complete model. The results are shown in **Table 4**.

In BSJG, the six variables of individual student level explained 9.91% of the intra-school variation and 41.03% of the inter-school variation; the three variables of the school-level governance structure explained 2.41% of the inter-school variation, reaching a very significant level. In PISA2015 high-scored countries/economies, the individual student level variable explained 13.01% of the intra-school variation and 21.77% of the inter-school variation, and the school level variable explained 1.54% of the inter-school variation, which also reached a very significant level. This indicated that after controlling several student-level variables, the school governance structure has a relatively small direct impact on student scientific literacy test scores, but it is still an essential factor that cannot be ignored. Also, there is still more than 97.5% of the variance that has not been explained in this model at the school level, implying that there are many inter-school variance variables that affect student performance, which need to be further studied.

On the impact of school governance structure variables, further analysis found that the impact of different dimensions of school autonomy on student performance presents different patterns in BSJG and high-scored countries/economies. Specifically: (i) Curriculum management autonomy had a significant positive predictive effect on students' scientific literacy test scores. In BSJG, every time the autonomy of school curriculum management increases by one standard deviation, the student's scientific literacy score would increase by 35.48 points, equivalent to a one-year educational experience. (ii) Student management autonomy had a significant predictive effect on students' scientific performance. Nevertheless, it is worth noting that in high-scored countries/economies, the predictive effect of student management autonomy was positive, whereas in BSJG, it was negative; that is, for every standard deviation of student management autonomy, student performance would drop by 42.54 points. (iii) The autono-

Table 4. Two-Level Linear Regression Analysis Results of the Impact of School Governance Structure on Students' Scientific Literacy Test Scores.

	Four Provinces (Cities) in China						High-Scored Countries/Economies					
	Zero Model		Stochastic Model		Complete Model		Zero Model		Stochastic Model		Complete Model	
	EV	SE	EV	SE	EV	SE	EV	SE	EV	SE	EV	SE
Fixed Effect												
Intercept	513.40 ***	6.46	485.51 ***	6.15	494.35 ***	14.49	517.16 ***	1.86	511.12 ***	2.35	469.37 ***	8.23
Individual Level												
Gender	-	-	13.81 ***	2.18	13.80 ***	2.18	-	-	5.58 ***	0.94	5.57 ***	1.02
Grade	-	-	39.03 ***	3.27	38.68 ***	3.25	-	-	33.53 **	1.24	33.64 **	1.24
SECS	-	-	5.21 ***	1.37	5.11 ***	1.37	-	-	14.89 ***	0.69	14.96 ***	069
Instrumental Motivation	-	-	-3.05	1.36	-3.01	1.60	-	-	-3.06 ***	0.49	-3.05 ***	0.49
Scientific Fun	-	-	1 3.20 ***	1.35	13.19 ***	1.36	-	-	17.91 ***	0.52	17.94 ***	0.52
Scientific Self-Efficacy	-	-	3.38**	1.07	3.38 **	1.07	-	-	6.83 **	0.43	6. 84 **	0.43
School Level												
Resource Allocation Autonomy	-	-	-	-	33.40	19.49	-	-	-	-	8.42	6.34
Course Management Autonomy	-	-	-	-	35.48*	16.60	-	-	-	-	19.33*	9.72
Student Management Autonomy	-	-	-	-	-42.54 *	20.12	-	-	-	-	23.49*	9.23
Random Effect												
School Variance	5,770.10 ***	75.96	3,402.39 ***	58.33	3,263.23 ***	57.12	3,481.17 ***	59.00	2,723.16 ***	52.18	2,669.60 ***	51.67
Intramural Variance	5,075.71	71.24	4,572.57	67.62	4,586.79	67.73	6,049.54	77.78	5,262.30	72.54	5,262.17	72.54

EV: Estimated Value; SE: Standard Error. *p < 0.05, **p < 0.01, ***p < 0.001.

my of resource allocation was not significant in the model, and its impact on student performance was not statistically significant.

Discussion and Recommendations

The multilevel analysis found that the governance structure has a significant impact on students' scientific literacy test scores, but the influence of school autonomy of different

dimensions on student performance presents different patterns. This shows that the relationship between governance structure and school effectiveness is not a simple linear relationship. Therefore, while we gradually clarify and expand schools' autonomy, we must also be clear that school autonomy is not the bigger, the better. How should the political-school relationship be handled? Which subjects' decision-making power should be expanded or appropriately restricted? How to coordinate the relationship between multiple subjects? These are issues that must be thoroughly considered and resolved in the reform of the school governance structure.

Expand School Autonomy and Establish a New Political-School Relationship

The relationship between government and school is the focus of the reform of the school's governance structure, but it is also a difficult point. The "Outline of the Plan" pointed out that it is necessary to continuously promote the separation of management and operation, and implement and expand school autonomy. It is proposed that "building a modern school system that runs schools according to law, independent management, democratic supervision, and social participation, to build up a new relationship between the government, schools, and society" (Ministry of Education, 2015). This policy reflects the international trend of school governance structure reform. In the past few decades, many Western countries have been promoting decentralization, giving schools more autonomy to meet their needs for education (OECD, 2016). Simultaneously, it also conforms to China's national conditions and is a real need to reform the governance structure in Chinese schools. It can effectively stimulate the vitality of the school and promote the independent development of the school. Based on the analysis of PISA2015 data, this study found that BSJG schools have more than 50% decision-making power in five matters: teacher selection, school budget proposal, budget allocation, student discipline formulation, and student evaluation policy formulation, indicating that it has a certain degree of autonomy right. However, the autonomy in the seven significant teacher selection issues, teacher dismissal, evaluation policy, enrollment policy, selection of teaching materials, course content, and course opening is significantly low. Among them, there was the most significant difference in autonomy with high-scored countries/economies in selecting teaching materials, curriculum, and enrollment policies. This demonstrated that, to a certain extent, BSJG still has much room for improving school governance structure and expanding school autonomy.

This finding is consistent with some previous related studies (Ye, 2010; Li & Xia, 2014) (Ye, 2010). In 2015, the "*Several Opinions of the Ministry of Education on Further Promoting the Separation of Education Management, Management, and Evaluation, and Promoting the Transformation of Government Functions*" (Education Politics Law [2015] No. 5) also clearly pointed out that at present, government management education still has the phenomenon of surpassing its position, absence, and dislocation. The independent development and self-discipline mechanism of the school is not yet sound (Education Ministry of China, 2016). In the future, to fully stimulate the vitality of schools, we must further promote the separation of management, operation, and

evaluation, clarify and guarantee school autonomy under the law, establish a new political-school relationship, and establish a modern school system. If the government wants to change its functions, it should, under the guidance of the new public management and new public service concepts, transform from a "paddler" to a "helmsman" and then to a "server" (Zhao, 2013). Reduce excessive administrative approval, inspection, and appraisal of schools, let alone arbitrarily intervene in the internal micro-affair management of schools, provide more generous space for school development, and create conditions to increase school autonomy, especially in the selection of teaching materials, curriculum, and enrollment policies and teacher recruitment.

Of course, we must also realize that the greater the autonomy is not necessarily, the better, and the expansion of school autonomy does not necessarily bring about changes in school effectiveness and student performance. As we have found that, in BSJG, the predictive effect of student management autonomy on student performance is negative; that is, the expansion of student management autonomy does not promote the growth of student performance. Therefore, while gradually expanding school autonomy, it is also necessary to improve the school's autonomous management capabilities through management mechanisms such as training, supervision, and accountability, to achieve a dynamic balance and optimization between the government and the school.

Give Priority to Curriculum Management to Ensure School Curriculum Management Autonomy

Curriculum management is the most critical and dynamic part of the school governance system. From the perspective of the world's curriculum reform trend, Western countries pay more attention to schools' autonomy in curriculum management practice, so that the curriculum can fully respond to the needs of multiple stakeholders and effectively promote the development of students (Yang, 2003). However, due to the long-term tradition of centralized and unified curriculum management in China, schools have relatively little autonomy. Since implementing the new curriculum, China has begun to implement a three-level curriculum management policy, giving schools a certain degree of curriculum autonomy. Simultaneously, the textbook also implements an outline for multiple versions of textbooks, allowing schools to choose to use different versions of textbooks. However, the fact is that due to various factors such as the enrollment policy of the high school and college entrance examination, the management methods for the selection of textbooks, and the awareness and ability of school curriculum management, the school's actual autonomy is still minimal. Our findings confirm this. Curriculum management autonomy has a significant positive predictive effect on student performance, but BSJG schools have very little autonomy in curriculum management, significantly different from high-scored countries/economies. There are respective 63.7%, 44.2%, and 31.5% differences in the decision-making of materials selection, course offerings, and course content. Therefore, to expand school autonomy, priority must be given to curriculum management autonomy.

To effectively protect the autonomy of school curriculum management, we need to pay attention to two aspects. On the one hand, China must revise and improve

relevant policies at the national level to strive for more generous space for school curriculum management autonomy. For example, the "Experimental Program of Compulsory Education Curriculum Setting" stipulates the types of courses and the number of hours schools should offer in grades 1-9. The sum of school-based courses, local courses, and comprehensive practical activity courses accounted for 16-20% of the 9-year total class hours. However, some provinces and cities have strengthened comprehensive practical activities, requiring that a certain number of hours be guaranteed for research studies or practical scientific activities. In some areas, local courses have been added, and individual courses that are of little value to student development are also included in the school curriculum, which, to certain degrees, takes up school-based curriculum time. Therefore, the plan needs to stipulate the proportion of school-based curriculum hours to protect the school curriculum's autonomy effectively. The "Interim Measures for the Selection and Management of Elementary and Middle School Textbooks" and other related documents need to be revised and improved based on extensive comments. On the other hand, local education administrative departments should strengthen relevant training to improve school curriculum management awareness and curriculum leadership. Only achieve: (i) the school attaches importance to top-level design and curriculum leadership; (ii) according to relevant national policies, combined with school development prospects, educational philosophy, school characteristics, and student development needs, independently plan school curriculum; (iii) implement creatively National curriculum and local curriculum, as well as the rational development and implementation of school-based curriculum, can we realize the autonomy of curriculum management.

Improve the Principal Accountability System and Strengthen the Principal's Power and Responsibility in School Management

We found that in BSJG, the average decision-making power of principals in various matters was 13.28%, while the average decision-making power of principals of PISA2015 high-scored countries/economies was 39.09%, and the difference between the two reached a very significant level. Besides, the decision-making power of the principals of BSJG in the three dimensions of resource allocation, curriculum management, and student management was significantly lower than that of all PISA2015 high-scored countries/economies. However, BSJG's school council's average decision-making power was 28.1%, which was significantly higher than in high-scored countries/economies. One is low, and the other is high; that is, the principal has low decision-making power, and the school council has high decision-making power. This, to a certain extent, shows that the four provinces (cities) of China place more emphasis on collective decision-making by the school council.

For a long time, China has been implementing a principal accountability system in elementary and middle schools. At the same time, schools are required to establish a school committee composed of principals, teachers, representatives of students

and parents, community representatives, and other relevant subjects, improve the faculty representative assembly system and establish a parent committee to strengthen democratic management school. This school's internal governance structure framework not only adheres to the principal accountability system but also emphasizes collective management, reflecting the principle of democratic centralism. However, it must be admitted that if the dialectical relationship between democracy and centralism cannot be handled properly, this kind of governance structure can easily lead to the dictatorship and monopoly of the principal in some schools. In contrast, it may also lead to the de facto no-one responsible situation, even called the collective responsibility. Compared with PISA2015 high-scored countries/economies, BSJG principals have poor decision-making, but the school council has high power. In its 2015 annual report, the OECD emphasized that principals with more power in school governance have relatively high student performance at their schools, mostly when student performance is tracked and analyzed or released to the public (OECD, 2016). In the future, we suggest that local education administrative departments appropriately expand principals' decision-making power, enhance principals' sense of responsibility, and improve their management efficiency. Researchers should also conduct an in-depth international comparative analysis and empirical research to provide reasonable and feasible policy recommendations for the practical improvement and promotion of the principal accountability system.

Strengthen Democratic Management and Promote Teachers' Participation in School Affairs Decision-Making

The participation of teachers not only reflects the democratic nature of the school's governance structure, but also affects teachers' job satisfaction, organization and work engagement, and personal performance to a large extent. Teacher participation in school management and decision-making has become the primary trend of elementary and middle school management (Chu, 2009). However, we found that the average decision-making power of BSJG teachers in major school affairs was only 7.44%, which was significantly lower than the average level of PISA2015 high-scored families/economies. Especially in the "student management" dimension, the decision-making power of BSJG teachers was not only lower than the average level of high-scored countries/economies but also lower than all their respective high-scored countries/economies. In the "course management" dimension, the decision-making power of BSJG teachers was only higher than that of Singapore but lower than that of the other 17 high-scored countries/economies. Several studies have confirmed this research result. Chen surveyed 731 elementary and middle school teachers in seven provinces (autonomous regions) in compulsory education from the teachers' perspective. When it comes to "important decisions related to teachers' work, teachers in our school have many opportunities to participate," 281 teachers mentioned that the situation was "somewhat inconsistent" in their schools. Another 64 teachers expressed "not at all," accounting for 47.2% of the total number of teachers interviewed (Chen, 2011). Zhao and Zhou analyzed the PISA2015 principal questionnaire and found that BSJG principals scored the lowest on the "teacher participation" dimension in the performance of various dimensions of lead-

ership. The frequency of various related leadership behaviors was generally lower than that of other high-scoring countries, especially in "giving employees the opportunity to participate in school decision-making." The proportion of BSJG principals showing such behavior "at least once a month" was only 23.8%, while the proportion of other high-scored countries was between 66.7%-93.7% (Zhao & Zhou, 2017).

The low level of teacher participation has become an important issue that cannot be ignored in the governance structure of BSJG schools. Article 30 of the *Education Law of the People's Republic of China* states that "following relevant law, institutions shall ensure the participation of faculty and staff in democratic management and supervision through organizational forms such as faculty and staff congresses as the main body." This is a clear stipulation in Chinese law for teachers to participate in school governance and provides a legal basis for teachers to participate. However, it must be acknowledged that these legal provisions are only provisions in principle, lacking operational rules for implementation, and failing to clarify the legal consequences and penalties after relevant entities violate this provision, making it challenging to implement teachers' right to participate. In the future, in addition to strengthening and improving relevant legislation, schools need to clarify further the responsibilities, powers, obligations, ways, and means of teachers' participation in school governance in the school's "Articles" and related systems under the guidance of the legal framework and modern school governance concepts. This enables teachers to rely on laws and rules for their participation. Of course, more importantly, the school should learn from the corporate governance experience and establish a governance structure and organizational culture in which the rights and responsibilities of multiple stakeholders are clear and that both restrict and promote each other. Only when all subjects are concerned about school development and participate in school governance in an orderly manner based on equal consultation can the school develop healthily and sustainably.

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ARTICLE

Study on the Ideal Matching Mode of Sleep Time and High Academic Performance of High School Students in China and Its Early Warning Mechanism

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Abstract*. Based on a sample survey of high schools in Province S of China, this study used quantitative statistical analysis to explore the ideal matching mode of sleep time and high academic performance and established a multi-level early warning mechanism for schools that sacrifice student sleep for high academic performance. The results showed that "students achieve the best academic performance when they sleep for eight hours or more." This is an ideal matching mode for schools to ensure the healthy development of students and build a good educational environment. Teachers, schools, education administrators, and parents should hold correct educational values and view comprehensively the relationship between students' sleep time and academic performance. For schools that sacrifice students' sleep time and blindly pursue high grades, a multi-level early warning mechanism should be established and their rectification should be supervised.*

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Question

THE sleep problems of high school students have received extensive attention from educational administration and scholars. China has also successively introduced a series of related policies to ensure students' sleep time, such as the "Compulsory Education School Management Standards" and "Comprehensive Prevention and Control of Myopia in Children and Adolescents Implementation Plan." These documents clearly mention the need to ensure that elementary, middle, and high school students sleep at least 10, 9, and 8 hours a day, respectively. A large number of studies have also confirmed that long-term lack of sleep is harmful to students' learning ability, academic performance, and physical and mental health (Curcio, 2006; Wolfson, 2003; Fallone, 2002).

However, the implementation effects of these policies are not satisfactory. Against the background of increasing pressure for higher education and academic competition, parents and teachers believe in the spirit of "extremely hard study" of the ancient Chinese "tie one's hair on the house beam and jab one's side with a needle to keep oneself awake - painstaking in one's study" and "bore a hole on the wall to make use of the neighbor's light to study" in order to let students pursue high scoring and obtain high rankings. Many students are affected by these kinds of thoughts and remind themselves to invest more time in their studies, but they ignore their own sleep problems (Tong, 2016). The monitoring data of the regional education quality physical examination project team of the Collaborative Innovation Center of Assessment for Basic Education Quality showed that in many areas, the sleep time of high school students has not reached the basic level, and there are many schools and regions that blindly sacrifice sleep time to pursue high performance. Multiple studies have pointed out the problem of insufficient sleep among high school students. Yang et al. (2018) investigated the sleep time of high school students in Shanghai and found that 94.8% of the students slept less than 8 hours; Hou et al. (2015) also found the average sleep time of high school students in Bao'an District, Shenzhen was only 6.2 hours. Studies have shown that the relatively good results brought about by lack of sleep are at the expense of the physical and mental health of the students and cause negative effects. Adequate sleep time, a good development environment, and high-quality academic performance are necessary conditions for a successful education. Based on this, this research will explore the ideal matching model of students' high academic performance and sleep time based on physical and mental development and a good educational environment, and provide multi-level early warning for schools that sacrifice students' sleep time in exchange for high performance, and hope it can provide enlightenment to the educational decision-making and practice.

Literature Review

With the promulgation of relevant policies, a large number of studies have also been carried out on the sleep time of high school students. We have found in existing re-

search that most of the related research focuses on the relationship between sleep time and academic achievement, physical and mental health, and analysis of its influencing factors.

The Relationship between Sleep Time and Students' Academic Performance

Sleep is a spontaneous and reversible resting state, manifested as the reduced responsiveness to external stimuli and temporary interruption of consciousness. Traditionally, as an adaptive and protective activity, sleep is an important way for individuals to restore physical strength. Liu et al. (2015) pointed out that sleep is not only important for restoring physical strength, but also for restoring mental strength. Good sleep is not only an important guarantee for subsequent learning, but also helps to consolidate and maintain memory. Dewald et al. (2010) conducted a meta-analysis of sleep time and academic performance for 15,199 students between the ages of 8 and 18 and showed that the correlation coefficient reached $r = 0.069$ and the correlation between boys were higher than that of girls. Mirghani et al. (2015) also reached a similar conclusion in the study. Jiang et al. (2011) found that school-age children with insufficient sleep time or poor sleep quality do not perform as well as children with a good sleep in language, mathematics, and academic performance. Therefore, the sleep time and the academic performance of the students present a positive correlation. However, as the pace of life accelerates and the pressure of study and work increases, many people try to make up for the lack of study and work time by reducing sleep and hope to improve the efficiency of study and work.

There are two explanations for the relationship between sleep time and academic performance: one is that when sleep is insufficient, the body's sympathetic nerve function is hyperactive and catabolism increases, which affects the mental activities related to memory and attention. This ultimately impairs the maintenance and consolidation of memory and causes a decline in students' academic performance. The other is that lack or interruption of sleep will reduce the nocturnal brain activity required for neurocognitive functions; among them, complex tasks require abstract thinking, creativity, integration, and planning; these tasks represent higher neurocognitive functions and mainly affected by sleep problems (Yang et al., 2018).

The Relationship between Sleep Time and Students' Physical and Mental Health

Liang et al. (2006) pointed out that lack of sleep in adolescents at night will weaken the body's immune function, weaken the body's defenses, and cause diseases; it will also hinder the production and release of growth hormone, leading to growth retardation. Long-term lack of sleep can disrupt the biological clock of adolescents, leading to cerebral cortex dysfunction, neurasthenia, and various neuroses. Knutson (2011) found that insufficient sleep time during adolescence was significantly positively correlated with overweight and obesity. Therefore, sleep is not only an important physical requirement,

but also an important guarantee for students' mental health. Morrison et al. (1992) found that adolescents with chronic sleep deprivation have a significantly higher incidence of depression, anxiety, and behavioral problems than those with adequate sleep, and the more serious the lack of sleep, the higher the anxiety and depression. Zhao et al. (2012) believed that from the perspective of emotional maintenance, long-term lack of sleep in students will show negative emotions such as emotional instability, irritability, anxiety, and other symptoms, which will affect normal life.

Analysis of Influencing Factors of Students' Sleep Time

A number of studies have focused on the related causes of sleep deprivation among Chinese students. He et al. (2007) investigated the sleep conditions of 618 high school students in Beijing and found that personal emotions, study pressure, and test scores are the main factors affecting the sleep time and quality of high school students. Zhao & Xue (2018) found in a survey that middle school students' participation in academic extracurricular tutoring can significantly reduce their sleep time. Participating in intuition is one of the important indicators of students' objective pressure. Liu et al. (2011) found that study stress and test anxiety have a positive predictive effect on students' subjective sleep quality, time to fall asleep, sleep time, sleep disturbance, and daytime dysfunction. Lin et al. (2018) found that the greater the learning pressure, the worse the quality of sleep. With the intensification of competition, all classes of society have to increase learning content and requirements for children, so that children need to invest more time in learning, thereby breaking the normal routine of work and rest and affecting normal sleep. Zheng et al. (2001) found that there is a linear regression relationship between students' learning pressure and willpower, thinking, emotion, and physiological indicators, that is, the greater the learning pressure, the greater the impact of negative emotions on sleep quality. If students are under heavy learning pressure, they will naturally suffer from anxiety and insomnia over the years.

In addition to learning pressure and other factors, Liu et al. (2017) found that the longer students use mobile phones each day, the worse their sleep quality; students who use mobile phones for more than 60 minutes before going to bed each day have a sleep disorder rate significantly higher than less than 10 Minute students, but using the basic functions of mobile phones (phone calls, text messages) has no effect on sleep quality. Demirci et al. (2015) found that excessive use of smartphones has a direct effect on low sleep quality, which directly affects negative emotions such as depression and anxiety, thereby indirectly causing sleep problems; sleep quality is moderately positively correlated with students' mental health and different components of sleep are all related to mental health, especially with somatization, compulsion, depression, and anxiety.

Therefore, students' sleep time is affected by many factors. In order to pursue high academic performance, academic pressure, negative emotions, and the length of mobile phone use are all critical factors that affect students' sleep time.

In sum, the lack of sleep has a negative impact on students' academic performance and physical and mental health. High school students spend most of their time in

the educational environment of the school. The hazards of insufficient sleep to students' physical and mental health and academic achievement will directly or indirectly affect their hobbies, learning quality, social relationships, and frequency of participating in activities inside and outside the school, thereby affecting their subjective well-being. The heavy academic burden caused by the pursuit of higher academic performance is an important cause of insufficient sleep for students. In view of this, it is particularly important to explore and find a balance between ideal sleep time, higher academic performance, and a good physical and mental development environment.

Methods

Data Sources

This research relies on the regional education quality and health examination project team of the Collaborative Innovation Center of Assessment for Basic Education Quality (hereinafter referred to as the project team) for data collection. The project team used a stratified random sampling method to survey 14,021 second-year students from 140 high schools in Province S in an eastern province of China, including 6,569 boys and 7,452 girls. After weighing the sample, there are a total of 205,938 students, including 97,024 boys and 108,914 girls. Boys accounted for 47% of the effective sample, and girls with 53% of the effective sample. The basic information of the survey subjects involved gender, region, parents' occupation, parents' education level, etc.

The project team referred to domestic and foreign assessment projects and related documents and measured the sleep time and academic performance of students every day (except weekends and holidays). Sleep time was divided into six periods of less than 5, 5-6, 6-7, 7-8, 8-9, and 9 hours or more; academic performance was the average score in Chinese language, mathematics, and English language.

In addition, the project team also investigated various variables such as students' interest, academic burden, learning quality, social relationships, and subjective well-being of activity participation, and combined with relevant statistical models to synthesize the above variables into an index of 0-100. The higher the index a school had, the better the students developed in this school. For example, the higher the learning interest index, the higher the learning interest of the students of this school; the higher the interest satisfaction index, the better the curriculum of this school can meet the students' interest development; the higher the homework index, the higher the ratio the school assigned the students homework time less than two hours (excluding weekends); the higher the sleep index, the higher the proportion of students in this school who sleep 8 hours or more per day.

Procedures

We use broader effect size to compare different matching patterns of sleep time and high performance. The effect size represents the size of the standard deviation between the two sets of means. Unlike the significance test, the effect size is not affected by the

sample size, and can more objectively reflect the size of the difference between groups. When the sample size is so large that the variable is easily significant, it is necessary to report the size of the effect. If the absolute value of the effect size is < 0.2, the actual difference is small, 0.2-0.8 is a moderate difference, and > 0.8 indicates the actual difference is large.

Results and Analysis

The High School in Province S Where "Students Have the Best Academic Performance When They Sleep for More Than 9 Hours", and They Had a Higher Interest, Less Pressure, Better Learning Quality, More Participation in Activities, More Harmonious Social Relations, and Higher Well-Being

According to regulations, the sleep time of high school students shall not be less than 8 hours. Therefore, in this study, when the sleep time was 8-9 hours and its two intervals less and more than 8 hours, that is, 7-8 hours and > 9 hours, to explore the sleep time period when the student's highest academic performance occurs, and then observed which group of the students were more interested and stressed less, a better quality of learning, high participation in activities, harmonious social relations and high sense of well-being. From this, we found an ideal matching mode between sleep time and performance. In this study, the "schools with the highest scores in sleep for more than 9 hours" were recorded as the category A; the "schools with the highest scores in 8-9 hours of sleep" were recorded as the category B; "the highest scores were in the 7-8 hours of sleep" were recorded as category C.

In **Table 1**, category A schools performed better than B and C on interest index, burden index, learning quality index, social relationship index, and activity participation index. From the actual difference reflected in the effect size, most of the effect size was ≥ 0.2. This showed that compared with the categories B and C schools, the students' interest in learning, art, and sports have reached a higher level, and the school could also meet the students' interests to a greater extent; sleep time was relatively high, relatively small homework time, a high proportion of students without extracurricular tutoring, and the students felt relatively less pressure; the relationship with teachers, parents and peers were relatively harmonious, participation in a club, charity, independent electives, and research studies were more motivated; learning motivation and self-confidence were stronger, and the subjective well-being was also higher.

Specifically, the indexes with large differences are as follows: In terms of interest, the three categories of schools have the largest differences in the learning interest index and interest satisfaction index, and the learning interest index of students in "category A schools" is higher than that of "category B schools" by 8.0. The score is 24.2 points higher than that of "category C school"; the interest satisfaction index of "A school" is 7.1 points higher than that of "category B school" and 22.1 points higher than

Table 1. Indices of Students in Three Categories of Schools.

		School Category			Effect Size	
		C	B	A		
		Schools with the highest scores with 7-8 hours of sleep	Schools with the highest scores with 8-9 hours of sleep	Schools with the highest scores with >9 hours of sleep	C *vs* A	C *vs* B
Interest Index	To Learning	41.7	57.9	65.9	1.10	0.39
	To Arts	60.6	64.8	66.1	0.64	0.14
	To Sports	69.5	72.9	75.0	0.63	0.22
	Interest Satisfaction	50.5	65.5	72.6	1.05	0.37
Burden Index	Learning Pressure	27.2	30.5	42.2	0.58	0.47
	Sleep	9.2	14.5	16.5	0.48	0.13
	Homework	58.6	59.0	63.1	0.22	0.19
Learning Quality Index	Learning Confidence	53.9	62.9	70.9	0.80	0.41
	Learning Strategy	55.2	59.6	59.3	0.76	0.05
	Learning Motivation	64.0	75.1	79.7	1.03	0.33
Social Relationship Index	With Teachers	58.2	72.1	78.4	1.06	0.35
	With Peers	65.9	73.9	80.7	0.75	0.40
	With Parents	67.3	75.8	81.3	0.71	0.33
Activity Participation Index	Charitable Activities	49.5	60.6	70.9	0.89	0.47
	Research Learning	48.7	60.3	71.7	0.99	0.52
	Independent Elective	36.8	50.3	55.4	0.86	0.23
	Social Activities	30.5	40.1	43.2	0.61	0.14
	Subjective Well-Being	72.4	77.9	83.2	0.87	0.44

"category C school". In terms of burden, students in the three types of schools have the largest difference in the learning pressure index. The learning pressure felt by students in "category A schools" is 11.7 points lower than that of "category B schools" and 15.0 points lower than "category C schools". In terms of social relationship, "category A school" is 20.2 points, 14.8 points and 14.0 points higher than "category C school" in teacher-student relationship index, peer relationship and parent-child relationship index, respectively, higher than "category B school" out of 6.3 points, 6.8 points, and 5.5 points. In terms of participating in activities, the three groups of school students have the biggest differences in participating in public welfare activities and research learning activities. The index of participation in public welfare activities of "category A schools" is higher than that of "category B schools" by 10.3 points and higher than "category C schools" by 21.4 points. On score: the index of "category A school" students participating in research learning activities is 11.4 points higher than that of "category B schools" and 23.0 points higher than "category C schools". In terms of learning quality, the three groups of school students have the largest differences in learning motivation and learning self-confidence index. The "category A school" students have a higher learning confidence index by 17 points than the "category C school" and 8.0 points higher than the

"category B school". The learning motivation index of "category A school" students is 15.7 points higher than that of "category C schools" and 4.6 points higher than "category B schools".

Ideal Matching Model of Sleep Time and High Academic Performance in Different Types of Schools

Classify schools according to their average socioeconomic status (SES), and explore whether schools of different socioeconomic status groups conform to the overall law, that is, compared with categories B and C schools, students in category A schools have higher interest and less pressure, The quality of learning is better, the participation in activities is more, the social relationship is more harmonious, and it has higher well-being. This study ranked all the participating schools. The top 30% of the schools with average socioeconomic status were defined as the high socioeconomic status group, and the lower 30% were defined as the low socioeconomic status group. The specific results are as below:

(1) In the low socioeconomic status group, the students in the low socioeconomic status group "when the sleep time is 8-9 hours, the students have the best performance", the school students have higher interest, less pressure, better learning quality, more participation in activities, and a more harmonious social relationship, and better well-being.

Students from the three categories in the low socioeconomic status group have different learning interests, academic pressure, learning quality, activity participation, social relationship, and subjective well-being. The following table presents the difference between the indexes of the two groups of schools.

It can be seen from **Table 2** that the students in the low socioeconomic status group "students with 8-9 hours of sleep have the best results" had a higher interest, less pressure, better learning quality, more participation in activities, and a more harmonious social relationship and students' subjective well-being was relatively high, showing the following characteristics.

First, in the low socioeconomic status group, the indexes of "category B schools" are higher than "category A schools", but the overall difference was not big, basically staying at about 5 points, which was different from the overall law. This shows that in a school environment with a lower overall socioeconomic background, students need to spend a certain amount of time and effort to achieve good results, but the highest score also needs to be met on the basis of 8 hours of sleep, so that students will have a healthy educational environment, such as participating in more activities, performing better in various aspects such as interest, self-confidence, social relationship, and having more well-being.

Second, in the low socioeconomic status group, the indices of "category C schools" and "category B schools" were quite different. Among them, "category C school" was 14.9 points and 14.8 points lower than "category B school" in learning interest index and interest satisfaction index, respectively; teacher-student relationship

Table 2. Indexes of Students in Three Categories of Schools in the Low Socioeconomic Status Group.

		Low Socioeconomic Status Group				
		Category C	Category B	Category A	Effect Size	
					B *vs* A	B *vs* C
Interest Index	To Learning	36.7	51.6	48.6	0.66	0.15
	To Arts	58.28	66.09	62.85	0.84	0.39
	To Sports	66.54	74.21	72.29	0.85	0.21
	Interest Satisfaction	47.38	62.18	60.29	0.72	0.10
Burden Index	Learning Pressure	14.3	24.4	18.6	0.61	0.37
	Sleep	6.6	17.7	10.4	0.65	0.45
	Homework	60.6	62.1	51.6	0.10	0.67
Learning Quality Index	Learning Confidence	57.8	56.9	55.4	0.05	0.07
	Learning Strategy	54.82	57.88	55.62	0.66	0.54
	Learning Motivation	60.8	69.9	69.6	0.57	0.02
Social Relationship Index	With Teachers	52.8	66.0	63.2	0.69	0.15
	With Peers	66.3	68.7	64.6	0.15	0.21
	With Parents	70.3	70.7	68.2	0.03	0.13
Activity Participation Index	Charitable Activities	37.9	55.9	53.6	0.81	0.13
	Research Learning	35.5	55.4	46.6	0.84	0.49
	Independent Elective	28.9	45.8	38.2	0.82	0.40
	Social Activities	17.0	35.3	28.5	0.86	0.34
	Subjective Well-Being	67.5	75.6	76.8	0.63	0.10

index was 13.2 points, 18.5 points, and 16.0 points lower; public welfare activity participation index, research learning index, the self-selective index, and the community participation index were 17.9, 19.9, 16.8 and 18.3 points lower, respectively. This shows that in a school environment with a low overall socioeconomic status, it is not possible to sacrifice students' sleep in exchange for good performance. Otherwise, children may face increased pressure, decreased interest, disharmony in social relationships, and participation in various activities, and subsequently, the enthusiasm was severely frustrated, and he was unable to feel happiness.

(2) For schools in the high socioeconomic status group, the students in the schools with "the best performance when they sleep more than 8 hours" had a higher interest, lower pressure, better learning quality, higher participation in activities, and social relationship were more harmonious and well-being was higher.

There are also differences in the performance of students in the three categories of schools in the high socioeconomic status group in terms of learning interest, academic pressure, learning quality, activity participation, social relationship, and subjective well-being. **Table 3** presents the difference between the indexes of the two groups of schools.

Table 3. Indexes of Students in Three Categories of Schools in the High Socioeconomic Status Group.

		High Socioeconomic Status Group				
		Category C	Category B	Category A	Effect Size	
					A *vs* C	A *vs* B
Interest Index	To Learning	54.4	72.6	74.0	1.15	0.09
	To Arts	54.99	66.52	66.15	1.30	0.04
	To Sports	64.88	74.36	75.01	1.18	0.06
	Interest Satisfaction	69.05	78.08	79.00	0.70	0.07
Burden Index	Learning Pressure	41.6	45.7	53.1	0.46	0.29
	Sleep	2.0	11.4	19.1	0.80	0.39
	Homework	56.5	64.7	59.5	0.12	0.21
Learning Quality Index	Learning Confidence	69.2	77.7	76.8	0.58	0.08
	Learning Strategy	54.38	64.25	60.27	0.89	0.56
	Learning Motivation	72.3	84.9	84.6	1.27	0.03
Social Relationship Index	With Teachers	82.1	88.2	85.0	0.24	0.29
	With Peers	87.0	87.0	86.9	0.01	0.01
	With Parents	82.0	86.9	85.8	0.39	0.12
Activity Participation Index	Charitable Activities	95.0	76.0	77.0	0.94	0.06
	Research Learning	69.3	74.6	78.5	0.51	0.20
	Independent Elective	47.7	67.5	61.7	0.66	0.25
	Social Activities	28.8	54.2	47.2	0.87	0.30
	Subjective Well-Being	86.0	86.4	87.7	0.21	0.17

In **Table 3**, in the high socioeconomic status group, some indices of category A schools were higher than category B and C schools, and some indices of category B schools were higher than category A schools. Comprehensively, the categories A and B schools were "the schools with the best student performance when the sleep time is more than 8 hours." The specific data presents the following characteristics:

In the context of the overall high socioeconomic background of the school, the indices of "category B schools" and "category A schools" are different from each other, but the overall difference is not big, basically maintaining around 5 points. The indices of "category C schools" are lower than "category A schools" as a whole, and the differences are large. Among them, "category C school" is more than 10 points lower than "category A school" in interest index; learning stress index and sleep index are 11.5 points and 17.1 points lower respectively; autonomous elective index and community participation index are 14.0 points and 18.4 points lower respectively; learning motivation index is 12.4 points lower. As a result, for students with high socioeconomic status, the lack of sleep brings serious consequences. They face increased pressure, decreased interest, disharmony in social relationships, and serious frustration in their enthusiasm for participating in various activities, and no well-being feeling.

Multi-Level Early Warning of High-Performance Sleep Interval in High Schools in Province S

Through the above analysis, no matter what the socioeconomic status of the school is, the achievement of high grades of students cannot be at the cost of reducing sleep time. Students who sleep for at least eight hours are more likely to get the good academic performance and are more conducive to the formation of a healthy and benign educational environment. The following is a multi-level early warning for all sample schools in province S:

- Schools with the highest scores in the student group whose sleep time is < 5 hours are listed as red warnings;
- Schools with the highest score in the student group of 5-6 hours of sleep are listed as a yellow warning;
- Schools with the highest scores in the 6-7 hours of sleep time are listed as orange warnings;
- Schools with the highest scores in the student group with 7-8 hours of sleep are listed as blue warnings.

More than 60% of schools in province S were at the warning level. Among 140 schools, 24 schools were at the red warning level; 18 schools were at the yellow warning level; most schools were at the orange warning level, as many as 34. What's more noteworthy is that province S as a whole was also at the orange warning level; 9 schools were at the green warning level. For these schools that exchange low sleep for high grades, we should pay attention to and supervise them in various ways to create a healthy educational environment for students.

Conclusion and Discussion

"Students Achieve the Highest Scores When They Sleep for Eight Hours or More." This Is an Ideal Matching Mode for the School to Ensure the Healthy Development of Chinese High School Students and Maintain a Good Educational Environment

According to the data, the schools in province S where "students sleep for eight hours or more have the best academic performance" have a good educational environment. Students in these schools actively participated in public welfare activities, research learning activities, independent electives, and club activities. They were confident and motivated to devote themselves to learning; not only were they interested in learning, but they were also interested in art and sports. Such schools could satisfy students' hobbies in all aspects to a greater extent. Ensure adequate sleep and complete homework of appropriate intensity every day; they had a more harmonious relationship with their parents, teachers, and peers, and they could feel more happiness.

For a long time, the spirit of "extremely hard study" reflected in ancient Chinese stories such as "tie one's hair on the house beam and jab one's side with a needle to keep oneself awake - painstaking in one's study" and "bore a hole on the wall to make use of the neighbor's light to study" have been highly praised as the outstanding qualities students should have. Current teachers and parents often use such stories to encourage students and children to concentrate on learning. Many children also use these stories to encourage themselves and remind themselves to study hard. However, the data obtained by the empirical investigation is exactly the opposite of this view. For students with relatively low family socioeconomic status, even if they have to spend more learning time, they must ensure 8-9 hours of sleep, so as to have a healthy educational environment and a healthy state of development. If the pursuit of high grades at the expense of sleep time will often increase the academic pressure of students, students will gradually lose their interest in learning, art, and sports, making students unwilling to participate in various activities, and worsening their relationship with teachers, parents, and peers. Therefore, keeping students' sleep time at 8 hours or more is an ideal matching model for schools to ensure the healthy development of students and create a good educational environment.

The ideal model of the relationship between sleep time and academic performance should be: in certain sleep time, the student's academic performance reaches its peak. The "Elementary and Middle School Health Education Guidelines" issued by the Ministry of Education in 2008 stipulates that students should be guaranteed adequate sleep. Among them, elementary, middle, and high school students should sleep 10, 9, and 8 hours a day, respectively. When the sleep time of high school students in province S is more than 8 hours, their academic performance reaches the highest point. The project team evaluated a high school in a southern coastal city of China and a middle school in the mainland of China in the same way and found that only when the sleep time was 7-8 hours or even 6-7 hours, the academic performance of students in this area can be reached the highest. It can be seen that the high school data in province S is closer to the ideal model than high schools (even middle schools) in other similar regions. In fact, since 1997, province S has continued to standardize school-running behavior and strengthened supervision of the phenomenon of increasing academic burden. Our data showed that the long-term efforts of province S have achieved certain good results.

Teachers, Schools, Administrators, and Parents Should Hold Correct Educational Values and Take A Comprehensive View of the Relationship Between Students' Sleep Time and Academic Performance.

It can be seen from this study that the high performance obtained by sacrificing students' sleep requires a price, such as students' low interest in learning, arts and sports, public welfare activities, research studies, autonomous electives, insufficient participation in club activities, high learning pressure, and the social relationship is tense and subjective, and well-being is low.

The fundamental goal of education and the healthy development of students should not be based solely on students' academic performance as the only evaluation criterion. The "Basic Education Curriculum Reform Outline (Trial)" issued by the Ministry of Education in 2001 pointed out: "Establishing an evaluation system that promotes the overall development of students. Evaluation should not only focus on students' academic performance but also discover and develop students' various potentials." The Opinions of the Ministry of Education on Promoting the Reform of Comprehensive Evaluation of Education Quality in Primary and Secondary Schools issued by the Ministry of Education in 2013 also particularly emphasized the concept of comprehensive indicators for education evaluation. The issuance of these important policy documents reflects the education administrators' thinking on the goals of education reform at the macro level. Educational goals and multiple evaluations should not only pay attention to the overall development of students' morality, intelligence, sports, art, and labor, but also demonstrate students' individual strengths and development potential. Pursuing good grades at the expense of students' sleep time and neglecting the physical and mental development of students and the creation of a good educational environment will inevitably lead China's education astray.

To ensure students' sleep time in educational practice, efforts should be made in the following aspects: First, the educational administrative department and the school should act as parents' consultants, and guide parents to choose appropriate family education methods according to their children's actual conditions. One size fits all. Parents should also understand that it is the duty of parents to let their children grow up healthily and happily. They should not blindly care about their children's academic performance, but should be more concerned about their children's subjective feelings and experiences in learning, concerned about the overall development of students, and balanced distribution of learning energy; It is necessary to face up to the academic burden of students and to think rationally and appropriately, so as not to fall into the misunderstanding of the excessive pursuit of high grades at the expense of students' sleep time. Second, the behaviors in schools that increase the learning burden of students and seriously affect students' sleep time should be strictly investigated and urged for improvement; appropriate homework should be assigned to avoid problematic tactics, fatigue bombing, and phenomena that affect students' sleep time. Third, the education administrative department needs to effectively implement the principle of enrolling nearby to ensure a reasonable distance between the student's residence and the school, so as to reduce the problem of insufficient sleep time caused by the student's home address being too far away from the school, and the long time on the way to school. In the long-term run, enrollment for high school and college entrance examinations should break the "score-only" selection criterion and replace it with a comprehensive standard. It is necessary to pay attention not only to student performance, but also to student development, creativity, and the spirit of serving the society. Guide the school to return to the track where knowledge education and quality education go hand in hand.

Provide Multi-Level Early Warning and Improve the Accountability Mechanism for Schools That Pay the Price of Lack of Sleep and Blindly Pursue High Academic Performance

Even under the general situation of S Province, which has continued to regulate school-running behaviors for many years, more than 60% of the students in the 140 schools surveyed in this study still achieved the highest results when they slept for less than 8 hours. Such a high proportion requires extensive attention. Among them, 24 schools were at the red warning level; 18 schools were at the yellow warning level; as many as 34 schools were at the orange warning level; 9 schools were at the blue warning level. This early warning mechanism is extensible. All regions can refer to this early warning standard and conduct multi-faceted supervision of schools that sacrifice sleep time in exchange for high grades.

Educational administrative departments should truly be aware of the harm to students in pursuit of high grades at the expense of sleep time. They should increase risk awareness, strengthen monitoring and early warning, and carry out necessary guidance and accountability. Early warning and supervision of students' sleep time is systematic work. It cannot be accomplished overnight with just one measure; it requires the joint efforts of many parties. For example, the administrative department of education can set up an early warning and monitoring system for an academic burden to encourage parents to respond to students' burden problems such as lack of sleep and heavy homework; in turn, relevant departments can use this as a reference to investigate relevant schools and supervise their rectification. They can also hire a third-party assessment agency to investigate the sleep time of students, and based on the early warning mechanism established in this study, publish the warning results every month, and criticize schools that blindly pursue high grades at the expense of student sleep time. In addition, different schools are encouraged to develop mutual learning and healthy competition. Schools at an early warning level learn from schools that can guarantee adequate sleep, high academic standards, healthy physical and mental development, and a good educational environment for students. The collision of different educational management modes and methods will produce different educational results, and mutual learning and communication can jointly promote the comprehensive and healthy development of students.

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ARTICLE

Are Students Satisfied with the Current School-Based Curriculum of Chinese Traditional Culture? A Survey of 120 Elementary and Middle Schools in China

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***Abstract**. The school-based curriculum is one of the crucial ways of Chinese traditional culture education. Therefore, it is essential to discuss the current elementary and middle school students' satisfaction with the traditional cultural school-based curriculum. A survey of the curriculum satisfaction of 120 elementary and middle schools in China with a traditional cultural school-based curriculum found that students' satisfaction with these curriculums is generally average. However, students believed that the quality of the curriculum is still low. Its main manifestations were passive satisfaction, compromise satisfaction, excellent satisfaction, fall satisfaction, and autonomous satisfaction. This highlighted the problems of some traditional cultural school-based curriculums like the positioning is based on subjective guesswork, the content has not been effectively screened, and the implementation method is a single indoctrination. Based on this, we suggest that: (i) create an all-round atmosphere for students to learn traditional culture actively; (ii) reshape the traditional culture in the curriculum according to the value of the times; (iii) guarantee the cultural resources and professional teachers of curriculum implementation with discipline construction, and (iv) focus on the experience of the implementation process.*

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Background

CHINESE traditional culture is a kind of objects and values that the Chinese nation has continuously inherited and developed based on diverse regional customs, unique languages, literature and art, and profound philosophical thinking in its thousands-year history (Zhang et al., 2017). It is broad, profound, and diverse. It has the essence in line with the development of the times and social progress and has dross. The ideological culture that transcends time and space and has current value is called Chinese traditional culture. Its content structure is multi-dimensional, in which values, psychological characteristics, and emotional thoughts constitute the core of national identity and cohesion (Zhao, 2002). Therefore, Chinese traditional culture is fertile cultural soil for the people's survival and development and the Chinese nation's spiritual backbone. For this reason, in March 2014, the "*Guiding Outline for Improving Chinese Traditional Culture Education*" (hereinafter referred to as the "*The Outline*") issued by the Ministry of Education of China not only carried out a top-level design on how to promote Chinese traditional culture education in schools but also required various Schools increase the proportion of traditional culture in the school-based curriculum. Therefore, it is of great significance to examine the effectiveness of the current elementary and middle school's traditional cultural school-based curriculum.

The traditional culture school-based curriculum discussed in this study is a curriculum with Chinese traditional culture as the main content, independently established and continuously implemented by elementary and middle schools (Lv & Ding, 2019). There are many kinds of school-based curriculums of this kind, which include not only the operational content in human life, such as chess, calligraphy and painting, opera, martial arts, and tea art but also conceptual content with a high degree of abstraction, such as local history and culture, ancient classical books, etc. The school-based curriculum should be based on the humanistic environment, geographical resources, historical accumulation of the school, the place where it belongs, and then developed by the level of differentiation, and students' needs.

In other words, the traditional culture-related school-based curriculum is a school-based activity that elementary and middle schools gradually develop based on local cultural resources. It helps students transform their own experience into emotional attachment and cultural awareness of their hometown. Since "*The Outline*" was issued, many scholars have researched traditional culture-related school-based curriculum. The research content mainly focuses on the following three aspects: First, the experience combing and improvement strategies of a particular type of traditional cultural school-based curriculum construction, such as the school-based curriculum of intangible cultural heritage (Zheng, 2017), the school-based curriculum of Chinese classics (Gao & Lei 2016); Second, explore how school-based curriculum construction can inherit regional culture (Li et al.,2015); Third, explore the value and significance of traditional culture-related school-based curriculum construction, such as shaping school cultural traditions (Tian & Wang, 2018) and generating students cultural consciousness (Zheng, 2014).

In short, the current research on traditional culture-related school-based curriculum presents two significant characteristics: first, as far as the research subject is concerned, it is mostly seen in the research on curriculum objectives, content, and implementation, and lacks research on curriculum evaluation; second, in terms of the research methods, most research focuses on case studies and discussions and lacks in-depth quantitative research. More importantly, there are very few studies on the effectiveness of China's current traditional culture-related school-based curriculum construction.

If you want to explore the effectiveness of traditional culture-related school-based curriculum construction, you must first clarify these curriculums' evaluation subjects. The construction of the school-based curriculum relies on the school's own culture, and its purpose is to realize the characteristics of the school, the professionalization of teachers, and the diversified development of students (Liu, 2016). These three all point to the independent and diversified development of students. Students are the logical starting point for constructing the school-based curriculum and the final destination of its construction. Therefore, the subject of school-based curriculum evaluation should be students. The student-based curriculum evaluation emphasizes allowing students to make independent judgments on the value of the courses they learn and then express their attitudes, interests, and needs (Xue, 2003). It can neither be limited to measuring the students' experience gained in course learning, nor can it take the students' feedback on the teacher's teaching quality as the only means. There has been a sharp increase in student satisfaction assessments regarding courses as service products in recent years. This evaluation realizes the student-based evaluation concept since the evaluation's content includes students' curriculum expectations, quality feedback, and value perception. As far as the actual teaching situation is concerned, if the quality of the students' experience in the school-based curriculum is higher than their expectations, they will have a higher degree of satisfaction, which may generate curriculum loyalty to continue to pay attention and learn. On the contrary, students will give up choosing the course, which will cause a deviation in the understanding of the course content. In other words, the student's curriculum satisfaction affects the continued existence and implementation of the school-based curriculum.

Therefore, this study takes students as the main body of evaluation to examine whether students are satisfied with the current traditional culture-related school-based curriculum. Specifically, the researchers described whether students are satisfied with the current traditional culture-related school-based curriculum through group clustering of satisfaction, and explored the problems behind the status quo with the specific answers of the student questionnaire and interviews with teachers and students, to put forward suggestions for improving the quality of the traditional culture-related school-based curriculum.

Methodology

Theoretical Source

The theoretical model developed for the Student Course Satisfaction Scale is derived from the Customer Satisfaction Index (CSI) model in foreign business administration. This model is based on the theory of perception and expectation difference proposed by American scholar Oliver in the 1980s. The theory believes that when the customer is perceived service quality or product quality is higher than their expectations, the customer will be satisfied with the service or product, and vice versa (Oliver, 1980). Through the long-term revision of many studies in economics and psychology, CSI can judge economic output quality in a particular area. Many countries or regions have also established CSI models with their characteristics (Liu et al., 2003). In education, the CSI model includes four essential observation variables: student expectations, perceived quality, value perception, and student satisfaction. At present, this theoretical model has been applied to education, especially in the field of course evaluation, such as online course evaluation (Wang et al., 2014) and the current status of high school students' course satisfaction (Yin, 2004). As mentioned above, as the logical starting point and final destination of school-based curriculum construction, students have a say in their own learning experience and feelings and the quality level that the school-based curriculum provides to themselves. Therefore, researchers expect to reflect the quality status of the traditional culture-related school-based curriculum to a certain extent based on students' curriculum satisfaction.

Scale Development and Testing

Aiming at the four basic dimensions of student expectations, perceived quality, value perception, and course satisfaction included in the CSI model, the researchers have drawn up their subordinate dimensions: student expectations include students' expectations of teaching content and methods; perceived quality includes students' teaching content Perception and method; perception of value is the learning gain of students; course satisfaction is the overall satisfaction of students with the course. We have compiled related test questions based on the above dimensions and combined them with the traditional culture-related school-based curriculum characteristics. To ensure the large-scale evaluation test's accuracy, we conducted a trial test on the developed questionnaire. The test subjects were a middle school and an elementary school in Changchun City. The total number of test students was 110 and 101 valid questionnaires were returned, and the effective questionnaire recovery rate was 91.82%. We calculated the alpha function of the test data and found that the reliability of the scale was high, with a reliability coefficient (Cronbach's Alpha) of 0.928; and using the fa function of the R language psych program to calculate the KMO value of the questionnaire was 0.802, which proved this questionnaire is suitable for factor analysis. Then the principal component analysis of the R language was used for the principal component analysis, the factor screening was performed with the threshold value of the characteristic root greater than one into seven standard factors, and the total interpretation of the factor rotation questionnaire using the maximum variance method (Varimax) was 69.83%. Based on the above exploratory factors analysis, we revised the test questions with multiple loads, inconsistent with the factor structure, and improper presentation, and obtained the for-

mal traditional culture-related school-based curriculum student satisfaction measurement scale.

Sample Survey

This survey used a stratified sampling design. Considering the differences in the types and quantities of traditional culture-related school-based curriculums opened in various provinces in China, we conducted a sample survey of 120 elementary and middle school. According to the overall number of schools announced by the Ministry of Education of China in 2017, the sampling ratio of elementary, middle, and high schools in this study was roughly 5:3:2. During the actual investigation process, the curriculum plans of 120 sample schools were analyzed. We found that 107 schools had a school-based curriculum, 92 of which had a traditional culture-related school-based curriculum. After that, this study used paper questionnaires for students who had studied the traditional culture-related school-based curriculum in 92 schools, and a total of 12,230 satisfaction questionnaires were collected (elementary school was 6,874, middle school was 5,356). When inputting data, excluding the missing values in the questionnaire responses and the inadvertent questionnaires, a total of 10,744 valid questionnaires were obtained, including 6,071 from elementary school and 4,673 from middle school. The effective response rate of the questionnaire was 87.85%.

Reliability and Validity Test

We use R language to carry out reliability tests, exploratory factor analysis, and structural equation modeling of the scale. Calculated by the alpha function, the overall Cronbach's Alpha of the questionnaire is 0.901, and α coefficients of each dimension were: 0.806, 0.734, 0.903, 0.814, all greater than 0.7. Exploratory factor analysis was conducted with the R language psych program, and it was found that the chi-square value of the Bartlett sphere test of the questionnaire was 60443.06 ($P < 0.001$), and the KMO value was 0.945 ($P < 0.001$). This showed that the result of factor analysis was good enough and suitable for factor analysis. Then, the principal component analysis of the R language was used for the principal component analysis, the factor screening was performed with the threshold value of the characteristic root greater than one as the four standard factors, and the maximum variance method (Varimax) was used for factor rotation to obtain the total interpretation of the questionnaire as 84.51%. Finally, referring to the existing university curriculum satisfaction construction model, using the R language nested semPlot program, and fitting the curriculum satisfaction model to output in RAM (reticular action model) format (as shown in **Figure 1**) (Chen, 2018). The fitting parameters were: $X2/df = 2.374 < 3$, $CFI = 0.946 > 0.9$, $NNFI = 0.913 > 0.9$ and $RMSEA = 0.047 < 0.06$. Therefore, the scale has a high degree of goodness of fit to the constructed model, that is, the students' satisfaction with the traditional culture-related school-based curriculum scale constructed in this study has good structural validity.

Group Clustering and Problem Description

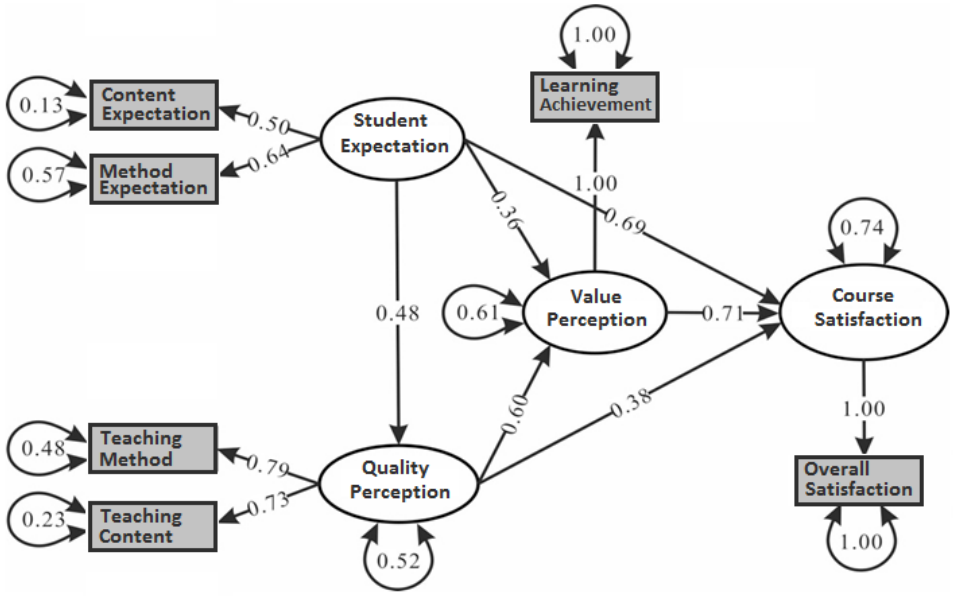

Figure 1. Structural Equation Model of Student Satisfaction with Chinese Traditional Culture School-Based Courses.

Cluster analysis is often used to classify features of similar groups, but SPSS clustering is usually disturbed by data noise, and it cannot visualize the features of each group, and cannot be used for calculations with large amounts of data. Therefore, we imported the above data into the server and used the average algorithm of the pheatmap package in R language to perform Cluster analysis and drew the heat map (Kolde, 2019). The image uses branched branches to represent the clustering of groups, and the color depth of the image expresses the level of a specific dimension score. Based on the scores presented in different course satisfaction dimensions, we carried out an in-depth description and typed refinement of different groups. After the group clustering situation was divided, we interviewed some teachers and students for some test questions, aiming to reveal the problems behind the satisfaction group's current satisfaction group of the traditional culture-related school-based curriculum.

Results and Analysis

The Status Quo of Student Satisfaction with the School-Based Curriculum

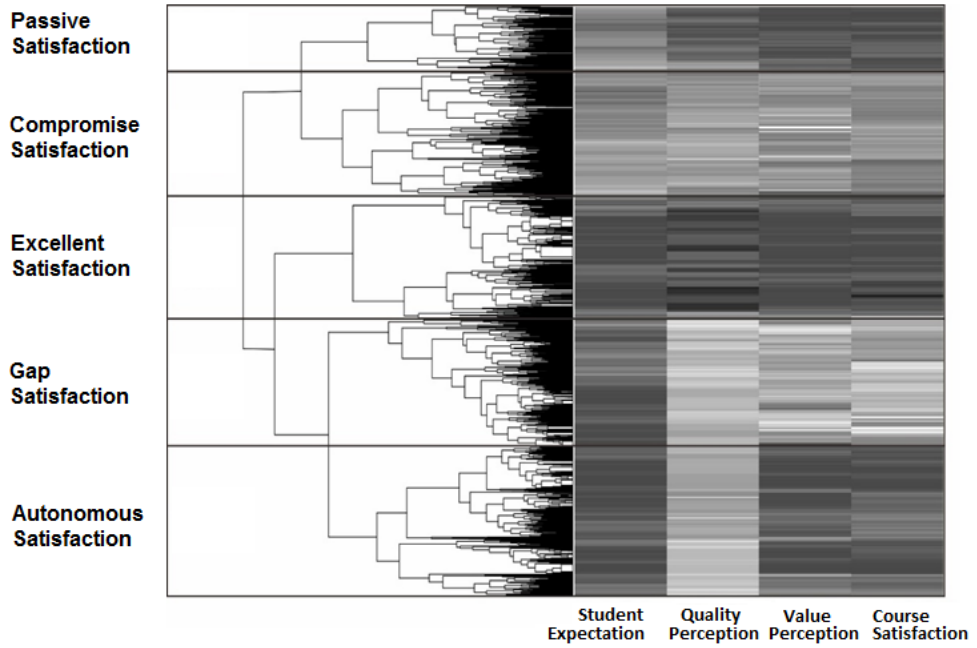

Figure 2. Group Clustering of Satisfaction with Chinese Traditional Culture School-Based Courses of Elementary and Middle School Students.

Students were satisfied with the current traditional culture-related school-based curriculum (mean value is 7.27). Specifically, current students often had high expectations for such a school-based curriculum. The average student expectation was 7.59, and 70.44% of students expressed their willingness to choose traditional culture courses to continue. However, students had a low degree of perception of teachers' teaching quality in these courses, with an average of only 5.88 points. More than 65% of students believed that teachers' teaching methods were not satisfactory and could not meet their learning needs. Even so, students still maintained a high learning gain (i.e., value perception), and overall satisfaction was high. To explain this phenomenon more comprehensively, we divided it into five categories based on the characteristics of clustering groups: passive satisfaction, compromise satisfaction, excellent satisfaction, gap satisfaction, and autonomous satisfaction, etc. (as shown in **Figure 2**).

The proportion of "passive satisfied" students was relatively low, accounting for only 10.39% of the entire group. This kind of students had low expectations for the traditional culture-related school-based curriculum. However, because the teachers carefully pre-set the teaching activities, they still perceived a higher curriculum quality

and achieved a better value perception and curriculum satisfaction degree. The course satisfaction state of this type of student was that the quality of the courses they felt was much higher than their expectations, and they had reached the surprise state described by the American marketing scientist Valarie (Zeithaml et al., 1988). As shown in the structural equation model in **Figure 1**, the achievement of this type of state was most directly affected by the perceived quality (the direct effect is 0.38), and value perception also played a part of the intermediary role in it, thereby generating a dual process of course satisfaction. The four dimensions of "compromise satisfaction" all performed somewhat. **Figure 2** shows that since this type of student's expectations were equal to perceived quality, they were not satisfied with the traditional culture-related school-based curriculum. Students of this type were not very interested in traditional culture and had reached a compromise evaluation of such courses with a perfunctory attitude. Therefore, "compromise satisfied" students often showed a low balance of traditional culture-related school-based curriculum.

"Excellent satisfied" students accounted for about 20%. This type of student had a higher perceived quality of the course, and because the perceived quality was higher than their course expectations, they had reached a state of surprise. Specifically, these students had strong desires and longings for Chinese traditional culture, and the school-based curriculum had also met their expectations. Therefore, these students were satisfied in all aspects. Although the "gap satisfaction" students accounted for about 20%, this type of student's course satisfaction status was precisely the opposite of the "excellent satisfaction" students. The students with "gap-type satisfaction" did not feel the higher course quality when the course expectations were high, which led to Valarie's loss state (Zeithaml et al., 1988). In other words, students' expectations for learning traditional culture had not been met, and the tremendous gap between expectations and gains had led to lower student satisfaction. In reality, most of these students had much perceptual knowledge of traditional culture and understood traditional culture only from the surface.

Besides, there was another type of students, accounting for about 25.6%, and they were "autonomous satisfaction." Although these students showed high expectations and low perceptions, they had a high level of course satisfaction. This seems to be different from the "satisfaction = perception-expectation" described in CSI's basic theory. Such students started the course with high expectations. Although they did not feel good course quality, their strong interest in learning prompted them to conduct exploratory learning autonomously based on some materials or even limited keywords, thus achieving better learning gains and higher satisfaction. Therefore, this type of students mainly played a role through the path that students expect to directly affect course satisfaction in the structural equation model (the direct effect is 0.69). This phenomenon was also similar to the results obtained from previous studies on flipped classrooms in universities based on the CSI model (Zhai et al., 2015).

In sum, the current students' satisfaction with the traditional culture-related school-based curriculum was diverse, and overall satisfaction was not high. Elementary and middle school students had high expectations for the traditional culture-related

school-based curriculum. However, the quality of the curriculum they felt was low, and students' satisfaction patterns were basically in line with "satisfaction = perception-expectation" except for the autonomous satisfaction." On the one hand, it showed that students' satisfaction with the traditional culture-related school-based curriculum was in line with the CSI theoretical model. On the other hand, it reminded us that while keeping students' expectations of this type of curriculum, we should work hard to resolve the problem that students felt that the curriculum's quality was low, thereby enhancing the overall construction of the courses.

Disclosure of the Problems of Student Satisfaction with the School-Based Curriculum

(i) Curriculum Positioning Is Based on Subjective Guesswork.

In the interview, we found that some teachers who participated in the development and implementation of the traditional culture-related school-based curriculum took it for granted that "children who eat McDonald's and drink Coke lack feelings for Chinese traditional culture" and believed that they were at a loss for traditional culture and never care about it. The current test evaluation system does not directly involve the traditional culture-related curriculum content, which leads to perfunctory and one-way indoctrination by teachers in curriculum development and teaching. Whether students are willing to accept traditional culture has become a prerequisite for establishing a traditional culture-related school-based curriculum. In terms of this survey, the proportion of " autonomous satisfaction " students was high, and about one-third of the students chose to place traditional culture at the top of other school-based curriculums, which showed that Chinese traditional culture still has a significant influence on students with particular attraction. Besides, students' responses to the cultural preference context test also proved this point. The survey question is: Mr. Li needs to bring a gift to foreign friends if he wants to go abroad. The following are some suggestions from students. Please sort the following options according to your preferences. Options include a set of chess, Tieguanyin tea, four masterpieces hardcover edition, Fabre's "Insects" hardcover edition, a Chinese knot, and a Bordeaux red wine gift box. Approximately 75.86% of students chose to put gifts representing Chinese traditional culture first. As a result, the artifacts representing Chinese traditional culture were still the cultural symbols that today's children are willing to touch, understand, and display. This also showed that the current students' lifestyles, thinking concepts, and value systems were under Chinese traditional culture. Therefore, the cultural cognition and judgment of elementary and middle school students cannot be based on the teachers themselves' subjective assumptions, nor can they mistakenly assume that students do not know and are unwilling to accept traditional culture as the condition of curriculum development and implementation.

(ii) The Course Content Has Not Been Effectively Filtered.

The researcher visited some of the research schools dominated by "gap-type satisfied" students and found that in such schools, nearly 90% of the traditional culture courses were part-timed by teachers of Chinese language, arts, or music. Most of them thought it was necessary to use a school-based curriculum to carry out traditional cultural education, and they were willing to practice it. Through a detailed analysis of student interviews and school curriculum plans, we found that some schools require 3rd-grade students to recite the "*Di Zi Gui*," "*Three Character Classics (San Zi Jing)*," "*Thousand Characters (Qian Zi Wen)*," "*The Great Learning (Da Xue)*," "*The Doctrine of the Mean (Zhong Yong)*" and "*Mencius*." Some proposed to attach importance to "the doctrine of the golden mean in classical culture, impartial and all-around integration into the classroom"; some schools organized students to bow to Confucius before the high school entrance examination. The champion was on the bridge, Streamers and other activities.

Many schools directly use the content of traditional culture as a school-based curriculum without screening, selecting, and processing. Students show varying degrees of dislike for the content of the school-based curriculum. The school-based curriculum content has not been effectively screened, which had become a significant factor affecting student curriculum satisfaction. As mentioned above, the essence and dross coexist in Chinese traditional culture. As a cultural selection process, curriculum design will shape students' understanding of traditional culture, and traditional culture will also be inherited and continued through school education, mostly curriculum. Besides, the school curriculum should be a process of understanding, selecting, and restructuring traditional culture, that is, the curriculum is a cultural transformation. Chinese traditional culture has differentiated textual expressions, artifacts, and regional customs. Therefore, the school-based curriculum need not pursue the unity of the national curriculum. It should use regional resources, consider students' living environment, and play its unique and agile role in educating people. The traditional culture-related school-based curriculum should be the "rebirth" of the cultural structure that maintains personal values, rather than the "inheritance" of one-way flow. The content of this kind of school-based curriculum should not fully cover Chinese traditional culture but should be a reasonable choice based on discussions between teachers and students.

(iii) The Implementation of the Course Is A Single Indoctrination.

Nearly half of the students in the cluster showed "gap satisfaction" and "autonomous satisfaction." These two types of students had low perceived quality of the traditional culture-related school-based curriculum. After a detailed analysis of the two types of student questionnaires, we found that 83.24% of the students thought the course's teaching methods were unsatisfactory. In implementing the traditional culture-related school-based curriculum, only 1% of students have been to communities, memorials, folklore museums, museums, and Confucian temples. Most teachers still only teach, preach ideas and instill values on the campus. The single instillation of the curriculum makes the traditional culture-related school-based curriculum only being a form, and it does not provide an opportunity for "revisiting these stories and connecting them with

the present" with "extended scenes" and "sacred memory spaces" (Qiu, 2017). This problem directly leads to the low quality of students' perception of the curriculum, but it is also difficult for students to form a deep memory and deep identification with Chinese traditional culture. Traditional cultural content has been systematically presented in national curricula, especially in Chinese language, history, ethics and law, music, sports, and fine arts. If the school-based curriculum is only understood as the supplement and expansion of the national curriculum content, the majestic and rich Chinese traditional culture will make the curriculum capacity unconstrained. Therefore, the school-based curriculum's traditional cultural content does not care about the increase in the amount of knowledge and information but uses synthesis, experience, and operation to make students feel and practice culture. It provides students with an environment to comprehend culture by integrating existing information and knowledge and practicing the expectation and curiosity of culture. Therefore, the implementation of the traditional culture-related school-based curriculum is not merely to "instill" information, "propaganda" values, and "implant" traditional cultural knowledge, but should allow students to discover the beauty in familiar cultural elements.

Conclusion and Suggestion

According to the above survey, we found that students' overall satisfaction with the current traditional culture-related school-based curriculum is not high, and their perception of the curriculum's quality is still insufficient. Besides, students mainly present five forms of passive satisfaction, compromise satisfaction, excellent satisfaction, gap satisfaction, and autonomous satisfaction. After a detailed analysis, we found that due to the traditional culture-related school-based curriculum: the curriculum positioning is based on subjective guesswork, the curriculum content has not been effectively screened, and the curriculum implementation method is singly instilled. This leads to the lack of students' perception of the courses' quality in the development and implementation of such courses. Then, we made the following suggestions for the construction of traditional culture-related school-based curriculum:

Create an All-Round Atmosphere for Students to Learn Chinese Traditional Culture Actively

From the survey results, it is found that students have many expectations for the traditional culture-related school-based curriculum, and because of this, some students have reached a state of "autonomous satisfaction." This shows that it is essential for students to maintain their expectations for such courses. The influence of culture on people is gradual and invisible, so it is critical to actively create a good atmosphere for students to learn Chinese traditional culture. In the current era of information explosion, people's feelings and cognition of many things are not derived from personal experience, but from the mass media. The mass media has many functions or values, such as environmental monitoring, social coordination, and cultural inheritance (Raswell, 2013). There-

fore, in different media, we should actively create an overall atmosphere for students to learn Chinese traditional culture.

First, whether it is traditional paper media, Internet media, or all kinds of current mobile new media, news, public service advertisements, TV, or movies related to Chinese traditional culture should be broadcast promptly. The second is to actively construct a trinity Chinese traditional culture propaganda mechanism of "school-family-community" so that students can feel the discussion and recognition of Chinese traditional culture symbols by the elders, peers, and their relatives in different fields. Third, the school should help students get immersed in Chinese traditional culture's learning atmosphere through various forms such as campus bulletin and teacher-student etiquette. Finally, based on the high frequency of publicity, the field's diversity, and the appropriate form, an atmosphere of active learning for students is created to maintain their expectations for the traditional culture-related school-based curriculum.

Adapt to the Value of the Times and Reshape the Traditional Culture in the School-Based Curriculum

Given the problem that the content of some traditional culture-related school-based curriculum has not been effectively screened, we need to clarify that not all concepts and spirits in Chinese traditional culture are worth inheriting. The primary prerequisite for the inheritance and promotion of Chinese traditional culture should be to judge it carefully. Because the traditional culture-related school-based curriculum has "reproduction" in cultural transmission, we must be cautious about the curriculum's cultural choices. Traditional culture is neither a propaganda tool nor a management ruler. The spiritual core it conveys should be desirable, something young people are proud of and willing to pass on. Therefore, the curriculum content of traditional culture needs to be reviewed, screened, and even reformed, and the values in line with the development of the times and national characteristics are integrated into the curriculum. Therefore, the traditional culture in the school-based curriculum needs to be reshaped according to the values of the times. The inheritance and promotion of Chinese traditional culture require the value of the times of "being benevolence, emphasizing the people, keeping honesty, upholding justice, advocating harmony, and seeking great unity" (Xi, 2014). This is a modern interpretation of the consensus concept of Chinese traditional culture. It highlights the use of "do not impose on others what you do not desire" to treat people or things around you; Governing the world with the concept of "treat other people as you would yourself" can realize the traditional Chinese concept of a society of "all things grow together without harming each other, and roads are parallel and not contradictory" (Ding & Lv, 2019). To realize the adaptation to the value of the times and reshape the school-based curriculum's traditional culture requires the following two points. First of all, the traditional culture-related school-based curriculum is being developed, and the content of traditional culture should be reviewed and selected based on the values of the times. Secondly, in teaching, teachers should also pay attention to the comparative examination of different cultures, integrate and condense the values behind the cultures,

and help students realize the values of the times in the traditional culture-related school-based curriculum give students the correct value guidance.

To Ensure the Cultural Resources and Professional Teachers for Curriculum Implementation by Subject Construction

Whether the positioning of the traditional culture-related school-based curriculum is based on subjective guesswork or the curriculum content has not been effectively screened, it shows that the current school education system, curriculum managers, and implementers themselves have a weak Chinese traditional culture accumulation. In fact, in the current relatively westernized discipline organization and knowledge system, it is already difficult for us to find the "words" and practical "methods" of moral development in China's early discipline teaching. Chinese traditional culture has become a small part of subject research and teaching because of its complex system.

Although the "Chinese studies boom" from the end of the last century to the beginning of this century brought Chinese traditional culture back to the public eye, the "studies of the quintessence of the country" and "studies of the national heritage" that rejected Western culture encountered difficulties in interpretation and implementation of the inheritance of Chinese traditional culture (Jing, 2010). Therefore, many scholars call for establishing Chinese traditional culture disciplines in universities or research institutes to strengthen their academic research and teacher training, thereby promoting their discipline construction (Guo, 2017). Similarly, it is also imperative to guarantee the cultural resources and professional teachers of curriculum implementation with discipline construction in terms of future development. On the one hand, discipline construction must guarantee the cultural resources needed for curriculum implementation. Relevant scholars should collect, sort, and compile regional cultural resources, and interpret the core connotations in the related cultural resources, to facilitate the search and use of course developers or implementers. On the other hand, cultivating traditional culture teaching through the discipline construction of traditional culture will break the dilemma that most frontline teachers are part-timers.

Pay Attention to the Experience of the Implementation Process of School-Based Curriculum

The survey found that part of the current implementation of the traditional culture-related school-based curriculum is a single indoctrination, which has resulted in students not having an indeed embodied experience and deep recognition of Chinese traditional culture. If the teaching method is far from the students' lifestyle, habits, and interests, the course content's deep meaning is usually challenging to understand by the students. If students do not have the cognitive premise of their own experience, it is even more challenging to produce emotional acceptance and value recognition. This shows that the implementation of traditional culture-related school-based curriculum does not lie in the expansion of information and instillation of ideas, but the course implementation process's experience. On the one hand, teachers should avoid simple in-

doctrination and rigid teaching in classroom teaching. Promote students' meaningful learning with concrete experience, life-like examples, and contextual interaction. This requires teachers to combine students' needs and interests, use multimedia teaching, project-based learning, and other teaching methods in the classroom so that students can happily recognize, accept and share the cultural connotation of their acquisition. On the other hand, in the course of implementation, students are allowed to enter the traditional cultural off-campus environment to study. Activities such as visits to related traditional cultural bases outside the campus and related professional experience provide students with opportunities for on-site experience, role-playing and hands-on practice, and provide unique conditions for students to deeply experience the value of traditional culture. In addition, teachers can also invite some intangible cultural heritage inheritors and museum interpreters to the school for technical demonstrations and cultural presentations to enhance students' understanding and recognition of traditional Chinese culture.

Only in this way can the implementation's experience the traditional cultural school-based curriculum be enhanced in the reform of classroom teaching, the expansion of the field outside the school, and the introduction of external resources.

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NEWSLETTER

From Universities to Elite Universities: Heterogeneous Returns to Higher Education and the Sorting Mechanism in the Context of Higher Education Expansion in China

By Zhou, Y. & Xie, Y.

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WITH the popularization of higher education, the viewpoint of "academic qualification is useless" begins to rise. There is still a controversial debate that accesses to higher education increases return on income, and what are the mechanisms by which education affects return on income? In fact, there may be strong "heterogeneity" within the sample, that is, differences not only in higher education but also in other factors affecting income between individuals and groups. A survey published in *Educational Research*, using baseline data from the China Family Panel Studies (CFPS) as a database, constructed the following regression mode:

- The logarithm of the income in the year (2010) of the sampling data collection was taken as the dependent variables, and control variables such as gender and age were included. Because the social stratification structure brought by higher education is obviously different before and after the enrollment expansion policy for higher education, the sample group is divided into pre-enrollment and post-enrollment.
- The core intervention variable is the type of higher education, which is divided into non-university education, non-key university education, and key university education. That is to say, the sample group includes high school groups, non-key university groups, and key university groups.
- In order to control the selection bias of the samples, an intervention model was established to estimate the predisposition weight of each sample to select three types of higher education. Based on the weights obtained, the resulting model is constructed, and the improved Mincer income function is used to estimate the impact of higher education on income return.

The results are as following:

- Before the higher education expansion, there was no significant difference in the returns to high education between key universities and non-key universities, but both of them had earnings much higher than those with senior high school education. In other words, the higher education selection in the elite education stage has become the "stepping stone" to enter the higher income group.
- After the enrollment expansion, the marginal income of key universities is significantly higher than that of non-key universities, but the difference in marginal income between the labor force in non-key universities and senior high schools is no longer significant. That is to say, key universities continue to play the role of "screening elite", while non-key universities have seen the transformation of higher education from elitist education to popular education.

This empirical study finds that higher education influences income returns through opportunity scarcity and achieves social stratification. Before the enrollment expansion policy for higher education, the scarcity mainly existed between universities and high schools, but after the enrollment expansion, the scarcity existed between key universities and other academic qualifications. After the analysis of heterogeneity, this study points out the inevitable structural changes brought about by the popularization of higher education and demonstrates the functions of elite universities in key universities.

Source: Educational Research, 2020; 41(5):86-98.

NEWSLETTER

The Impact of New College Entrance Examination Reform on Academic Adaptation of Freshmen: Suppression or Enhancement?

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THIS a study published in *Journal of East China Normal University (Educational Sciences)*, which used the double differential propensity score matching method (PSM-DID). The research is based on the national college teaching quality and student development survey data and interview data, using the double differential tendency score matching method (PSM-DID) to explore the effect of the new college entrance examination reform on the academic adaptation of freshmen. This paper used the national college student development survey data of year 2017 and 2018, setting the type of college entrance examination as the core independent variable. Judging by the different location, students in Zhejiang and Shanghai are considering as the treatment group, which values as 1; and students from other provinces are the control group, and the variable is 0. In order to improve the reliability of the data analysis results, this paper incorporates the individual characteristics of the students' academic foundation (grouping and standardizing the college entrance examination scores), college characteristics, discipline types, academic participation, and family socioeconomic status into the control variables. This article focuses on the following three major issues: (i) How will the new college entrance examination reform affect students' academic performance at the university level? (ii) Whether the reform will help to improve the matching degree of students' professional choices? (iii) Whether those students with relatively weak educational resources may face obstacles in academic adaptation after admission.

The research results are as follows:

- In terms of academic performance, research data shows. Before the implementation of the new college entrance examination reform, the academic performance of students in Zhejiang and Shanghai areas was significantly better than other provinces. While after the reform, the academic performance advantage of freshmen in Zhejiang and Shanghai area has shrunk. On the one hand, the increase in the number of exams squeezed students' lin-

ear learning time, speeding up and compressing the learning progress, but instead caused the weakening of the students' academic foundation before entering the university, leading to a decline in the academic performance of freshmen in Zhejiang and Shanghai. On the other hand, to help students choose professional subjects based on students' learning interests and personality development. In reality, they are also alienated into divergence and avoidance of competition strategies that are difficult to optimize scores. This bought a freshman basic subject Risk of lack of knowledge.

- About the interest of studying majors, after the implementation of the new college entrance examination reform, the academic interest of freshmen in the Shanghai area of Zhejiang Province has significantly improved. The design of the admission mechanism of the new college entrance examination has met the students' professional aspirations to the greatest extent, which helped to promote further studies. The degree of matching between the person and the major of study. Due to the system design of subject selection, high school schools are required to strengthen the career planning education of high school students to help students establish an objective understanding of various majors and their future career directions, so as to make more rational professional choices.
- The impact of the new college entrance examination reform on college students' academic adaptation has obvious heterogeneity. In the context of the new college entrance examination, due to the weak school hardware conditions, the shortage of teacher reserves and curriculum resources, the disadvantaged group of students in vulnerable high school schools may be at a disadvantage in the new progression model. It can be seen that the difference in the level of educational resources occupies the children of the disadvantaged in the new college entrance examination reform, which shows a more embarrassing situation of academic discomfort and decline after entering the university.

The research conclusion of this article can provide the following four aspects of enlightenment for the reform of the new college entrance examination:

First, the reform of the new college entrance examination requires reflection and coordination of possible conflicts between the reform measures and the teaching practice of the high school. On the basis of adhering to the value orientation of the new college entrance examination, the stability of the high school education is maintained. Second, university education also needs to adjust training programs in time for reforms, and provide targeted tutorial education for students with different subject structures and academic foundations. Third, each reform area should provide sufficient high school teachers and social resources for each high school to assist each school to establish an effective life planning education system. Fourth, the new reform should con-

sider the relatively weak schools at the grass-roots high schools, providing them with the necessary teachers and hardware conditions for the reform, so that the disadvantaged groups receive a fairer education.

Source: Journal of East China Normal University (Educational Sciences), 2020; 38(6):20-33.

NEWSLETTER

The Influence of Parent-Child Separation on the Development of Children: Evidence from the Survey of Migrant Children in Beijing

By Li, B. & Yin, L.

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BASED on a survey of 2,367 fourth-grade migrant children in Beijing's functional development zone (2016-2017), this article explores the impact of parent-child separation on children's development from three dimensions: academic performance, non-cognitive development, and physical health. The brief is as follows:

- The research focuses on the following issues: First, will the separation of parent and child have an impact on children's academic performance, non-cognitive abilities, and physical health? Second, is there any difference in the impact of separation between father and mother? Third, whether this difference will be heterogeneous based on the gender of children.
- Data source and variable description: The survey follows the principle of three-stage cluster sampling. The surveyed students were all from fourth grade of primary school and are at the same education level, so the student development indicators are horizontally comparable. The core variables of this study include core explanatory variables and explained variables. Among them, the core explanatory variables are dummy variables of parent-child separation. Including separation from father and mother. The core explained variables include academic performance, non-cognitive development, and institutional health.
- Research results:
    i. The impact of separation from parent-child on children's academic performance: separation from mother has a stronger impact on children's academic performance than separation from father.
    ii. The impact of parent-child separation on children's non-cognitive abilities: separation from mothers has no significant impact on non-cognitive abilities in all dimensions; however, separation from the father has a significant nega-

tive impact on children's self-esteem, self-control, interpersonal communication, school adaptation, leadership, and cooperation.

iii. The impact of parent-child separation on children's physical health: separation from mothers has a significantly greater impact on children's physical health than separation from fathers.

iv. Analysis of the heterogeneity of the impact of parent-child separation on children's development: parent-child separation differs a lot in gender; for boys, separation from mothers has a significant negative impact on their academic performance, but separation from fathers has no significant impact on male academic performance, while for girls, separation from their mothers significantly affects their English scores, and separation from their fathers significantly affects their mathematics scores; but separation from their mothers has no significant impact on girls' Mathematics and Chinese scores. Similarly, separation from fathers has no significant impact on girls' language and English scores.

- Conclusions and policy recommendations:
  i. Change the misconception of "pay attention to money, not the time" that exists in progress of children's growth, and do a good job in the important duty of guiding children.
  ii. Schools and teachers should concentrate on students who have separated parent-child, ask more about their problems and difficulties in study and life, and promptly guide and communicate; at the same time, the school should establish relevant psychological counseling institutions or groups to promptly discover and ease the psychological problems of students.
  iii. Relevant departments should gradually abolish the discriminative policies related to household registration division on employment, education, and medical, so as to reduce the occurrence of parent-child separation from the source.

Source: China Economics of Education Review, 2019; 4(6): 93-108.

NEWSLETTER

The Impact of Student Leaders' Identity on Their Acquisition of Learning Opportunities: A Study Based on the Findings from 4,026 Junior High School Students via Propensity Score Matching

By Ke, Z. & Li, C.J.

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A STUDY published in *Education Research*, taking 4,026 junior high school students as samples and use the method of Propensity Score Matching to conduct data analysis, in order to explore two questions: Does the identity of student leader affect students' learning opportunities? And how big is the impact?

In terms of the data model, the dependent variable learning opportunities were subdivided into question opportunity, discussion and cognitive opportunities. The sample was divided into the student leaders and the ordinary students by Propensity Score Matches, where the two groups of variables can be as similar as possible, to eliminate bias, better for causal inference, the results are as follows:

- Preliminary descriptive statistics and differential analysis show that student leaders do get more learning opportunities than ordinary students in the natural state.
- The Logit model is established to analyze the factors that influence the identity of student leaders. Gender, academic ability and personality are all important factors that influence students to serve as student leaders. Female students are more likely to serve as student leaders, and students with strong academic ability and outgoing personality are more likely to serve as student leaders.
- The nearest-neighbor matching method is used to match the model, and the result is suitable. The Average Treatment Effect (ATT) was calculated to analyze the increase in learning opportunities brought by student leaders. The ATT of student leaders on students' opportunities to acquire the opportunities to ask questions, discuss, acknowledge and overall learning are 34.4%, 13.4%, 21.6% and 26.1%, respectively. It shows

that the identity has indeed brought improvement to students' learning opportunities.

Based on this, researchers believe that the current student leader system has become a lever for advantaged student groups to gain greater educational advantages, which aggravates the unfairness of educational process or learning opportunities and it is necessary to adjust the current student leader system.

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