The Influence of Family Background on Junior Middle School Students' Cognitive Ability

Yujuan Chen

Social College, Shanghai University, Shanghai, China

christina0109@foxmail.com

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Abstract. This article is based on the "China Education Tracking Survey" 2013-2014 data, to explore the phenomenon of the poor family difficult to have a success child. The problem is embodied as the impact of family capital on junior high school students' cognitive ability and academic performance. The research results show that family capital has a significant effect on cognitive ability test scores, and its effect is lower than that of the group with higher cognitive ability scores; the family capital does not exist on the academic performance of young people. It has a significant effect, but it has a positive effect on academic performance by affecting cognitive ability.

Introduction

Family background is the social capital accumulated by the parents, which has an important influence on the life and development of the children. For junior high school students, their family background is a matter that individuals can not change. In recent years, it has been said on the Internet that it is difficult for a poor family to have a success child, believing that one's family background largely determines one's future development. Family background to a certain extent reflects its access to social resources. The heterogeneity of each family reflects the unbalanced distribution of social resources at the family level. The existence of this kind of inequality hinders the personal development of junior high school students.

To understand whether the development of junior high school students is related to their family background, it is necessary to understand what is related to the development of junior high school students. Studies have shown that cognitive ability is an important component of human capital (Hanushek, 2011, 1-6; Li Xiaoman, Zeng Xiangquan, 2012, 120-126) [1]. A lot of studies on labor economics show that cognitive ability can accurately predict a person's future education achievement and salary level (Autor, 2014, 43-51; Zhou Yang, Liu Xuejin, 2017, 66-75) [2]. More importantly, the formation of new skills requires a certain accumulation of previous skills (" skills beget skills ") (Cunha & Heckman, 2007, 31-47; Cunha et al., 2010, 883-931)[3], which means that it is very difficult to narrow the difference in adult cognitive ability (Almond & Currie, 2011, 4b)[4]; which also means that the cognitive ability during the period of education largely determines a person's future development prospects.

As for the meaning of cognition, American psychologist Wood believes that cognition refers to the psychological process covering the storage, retrieval and use of knowledge, including perception, memory, imagination, concept formation, reasoning, decision making, problem solving and language. Zhang Chunxing, a psychologist in Taiwan, puts forward that cognition is the mental process of an individual's cognition and understanding of things through conscious activities. For junior high school students, cognitive ability obtained by education is a comprehensive reflection of personal ability, which is related to the future development of junior high school students. As a result of the existence of college entrance examination system in China, academic performance is an important criterion of evaluating personal development. While the standard cognitive ability test does not contain personal academic performance. In this paper, the analysis of cognitive ability, will start from two aspects of cognitive ability and academic performance, and discuss its influence on the development of the junior middle school students, namely the cognitive ability.

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Literature Review

The importance of cognitive ability is indispensable for personal development. According to relevant studies, the improvement of cognitive ability can promote entrepreneurship and increase entrepreneurial income (Zhou Yang, Liu Xuejin, 2017) [2]. It can be seen the difference in cognitive ability has a significant impact on people's performance in the labor market. However, the cumulative effect of cognitive ability (Cunha & Heckman, 2007; Cunhaet al., 2010) [5], which makes the differences in the cognitive abilities of junior middle school students continuously expand in the subsequent growth process, and finally presents as the differences in education achievement and income level after adulthood (Jiang Qiuchuan, 2017) [6]. Therefore, the study on the cognitive abilities of junior middle school students and even earlier is more important.

In the research on the cognitive ability of junior middle school students, family background (Figlio et al., 2014) [7] and school characteristics (Chetty et al., 2014) are considered as the key factors affecting the individual cognitive ability[8]. If parents' participation in education is enhanced, it will significantly affect the difference in cognitive ability of junior middle school students (Huang Liang, 2016) [9]. Family economic status had a positive effect on the cognitive ability of junior high school students by influencing the preschool teachers of junior high school students (Wang Huimin, Wu Yuxiao, Huang Chao, 2017) [10]. In the research on the differences in cognitive skills between urban and rural junior high school students (Jiang Qiuchuan, 2017) [11], based on family background and school quality, it is believed that family characteristics have become the main factor for urban and rural students. Becker mentioned in family theory that family environment has a significant influence on the achievement of individual education. Coleman report found that family background is the main source of the achievement difference of students from different groups through the analysis of the factors affecting the academic performance of students of different RACES in the United States.

Scholars (Gevrek &Seiberlich, 2014) used Program for International Student Assessment (PISA) data to analyze the performance differences between 15-year-old boys and girls in reading, mathematics and science literacy in European countries [12]. The results showed that girls outperformed boys in science literacy, and most gender differences could be explained by school characteristics. However, using student performance studies (Fortin et al., 2015) [13] for students in grade 12 (for tin et al., 2015), the difference in achievement for both boys and girls can be attributed largely to their own causes. Another study looked at cognitive differences among students of different RACES and regions. However, there is no unified answer on which factor is the most important factor affecting students' cognitive ability. Many other studies have found that school characteristics are the main factor for the differences in students' cognitive abilities (Nieto & Ramos, 2015) [14].

There's also a study of the effect of peer behavior on individual cognitive abilities in the middle school, and it turns out that individual cognitive abilities are significantly different from the peer behavior. In addition, some scholars analyzed the relationship between the number of children in the family and the cognitive ability of middle school students according to Becker's "quantity of children -- quality balance theory" (Yuan Yuzhi, Ye Xiaomei, 2017, 34-38) [15]. The results showed that the number of siblings had a negative impact on the development of students' cognitive ability, and girls were more influenced by the number of children in the family than boys.

Combined with the review of appeal literature, you can see that in the study of cognitive abilities, most scholars are concerned about the family economics, parent participation, family environment. There's also a small amount of paper that focuses on the demographics of middle school students, the type of friends, and the number of people in the population. However, in the existing studies, it is rare to distinguish the different effects of academic performance and cognitive ability on the future development of junior high school students, and whether there are different effects of family background on academic performance and cognitive ability. Based on the Chinese education tracking data from 2013 to 2014, this paper focuses on the factor of family background and

analyzes the influencing factors of cognitive ability and academic performance of junior middle school students.

Data and Variable

Table I descriptive statistics of variables

variable	numbers	numerical	mean	meaning
dependent variable				
cognitive ability	15271	0-100	44.069	
academic grade	15271	0-300	211.841	
independent variables				
father occupation	15271	0，1，2	.651	0-2 means white collar, blue collar and handicraft worker
mother occupation	15271	0，1，2	.512	
father education	15271	1-9	7.794	1-9 means not in school --- graduate student or above
mother education	15271	1-9	3.107	
family economic	15271	0，1，2	1.005	0-2 means financial hardship--rich
self expectation	15271	1-10	6.970	higher number, higher expectation
peer groups	15271	0-3	2.312	percentage of good friends who are motivated
friend numbers	15271	0-99	10.836	
siblings numbers	15271	0-5	.545	
Registered residence	15271	0，1	.465	0 means rural，1 means city
sex	15271	0，1	.498	0 means girl, 1means boy
age	15271	16-22	18.532	

This study is mainly based on the Chinese education tracking survey (CEPS) data from 2013 to 2014. The data come from a large tracking project designed and implemented by the China survey and data center (NSRC) at Renmin university of China. In this paper, after removing the samples with missing values of relevant important variables, the effective sample number for modeling analysis was 15271.

In this paper, the cognitive ability test score and the score of the professional examination are selected as dependent variables. Meanwhile, for the convenience of understanding, the range of the standard score of cognitive ability is processed as [0,100]. The academic test score is the sum of the standardized scores of the three courses of Chinese, mathematics and foreign language in the fall semester, which is provided by the school and the value range is [0,300]. The higher the value of cognitive test score and academic test score, the stronger the cognitive ability of students.

This paper focuses on the influence of family background on cognitive ability. The main independent variable is the family background of junior high school students. Family background is defined as family economic capital, family cultural capital and family social capital. The data of CEPS are used to respectively manipulate these three aspects into the economic status of the family, the education level of the parents and the occupation of the parents.Keep your text and graphic files separate until after the text has been formatted and styled. Do not use hard tabs, and limit use of hard returns to only one return at the end of a paragraph. Do not add any kind of pagination anywhere in the paper. Do not number text heads-the template will do that for you.

Model

First, OLS linear regression model was established to fit the linear relationship between the independent variables set in table 1 and cognitive ability and academic performance. The model structure is shown as follows:

$$E(y|x) = X * \beta + \varepsilon \quad (1)$$

Where y is the dependent variable; X is the independent variable; β is the coefficient; and ε is the random perturbation term. The OLS model mainly depict the condition mean E(y|x) of dependent variable y on the independent variable X. Conditions mean E(y|x) easily affected by extreme value, and unable to a comprehensive understanding of Y|X. Therefore, quantile regression is proposed, and the model setting of quantile is as follows:

$$Qy(y|x) = X * \alpha + Q_U(\tau) \quad (2)$$

Where $\tau \in (0,1)$, α is coefficient, Qy(y|x) is the τ distribution of y. Qu (τ) is τrandom disturbance. Quantile regression uses residual weighted average as the objective function of minimization, which is not susceptible to the influence of extreme values, and the results are relatively robust. Meanwhile, quantile regression also provides a comprehensive understanding of conditional distribution Y|X.

Empirical Analysis

Cognitive Ability.

It can be seen from the output results of model1 (table 2) that family background has an important influence on the cognitive ability of junior high school students. Parents' occupation, education level and family economic level have significant positive effects on the cognitive ability of junior high school students. The cognitive ability will be improved by nearly one unit for each grade of maternal occupation, and the promotion effect is significant. The role of father's career is not very significant for cognitive ability, which is related to the way of domestic production in China. In family activities, father and mother assume different responsibilities, and most children's education and life are all the responsibility of their mother, which is the reason why the mother's work will play a significant role in the cognitive ability of junior middle school students. In addition, Parents' cultural capital has a significant effect on cognitive ability; parents' education level and cognitive ability was significantly positive correlation, same as the family economic status. The higher the education level of parents, the more attention they pay to the cultivation of family cultural atmosphere. At the same time, they can also teach junior high school students their own ideological and cultural knowledge, which is conducive to the improvement of cognitive ability. The better the economic condition of the family, the more opportunities it can provide for junior high school students to improve their knowledge, and the more it can promote the improvement of cognitive ability.

Academic Achievement.

From the model2 and model3(table 2), family background has little or no effect on academic performance. In model 2, only the mother's cultural capital and the family economic capital have tiny effect on academic performance, and in model 3, adding cognitive, the mother's cultural capital effect of is still not big, and the influence of family economic capital effect increased; but in the model 2 and model 3, it has the negative influence on academic achievement. The reasons for this phenomenon is due to different between academic performance and cognitive ability. Academic achievement is targeted at a specific discipline. When family economic capital is higher, the family cultural capital in the offspring from the above is not significant. The family background, not rich family, will pay more attention to the child's cultural capital, namely academic performance. Because of China's college entrance examination system, an important way of upward mobility, is still by improving the individual cultural capital. From model 3, cognitive ability has a significant effect on academic performance. Since family background has a significant positive impact on cognitive

ability, it can be considered that family background indirectly affects the academic performance by influencing their cognitive ability.

Table II OLS regression model of cognitive ability and academic performance

	Model1	Model2	Model3
variables	Cognitive ability	Academic performance	Academic performance
Cognitive ability			0.4218***
			(0.0106)
father occupation	0.5096*	-0.1720	-0.3869
	(0.2424)	(0.3336)	(0.3176)
mother occupation	0.9989***	0.152	-0.2689
	(0.2596)	(0.3573)	(0.3402)
mother education	0.3210***	0.3251*	-0.3197*
	(0.0955)	(0.1290)	(0.1251)
father education	0.5669***	-0.1842	0.0860
	(0.0937)	(0.1313)	(0.1229)
family economic	1.6557***	-0.9336*	-1.6320***
	(0.2866)	(0.3944)	(0.3758)
self expectation	1.9459***	4.5718***	3.7509***
	(0.0824)	(0.1134)	(0.1099)
friend numbers	-0.0551***	-0.0993***	-0.0761***
	(0.0091)	(0.0125)	(0.0119)
peer groups	3.5728***	5.4690***	3.9619***
	(0.2215)	(0.3048)	(0.2926)
siblings numbers	-0.5478**	1.0167***	1.2478***
	(0.1870)	(0.2572)	(0.2449)
Registered residence	1.6288***	-2.3655***	-3.0526***
	(0.3079)	(0.4236)	(0.4036)
sex	2.0604***	-8.5534***	-9.4226***
	(0.2773)	(0.3816)	(0.3639)
age	-3.0265***	-2.0816***	-0.8049**
	(0.1930)	(0.2656)	(0.2548)
_cons	71.6120***	209.5920***	179.3830***
	(3.5633)	(4.9032)	(4.7286)
p	0.0000	0.0000	0.0000

Standard errors in parentheses

* p < 0.05, ** p < 0.01, *** p < 0.001

Combining model 1 and model 3, quantile regression was performed on the data. The effects of various variables on cognitive ability and academic performance at different quantiles are shown in table 3 and table 4.

The output of quantile regression only selects few variables. The positive effect of family economic capital on cognitive ability increases with the increase of quantile, which indicates that family economic growth has a very significant effect on the improvement of cognitive ability. Improving the economic status of the family can improve the children's cognitive ability to a higher level, but under the regression of most quantiles, family background has no effect on academic performance. Cognitive abilities for academic performance on all quantile have significant positive effects, and the effect decreased with the increase of cognitive ability.

This suggests that the cognitive ability is intermediate mechanism of family background, family background by influencing the students' cognitive ability, in turn, affect the academic performance of junior middle school students, higher scores for the academic performance of junior middle school students, strength weakened the influence of cognitive ability, the academic achievement with many factors outside of family background.

Table III Quantile Regression of Cognitive Ability

τ	fath_occu	moth_occu	fath_edu	moth_educ	Fami_econo	self_expec	Pee_group
10	0.5176	0.9238	0.6984***	0.3018	0.8983	1.5227***	1.5893***
20	0.7099*	0.8648**	0.6122***	0.3498*	2.2023***	1.9067***	1.3305***
30	0.7093**	1.0730***	0.6120***	0.3873**	1.8598***	2.0377***	1.5567***
40	0.5702	1.2797***	0.5963***	0.4636***	1.6835***	2.1018***	1.7565***
50	0.7861**	1.0847***	0.4876***	0.3504*	2.1341***	2.1951***	1.5374***
60	0.9088*	1.1930***	0.4726***	0.2899	1.7920***	2.3563***	1.4332***
70	0.6655*	0.8636***	0.4604**	0.3768**	1.8705***	2.3802***	1.4785***
80	0.2485	1.1404***	0.4691**	0.2750*	1.8613***	2.4664***	1.6680***
90	-0.1059	1.1103*	0.6087***	0.3027	1.8700**	2.4918***	1.2265***

Table IV Quantile Regression of Academic Performance

τ	con_abilit	fath_occu	moth_occu	fath_edu	moth_educ	Fami_econo	self_expec	Pee_group
10	0.6098***	-0.5479	0.0196	0.2601	-0.621*	-1.639**	3.7361***	2.0976***
20	0.5922***	0.0176	-0.0996	-0.1142	-0.31**	-1.811**	4.0216***	2.1068***
30	0.5274***	0.006	-0.4904	-0.0796	-0.1505	-1.3123*	4.2846***	1.7779***
40	0.4819**	0.0251	-0.5585	0.0781	-0.2059	-1.4487*	4.1722***	1.7618***
50	0.4248***	-0.036	-0.9273*	0.1482	-0.0746	-1.3780*	4.1763***	1.7111***
60	0.3658***	-0.2507	-0.7647*	0.2368	-0.2046	-1.2017*	4.1668***	1.4692***
70	0.3164***	-0.5857*	-0.3955	0.1324	-0.162	-1.177**	3.9566***	1.4766***
80	0.2681***	-0.5094	0.0038	0.0773	-0.315*	-1.63***	3.8152***	1.5438***
90	0.2076***	0.0547	-0.4469	-0.1768	-0.2238	-1.81***	3.4918***	1.3209***

Combined with the results of the model analysis, it can be seen that family background has a significant impact on cognitive ability, whether it is the direct effect of family background on cognitive ability or the impact of cognitive ability on academic performance. Since academic performance still largely determines a person's future, this seems to confirm the claim that children come from poor families.

Conclusion

This paper attempts to explore the truth of whether it is difficult to have success child in a poor family. Combined with the data of "China education tracking survey (CEPS)" from 2013 to 2014, this paper concretely translated the viewpoint into the influence of family background on the cognitive ability of junior high school students. Based on the results of OLS and quantile regression model, the following conclusions are drawn.

For junior high school students, family background has a significant positive effect on cognitive ability. Specifically, the cultural capital, economic capital and social capital of the fathers have positive effects on cognitive ability, but neither the cultural capital, economic capital nor social capital of the fathers has any influence on academic performance. This does not mean that family has no effect on academic performance; because among the influencing factors of academic performance, cognitive ability has a significant positive effect, while family background affects cognitive ability. As the future development of individuals largely depends on the cognitive ability accumulated during adolescence (Autor, 2014; Zhou Yang, Liu Xuejin, 2017), and academic performance is an important way of class mobility. It can be considered that family background influences the imbalance of social resources, including education resources, through its unique mechanism of action, so that teenagers with different family backgrounds have different cognitive abilities.

It is not only a conclusion but also a social phenomenon that it is difficult for a poor family to have success child. Due to education resource allocation imbalance on family level, personal development is more and more dependent on family background. Family background tends to be transmitted through children, which exacerbates class solidification and social inequality. Therefore, in order to weaken the influence of family background, the government should increase the

investment in basic education, promote the fairness of education resources, and narrow the differences caused by family background.

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