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Best Evidence of Chinese Education

EDITORS

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NEWSLETTER

Can STEM Instruction Improve Students' Creativity?

By R. Zhou & S. Li

WITH the theme of "the impact of STEM teaching on students' creativity", a study published in *Open Education Research* adopts the meta-analysis method to analyze 42 experimental research papers from 2008 to 2018 at home and abroad.

The results show that:

- STEM teaching has a medium to small positive impact on improving students' creativity, and there is no significant difference in innovative thinking, innovative practice ability, innovative personality and psychology
- From the perspective of students' study phases, STEM teaching has the greatest impact on the creativity of high school students.
- From the perspective of subjects, implementing STEM teaching in innovative science and technology disciplines has a noticeable effect on promoting creativity, such as information technology, STEM courses, robot courses, 3D printing and so on.
- From the teaching cycle perspective, the longer the experiment period is, the more obvious the effect of STEM teaching on creativity is.
- From the perspective of teaching theme, scientific inquiry and prototype creation themes have obvious influence on creativity.
- From the perspective of teaching methods, inquiry-based, question-based, design-based and project-based teaching methods all have no significant effect on creativity, and there is no significant difference between the four teaching methods in the cultivation of creativity.

From the perspective of teaching field, laboratory and life scene type have an obvious influence on creativity.

In response to the results of this study, the authors suggest reducing the cognitive load on STEM learning and optimizing the design of STEM teaching themes, such as actively seeking interdisciplinary, close-to-realistic themes, and maximizing the explorability of the subject; achieving the integration of STEM teaching phases and continuously paying attention to the continuation of STEM course content and teaching duration; constructing the innovation field of STEM teaching and linking it as much as possible to resources that are conducive to innovation.

Source: Open Education Research, 2019; 25(03):60-71.

NEWSLETTER

Does Student Financial Aid Improve the Interpersonal Communication Capacity of Needy Students?

By Z. Yao & S. Hong

A STUDY published in *Education and Economy*, based on the "2016 National Assessment of Collegiate Capacity (NACC)", discusses the impact of student financial aid on the interpersonal communication capacity of needy students with Propensity Score Matching. The research is mainly conducted from three aspects: the decision of financial aid to students' enrollment and dropout, the impact on students' academic development and the employment rate of students. The results show that:

The students in "Project 985" universities from rural areas with lower parents' occupation classes have a greater probability of obtaining student financial aid. This may refer to the current standard of matching poor college students and the allocation of financial aid.

Student financial aid can significantly improve the interpersonal communication capacity of needy students. However, the increments are limited.

Compared with hardship subsidies, student loans improve needy students' interpersonal skills even more. The pressure of loan repayment is an incentive for students to study hard and improve their abilities.

Combined with the conclusions, student financial aid should not only provide economic help, but also cover spiritual help and ability help, so that students can really learn something and really "get rid of poverty". Colleges and universities should pay attention to the ability development of needy students, take financial aid as the carrier and education as the main line, and carry out "compensation education".

Source: Education and Economy, 2019, 02:88-96.

NEWSLETTER

Radiation Effects of National Model Higher Vocational Colleges

By Y. Liu

BASED on the radiation theory of industrial organizations in geoeconomics, an empirical study published in *Peking University Education Review* used the data of 2016 national colleges and universities quality annual report and the geographic information of national vocational colleges and other related data to discusses the radiating and driving effects of National Model Higher Vocational College Construction Plan by measuring the impact of vocational model institutions on the final output of graduate schools (graduate employment rate and starting salary) and intermediate output (resource acquisition and teaching level). In order to discuss the heterogeneity of radiation effects, the study uses a robust multiple linear regression model to analyze the effects of radiation.

Research findings:

- There is no significant difference in the employment rate and starting salary of students between ordinary colleges with model colleges within 10 kilometers around and those without model colleges within 10 kilometers around.
- There is no significant difference in the employment output of ordinary colleges with model colleges of different periods within 10 kilometers around;
- The number of model colleges does not have a significant impact on the employment of nearby ordinary colleges;
- At different geographical distances, only in groups with no model colleges within 10 kilometers around can the impact of model colleges within 10~30 kilometers around on the employment output of ordinary colleges be shown (lower graduate employment rates while raising starting salaries). However, this effect is not seen in the groups with model colleges within 10 kilometers around.
- The existence of model colleges is conducive to improving the teaching level of ordinary colleges within 10 kilometers around, and this role is enhanced with the increase of the number of model colleges. However, this effect only stays at the teaching level and does not pass on to students' employment output. Meanwhile, the model

colleges have no significant influence on the resource acquisition of ordinary colleges within 10 kilometers around.

Based on the above research, in order to enhance the positive role of model colleges in ordinary colleges, the researchers suggest:

- Design a top-level exchange and cooperation system for higher vocational colleges.
- At the provincial level, implement classified management of national model colleges and ordinary colleges, and develop special development plans for the latter.
- Establish a sharing mechanism and supporting system between the model colleges and surrounding colleges.
- Establish an institutionalized inter-college teacher cooperation and discussion mechanism.
- Promote the sharing of educational resources.

Source: Guangdong Education, 2019; 5:34-37.

NEWSLETTER

The Influence of Parent-adolescent Relationship on Adolescents' Risk-taking Behavior

By L.L. Liu, L.M. Tian, & J.J. Guo

THE adolescent stage is a transitional period from child to adult, which is a period of high risk-taking behavior. Common negative risk behaviors during adolescence include drug use, alcohol abuse, unsafe sex and dangerous driving. Recently, an article published in *Psychological Development and Education* explores the mechanism of the influence of parent-adolescent relationship on adolescents' risk-taking behavior. The study uses the parent-adolescent relationship questionnaire, the peer group characteristics questionnaire and the risk behavior questionnaire to investigate 1,275 grade one students of junior high school to grade three of senior high school in three general middle schools in Rizhao City, Shandong Province. The findings are as follows:

Parent-adolescent relationship is a direct factor affecting adolescents' risk-taking behavior. Parental support is significantly and negatively related to parent-adolescent conflict, deviant peer affiliation and adolescents' risk-taking behavior; parent-adolescent conflict is significantly and positively related to deviant peer affiliation and adolescents' risk-taking behavior.

Deviant peer affiliation is significantly and positively linked with adolescents' risk-taking behavior.

Bad parent-adolescent relationship increases the possibility of adolescents to communicate with bad peers, which increases the chance of risk-taking behaviors. Good parent-adolescent relationship improves the ability of adolescents to resist the temptation of bad peers, so they are less likely to take risks.

When there are more conflicts between parents and adolescents, it is easier for adolescents to make bad companions, and the risk-taking behavior is also on the rise. But boys are more affected than girls by their bad peers.

The article points out the shortcomings in the research process. First, because the article uses cross-cutting studies, it does not reveal the causal relationship between parent-adolescent relationship, bad peer interactions and risk-taking behaviors. At the same time, adolescents may make dishonest answers in order to meet social expectations or escape punishment, and the reliability of the data needs to be strengthened. Finally, the influence of mother-adolescent relationship and father-adolescent relationship on adolescents'

risk behaviors may also be different. The article does not distinguish between them.

Source: Psychological Development and Education, 2019; 35(2):210-218.

NEWSLETTER

Is the Spoc Flipped Classroom Teaching Effective?

By C.Y. Liu, D. Li, B.R. Zhang, & X.L. Hu

A STUDY in *Open Education Research* explores the effectiveness of teaching Spoc in the classroom. The study uses systematic evaluation methods to compare and analyze the teaching effects of SPOC flipped classroom and traditional teaching, and then statistically analyzes its effect value by meta-analysis. The study analyzes from the aspects of test scores, compliance rate, learning ability, learning motivation, learning attitude and satisfaction. Results are as follows：

- Compared with traditional classrooms, SPOC flipped classrooms have obvious advantages in improving academic performance, knowledge understanding ability, application ability, self-learning ability and self-management ability.
- There is no significant difference between the SPOC flipped classroom and the traditional classroom in terms of passing rate, excellent rate and improving collaboration ability.
- SPOC flipped classroom has obvious advantages in stimulating students' interest in learning, improving students' seriousness and learning participation.
- Students have higher satisfaction with SPOC flipped classroom teaching mode.

At the same time, the author also pointed out the shortcomings in the research process:

- No available quantitative foreign literature is found in the search.
- There are differences in the measurement dimensions, evaluation measures, or measurement tools of the population information included in the study, resulting in heterogeneity between the included studies.
- The research lacks gray literature, and there is no official authoritative research report issued by government departments or evidence from other non-traditional sources, so relevant literature affecting outcome indicators may be missed.
- Due to limited access to languages, research literature in other languages besides Chinese and English may be omitted.

Source: O*pen Education Research, 2019, In Press.*

NEWSLETTER

Mobile Phones and Tablets: Good Teachers and Helpful Friends for Extracurricular Reading?

By X. Li & L. Zheng

A STUDY published in *China Educational Technology* analyzes students' use of mobile phones and tablets, and explores the impact on students' after-school reading. The study investigates 1,169 school students (Grade 4-5 and Grade 6-9) in 16 districts in Shanghai, and their use of mobile phones and tablets, including duration of use, frequency, experience and content, as well as after-school reading, including reading interest, reading frequency and duration of reading.

The study finds that there are significant differences in the ownership and use of smart media between middle school students/primary school students and urban/suburban students, and there are slight differences between male and female students; the after-school reading of primary and middle school students in Shanghai is good, and the use of intelligent media has a certain negative but limited impact on after-school reading; there is a significant difference between mobile phone and tablet. Mobile phone has a significant negative effect on reading, while tablet has a certain promoting effect on reading and learning; the use content of intelligent media is quite critical, and it is necessary to guide school-age children to use learning content and control its recreational use; the difference between urban students and rural students reflects the regional digital divide, and it is the future direction to improve the digital skills of children in backward areas.

Source: China Educational Technology, 2018; 40(12): 109-117.

NEWSLETTER

The Effect of Parents' Early Education Participation on Children's Future Academic Achievement

By Y.R. Cui, G.C. Liang, & D.H. Zhang

PARENTS' participation in early education refers to the behavior and attitudes that parents convey in the family interaction outside school in order to promote their children's academic development. A study published in *Studies in Preschool Education* discusses the impact of early parental involvement on the scientific and mathematical performance of 4th grade students.

The study uses data from 3,600 students of 145 classes in 132 schools in Hong Kong in the Trends in International Mathematics and Science Research (TIMSS) conducted by the International Association for the Evaluation of Educational Achievement (IEA). The test includes parents' attitudes towards science, technology, engineering and mathematics education (STEM education), parents' early participation behavior, children's self-concept on mathematics and science, family educational resources and immigration variables. Early parental involvement includes 11 activities related to math and science activities including singing digital songs, visiting science and technology museums, and feeding small animals. Children's self-concept of mathematics and science refers to their expectation, trust and evaluation of their ability to learn science and mathematics. Results show that:

- The more parents' early participation behavior, the better their future math performance, but there is no significant relationship between the participation and scientific achievement.
- Early participation in systematic knowledge learning, such as providing science and technology TV programs and visiting science and technology museums, have a significant positive impact on students' future achievements in earth, biology and physics.
- The more positive parents' attitudes towards STEM education, the better their children's math and science achievements would be in the future.
- The higher their children's self-concept, the better their future math and science achievements.
- The more abundant family learning resources, the better the future math and science achievements would be.

The author finds that boys are more willing to study mathematics and science than girls, and their achievements in mathematics and science are generally higher. Compared with indigenous families, immigrant families have more positive attitudes towards STEM education, but they do not engage in much early education. This study suggests that gender stereotypes in early education should be avoided and more resources should be provided for migrant families.

Source: Studies in Preschool Education, 2019; 33(04): 3-15.

NEWSLETTER

Road to "Counterattacks" of Rural College Students

By Q. Wu & S. Cui

A STUDY published in *Journal of East China Normal University (Education Sciences)* focuses on the education of rural college students, trying to explore the key factors for rural college students to realize the counterattack. Based on the "Beijing College Students Panel Survey" (BCSPS), this article attempts to give an answer by examining the enrollment, growth at university and employment development in a dynamic research perspective by using the methods of one-way analysis of variance, multiple linear regression and logistic regression.

The main conclusions are as follows:

- Family background is the main factor that influences the difference of college students' scores in urban and rural areas.
- Through positive learning attitude and their own efforts, rural college students can achieve equal or even better performance than urban college students in terms of academic performance and comprehensive ability.
- When relevant variables are controlled, rural students receive the same level of employment salary as urban students when they graduate, but there are differences in employment between the two types of students. Rural students invest more in employment preparation and are more fully prepared, and get satisfactory employment results by making efforts to make up for their shortcomings.

In order to help the rural college students to realize their further pursuit of life, researchers give the suggestions of helping rural students go through mentality transition, building a platform for the growth of non-cognitive ability of rural students, giving rural students development-oriented financial support and strengthening employment guidance and assistance for rural students.

Source: Journal of East China Normal University (Education Sciences), 2019; 37(01):124-136+170.

ARTICLE

Relationship between Time Length of E-learning Environment Using and Physical Health of Elementary and Middle School Students

Jing Gao,[1] Jing Liu,[2] Hong Feng,[1] Zhixin Zhang[1]

1. *Capital Normal University, Beijing, China*
2. *Beijing Open University, Beijing, China*

Abstract. A total of 783 elementary and middle school students in Beijing city and Shandong province were selected for a one-year follow-up investigation, and the impact of time length of using E-learning environment each week on physical health was explored from four aspects as eyesight, respiratory rate, body mass index, sit and reach. Through Covariance Analysis, we found that time length of using E-learning environment each week by elementary and middle school students had a significant impact on their eyesight, but not on the respiratory rate, body mass index, sit and reach. Meanwhile, the comparative results of elementary and middle school students between different genders and learning stages that affected by the time length of E-learning were basically consistent with the findings above. Slight difference was found that the E-learning environment produced significant impact on both left and right eyesight of elementary girls, but on the left eyesight of middle-school boys, and significant effect on the middle-school body mass index. Based on this, we proposed that the time length of E-learning each day for elementary and middle school students should be controlled less than 1.5 hours.

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***Keywords**: E-Learning Environment; Eyesight; Respiratory Rate; Body Mass Index; Sit and Reach*

***Correspondence to**: Jing Liu, Assistant Research Fellow, OUCHN Operating Department, Beijing Open University, Chin; Email: xiaomiao517@163.com.*

***About the Author** Jing Gao, Postgraduate Student, Department of Educational Technology, Capital Normal University, China, Email: gaojing11008389@163.com.*

Introduction

E-LEARING environment, which carries the whole process of online learning, has been proposed to have a big impact on students' physical health and has aroused widespread concerns. At present, the impact of E-learning environment on students' physical health has been becoming a hot issue in China with the rapid development of information technology. For this reason, the Ministry of Education of China has specially set up a project, and Capital Normal University was in charge of the one-year large-scale research with joint conduction of the General Administration of Sport of China, Beijing Sports University and other research institutes to formulate the "E-learning Environment User Manual" and provide parents, schools and communities with important guidelines for protecting the health of elementary and middle school students.

A Literature Review on the Relationship between E-learning Environment and Students' Physical Health

National Students' Physical Health Survey Results in 2014 showed that the rate of adolescents with poor eyesight in China was still high and tendened to become younger; and the rate of obesity among students of all ages continued to rise; the physical fitness, such as flexibility and strength, continued to show a steady and positive trend, but the level of physical health was worsening (General Administration of Sport of China, 2015). On the basis of these phenomena, parents and communities start to doubt the use of smart devices and E-learning environment.

The adverse effects of hardware environment of online learning on students' physical health have been confirmed that long-term use of computers and other electronic devices cause the absorption of electromagnetic waves and harmful gases released by these devices produced harmful effect on adolescents' health (Zhang et al., 2018). A web-based trial of dry eye disease showed that about 36.2% of netizens experienced five or more types of dry eye symptoms, and network using had an ascertained effect on eyes and excessive use would damage eyesight (Wang et al., 2018). Cumulating data have shown that mobile internet addiction could cause cervical spine stiffness, obesity, decreased vision, insufficient thoracic blood and cardiopulmonary function

***About the Author**: Hong Feng, Associate Professor, Department of Educational Technology, Capital Normal University, China; Email: hg_feng_cnu@126.com.*

Zhixin Zhang, Lecturer, Department of Educational Technology, Capital Normal University, China; Email: zhangzx517@163.com.

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decline in adolescents; and computer internet addiction could cause decreased vision, obesity, insomnia and inappropriate eating behavior in adolescents; and the sub-health status of adolescents was closely related to the time they spent on internet (Wang et al., 2017).

Other peer researches such as the American Academy of Ophthalmology also believed that increased frequency of computer use would lead to eye fatigue, redness, blurred vision, myopia and other various eye symptoms and potential visual impairment that depend on several factors including using time, viewing distance, sitting posture, computer screen (Cai, 2017). Frequently watching computer screens could cause eye irritation, blurred vision, fatigue and headache (Kozeis, 2009). The most common symptoms from the use of computers were eye burning and muscle pain, which are strongly related to the duration of computer use (Taptagaporn, 2009).

Although many recent studies had observed the influence of e-learning environment on students' eyesight, obesity, cardiopulmonary function and so on, most of them were based on subjective judgments and lacked solid scientific evidence, and it is still difficult to explain scientifically how the e-learning environment affects the health of students. Therefore, we intended in this study to answer following two questions:

- Does the e-learning environment have any impact on the physical health of elementary and middle school students?
- In order to prevent e-learning environment from affecting students' health, how long should they use e-learning environment every day?

Research Implementation

Research Tools

In this study, eyesight, height and weight, sit and reach of the subjects were tested using standard logarithmic visual acuity scale (GB 11533-1989, Shanghai Aice Electronic Technology Company Limited), electronic height and weight meter (HGM-702, Henan Shengyuan Industrial Company Limited), sit and reach tester (HHTC/ZT100, Beijing Huaxia Huihai Technology Company Limited). Body Mass Index equals weight divided by height squared, and respiratory rate was recorded and calculated with stopwatch (GY12001, Shanghai Stopwatch Factory).

Research Objects

A total of 783 students from two middle schools and four elementary schools in Beijing city and Shandong province were selected by Convenient Sampling method, taking into the differences in economy, urban and rural locations, and quality of students etc. These students were the second, third, fourth and seventh graders, and all belonged to 21 experimental classes where the e-learning using was more than one semester and one control class where no e-learning environment at all.

Data Collection and Processing

From September to October 2014, the first test data were obtained; from September to October 2015, the second test data were obtained.

This study investigated the use of e-learning environment, including:

- Time length of using "electronic whiteboard" or "touch integrated machine" in class;
- Time length of using "tablet" or "online notebook" in class;
- Time length of using "tablet" or "online notebook" outside classroom.

According to the preliminary statistics, the duration of using of e-learning environment in the experimental and control classes was between 0 and 30 class hours per week. According to the time length of e-learning environment using each week and excluding missing values, the students in both experimental and control classes were divided into two groups with equal numbers. The first group used less e-learning environment (0 - 13 class hours each week) and the second group over-utilized e-learning environment (14 - 30 class hours each week), and the grade distribution of the two groups was the same. In this study, SPSS 19.0 was used for data processing and statistical analysis. Covariance Analysis was used to explore the impact of time length of e-learning on the health of elementary and middle school students, as well as the extent to which students of different genders and grades were affected. According to the Mean Values Adjusted by Covariance, it was concluded that how long e-learning environment was used was beneficial to the health of the students through analysis.

Analysis and Research Results

Eyesight

The Relationship between Eyesight and the Time Length of e-learning Environment Using Each Week in Elementary and Middle School Students

In this study, the time length of e-learning environment using each week in the sample students was the independent variable, the second test of the left eyesight was the dependent variable, and the first test of the left eyesight was the covariate. The homogeneity test results of the regression coefficients in the group showed that the interaction between the independent variables and the covariance did not reach a significant level ($F_{(1,479)} = 0.358$, $P > 0.05$), indicating that the covariance in each group was consistent with the linear relationship of the dependent variables and the Covariance Analysis need to be continued. In order to correctly estimate the effect of the interaction between independent variable and covariance, this study removed the interaction term and reanalyzed it. In addition, Levene's Variance Homogeneity Test did not reach significant levels ($F_{(1,481)} = 0.016$, $P > 0.05$), showing that there was no significant difference between the discrete cases of the two groups. The test of covariance effect reached a significant level ($F_{(1,480)} = 905.533$, $P < .01$), satisfying the conditions of the linear relationship. The test of the effect between groups reached a significant level ($F_{(1,480)} = 18.940$, $P < 0.01$), indicating that the time length of using of e-learning environment

each week significantly affected the left eyesight of elementary and middle school students.

In the same way, the time length of e-learning environment using each week in elementary and middle school students as the independent variable, the second test of the right eyesight as the dependent variable, and the first test of the right eyesight as the covariate, used the Covariance Analysis method for analysis. The results showed that the time length of E-learning environment using each week significantly affected the right eyesight of elementary and middle school students ($F_{(1,482)} = 4.130$, $P < 0.05$) . Comparing the Mean Values Adjusted by Covariance, we found that the left and right eyesight of elementary and middle school students in the group 1 was significantly better than that in the group 2.

Comparison of the Degree of Different Genders Students' Eyesight Affected by the Time Length of E-learning Environment Using Each Week

In order to explore the extent to which the eyesight of students of different genders was affected by the time length of e-learning environment using each week, we used Covariance Analysis to analyze the sample data of male and female students, respectively. The results of the male sample showed that the effect between the left eyesight reached a significant level ($F_{(1,239)} = 10.214$, $P < 0.01$), while the the effect between the right eyesight did not reach a significant level ($F_{(1,242)} = 0.974$, $P > 0.05$). The results of Covariance Analysis of female sample data showed that the effect between the left eyesight groups reached a significant level ($F_{(1,238)} = 11.595$, $P < 0.01$), and the effect between the right eyesight groups also reached a significant level ($F_{(1,237)} = 5.933$, $P < 0.05$). In conclusion, the time length of e-learning environment using each week significantly affected the left eyesight of the boys and both left and right eyesight of the girls.

Comprehensive comparison of the Modified Means of Covariance between boys and girls, we found that the left eyesight of boys in the group 1 was significantly better than that of boys in the group 2, while the difference between the two groups of boys in the right eyesight was not significant; both left and right eyesight of girls in the group 1 was significantly better than that of girls in the group 2.

Comparison of the Degree of Different Semesters Students' Eyesight Affected by the Time Length of E-learning Environment Using Each Week

In order to explore the extent to which the eyesight of students of different semesters was affected by the time length of e-learning environment using each week, we used Covariance Analysis to analyze the sample data of middle school students and elementary school students, respectively. The results of Covariance Analysis of middle school students data showed that the effect between the left eyesight groups reached a significant level ($F_{(1,108)} = 10.529$, $P < 0.01$), while the effect between the right eyesight groups did not reach a significant level ($F_{(1,105)} = 0.779$, $P > 0.05$). The results of Covariance Analysis of elementary school students data showed that: the effect between the left eyesight groups reached a significant level ($F_{(1,369)} = 7.646$, $P < 0.01$), and the effect between the right eyesight groups also reached a significant level ($F_{(1,374)} = 4.488$, $P <$

0.05). In sum, the time length of e-learning environment using each week significantly affected the left eyesight of the middle school students and both left and right eyesight of the elementary school students.

Comprehensive comparison of the Modified Mean of Covariance between middle school students and elementary school students, we found that the left eyesight of middle school students in the group 1 was significantly better than that of the middle school students in the group 2, while the difference between the two groups of middle school students in the right eyesight was not significant; the left and right eyesight of elementary school students in the group 1 was significantly better than that of the elementary school students in the group 2.

Respiratory Rate

The Relationship between Respiratory Rate and the Time Length of E-learning Environment Using Each Week in Elementary and Middle School Students

In this study, the time length of e-learning environment using each week was the independent variable, the second test of students' respiratory rate was the dependent variable, and the first test of students' respiratory rate was the covariate. The results showed that the effect between the two groups did not reach a significant level ($F_{(1,512)} = 0.734$, $P > 0.05$), indicating that the time length of e-learning environment using each week had no significant effect on the respiratory rate of elementary and middle school students.

Comparison of the Degree of Different Genders Students' Respiratory Rate Affected by the Time Length of E-learning Environment Using Each Week

In order to explore the extent to which the respiratory rate of students of different genders was affected by the time length of e-learning environment using each week, we used Covariance Analysis to analyze the data of male and female students, respectively. The results of Covariance Analysis of male sample data showed that the effect between groups did not reach a significant level ($F_{(1,264)} = 0.085$, $P > 0.05$). The results of Covariance Analysis of female data also showed that the effect between groups did not reach a significant level ($F_{(1,245)} = 1.157$, $P > 0.05$). In sum, the time length of e-learning environment using each week had no significant effect on the respiratory rate of boys and girls.

Comparison of the Degree of Different Semesters Students' Respiratory Rate Affected by the Time Length of E-learning Environment Using Each Week

In order to explore the extent to which the respiratory rate of students of different semesters was affected by the time length of e-learning environment using each week, we used Covariance Analysis to analyze the data of middle school students and elementary school students, respectively. The results of Covariance Analysis of middle school students data showed that the effect between groups did not reach a significant level ($F_{(1,112)} = 0.138$, $P > 0.05$). The results of Covariance Analysis of elementary school students

data also showed that the effect between groups did not reach a significant level ($F_{(1,397)}$ = 0.459, P > 0.05). In sum, the time length of e-learning environment using each week had no significant effect on the respiratory rate of middle school and elementary school students.

Body Mass Index

The Relationship between Body Mass Index and the Time Length of E-learning Environment Using Each Week in Elementary and Middle School Students

In this study, the time length of e-learning environment using each week in the students was the independent variable, the second test of the students' Body Mass Index was the dependent variable, and the first test of the students' Body Mass Index was the covariate. The results showed that the effect between groups did not reach a significant level ($F_{(1,501)}$ = 0.462, P > 0.05), indicating that the time length of using E-learning environment each week had no significant effect on the Body Mass Index of elementary and middle school students.

Comparison of the Degree of Different Genders Students' Body Mass Index Affected by the Time Length of E-learning Environment Using Each Week

In order to explore the extent to which the Body Mass Index of students of different genders was affected by the time length of e-learning environment using each week, we used Covariance Analysis to analyze the data of male and female students, respectively. The results of Covariance Analysis of male data showed that the effect between groups did not reach a significant level ($F_{(1,252)}$ = 0.039, P > 0.05). The results of Covariance Analysis of female data also showed that the effect between groups did not reach a significant level ($F_{(1,246)}$ = 1.722, P > 0.05). In sum, the time length of using of the E-learning environment each week had no significant effect on the Body Mass Index of both boys and girls.

Comparison of the Degree of Different Semesters Students' Body Mass Index Affected by the Time Length of E-learning Environment Using Each Week

In order to explore the extent to which the Body Mass Index of students of different semesters was affected by the time length of e-learning environment using each week, we used Covariance Analysis to analyze the data of middle school students and elementary school students, respectively. The results of Covariance Analysis of middle school students data showed that the effect between groups reached a significant level ($F_{(1,111)}$ = 5.218, P < 0.05). But the results of Covariance Analysis of elementary school students data showed that the effect between groups did not reach a significant level ($F_{(1,387)}$ = 0.095, P > 0.05). In sum, the time length of e-learning environment using each week significantly affected the Body Mass Index of middle school students, but had no significant effect on Body Mass Index of elementary school students.

Sit and Reach

The Relationship between Sit and Reach and the Time Length of E-learning Environment Using Each Week in Elementary and Middle School Students

In this study, the time length of e-learning environment using each week in the students was the independent variable, the second test of the students' sit and reach was the dependent variable, and the first test of the students' sit and reach was the covariate. The results showed that the effect between the two groups did not reach a significant level ($F_{(1,513)} = 0.032$, $P > 0.05$), indicating that the time length of e-learning environment using each week had no significant effect on the sit and reach of elementary and middle school students.

Comparison of the Degree of Different Genders Students' Sit and Reach Affected by the Time Length of E-learning Environment Using Each Week

In order to explore the extent to which the sit and reach of students of different genders was affected by the time length of e-learning environment using each week, we used Covariance Analysis to analyze the data of male and female students, respectively. The results of Covariance Analysis of male data showed that the effect between the two groups did not reach a significant level ($F_{(1,263)} = 0.844$, $P > 0.05$). The results of Covariance Analysis of female data also showed no significant difference ($F_{(1,247)} = 3.352$, $P > 0.05$). In sum, the time length of e-learning environment using each week had no significant effect on the sit and reach of boys and girls.

Comparison of the Degree of Different Semesters Students' Sit and Reach Affected by the Time Length of E-learning Environment Using Each Week

In order to explore the extent to which the sit and reach of students of different semesters was affected by the time length of e-learning environment using each week, we used Covariance Analysis to analyze the data of middle school students and elementary school students, respectively. The results of Covariance Analysis of middle school students data showed that the effect between the two groups did not reach a significant level ($F_{(1,112)} = 0.001$, $P > 0.05$). The results of Covariance Analysis of elementary school students data also showed no significant difference ($F_{(1,398)} = 1.193$, $P > 0.05$). In sum, the time length of the E-learning environment using each week had no significant effect on the sit and reach of both middle school and elementary school students.

Conclusion and Suggestion

From the results of Covariance Analysis above, our study demonstrated following conclusions. First, according to the full sample analysis, the time length of e-learning environment using each week by elementary and middle school students had a significant impact on their eyesight, but not on respiratory rate, body mass index , and sit and reach. However, we cannot rule out other confounding factors that were difficult to be controlled. In terms of eyesight, students with less use of the e-learning environment showed better eyesight than that of the over-utilized ones. After further refinement of the e-learning environment using to a daily basis, we found that the time length of daily

using of E-learning environment for elementary and middle school students should be controlled less than 1.5 hours.

Second, after comparing the effect of the time length of e-learning environment using each week with different genders, we received consistent results with the whole sample analysis in terms of respiratory rate, body mass index, and sit and reach. To the eyesight, the time length of e-learning environment using each week significantly affected both left and right eyesight of girls, but only on the left eyesight of the boys, indicating that girl's eyesight was more sensitive and was more easily affected than that of boy's even under the same condition. Clinical studies have found that 53% - 85% of people had right eye as their dominant eye (Miao et al., 2007). In the binocular eyesight activity, the dominant eye occupies more space and has better clarity and development than the auxiliary eye (Zang, 2012). The left eye might be more vulnerable to damage as an auxiliary eye in e-learning environment - of course, this proposed statement is yet, confirmed by further research.

Third, according to the comparison results of different semesters affected by the time length of e-learning environment using each week, we got consistent results with the whole sample analysis in terms of respiratory rate, body mass index, and sit and reach. Regarding the eyesight, the time length of e-learning environment using each week significantly affected both left and right eyesight of elementary school students, but only had a significant impact on the left eyesight of the middle school students indicating that students from elementary school were more sensitive in their eyesight and more easily to be affected than those from middle school. In addition, the time length of e-learning environment using each week significantly affected the body mass index of middle school students, but had no significant effect on that of the elementary school students. This may be because middle school students were at a critical stage of growth and development, so their body mass indexes were more susceptible to the time length of e-learning environment using.

Based on these findings, we proposed that:

- Primary and middle schools should arrange reasonable number of sessions of the e-learning environment using, and increase the extracurricular sports activities;
- Teachers should reasonably use a variety of media in teaching, but could not rely only on modern electronic media such as electronic whiteboards and internet notebooks;
- Parents should take more time to accompany their children and strictly control their extracurricular use of electronic devices and set themselves as role models. All in all, schools, teachers, and parents need to cooperate to create a good e-learning environment for students and control the time length of the daily use of e-learning environment to less than 1.5 hours.

References

Cai, P. (2017) Research on the influence of Network Learning Environment on the eyesight of elementary and middle school Students. Wuhan, P.R.China: Central China Normal University, 4.

General Administration of Sport of China. (2015) Results of the 2014 national student physical health survey. Chinese Journal of School Health; 12:4.

Kozeis, N. (2009) Impact of computer use on children's vision. Hippokratia; (4): 230-231.

Miao, A.Z., Zhou, X.T. (2007) Advances in the study of dominant eye. Chinese Journal of Ocular and Otorhinolaryngology; (1): 61- 62.

Taptagaporn, S. (2009) Computer use among children: Health and social impacts. Proceedings of 17th World Congress on Ergonomics. Beijing, P.R.China: International Ergonomics Association, 6.

Wang, W., Lei, L., Yang, J.H. (2018) The influence of Internet on the physical and mental health of netizens. Journal of Shanxi Datong University (Natural Science Edition); (2): 69-73, 79.

Wang, Z.S., Wei, Y. (2017) The influence of Internet addiction on adolescent health. Youth Sports; (1): 120-121, 53.

Zang, Y.J. (2012) Study on characteristic parameters affecting the comfort of stereo image. Tianjin, P.R. China: Tianjin University, 5- 6.

Zhang, Z.X., Gao, J., Feng, H., Xie, J.R., Zhang, X.Y. (2018) Review on the impact of online learning on adolescents' physical and mental health. Modern Distance Education; (3): 59- 65.

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ARTICLE

The Effect of Preschool Education on Non-cognitive Skills of Middle School Students: Empirical Study Based on CEPS

Xin Gong, Zhenyi Li

Central China Normal University, Wuhan, China

Abstract. Preschool education has been being seen as a crucial factor of individual cognitive skills, but it is yet clear regarding its effect on children's non-cognitive skills. Apart from cognitive skills, the "capabilities" in the human capital model should also include non-cognitive skills. Using the baseline data of the "China Education Panel Survey", this study explored the influence of preschool education experience on the non-cognitive skills of middle School students by using the method of propensity score matching. The results showed that children's chances of receiving preschool education has been affected by factors like the health status of the children before schooling, family economic status, and parents' education level. More importantly, preschool education had a statistically significant positive impact on the students' ability of curiosity, acceptance of new things and self-discipline, and showed a negative impact on negative emotionality.

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***Correspondence to**: Xin Gong, College of Education, Central China Normal University, Wuhan, China, E-mail: gongxin@mail.ccnu.edu.cn.*

***About the Author** Zhenyi Li, College of Education, Central China Normal University, Wuhan, China, E-mail: lizhenyi0206@163.com.*

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Research Background and Problem

PRESCHOOL education, is of great significance to children's physical and mental health, habit formation and intellectual development, and has a foundational role in individual's lifelong development. In recent years, more and more attention has been paid to preschool education in China, and the gross enrollment rate of preschool education has increased from 35.9% in 2001 to 77.4% in 2016. The rapid progress of preschool education, on the one hand, benefits from the rapid growth of the social economy; on the other hand, the increasing realization of the economic and non-economic value of preschool education for children's overall growth. James J. Heckman, a Nobel Laureate in economy, has found that early childhood development interventions before formal elementary school are the highest-reward form of human capital investment, which is worth more than later investments in school education and on-the-job training (Heckman, 2006), and the economic benefits of universal preschool education is far greater than the traditional economic plan (Qiu & Liu, 2011). In terms of the specific impact of preschool education on children's development, it mainly focuses on the following two aspects: cognitive ability including in language, mathematics, and academic achievement; and non-cognitive ability such as sociability, self-confidence, motivation, etc.

Under the traditional human capital model, the word "ability" is always equated with cognitive ability, while the non-cognitive ability is usually ignored. However, in empirical studies, the cognitive ability from the controlled individuals only cannot explain the whole variety of individual outcomes. Therefore, Bowles proposed that "ability" in the human capital model should not be limited to "cognitive ability", but should also include "non-cognitive ability" (Bowles & Osborne, 2001). In recent decades, supporters of the new human capital theory headed by Heckman divided the "ability" in human capital into two parts: cognitive and non-cognitive abilities, emphasizing the important role of non-cognitive ability that is independent from cognitive ability (Heckman, 2007).

In studies over the past decade on non-cognitive ability, most of them have confirmed the important role of non-cognitive ability in individual's academic performance and income (Eren & Ozbeklik, 2013; Heckman & Rubinstein, 2001; Heineck & Anger, 2010; Scick & Steckel, 2015). Li et al. (2017) found that non-cognitive ability has a significant positive impact on students' academic performance. Le et al. (2017) used the data of the "Chinese Family Panel Survey" in 2012 and 2014, and according to "The Big Five-Factor Model of Personalities", showed that the non-cognitive ability has a substantial effect on the income of laborers, and its contribution was even higher than that of the core variable concerned by traditional human capital- education years. Huang and Xie (2017) found an explanatory effect of the non-cognitive ability on labor income difference that is independent from cognitive ability. Compared with cognitive ability, the non-cognitive ability has a greater impact on workers' income (Yu et al., 2017). The non-cognitive ability has also been found to improve individual's happiness and was

more conducive to a healthy and long life (Friedman et al., 2010; Kubzansky et al., 2009). In addition to the "instrumental" value of non-cognitive ability such as on an individual's academic performance, income, and health, researchers start to realize its own value of the non-cognitive ability. For example, from an emotional perspective, if an individual rarely shows negative emotionality, then its immediate happiness will be relatively higher indicating the intrinsic value of the non-cognitive ability. In recent years, attention has been paid to the key competencies of students in China, and formulated the overall framework of "key competencies of Chinese students' development", emphasizing on the cultivation of comprehensive quality of students' both cognitive and non-cognitive abilities.

With the attention paid to the non-cognitive ability, more discussion was raised on the cultivation of non-cognitive ability and its potential influence. Studies showed that the formation of non-cognitive ability needs several periods within a long developing period (Almlund et al., 2011), and the important period for the non-cognitive ability acquisition is the early childhood (Coneus & Laucht, 2014; Heckman, 2006). Moreover, abilities formed in different stages were closely related each other, and the development of one skill would help to acquire other skills during the next period (Borghans et al., 2008). Preschool stage is a sensitive period essential to cultivate children's initiative, good personality, sense of responsibility, self-esteem, and self-control (Zhu, 2003; Shen, 1997), and to develop qualities such as curiosity, thirst for knowledge, imagination, and sociability as well (Pang et al., 2003). In particular, various game activities during the preschool period had an important impact on the cultivation of the non-intellectual abilities (Shen, 1997). Duncan et al. (2007) found in their empirical study that stable emotional characteristics cultivated in the early stage contribute to the development of children's exploration ability later. A large number of empirical studies have confirmed that preschool education has a positive impact on the development of children's cognitive and non-cognitive abilities (social skills, attention, etc.) (Nores & Barnett, 2010). The earlier the intervention would, the more beneficial would follow to the formation of both the cognitive and non-cognitive abilities. Besides, families and preschoolers might be more motivated to focus on the cognitive and non-cognitive development as it is too early to consider the competitive College Entrance Test during the preschool period.

Based on the analysis and consideration above regarding the education reality in China, we proposed that the acquisition of preschool education may possess an important role in the development of children's non-cognitive abilities. However, it is yet known about the clear relationship between preschool education and the non-cognitive ability. In view of this, this study was designed to use the baseline data of China Education Panel Survey (CEPS) to observe the influence of preschool education on the development of the non-cognitive abilities in middle school students' via Propensity Score Matching Method and, at the same time, to investigate the factors that affect the preschool education opportunities. As the prominent role of non-cognitive ability is increasingly recognized, it is particularly pivotal to explore the role of preschool education in developing the non-cognitive ability. First, it is important for public education policy makers in establishing capital investment, implementation and improvement of

the preschool education plan, popularization of preschool education, and promotion of human capital accumulation; second, it is crucial to provide with empirical evidence to the role of preschool education in the development of students' non-cognitive ability.

Literature Review

Accumulating data have showed the contributing effects of preschool education on both cognitive and non-cognitive abilities. At the same time, some pieces of evidence have confirmed the significant role of preschool education in the improvement of children's non-cognitive ability. Reynolds (1995) investigated the impact of the Child-Parent Center Educational Program on children's cognitive and social development, and found that students in grades one to six who had received one or two years of preschool education had 0.34 standard difference higher in cognitive and social development than those who had not received the preschool education. Adaptability is another important characteristic for those who receive preschool education. Sammons (2010) found that preschool education has a long-term impact on children's "hyperactivity", "self-discipline" and "anti-social" behaviors. Furthermore, Sammons et al. (2014) used data from the UK and found that high-quality preschools (*v.s.* low-quality ones) had a significant impact on the non-cognitive ability (such as self-discipline) of 16-year-olds. Andersson et al. (1992) obtained similar results in a study carried out in Sweden that students who participated in the public childcare system were more independent and confident. Gormely et al. (2011) used the fixed effects regressions with propensity score matching examined the effect of the early childhood education on children's social-emotional outcomes in Tulsa, Oklahoma, and found that children participated in early childhood education programs showed lower timidity and higher concentration, and this effect was more significant on male children who came from the low-income families. Heckman (2006) indicated that the reason why the Perry Preschool Program in the United States could effectively improve the future success of participants was majorly due to its role in improving the non-cognitive ability. Chetty et al. (2010) found that high-quality education in K grade in the United States, had a significant impact on students' non-cognitive abilities such as autonomy and effort in the grades of 4 and 8, and could reduce students' destructive behaviors.

However, in China, few studies did the same observation. Several studies focused on the impact of preschool education on children's cognitive development, but most of them were small sample and did not examine the long-term impact. Peng et al. (2011) investigated 182 children from three rural elementary schools in Sichuan Province and found that children with kindergarten learning were more likely to be praised by their peers and less likely to be downgraded than the comparisons. Rao et al. (2012) observed 370 rural children in Guizhou Province and showed that children who had attended kindergarten or preschool classes were significantly better than those who had not in reading and mathematics. Liu et al. (2013) studied 1,360 children in Beijing and Shanxi Province and found that one-year preschool education had a significant effect on the mathematical learning and language development, reaching 0.61 and 0.33 standard deviations, respectively. Li et al. (2016) investigated the influence of preschool educa-

tion on children's language, mathematics, and social cognition ability and found a significant relation between them. Chen and Liu (2017) used a sample of 5,177 students from the Program of International Student Assessment (PISA) Shanghai 2012 data and Propensity Score Matching and OLS estimation methods, they found that preschool education had a significant positive impact on the mathematics, reading and scientific literacy for 15-year-old students, and the academic achievements in those who received more than one-year preschool education were higher than those who received only one-year preschool education. Gong et al. (2016) used assessed the long-term impact of preschool education on the development of rural children with the age over 10 on the basis of the "Chinese Family Panel Survey" (CFPS) data through fixed-effects model, OLS estimation method, and Propensity Score Matching, and found that preschool education had a substantial impact on the social and emotional skills, which were displayed as preschool attendees in a rural area tended to have 1.32–1.53 more friends and an 11%-17% higher chance to be a school leader than the non-attendees.

The above-mentioned studies focused on the influence of preschool education on students' cognitive abilities such as mathematics, language, and reading, but rarely explored its effect on the non-cognitive ability. However, the impact of preschool education on children's development is a multi-dimensional, multi-level and multi-faceted complex system, and researchers and decision-makers should pay more attention to its impact on children's non-cognitive development. This study evaluated the effect of preschool education from a new perspective and empirically tested the influence of preschool education on the development of the non-cognitive ability of middle school students with a nationwide sample.

Data

This study used data from the China Education Panel Study (CEPS) baseline survey for the 2013-2014 academic year. The survey was designed and implemented by the National Survey Research Center at Renmin University of China. The middle school (7th graders) and high school (9th graders) students were the objects, and multi-stage probability proportional to size (PPS) sampling method was used. After four sampling stages, the county (district), school, class, student/parent/teacher/main subject teacher/school leadership and other four sampling units were extracted. In the baseline survey, a total of 28 counties, 4 schools from each county, and 4 classes from each school were selected, and a total of 19,487 seventh- and ninth-graders from 112 schools and 438 classes were sampled including 18,034 sample booklets with complete information on the preschool experience.

Variables

Outcome Variables

The outcome variable of this study was the non-cognitive ability. At present, there is no unified standard for the definition and measurement of non-cognitive ability. It is generally believed that the non-cognitive ability is not a representative of a single ability,

but a combination of multiple abilities. In western, the concept of "non-cognitive skills" was defined as those that are different from calculation, reading or reciting and can be measured by personality traits. For example, curiosity, attention, grit, self-control, social-emotional ability, self-discipline, motivation, self-esteem, sociability, time preference and so on (Borghans et al, 2008; Duckworth & Yeager, 2015; Gutman & Schoon, 2013). In China, Yan (1988) divided "non-intelligence factors" into three levels: (1) in the broad sense, they refer to all psychological factors other than intelligence factors; (2) in the narrow sense, they mainly include motivation, interest, emotion, intention, character and other psychological factors; (3) specific non-intellectual factors, including achievement motivation, thirst for knowledge, and enthusiasm for learning; self-esteem, self-confidence, and competitiveness; sense of responsibility, obligation and honor; Self-control, tenacity and independence. In the past two decades, the "big five personalities" measurement method developed by personality psychology has gradually been recognized and applied to measure the non-cognitive abilities that include extraversion, openness, emotional stability, agreeableness, and conscientiousness. Since no uniform measurement index exists, empirical researchers often reconstruct the proxy index of the non-cognitive ability according to specific questionnaire index and the characteristics of the "big five personalities".

Openness

According to the four related questions in the questionnaire, they can express opinions clearly, respond quickly, learn new knowledge swiftly, and be curiosity about new things (1 = completely disagree to 4 = completely agree). Through factor analysis, this study found that these four items naturally stayed together to form one factor value (α = 0.72). Combined with the "big five grid" model, we define this factor value as "openness", and set it up as a measure of non-cognitive ability to keep consistent with the method used by Li et al. (2017).

Negative Emotionality

The CEPS questionnaire asked students if they felt dispirited, depressed, unhappy, listless, or sad in the past seven days, using a five-point scoring system (1 = never to 5 = always) to measure the frequency of these feelings. Factor analysis showed that these five measures had a high similarity and could be naturally aggregated into one factor value (α = 0.85). Combined with the negative emotionality in the temperament type of children, we define this factor value as "negative emotionality". The higher the factor score is, the stronger the negative emotionality would be.

Self-Discipline

According to the CEPS questionnaire, whether students often skip classes or late, a factor value (α = 0.69) was obtained by factor analysis. Referring to the research idea of Cawley et al. (2001) that took truancy, lateness and other behaviors as proxy variables of "self-discipline", our study reversed scores of the above-mentioned factor value (1 =

completely agree to 4 = completely disagree) and defined it as "self-discipline". The higher the factor score is, the stronger the self-discipline would be.

Sociality

We took the number of students' self-reported good friends as a social indicator. In previous studies, the number of friends has been used as a proxy indicator of social communication skills. For example, Gong et al. (2016) used "the number of good friends they have" and "whether they are class cadres" as proxy indicators of non-cognitive social skills. Some western studies also took the number of good friends as the proxy variable of social communication (Kingery et al., 2011; Pettit et al., 2011). In addition, studies have shown that people who have more friends as childhood had better social and emotional well-being in adolescence and adulthood. Kingery et al. (2011) found that students who had more friends showed reduced loneliness and increased self-esteem. Wentzel et al. (2004) found a positive correlation between the number of friends and various adaptive indicators. Above-mentioned studies indicated that the larger the number of friends, the stronger the transitional adaptability from one stage of development to the next. In addition, our study added a reflection of the quality of friends that was composed of friends' academic performance, effort, educational expectations and discipline.[1]

Independent Variables

The key independent variable of our study is preschool education experience. The CEPS questionnaire asks a student whether he or she has attended preschool or a one year preschool class before grade 1 after the age of 3, and we construct a binary variable (yes = 1, no = 0) based on the student's answer whether he or she has received preschool education (79.8%).[2]

Control Variables

On the basis of the literature reviewed above, this study controlled for the other factors that may affect both preschool education acquisition and the non-cognitive ability of middle school students, including:

- At the personal level, gender (female = 1, male = 0) and grade are used (nine grade = 1, grade 7 = 0), nationality (Han = 1, minority = 0), household registration (agricultural as the reference), one-child (one-child = 1, non-only child = 0), birth weight (low birth weight or birth weight less than 2.5 kg = 1, normal birth weight = 0), illness before elementary school (severe illness = 1, not severe = 0), and other variables.
- At the family level, two variables are included: the years of education of the parent; the subjective evaluation of the family economic status before the children enters elementary school, including "family economic status is medium" and "family economic status is rich" two binary variables, taking "family economic status is difficult" as the reference.[3]

- At the regional level. A region of the average level of teaching education to a certain extent reflects the local social and economic development. To observe the influence of regional social, economic and cultural level on preschool education and the development of the cognitive ability, we selected students in the county level with average education years as a regional social, economic and cultural development level proxy variable.[4]

Method

First, we used descriptive statistical methods to analyze whether there were differences between students with or without preschool education in terms of individual characteristics and family background, so as to understand whether the basic characteristics of both groups matched. On this basis, the logit method was used to investigate the factors that affect the preschool attending.

Second, in order to accurately evaluate the influence of preschool education on children's non-cognitive ability, we adopted the OLS estimation and the Propensity Score Matching (PSM) methods. Conventional OLS estimation roughly assumes that the observed value of the treatment group is the influence after receiving preschool education, which will lead to biases of the estimation results. It is not a natural process if receive preschool education or not or how long preschool education lasts, but generally is influenced by factors such as students' individual characteristics and family socioeconomic background. So it is impossible to observe the outcomes of the same individual in the two states of both preschool and non-preschool education at the same time. Selective bias is a problem we need to take care of in order to accurately estimate the effect of preschool education on the non-cognitive ability. Compared with OLS, PSM can match the background of both groups more effectively and reduce the selective bias. Therefore, our study was based on the estimation of PSM.

PSM was first proposed by Rosenbaum and Rubin, and has been increasingly recognized and widely used in recent years. The basic feature of PSM is its good match of the control group with the treatment group to balance the data of the probability (propensity score). It degrades the multidimensional standard of both groups into one dimension to greatly improve the matching degree and guarantee the comparability of both groups, and to get a better estimation of the intervention effect of the treatment group. The net effect of preschool education on the non-cognitive ability of middle school students was recorded as Average Treatment Effect on the Treatment group (ATT) in the PSM model, and the model was as follows,

$$ATT = E\{E[Y1i - Y0i \mid Di = 1, p(Xi)]\}$$

where Y_{1i} and Y_{0i} represent the scores of the non-cognitive ability of individual student in preschool and non-preschool education, respectively. D_i is the processing variable, which represents the dummy variable of whether students receive preschool education. If student i receives preschool education, $D_i = 1$; otherwise, $D_i = 0$. $P(X_i)$ is the propensity score value, which represents the conditional probability of student i receiving pre-

school education under the control of sample characteristic covariate X. PSM is generally divided into four steps: (1) select appropriate covariates. Based on the previous research experience, we selected a group of variables that have an influence on both preschool education participation and children's non-cognitive abilities (see Control Variables above); (2), calculate propensity scores. The propensity score was calculated by logit regression; (3), match samples according to propensity scores. In this study, the nearest neighbor matching method is used, and the radius matching and kernel matching methods were used to test the robustness of the estimated results; (4) by comparing the estimation results of various matching methods, the net effect of preschool education on the non-cognitive ability of middle school students is obtained.

Results

Descriptive Picture

Table 1 shows significant differences between preschool attendees and non-attendees in terms of individual and family background. Specifically, among the samples receiving preschool education, non-agricultural households account for 43.5% of the total sample, which was significantly higher than the proportion of non-rural households in the group without preschool education (30.2%). In addition, compared with non-preschool attendees, the proportions of individuals with low birth weight and serious illness before elementary school were much lower in students who received preschool education, and the proportion of only children was higher. From the point of family economic background, the parents of preschool attendees have more years of education, with a difference of 1.27 years than the non-attendees, and the proportion of moderate and rich family in the preschool attendees was significantly higher than the comparisons. Finally, there was a significant difference in the average length of education (~0.68 yrs). In sum, obvious difference exists in individual characteristics and family background between preschool attendees and non-attendees.

Factors Affecting Individual's Acceptance of Preschool Education

On the basis of above-mentioned descriptive analysis, we found significant differences between the two groups in terms of individual characteristics and family background. In order to observe the factors that influence individual acceptance of preschool education, we used logit regression analysis method to analyze the specific factors affecting individual acceptance of preschool education, and the estimation results are shown in **Table 2**. Since most independent variables in the model are discrete variables, the table presents both odds ratio and the original non-standardized coefficient of the model.

Table 2 shows that factors such as gender, ethnic group, grade, individual health status, family economic status and years of education of parents all had significant influences on individual's acceptance of preschool education. Specifically, only-child families were more likely (22.9%) to receive preschool education than non-only children. Seventh-graders were 12%more likely than ninth-graders to receive preschool education, which may be related to the development of preschool education. Students in

Table 1. Sample Characteristics.

Variables	Overall Sample	Preschool Attendees	Preschool Non-attendees	*t*-test
Preschool Attendance	0.798	1	0	-
Female	0.485	0.490	0.470	0.020*
Han Ethnicity	0.910	0.924	0.857	0.067***
Grade 9	0.473	0.464	0.505	-0.041***
Non-Agricultural Household	0.409	0.435	0.302	0.133***
Low Birth Weight	0.322	0.295	0.433	-0.138***
Had Major Illness before Entering Elementary School	0.091	0.083	0.126	-0.043***
The Only Child	0.434	0.468	0.300	0.168***
Parent's Education	10.767	11.082	9.793	1.273***
Family Economy Medium	0.731	0.749	0.652	0.097***
Family Economic Affluence	0.056	0.060	0.041	0.019***
Average Number of Years of Education in the County	9.485	9.481	8.938	0.543***

*Note: *p<0.05, **p<0.01, ***p<0.001. The value in the table is the mean value of each variable. Since most of the result variables are standardized factor score values, the mean value of the result variables is not shown here.*

poor physical condition before elementary school were significantly less likely (25.7%) to receive preschool education than those in good physical condition. In comparison, students came from families with economic difficulties had a 43.3% of preschool education acceptance, but those from family with good economic status had a 63.1% of the preschool education acceptance, this is mainly because of poor families are unable to afford the high cost of preschool education. In addition, the level of local education level had a statistically significant impact on students' access to preschool education. Therefore, the analysis confirmed that students in a better position were more likely to receive preschool education. Moreover, the family's economic status is the most significant factor influencing students to receive preschool education.

Influence of Preschool Education on Non-Cognitive Ability of Middle School Students

We first used the OLS regression method to estimate whether preschool education had a significant impact on students' non-cognitive ability after controlling other confounding factors. Then, the PSM method was used for further analysis. The results are shown in **Table 3**.

The PSM results showed that a stable and significant relationship exists between preschool education and students' non-cognitive abilities such as thinking openness, negative emotionality, and self-discipline and friend quality. After controlling the

Table 2. Influencing Factors of Preschool Education: Logit Regression Results.

Variables	Preschool Attendance	
	Coef	Odds Ratio
Female	0.082*	1.086
	(0.039)	
Grade 9	-0.128***	0.880
	(0.039)	
Han Ethnicity	0.195**	1.217
	(0.065)	
Non-Agricultural Household	0.033	1.034
	(0.469)	
Low Birth Weight	-0.291***	0.743
	(0.041)	
Had Major Illness before Entering Elementary School	-0.131*	0.872
	(0.062)	
The Only Child	0.206***	1.229
	(0.046)	
Parent's Education	0.064***	1.070
	(0.012)	
Family Economy Medium	0.355***	1.433
	(0.043)	
Family Economic Affluence	0.487***	1.631
	(0.112)	
Average Number of Years of Education in the County	0.198***	1.219
	(0.017)	
N	18,034	
*Note: *p<0.05, **p<0.01, ***p<0.001.*		

personal and family factors, the thinking openness in students who had received preschool education were 0.04-0.05 standard deviations higher than those who had not received preschool education, that is, students who have received preschool education were better than those who had not received preschool education in terms of curiosity and ability to accept new things. Regarding the negative emotionality, students who have received preschool education showed less negative emotions such as depression, sadness and unhappiness indicating that in terms of emotional regulation, students who had received preschool education were stronger than those who had not received preschool education. In addition, on self-discipline, students who had received preschool education rarely ran away from school and late when compared with those who had not received preschool education. Finally, in terms of the quality of friends, students who had received preschool education showed better performance. Among the friends they mentioned, most were students who learnt hard, achieved outstanding results and per-

Table 3. Influence of Preschool Education on Non-cognitive Ability of Students.

Outcome Variable	OLS	PSM		
		Nearest Neighborhood Matching	Radius Matching	Kernel Matching
Openness	0.036**	0.042**	0.036**	0.045***
	(0.015)	(0.019)	(0.017)	(0.017)
Negative Emotion	-0.071***	-0.071***	-0.073***	-0.071***
	(0.017)	(0.022)	(0.020)	(0.019)
Self-Discipline	0.028*	0.011	0.032*	0.034*
	(0.014)	(0.019)	(0.017)	(0.017)
Number of Good Friends	0.547+	0.278	0.149	0.198
	(0.279)	(0.344)	(0.307)	(0.301)
Quality of Friends	0.151***	0.176***	0.197***	0.206***
	(0.037)	(0.052)	(0.047)	(0.046)

*Note: +p<0.1, *p<0.05, **p<0.01, ***p<0.001. Other control variables are included in both OLS and PSM estimates. In PSM estimation, the nearest neighbor matching (K=4), radius matching (caliper= 0.01), kernel matching and other matching methods were adopted. The standardized mean differences of almost all variables after matching were less than 10%, and the standardized mean differences of most variables were significantly reduced. ATT was reported in the table.*

formed well. In addition to preschool education, parents' education level and the status of family economy were also important factors affecting these non-cognitive abilities.[5]

Chinese scholars have analyzed the important role of preschool education in cultivating children's curiosity from the theoretical point, but no corresponding empirical study was conducted. Our study demonstrated that preschool education has a significant positive effect on the development of students' curiosity that provides an empirical evidence for the theoretical analysis mentioned above. In addition, this study found that preschool education has a significant positive impact on the self-discipline of middle school students, which is consistent with the conclusion of Sammons (2010). Different from Gong et al. (2016), they found that preschool experience had no significant effect on the number of students' friends, which may be related to the differences in the samples used in the two studies, Gong et al took rural students as the research objects, whereas this study covered students from both urban and rural areas, and this variable was given priority, and therefore may exist a certain difference. Although the conclusions were inconsistent in terms of the number of friends, our study found that the students who received preschool education were more likely to have good academic performance, learn hard and perform well with their best friends, which supplemented the study of Gong et al. These two studies verified the significant influence of preschool

education on the development of the non-cognitive ability of elementary and middle school students from different aspects.

Matching Effect Analysis

The propensity score matching method was used to satisfy two basic assumptions: (1) equalization of covariate distribution in the post-match treatment and control groups; (2) the propensity scores of both treatment and control groups with common support areas. Our study focused on the balance of variables that also affect the preschool enrollment and the non-cognitive abilities of children. The balanced variables include parents' educational attainment, family economic status before elementary school, household registration, and only-child family. The balance test found that these variables matched well and standardized mean differences were less than 5%. Meanwhile, the standard mean difference of the other control variables was less than 10%. According to the distribution map of propensity scores between the treatment and the control groups, there were overlapping areas of propensity scores between the preschool attendees and non-attendees indicating that the matching reduced the initial difference of characteristic variables between both groups.

Conclusions and Suggestions

Given the prominent role of the non-cognitive ability in personal growth and development, it is increasingly recognized that "ability" in the human capital model includes not only cognitive ability, but also the non-cognitive ability. It has become the latest trend of world education practice to try new teaching methods to develop children's non-cognitive abilities in social emotion, curiosity, and thirst for knowledge, self-discipline, and initiative. In this context, it is particularly important to explore the role of preschool education in the development of children's non-cognitive ability. Based on the national sample of the 2013-2014 baseline data of the CEPS, this study empirically investigated the effect of preschool education on the non-cognitive ability of middle school students in China using the propensity score matching method, and attempted to answer the following questions: What factors affect the access to preschool education? Does preschool education affect the non-cognitive ability of the middle school students? The main research conclusions are:

First, there is inequality in access to preschool education. Our study found that students' physical condition before elementary school, family economic condition, parents' years of education and local economic level all possess role in affecting students' access to preschool education. In comparison with students from poor families, students from middle and wealthy families are 43.3% and 63.1% more likely to receive preschool education.

Second, preschool education has a significant impact on the non-cognitive ability of middle school students. We found that students who have received preschool education had a strong curiosity and ability to accept new things, less negative emotions, better self-discipline, and less truancy and lateness. In addition, in terms of the quality of friends, students with preschool education had more good friends who are more like-

ly to get good academic and other school performance. Therefore, preschool education can improve the non-cognitive ability of human capital and play a positive role in promoting individual's future development.

Based on these findings, we strongly suggest that the government should continue to pay attention to and invest in the preschool education. Meanwhile, because children from poor families with poor health are significantly less likely to receive preschool education, so the government's financial expenditure on preschool education should incline to vulnerable children to guarantee the right of the disadvantaged children to receive preschool education.

We need to point out the limitations that our study has. First, the two methods we used in this study are non-experimental ones. Although the PSM method can reduce the selective bias to some extent, it only controls the influence of observable variables. If there is an unobservable endogenous variable, so "hidden bias" cannot be avoided. Second, we observed a number of non-cognitive indicators such as self-discipline, negative emotionality, and thinking openness, but most of these indicators are self-reported measures. So they were more subjective. With the development of measurement technology, more objective indicators can be investigated in the future. Finally, future studies can observe the impact of preschool education with different types and quality on the development of children's non-cognitive ability.

Note:

1. *The CEPS questionnaire asks the following questions: "do some of the good friends mentioned above have the following situations: good academic performance, hard study, and want to go to college", then the answer is "no such" (1) "one or two" (2) and "many such" (3) Another related question is: "good friend mentioned above have the following situation: skipping classes, truant, kip, in violation of the rules being criticized, disposition and fight back and learned", because the behavior such as skipping classes and grades excellent performance, such as is on the contrary, to facilitate research, do the reverse score here, answer "no such assignment 3," answer "one or two" assignment 2, answer "many of these" assignment 1. On this basis, the index of "friend quality" (a = 0.80) was synthesized by principal component analysis.*
2. *The preschool education here is mainly for children aged 3-6, but not limited to this. In the CEPS survey, no matter how old a child is enrolled in kindergarten or pre-school, or how many preschools he or she has received, the figure is better than the three-year gross enrollment rate reported by the national statistics.*
3. *During the survey, the hospital asked parents and students for subjective evaluation of the economic status of the family before elementary school. We give priority to the parents' questionnaire data, and then use the students' questionnaire data when the parents do not answer, and finally generate derived variables that reflect the family economic status of students before they enter elementary school.*

4. *Based on the data of the sixth national census, the CEPS project works out the average years of schooling in the samples' districts and counties.*
5. *Limited by space, other control variables from the results of omission.*

References

Almlund, M., Duckworth, A. L., Heckman, J. J., & Kautz, T. D. (2011). Personality Psychology and Economics. In Hanushek, E.,Machin, S.,&Woessmann L(Ed.), Handbook of Economics of Education(pp.117-150).North-Holland Press.

Andersson, B.E. (1992). Effects of Day-Care on Cognitive and Socioemotional Competence of Thirteen-Year-Old Swedish Schoolchildren. Child Develop, 63(1): 20-36.

Borghans, L., Duckworth, A. L., Heckman, J. J., & Baster, W. (2008). The Economics and Psychology of Personality Traits. J Human Resource, 43(4): 972-1059.

Bowles, S., & Osborne, G. M. (2001). The determinants of earnings: a behavioral approach. Journal of Economic Literature, 39(4): 1137-1176.

Cawley, J., Heckman, J. J., & Vytlacil, E. (2001). Three Observations on Wages and Measured Cognitive Ability. Lab Econ, 8(4): 419-442.

Chen C J & Liu Q . (2017) .A Quasi-experiment Study of Impact of Early Childhood Education on Students' Academic Achievements When They Were 15 Years Old Based on the Shanghai Data from PISA. Stud Early Child Edu, (1): 3 -12.(in Chinese)

Chetty, R., Friedman, J. N., Hilger, N.,Saez, E., Schanzenbach,D.W.,& Yagan,D. (2011). How Does Your Kindergarten Classroom Affect Your Earnings? Evidence from Project STAR. Q J Econ, 126(4): 1593.

Coneus, K., & Laucht, M. (2014). The Effect of Early Noncognitive Skills on Social Outcomes in Adolescence. Edu Econ, 22(2): 112-140.

Duckworth, A. L., & Yeager, D. S. (2015). Measurement Matters: Assessing Personal Qualities Other Than Cognitive Ability for Educational Purposes. Edu Res, 44(4): 237-251.

Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston,A. C., &Klebanov, p.,et al.(2007). School Readiness and Later Achievement. Deve Psy, 43(6): 1428-1446.

Eren, O., & Ozbeklik, S. (2013). The Effect of Noncognitive Ability on the Earnings of Young Men: A Distributional Analysis with Measurement Error Correction. Lab Econ, 24(6): 293-304.

Friedman, H. S., Kern, M. L., & Reynolds, C. A. (2010). Personality and Health, Subjective Well-being, and Longevity. J Personality, 78(1): 179-216.

Gong, X., Xu, D., & Han, W. J. (2016). The Effects of Preschool Attendance on Adolescent Outcomes in Rural China. Early Child Res Q, 37: 140-152.

Gormley, W. T., & Adelstein, S. (2011). Social-Emotional Effects of Early Childhood Education Programs in Tulsa. Child Develop, 82(6): 2095-2109.

Gutman L M, Schoon I. The Impact of Non-cognitive Skills on Outcomes for Young People: Literature Review[EB/OL].https://v1.education endowment foundation. org. Uk/uploads/pdf/Non-cognitive _skills_literature_review_2.pdf

Heckman, J. J. (2006). Skill Formation and the Economics of Investing in Disadvantaged Children. Science, 312(5782): 1900-1902.

Heckman, J. J. (2007). The Economics, Technology, and Neuroscience of Human Capability Formation. Pro National Academy Sci 104(33):13250-13255

Heckman, J. J., & Rubinstein, Y. (2001). The Importance of Noncognitive Skills: Lessons from the GED Testing Program. Am Econ Rev, 91(2): 145-149.

Heineck, G., & Anger, S. (2010). The Returns to Cognitive Abilities and Personality Traits in Germany. Lab Econ, 17(3): 535-546.

Kingery, J. N., Erdley, C. A., & Marshall, K. C. (2011). Peer Acceptance and Friendship as Predictors of Early Adolescents' Adjustment Across the Middle School Transition. Merrill-Palmer Quarterly, 57(3): 215-243.

Kubzansky, L. D., Martin, L. T., & Buka, S. L. (2009). Early Manifestations of Personality and Adult Health: A Life Course Perspective. Health Psy, 28(3): 364-372.

Le, J. J., & Hu B. W. (2017). The Effects of Non-cognitive Abilities on Wages: Evidence from China Family Panel Studies. Chin J Pop Sci ,(4): 66-76.(in Chinese)

Li, K., Yi, P., Hu, B.,Burchinal, M., Marco, A. D.,&Fan, X.,Qin,J. L. (2016). Early Childhood Education Quality and Child Outcomes in China: Evidence from Zhejiang Province. Early Child Res Q 36(Supplement C): 427-438.

Li, L., Zhao W. L., & Bian W. J. (2017). Family Background and the Non-cognitive Skills. Res Edu Develop, (1): 45 -52.(in Chinese)

Liu, Y., Zhao J. H., & Zhang L. (2013). Value Added Analysis of Teaching Effectiveness of One-Year Preschool Education. J Edu Stud ,(3): 56 -66.

Nores, M., & Barnett, W. S. (2010). Benefits of Early Childhood Interventions Across the World: (Under) Investing in the Very Young. Econ Edu Rev, 29(2): 271-282.

Pang, L. J., Hu J., & Hong ,X. M. (2003). Value of Preschool Education. Studies Early Child Edu ,(1): 7 -10.(in Chinese)

Peng, J. Y., Gao Q., & Xiao J. (2011). The Outcome of Kindergarten Education in the Western Rural Area. Studies Early Child Edu, (7): 9-13.(in Chinese)

Qiu, Z. H., &Liu Y. (2011). The Research on the Economic Development Benefits of Preschool Education of the Foreign Countries. Interl Com Edu,(6): 1-4. (in Chinese)

Rao, N., Sun, J., Zhou, J., & Zhang, L. (2012). Early Achievement in Rural China: The Role of Preschool Experience. Early Child Res Q, 27(1): 66-76.

Reynolds, A. J., Temple, J. A., Ou, S. R., Arteaga, I. A.,&White,B .A. B. (2011). School-Based Early Childhood Education and Age-28 Well-Being: Effects by Timing, Dosage, and Subgroups. Science, 333(6040): 360-364.

Sammons, P. (2010). Do the Benefits of Preschool Last? Investigating Pupil Outcomes to the End for Key Stage 2 (aged 11).In Sylva K, Melhuish E, Sammons P. Siraj-Blatchford I, and Taggart B. (Eds.). Early Childhood Matters: Evidence from the Effective Pre-school and Primary Education project(pp.114-148).Routledge, New York.

Sammons, P., Sylva, K., Melhuish, E.,Siraj, I. (2014). Influences on Students' Social-behavioural Development at age 16 Effective Pre-School, Primary & Secondary Education Project. (EPPSE).[EB/OL].https://www.researchgate.net/publication/266372995_Influences_on_students%27_social-behaviour-al_development_at_age_16_Effective_Pre-School_Primary_Secondary_Education_Project_EPPSE

Schick, A., & Steckel, R. H. (2015). Height, Human Capital, and Earnings: The Contributions of Cognitive and Non-cognitive Ability. J Human Capital, 9(1): 94-115.

Shen, D., L. (1997). Theory and Practice of Non-intellectual Factors. Edu Sci Press. (in Chinese)

Tam, T., & Wu, H. F. (2013). Noncognitive Traits as Fundamental Causes of Health Inequality. Chin Soc Rev, 46(2): 32-62.

Wentzel, K., Barry, C., & A. Caldwell, K. (2004). Friendships in Middle School: Influences on Motivation and School Adjustment .Edu Psy,96(2):195-203.

Yan, G., C. (1988). A Few Questions about Non-Intellectual Factors. J Shanghai Normal

Univ(Philosophy & Social Science Edition),(4): 134-139.

Yu, F., Wang, C., Shen, J.,Shi, Y.,& Li, T. (2017). Effect of Cognitive Abilities and Non-cognitive Abilities on Labor Wages: Empirical Evidence from The Chinese Employer-Employee Survey. China Econ J, 10(1): 76-89.

Zhu, Z., X.(2003). Child Psychology. People's Edu Press. (in Chinese).

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ARTICLE

Integrating Games into Picture Books to Facilitate the Development of Social Emotions in Preschoolers: An Empirical Study on the Positive Effects of Game-Combined Guided Reading of Picture Books on Social Emotional Development in Preschoolers

Juzhe Xi, Wenying Zhou, Zhihong Zuo

East China Normal University, Shanghai 200062, China

Abstract. This 6-week experimental study aimed to examine the effects of game-combined guided reading of picture books on children's social emotional development. Pre- and post-test design was used among a sample of 81 children and their parents from 3 senior classes in a Shanghai public kindergarten. The participants were divided into five groups: guided reading group, self-reading group, reading-with-listening group, and two control groups. In both pre- and post-tests, children's parents were administered measurement "The Scale of School Readiness in Emotional and Social Areas for Children". The guided reading group was asked to read picture books by following the instructions, the self-reading group read the picture books by themselves, while in the reading-with-listening group, the investigator read the stories out loud to the children and pointed to the text. The two control groups did not read picture books, and the second control group was mainly used to investigate the effects of the pre-test. The results indicated that all types of reading had significant effects on the improvement of children's social-emotional development with difference across the groups. The game-combined guided reading had more significant effects on children's interpersonal relationships and self-awareness development than the other two reading styles, but the effect on children's moral development was at the statistically marginal level and was significantly higher in the other groups. Our data suggest that picture book reading is effective in promoting children's social-emotional development. Furthermore, game-combined guided reading is suitable for children's psychological characteristics, and has much greater promoting effects on their

social-emotional development. If adults could add mini games to the reading, it would enhance children's positive experience and contribute to their social-emotional development.

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***Correspondence to**: Zhihong Zuo, Associate Professor, Department of Preschool Education, Faculty of Education, East China Normal University, China; Email: zuozhihong@126.com.*

***About the Author** Juzhe Xi, Professor, Department of Applied Psychology, School of Psychology and Cognitive Science, East China Normal University, China; Email: jzxi@psy.ecnu.edu.cn.*

Wenying Zhou, Graduate Student, Department of Applied Psychology, School of Psychology and Cognitive Science, East China Normal University, China; Email: ecnuzhouwenying@163.com.

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As an important component of psychological development, social development has aroused increasing attention. Since early 1930s, Western scholars have begun to study social development in children that regarded children as active participants in social activities rather than passive socialized individuals. Freud's theory of personality, Vygotsky's cultural-historical psychology, and Meade's Cultural Determinism were considered the three most important theoretical bases of children's social development (Chen, 1994). Since the 1980s, the term 'social' has been recognized in preschool and school-aged education in China (Shi, 1994). From the mid-1980s, the focus of preschool education has shifted from intelligence development to children's overall development. Since the mid and late 1990s, quality-oriented education and the cultivation of children's sociality have been strongly promoted.

Social development is not only an important part of children's psychological development, but also the foundation of healthy personality and social adaptation ability. The Guidelines for Kindergarten Education (Trial Version) issued by the Ministry of Education of China in 2001 stated that the purpose of social development in preschool children is to build up their 'willingness to communicate, learn, cooperate and share, and compassion for others'. Social development can facilitate children's formation of multi-dimensional and multi-level psychological structure, shapes their personality structure of agreeableness and intelligence, and builds up their morals of gregariousness and harmony (Liu, 2010). Children with such social competence are likely to understand social norms, master life skills, manage interpersonal relationships and adapt to social life (Yang & Wu, 2001). A nationwide survey showed that promoting children's social and emotional development helped reduce the occurrence of behavioral problems (Lian et al., 2008).

Emotion is one of the four most important factors in children's socio-psychological structure and a core field in their social development (Chen, 1994; Shaffer & Kipp, 2013). Social-emotional development, as a critical component of children's social development, is particularly important to preschool children (Pahl, 2007). Social-emotional development refers to the generation of emotions with social significance in the process of interpersonal communication and social behavior feedback on the basis of primitive emotions (Meng, 1989). Children with high levels of social-emotional development tend to be more confident, have better peer relationships and more cooperative spirit, and be more capable of managing and regulating emotions, solving conflicts and promoting interpersonal communication and social adaptation (Cunningham, et al., 2009; Mandez, et al., 2002). In contrast, children who have difficulties in social-emotional development tend to demonstrate poor performance in school life, peer relationships and academic learning (Aviles, 2005; Harniss, 1999). The transition from kindergarten to elementary school is a crucial stage of overall development in preschool children. Therefore, this stage requires special attention (Chen, 2008). The main task of social development in preschool children is to have emotional interaction and maintain positive social interaction. It is imperative to prepare preschool children to have social-emotional development in accordance with the purpose of social development stated in

the Guidelines for Kindergarten Education (Trial Version) so that the children may have a better transition from kindergarten to elementary school.

Picture books are suitable materials for preschool children. The effects of picture book reading on children's development have aroused great attention. High quality picture books do not only deliver knowledge, but also inspire courage, sow hope, and cultivate children's temperament (Geng, 2010). The results of previous empirical research suggested that picture books play a significant role in promoting children's social-emotional development. For example, picture book reading can effectively promote the development of children's social interaction and moderate their challenging behaviors (Zuo, et al. 2012). It promoted children's self-perception, interpersonal relationships and understanding of social regulations (Zhang & Zeng, 2016). In addition, reading picture books could encourage pro-social behaviors and improved social adaptability in preschool children (Du, 2015; Yang, et al., 2014). The existing empirical studies on the use of picture books had provided enlightenment and directions for social-emotional development education in children (Liu, S., 2003; Xie, 2003).

In addition to picture book reading, playing games is also a crucial way to support children's social-emotional development (He & Liu, 1999; Zhou, 1990). Vygotsky maintained that playing games is a purposeful and conscious social activity among children (Lv, 2006). For example, sports games can improve social interactions, help free children from self-centered traits, and cultivate positive emotions and healthy psychological quality (Yang, 2002). Role-playing games can reinforce pro-social behaviors, improve social cognition, and promote peer interaction and cooperation (Duan, 2010). Moreover, autonomous games can promote the development of social cognition, social emotions, social skills, social morality and self-awareness (Meng, 2014).

In summary, the combination of picture book reading with game playing in the kindergarten curriculum is a new and worthwhile topic. For example, Jiangsu Provincial Department of Education launched a Gamification Course program in 2014, aiming to guide kindergartens to set up correct views on children, games and curriculum (Cao, 2016). In Sun's (2017) study of early childhood reading in the context of gamification curriculum, picture book stories were put through into children's daily life in the form of games. The Picture Books Game Course was developed on the basis of the holistic function of picture book reading. Fei (2016) and Leng (2017) explored new ways of using picture books and new models of picture-book-based education so that the overall development in children could be promoted. Kindergarten teachers integrated performance games into activities of picture book reading to stimulate children's abilities to perform and comprehend reading materials. This method assumed that picture books are a critical carrier of children's experiencing of games (Peng, 2016). Fang (2012) maintained that picture books contain game elements in the perspectives of form, content and usage. Therefore, the combination of picture book reading with games can facilitate children's understanding better of the material (Guo, 2015). Previous study indicated that gamified electronic picture books which integrate the characteristics of games into learning materials can improve students' concentration and interest in learning (Chen, 2017). In spite of the existing literature that suggested many benefits of combin-

ing picture book reading with games, concise and instructive curriculum frameworks for educators are rare. Such frameworks are crucial for educators to grasp the essentials quickly and generate an educational system which integrates games into picture book reading.

This study developed a mode of game-combined guided reading of picture books, which integrated picture book reading and games. During the reading process, thought provoking and guiding approaches were applied, different levels of questions were asked, and story related mini-games were designed. In the process of game-combined guided reading of picture books, children's initiative was paid full respect. The investigators used different approaches to encourage the children to participate in discussions and used various methods to stimulate children's motivation. The goal was to help children to connect their existing life experiences and knowledge to the content of the story. Thought provoking questions were used to guide them to think, and to cultivate their skills of anticipation, hypothesizing, questioning, and reflection. Role-play, sports games and action mimicking were utilized to internalize and consolidate children's social-emotional knowledge, and to enhance their social-emotional skills. The purpose of this study is to examine whether this innovative reading method, in comparison to traditional methods of picture book reading (e.g., self-reading, reading-with-listening), could improve children's social-emotional development through participation and enriched experience of picture books.

Methods

Sample

A volunteer sample of 81 preschool children including 47 boys (58.02%) and 34 girls (41.98%), and their parents were the participants of this study. All the children were from a senior class of a public kindergarten in Shanghai where social-emotional development curriculum was not offered. All participants were under the 'equivalent conditions'. We herein define 'equivalent conditions' as no significant difference in age, physiological development, and parent-and-child shared reading (e.g., attitude, frequency and time). Prior to the experiment, all participants were randomly divided into five groups. An analysis of single factor ANOVA for social-emotional development was conducted with all five groups of participants. The results indicate that there were no significant differences in the first four groups of social-emotional scores ($F(3,63) = 0.93$ -2.44, $p > 0.05$). The fifth group did not participate in the pre-test. There were no significant differences in age among each group ($F(4,76) = 0.68$, $p = 0.957$). As shown in the **Table 1**, there were no statistically significant differences in terms of gender in each group ($\chi^2(df = 4, N = 47) = 3.54$, $p = 0.473$).

Tools and Materials

Outlines for Game-Combined Guided Reading of Picture Books

Table 1. Participants' Demographic Information.

Group	Number	Boy (n)	Girl (n)	Average Age (mo) (*M* ±*SD*)
Guided Reading Group	19	13	6	73.00 ± 3.39
Self-Reading Group	16	9	7	72.55 ± 2.95
Reading-with-Listening Group	19	9	10	72.60 ± 4.47
Control Group 1	13	6	7	72.40 ± 4.44
Control Group 2	14	10	4	72.33 ± 3.11

Note: The purpose of setting up Control Group 2 was to examine the effect of pretest.

The reading materials were selected from *The Way I Feel* series of picture book by Cornelia Maude Spelman. The author was a therapist with children and families before turning full-time to writing and art. The reading materials included seven common social-emotional themes for preschool children: happiness, feeling scared, sadness, jealousy, self-confidence, missing someone, and empathy (see **Table 2**).

Measurement of Social-Emotional Development

This study used Yang's (2015) "the Scale of School Readiness in Emotional and Social Areas for Children", which was developed on the basis of the Five-Domain Model of School Readiness, Child Behavior Checklist and Child Social Development Scale within the Chinese cultural context. From Yang's scale, 44 items were selected. The children's parents were asked to indicate their children's performance in the aspects of interpersonal relationships (e.g., taking the initiative to play games with others), morals (e.g., never destroying plants and flowers or harming small animals), and self-awareness (e.g., using appropriate approaches to realize personal wishes). Responses were on a five-point Likert-type scale ranging from 'completely disagree' to 'completely agree'. The internal consistency coefficients demonstrate satisfactory psychometric properties (interpersonal relationships (α = 0.881), morals (α = 0.898), self-awareness (α = 0.830) and overall (α = 0.864)).

Procedure

As shown in the **Figure 1**, this study included three stages: pre-test, experimental design implementation, and post-test. The pre-test was to understand participant children's conditions of emotional development, select appropriate picture books, and make reading plans. The pre- and post-test utilized the same measurement. A team of university students who had received standardized training in advance implemented the experiment. Only one chief investigator was in charge of all the experiments in all five groups. This was to minimize experimenter bias. The guided reading group was provided with instructions in reading the game-combined picture books. Children in the self-reading group read the materials by themselves. In the reading-with-listening group, the chief investigator pointed to the texts while reading the story out loud, and the participant

Table 2. Outlines for Game-Combined Guided Reading of Picture Books.

Guided Reading of Game Combined Picture Books	Introduction		Themes
			Appropriate Reading Age
			Story Topic
	Picture Book Introduction		Cover & Back Cover
			Front Lining & Title Page
	Guided Reading	Appropriate Guiding Behaviors	Thought Provoking Questions
			Guiding Questions
			Experience Sharing
			Mini Games
			Action Mimicking
			Role Play
		Inappropriate Guiding Behaviors	Assigned Reading Materials
			Distraction, Perfunctoriness
			Literacy
			Lecturing in the Process
	Post Reading		Summary Sharing
			Craft Work
			Mini-Games
			Conclusion

children listened to the story. The two control groups did not read picture books, and the second control group was only used to examine the pre-test effects. Children in the three experimental groups read picture books twice a week, 15-20 minutes each time, for a period of 6 weeks according to the setting of each experimental group.

Data Analysis and Results

Significance Tests on Children's Social-Emotional Developmental Changes in Each Group

The data of post-test from control groups 1 and 2 were compared. The results showed that there was no significant difference between the two groups (ps >.410). This finding indicated that receiving pre-test did not have impact on the participants' post-test results. Therefore, possible interference of the pre-test on the experimental results could be excluded. As shown in the **Table 3**, the results of pre- and post-test comparisons showed

Table 3. Descriptive Statistics of Children's Social-Emotional Developmental Changes (M ± SD).

Experimental Groups		Interpersonal Relationship	Moral	Self Awareness
Guided Reading Group (n = 19)	Pre-test	40.53 ± 4.58	45.95 ± 3.29	60.95 ± 6.10
	Post-test	55.32 ± 4.36	57.26 ± 4.72	76.00 ± 6.31
Self-reading Group (n = 16)	Pre-test	41.69 ± 3.44	44.06 ± 4.12	61.88 ± 6.31
	Post-test	51.69 ± 3.26	52.81 ±4.22	73.25 ± 3.86
Reading-with-Listening Group (n = 19)	Pre-test	42.58 ± 7.40	46.89 ± 2.81	63.53 ± 8.66
	Post-test	50.89 ± 3.56	54.58 ± 4.21	72.68 ± 5.93
Control Group 1 (n = 13)	Pre-test	43.46 ± 4.05	46.46 ± 2.44	65.23 ± 5.93
	Post-test	50.31 ± 4.11	54.54 ± 4.03	69.69 ± 4.99

significant improvement in all three aspects of interpersonal relationships, moral, and self-awareness among the four groups of participants ($t = 2.27 - 13.91$, $p < .05$).

Significance Tests on Children's Social-Emotional Developmental Changes among Different Groups

The above findings suggested that the four groups of participants who had shown no significant difference in the pre-test had developmental changes in social emotions after completing their respective picture book reading tasks. As shown in the **Table 4**, a repeated ANOVA on the scores of three social emotions (interpersonal relationships, moral and self-awareness) by 4 factors (four groups: guided reading group, self-reading group, reading-with-listening group, and control group 1) × 2 stages (two stages: pre-test and post-test) was conducted. This was to examine the effects of guided picture book reading. The results showed that in the aspect of interpersonal relationships, the interaction effects within and between subjects reached the level of statistical significance ($F(3,63) = 5.61$, $p = 0.002$, $\eta^2_p = 0.211$). In the aspect of moral, the interaction effects within and between subjects reached the marginal level of statistical significance ($F(3,63) = 2.42$, $p = 0.075 < 0.10$, $\eta^2_p = 0.075$). For self-awareness, the interaction effects within and between subjects reached the extreme level of statistical significance ($F(3,63) = 6.28$, $p = 0.001$, $\eta^2_p = 0.230$).

As shown in the **Figure 2**, the mean deviation among the four groups in all three aspects (i.e., interpersonal relationships, moral, and self-awareness) was compared. It was found that the improvements within the guided reading group were especially significant, i.e., the scores in all three aspects were higher than that of the reading-with-listening group and the control group 1, and also significantly higher than that of the self-reading group in the aspect of interpersonal relationships ($p < 0.05$).

Simple effects tests on all three aspects were conducted. As shown in the **Table 5**, the results indicated that participants' performance in the post-test were significantly different among groups in the aspects of interpersonal relationships and self-awareness

Table 4. Effects of Changes in Children's Social-Emotional Within Subjects, Between Subjects and Interactive Effects of Within Subjects & Between Subjects.

Source of Variation	Statistical Indicators	Interpersonal Relationship	Moral	Self Awareness
Within Subjects × Between Subjects	*F* (3, 63)	5.61**	2.42†	6.28**
	p	0.002	0.075	0.001
	η^2_p	0.211	0.103	0.230
Within Subjects	*F* (3, 63)	178.76***	258.97***	135.10***
	p	<.001	<.001	<.001
	η^2_p	0.739	0.804	0.682
Between Subjects	*F* (3, 63)	0.52	3.18*	0.13
	p	0.674	0.030	0.941
	η^2_p	0.024	0.132	0.006

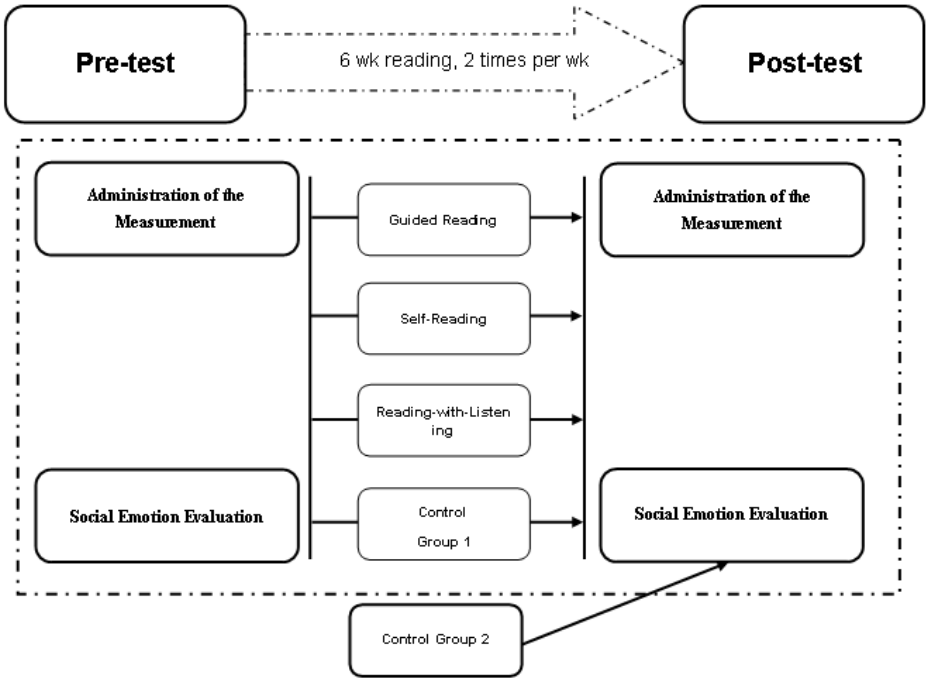
*Note: †p <0.10, *p < 0.05, **p <0.01, ***p < 0.001.*

Table 5. Group Differences and Repeat Measure of Simple Effects Tests.

Origins of Differences	Interpersonal Relationships		Morals		Self Awareness	
	F	η^2_p	*F*	η^2_p	*F*	η^2_p
Guided Reading Group × pre-test and post-test	113.89***	0.644	120.11***	0.656	88.74***	0.585
Self-Reading Group × pre-test and post-test	43.85***	0.410	60.48***	0.490	42.67***	0.404
Reading-with-Listening Group × pre-test and post-test	36.01***	0.364	55.39***	0.468	32.84***	0.343
Control group 1 × pre-test and post-test	16.70***	0.210	41.87***	0.399	5.33*	0.078
Differences within Group × Pre-Test	0.93	0.042	2.44†	0.104	1.14	0.052
Differences within Group × Post-Test	6.03**	0.223	3.19*	0.132	3.20*	0.132

*Note: †p <0.10, *p < 0.05, **p <0.01, ***p < 0.001.*

Figure 1. Experiment Procedure.



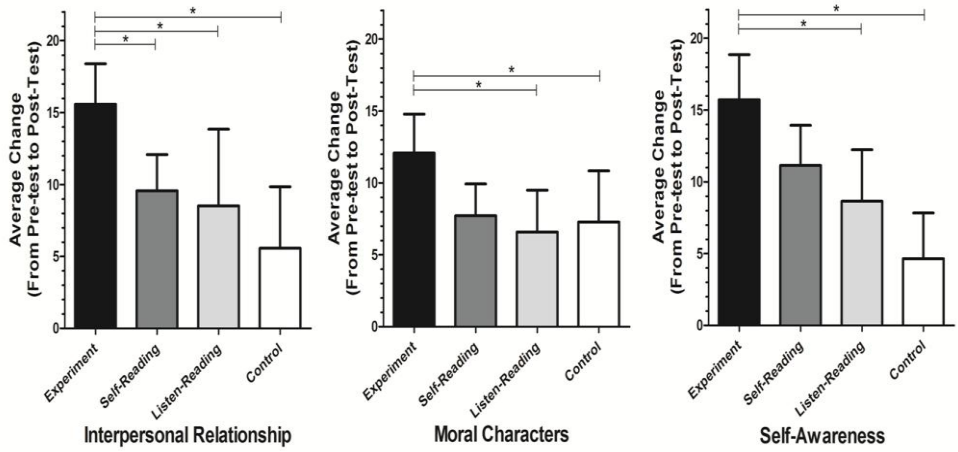
($p < 0.001$). The results of comparisons among **Tables 3** and **4** and **Figure 2** indicate that there were more significant improvements in social-emotional development within the guided reading group than in other groups.

Discussion

Game-Combined Guided Reading of Picture Books Is More Effective in Promoting Children's Social-Emotional Development

As shown in the **Figure 2**, after the 6-week experiment, the social-emotional development levels in the entire participant children have been improved. The experiment began during the second semester in a kindergarten's senior class, where the courses and activities related to the transition from kindergarten to elementary school were conducted. The children in the control groups also had a significant improvement in their level of self-awareness as their age increased. The fastest development stage was 4−8 years old (Ran, 1994). All the participant children in this study were exactly on this stage. Therefore, their self-awareness was developing rapidly in a positive trend. The interaction within and between subjects (see **Table 4**) suggested that game-combined guided

Figure 2. Comparison of Mean Deviation (MD) among Groups.



*Note: *the result reached statistical significance.*

reading of picture books plays a greater role in promoting children's social-emotional development.

Children's self-awareness reflects their understanding of the surrounding environment and their position in the society. It is an crucial prerequisite for socialization and personality improvement. Self-awareness affects children's social behavior and social adaptation (Wang, et al, 2011; Yang, 2014). Self-awareness is not innate. Instead, it is formed in the interactions with the objective social environment (Xu & Qu, 2001). Children start to develop their awareness of social roles as well as their mind after their second year in kindergarten. In this study, through the activities of picture book reading, self-portrait, 'praise myself' and other mini games, children were guided to become aware of their similarities with and uniqueness from others. This was helpful for children to understand themselves properly and evaluate themselves positively. On the basis of proper self-evaluation, children could learn to evaluate others properly. In the process of answering thought invoking questions, children were free to deliver ideas so that they could fully express their thoughts, emotions and explanations. The participant children were also allowed to draw or act out their thoughts and feelings. In the activities within this study, children had a deeper self-experience, which enriched their inner world.

Rogers (1951) maintained that in social interactions, individuals require 'positive regard', and there is no exception for children. They also require recognition, attention and love from others. In the process of picture book reading, the investigators always responded to children with encouragement and positive words, so that the children could have a positive and new understanding of themselves. This process enabled chil-

dren to be freed from self-centeredness. The participant children were able to recognize, comprehend, and adjust their emotions on the basis of their experiences in reading and game playing. They first mimicked the characters' actions of the story, and then learned to solve conflicts in constructive ways and manage interpersonal relationships.

The Reasons Why the Game-Combined Guided Picture Book Reading Could Promote Social-Emotional Development.

Why could game-combined guided picture book reading promote children's social-emotional development? We herein explained that the main reason is the scaffolding for positive construction in the reading activities, which involves the following four points:

First, children internalized many socialized experiences from reading picture books so that they were able to understand themselves and others, and then improve social skills. Nowadays, children's life experiences are mainly from their family, friends and people around them, but they were limited. However, picture books cover a wide range of contents, and through reading picture books, children could experience different lifestyles, meet a variety of people and things, and come across diverse views on life. Picture books served as a medium, and the game-combined reading activities enabled children to have a deeper experience and understanding of the materials in an enjoyable way. In such process, children could experience many that they cannot get in their real life. Their view horizons were expanded, their life experiences were enriched, and the knowledge and skills that they had learned could be transferred to their daily life (Guo, 2015). The social practice of games set up a certain life scenarios, in which children could understand simple social relations, and take initiative to solve problems (Fredrickson & Marcial, 2005).

Second, game-combined guided reading of picture books adopted free and open discussion approaches, in which children were free to express their ideas and ask questions. This was to help children to learn the skills of thinking and reasoning. The improved ability of thinking in turn to help them understand the main points of the story and promote their cognitive and language development. Then, they may become intelligent people with better-developed emotions. In addition, the picture books use elaborate illustrations, simple words and emotional expressions, and depict the virtues of courage, confidence, optimism and kindness in the stories. These elements helped set role models for children to learn.

Third, the features of the three-dimensional design, full-scale demonstration and game participation enhanced participants' senses of experience. The game-combined guided picture book reading enabled children to comprehend the content of stories, and further encouraged them to participate in the exploration and understanding of the external world through multiple forms of expression such as reading, acting, dancing, drawing, practicing, running and jumping. In the reading process, children gave many types of responses to the materials, such as dancing, clapping, acting and performing (Hickman, 1981). Game-combined guided picture book reading supported children to give responses to the stories, and encouraged investigators to interact with children. The embedded mini games in the reading process were not simply recreational

activities. Instead, they incorporated higher level of meaning and value (Dewey, 2003). Children could use games to express their ideas, manage physical actions, express emotions and establish relationships with people and the environment. Game is the primary form and path of children's learning and development (Yang & Li, 2009).

Fourth, the selected picture books contained rich social-emotional elements, and the themes were in accordance with preschool children's life experiences. Children, who have not yet developed strong observation abilities, might have egocentric consciousness, and therefore lack awareness, cognition and understanding of other's emotions and needs. This will lead to a lack of social-emotional skills such as helping others, cooperation, caring and compassion. The selected picture books contained a number of common emotions of children and themes such as empathy, self-esteem, self-reliance and self-awareness. The books were used to help children to develop their self-awareness (e.g., 'who I am' and 'how I am'), social skills (e.g., how to greet others, apologize, and share), the adaptability to a new environment, recognition of their own emotions, control of emotions, self-regulation abilities and pro-social behaviors (e.g., being willing to get along with peers, recognition of other's feelings and emotions and providing proper responses).

Limitation

Although the effects of game-combined guided picture book reading were significant in certain aspects, the duration of this study was relatively short. If longitudinal studies could be conducted among children, the durability of the guided reading effects could be investigated. This study only collected data from parents whose children participated in the study. The parents' evaluation was mainly based on their own life experiences with their own children. In future research, data should be collected from multiple sources (e.g., teachers, parents and children). The pre-test data were collected on a parents' meeting, while the post-tests were completed by the parents on their own at home. In both situations, parents' evaluation could be biased. If the methods of observation, interview and experiment could be involved, the evaluation of children's emotional development levels would be better-rounded. Meanwhile, some other study methods such as Social-Cognitive Aptitude Test and Object Cognition Test could be used.

Due to various objective limitations, this study only set up three experimental groups to compare game-combined guided picture book reading with traditional self-reading style and parent-reading-while-child-listening style. However, this study did not set up a game-only group (i.e., in this group, participants only play games without reading books). Therefore, we were not able to distinguish which was the fundamental influencing factor (i.e., the picture book reading, or game playing or the combination of both) on children' social emotional development. If game only groups could be added, the study results would be more rigorous and convincing.

Conclusion

- Picture book reading can promote children's social-emotional development. Furthermore, game-combined guided reading of picture books is more suitable

for children's psychological characteristics, and its core mechanism is to promote children's scaffolding in learning and development. Therefore, if adults add mini games into the reading with children, it will not only enhance children's positive experience, but also support children's social-emotional development.

- Although this study has some limitations, the results indicate that game-combined guided reading of picture books plays a role of positive construction in social-emotional development in children. This reading style is worth applying and promoting.

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References

Aviles, A.M., Anderson, T.R., & Davila, E.R. (2006). Child and adolescent social-emotional development within the context of school. Child Adoles Ment Hlth, 11(1), 32-39.

Cao, Y.L. (2016). The understanding and practice of kindergarten curriculum through games. Stud Early Child Edu, 12, 61-63.

Chen, H.C. (1994). Characteristics, impact factors and measurement of children's social development—General report of "The social development of children aged 3–9 in China". Psychol Dev Edu, 4, 1-17.

Chen, J.F. (2008). Analysis on the problems and strategies on kindergarten-primary school transition in China. Forum Contem Edu, 11:54-55.

Chen, Y.X. (2017). Examination the practice of pleasing learning: Take a game-style electronic picture book as an example. Taiwan Edu Rev, 9:311-313.

Cunningham, J.N., Kliewer, W., & Garner, P.W. (2009). Emotion socialization, child emotion understanding and regulation, and adjustment in urban African American families: Differential associations across child gender. Dev Psypathol, 21(1):261-283.

Dewey, J. (2003). Democracy and Education. (Lin, Bao-shan translated) (pp.203–213). Taichung: Wu-Nan Book Company.

Du, M. (2015). The intervention study of picture books reading on the altruism behavior and social adjustment in rural primary school children. Unpublished Master's Dissertation, Jiangxi Normal University.

Duan, Y. (2010). The value of performance games for children's social development. Ability Wisdom, 35:259.

Fang, W.P. (2012). The literature of play: Playfulness in children's literature. Stud Early Child Edu, 6:3-7.

Fei, L.L. (2016). Selection and application of picture books in kindergarten performance games. Pop Sci, 7:90.

Fredrickson, B.L., & Losada, M.F. (2005). Positive affect and the complex dynamics of human flourishing. Am Psychol, 60(7):678-686.

Geng, M.L. (2010). Significance and educational suggestions in picture book reading for children's development. J Hunan Univ Sci Eng, 31(10):54-56.

Guo, Y.M. (2015). On the literature picture books for young children. Stud Early Child Edu, 8:64-66.

Harniss, M.K., Epstein, M.H., Ryser, G., & Pearson, N. (1999). The behavioral and emotional rating scale: convergent validity. J Psy Edu Assess, 17(1):4-14.

He, M.Y., & Liu, Y. (1999). Facing the 21st century, fostering children's playfulness. Stud Early Child Edu:20-23.

Hickman, J. (1981). A new perspective on response to literature: research in an elementary school setting. Res Teach Eng, 15(4):343-354.

Hsieh, S.H. (2004). The effect of the picture book guidance program on the social skills of elementary students. Unpublished Master's Dissertation, Normal University of Taipei.

Leng, X.Y. (2017). Analysis on the application of interesting picture book in the background of curriculum gamification. Read Write Period, 14(2):228.

Lian, G.L., Wang, H.S., Huang, X.N., Shi, S.H., Liu, G.Y., & Zhang, J.R. (2008). Study on correlation between social-emotional development and behavior problems in 2–3 years old children. Chin J Child Hlth Care, 16(2):139-141+143.

Liu, S.W. (2004). An action research on using children's literature in teaching social studies. Unpublished Doctor's Dissertation, National Taiwan Normal University.

Liu, Y.X. (2010). On theoretical significance of children's social development. J College NW Adult Edu, 6:80-81+65.

Lv, X., & Long, W. (2006). On Vygotsky's Play Theories. Stud Early Child Edu, 6:53-55.

Mendez, J.L., McDermott, P., & Fantuzzo, J. (2002). Identifying and promoting social competence with African American preschool children: Developmental and contextual considerations. Psychol Sch, 39(1):111-123.

Meng, Q.Y. (2014). The influence of independent games on children's social development. J Kaifeng Inst Educ, 34(9):226-227.

Meng, Z.L. (1989). Human emotion. (pp.393). Shanghai: Shanghai People's Publishing House.

Pahl, K.M., & Barrett, P.M. (2007). The development of social-emotional competence in preschool-aged children: An introduction to the Fun FRIENDS Program. Aust J Guid Counsel, 17(1):81-90.

Peng, X.C. (2016). Analysis of the game characteristics of children's literature. J Shandong Agr Eng Univ, 33(8):185-186.

Peng, X.P. (2009). Traceability of educational activities in kindergarten. Stud Early Child Edu, 10:17-22.

Ran, N.Y. (1994). Self-awareness and social development of children aged 3–9. Psychol Dev Edu, 4:18-21+29.

Rogers, C. (1951). Client-centered therapy: Its current practice, implications and theory. London: Constable.

Shaffer, D.R., & Kipp, K. (2013). Developmental psychology: Childhood and adolescence (9th). (pp.380–381). Wadsworth: Cengage Learning.

Shi, S.H. (1994). Establishment of the Chinese children's social development literature database (CCSD). Psychol Dev Edu, 4:64-67+26.

Sun, Y. (2017). Goals and implementation of picture book games curriculum. Stud Early Child Edu, 2:64-66.

Wang, Y.W., Wang, Z.H., & Liu, J.J. (2011). The development of self-conscious emotion understanding of primary school children and its relationship with prosocial behaviour and peer acceptance. Psychol Dev Edu, 1:65-70.

Xu, J.H., & Qu, J. (2001). Cultivation of self-consciousness of preschool children. Stud Early Child Edu, 4:63-65.

Yang, B.J. (2002). The effect of sports game on social character development of children and

adolescence. Chin Sports Sci Tech, 38(6):58-60.

Yang, L.Z., & Wu, W.J. (2001). Social development and education of preschool children. (pp.11–16). Dalian: Liaoning Normal University Press.

Yang, W.P., Lei, Y.L., Chen, K.C., & Hong, X.M. (2014). The experimental research of teaching by using social theme picture story books to promote the development of preschool children's prosocial behaviors. J Edu Stud, 10(6):87-94.

Yang, X.P., & Li, C.Y. (2009). Reflection on children's play from the perspective of cultural philosophy. Stud Early Child Edu, 10:17-22.

Yang, Y.F. (2014). Promote the social development of young children. Chin J Child Hlth Care, 22(3):225-227.

Yang, Y.J. (2015). Preparation of preschoolers emotional and social development level of assessment tools. Res Teach, 38(2):114-118.

Zhang, Z., & Zeng, B. (2016). Experimental study on picture books to the formation of children's sociality. J Shaanxi Xueqian Norm Univ, 32(1):83-86.

Zhou, X. (1990). Games and social development of children. Psychol Dev Edu, 4:246-251.

Zuo, Z.H., Xi, J.Z., & Shi, J. (2012). Ameliorating preschoolers' challenging behaviors through instructive picture books reading. Stud Early Child Edu, 6:29-35.

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