

The Impact and Mechanism of Career Expectations of Only Child Families on Academic Performance in Distance Education

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Abstract:

Based on PISA2022 data, this study analyzes the impact of family career expectations on the academic performance of only child and the mediating mechanism. Research has found that (1) only child have significantly higher academic performance, family career expectations, self career expectations, and self-efficacy than non- only child; (2) Family career expectations positively predict academic performance; (3) Self career expectations play a mediating role between family career expectations and academic performance; (4) Self efficacy plays a mediating role between family career expectations and academic performance; (5) Self career expectations and self-efficacy play a chain mediating role in the relationship between family vocational education expectations and academic performance.

Keywords:Distance education; Family career expectations; Only child; Academic performance;

1. Introduction

Distance education is also an important supplementary teaching method in today's primary and secondary school education. Compared to offline teaching, the influence of schools in distance education is much weaker, and students rely more on self-management skills for home learning. Whether students have lofty aspirations can significantly predict their self-management ability, therefore, traditional Confucian culture in China places particular emphasis on aspiration education. In modern society, aspiring education is closely linked to vocational education, and career expectations have become an important manifestation of life goals. So, will family career expectations affect students' academic performance? If possible, what is its mechanism of action? These issues are worth exploring in depth.

1.1 Family career expectations and academic performance

Research on family expectations mostly focuses on family education expectations and family career expectations, among which research on family career expectations mainly focuses on, for example, gender^[1], international comparison^[2], subject.^[3] Previous studies have shown that family background and parental occupation have a significant positive impact on family career expectations^[4]. Meanwhile, some researchers have also found that family background significantly positively predicts students' ac-

ademic performance^[5], thus proposing H1: Family career expectations positively predict academic performance.

1.2 Self professional expectations

There are many studies on the relationship between parental occupation, social status, family background, and students' self career expectations. These studies have found that family background can significantly influence students' self career expectations.^[6] A specialized classification has been formed regarding the impact of parental occupation on children's careers, which is intergenerational occupational mobility. Some studies suggest that parents' professions and social status significantly influence their children's career expectations.^[7] At the same time, students' self career expectations can significantly affect academic performance.^[8] Therefore, H2 is proposed: Self career expectations mediate the relationship between family career expectations and academic performance.

1.3 Self efficacy

Self efficacy was proposed by psychologist Bandura, who believes that self-efficacy is the level of confidence people have in their ability to use their skills to complete a certain work behavior. Luthans gave a more specific definition: "Self efficacy refers to an individual's precise belief (or confidence) in their ability to mobilize necessary machinery, cognitive resources, and a series of actions to successfully complete a specific task in a certain context."^[9] Previous studies have found that student self-efficacy

can significantly predict their academic performance^[10], and self-efficacy is highly correlated with career expectations.^[11] This means that self-efficacy, career expectations, and academic performance may also be highly correlated. Therefore, H3: Self efficacy plays a mediating role between career expectations and academic performance.

1.4 Only child and non-only child

There are also studies indicating that the scale of family fertility is closely related to the family resources that children can access. A study has found that larger families have a decrease in per capita family support for their children, resulting in a resource dilution effect^[12], Therefore, reducing the size of family childbirth can help improve academic performance.^[13] This means that only child receive more family resources than non- only child. Therefore, H5 suggests that only child have significantly higher

academic performance, family career expectations, self career expectations, and self-efficacy than non- only child. There are few studies on the career expectations of only child, and even fewer related studies on distance education for only child. Therefore, this study focuses on the vocational education situation of only child, exploring the impact of family career expectations on academic performance under distance education, and the chain mediating effect of self career expectations and self-efficacy. In summary, this study takes self career expectations and social efficacy as mediating variables, and whether only child are the moderating variable, in order to explore the relationship between family vocational education expectations and academic performance of only child. The hypothetical diagram of its model is as follows (as shown in Figure 1):

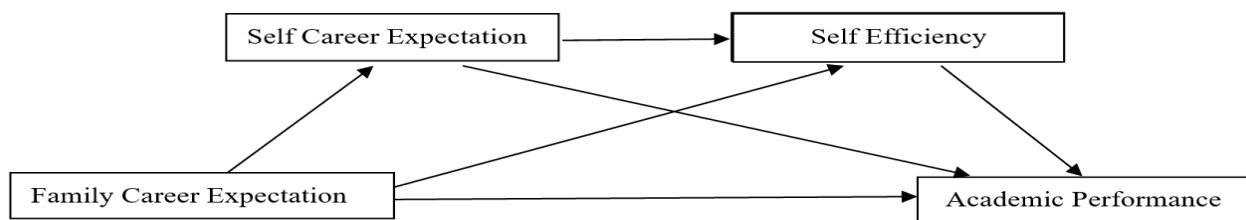


Figure1. the role of chain mediation between family career expectation and academic performance

Figure1. hypothesis model

2. Research Design

2.1 Data source

This study used the International Student Assessment Program (PISA) database led by the International Organization for Economic and Trade Cooperation, with the main test subjects being 15-year-old junior high school students. This study selected countries and regions from the PISA2022 database that have been closed for more than 1 year and have implemented distance education for all students based on test questions ST347Q01JA and SC-214Q01JA as the data for this study. After data cleaning, use SPS25.0 and the SPSS macro program process developed by Hayes (2013) to organize and analyze the data.

2.2 Research variables

2.2.1. Academic performance. PISA estimates the probability distribution of each student's level in science, mathematics, and reading tests using Project Response Theory (IRT), and presents scores with 10 Plausible Value. This study intends to take PV1 to understand the overall liter-

acy level of students in their subjects, and normalize the average PV1 of the three subjects to obtain a standardized score as the research object.

2.2.2. Family career expectations and self career expectations. PISA borrows the ISCED educational classification to evaluate parents' career expectations for students and generates the Family Career Expectation Index (PAR-EXPT), and uses the same method to generate the BSMJ index to test students' self career expectations.

2.2.3. Self-efficacy. PISA has set up 8 questions related to digital learning and independent learning to test students' confidence in future digital learning. Each question has 4 answers, from high to low: very confident, confident, not very confident, not at all confident, and has generated the Self Efficacy Index (SDLEFF).

2.2.4. Is it an only child or not. PISA2022 uses the test question ST230Q01JA to test the number of brothers and sisters in a student's family. In the scale, the number 1 represents 0, the number 2 represents 1, the number 3 represents 2, and the number 4 represents 3 or more. This research recodes them in the way that the only child is 1,

and the non- only child is 0, to get a binary variable of whether the only child is an only child or not.

2.2.5. Control variable. In PISA, the Family Socio Economic and Cultural Background Index (ESCS) is composed of three indicators: Family Wealth Index, Parental Education Level, and Occupational Status. This study

intends to use this indicator as the control variable. The gender variable is set to 1 for males and 0 for females.

3. Research results

3.1 Descriptive statistical results

Table1. the description of main variables

Variable	Total		Single-child Family		Non- only-child Family		t
	Mean	SD	Mean	SD	Mean	SD	
DV							
Mean Score	467.54	94.130	482.814	94.688	465.929	93.236	-13.926***
IV							
Self Career Expectation	6.960	2.037	7.070	1.954	6.940	2.045	-1.499
MV							
Family Career Expectation	13.989	2.685	14.253	2.433	13.961	2.709	-2.586**
Self Efficiency	0.029	0.972	0.093	0.991	0.023	0.970	-1.883*
CV							
Family Status	-0.206	1.079	-0.143	0.976	-0.213	1.089	-4.223***
Gender	0.530	0.499	0.510	0.500	0.530	0.499	0.990

***p<.01, **p<.05, *p<.1

The results of the difference analysis between only child and non--only child in various variables in Table 1 show that only child is significantly higher than non- only child in academic performance, family career expectations, self-efficacy, and family background (p<0.1), but self ca-

reer expectations (p>0.1) and gender (p>0.1) are not significant (not significant). Part H5 is established.

3.2 The impact of family career expectations on the academic performance of only child

Table2. the linear regression result of chain mediation model

Academic Score	Coef.	St.Err.	t	[95% Conf	Interval]
Self Career Expectation	0.005	0	14.43***	0.005	0.006
Self Efficiency	0.055	0.006	8.46***	0.042	0.067
Family Career Expectation	0.025	0.004	6.98***	0.018	0.032
Family Status	0.358	0.006	58.26***	0.346	0.37
Gender	-0.094	0.013	-7.37***	-0.118	-0.069
R ²	0.187		Adj R ²	0.187	

***p<.01, **p<.05, *p<.1

In order to gain a preliminary understanding of the relationship between the main variables and the academic performance of only child, we first conducted regression analysis based on the constructed theoretical model, as shown in Table 2. The subsequent content focuses on the “predictive effect”. The results of this model indi-

cate that career expectations, self-efficacy, family career expectations, and family background can significantly positively predict academic performance (p<0.001). However, gender significantly negatively predicted academic performance (p<0.001), indicating that the academic performance of only child was significantly lower than that

of only girls. Family background has a more significant impact on academic performance (Coef.=0.358, $p<0.001$).

3.3 The mediating role of self career expectations and self-efficacy

As shown in Table 3, there is a significant correlation between variables such as family career expectations, self

career expectations, self-efficacy, and academic performance of only child, which to some extent satisfies the prerequisite for testing the mediating effect. In addition, there is a significant correlation between the variables but not a high degree of correlation ($r>0.8$), indicating that there is no significant multicollinearity issue.

Table3. the correlation analysis of main variables

	Academic performnce	Self Career Expectation	Self Efficiency	Family Career Expectation
Academic Performnce	1.000			
Self Career Expectation	0.162***	1.000		
Self Efficiency	0.121***	0.109***	1.000	
Family Career Expectation	0.124***	0.295***	0.100***	1.000

*** $p<.01$, ** $p<.05$, * $p<.1$

Based on the above results and research hypotheses, a chain mediation model was constructed for family career expectations, self career expectations, self-efficacy, and academic performance of only child. The chain mediation effect was tested using the process macro program of SPSS software to examine the mediating effect between family career expectations and academic performance of only child. The specific path relationships between

variables in the model are shown in Figure 2. Family career expectations positively predict only child academic performance (Std=0.039, $p<0.001$), self career expectations (Std=2.929, $p<0.001$), and self-efficacy (Std=0.039, $p<0.001$), and H1 holds true. Moreover, self-efficacy (Std=0.098, $p<0.001$) and career expectations (Std=0.007, $p<0.001$) significantly positively predict the academic performance of only child.

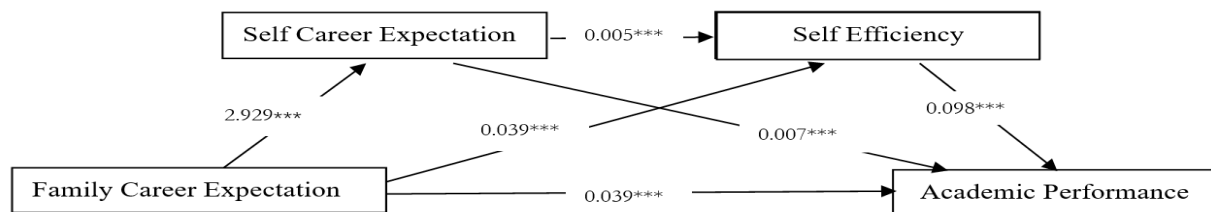


Figure2. the role of chain mediation between family career expectation and academic performance

Figure2.the role of chain mediation between family career expectation and academic performance

In order to test the mediating effect between family career expectations and academic performance of only child in terms of self-efficacy and self-efficacy, this study further decomposed the path effect of the chain mediation model. The bias corrected non- parametric percentile Bootstrap

estimation method was used to perform 5000 repeated sampling on the sample (n=1075), and the 95% confidence interval was calculated. The results are shown in Table 4.

Table4. results of chain mediation effect test

Path	Effect Value	SE	[95% Conf Interval]		P-value
			Low	High	
Family Career Expectation→ Self Career Expectation→ Academic Performance	0.020	0.001	0.017	0.022	0.000***
Family Career Expectation → Self Efficiency→ Academic Performance	0.004	0.001	0.003	0.005	0.000***
Family Career Expectation→ Self Career Expectation→ Self Efficiency→ Academic Performance	0.001	0.0001	0.001	0.002	0.000***

***p<.01, **p<.05, *p<.1

Firstly, examine the mediating role of self career expectations. In this path, the indirect effect value of family career expectation on the academic performance of only child is 0.020, with a 95% confidence interval between 0.001 and 0.017, excluding 0. This indicates that self career expectation plays a significant mediating role between family career expectation and only child academic performance, and H2 is established.

Secondly, examine the mediating role of self-efficacy. In this path, the indirect effect value of family career expectations on the academic performance of only child is 0.004, with a 95% confidence interval between 0.001 and 0.003, excluding 0. This indicates that self-efficacy plays a significant mediating role between family career expectations and the academic performance of only child, H3 is established.

The indirect effect value of family career expectations on the academic performance of only child in the path where both career expectations and self-efficacy play a mediating role is 0.001, with a 95% confidence interval between 0.0001 and 0.001, excluding 0, indicating that career expectations and self-efficacy have a chain mediating effect, and H4 is established.

By comparing the effect values of these three paths, it was found that the effect values of the three paths gradually decreased, indicating that self career expectations had the highest mediating effect on the impact of family career expectations on the academic performance of only child. The mediating effect of self-efficacy alone is significantly smaller than self career expectations. Meanwhile, the mediating effect of the chain of self career expectations and self-efficacy is the lowest, indicating that family career expectations influence academic performance more through influencing self career expectations.

4 Discussion

This article uses the PISA2022 database, based on OSL regression and chain mediation model, to analyze the impact and internal mechanism of family career expectations on the academic performance of only child, which helps to improve the teaching effectiveness of secondary distance education. Based on the above research, it can be found that: firstly, in addition to career expectations, only child have significantly higher family career expectations, self-efficacy, and academic performance than non--only child. Previous studies have shown that only child have access to more educational resources than non--only child, and therefore are more able to focus on learning itself and achieve higher academic performance.

Secondly, there is a significant positive correlation between family career expectations and academic performance of only child. This indicates that family career expectations can also generate the Pygmalion effect, which is subtly transmitted to children through family education, thereby significantly improving the academic performance of only child.

Thirdly, mediation analysis reveals that family career expectations not only have a direct impact on the academic performance of only child, but also indirectly influence their academic performance through the effects of self career expectations and self-efficacy. Among them, the path where family career expectations indirectly affect the academic performance of only child through self career expectations has the highest effect value. This indicates that for only child, establishing their self career expectations can significantly improve their academic performance.

5. Conclusion

(1) The academic performance, family career expecta-

tions, self career expectations, and self-efficacy of only child are significantly higher than those of non-only child; (2) Family career expectations positively predict academic performance; (3) Self career expectations play a mediating role between family career expectations and academic performance; (4) Self efficacy plays a mediating role between family career expectations and academic performance; (5) Self career expectations and self-efficacy play a chain mediating role in the relationship between family vocational education expectations and academic performance.

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