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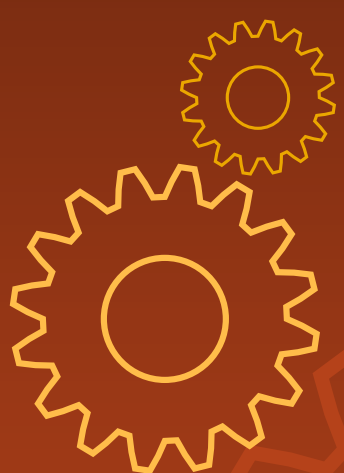
Best Evidence of Chinese Education



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Best Evidence of Chinese Education

EDITORS

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NEWSLETTER

Can Pupils of Primary Schools Benefit from the Study Time after Class?

By Chenchen Fang, Yongmei Hu, Pingping Zhang

A study published in *Journal of Educational Science of Hunan Normal University*, based on the data of evaluation of basic education from the National Collaboration and Innovation Center, analyzed the study time after class and its influence on pupils' achievements. The research team focused on four questions:

- Is the burden of internal homework heavier or the burden of external homework heavier?
- Do pupils benefit more from internal homework or external homework?
- What is the appropriate length of time for pupils to do internal homework every day?
- What is the appropriate length of time for pupils to attend external extracurricular tutoring every week?

Then the research team employs the descriptive statistical analysis and IV estimation approach to analyze the data, and comes to the following conclusion:

- On the whole, primary school pupils have a heavy study load, and the burden of internal homework is heavier than that of external homework. The external extracurricular tutoring on primary school pupils is longer than that of internal extracurricular tutoring.
- The homework has a significant negative effect on pupil achievements. The longer the pupils work, the lower the pupil achievements.
- The internal extracurricular tutoring has a significant negative impact on the academic performance of pupils, and the external extracurricular tutoring has a significant positive effect on pupil achievements.

At the same time, the author suggests that schools should assign proper amount of homework to students in strict accordance with the national regulations, and parents should not assign extra homework to children. Students' achievements could be greatest when external extracurricular tutoring time is controlled within 6-8 hours per week.

Source: J Edu Sci Hunan Norm Univ 2018; 17(01):69-77.

NEWSLETTER

Does Information Technology Promote Students' Academic Performance?

By Chao Fang, Bin Huang

FANG and Huang published a study on *Open Education Research*, exploring the performance of information technology on students' academic performance, based on China Education Panel Survey (CEPS) data (2013-2014) provided by National Survey Research Center of Renmin University of China. By studying the Mathematics, Chinese and English scores of nearly 20,000 students nationwide, with factors of family background, household registration, ethnic groups and other variables, the main conclusions are as follows:

- The academic performance of students in urban is better than that in rural areas, and the difference in English scores is more obvious, indicating the uneven distribution of educational resources. The urban education resources are superior in quantity and quality to those in rural areas.
- In terms of family background, parents' education level is positively correlated with the utilization rate of the Internet, while school-age children's perception of family poverty and family size are negatively correlated with the utilization rate of the Internet.
- Information technology has inhibited students' academic performance, which has an indirect impact on liberal arts by changing school-age children's reading patterns and habits, and a direct impact on science by crowding out effective learning time. Students' entertainment preference when using the Internet is the root of negative effects.
- The use of the Internet has a negative impact on the academic performance of school-age children from poor and non-poor families in urban and rural areas. Parental education level guidance, conditioning and regulation of Internet entertainment preferences, as well as school-age children's perception of academic pressure and family economic conditions are the root causes of the difference in the absolute value of the estimator of school-age children between urban and rural, poor and non-poor families.

The author puts forward three suggestions. First, parents need to cultivate children's entertainment preferences and rational cognition of information technology tools. Second, teachers need to stimulate students' enthusiasm for offline learning. Third, the government needs to further balance the construction of information system.

Source: Open Edu Res 2018; 24(6): 88-99.

NEWSLETTER

How to Use Feedback to Improve Children's Learning Performances?

By Yu-chen Zou, Ying Ding, Xu-ran Zhang, Yan-fang Li

A research research published in "Psychological Development and Education" analyzes the effects of different types of feedback (positive/negative feedback) and reinforcements (physical/social reinforcement) on children's learning performances and gender differences in these effects, in order to provide empirical evidence on how to use feedback to promote children's learning performances.

In this study, the subjects are from third grade of a primary school in Beijing. By the connected learning paradigm, they use two experiments to examine the effects of different types of feedback on children's learning performances, and these children range in age from 8 to 10. Experiment 1 examines the effects of positive and negative feedback on children's learning outcomes. Based on the conclusion of experiment 1, experiment 2 adds material and social reinforces on the basis of positive and negative feedback to explore the gender differences of learning performances in the monetary and social reinforcement conditionings. Results show:

- Positive and negative feedback have different effects on children's learning effects: negative feedback has a greater impact on children's learning effect than positive feedback.
- There are gender differences in the effects of material and social reinforces on children's feedback learning: the monetary reinforcement conditioning promotes boys' learning performances better，while the social reinforcement conditioning has a stronger influence on girls' learning performance.

Based on the research results, the researcher proposes that praise and encouragement should not be used blindly in the guidance for children's learning, and negative feedback can be used reasonably. At the same time, gender differences should be paid attention to, and different rein forcers should be used for boys and girls to achieve the best motivational effect.

Source: Psychol Develop Edu2018; 34(5):567-575.

NEWSLETTER

The Correlation of Expenditure on School Level and Students' Academic Performance: An Empirical Study Based on the Poor Rural Areas of Western China

By Lili Li, Hongyu Guan, Rozelle Scott

A study published in *Journal of East China Normal University* (Educational Science Edition), based on the data of the "Basic Survey of Primary Schools in Poor Rural Areas" conducted by the Institute of Educational Experimental Economics of Shanxi Normal University, explores the relationship between school-level expenditures and students' academic performance.

The project randomly surveys 1-2 classes in the fourth and fifth grades of 94 rural schools in 38 poverty-stricken counties in four provinces of northwest China, and finally selects a total of 6,497 students. The survey contents include school-level expenditures, basic information of schools, teachers, students and parents, and standardized math and Chinese tests for students. The author uses this survey data, and takes students' Chinese and mathematics scores as dependent variable and school expenditures as independent variables. At the same time, the author controls students' personal and family characteristics, as well as school and teacher characteristics, and studies the influence of school expenditures on students' academic performance. The study finds that:

- School expenditures on students and teachers account for only 12% of the total, while expenditures on school administration are higher at 72%.
- Expenditures on students and teachers are positively correlated with student's Chinese standardization (the regression coefficients: +1.34 and +0.83, respectively); however, expenditures on school (school administrative expenditures) are negatively correlated with students' Chinese standardization scores (the regression coefficient: -0.34). And expenditures in other areas had nothing to do with the Chinese standardization of students.
- Expenditures on students and other aspects of expenditures are positively correlated with student's mathematical standardization (the regression coefficients: +2 and +0.39, respectively); however, expenditures on school (school administrative expenditures) are negatively correlated with students' mathematical standardization scores

(the regression coefficient were -0.57); and expenditure on teachers have nothing to do with the students' mathematical standardization.

- School "software" expenditures (total expenditures for students and teachers) have a significant positive impact on students' Chinese and mathematics scores. (The regression coefficients: +1 and +0.91, respectively).
- School "hardware" expenditures (administrative expenditure) have a significant negative impact on students' Chinese and mathematics scores. (The regression coefficients: -0.34 and -0.57, respectively).

Therefore, the author suggests improving and optimizing the expenditure structure at the school level, and increasing its proportion on students and teachers. The target should be better aimed at in the process of carrying out poverty alleviation in education through financial input.

Source: J East China Norm Univ (Edu Sci Edition) 2018; 63(6):100-106, 158.

NEWSLETTER

Is Extension of Compulsory Education Beneficial to Basic Education?

By Chunxin Chen, Xiaoqing Gu

AN article published in *Journal of East China Normal University* (Educational Science), based on the test data of the International Student Assessment Program (PISA) in 2015, analyzes the distribution and characteristics of compulsory education duration in different countries from the international perspective. On the basis of the analysis, the study focuses on duration of compulsory education, the age of enrollment and the influence of economic development on students' achievements in science, mathematics and reading literacy by using the multilevel linear model.

The results show that:

- Extending compulsory education to 12 years has the greatest positive effect on students' science, mathematics and reading literacy scores. Duration of compulsory education is the key factor that causes the difference of students' accomplishments.
- In countries where compulsory education duration are 9 years, admission age at 6 had significant and positive effect on students' science, mathematics and reading literacy scores . Moreover, the achievements of urban students and girls are more affected by the age of admission.
- In countries with 9 years compulsory education, students' average budget expenditure is less than the international average. Among the countries whose expenditure per student is fewer than 50,000 dollars, higher spending on education is significantly associated with higher student achievement.

The author suggests that the government should establish a stable quality assurance system of compulsory education to ensure that the development of compulsory education better meets the needs of national and regional economic development; guarantee the school-age children enrollment in accordance with law. Taking into account the differences between urban and rural areas, the appropriate school-age in urban areas is 5-6 years old and 6-7 years old in rural areas, especially in remote economically backward areas; improves the financial input mechanism for compulsory education and acceler-

ates the balanced development of high-quality compulsory education in urban and rural areas.

Source: J East China Norm Univ (Edu Sci) 2018; 5(7).

NEWSLETTER

Do Preferential Enrollment Policies Guarantee the Admission Opportunities of Disadvantaged Students?

By Wen Wen, Zhi-xin Lian, Fang Yang

A research published in *Tsinghua Journal of Education* analyzes the effectiveness of preferential enrollment policies such as "National Special Project", "Ethnic Minorities Project" and "Institutional Project", in order to provide reference for improving the effect of policy implementation.

Based on the enrollment data and survey data of the Cohort of 2014 students in a university directly affiliated to the Ministry of Education, the paper conducted an empirical study on the "institutional logic" of the preferential admission policy to explore how the high-quality higher education resources represented by the admission opportunity can change the unequal structure of education through different policy interventions. Results show:

- The above three preferential enrollment policies are effective on the whole.
- There are differences in the effects of government-initiated and institutional preferential policies. Government-initiated policies are more effective in reducing the opportunity gap between groups, while institutional policies are more effective in selecting qualified candidates and allocating secondary education resources.

The study also points out that: At present, only 31% of the nation's universities adopt independent enrollment for special talents as the university does in this study. And the vast majority of universities, considering the policies, cost and other factors, give away autonomy to some extent, and admit the candidates provincially according to the entrance exam results. More empirical studies are needed to evaluate the effectiveness of different implementation modes of preferential enrollment policies.

Source: Tsinghua J Edu 2018; 39(2):111-119.

NEWSLETTER

What Influence Does School Climate Have On Left-behind Children's Emotional Intelligence?

By Shutao Wang

AN empirical study published in *Modern Education Management* analyzes the influence of school climate on emotional intelligence of left-behind children and non-left-behind children . In this study, a random sampling questionnaire is used to investigate the students of six rural primary and middle schools in a certain county of Jiangxi Province. The school climate is measured from five dimensions: teacher-student relationship, schoolmate relationship, development diversity, academic stress, and order and discipline. (The first three dimensions are supportive climate factors, and the latter two dimensions are controlled climate factors), and emotional intelligence is measured from four dimensions: emotional perception, emotional regulation, emotional understanding and emotional utilization. And the data are statistically analyzed by SPSS16.0 software.

The study found that:

- The supportive climate factors, such as schoolmate relationship, diversity of school development, and teacher-student relationship, have significant positive effects on the emotional intelligence of left-behind children, while the controlled climate factors, such as academic stress, order and discipline, have significant negative effects.
- Compared with left-behind children, teacher-student relationship has the most significant influence on the emotional intelligence of non-left-behind children. And the influence of school climate on the emotional intelligence of non-left-behind children is less than that of left-behind children.

Finally, the author puts forward the corresponding policy suggestions from the macro and micro level: The school climate of rural compulsory education should be improved nationwide. And the supportive school climate should be encouraged while the controlled school climate should be reduced.

Source: Modern Edu Management 2018; 4:100-105.

NEWSLETTER

Rational Use of Non-verbal Behaviors Can Improve Students' Classroom Engagement

By Xiuxiu Yang

A study published in *Educational Measurement and Evaluation* selects students from three grades of a junior high school as a sample. Questionnaire method is used to investigate the relationship between teachers' non-verbal behaviors and students' classroom engagement.

This study classifies teachers' non-verbal behaviors into six categories: facial expressions, eyes, body movements (sign language and body language), spatial position, paralanguage (intonation, tone, timbre, etc.), appearance and dress. Based on the three dimensions which include gender, grade, and study in class, this study investigates the influence of teachers' non-verbal behaviors acting on junior high school students' classroom involvement attitudes.

The results show that:

- The teachers' non-verbal behaviors have significant influence on students' attitudes towards classroom input.
- There is no significant difference between boys and girls in attitudes in terms of genders.
- Most students with lower academic performance tend to treat teachers' looking around negatively in terms of students' academic performance.
- Ninth graders are more willing to participate in class actively than seventh and eighth graders.

According to the research, if teachers want students to be active in class, they should smile or show rich facial expression in class, show encouragement and attention to students through eye contact, make full use of body language, walk around or give lectures in the middle of classroom, and use paralanguage appropriately. In short， the teachers' non-verbal behaviors have significant influence on students' attitudes towards classroom input. Rational use of non-verbal behaviors can improve student' classroom engagement.

Source: Edu Measurement Evaluat 2018; 9.

NEWSLETTER

Do Parental Educational Expectations Affect Children's Academic Burnout?

By Ruoxuan Li, Wenlong Zhu, Hongrui Liu, Meilin Yao

A study published in *Psychological Development and Education* explored the relationship between parental educational expectations and children's academic burnout, as well as the mediating role of parental involvement and moderating role of family functioning. 2,921 students and their parents were recruited from 10 primary and middle schools in Beijing, China.

Previous studies have focused on the impact of educational expectations on positive academic outcomes, while this study has explored the relationship between educational expectations and negative outcomes, such as academic burnout.

The research results show that:

- Parental educational expectations negatively predict children's academic burnout.
- The relationship between parental educational expectations and students' academic burnout was mediated by parental involvement. Specifically, high expectations enhanced the level of parental involvement, and it in turn decreased students' academic burnout.
- The influence of parental involvement on academic burnout is moderated by family functioning. Parental involvement only alleviates students' academic burnout when there is a good family functioning.

The author suggests that parents should not only set correct academic goals for their children and actively participate in their educational process, but also pay attention to the establishment of a warm and comfortable family atmosphere. For students with family dysfunction, it is necessary to promote their academic development through improving family atmosphere. Ignoring the importance of family to function to make blind investment will not benefit children's academic development. Parents should pay attention to homework guidance and school communication, and create a warm and healthy family atmosphere for their children.

Source: China Psychol Develop Edu 2018; 34(4):489-496.

NEWSLETTER

Teacher Effectiveness and Students' Learning Attitude: the Mediating Effect of Class Atmosphere

By Nian Yang, Xiefeng Lu

AN article published in *Education Science Journal of Hunan Normal University* explores the relationship between teacher effectiveness, class atmosphere and students' learning attitudes. In this study, 2,430 valid questionnaires were collected from four middle schools. Multi-layer analysis method, two-level analysis path and Sobel test were used to draw the following conclusions:

- Traditional analysis methods cannot consider the cross relationship between variables at the same level and variables analysis at different levels. The promotion and application of covariance structure model and hierarchical linear model can effectively solve the above two problems.
- Class atmosphere plays a complete mediating role between teacher effectiveness and students' learning attitude, that is, teacher effectiveness has no direct influence on students' learning attitude, and the influence relationship between them is achieved through the mediating role of class atmosphere.

The author suggests that if teachers can advocate a kind of learning atmosphere of fairness, openness, harmony and friendship, solidarity and mutual aid in the class, it is bound to effectively promote students' academic progress.

Source: Edu Sci J Hunan Norm Univ 2018; 17(2):55-59, 91.

NEWSLETTER

What is the Influence of Father's Emotional Expressivity on Infant's Social-Emotional Competence?

By Xueying Li

A study published in *Preschool Education Research* adopts questionnaires to investigate the unique effect of fathers' emotional expressivity on children's social-emotional competence, and further explore the regulating effect of infant's temperament. Three hundred and fifteen families with infants aged 12-36 months participated in the study.

From the perspective of father's emotional socialization, this study shows that father's emotional expressivity has different effects on the social-emotional competence of infants with different temperament. The results show that the combination of father's positive emotional expressivity and infant's positive temperament can better develop the infant's positive social-emotional competence, while father's negative emotional expressivity combined with children's negative temperament will hinder the development of infants' social-emotional competence.

In addition, the author suggests that fathers should be encouraged to express more positive emotions in children rearing, and family members should work together to promote the development of children's social-emotional competence.

Source: Preschool Edu Res 2018; 4:28-39.

NEWSLETTER

Do Teachers Have More Influence on Students' Academic Achievement in Geometry Than That in Algebra?

By Lidong Wang, Yiming Cao, Zhu Guo

A study published in *Teacher Education Research* explores the impact of mathematics teachers on students' academic achievement. The data used in this study are selected from the MIST-CHINA international cooperation project database of the School of Mathematical Sciences, Beijing Normal University. The samples are from teachers and students in three major cities of China. SPSS and HLM software were used to process the data and validate the model.

- Teachers have more influence on students' academic achievement in geometry than that in algebra.
- Teachers have a significant impact on students' academic achievement at the three basic cognitive levels of knowing, understanding and mastery.
- The highest cognitive demand level of mathematical tasks used by teachers in classroom teaching plays an important role and explains the structure of teachers' influence.
- Teaching age, educational background and gender have no significant direct impact on academic achievement, but the above variables may have indirect impact on academic achievement.

The author proposes that mathematics learning in different fields may be affected differently by teacher quality, and the relative programmed algebraic learning is less affected by teacher quality. Mathematics tasks with high cognitive demands affect students' mathematics learning at all cognitive levels, and high quality teachers can help students achieve higher academic achievements in learning tasks at all cognitive levels.

Source: Teacher Edu Res 2018; 30(1):87-94.

NEWSLETTER

Does Housing Condition Have an Impact on Student Academic Performance?

By Jianhong Huang

A study from *Sociological Review* reports the relationship between housing poverty and student achievements, and whether this relationship is regulated by the neighborhood environment.

The study selects data from 2014 China Family Panel Studies (CFPS), with students' language and math scores as the dependent variables, student learning cognition, parental caring, family counseling, and health status as the independent variables. Results show:

- Housing poverty affects children's physical and mental health and thus influences children's academic performance, which mainly shows that poor living environment will reduce children's immunity and increase cold, cough and other respiratory diseases, which are not conducive to children's attendance at school.
- The factors of individual learning cognition, parental caring, family counseling, and basic education resources are not affected by housing poverty.
- Housing poverty does not have a substantial impact on children's academic performance in poor communities, but has a significant negative impact in wealthy communities.

The author interprets the negative effects in wealthy communities as abnormal psychological implications and pressure of more living costs, and suggests that housing assistance should focus more on improving adequate living space.

Source: Sociol Rev 2018; 6(6):57-70.

NEWSLETTER

Parental Involvement and Children's Academic Development under the Framework of Key Competences – Comparative Study Based on Urban-rural and Regional Migration

By Wenyan Liang, Ran Sun, Xiaomei Ye

A study published in *China Economics of Education Review*, adopting the data of China Education Panel Survey (CEPS) , makes a comprehensive definition of children's academic development under the framework of key competences, divides children into four groups according to urban-rural household registration and regional migrant status, exams and compares the effect of parental involvement (direct learning involvement、emotional involvement and cultural involvement) on children's academic development in each group as well.

The research finds that:

- Parents' direct learning involvement has very limited improvement effect on children's academic development, and even shows a negative effect on a number of academic development indicators of rural household registered children. The study believes that the long-standing urban-rural differences in China have resulted in low education level and poor self-learning strategies of rural household registered parents, who lack professionalism and effectiveness in guiding and supervising children's learning, and become frustrated in the contact with teachers because of social class obstruction.
- Parents' emotional involvement can promote all-round academic development of four groups. In addition, this effectiveness will not change as the urban- rural household registration and regional migrant status are different. The study believes that through more exchanges about learning, school and teachers between parents and children, parents' attention to learning can be felt by their children, the asymmetry of information between parents and children during learning can be reduced, and the overall development of children can be promoted.

- Parents' cultural involvement has positive effect on children's academic development, which only exists in local non-agricultural registered children, while it has significant negative impact on the learning willpower and curiosity of non-agricultural outsiders. This may be due to the differences in cultural systems, and it is often difficult for migrant parents and children to choose the right urban cultural resources.

The findings of this study provide some inspirations for guiding parents to participate in children's education. First, schools can't extend the responsibility of direct intervention in learning, such as guidance and counseling, to parents. The principle of teacher-led should be adhered. Second, schools should encourage parents to communicate more with their children at home about learning and school matters. This kind of emotional participation can effectively strengthen children's positive emotions or reduce negative emotions, and help children achieve comprehensive academic development. Third, considering the regional differences in cultural systems, schools should use modern media such as Internet platforms to provide more appropriate information on recreational activities for migrant children and agricultural registered parents.

Source: Chin Econ Edu Rev 2018; 3(3):40-60.

NEWSLETTER

How Family Status Influences the Knowledge Literacy of Students

By Wenhong Zhang, Wei Han

A study published in *Journal of Jiangsu Administration Institute*. Based on statistical analysis of data collected from the Program for International Student Assessment in 2015 (from 4 provinces or municipalities in China)，explores the pathway and mechanism of family background affecting students' knowledge literacy. The study uses three methods: descriptive statistics, Bootstrap mediation effects analysis and Hierarchical Linear Model (HLM). Results are as follows:

Family socioeconomic status has a significant direct positive effect on students' knowledge literacy. According to Bourdieu's habitus theory, families with specific socioeconomic status have a set of thinking mode, cognitive structure and behavior pattern. This habitus system, which corresponds to its social and economic status, is itself a wealth of knowledge.

The emotional support of parents, the quality of selected schools, purchased market services and the attitudes and habits of learning are all important pathways to influence knowledge literacy.

Among these intermediary paths, school teaching quality is still the most important influence path. Under the same conditions of other variables, choosing the school with higher average family socioeconomic status can greatly improve students' knowledge literacy.

On the pathway and mechanism of the influence of family background on students' knowledge literacy, the education stage plays a significant regulatory role. In the stage of compulsory education, the family background can play a more important role, but in the stage of senior high school, its effect has declined, and the extracurricular tutoring path is no longer significant.

According to analysis in the research, the choice of school environment is inseparable from family socioeconomic status. And the gathering of children from families with similar socioeconomic status in turn further affects their academic achievement, thereby exacerbating the class division of education and education inequality. Therefore, in order to improve students' knowledge literacy, in addition to parents' attention and concern for their children, and schools' efforts to improve the knowledge level of teachers,

strengthen management, and form a good learning atmosphere, relevant education departments must also make every effort to promote the balanced distribution of various educational resources in different regions and different schools.

Source: J Jiangsu Admin Coll 2018.

NEWSLETTER

Does Only Child Economic Behavior Differ from That of Non-only Child? Evidences from Lab and Field experiments

By Haoran He, Hui Xu

A study published in *Journal of Beijing Normal University* (Social Science) explores the differences in economic behavior between only children and non-only children. 510 only and non-only children among ordinary university students and unconventional working adults in Guizhou and Beijing were recruited from 2009 to 2012 in this study. And three independent experiments were designed to compare the possible differences between the two groups on the individual independent decisions such as risk preference and time preference, and strategically interactions with other players in terms of pro-social cooperative behavior and anti-social behavior such as encroachment and revenge.

The results show that no significant differences have been detected between only children and non-only children in terms of risk preference, time preference, pro-social cooperative behavior, and anti-social behavior such as encroachment and revenge. And the results are robust in multivariate tests with control for other possible influential factors.

The author also indicates that since the subjects in this study are all adults, the results can only reflect that there is no difference in economic preference and behavior of the adult only and non-only-children. However, the possibility of behavioral difference between the two groups in childhood cannot be ruled out.

Finally, the author believes that this study provides new evidence for whether there are differences between only and non-only children in relevant economic behaviors, and hopes to provide references for improving the potential discrimination of only children in the labor market and the reform of relevant population policies.

Source: J Beijing Norm Univ (Social Science) 2019; 1:51-65.

NEWSLETTER

Impoverished Students' Ways of Overcoming Difficulties – the Influencing Factors and Enlightenment of Resilient Students in Hong Kong

By Qianming Liu, Sujun Huang

A study published in *Education Research Monthly*, based on the data of Hong Kong 2015 PISA, made an empirical analysis by taking Hong Kong resilient students in PISA international definition as the independent Variables . The study focused on the different effects of resilience in learning variables on resilient students and non-resilient students, and further explored how educators can help students from disadvantaged social-economic backgrounds achieve academic success in science subjects.

The main conclusions of the empirical study are summarized as follows:

- Grade differences significantly affect whether or not students from disadvantaged social-economic backgrounds become resilient students. According to the study, for students from disadvantaged social-economic backgrounds, the higher the grade is, the more likely they are to accumulate higher scientific literacy ability in primary and secondary education. On the other hand, academic underdevelopment due to academic failure or other reasons has a negative impact on students. And so it is to students from disadvantaged social-economic backgrounds.
- Achievement motivation has a significant positive impact on the disadvantaged students becoming resilient students. From the perspective of self-regulation theory, students construct self-motivation beliefs (including self-efficacy, outcome expectations, etc.) before they begin to learn, which has a positive impact on the outcome of learning.
- Scientific topic interest and scientific learning enjoyment have a significant positive impact on the disadvantaged students becoming resilient students. Students who have a broad interest in scientific topics and a high sense of learning enjoyment in science subjects are more likely to become resilient students.

The author suggests that educators should pay attention to the study of students with weak socioeconomic status, improve their achievement motiva-

tion, enhance their self-confidence and pay attention to students' interest in scientific learning, and help them form a high sense of learning enjoyment to achieve higher academic achievement.

Source: Edu Res Monthly 2018; 11:80-86.

NEWSLETTER

Can Parents' Negative Emotions Lead to Adolescents' Problematic Behavior?

By Yuan Peng, Lei Zhu, Zhenhong Wang

AN article published in *Psychological Development and Education* explores the relationship between parental emotional expression and adolescent problematic behavior.

The study collected data from 11 classes of a regular junior high school and a regular high school in Xi'an. Seven hundred thirty three students completed the questionnaires. And valid tests were 688 (including 348 girls and 340 boys). The research team distributed 4 questionnaires to the students, including Parental Emotional Expression Questionnaire, Intimate Relationship Experience scale, Loneliness Scale, and Juvenile Self-Assessment Scale, to explain the relationship between negative emotions of parents and behavior of adolescents from the two paths of parent-child attachment and loneliness. Adolescent Self-Assessment Scale is used to measure the behavioral tendency of adolescents, which is divided into adolescent internalization problem and externalization problem. Internalization behavior refers to some unpleasant or negative emotional emotions experienced by young people, including depression, anxiety, and withdrawal, etc. The externalization problem refers to behavior that violates moral and social behavioral norms, including attacks and violations.

Research reveals that:

- In the parental behavior of negative emotions, the emotional expression of parents has a significant indirect effect on the internalization problems and has a significant direct and indirect effect on externalization problems. That is, the expression of negative emotions of parents can directly affect their children's attacks and violations to others. It can also influence internal attachment work model of adolescents, and then forming emotional problems pointing to themselves.
- In the positive emotions of parents' behavior, the emotional expression of parents has significant direct and indirect effects on internalization and externalization. That is, the emotional expression of parents can reduce the painful experiences of adolescents and reduce their hostility to external environment.

- In terms of gender variables, there is no significant difference in the relationship between parental emotional expression and adolescent problem behavior.

The author suggests that parents should adopt a warm, positive and supportive emotional expression to establish a stable attachment relationship with their children, which will reduce possibilities of loneliness and problematic behavior and promote the better social adaptation and individual development of the youth.

Source: Psychol Develop Edu 2018; 34(4): 504-512.

ARTICLE

Family Income and Its Relation to Preschool Education in China: Empirical Research Based on CFPS Survey Data

Pengcheng Wang & Xin Gong

Central China Normal University, Wuhan 430079, China

Abstract. Based on the data from the China Family Panel Survey, this study uses the logit model to estimate the household income effect on the chance of children's preschool attendance and their choice of preschools. The results showed that a 100% increase in household income per capital is associated with an increase of 2.6% in the probability of a child's preschool attending. Following the classification of preschools with different characteristics, we found that household income has a large impact on children's public preschool attending. The age of children, household registration status, and the family size show statistically significant effect on the preschool attendance and a significant difference exist between urban and rural areas on this issue. Compared with those living in urban areas, rural children are more significantly influenced by family income in respect of the preschool education chance.

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***Keywords**: Family income; Preschool attendance; The choice of preschools*

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

Research Background and Problem

IN recent years, preschool education, as the starting point and foundation of education, has achieved remarkable progress in China. By the end of 2016, the gross enrollment rate of preschool education had reached 77.4%, about 20% higher than 2010. In spite of this, there is still a significant imbalance between regional and urban-rural in the development of preschool education (Liu & Gao, 2013; Hong & Luo, 2012). First, government spending in preschool education has shown a central concave pattern, whereby the middle region spends the least compared to the eastern and western regions, the family cost sharing is comparatively higher in the central region, and the cost sharing structure is quite different among provinces. Secondly, there are disparities between urban and rural areas in terms of school buildings, material and teachers, and the gaps between urban and rural areas are greater than the regional differences (Wan, 2011). Moreover, opportunities for preschool education are unevenly distributed among different classes. Because the cost of preschool education is mainly shared by public finance and the families, and it has not been identified as compulsory education, the contradiction between low family income and high education cost may lead low-income families only being able to choose private kindergartens of an ordinary quality or even choosing not to send their children to kindergartens (Song & Liu, 2013).

Many reasons have been explored to explain the unequal distribution of preschool educational opportunities. Due to the disintegration of the planned economy in China, the supply system of preschool education units adapted to the planned economy in the early stage gradually collapsed, whereas the public finance system of preschool education was not improved simultaneously (Cui et al., 2011). Since the reform of the education system in the mid-1980s, a new system is gradually taken shape in China under the Centralized Political System and actively mobilizes social forces to participate in running schools. One of the obvious changes is to encourage social forces to be involved in partial educational services. For a long time, due to the unclear nature of educational investment shared by the government, society and family, the ambiguous responsibility of the government and the imperfect budget system of preschool education, governmental financial investments in preschool education have been relatively lower (Xia et. al., 2014). At present, the financial responsibility of preschool education in China is mainly undertaken by the district, county, township, and village. The limited financial investment in China has sharply decreased in the number of public kindergartens (Bai et. al., 2012). Consequently, households need to invest more capital to compete for scarce public resources. At the same time, the market sector has gradually become an important supplier of preschool education services, which has made preschool education services become a

purchasable product. The non-compulsory characteristic of preschool education requires families to pay for a large portion of the cost of preschool education.

Although the difficulties of entering the kindergarten have been alleviated in recent years, the expensive payment for admission is still a serious problem. Using the cumulative CPI growth index and taking inflation into account, preschool tuition fees increased 55.62 times between 1996 and 2013. Recent data showed that preschool tuition fees have reached 100,000 CNY for a year in some cities, such as Beijing, Tianjin, Nanjing, and kindergartens, with a monthly fee of more than 5,000 CNY being common in these cities. Moreover, according to a survey in some rural areas in 2011, 40.3% of parents argue that preschool education costs are too high. As a result, low-income families cannot afford to send their children to enter these high-fee kindergartens, better quality and strict admission conditions. In conclusion, high tuition fees and low family income have built obstacles for many low-income children to receive preschool education.

Gaps between income and tuition fees will not only decrease the possibility of preschool education, but also exacerbate educational inequality. One of the important functions of foundation education is to fulfill equalization, that is, to help disadvantaged people achieve upward mobility through education. In order to explore the relationship between family income and choice of preschool education based on CFPS data, this study attempts to answer the following questions: (1) does family income affect the access to preschool education opportunities? (2) Does family income affect children's access to different types of kindergartens?

The rest of this study is structured as follows. The second part is the literature review, while the third part presents data, variables and analysis methods. The fourth part summarizes empirical results, and the fifth part includes the conclusion, implications and research limitations.

Literature Review

Foreign researchers have conducted extensive studies on this issue. Chiswick and DebBurman found that increasing household income can increase the likelihood of entering kindergartens for school-age children after controlling for other factors (Chiswick & DebBurman, 2004), while Davis and Connely examined that children with better family background are more likely to enter high quality public kindergartens (Connelly, 2005). According to the U.S. Census Bureau, 67% of children who receive early childhood education come from a family with an annual household income of more than $150,000, while only 35% of children earning less than $10,000 will have access to preschool education through governmental financial aid (Bennett, 2008). Fuller et al. also explained why wealthier families send their children to kindergarten earlier (Fuller, Holloway & Liang, 1996).

By comparing the data from different countries, the results indicate that the relationship between family income and preschool educational opportunities may show some pattern. Bassok et al. (2011) established that the relationship between household income and formal preschool education shows a "U" line, namely that children from middle-income families may have less opportunities for preschool education because families below the poverty line will receive federal government subsidies (Bassok, Fitzpatrick, & Loeb, 2011). In many European countries, by contrast, there is no direct correlation between the enrolment of school-age children and household income. Most European countries, with the exception of Ireland and the Netherlands, provide all children aged 3-6 with at least two years of free education, which is recognized as the legal right of children from the age of three, while Belgium and France provide free preschool education from an earlier age. According to the OECD family database in 2005, 100% of the children aged 3-6 attend school in Italy and France (Bai et al., 2012). However, the relationship between family in-come and children enrollment opportunity is linearly dependent in most developing countries. For example, Foguel and Veloso concluded that the average enrollment rate for children aged 4-6 in Brazil is 73%, and the correlation between family background and enrollment rate reached 90% (Foguel & Veloso, 2014).

In China, research has mainly concentrated in partial provinces or groups of children. Based on mixed panel data from nine provinces included in the China health and nutrition survey (CHNS), Gong et al.'s study found that the chance of preschool enrollment of rural children is increased by 7.8% and that of urban children by 7.6% for a 100% increase in household income (Gong, Xu, & Han, 2015). A study about Chinese migrant children found that those who have agricultural household registration (in Chinese pronunciation "Hukou (户口)") status and cross-province migration are less likely to enter preschools, while those children with household educational savings have a higher chance of preschool education (Xing & Hu, 2015). The family will face the decision of which kindergarten to choose when they have already chosen preschool education. Studies focusing on family income and kindergarten type have found a significant correlation. A survey from Nanjing province revealed that children with high-income families and parents working for governmental institutions are more likely to enter public kindergartens. Liu et al. studied 3456 children in Shenzhen, concluding that children from high-income families have the attendance opportunities of 1.82 times of that for children from middle and low-level families (Liu et. al., 2016). Empirical studies of preschool education choices have shown that public kindergartens tend to be more accessible to children from highly educated families.

Although the literature has not formed a unified evaluation standard for different kindergartens, some scholars still carried out research on kindergarten evaluation. Liu et al. (2008), comparing the differences of 26 kindergartens in Shanxi, found that

public kindergartens have more obvious advantages than non-governmental kindergartens and village kindergartens, due to the financial educational funds from the state, teachers' salaries, and kindergarten management (Liu et al., 2008). For non-governmental kindergartens, there is a positive correlation between the quality of kindergarten and entry fee, because the running cost is all shared by the market. According to the discussion above, families should pay for the cost of preschool education whether in government kindergartens or non-government kindergartens. The question is thus: what is the relationship between household income and preschool choice?

To summarize, foreign studies analyzing the relationship between family income and preschool education opportunities have revealed the relationship in detail, while the studies from China are usually constricted to partial regions, provinces, and cities. Furthermore, most of the conclusions mainly come from simple statistical description, and there is scant empirical research. Based on a national sample, this study aims to utilize the logit model to conduct an empirical estimation on the relationship between preschool attendance and household income.

Data

Data in this study are from the micro survey of China Family Panel Studies (CFPS) conducted by the China Social Science Research Center at Peking University. The CFPS sample covers 25 provinces, municipalities and autonomous regions, with a target sample size of 16,000 households[1]. The CFPS database conducted a baseline survey in 2010 and tracked all baseline family members, their offspring and adopted children as CFPS genetic members in 2012, 2014 and 2016. The questionnaires are divided into four types: community questionnaire, family questionnaire, adult questionnaire and children questionnaire, among which the children questionnaire is divided into two: parents answered for those under 10 and self-answered for those aged 10-15. Since the areas cover about 95% of total population, CFPS can be regarded as a nationally representative sample.

The sample used in this study is the tracking data of 2012 and 2014.[2] This study selected children aged 3-6 years in the CFPS2012 as the main research object, and the main variables came from the children's questionnaire and its corresponding family questionnaire. By matching the CFPS2012 children's questionnaire with its corresponding family questionnaire, 1,195 children were successfully matched. In order to analyze and compare across different years, we successfully matched 1,015 children by using CFPS2014 data.

Variables

Dependent variable: preschool attendance and types. According to the children's questionnaire, "Is the child currently attending school/kindergarten/nursery? The research objects can be divided into two categories, namely entering the kindergarten and not entering the kindergarten.

Independent variable: household income. The measurement indicator in this study is per capita annual incomes reported by parents in the family questionnaire. In order to avoid the influence of extremum, this study truncated the extreme value of 5% of income. Finally, the natural logarithm of income was added into the regression model.

Controlling variable: family background variables and demographic variables. Previous studies have shown that the influence of family background on educational attainment can be realized by the choice of educational resources, and families with superior capital can make choices in favor of children's educational attainment depending on their superior resources (Fang, 2011). According to Bourdieu's family capital theory, we will control for other family background factors besides household income in order to observe the independent effect of family income on preschool education admission. Therefore, other influential variables controlled in this study basically include parents' education level, occupational category, political identity, frequency of family purchasing cultural products, number of families, and whether the mother lives at home. Parents' education level is mainly coded by current education system, mainly reflecting the household cultural capital. At the same time, cultural capital can also be "expressed in the form of enduring mental and physical dispositions" (Liu et al., 2016); we will treat "whether children often go out to play with their parents" and "do your family often buy books for children?" from the children questionnaire as measurable indicators of family cultural capital. We believe that the frequency of parent-children interaction can reflect parental education philosophy to some extent, and the low-income family's spending on parenting time and educational materials are limited (Brown, 2006). The occupational category of parents is converted according to the standard occupation code of China. In the labor market, parents' income is related to their occupation to some extent. Political identity is mainly divided into party members and non-party members.

Demographic variables mainly include gender, age, and household registration status. In addition, considering that the regional gaps in economy may have an impact on the access to preschool education, this study also adds the provinces of the research objects as dummy variables to control for provincial differences. **Table 1** presents the descriptive statistics of main variables.

Table 1. Descriptive Statistics for Analysis Variables.

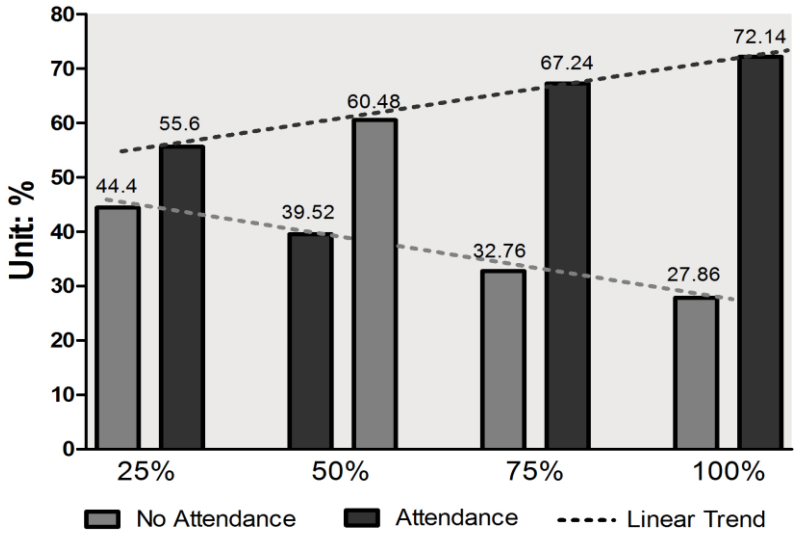
Classification	Variable	Subsample	Mean	SD
The Dependent Variable	Preschool Attendance	Yes =1, No =0	0.644	0.478
Individual Variables	Per Capita Household Income	The Logarithm	8.593	1.280
	Gender	Women =1, Men =0	0.459	0.498
	Age	Age of Units:	3.968	0.821
	Household Registration Status	Non-agricultural =1, Others=0	0.226	0.418
	Mother Doesn't Live at Home	Yes =1, No =0	0.826	0.378
	The Eastern Region	Yes =1, No =0	0.345	0.475
	The Central Region	Yes =1, No =0	0.342	0.476
	The Western Region	Yes =1, No =0	0.309	0.462
	The Number of Households	Units: Number	5.305	1.743
Cultural Background	Father's Years of Schooling	Years	4.136	4.361
	Mother's Years of Schooling	Years	1.789	3.332
	Times of Family Trips for a Month $\geq$ 2	Yes =1, No =0	0.503	0.500
	Times of Buying Books for a Month $\geq$ 2	Yes =1, No =0	0.791	0.406
Social Background	Occupational Classification of Fathers	Class Level 9 and Above =1, Others = 0	9.282	3.360
Political Background	Is Father a Member of the Party?	Yes =1, No =0	0.121	0.326

Note： Parents' years of education are coded according to the Chinese current school system, specifically as follows: primary school =6, junior high school =9, senior high school/technical secondary school =12, junior college =15, undergraduate =16, master =19, doctor =22; In the regression analysis, the number of years of education was used as a continuous variable. 2. The occupational classification of fathers in this study was converted according to the Gold Thorpe scale (EGP).

Model and Method

Preliminary statistical analysis revealed that the per capita household income is divided into four levels from low to high, with 25% as a unit. The overall picture of household income and preschool opportunities is shown in **Figure 1**. Compared with the stable increase of household income, the percentage of preschool attendance increases gradually; meanwhile, the proportion of children not entering the kindergarten gradually decreases.

Figure 1. Income Level and Attendance.



We conducted a *t*-test on the per capita income and preschool opportunities (**Table 2**), and found that the income level of the families with different choices was significantly different at the statistical level of 1%. Specifically, the average per capita income of the families who chose to enter the kindergarten was 1,0543.2 CNY, while the average per capita income of the families who did not enter the kindergarten was 7,903.21 CNY. The average difference between the two groups was nearly 2,000 CNY.

Table 2. Family Income Gap of Different Choices (unit: CNY).

Variable	Group	M	T Value
Preschool Attendance	Yes	10543.2	-4.403***
	No	7903.21	
Preschool Type	Public Kindergarten	11661.7	-3.188***
	Private Kindergarten	9485.95	

Note. *** stands for significant at the 1% statistical level.

By comparison between the two groups of public and private kindergarten, the results reveal that the average per capita income is still significantly different at the statistical level of 1%. This confirms that there are some correlations between household income and preschool choice. In addition, we want to know more about the extent to which family income influences the access to preschool education. Furthermore, we seek to confirm if there are other factors that also play a role in family educational choices. Therefore, we propose to test the above hypothesis through further empirical analysis.

Since the dependent variable y is a binary variable, the multivariate logit model is adopted for analysis. The model is set as follows:

$$y^* = \beta_o + \beta_1 \text{income} + \sum_{i=2}^{k} \beta_i x_i + u$$

Where y* is the potential variable, which represents the tendency of children to enter kindergarten, and it is the continuous variable. Income is the per capita income of a family. x_i presents other factors affecting children's tendency to enrollment including gender, age, household registration status, and family size. u is a random distributed variable, subjecting to logistic distribution. The relationship between y and y*, the binary variable of whether children are enrolled in kindergarten, is as follows:

$$y = \begin{cases} 1, & y* \geq c \\ 0, & y* < c \end{cases}$$

Where c presents a certain critical value, P(y=1) = P (y* ≥ c) is the probability of entering the kindergarten, and P(y=0) = P (y* ≤ c) is the probability of not entering the kindergarten. The logit expression of the probability ratio of entering the kindergarten or not entering the kindergarten is as follows:

$$\ln \frac{P(y = 1|X)}{P(y = 0|X)} = \beta_o + \beta_1 \text{income} + \sum_{i=2}^{k} \beta_i x_i$$

The coefficients can be obtained by using the maximum likelihood estimation method. We used the CFPS2012 database to measure the impact of per capita household income on children's enrollment. From the perspective of consumer demand theory, the utility of commodities not only comes from the inherent quality of commodities, but also depends on the consumption of other consumers and the price of commodities (Liu et al., 2008). When controlling for other family background factors, household income is the foundation of family buying education services, especially for the kindergarten fees varying in the competitive market, and preschool education

service price directly affects the ability to buy and the category of education services required, so the estimated coefficient of the core explanatory variable is expected to be positive.

There are three choices that can be explained in terms of types of kindergarten entry (public kindergarten, high-fee private kindergarten, and low-fee private kindergarten), and multiple logit models are required (Mlogit). The private low-fee kindergarten is taken as the reference group. Suppose the probability of entering a public kindergarten, private high-fee kindergarten, and private low-fee kindergarten is Pp= P(y=public|X), Ph=P(y=high|X) and Pl=P(y=low|X), then the logit expression of their probability ratio is:

$$\ln\frac{P(y=\text{public}|X)}{P(y=\text{low}|X)}=\beta_{op}+\beta_{1p}\text{income}+\sum_{i=2}^{k}\beta_{ip}x_i$$

$$\ln\frac{P(y=\text{high}|X)}{P(y=\text{low}|X)}=\beta_{oh}+\beta_{1h}\text{income}+\sum_{i=2}^{k}\beta_{ih}x_i$$

Similarly, two sets of coefficients in the above model can be obtained by using the maximum likelihood estimation method.

Results

The Relationship between Household Income and Kindergarten Opportunities

Stepwise regression was used to analyze the sensitivity of the model. As shown in **Table 3**, model (1) is the benchmark model, demographic variables and regional stratification are added in model (2), and model (3) and model (4) control the cultural background and social political background of the family respectively.

It is estimated from model (1) that the influence of family income on children's preschool education opportunity presents statistical significance with a positive coefficient when no variables are controlled for. By examining the marginal impact of family income, the results indicate that a 100% increase in family income will increase the chance of children entering kindergarten by 4.8%.

At the same time, after controlling for individual variables and regional dummy variables, the marginal impact of children entering the kindergarten will increase by 3.2% for every 100% increase in family income. After controlling for family cultural background, social background and political background successively in model (3) to model (4), the influence of household income on children's admission to kindergar-

Table 3. Regression Results of Family Income and Enrollment Opportunity.

Variable		**(1)**	**(2)**	**(3)**	**(4)**
Key Explanatory Variable	Household Income	0.214***	0.207***	0.167**	0.174**
		(0.049)	(0.062)	(0.067)	(0.075)
	Marginal Effect	0.048***	0.032***	0.025**	0.026**
Other Individual Variables	Women		0.131	0.103	-0.030
			(0.161)	(0.172)	(0.190)
	Age		1.562***	1.583***	1.670***
			(0.114)	(0.121)	(0.133)
	Non-agricultural Household Registration Status		0.718***	0.565**	0.572**
			(0.226)	(0.251)	(0.286)
	Household Number		-0.119***	-0.160***	-0.151***
			(0.046)	(0.049)	(0.052)
	Mother Doesn't Live at Home		0.292	0.298	0.498*
			(0.219)	(0.225)	(0.259)
Region	Ease		1.070***	1.048***	1.134***
			(0.201)	(0.211)	(0.232)
	Middle		1.497***	1.645***	1.835***
			(0.207)	(0.224)	(0.251)
Cultural Background	Father's Years of Schooling			-0.020	-0.026
				(0.023)	(0.027)
	Mother's Years of Schooling			0.020	0.027
				(0.031)	(0.037)
	Communication Frequency			0.079	0.091
				(0.066)	(0.072)
	Buying Books			0.235**	0.121
				(0.099)	(0.110)
Social Background	Father's Occupational Class				0.019
					(0.032)
Political Background	Father Is a Party Member				0.359
					(0.278)
Constant Term		-1.264***	-7.823***	-7.885***	-8.584**
		(0.427)	(0.848)	(0.913)	(1.135)
N		1069	999	910	779
Pseudo R^2		0.013	0.267	0.282	0.301

Note. The brackets are robust standard errors, as shown in the following table; *, **, and *** are respectively significant at the statistical level of 10%, 5%, and 1%, as shown in the following table.

ten continued to be significant, and the marginal influence value remained continuous at about 2.6%.

It can be seen from model (2) that children's age has a significant influence on children's admission to kindergarten, and the coefficient is significantly positive. This may reflect that family is more likely to send their children to kindergarten when children are readier to be adapted to the kindergarten environment. The gender difference does not show a significant difference in the opportunity to enter the kindergartens, which is inconsistent with the results of some previous studies, which show that boys are more likely to enter the kindergarten (Gong et al., 2015; Hannum, Werum, Fuller, & Baker, 2003). It can be inferred from this that, with the development of society, people may gradually abandon the traditional "son preference" in the concept of education. Family size has a significantly negative impact on children's enrollment, indicating that the larger the number of families, the greater the expenditure pressure that the family income has to bear. Only when the survival needs of the whole family are met can the family consider its educational needs. Fuller and Liang (1996) also showed that the family size was negatively correlated with the availability of county kindergarten centers in the county and district in the United States. Regional factors also show significant differences in the opportunity for children to enter the kindergarten. Compared with the western region, the enrollment rate of children in the eastern and central regions is higher, which is basically consistent with the regional imbalance in the development of preschool education.

When model (3) controlled for parents' education background, it was found that parents' years of education had no statistically significant influence on children's chances of entering the kindergarten. The frequency of families purchasing books for their children has a significant impact on their access to preschool education, indicating that the higher the investment of families in cultural products for their children, the more likely they are to send their children to kindergartens. In model (4) and model (5), we added the family social background and political background respectively and concluded that the occupational background of their father had no significant influence on preschool attendance, but the coefficient was positive. Family political capital has no significant influence on children's preschool education, which is similar to Ye's preliminary conclusion (Ye, 2012), but he then examined the influence of grandparents' political resources and found that the capital advantage of intergenerational effect was significant. However, due to the limit of relevant indicators, it was impossible to further test the capital advantage of grandparents.

Finally, we considered the robustness check through filling the missing value, and found that the results have no changes, still presenting statistical significance at the 1% level and the standard errors are reduced. This shows that the relationship between household income and preschool opportunity is stable and significant.

Differential Relationships between Household Income and Kindergarten Opportunities

In order to further estimate the influence of different family income starting points on the enrollment opportunity, we selected 25%, 50%, and 75% as the starting points of four different levels of family income. The results are shown in **Table 4**.

It is evident from **Table 4** that there are significant differences in the marginal effects of income for families with different income levels. The marginal effect of household income at the 50% percentile presents statistical significance, while the marginal effect on the remaining percentiles is not significant. The regression coefficient of each income locus was positive, and the basic conclusion was consistent with the logit regression results, indicating that the results were robust. From the perspective of marginal effect value, the overall change shows a trend of increasing first and then decreasing. The maximum marginal effect appears at the income sub-point of 50%, which shows that if the income is doubled, the children's opportunities of entering the kindergarten will increase by 8.3%. For the sample in this study, this means that the per capita household income increases from 3,000 CNY to 6,000 CNY, and the child enrollment rate increases by 8.3%. Once the median income level is exceeded, the marginal impact of household income gradually decreases with the increase of income level. **Figure 2** visually depicts the change of marginal contribution of family income to the opportunity to enter the kindergarten. As is evident from the changing trend in **Figure 2**, the marginal impact of per capita household income on the preschool opportunity basically presents an inverted u-shaped changing trend, which goes up first and then goes down.

Disparity in Kindergarten Opportunities between Rural and Urban Children

Since the reform and opening up, the increasing disparities in household income may result in the inequality of educational opportunities between urban and rural areas. Under the background of the dual economic structure in urban and rural areas, there are significant differences between urban and rural families in terms of income, wealth, parents' education level, and other aspects (Sun & Yan, 2015). In order to further examine the effect of family income on children's school opportunities by region, we also conducted a sample regression for children with different household registration status. The results are shown in **Table 5**.

Controlling for other factors, children's preschool education in urban areas is not significantly influenced by household income, but the coefficient value is still positive. For rural families, household income has statistical significance for children's chances of enrolling in kindergartens, which illustrates that every 100% increase in family income will increase the chance of children's enrolling in schools by 3%. The results indicate that the influence of family income level on the opportunity

Table 4. Estimation Results Based on Different Income Quartiles.

Family income point	P25	P50	P75
Preschool Attendance	0.047	0.558***	0.283
	(0.258)	(0.277)	(0.276)
Marginal Effect	0.007	0.083***	0.042
Other Control Variables	yes	Yes	yes
Note. N=779, Pseudo R2= 0.032.			

Figure 2. The Marginal Effect of Family Income Quartile on Preschool Attendance.

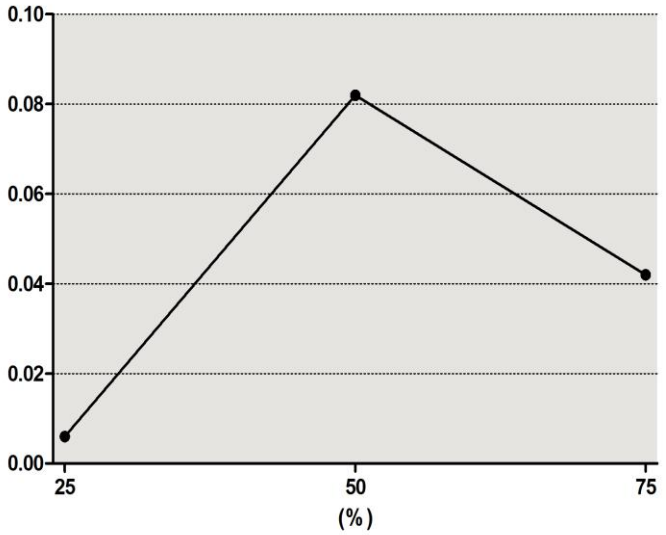


Table 5. Sample Regression in Urban and Rural Areas.

Household Income	Whole Samples	Urban Sample	Rural Samples
Preschool Attendance	0.174**	0.089	0.196**
	(0.075)	(0.243)	(0.085)
Marginal Effect	0.026**	0.010	0.030**
Control for Other Variables	Yes	Yes	Yes
N	1195	271	924
The Pseudo R^2	0.301	0.268	0.032

Table 6. Mlogit Regression Results of Family Income and Kindergarten Choice.

Reference Group (Private Low Fee Kindergarten)	Public Kindergarten	Private High Fee Kindergarten
Household Income	0.227**	0.691
	(0.101)	(0.486)
Marginal Effect	0.041**	0.010
Other Control Variables	yes	yes
N	227	230
The Pseudo R^2	0.126	0.126

Note. Only key independent variables are reported here, and the control variables here are consistent with the benchmark model.

of children with different household registration is different. Compared with children in urban areas, the opportunities of rural children are more susceptible to the influence of family income. Because the expenditure of preschool education accounts for a small proportion in the high level of urban consumption expenditure, family income has little influence on the opportunity of preschool education. For rural families, the education investment is a burden almost entirely on the family, low family income and high education cost being the main obstacles for their children to receive preschool education. The household income also affects the opportunities of university education of rural and urban children. One study found that the effect of household income on university education opportunities is more significant for children in rural areas than that of students in urban areas, which is similar to the above estimated results (Xu & Zong, 2016).

The Relationship between Household Income and Kindergarten Types

According to the children's questionnaire item, "what kind of kindergarten/preschool does the child attend?", the children are divided into two categories: public kindergarten and private kindergarten. At the same time, according to the item "what is the fee for the latest month of kindergarten/preschool?", children entering private kindergartens are further divided into two categories: high fee and low fee[3]. Specific results are shown in **Table 6**.

All the selected children were taken as samples to be examined and analyzed by taking private low-fee kindergartens as the reference group. The results indicate that the attendance to public kindergarten was significantly affected by the household

income at the statistical level of 5%. Every 100% increase in family income increases the probability of children's access to public kindergartens by 4.3%. Compared with entering private low fee kindergartens, the access to private high fee kindergartens does not significantly correlate with household income, even the marginal effect value is positive. It is evident from the regression results that the families with higher family income prefer public kindergartens to private kindergartens.

Comparison of Results by Follow-Up Rounds

Considering the comparability of the results, we used CFPS2014 data to conduct an empirical test on the children's admission to the kindergarten in that year by the reference of CFPS2012, and analyzed the relevant differences between the regression results in 2012 and 2014, so as to investigate the development trend of admission in different years. The comparison results indicate that: first, the significant influence of household income on preschool education still exists at the statistical level of 10%. Specifically, every 100% increase in family income will increase children's chances of enrolling in kindergartens by 2.2%.

Second, compared with the entry into private low-fee kindergartens, the marginal effect of family income on children's choice to enter public kindergarten is no longer significant, but the coefficient is positive.

Third, compared with the results in 2012, the influence of family income on the preschool opportunity in 2014 was significantly decreased at the statistical level, which was reflected in the significant reduction of the marginal influence of income. At the same time, household income has no significant influence on the kindergarten type. To some extent, this conclusion highlights the remarkable achievements of the First Phase of the Three-Year Action Plan for Preschool Education (2011-2013). Since 2011, the Three-Year Action Plan for Preschool Education has been put into effect. Preschool education investments have increased rapidly nationwide. From the perspective of the average investment in preschool education, the total investment increased from 921.02 CNY in 2009 to 4,513.98 CNY in 2013, an increase of 3.90 times. The steady growth of per pupil expenditure provides an important guarantee for the educational improvement, and also drives the enthusiasm of local governments to invest in preschool education. By the beginning of 2012, the number of public kindergartens and private kindergartens in Gansu province had increased to 1,280 and 1,445 respectively, which was significantly higher than that of 2010, and the number of private kindergartens was slightly higher than that of public kindergartens (Shen & Li, 2013). By the end of 2013, the number of kindergartens runs by enterprises and institutions in Heilongjiang province increased by 1,177 compared with 2010, with a growth rate of 35.27%.

In conclusion, in terms of both the quantity and quality of preschool education resources, the public has a wider selection of kindergartens. Furthermore, under the trend of the rapid development of inclusive kindergartens, the influence of family income on children's access to preschool education has been gradually weakened.

Conclusions and Implications

Equal preschool education is the starting point of educational equity, and access to preschool education at this stage has a positive impact on individuals, families, and even the society. There has been research confirming that family economic background has a significant positive effect on educational attainment, but there are few similar studies in the field of early childhood education. Aiming to estimate the influence of family income on preschool education opportunity, we utilized the CFPS database to investigate the influence of family income on children's enrollment opportunity and choice, based on the Logit Model and Multinomial Logit Model. The specific conclusions are as follows:

(i) Family income has a significant impact on preschool education en-rollment. Every 100% increase in household income increases a child's chances of entering preschool education by 2.6% according to 2012 CFPS data. Based on the above results, we tested the heterogeneity of children's choice in kindergartens, and found that: compared with entering private kindergartens with low fees, family income can significantly increase the opportunities for entering public kindergarten, while it has no effect on entering private kindergartens. The CFPS2014 database showed a similar marginal effect (2.2%).

(ii) Compared with the central and eastern regions, the enrollment rate of children in the western regions is significantly lower. At the same time, family size significantly affects children's preschool opportunities; that is, the larger the number of families, the lower the children's kindergarten attendance opportunities.

(iii) The findings indicate that the preschool opportunities of rural children are significantly affected by their household income which has no impact for urban children comparably. It is evident that the family income is an important factor for rural children to consider whether they can receive preschool education. If the family cannot afford the full amount of preschool education funds, children may not have the opportunity to enter kindergartens.

The conclusions of this study provide the following implications:

(1) Children in low-income families can achieve a better performance than children from middle class families through preschool education, which

has a larger marginal effect (Bai and Xiong, 2012). In order to better reflect the public welfare of preschool education and ensure the fairness and efficiency of the preschool education market, many countries directly or indirectly distribute financial funds to the families of young children. The Australian government stopped providing subsidies to preschool education institutions and began to provide subsidies to parents of young children. Denmark, the Netherlands, France, and other countries have also adopted the mode of co-supply of education service providers and demanders to reduce family expenditures on preschool education.

At the same time, compared with urban families, rural families' income has a greater impact on children's preschool chances. Due to the differences in educational development between urban and rural areas, the rational allocation of educational resources and improvement of resource utilization efficiency will be the focus of early childhood education development in the future. From the experience of field research on rural kindergartens, it is evident that the facilities of kindergartens in rural areas have been gradually supplemented and improved, and the infrastructure construction of township central kindergartens has been heavily invested in. However, the weak teaching staff, extremely limited financial aid, and the lack of effective supervision still limit the improvement of rural preschool education. The principal problem faced by the development of rural kindergartens is that it is difficult to purchase high quality services, even if the same amount of money is spent.

(2) According to the empirical analysis results, an increase of family income will increase the preschool education possibility, which means that children from low-income families, especially those from rural low-income families, are more likely to enter private kindergartens. Therefore, the administrative department should actively guide and supervise the development level and quality of private kindergartens, so that quality and quantity go hand in hand. Local government needs to build systematic indicators for educational investment and supervision based on the supply capacity and output quality of private kindergartens.

Although this study makes an objective estimation of family income and preschool education opportunities with national samples, it still possesses the following limitations: first, whether it is reasonable or not to divide kindergartens into public kindergartens, private high fee kindergartens, and private low fee kindergartens may still need discussion. Furthermore, there are no comprehensive databases to estimate the relationship of household income and preschool quality. If the relationship between family income and children's selection needs to be understood more accurately,

then information collection and the evaluation of kindergarten quality should be strengthened. Second, due to limited data, in addition to controlling for family background factors, this study fails to further control the individual development differences of school-age children, which may affect whether they can receive preschool education.

Notes

1 *Excluding Xinjiang Uygur Autonomous region, Tibet Autonomous region, Qinghai province, Inner Mongolia Autonomous region, Ningxia Hui Autonomous region, Hainan province, and Hong Kong, Macao and Taiwan regions.*
2 *The CFPS2010 data were not used in this study because it lacked key indicators of the kindergarten category for children aged 3-6 years, such as whether they attended public or private kindergartens.*
3 *According to the latest monthly fee of the institute, the monthly fee is higher than 1200 CNY.*

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ARTICLE

Family Capitals and Education Acquisitions: Analysis on the Mediating Effect of Shadow Education

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Abstract. The purpose of this study is to explore whether family capitals and shadow education affect students' education acquisitions. The study constructs the social reproduction theory mode of family capitals influence on children's education acquisitions. Using 2014 Chinese education tracking data, this study examined shadow education's mediation effects on the process of family capitals affecting on education acquisitions for middle school students. Family capitals and shadow education jointly affect the education acquisitions of students, in which, shadow education plays an intermediary role between family capitals and education acquisitions for students. In sum, shadow education is increasingly becoming a supplement to school education and may become a new intermediary for family capitals influence on students' education acquisitions. The study adds to the limited literature in this particular field concerning the mediating effects of shadow education on family capitals and education acquisitions.

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Research Background and Problem

FAMILY socioeconomic background influence on education acquisitions is a major field of study, in China. When it comes to social equity research, many scholars in the country have examined the effects of family social, cultural, economic and political capital has on academic education opportunity acquisitions of children. It turns out that most students with higher family capitals have more chances to attain better academic education opportunities. Nowadays, there are plenty of Chinese compulsory education students participating in extracurricular tutoring, called "shadow education". Shadow education and school education complement each other and jointly influence students' education acquisitions. To date, the vast majority of empirical research on supplementary tutoring has only investigated the effects of family capitals/shadow education on academic education opportunity acquisitions. Also, empirical research combining school and shadow education outcomes concerning family capital and its related effects on student academic performance and higher-level education acquisitions is rare. Even fewer studies have explored the mediating effects of shadow education on students' education acquisitions under the affects of family capitals. This paper will establish a theoretical model using joint social reproduction to investigate how family capitals influence the mechanisms of students' education acquisitions through shadow education. At the same time, an examination of the mediating effects of shadow education on students' education acquisitions performed using family capitals will be conducted. From the perspective of shadow education, this paper plans to expand the research about family capitals and its effects on student education acquisitions. The results from this study will provide governments and education policy-makers another scientific theoretical reference for developing educational social equity initiatives.

This paper is divided into five parts: first, a review of relevant empirical studies; second, an introduction to data sources and variables to be used in the study; third, an explanation of the constructs and theoretical model for family capitals on education acquisitions; fourth, an introduction to the structural equation modeling (SEM) method to be used; and, fifth, a summary of results, discussion, and implications of this study.

Review of Existing Research

Connotations and Classification of Family Capitals

The concept of family capital was derived from the larger theories on social capital.

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Social capital in the modern era was first proposed in the late 1970s originating from the fields of social relations and social networks. French sociologist, Pierre Bourdieu, was one of the first researchers that devoted to systematically study the concept of social capital. In his view, "family" is the "cell" and basic unit of society. A family capital was seen as a means to providing various useful resources for educational activities for individual students.

Coleman (1988), an American scholar, divided family capitals into material, human and social capitals. Material capital refers to the material resources that can promote the development of production. Human capital applies to the knowledge level and ability that people possess to change the society. Lastly, social capital is a social resource structure that exists in the interpersonal network and can be used as an asset to help individuals achieve their goals. Social capital is believed to be found inside and outside of the family construct. More specifically, it is present in parent-child relationships, parents' concerns, expectations, supports, investments and participation in education of their children. Outside the family, concerns the interpersonal relationships within the community where the family is located.

According to Li Chunling (2003), family background mainly deals with the family's economic capital (family's income level), cultural (father's education level), social (father's position level) and political capitals (family's composition). Jiang Guohe and Yan Guangfen (2006) believed that family capitals mainly include family economic, cultural and social capitals. Liu Zhimin and Gao Yao (2011) understood family capitals as family socio-economic background, which included family economic, social, cultural and political capitals.

Influence of Family Capitals on School Education Acquisition

Coleman's (1988) work indicated that family social capital assists students to achieve higher education achievement. Teacherman (1987)'s study showed that social capital of American families measured by parents' occupation had an important influence on children's education prospects and academic performance in high school. Wong (1998) found that family social capital had a significant positive impact on children's academic achievement in his research from the Czech Republic. James (2000), using Australian survey data from 1991 to 1997, indicated that children from families with low social capital usually attended lower level colleges and universities.

In the 60 years from the 1940s to the 1990s, family social capital measured using the occupational status of fathers was viewed as an important impact on the student's education acquisition (Li, 2003). This theory began to change, in the 1980s, when research began revealing that the higher the occupational levels of fathers resulted in the higher their children's academic performance. Li Yu (2006) found that from 1966 to 2003, family social capital measuring fathers' occupational status had different degrees of influence on the probability of their children going to high schools and colleges. During China's Great Cultural Revolution (1966-1976), family social capital had little influence on the probability of children attending school. In

the earlier years of educational reform (1977-1991), the family's social capital on the probability of children attending school began playing as a factor. In later years (1992-2003), the influence of family social capital rose steadily, to the point, which it performed as a significant indicator for university entrance. For instance, Liu and Gao (2011) study, using survey data of 14 university students from Jiangsu province, learned that the relationship between family capitals and higher education acquisition was a significant factor.

Family Cultural Capital on School Education Acquisition

Bourdieu (1989) indicated that children with higher cultural capital, in French families, received more and higher quality education. As well, Teacherman (1987) found that American parents with education degrees had a significant influence on their children's education and academic achievements in high school. Based on TIMSS data from Hong, South Korea, Japan, Singapore, and Thailand, Woessmann (2003) saw results indicating similar significant positive impact on students' performance. However, two studies, concluded otherwise, Robinson and Garnier (1985) and Katsillis and Rubinson (1990) found cultural capital to have little or no impact on student academic achievement.

Family Economic Capital on School Education Acquisition

American parents' incomes play an important factor on their children's education opportunities and academic performance in high school (Carneiro & Heckman, 2002; Teacherman, 1987). Wong (1998), in a study done in the Czech Republic, found similar results indicating that family economic capital had a significant positive impact on students education achievement.

Li (2003) discovered that from the 1940-1970, family economic capital had a weak impact on individual education acquisition; but, had a significant impact on some special groups (such as rural and female populations). In the years, 1970-1990, the relationship between the two concepts would have a greater impact on all populations. An urban family survey indicated if the family's economic capital was at the top-tier in social class, the education level of their children was generally higher Guo & Min, 2006). Finally, Liu & Gao (2011) found that family economic income was a significant predictor of acquisition; but, had no significant impact on the quality of education acquisition.

Family Political Capital on School Education Acquisition

Bian, Wu and Li (2008), believed that political capital refers to the identity, power and resources provided by political parties and regimes, as well, as the deterrent and influence derived there from. Li (2003) uncovered that during the 1940s up until the 1990s, the influence of family political capital on personal education acquisition was divided with the first 30 years showing a positive relationship between concepts;

whereas, in the following 20 years, the influence of family political capital on children's education acquisition was just the opposite. Beginning in the 1990s, family political capital had no significant influence on individual education acquisition. Family political capital mainly played a role in the opportunity distribution of middle and higher education. Liu & Gao (2011), observed that, if the father's political status was a member of the Communist Party of China, had a significant negative impact on the quantity of higher education acquisition of his children. Meanwhile, the father's national administrative level had also an insignificant impact on the quantity of higher education acquisition of his children. Moreover, the father's political status and national administrative level had a significant positive impact on the quality of his children's acceptance to higher education institutions.

Family Capitals on Shadow Education Acquisition

Research by Smyth (2009) on Irish families saw that with more social capital a family could afford more shadow education acquisition resulting in higher quality education for their children. Hong & Zhao (2014) found that parental occupation hierarchy had a significant positive impact on whether urban compulsory education students participated in shadow education or not. Similar results were discovered in Zhou & Zou (2016) review using PISA 2012 data that analyzed the influence of family social capital in China and the United States and how children's shadow education opportunity acquisition was impacted. Using a multi-layer linear model, results indicated that Chinese parents ranked at the highest occupational status index had significant positive opportunities for their children to getting supplementary tutoring in mathematics, reading and science; meanwhile, American parents in the highest occupational status index, would have no significant impact on their children receiving similar supplementary tutoring.

Family Cultural Capital on Shadow Education Acquisition

Tansel and Bircan-Bodur (2008) indicated that parents' education levels have a significant positive impact on supplementary tutoring expenditure for Turkish primary and secondary school students. A Chinese survey pointed out that the degree of education affects the head of a household significantly and on whether urban students participated in supplementary tutoring (Xue & Ding, 2009). Parents' education degrees and expectations had significant positive impacts on whether Chinese primary and secondary school students participated in supplementary tutoring and compulsory education (Chu, 2009; Hong & Zhao, 2014; Mark Bray et al., 2014; Xue, 2015). However, other studies found differing results, education degrees and education expectations on the part of parents had no significant influence on whether students participated in shadow education (Buchmann et al., 2010; Zeng et al., 2010).

Family Economic Capital on Shadow Education Acquisition

Stevenson and Baker (1992) conducted a pioneering research on shadow education and discovered that family economic capital had a significant impact on whether Japanese high school students participated in supplementary tutoring, which eventually led to a more likely chance of attending university for these particular students. Other studies discovered parallel findings, such as, family income significantly impacting supplementary tutoring (Bircan, 2008; Buchmann et al., 2010; Tansel and Bircan, 2008; Xue & Ding, 2009). On the other hand, a survey completed in Gansu, Hunan, and Jiangsu provinces, Zeng et al. (2010) found that the monthly income of fathers has no significant impact on whether junior high school students chose supplementary tutoring. Xue's (2015) study, also done in China, found similar results showing that net household income per capita of a family had no significant influence on whether students participated in supplementary tutoring.

Influence of Shadow Education on School Education Acquisition

Family capitals directly influence the students' school and shadow education acquisitions and, at the same time, students' shadow education acquisitions influence their school education acquisitions. Since students' shadow education will be helpful for them to improve their academic performance, also will position them favorably for higher education success.

Studies on the influence of shadow education acquisition on school education acquisition have basically centered on the influence of shadow education acquisition on students' academic performance at school. Due to the influence of individual, family, school, and other factors on students' academic performance, in order to control the endogenous problems, some scholars, in China, and abroad have adopted advanced statistical methods to estimate the influence of supplementary tutoring on students' academic performance. These studies, so far, have presented mixed results.

Sunderman (2006) attempted to estimate the influence of supplementary tutoring on Indonesian fourth-graders by using the instrumental variable method and found that the influence was not significant. As well, Dang (2007), made use of the instrumental variable method and using such data as the hourly after-class tuition fees paid by parents predicted the positive impact on student learning. ZHAO (2015), making use of the instrumental variable method, also, found that after-school tutoring expenditures, though small, showed an impact on the math performance. Yet, studies from Guill and Bonsen (2010), using a multilayer linear model to observe the influence of supplementary tutoring on grade 5 and 6 students, in Hamburg, Germany, saw no significance in student learning. Zhang (2013) and Hu et al. (2015) studies had similar findings.

Summary of Existing Research

Scholars have paid extensive attention to the influence of family capitals on education opportunity acquisition in schools and most of the relevant research concludes

that family capitals is an important influence on student learning. With the rise of shadow education, the influence of family capitals on shadow education acquisition has only begun to attract the attention of scholars, in recent years. Related studies tended to focus on the influence of family cultural capital and economic capital on the opportunity acquisition of shadow education, and rarely discussed the influence of family social capital and political capital. At present, in the compulsory educational system now present in China, shadow and school education complement each other.

The vast majority of existing studies focused mainly on the family capitals impact on school education acquisition or shadow education acquisition. Few studies combined school education and shadow education to investigate the influence of family capitals on the students' academic performance and higher-level education acquisition. As well, few studies investigated the mediating effects of shadow education on the influence of family capitals, students' performance, and the acquisitions of higher-level education.

Data Source and Variable Description

The data used in this study came from the 2014 China Education Panel Survey (CEPS) conducted by the China Survey and Data Center of Renmin University of China. The variables used in the statistical analysis are described in **Table 1**. The variables of extracurricular tutoring in the dataset refer to the education activities of academic course supplements. The sample number of junior high school students in this data set was 19,487.

According to the literature research results from above, this study, divides family capitals into four capital categories: social, cultural, economic and political. Family social capital measurements come from Li Chunling's research on occupational stratification, which divides the occupation of students' parents into upper, middle and lower levels. The parent with the higher occupational stratification was used to measure the index of student's social capital outside the family. The higher the occupational stratification of the parent, the more social capital outside the family the student attained. [1]Cultural capital is measured by the number of books in the family, outside of the parent's highest education and textbooks and magazines. Economic capital is measured by family financial status, which can be divided into three levels: difficult, medium and rich. Political capital is measured by parents' political status, which can be divided into three categories[2]: party members, democratic parties and the masses.

From previous literature, education acquisitions of students mainly referred to the level and quality of education acquired by students. Generally, the difference of education acquisitions of students can be measured from two dimensions. One is the level of education received by students or the number of years receiving education, which represents the difference of education acquired by students. Second, to measure the education obtained by students is the difference in education quality under the

same education level or years, usually measured by students' grades or school quality. Although the quantity and quality of education are both important measures of education acquisition, in studies of family capitals and student's education acquisitions, affected by data availability, the researchers always paid much more attention to the number than to the quality of education acquisition. Most studies were not involved in aspects of the difference of quality education, which may be because the quality of education information data is difficult to collect. Different from existing studies, this paper will mainly focus on the influence of family capitals on quality of students' education acquisitions, which is measured by students' academic performance at school. The variables involved in the article are described in **Table 1** below.

Theoretical Construction Model of the Influence of Family Capitals on Education Acquisition

According to existing literature studies, family capitals has an important impact on acquisitions of school education and shadow education; but few studies combine them to investigate the impact of family capitals on education acquisitions of children. It will underestimate the influence of family capitals on children's education acquisitions if they are investigated separately, and the mechanisms by which family capitals affect children's education acquisitions will also not be fully revealed. In order to fully and accurately evaluate the influence of family capitals on children's education acquisitions, this study, combined school education and shadow education to construct a theoretical model of the influence of family capitals on children's education acquisitions. Based on Li's (2006) study on the mechanisms of education inequality and Liu & Gao's (2011) study on the mechanisms of family capitals influences on acquisition of higher education quantity and quality, this study, constructs the theoretical model of family capitals impact on acquisition of education (see **Figure 1**). Firstly, family capitals can directly influence children's academic achievement at school. Secondly, family capitals can also influence their children's academic performance at school by influencing the child's access to education opportunities (for example, go to a better school) (see corresponding solid arrows in **Figure 1**). Thirdly, family capitals can also influence their children's academic performance at school by influencing their shadow education opportunity advantage (see corresponding dotted arrows in **Figure 1**). Finally, advantage opportunity in children's school education acquisitions will also affect their advantage opportunity acquisitions in shadow education (see corresponding part of the dotted line arrow in the **Figure 1**).

The mechanism faction that family capitals affects is their children's education acquisitions that are essentially a mechanism of resource exclusion, meaning that the advantage class families use their family capital advantage to reduce competition for entrance, or to exclude some competitors from the competition so to increase opportunities of accessing high-quality school education and shadow education. This kind of exclusion is embodied in four types: economic resource, privileged resource, implicit resource, and cultural resource. Economic resource exclusion, which is the

most common form in modern society, mainly refers to the rich class's exchange of family economic capital for high-quality education resources. Privileged resource exclusion refers to the fact that in the design of education system, special positions are always reserved for some privileged classes. The setting of high-quality education resources often favors some privileged classes. Implicit exclusion of resources means that when making decisions on admission to higher education and shadow education, vulnerable class families have to withdraw from competition for shadow and better school education opportunities due to their poor abilities to bear the risk of low evaluation on the expected return of education. Lastly, the exclusion of cultural resources indicates that families with parents, who have low educational backgrounds and poor cultural resources, do not attach great importance to their children's education, so therefore they may withdraw from the competition for shadow and better school education opportunities.

Based on the theoretical model of family capitals influencing education, in order to test the mediating effect of shadow education on family capitals and education acquisition, the following research hypotheses are as follows:

Hypothesis 1: Family capitals have a significant positive impact on education acquisitions of junior high school students.

Hypothesis 2: Whether participation in shadow education has a significant positive impact on education acquisitions of junior high school students.

Hypothesis 3: Shadow education plays an intermediary role in the process of family capitals influence on students' education acquisitions, that is, family capitals influences students' education acquisitions by influencing their shadow education participation opportunities.

Analysis of the Mediating Effect of Shadow Education

Based on the theoretical model and research hypothesis established, this study will use structural equation models to analyze influences of family capitals to students' education acquisitions and test mediating effects of family capitals to students' education acquisitions through shadow education.

Intermediary Model of Family Cultural Capital on Students' Education Acquisitions

Using the theoretical model and Wen et al.'s research to verify the methods and procedures for mediating effects, this study constructs an intermediary model for family cultural capitals impact on students' education acquisitions (the normalized regression path coefficient results of the model are shown in **Figure 2**). Results indicated that the path coefficients passed the significance level test except for the path coefficient of shadow education participation affects to students' performance. According to the joint significance test, the mediating effect of family cultural capital to students' achievements is not significance; shadow education does not play an intermediary role between family cultural capitals and students' performance.

Table 1. Description of Variables in Statistical Analysis.

Variable Type	Variable Name		Variable Description
Shadow Education	Whether to participate in extracurricular tutoring		0=No,1=Yes
Education Acquisition	Student achievement		The total score of standardized scores of students in the mid-term examination of foreign languages and numerals in 2013
Family Capitals	Social capital	Parents have the highest career stratification	1= lower, 2= middle, 3= upper
	Cultural capital	Highest degree of parents	1= illiteracy, 2= primary school, 3= junior high school, 4= high school, 5= junior college, 6= university undergraduate, 7= graduate student and above
		Books, magazines outside the family library	1=little, 2= less, 3= average, 4= more, 5= a lot
		Parents' expectations of their children's education level	1= don't read now, 2= junior high school graduation, 3= high school, 4= junior college, 5= Big Ben, 6= graduate student, 7= doctor
	Economic capital	Family financial status	1= difficult, 2= medium, 3= rich
	Political capital	Political status of parents	1= communist party member 2= Democratic Party 3= masses
Individual Factors	Gender		0 = female, 1 = male
	Grade		0= seventh grade, 1= ninth grade

Table 2. Fitting Results of the Intermediary Model of Family Cultural Capital Influencing Students' Education Acquisitions.

Fitting Index	CMIN	DF	CMIN/DF	RMSEA	NFI	RFI	IFI	TLI	CFI
Numerical	358.10	12	29.84	0.038	0.967	0.922	0.968	0.925	0.968
Judgment Standard			<5.0	<0.10	>0.90	>0.80	>0.90	>0.80	>0.90

Table 3. Results of the Intermediary Model – Family Social Capital Influencing Students' Education Acquisitions.

Fitting Index	CMIN	DF	CMIN/DF	RMSEA	NFI	RFI	IFI	TLI	CFI
Numerical	140.01	5	28.00	0.034	0.957	0.919	0.959	0.875	0.959
Judgment Standard			<5.0	<0.10	>0.90	>0.80	>0.90	>0.80	>0.90

Table 4. Results of the Intermediary Model – Family Economic Capital Influencing Students' Education Acquisitions.

Fitting Index	CMIN	DF	CMIN/DF	RMSEA	NFI	RFI	IFI	TLI	CFI
Numerical	59.38	5	11.87	0.02	0.970	0.910	0.972	0.917	0.972
Judgment Standard			<5.0	<0.10	>0.90	>0.80	>0.90	>0.80	>0.90

Table 5. Results of the Intermediary Model – Family Political Capital Influencing Students' Education Acquisitions.

Fitting Index	CMIN	DF	CMIN/DF	RMSEA	NFI	RFI	IFI	TLI	CFI
Numerical	59.47	5	11.89	0.02	0.964	0.892	0.967	0.900	0.967
Judgment Standard			<5.0	<0.10	>0.90	>0.80	>0.90	>0.80	>0.90

Table 6. Results of the Intermediary Model – Family Capitals Influencing Students' Education Acquisitions.

Fitting Index	CMIN	DF	CMIN/DF	RMSEA	NFI	RFI	IFI	TLI	CFI
Numerical	1136.66	2	35.52	0.042	0.950	0.914	0.951	0.916	0.951
Judgment Standard			<5.0	<0.10	>0.90	>0.80	>0.90	>0.80	>0.90

The results show that the model is recursive, with a sample size of 19487 (the results of model fitting are shown in **Table 2**). It can be seen from the table that all other fitting indexes reach a good level except for CMIN/DF=29.84>5, this indicates that the model can fit well with the actual observation data and the established model for family cultural capital influencing education acquisition. In all, the theoretical hypothesis model is stable. The likeliest reason why CMIN/DF>5 rejects theoretical model 1 is the large number of valid samples (N=19,487). When the sample size is very large, all the models that fit well with the data will be rejected, so whether to use the model cannot be decided through a chi-square test. Fitting index cannot be the main basis for comparing models, instead, the rationality of the relationships between variables described in models and the appropriateness of parameters' estimation should be considered (for example, the correlation coefficient cannot be greater than 1, and the error variance cannot be a negative number). The relationship between variables described in this model is reasonable and the parameters' estimation is appropriate. Therefore, this study decided to use this model to test the mediating effect of family cultural capitals on students' education through shadow education.

Intermediary Model of Family Social Capital Influence on Students' Education Acquisitions

For family capitals influence on education acquisition, this study, constructed the intermediary model that family social capital influences education acquisitions of students. All the path coefficients in the model past the significance level test (the results of standardized regression path coefficient of the model are shown in **Figure 3**). According to the joint significance test, family social capital has a significant mediating effect on students' performance and shadow education plays a partial mediating role between family social capital and students' performance.

The results display a model that is recursive at a sample size of 19,487 (**Table 3**). Except for CMIN/DF = 28.00 > 5, all other fitting indexes reached a good fit level indicating that the model can be well fitted with the actual observation data. The relationships between variables described in this model were reasonable and the parameters' estimation as appropriate. So, this study decided to use the model to test the mediating effect of families' social capital on students' education through shadow education.

Intermediary Model of Family Economic Capital Influence on Students' Education Acquisitions

This study measured family capitals influence on education acquisition. The intermediary model shows family economic capital influences education acquisitions of students (the results of standardized regression path coefficient of the model are shown in **Figure 4**). All path coefficients in the model past the significance level test except family economic capital influence students' performance. The joint significance test revealed that family economic capital had a significant mediating effect on students' performance and shadow education played a complete mediating role between family economic capital and students' performance.

The results of the model analysis suggest that the model is recursive with a sample size of 19,487 (the results of model fitting are shown in **Table 4**). All, except CMIN/DF = 11.87 > 5, reached a good fit level indicating that the model can be well fitted with the actual observation data. The relationships between variables described in this model were reasonable and the parameters' estimation as appropriate. The model was used to test the mediating effect of families' economic capital on students' education through shadow education.

Intermediary Model of Family Political Capitals Influence on Students' Education Acquisitions

This study constructed the intermediary model to test family political capital influence on education acquisitions of students. The results of standardized regression of path coefficients show that all the path coefficients in the model have past the significance level test (are shown in **Figure 5**). Family political capital had a significant

Figure 1. Theoretical Model of Family Capitals Influencing Education.

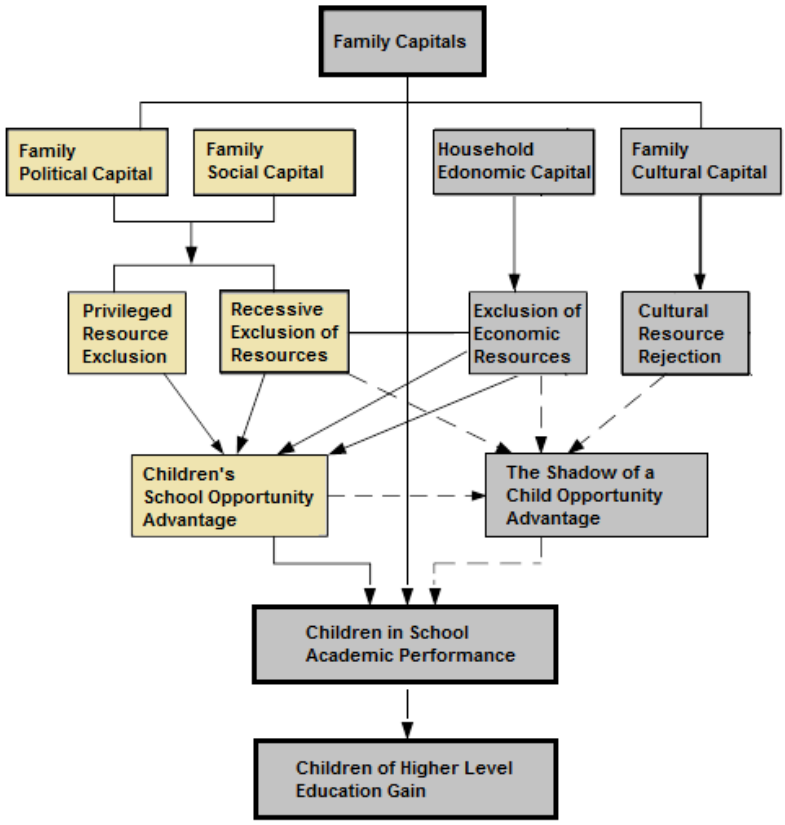
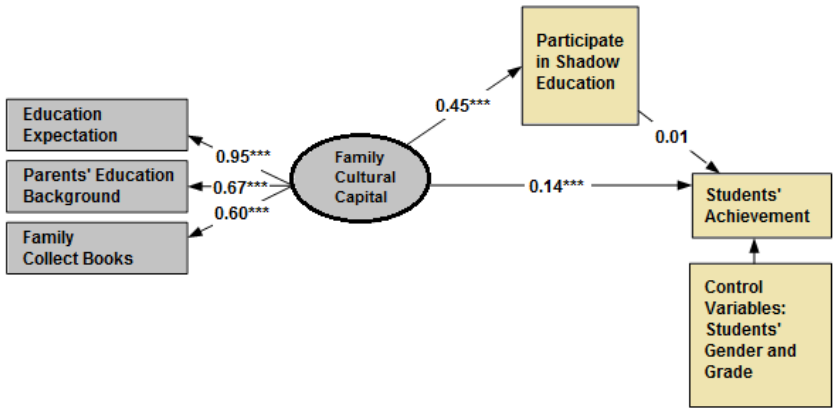
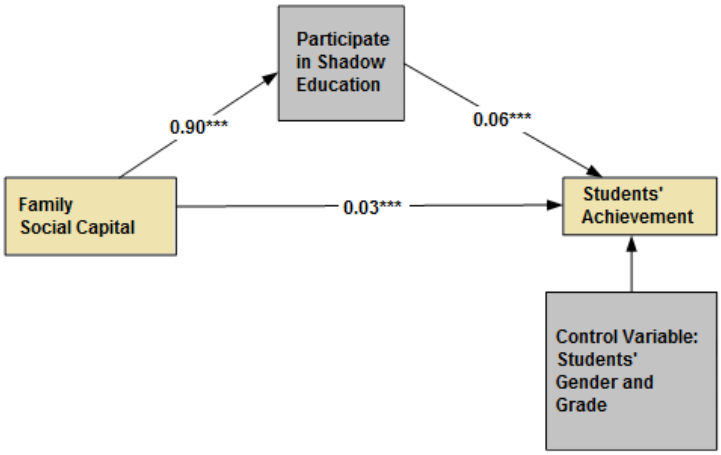


Figure 2. Multiple Intermediary Model of Family Cultural Capital Influencing Students' Education Acquisitions.



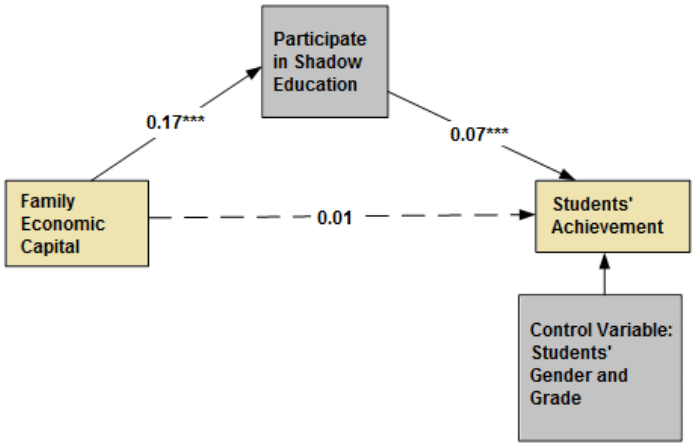
***P<0.001, **P<0.01, *P<0.05

Figure 3. Model of Family Social Capital Influencing Students' Education Acquisitions.



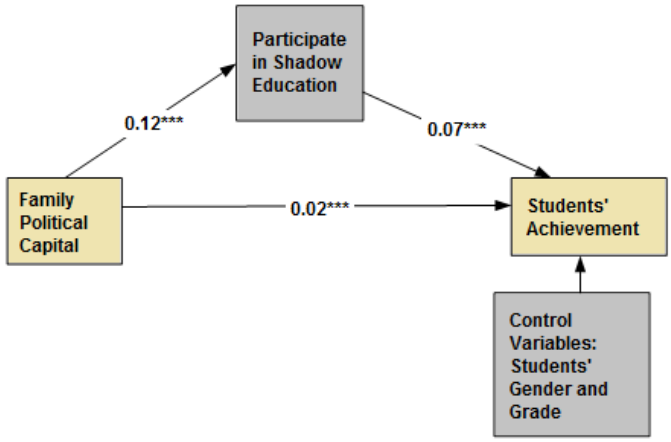
***P<0.001, **P<0.01, *P<0.05

Figure 4. Model of Family Economic Capital Influencing Students' Education Acquisitions.



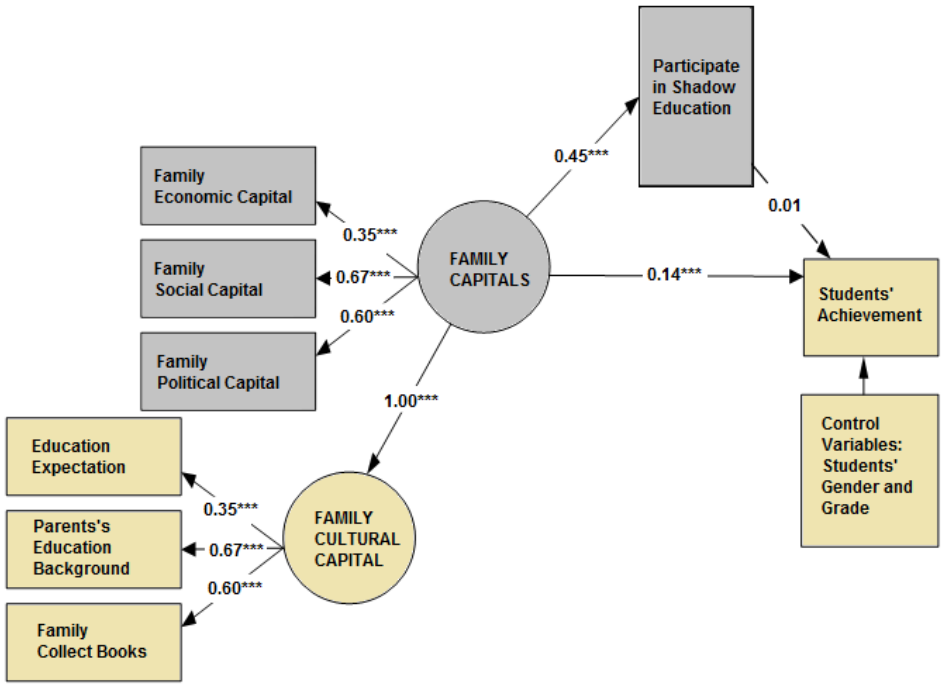
***P<0.001, **P<0.01, *P<0.05

Figure 5. Model of Family Political Capital Influencing Students' Education Acquisitions.



***P<0.001, **P<0.01, *P<0.05

Figure 6. Model of Family Capitals Influencing Students' Education Acquisitions.



***P<0.001, **P<0.01, *P<0.05

mediating effect on students' performance and shadow education played a partial mediating role between family political capital and students' performance.

The results from the model analysis signified that the model is recursive with a sample size of 19,487. Except for CMIN/DF = 11.89 > 5, all other fitting indexes have reached a good fit level indicating that the model can be well fitted with the actual observation data (he results of model fitting are shown in **Table 5**). The established model of family political capital influencing education was a good theoretical hypothesis model because CMIN/DF>5 rejects theoretical model 1 and was the largest number of valid samples in the model statistically analyzes (N=19,487). The relationships between variables described in this model are reasonable and the parameters' estimation was appropriate. So it was decided to use this particular model to test the mediating effect of family political capitals on students' education through shadow education.

Intermediary Model of Family Capitals Influence on Students' Education Acquisitions

The results from the standardized regression path coefficients suggest that the model past the significance level test (**Figure 6**). Family capitals had a significant mediating effect on students' performance and shadow education played a partial mediating role between family capitals and students' performance.

The results of model analysis showed that the model was recursive with a sample size of 19,487 (see **Table 6**). Except for CMIN/DF = 35.52 > 5, all other fitting indexes reached a good fit level.

Conclusion and Policy Recommendations

Conclusion

This paper combines school education and shadow education to investigate the influence of family capitals on junior high school students' education acquisitions. The following are the main research conclusions.

A family capital has a significant positive impact on education acquisitions on junior high school students, which, therefore, supports hypothesis 1. In terms of all types of family capitals, family cultural, family social, and family political all have a direct and significant positive effect on junior high school students' education acquisitions. However, family economic capital has no significant direct impact on junior high school students' academic education acquisitions.

Participating in shadow education has a significant positive impact on education acquisitions of junior high school students, as well, thus, supporting hypothesis 2. In the mediating effects of family capitals and total family capitals affecting students' education acquisitions, participating in shadow education had a significant positive impact on junior high school students' education acquisitions in all categories.

Shadow education plays a partial mediation intermediary role in the process of family capitals influencing students' education acquisitions. More specifically, family capitals influences students' education acquisitions by influencing their shadow education participation opportunities, and therefore, supporting hypothesis 3 of this study. Shadow education has different mediating effects among different types of family capitals and education acquisitions of students. It does not perform an intermediary role between family cultural capital and students' education acquisitions. The reason may be that families with high cultural capital can provide more direct guidance and motivation for their children's learning and such, families are less dependent on shadow education to improve children's academic performance. Shadow education also showed an intermediary role between family economic capital and students' education acquisitions. Families with high economic capital cannot provide direct support and motivation for their children to study on their own, but have the ability to buy more shadow education for their children and this largely relies on the shadow education to raise their children's academic performance. Results indicated that shadow education functions as an intermediary between family social capital and students' education acquisitions and political capital and students' education acquisitions. Families with high social capital and political capital not only provide direct support and motivation for their children's learning, but also rely on shadow education to improve their children's academic performance.

A family capital gets its status through the influence of both school education and shadow education on children's education acquisitions. Family capitals influence on junior high school students' education acquisitions through school education and shadow education systems displays the differences in opportunities. Families with higher education levels, ultimately, have their children attain higher social stratifications. Children growing-up in families with more capitals are more likely to enter the primary labor market, whereas, children coming from families with poor capital are more likely to enter the secondary labor market. Therefore, family capitals are transmitted from the fathers to the children. Intergenerational inheritance of family capitals is realized, and hence, this process of intergenerational inheritance of family capitals is seen in school education and shadow education. This educational social structure leads to solidifying of class right-up to the job market. Classic social reproduction theorists, such as, Coleman and Bourdieu, focus on the influence of family capitals on education acquisitions in schools. They elaborate on the mechanisms of education social reproduction in schools, but ignore the mechanisms of shadow education social reproduction. Currently, shadow education has become an important supplement to education in schools, globally. Shadow education acquisition is not only an important form of student education acquisition, but also, has an important impact on student school education acquisitions. Therefore, to only investigate the influence of family capitals on education acquisition on school education will eventually underestimate the influence of family capitals on education acquisitions of children and fully reveal the current mechanisms of education social reproduction. This study finds that the shadow education plays an intermediary role between family capitals

and education acquisitions. It also, ravels the joint mechanism of social reproduction between school education and shadow education, to a certain extent. In all, this study aims to assist in the development and improvement of the classic education social reproduction theory, for the current implementation of education fairness and the social mobility policy, in China, has certain significance.

The influence of shadow education on students' education acquisitions can be divided into short-term and long-term impacts. The short-term impact of shadow education on students' learning is mainly reflected in the promoting of students' academic performance in school. While, the long-term impact of shadow education on students' learning is attained in helping students to enter better schools.

Limited by data, this study only discusses the short-term impact of shadow education on the acquisition of family capitals and education. Therefore, we will analyze whether shadow education can help students to attend better schools. And, in subsequent studies, explore the long-term impact of shadow education between family capitals and education acquisition.

Policy Suggestions

Limiting the influence of family capitals on education acquisition and giving more emphasis to the role of education in promoting social mobility should become important responsibilities of governments around the world to achieve social equity. Based on the conclusions and discussions of this paper, the policy implications of this study are as follows.

Governments should take notice of the importance of shadow education and its influence on family capitals and students' education acquisitions. Governments can make policies, in particular for shadow education to reduce its impact and create more equal schooling. In recent years, Chinese governments at all levels have paid more attention to creating a fairer educational system that can control such dilemmas as shadow education. As well, new policies have been adopted to weaken the influence of family capitals. The hope is to lessen the role that the dominant class currently holds over the educational system and, thus, open new opportunities to disadvantaged groups.

In order to maintain their competitive advantage of entering the best schools, the dominant class has increasingly attached importance to use of the shadow education system and this has resulted in the exclusion of groups with less power. In other words, disadvantaged groups stuck in the inescapable intergenerational inheritance of family capitals are left with a school education and shadow education that is combined with social reproduction mechanisms. The result is severely weakened government policies on education and a damaged foundation for social equality.

At present, governments at all levels are fighting the logic that shadow education is an outcome of market behavior. Therefore, most lawmakers have a laissez-faire attitude towards shadow education and so generating a "if it isn't broke, don't fix it" approach to the current situation. However, governments should focus more on the intermediary role of shadow education and family capitals on students' education

acquisitions, forming initiatives to establish an educational system that will weaken the impact of shadow education through compulsory education fair policies.

The intermediary role of shadow education between family capitals and students' education acquisitions initiates the joint social reproduction mechanism of school and shadow education. Education's social reproduction function has also been further enhanced, making it easier for social strata to replicate and solidify. In order to break the class solidification and promote social equality, Chinese governments can also provide shadow education subsidies to families of junior high school students with poor academic performance and family capitals to weaken the negative impact of shadow education. Developed countries like Australia, England, France, Singapore and the United States have dealt with shadow education through measures, such as, remedial vouchers and allowances and tax breaks. Chinese governments can learn from these practices and bring forth explicit policies relevant to China to combat shadow education in the hopes to providing an equal opportunity education for all Chinese students.

Notes

1 *The upper professional class includes: heads of government agencies, enterprises and public institutions, middle management personnel, middle and senior professional and technical personnel, cadres and civil servants of general government agencies, economic business personnel, private business owners and employees or above. The middle class includes: grass-roots management personnel, other professional and technical personnel/general technicians, employees of enterprises and institutions, technical workers, military police fire fighters, self-employed/small business owners (8 employees or less). The lower occupational class includes: commercial and service personnel, non-skilled workers, agricultural, forestry, animal husbandry and fishery personnel, freelancers, unemployed and laid-off household workers.*

2 *Since this survey did not specifically ask parents about their political status, it asked respondents about their political status. However, since respondents may be people other than their parents, parents rather than parents' political status are used to measure family political capital. Statistical analysis shows that 92.5% of respondents are parents, 5.3% are grandparents, and the rest are other identities.*

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ARTICLE

How Does Parental Involvement Affect Children's Academic Development from A Core Literacy Perspective?

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Abstract. This study explores the influence of parental involvement on children's academic development, and comprehensively defines the indicators of children's academic development from the perspective of core literacy. Based on urban and rural household registration status and regional migration, children in China are divided into four categories. Three main findings are as follows. First, parents' direct learning participation can hardly benefit children's academic development, regardless of what type of children. Specifically, this type of parental participation has a significant negative impact not only on academic test score of all children, but also on all academic development dimensions of children who have rural to urban migrant experience. Second, parents' emotional participation behavior can effectively promote the academic development of children, regardless of migration type. Third, parents' cultural participation has a positive effect on local urban children's academic development, while it has a negative effect on the learning willpower and curiosity of urban-urban migrant children who move from one urban area to another in different provinces/districts. Under the background of mass internal migration and rapid urbanization, our findings provide implications for parents to better participate in their children's education in the context of rapid population movements and urbanization.

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***Keywords**: Parental involvement; Academic Development; Core Literacy; Rural Hukou (Household Registration); Regional Migration*

Research Background and Problem

EXPLORING the impact of parental involvement on children's academic development is a key research issue, while helping parents improve their participation is regarded as a way to promote children's academic development (Fan & Chen, 2001). For example, the United States has implemented some home-school cooperative programs such as "Head Start"[1] and "Success for All"[2] to help parents from disadvantaged groups to better participate in their children's learning (Currie, 1997; Hill & Tyson, 2009). In China, some researchers have tried to explore the influence of parental involvement on children's academic development based on different samples from different regions or different educational stage. However, as China has experienced rapid internal rural-urban migration or regional migration, and almost all of public welfare such as education is depending on household registration, then further studies are required to explore the research question mentioned above.

On the one hand, most related studies only focus on children's test scores (Hill & Tyson, 2009; Altschul, 2011; Jona et al., 2013; Wilder, 2014), while a single dimension of outcome would be no longer in line with the demand of future society. In fact, there will be full of uncertainty and challenges in the future, it requires that children' academic development should be comprehensive and diverse. As Heckman et al. (2006) pointed out that the disciplinary knowledge taught by schools in the era of information and globalization is depreciating at an accelerating rate; as a result children must not only acquire subject knowledge, but also acquire the literacy and skill of adapting to varied complex situations. That means if we overlook children's developments in areas which are not measured by subject test scores; we will not only hinder children's ability to have a high quality and happy life, but also affect the country's labor quality and social well-being. In the existing literature, only very limited number of scholars express concern regarding the effects of parents' participation on children's academic developments other than test score: self-educational expectations (Brooks et al., 1997; Gonzalez et al., 2002), learning effectiveness (Fan & Williams, 2010), learning autonomy (Shao, et al., 2016), et al. However, these studies are mostly carried out by psychologists and not educators, measures of parental participation are decentralized and sporadic. Without a common framework, it is difficult to obtain a holistic conclusion through existing researches.

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On the other hand, among the previous related researches which focused on urban children's education development under the background of internal population migration, authors just focuses on RUMC (Zhou & Wu, 2008; Shao, et al., 2016). In fact, according to population migration and existing hukou (Household Registration, in Chinese "户口") segmentation policy, the urban resident children can be divided into four types: local urban children (LUC) without any migrant experience; rural-urban migrant children (RUMC) moving from rural to urban areas within the same province/district; urban–urban migrant children (UUMC) moving from one urban area to the other in different provinces/districts; and children who had moved from rural to urban areas in different provinces/districts with dual mobility experience (DMC). And ensuring each type of children gain better education is the basis for promoting social integration. Obviously, focusing only on DMC cannot explore the complete relationship between parental involvement and children's academic development in rapidly urbanizing China. Then it cannot provide specially and helpful suggestion for the improvement of parental involvement for different kinds of children.

Compared with the existing researches, this current study tried to gain improvements in the following two aspects. First, based on the framework of core literacy, we construct a more comprehensive indicator for the measurement of children' academic development. These indicators will cover both test-score and non-test score indicators. Second, according to hukou and regional mobility situation, we divide urban resident children into four types: LUC, RUMC, UUMC and DMC. Then, we explore and compare the relationship between parental involvement and children's academic achievement in such four children categories.

Literature Review and Research Hypothesis

Indicator Framework for Children's Academic Development on the Framework of Core Literacy

Children's academic development indicators can be mainly divided into two categories: 1) existing and directly available test performance indicators. These indicators can measure the academic achievement aspects of subject knowledge and other literacy skills; 2) specially designed and collected non-test score indicators. These indicators can measure the academic achievement aspects of learning abilities and attitudes (Chu, 2016). Studies regarding children's academic development have traditionally focused on the first category. Though it is important for children's education and social economic achievement (Hanushek & Woessmann, 2008), it is insufficient to adapt the demand of the uncertain and challenging in future society (Chu, 2016). Although the second category indicators are often overlooked, they have benefits for children's long-term development and social well-being (Heckman et al., 2006).

What specific indicators should be included in assessment of a child's academic development? The "China Student Development Core Literacy" report, released in 2016, provides us a guided framework. Among the six aspects of core literacy pro-

posed by the above report, the three aspects – cultural literacy, scientific spirit, and learning to learn-are closely related to academic development. Specifically, the aspect of cultural literacy emphasizes the basic ability of applying knowledge and skills; it includes indicators such as test scores and grades. The aspect of scientific spirit emphasizes value standards, thinking modes and behavioral expressions formed during the student's learning process; it includes indirect academic development indicators such as learning willpower and learning curiosity. The aspect of learning literacy emphasizes students' choice of learning methods, the performance of the learning process assessment and regulation; it includes indicators such as t self-learning ability, self-education expectations and other indirect academic development.

Among the existing literature, many scholars have studied children's academic development under the core literacy framework based on theoretical discussion (Yang, 2017) or international comparison (Chu, 2016). However, few scholars conduct empirical research based on the perspective of core literacy to assess the influence of parental involvement on children's academic development. This is the focus of current research.

Parental Involvement on Children's Academic Development

Referring to the study of Grolnick and Slowiaczek (1994), we divide parental involvement into three categories: direct learning participation, emotional participation, and cultural participation.

Firstly, direct learning participation (DLP) refers to parents directly intervening in the child's learning process, including checking homework, guiding homework, attending parent meeting, etc. In the existing literature, only a few studies conclude that parents' DPI significantly improves children's test scores (Li, 2017). Most studies have found that such parental participation behavior has no positive effect on children's academic test scores and can even have negative effects. (Sui-Chu & Willms, 1996; Patall et al., 2008; Zhao & Hong, 2012; Li & Zheng, 2016). Nonetheless, some studies that use non-test scores as a result variable suggest that such participation has a positive effect, for example, to enhance children's learning willpower (Gonzalez et al., 2002; Fan & Williams, 2010), learning adaptability (Plunkett et al., 2008) and self-educational expectations and learning autonomy (Gonzalez et al., 2002).

The second type of parental involvement is emotional participation (EP) that refers to parental communication with their children and corresponding responsiveness to their children' needs. Such participation includes parents communicating with their kids and discussing matters related to school and study. Research suggests that EP can improve children's academic test scores (Sui-Chu & Willms, 1996; Zhao & Hong, 2012), promote children's self-learning ability (He & Li, 2000), learning willpower (Huang & Huo, 2014), learning autonomy (Liu & Teng, 2016) and other non-test scores.

Finally, cultural participation (CP) refers to parents guiding their children to participate in various cultural activities, including accompanying children to read,

visiting museums, and watching cultural performances. Studies suggest that parental CP behavior not only helps improve children's academic test scores (Grolnick & Slowiaczek, 1994; Altschul, 2012; Sibley & Dearing, 2014), but also enhances children's interest in learning, their learning power, etc. (Brooks et al., 1997; Wang & Sheikh-Khalil, 2014). However, cultural participation has higher requirements for parental literacy, and its positive impact is mainly observed in the upper middle class (Sibley & Dearing, 2014).

Furthermore, after reviewing related literature, we found that the indicators chose by existing researches are scattered and not system. Each author only chose a few indicators in each paper, which restricts the comprehensiveness and comparability of research conclusions. In current research, we study the impact of the above three types of parental involvement on children's academic development under a unified analytical framework and outcome indicator framework. We propose the following three hypotheses:

H1: The more parents' DLP, the better their child's academic development would be.

H2: The more parents' EP, the better their child's academic development would be.

H3: The more parents' CP, the better their child's academic development would be.

Migration, Hukou Segmentation, and Parental Involvement

As mentioned above, Children living in cities are divided into LUC, RUMC, UUMC and DMC. Compared to children of the first category, the last three categories of children experience migration across of rural-urban or urban-urban or both. In a sense, RUMC, UUMC and DMC can be regarded as "outsiders" towards their current living city.

Due to the long-term existence of the urban-rural and regional divides in China, LUC, RUMC, UUMC and DMC differ in family socioeconomic status. First, parent of non-agricultural hukou, which are LUC and UUMC, have higher educational attainment, higher-level occupations and more stable jobs than the parent of other two types of children (Feng & Chen, 2016: 67-70). Second, local parents, which are LUC and RUMC, are more familiar with the local labor market than other two types of non-local parents. Thus, local parents are more likely to have local social resources which lead to advantage in better job market (Xie, 2012). Third, as there exist different requirement for job skill among different regional labor market, then adult would face inescapable mismatch in inflow areas' labor market, so non-local parents' income level, job stability and flexibility would be affected (Xie, 2012). Presumably, we infer that, among such four types of children, their social and economic status of households sorting from highest to lowest would be: LUC, UUMC, RUMC and DMC.

Previous studies have shown that, parental involvement behavior is closely related to family socioeconomic level. First, among disadvantage families, lower economic income, longer and less flexible working hours, and higher unemployment risks would limit parent participate in their children's learning and life (Wu et al., 2017). Second, among disadvantage families, as parents have lower levels of

knowledge and cultural literacy, which would limit them attach importance to their children education and have higher expectation for their children. As a result, these parents are more likely to lack planning in their children's educational involvement, especially ignore emotional participation and cultural participation (Altschul, 2012). In contrast, among advantage families, parents would have higher quality involvement. Owing to they own high-level learning experience, they can not only teach their children knowledge and learning strategies in subtle ways, but also carry out parent-child communication more effectively (Wu et al., 2017). Third, according to the theory of social reproduction, schools have the attributes of the upper middle class, which makes it difficult for parents from disadvantage families to adapt to the culture and ideology of the school when communicating with teachers or participating in school activities (Sui-Chu & Willms, 1996; Li & Zheng, 2017). At the same time, some researchers even found that schools may show discrimination against such parents (Wu et al., 2017). Fourth, specific to immigrant groups, they would also face the obstacles in the aspects of cultural customs, social rules, languages, et al., this would inevitably hinder such parents carry out parent-teacher communication or CP behaviors (Altschul, 2011). As a result, the quantity and quality of parental involvement for LUC, UUMc, RUMC and DMC would be descending.

According to relevant research, the influence of parental involvement behaviors of different socioeconomic groups on children's development cannot be completely determined (Nguon, 2012; Li & Qiu, 2016). Thus, in current research, whether the effect of parental involvement on academic development would have difference among such four children types is uncertain. If such impact effects are different between among such four children types, targeted guidance information is required for each type of parent to help them better involved in children's education. Since many related studies in the past only focus on some of these types (Zhou & Wu, 2008; Liu & Teng, 2016), the conclusions may not be comparable, they cannot provide targeted and effective information for parental involvement in special type of children either. To this end, we attempt to verify hypotheses 1-3 for each type of children group.

Data and Variables

Data

Data in this study are collected from the China Education Panel Survey (CEPS) baseline database. In current paper, we do not include all samples of CEPS, but only keep grade 8 (junior) students who study and live in urban areas. Furthermore, to ensure consistency of the sample, this study retains 9727 children with no missing values for all dependent, explanatory and control variables. We define place of residence and household registration in the same province as local, and the household registration in the province as a flow. Combining urban and rural household registration and mobility, the research sample is divided into four groups (number of individuals in group): LUC (4688), RUMC (2973), UUMC (785), and DMC (1231) (the composition ratio is shown in Figure 1).

Variables

Academic Development Variables

Based on the core literacy framework, the academic development variables include two types: 1) test score indicator, specifically, the class scores of children's self-evaluation[3], and 2) non-test score indicators, including learning willpower, learning curiosity, and self-learning ability and self-education expectations. Among these, learning willpower is based on responses to "even if the body is a little uncomfortable, or there are other reasons to stay at home, I will still try to go to school" and "even if the homework takes a long time to finish, I will continue to do my best." Learning curiosity is measured by reported agreement with the statement "I am very curious about new things." Self-learning ability is measured by response to "I can learn new knowledge quickly."[4] Self-education expectation is highest expected by the students' reported expectations[5].

Parental Involvement

Parental involvement is divided into three categories[6]: DLP, EP, and CP. The aspect of DLP includes four items: 1) how frequently parents check their children's homework; 2) how frequently of parents guide children as they do their homework; 3) parents willingness to participate in parent conferences; and, 4) the frequency of parents' active contact with teachers. The aspect of EP includes two items: 1) the frequency of parents and children discussing school events; and 2) the frequency of parents and children discussing the child's relationship with teachers. The aspect of CP includes four items: 1) frequency of parents and children reading together; 2) frequency of parents and children exercising together; 3) frequency of parents and children visiting museums and zoos together; and 4) frequency of parents and children watching a game or performance together. To facilitate interpretation of results, we conduct a factor analysis[7] for the items in each category and take the first common factor score to synthesize data as indexes for each aspect of parental involvement.

Control Variables

To reduce estimation bias and identify true effects as much as possible, we introduce control variables from three resources: individual, family and school. Individual level Control variables include gender, grade, cognitive test scores, number of siblings, agricultural household registration, and inter-provincial mobility. Family-level control variables include the parents' maximum number of education years[8], the family's economic status[9], and whether the child was living with their parents. School-level control variables include teacher ratios of bachelor, school conditions[10], and school rankings (1 = lower middle, 2 = upper middle, 3 = best).

Description and Comparison of Variables

To better understand the characteristics of the four categories of children, **Table 1** describes the values of different types of children in each variable.

In terms of parental involvement, the parents of LUC scored highest in the three types of participation behaviors, followed by the parents of UUMC parents, and the last two are parents of RUMC and DMC. In terms of children's academic development, LUC score the highest in terms of test score ranking, self-learning ability and self-education expectation, followed by UUMC, and finally two types are also RUMC and DMC. Fortunately, the two types of children who experience rural-urban migrant have shown a slight advantage on the aspects of learning willpower and curiosity. As a result, from the perspective of absolute value comparison, comparing to regional migrant status and such hukou segmentation, rural-urban migrant status and such hukou segmentation show larger negative influence on parental participation behavior and three aspects of children's academic development.

In terms of control variables, there are also some meaningful findings. For example, for the cognitive ability test scores, the scores of LUC, UUMC, RUMC and DMC decrease sequentially, which perfectly mirrors the ranking of the four groups in the test-based academic development score? The rank of cognitive ability test scores is identical with academic test score that means we could solve the "negative choice" problem" – the worse the score, the more parents participate in child's education". In addition, the average values of the parental maximum educational level and family economic status of RUMC and DMC are lower than the other two types of children significantly. Besides, RUMC are far ahead in the indicator of not living with parents compared with other three types of children. This is because the parents of RUMC send their children to local urban areas for further education and RUMC are more likely to choose to stay with relatives, teachers or live at schools due to the similarity of cultural backgrounds and the richness of social relations.

The Influence of Parental Involvement on the Academic Development of Different Types of Children

Based on the research framework presented above, we take the academic development as the dependent variable and the parental involvement behaviors as the main explanatory variables for constructing a regression model for estimation. Since the data has a nested structure of student within school, this study sets up a two-level model. To test hypotheses 1-3 for each type of children group respectively and compare the heterogeneous effects of different children groups, this study will introduce the interactions among hukou segmentation, migration status and parental involvement behaviors in the model. The benchmark model of this study is:

Level 1:

$$\text{xueye}_{ij}^{s} = \alpha_{0j} + \sum_{e=1}^{3} \lambda_e \text{PI}_{ij}^{e} + \sum_{e=1}^{3} \rho_e \text{PI}_{ij}^{e} \times \text{rural} + \sum_{e=1}^{3} \phi_e \text{PI}_{ij}^{e} \times \text{migrant} + \sum_{e=1}^{3} \zeta_e \text{PI}_{ij}^{e} \times \text{rural} \times \text{migrant} + \sum_{k=1}^{6} \tau_k \text{contr\_ind}_{kij} + \sum_{\tau=1}^{3} \theta_\tau \text{contr\_fam}_{\tau ij} + e_{0ij} \quad (1)$$

Level 2:

$$\alpha_{0j} = \beta_0 + \sum_{l=1}^{3} \gamma_l \text{contr\_sch}_{lj} + \mu_{0j} \quad (2)$$

Here, equation (1) is the individual-level model, where xueye^{s}_{ij} denotes the s^{th} academic outcome of interest (s = 1, ..., 5) for an individual i, residing in school j and PI^{e}_{ij} denotes the e^{th} parental involvement indicator(e = 1, 2, 3)[11]. Further, the dummy variables – rural and migrant – reflect hukou segmentation and regional migration status respectively. Besides, contr_ind and contr_fam are individual-level and family-level control variables, e_{0ij} is an individual-level random error term. Equation (2) is the school-level model, where contr_sch are the school-level control variables, and μ_{0j} is the school-level random error term. We will introduce academic development indicators respectively in turn and construct five models. **Table 2** presents the results from all aforementioned estimating regressions.

Next, in models 1-5, we calculate the linear combination of which includes the coefficient of parental involvement behavior λ, the coefficient of the interaction between parental participation behavior and rural ρ, the coefficient of the interaction between parental participation behavior and migrant ϕ, and the coefficient of the interaction among parental participation behavior, rural and migrant ζ. After that, we conduct statistical tests and identify the impact of parental involvement behaviors on academic development of each type of children group in detail (**Table 3**). What's more, comparing the heterogeneous effects among different types of children is our focus (**Table 4**). Based on the results presented by **Tables 3** and **4**, we draw the following conclusions:

The Impact of Parental Involvement on Children's Test Score Indicator

Firstly, parents' DLP has a significant negative impact on the test scores of LUC, RUMC and DMC, which is contrary to Hypothesis 1. Only in UUMC, there is a non-significant negative effect, but Hypothesis 1 is still not verified. In terms of inter-group, the negative effects of parents' DLP on the test scores of RUMC and DMC are significantly greater than that of UUMC, and the negative effect of parents' DLP on the test scores of DMC is also significantly greater than that of LUC. In sum, parents' DLP cannot improve the academic test scores of any type of children, and sig-

Table 1. The Description of Characteristics Based on Hukou and Migration Status Samples.

	Dimension	Index	LUC	RUMC	UUMC	DMC
Parental Involvement	DLP	Direct learning participation behavior index	0.090	-0.097	0.99	0.099
	CP	Cultural participation behavior index	0.129	-0.178	0.124	0.102
	EP	Emotional participation behavior index	0.065	-0.030	0.042	0.094
Academic Development	Test score indicator	Last final test class ranking	3.222	2.991	3.122	3.017
	Non-test score indicators	Learning willpower	3.340	3.406	3.274	3.339
		Learning curiosity	3.515	3.542	3.478	3.498
		Self-learning ability	3.117	2.965	3.019	2.942
		Self-education expectations	17.36	16.49	17.03	16.17
Control Variables	Individual Level	Gender (1= Female, 0= Male)	0.511	0.488	0.508	0.491
		Grade 9 (1=9th grade, 0=7th grade)	0.482	0.487	0.375	0.389
		Cognitive ability test score	0.309	0.015	0.111	-0.044
		Single child (1= Yes, 0= No)	0.741	0.349	0.536	0.269
		Rural *hukou* (1=Yes, 0= No)	0.000	1.000	0.000	1.000
		Migration status(1= Yes, 0=No)	0.000	0.000	1.000	1.000
	Family Level	Father/ mother maximum education years	12.91	9.715	12.97	9.633
		Family's financial situation	2.972	2.775	2.987	2.833
		Parental living conditions				
		Parents are at home	82.57%	74.10%	82.55%	86.03%
		Father is not at home	8.85%	10.12%	9.55%	4.96%
		Mother is not at home	3.20%	2.76%	3.18%	2.52%
		Parents are not at home	5.38%	13.02%	4.71%	6.50%
	School [a] Level	School running conditions	0.710	0.679	0.725	0.705
		The ratio of teacher with bachelor degree or above	0.898	0.781	0.932	0.877
		School ranking	2.332	2.025	2.061	1.894

Note: a-The indicator for this dimension is the inter-school level average of the schools where the various groups of children are located

Table 2. Two-Level Regression Model of the Effect of Parental Involvement on Children's Academic Development.

		Non-Test Scores Indicators			
	Test Score Indicator	**Learning Willpower**	**Learning Curiosity**	**Self-Learning Ability**	**Self-Education Expectations**
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
DLP (λ_1)	-0.103***	0.077***	0.064***	0.033**	-0.015
	(0.021)	(0.014)	(0.016)	(0.016)	(0.061)
EP (λ_2)	0.183***	0.091***	0.048***	0.097***	0.408***
	(0.023)	(0.015)	(0.017)	(0.017)	(0.066)
CP (λ_3)	0.095***	0.010	0.013	0.097***	0.226***
	(0.024)	(0.017)	(0.019)	(0.019)	(0.071)
DLP*Rural *hukou* (ρ_1)	-0.031	-0.043*	-0.075***	-0.018	-0.108
	(0.034)	(0.023)	(0.026)	(0.026)	(0.099)
EP*Rural *hukou* (ρ_2)	0.020	-0.001	-0.010	-0.008	0.123
	(0.035)	(0.024)	(0.027)	(0.027)	(0.104)
CP*Rural *hukou* (ρ_3)	-0.048**	-0.005	-0.036	0.032	-0.313***
	(0.025)	(0.027)	(0.030)	(0.030)	(0.115)
DLP*Migration status (ϕ_1)	0.072	0.007	-0.037	0.99	-0.140
	(0.053)	(0.036)	(0.041)	(0.041)	(0.157)
EP*Migration status (ϕ_2)	0.016	-0.022	-0.071	-0.014	0.002
	(0.057)	(0.038)	(0.044)	(0.044)	(0.166)
CP*Migration status (ϕ_3)	-0.056**	-0.073*	-0.105**	-0.060	-0.000
	(0.029)	(0.042)	(0.047)	(0.047)	(0.179)
DLP*Rural *hukou** Migration status(ξ_1)	-0.135*	0.005	0.091	0.018	0.051
	(0.073)	(0.049)	(0.056)	(0.056)	(0.213)
EP*Rural *hukou** Migration status (ξ_2)	-0.039	-0.019	0.058	-0.006	-0.104
	(0.076)	(0.051)	(0.059)	(0.058)	(0.222)
CP*Rural *hukou** Migration status (ξ_3)	0.082	0.102*	0.074	0.020	0.494**
	(0.082)	(0.056)	(0.064)	(0.063)	(0.241)
Constant term	2.637***	3.600***	3.619***	2.803***	14.978***
	(0.122)	(0.075)	(0.076)	(0.089)	(0.444)
Individual control variables	Yes	Yes	Yes	Yes	Yes
Family control variables	Yes	Yes	Yes	Yes	Yes
School control variables	Yes	Yes	Yes	Yes	Yes
Random residual standard deviation					
School level	0.145	0.080	0.065	0.099	0.606
Student level	0.992	0.675	0.770	0.767	2.907
School sample	66	66	66	66	66
Student sample	9677	9677	9677	9677	9677

Note: 1. *- indicates significance at the level of 0.1, **- indicates significance at the level of 0.05, and ***- indicates significance at the level of 0.01

Table 3. The Impact of Parental Involvement on the Academic Development of Four Types of Children Groups.

		Test Score Indicator		Non-Test Scores Indicators							
				Learning Willpower		Learning Curiosity		Self-Learning Ability		Self-Education Expectations	
		Coefficient	T Value	Coefficient	T Value	Coefficient	T Value	Coefficient	T Value	Coefficient	T Value
DLP	LUC (λ1)	-0.103***	[-4.934]	0.077***	[5.457]	0.064***	[4.014]	0.033***	[2.067]	-0.015	[-0.25]
	RUMC (λ1+ρ1)	-0.134***	[-4.918]	0.034*	[1.827]	-0.011	[-0.522]	0.015	[0.714]	-0.123*	[-1.638]
	DMC (λ1+ρ1+φ1+ζ1)	-0.196***	[-4.74]	0.046*	[1.625]	0.043	[1.326]	0.042	[1.307]	-0.212*	[-1.747]
	UUMC (λ1+φ1)	-0.031	[-0.623]	0.084***	[2.487]	0.027	[0.716]	0.042	[1.107]	-0.156	[-1.073]
EP	LUC (λ2)	0.183***	[8.126]	0.091***	[5.961]	0.048***	[2.726]	0.097***	[5.595]	0.408***	[6.175]
	RUMC (λ2+ρ2)	0.203***	[7.417]	0.09***	[4.846]	0.037*	[1.869]	0.089***	[4.224]	0.531***	[6.596]
	DMC (λ2+ρ2+φ2+ζ2)	0.180***	[4.25]	0.049*	[1.696]	0.024*	[1.723]	0.070***	[2.133]	0.428***	[3.448]
	UUMC (λ2+φ2)	0.199***	[3.819]	0.069**	[1.965]	0.024	[0.584]	0.084***	[2.087]	0.409***	[2.686]
CP	LUC (λ3)	0.095***	[3.897]	0.01	[0.617]	0.013	[0.71]	0.097***	[5.19]	0.226***	[3.177]
	RUMC (λ3+ρ3)	0.047	[1.484]	0.005	[0.237]	-0.023	[-0.941	0.129***	[5.306]	-0.087	[-0.932]
	DMC (λ3+ρ3+φ3+ζ3)	0.073	[1.58]	0.034	[1.093]	-0.054	[-1.51]	0.090	[1.526]	0.407	[1.021]
	UUMC (λ3+φ3)	0.038	[0.676]	-0.062*	[-1.615]	-0.091**	[-2.074]	0.038	[0.863]	0.226	[0.356]

Note: 1. *- indicates significance at the level of 0.1, **- indicates significance at the level of 0.05, and ***- indicates significance at the level of 0.01. 2. The values in parentheses are T values. 3. The values in the "Coefficients" column in the table indicate the specific effects of parental involvement on the academic development of each type of children.

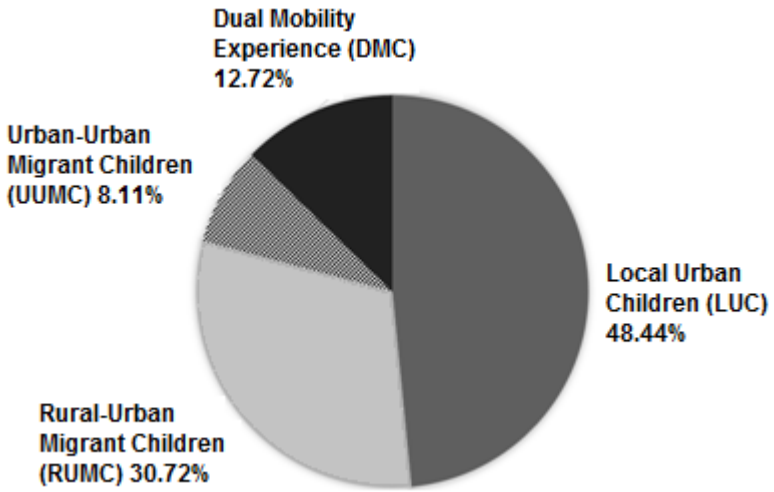
Table 4. Inter-group differences in the influence of parents' participation in the development of four types of children's academic development.

		Test Score Indicator		Non-Test Scores Indicators							
				Learning Willpower		Learning Curiosity		Self-Learning Ability		Self-Education Expectations	
		Coefficient	T Value	Coefficient	T Value	Coefficient	T Value	Coefficient	T Value	Coefficient	T Value
DLP	RUMC V.S. LUC (ρ_1)	-0.031	[-0.924]	-0.043*	[-1.888]	-0.075***	[-2.887]	-0.018	[-0.698]	-0.108	[-1.087]
	RUMC V.S. UUMC (ρ_1-φ_1)	-0.103**	[-1.829]	-0.05	[-1.305]	-0.038	[-0.881]	-0.027	[-0.629]	0.033	[0.199]
	DMC V.S. UUMC (ρ_1+ζ_1)	-0.166***	[-2.579]	-0.038	[-0.865]	0.015	[0.305]	0.000	[-0.009]	-0.057	[-0.301]
	DMC V.S. RUMC (φ_1+ζ_1)	-0.063	[-1.275]	0.012	[0.361]	0.054	[1.404]	0.027	[0.706]	-0.090*	[-0.182]
	DMC V.S. LUC (ρ_1+φ_1+ζ_1)	-0.094***	[-2.044]	-0.031	[-0.997]	-0.022	[-0.61]	0.99	[0.245]	-0.197**	[-1.963]
	UUMC V.S. DMC (φ_1)	0.072	[1.344]	0.007	[0.182]	-0.037	[-0.893]	0.99	[0.222]	-0.14	[-0.897]
EP	RUMC V.S. LUC (ρ_2)	0.02	[0.574]	-0.001	[-0.046]	-0.01	[-0.373]	-0.008	[-0.293]	0.123	[1.19]
	RUMC V.S. UUMC (ρ_2-φ_2)	0.005	[0.080]	0.021	[0.532]	0.061	[1.341]	0.006	[0.122]	0.121	[0.706]
	DMC V.S. UUMC (ρ_2+ζ_2)	-0.019	[-0.278]	-0.02	[-0.442]	0.047	[0.911]	-0.014	[-0.272]	0.019	[0.096]
	DMC V.S. RUMC (φ_2+ζ_2)	-0.023	[-0.462]	-0.041	[-1.21]	-0.014	[-0.351]	-0.02	[-0.504]	-0.103	[-0.697]
	DMC V.S. LUC (ρ_2+φ_2+ζ_2)	-0.003	[-0.062]	-0.042	[-1.306]	-0.024	[-0.644]	-0.028	[-0.746]	0.021	[0.147]
	UUMC V.S. DMC (φ_2)	0.016	[0.275]	-0.022	[-0.58]	-0.071*	[-1.922]	-0.014	[-0.309]	0.002	[0.011]
CP	RUMC V.S. LUC (ρ_3)	-0.048**	[-1.924]	-0.005	[-0.193]	-0.036	[-1.199]	0.032	[1.051]	-0.313***	[-2.723]
	RUMC V.S. UUMC (ρ_3-φ_3)	0.008	[0.137]	0.068	[1.538]	0.069	[1.372]	0.091**	[1.828]	-0.313*	[-1.649]
	DMC V.S. UUMC (ρ_3+ζ_3)	0.034	[0.47]	0.097**	[1.956]	0.038	[0.67]	0.052	[0.921]	0.181	[0.85]
	DMC V.S. RUMC (φ_3+ζ_3)	0.026	[0.467]	0.029	[0.776]	-0.031	[-0.724]	-0.04	[-0.929]	0.494***	[3.05]

	DMC V.S. LUC ($\rho_3+\varphi_3+\zeta_3$)	-0.022	[-0.429]	0.024	[0.683]	-0.067	[-1.678]	-0.008	[-0.196]	0.181	[1.194]
	UUMC V.S. DMC (φ_3)	-0.056**	[-1.919]	-0.073*	[-1.746]	-0.105**	[-2.209]	-0.06	[-1.259]	.000	[-0.002]

Note: 1 and 2 are the same as above; 3.The values in the coefficient column of the table indicate the difference in the effect of tntergroup taking the latter group of children as the reference group.

Figure 1. The Composition of Children According to *Hukou* Segmentation and Migration Status.



nificantly reduces the academic test scores of all except UUMC. Especially for RUMC and DMC, the negative effects are strongest.

Secondly, parents' EP has a significant positive impact on the test scores of all types of children, which supports Hypothesis 2. No significant differences between groups are observed. This shows that if parents can communicate more with their children about their schools and teachers, academic test scores of all types of children would be improved significantly. What's more, the effects do not differ from each other due to hukou segmentation and migration status.

Finally, parents' CP has a significant positive impact on the test scores of LUC, while the impact is not significant in the other three types of children groups. Therefore, Hypothesis 3 is only verified in LUC. In terms of intergroup, the effects of parents' CP on the test scores of RUMC and UUMC are significantly lower than that of LUC. This means that only LUC can improve their academic test scores through more parents' CP.

The Impact of Parental Involvement on Children's Non-Test Score Indicators

In this section, we similarly uncover the effects of parental involvement on each non-test score indicator of each type of children from the perspective of parents' DLP, EP and CP.

Learning Willpower

Firstly, parents' DLP has a significant positive impact on the learning willpower of all types of children, so Hypothesis 1 is supported in each type of children groups. In terms of intergroup, the effect of parents' DLP on the learning willpower of RUMC is significantly lower than that of LUC, but there is no significant difference among the other children groups. Secondly, parents' EP has a significant positive impact on the learning willpower of the four types of children, supporting Hypothesis 2. Pairwise comparisons between groups reveal no significant intergroup differences upon this effect. Finally, parents' CP has a significant negative impact on the learning willpower of UUMC, which rejects Hypothesis 3. Meanwhile, there are positive but non-significant effects in the other three categories of children and Hypothesis 3 is not verified, either. In terms of intergroup, the influence of parents' CP on the learning willpower of UUMC is significantly different from that of LUC and DMC.

Learning Curiosity

Firstly, parents' DLP can significantly improve the learning curiosity of LUC, which means Hypothesis 1 is verified in this type of children. In contrary, the effects of parents' DLP on the learning curiosity of RUMC, UUMC and DMC are non-significant and Hypothesis 1 is not supported. In terms of intergroup, the effect of parents' DLP on RUMC's learning curiosity is significantly lower than that of LUC. Secondly, parents' EP can significantly improve the learning curiosity of LUC, RUMC and DMC. Thus Hypothesis 2 is supported in above three types of children groups. But there is positive but non-significant effect in UUMC, reflecting Hypothesis 2 is not testified in UUMC. Focusing on the intergroup, the effect of parents' DLP on UUMC is significantly lower than that of LUC. Finally, parents' CP can significantly impede the learning curiosity of UUMC and Hypothesis 3 is rejected. Meanwhile, the effects of parents' CP on the other three types of children groups are not significant, and Hypothesis 3 is not supported. Focusing on the results of pairwise comparisons, we can conclude that the impact of parents' CP on UUMC is significantly lower than that of LUC.

Self-Learning Ability

Firstly, parents' DLP can promote the self-learning ability of LUC significantly, but has a non-significant positive effect on the other three types of children groups, which means Hypothesis 1 is only supported by LUC. Further, no significant differences are observed between groups. Secondly, parents' EP has a significant positive impact on the self-learning ability of all types of children. As a result, Hypothesis 2 is supported in all children samplings. Similarly, there is no significant difference in terms of intergroup. Lastly, parents' CP can significantly improve self-learning ability of LUC and RUMC so that Hypothesis 3 is supported in above two groups. However, the effect of this behavior on the self-learning ability of UUMC and DMC are not significant, of which Hypothesis 3 is not verified. Focusing on the results of

pairwise comparisons, what draw our attention is that the effect of parents' CP on RUMC is significantly higher than that of UUMC.

Self-Education Expectations

Firstly, parents' DLP has a significant negative impact on the self-education expectations for RUMC and DMC, and a non-significant negative impact on the self-education expectations for LUC and UUMC. Thus, Hypothesis 1 is rejected in all types of children groups. Among these groups, the negative impact of parents' DLP on DMC is significantly stronger than LUC and RUMC. Secondly, parents' EP can promote the self-education expectations of all four types of children significantly, and Hypothesis 2 is testified completely. What's more, no differences between groups are observed in terms of intergroup. Finally, parents' CP can significantly improve the self-education expectations of LUC, supporting Hypothesis 3. However, in the other three groups, Hypothesis 3 is not accepted. Among these groups, the influence of parents' CP on the self-education expectations of LUC is significantly lower than that of the other three types of children.

Conclusion and Discussion

The first finding of our study is that parents' DLP has a limited effect on children's academic development. Especially for most academic development indicators of RUMC and DMC, there are significant negative effects. Parents' DLP not only fails to improve the academic test scores and self-education expectations of any type of children, but also has a significant negative impact on the academic test scores and the self-education expectations of LUC, RUMC and DMC. Moreover, the improvement of learning curiosity and self-learning ability occurs only in LUC. In contrast, in terms of learning willpower, improvement occurs in all types of children groups. Focusing on the results of the comparison between groups, the negative impacts of parents' DLP on the academic test scores of RUMC and DMC are significantly stronger than that of LUC and UUMC. Besides, the negative impact of parents' DLP on the self-education expectations of DMC is significantly stronger than that of LUC and RUMC.

We speculate the reason of showing above results is that there is a long-term imbalance between urban and rural education in China, with the conditions for running schools in rural areas lagging behind cities, resulting in agricultural household parents with low level education[12], poor self-learning strategies, lack of long-term goals, and falling into low social classes. As a result, they not only lack professionalism and effectiveness in guiding and supervising children's learning process, but also may generate frustrating emotions due to classes' segmentation when communicating with teachers (Wu Zhonghan et al., 2017). Hence, Low-quality DLP is likely to convey ineffective learning strategies, repetitive and boring learning content, and resistance to school and learning, which is not conducive to children's academic devel-

opment (Sui-Chu and Willms, 1996; Zhao Yandong and Hong Yanbi, 2012). It should be noted that while some scholars (Sun, 1998) believe that the "negative selection" problem may lead to overestimating the negative effect of DLP, in this study we introduce the students' cognitive ability score as a control variable to address this problem. At the same time, since the negative selection problem theoretically exists mainly in the estimation of the test score as the dependent variable, the three non-test indicators of self-education expectation, learning curiosity and self-learning ability are consistently estimated, and thus we think that negative selection has little effect on our results and the research results are robust.

The second finding of this study is that parents' EP has a significant role in improving all aspects of academic development for all children groups[13], and there is no significant difference in terms of hukou segmentation and migration status. This finding is consistent with existing literature (Sui-Chu and Willms, 1996; Jr. McNeal, 1999; Zhao Yandong and Hong Yanbi, 2012; Huang Shuang and Huo Liyan, 2014). We believe that this result is due to the fact that through communicating with their children more about learning, schools, and teachers, parents can build a closer relationship and trust with their children, and form social closure with their children, the classmates of children, teachers, school and the parents of their children's classmates, which not only enables children to feel the great attention that parents pay to their learning, but also reduces the information asymmetry of parents on children's learning process. Accordingly, parents' EP is a great social capital that can encourage and promote the development of children's academic development. Meanwhile, communicating with their children is relatively less constrained by the parents' own literacy; therefore, parents' EP can enhance academic development in different types of children groups.

The third finding of this study is that the positive impact of parents' CP is mainly reflected in LUC. This effect is not significant or even negative in rural hukou and non-local children's groups and, in particular, there is a significant negative effect on learning curiosity and learning willpower in DMC, indicating that the regional division restricts the beneficial effect of parents' CP on the development of non-local children's academic development. We speculate the reason is that there are cultural, social, and psychological integration problems for the migrant children. Specifically, due to the differences on cultural and social aspects between the growing surroundings and the local region, migrant children's parents tend to have some difficulties in choosing suitable urban cultural resources. Moreover, migrant children may not be able to resonate and gain benefits when they participate in relevant recreational activities, conversely, they are more likely to feel bored or discriminated against in their activities, which may restrict the positive effects of parents' PE eventually.

In summary, the findings of this study provide some guidelines when parents participate in their children's education. First, in the process of teaching students, the school cannot extend the responsibility of direct learning intervention, such as guidance and counseling knowledge, to students' parents; knowledge conveying should remain teacher-led. Due to the lack of professionalism, parents' DLP not only nega-

tively affect multiple academic development indicators of the socioeconomic disadvantaged rural hukou children groups, but also plays a limited role in the academic development of relatively high cultural level children groups. Second, schools should encourage parents to communicate more with their children about learning and school at home. The social capital built by parents through this kind of emotional participation behavior is the key to make up for the weaknesses of class teaching system and collective education, which can effectively strengthen positive emotions and weaken negative emotions of children, thereby helping children to achieve comprehensive academic development. Further, above effectiveness will not change due to the difference in hukou and migration status. Third, under the background of accelerating urbanization, the regional differences of cultural systems cause problems of educational integration for migrant children. Thus, schools should make good use of modern media such as the Internet platforms to provide the parents of rural hukou and migrant children with more appropriate recreational activities-related information.

In the future, we can consider to improving the study based on the following aspects. First, this paper discussed children's academic development under the framework of key competences comprehensively and systematically, but the indicators used were children's self-reported data. Hence, the measurement tools need to be modified further. Second, although this paper introduced students' cognitive ability test scores to solve the endogenous problems such as "negative selection", it was still difficult to ensure that we obtained the causal effect of parents' involvement on children's academic development. Therefore, relevant researches need to be improved based on quasi-experimental design and other means. Third, based on the hukou and migration status, we divided all the children into four types and uncovered, compared the effect of parental involvement on the academic development of four types of children respectively, thereby offering parents targeted suggestions. However, due to the change of migration status and migration periods, the relationship between parental involvement and children's academic development may be change correspondingly, so relevant researches need to analyze based on longitudinal data.

Notes

1 *The most important and distinctive part of the "Head start" program is to help parents better get involved in their children's learning and life, for example, "providing parents with the trainings about home literacy skills and parenting skills in order to develop their skills to communicate with their children. See: http://www.nhsa.org/.*

2 *The "Success for All" program aims to interfere with the learning of students from disadvantaged families by guiding family support effectively, for example, "the program requires parents to accompany their students to read at home for 20 minutes every night, and teachers to provide appropriate guidance for parents." See: http://www.successforall.org/.*

3 *Since there is no uniform academic standardized test in the existing large public databases, it is feasible to use the student self-reported score ranking as a test score indica-*

tor. Although above act may be affect the accuracy and comparability of the measurement, considering that the study focuses on estimating the directionality of the impact (positive or negative), we think it is a compromise.

4 *The items of learning willpower, learning curiosity and self-learning ability are all ordered variables of 1-4. The higher the value, the better the academic development of the corresponding dimensions.*

5 *The assignment rules of self-education expectations: "Quit now" = 6 years (seventh grade) or 8 years (ninth grade); "Middle school graduation" = 9 years; "Secondary school/Technical school" or "Vocational High School" = 11 years; "High school" = 12 years; "College" = 15 years; "Four-year bachelor" = 16 years; "Graduate" = 19 years; "Doctor" = 22 years.*

6 *In terms of parental involvement, except for "Whether the parents are willing to show up the parent meeting" (dummy variable, 1= Yes, 0=No), all the other variables are 1-4 ordered variables, and the higher the value, the higher the frequency of the corresponding behavior.*

7 *In the three types of parental involvement, the variance contribution rate of the first common factor is more than 90%, indicating that it can represent most of the information in the items included in each parental involvement dimension.*

8 *"No education" = 0 year; "Primary school" = 6 years; "Middle high school" = 9 years; "Secondary school/Technical school" and "Vocational High School" = 11 years; "High school" = 12 years; "College" = 15 years; "Four-year bachelor" = 16 years; "Graduate and above" = 19 years.*

9 *The assignment rules of family economic conditions: 1 = Poor, 2 = Middle, 3 = Wealthy.*

10 *In the school questionnaire, 10 questions such as "Is there a laboratory", "Is there a swimming pool" (1 = Yes, 0 = No) are weighted and summed according to the reciprocal of the proportion, and then standardized.*

11 *Strictly speaking, an ordered logit model should be constructed, but this is not convenient for interpreting the interaction term coefficients. To this end, we construct a common two-level regression model with each academic development variable as a continuous variable, although the size of coefficients is biased, considering the main focus of the study, the directionality of coefficients will not be influenced.*

12 *In fact, combined with the data in Table 1 and the existing literature (Xie Guihua, 2012; Ma Xiaohong, 2014), the cultural quality of rural hukou parents is significantly lower than that of urban hukou parents, while the cultural quality of local parents are lower than non-local parents in terms of migration status.*

13 *The positive impact of learning curiosity is not significant only for UUMC.*

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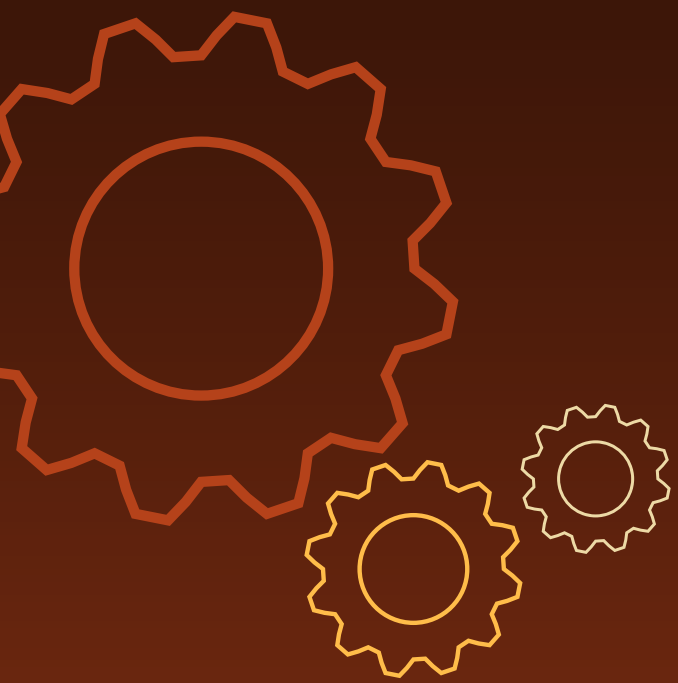

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