

The effects of children's self-educational aspiration and self-efficacy on mathematics achievement: A moderated chained mediation model

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Título: Los efectos de la aspiración autoeducativa y la autoeficacia en el rendimiento en matemáticas de los niños: Un modelo de mediación en cadena moderado.

Resumen: Muchos estudios previos han discutido la influencia de factores extrínsecos (por ejemplo, entorno vital) en el logro académico de los niños de China occidental. El presente estudio se centró en cuatro factores no cognitivos, la aspiración autoeducativa, la autoeficacia, la motivación instrumental y la ansiedad, los cuales podrían afectar el logro matemático. El propósito de este estudio fue investigar los mecanismos por los cuales estos cuatro factores no cognitivos afectaron el logro matemático. Un total de 5774 estudiantes de primaria de 4° y 5° grado en el oeste de China participaron en este estudio. Se construyó un modelo de mediación encadenado moderado. Los resultados mostraron que la aspiración autoeducativa podría predecir positivamente el logro matemático. Sin embargo, la motivación instrumental y la ansiedad formaron una mediación encadenada entre la aspiración autoeducativa y el logro matemático, y predijeron negativamente el logro matemático. Además, la autoeficacia desempeñó un papel moderado en la relación entre la aspiración autoeducativa y la ansiedad.

Palabras clave: Aspiración autoeducativa; Autoeficacia; Motivación instrumental; Ansiedad; Logro matemático.

Abstract: Many previous studies have discussed the influence of extrinsic factors (e.g. living environment) on academic achievement of children from western China. The present study focused on four non-cognitive factors, self-educational aspiration, self-efficacy, instrumental motivation, and anxiety, which could affect mathematics achievement. The purpose of this study was to investigate the mechanisms how these four non-cognitive factors affected mathematics achievement. 5774 primary school students from fourth and fifth grade in western China participated in this study. A moderated chained mediation model was constructed. The results showed that self-educational aspiration could positively predict mathematics achievement. However, instrumental motivation and anxiety formed chained mediation between self-educational aspiration and mathematics achievement, and negatively predicted mathematics achievement. Besides, self-efficacy played a moderated role in the relationship between self-educational aspiration and anxiety.

Keywords: Self-educational aspiration; Self-efficacy; Instrumental motivation; Anxiety; Mathematics achievement.

Introduction

Primary school stage is a crucial period for children's future achievement. There are a variety of factors that affect students' academic achievement, including cognitive factors and non-cognitive ones. In recent decades, psychologist and educationist are more interested in children's non-cognitive factors. Most previous researches discussed the influence of extrinsic factors on academic achievement like living environment, volumes of books, learning resources and so on (Zhang, Bian, Wang, & Yuan, 2012; Zhang, Luo, Tao, Luo, & Dong, 2015). A research of the Central Institute of Educational Science and Tian (2011) emphasized the important role of economic conditions and external resources. The result of their research showed that there were significant differences in the level of children's academic achievement between western China and eastern China. The level of children's academic achievement in eastern China was significantly higher than that of the western China in where economy was slightly behind. However, with the implementation of the western development strategy in China in recent

years, these extrinsic materials or environment in western China improved tremendously. However, there were few studies concerning the relationship between non-cognitive factors and academic achievement from the psychological perspective of individuals. Therefore, it is of great importance to explore the relationships between students' own non-cognitive factors and achievement in the context of western China.

Parental educational expectation is one of the most famous non-cognitive factors in previous studies. Parental educational expectation is the educational degree that parents expect their children will be (Yamamoto & Holloway, 2010). Dozens of researchers have proved that parental educational expectation positively correlated with children's academic achievement (Aldous, 2006; Creed, Conlon, & Zimmer-Gembeck, 2007; Schoon, Parsons, & Sacker, 2004; Strand, 2011; Thiessen, 2007). Though parental educational expectation has positive correlation with students' academic attainment, it might not be a direct effect (Sy & Schulenberg, 2005). Self-educational aspiration might be the key factor. Abiola (2014) believes that self-educational aspiration is a significant variable for predicting academic achievement. He explains that self-educational aspiration is an academic achievement motivation which will make students desire to succeed. Some researchers hold that students' academic achievement is affected by parental educational expectation via their self-aspiration (Nilsen, 2011; Rutchick, Smyth, Lo-

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poo, & Dusek, 2009). In sum, most previous researches have discussed how parental expectation affects students' academic achievement, but few researches stand on the point of students themselves to explore how students' self-educational aspiration directly affects their academic achievement.

Amongst the non-cognitive factors that affect academic achievement, learning motivation is another research hotspot. Learning motivation refers to a psychological tendency that stimulates and maintains individual learning behavior so that their learning desires can be satisfied (Schraw & Sinatra 2004). Many researches indicate that students' learning motivation has significant and positive impacts on academic achievement (Singh, Granville, & Dika, 2002). Uguroglu and Walberg (1979) read up a lot of research reports concerning the relationships between motivation and achievement. They find that the higher motivation level a student has, the higher achievement he will get. Motivation was considered as an integral factor in early studies, but it is furtherly divided into distinctive two types recently. Researchers from OECD (Organization for Economic Co-operation and Development) propose that learning motivation can be divided into intrinsic motivation and instrumental motivation. Intrinsic motivation refers to the fact that students learn something because they like it, while instrumental motivation is that students learn something for they think it useful (OECD, 2013; OECD, 2014). Although those two types of motivation and academic performance are closely related, instrumental motivation is the predominant factor when students are in primary education, in the meantime, their intrinsic motivation is rather weak (Giannelli & Rapallini, 2018; OECD, 2013). Besides, Lens, Paixão and Herrera (2009) think that the instrumental motivation based on future goals is autonomous and of high quality. Therefore, it is worthwhile to investigate how primary school students' instrumental motivation will affect mathematics achievement.

Self-efficacy also affects academic achievement. Self-efficacy was proposed by Bandura (1977) and defined as an indicator of confidence in the competence of fulfilling a task. Bandura also pointed out that self-efficacy can enhance or weaken motivation. Individuals with high self-efficacy tend to choose challenging tasks and take efforts to fulfill them (Bandura, 1995). There is a significant positive correlation between self-efficacy and academic achievement (Loo & Choy, 2013). Zajacova, Lynch and Espenshade (2005) also think that self-efficacy can predict academic success.

In addition, learning anxiety neither should be ignored. Many researchers have shown that learning anxiety has a crucial effect on academic achievement (Daniela, Margherita, Moè, Robert, & Stephanie, 2018; Macher, Paechter, Papoušek, & Kai, 2012; Nunez-Pena, Suarez, Bono, 2013). El-Anzi and Owayed (2005) find that academic achievement is negatively correlated with anxiety. Tuncer and Dogan (2015) point out that students' anxiety strongly predicts their academic performance. Anxiety can negatively affect the academic achievement. When one's anxiety increases, his aca-

ademic achievement will decrease to a certain extent (Mohammad, Akhtar, Saira, & Syeda, 2012). Beyond that, Ashcraft (2002) also believes that in the process of mathematics learning, highly anxious individuals would like to avoid mathematics, which will ultimately weaken their mathematics competence and lead to poor academic performance.

The simple relationships between academic achievement and motivation, academic achievement and self-efficacy, academic achievement and learning anxiety, are clear. However, these variables may take place together and correlate with each other. Many in-depth studies have been done. Some researchers are interested in self-efficacy. They find that self-efficacy can strongly predict the motivation (Skaalvik, Federici, & Klassen, 2015). And self-efficacy could also predict academic performance (Kalaycioglu, 2015). Ahuja (2016) believes that self-efficacy together with self-educational aspiration significantly and positively predict academic achievement. Many researchers concentrate on exploring the relationship between self-efficacy and educational anxiety. Some previous studies show that self-efficacy have significantly passive correlations with mathematics anxiety (McMullan, Jones, & Lea, 2012; Razavi, Shahrabi, & Siamian, 2017). Akin and Kurbanoglu (2011) also think that self-efficacy predicts mathematics anxiety negatively. All these studies above prompt us that self-efficacy may play a moderated role and anxiety may play a mediated role.

When researchers took motivation into consideration, the mechanism became more complex. Wigfield and Eccles (2000) believe that children with high educational aspiration tend to have stronger motivation. Taylor and Brown (1988) hold that positive self-aspiration could improve students' academic achievement via strengthening their learning motivation. While higher motivation would bring in higher level of anxiety (Essau, Leung, Conradt, Cheng, & Wong, 2008). Thus, it seems like learning motivation and learning anxiety work as chained mediation between self-educational aspiration and academic achievement.

In general, owing to the lack of systematic researches on non-cognitive factors of primary students' achievement, the relationships of all these non-cognitive factors are still ambiguous. And the mechanism of the effects of all these non-cognitive factors on mathematics achievement is unclear.

The present research

The purpose of this research was to investigate the non-cognitive factors which could affect primary students' mathematics achievement in the context of western China, that is, to investigate the combined effects of primary school students' self-educational aspiration, self-efficacy, instrumental motivation and anxiety on mathematics achievement. In addition, the previous questionnaires for measuring self-efficacy, instrumental motivation, and anxiety were not suitable for evaluating primary students. So the new questionnaires were demanded. Based on the analyses above, this

study made the following hypotheses: (1) Students' self-educational aspiration and self-efficacy could significantly and positively predict mathematics achievement. (2) Students' instrumental motivation and anxiety acted as mediators between self-educational aspiration and mathematics

achievement. Specifically, instrumental motivation and anxiety worked as the chained mediation. (3) Self-efficacy played a moderated role in the relationship between self-educational aspiration and mathematics anxiety. The hypothetical model is presented in Figure 1.

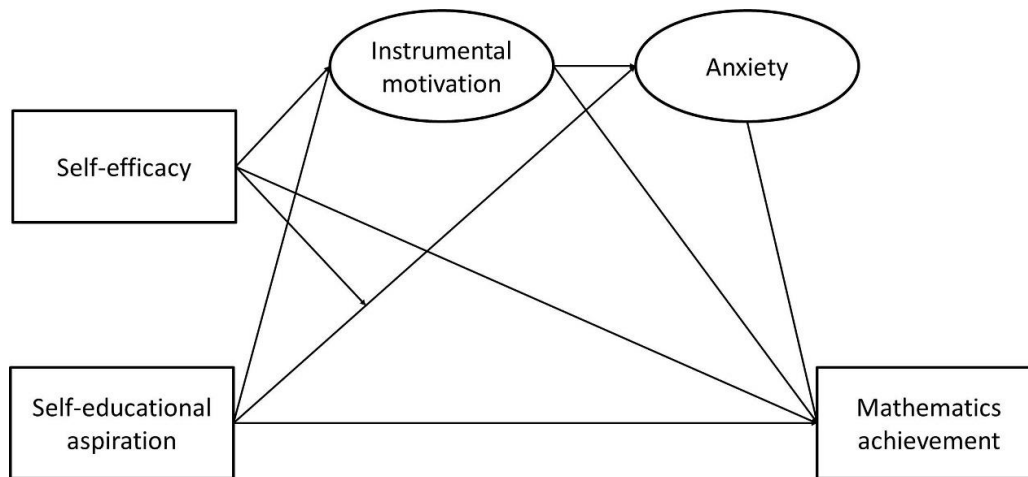


Figure 1. Hypothetical model.

Methods

Participants

The protocol of our research was approved by the ethics committee of the Academy of Psychology and Behavior, Tianjin Normal University. Our research did not involve cheating or other acts which would violate ethics. Because the measures used in the present study are more suitable for senior primary school students, 5776 fourth and fifth grade students including 2973 boys and 2803 girls completed the tests. Their average age was 11.50 (The average age of fourth grade students was 10.80 while the average age of fifth grade students was 12.16).

All participants came from five western provinces, which were selected conveniently from twelve provinces of western China. There were totally 60 schools included (12 schools per province). Two classes, one from grade 4 and another from grade 5 were chosen randomly. A dozen local teachers who can speak dialect were recruited from the local education commission, not from sample schools, together with postgraduate students of our university fulfilled the test administrations. Before the test administrations, test administrators would emphasize that all the data can be only used for research and the results would keep strictly confidential and would not be fed back to schools. Beyond that, the recruited local teachers would interpret in dialects if someone had problems with questionnaires to ensure that each student understood the meaning of the questionnaires. All questionnaires and materials were packed and mailed back to our university as soon as data collection was over.

Measures

Self-educational Aspiration Questionnaire

The Self-educational Aspirations Questionnaire had only one item and was revised based on the item that measured students' educational aspiration developed by Zhang, Haddad, Torres and Chen (2011). The item was what is the highest degree of education you want to get? There were 6 options: 1 = primary school education, 2 = junior high school education, 3 = senior high school education (including vocational high school and technical secondary school), 4 = university education (including college and bachelor degree), 5 = postgraduate education (including master and doctor degree), and Not Clear. If a student did not understand the concept of the options, he could choose the sixth option "Not Clear". If participants chose "Not Clear", the response to item would be regarded as a missing value.

Instrumental Motivation Questionnaire

Exploratory factor analysis was used to analyze PISA 2012 Mathematics Learning Motivation Scale in a pilot study, and the results showed that there were two factors: mathematics instrumental motivation and mathematics intrinsic motivation. The former concept was retained, and a new instrumental motivation questionnaire was developed to investigate primary school students' instrumental motivation in mathematical learning. There were four 4-points items in this scale (from 1 = strongly disagree to 4 = strongly agree). Instrumental motivation was processed as a latent variable in structural equation model (SEM).

Self-efficacy Scale

Self-efficacy Scale was also newly developed for primary students' mathematical learning. Three 4-points items (from 1 = strongly disagree to 4 = strongly agree) were constructed. The standard scores of self-efficacy were treated as a manifest variable in SEM.

Anxiety Scale

Anxiety Scale which contained three 4-points items (from 1 = strongly disagree to 4 = strongly agree) was revised based on mathematics anxiety scale from OECD (2014). It was processed as a latent variable in SEM.

Mathematics Achievement Test

The Mathematics Achievement Test was compiled by the primary school teachers and educational measurement experts from the Mathematics Curriculum Standards of Compulsory Education. It could evaluate students' mathematics achievement by using 30 multiple-choice items from four dimensions: algebra, space and graphics, statistics and pro-

bability, practice and integrated application. The mean of item difficulties was 0.55, and the mean of item discriminations was 0.25. The standard scores of mathematics achievement were treated as a manifest variable in SEM.

Data analysis

IBM SPSS 24.0 was used to preprocess data and do descriptive statistics. Mplus 8.0 was used to run the multiple latent mediated models.

Results

Questionnaires verification

Reliability and validity of scales

The Self-educational Aspirations Questionnaire had only one item which was revised based on the measure tool developed by Zhang, Haddad, Torres and Chen (2011) which had been proved to be available. And the frequency of participants' response to self-educational aspiration is as follow:

Table 1. Frequency of response to self-educational aspiration.

	Frequency	Percentage	Accumulated percentage
Primary school education	84	1.5	1.5
Junior high school education	159	2.8	4.2
Senior high school education	335	5.8	10
University education	2014	34.9	44.9
Postgraduate education	2650	45.9	90.8
Missing values	534	9.2	100
Sum	5776	100	

In addition, self-efficacy scale, instrumental motivation questionnaire, and anxiety scale were newly developed specially for mathematical learning of primary school students from western China. So the reliability and validity of these three scales have been verified firstly in the present study. The internal consistency coefficients (α) of these three scales were .63 (anxiety scale), .69 (self-efficacy scale) and .72 (instrumental motivation questionnaire). They were good and acceptable considering the short test length (Green & Yang, 2009; Morera & Stokes, 2016).

Table 2. Reliability and validity of three new scales

Scales	α	Total	Eigenvalues % of Variance	RMSEA	CFI	TLI
Instrumental Motivation Scale	0.72	2.20	54.98	0.05	0.97	0.95
Self-efficacy Scale	0.69	1.85	61.64	0.00	1.00	1.00
Anxiety Scale	0.63	1.72	57.23	0.00	1.00	1.00

Besides, the mathematics achievement test used in present study was also used in another study of western China which had verified the reliability and validity of it (Wang, Yang, Zhang, Wang, Liu, & Xin, 2018). In present study, the reliability and validity indices of mathematics achievement test were calculated. The coefficient of internal consistency

Besides, Exploratory Factor Analysis were conducted, the results showed that the unidimensionality of the scales were well satisfied and the confirmatory factor analysis also verified the structure validity, the *CFI*, *TLI* and *RMSEA* indicated good fit of structure of three scales. The internal consistency coefficient (α), explanation rate of the first factor (EFA), and the model fitting index (CFA) of three scales are as follows:

was 0.79. Two mathematics teacher and three experts engaged in mathematical teaching practice in primary schools were invited to evaluate the item content. The inter-rater reliability was 0.93, which proved that this mathematics achievement test was good.

Item difficulties of mathematics achievement test

Item difficulties of mathematics achievement test were also calculated (see Figure 2). Figure 2 shows that more than

half of the students could not reach the right answers to 14 out of 30 items.

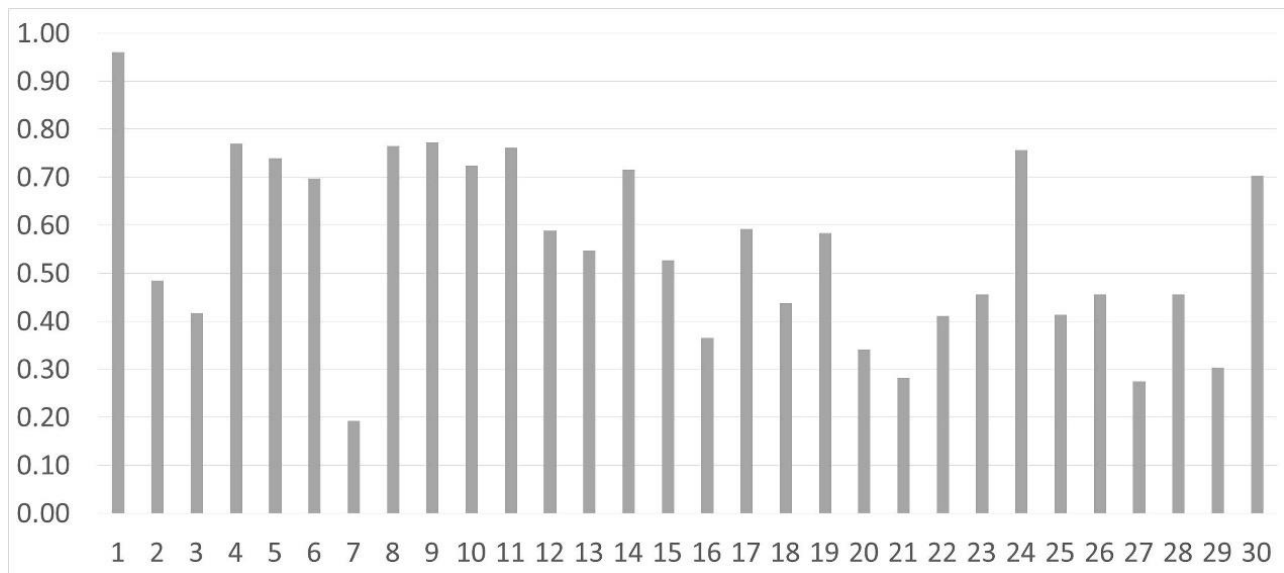


Figure 2. Item difficulties of mathematics achievement test.

Common method bias test

Due to the artificial covariation between the predictor variable and the dependent variable was caused by the same raters, the same item context, and the characteristics of the item themselves, Harman's single factor test was used to test common method bias. The results of Harman's single factor test showed that there were a total of 2 factors with eigenvalues greater than 1, and the first factor explained a variance

of only 31.36%, which was less than the critical value of 40%, indicating that there was no common method bias.

Descriptive statistics analysis and correlation analysis

Descriptive statistics analysis and correlation analysis were conducted. The descriptive statistics and the correlation matrix of all variables are shown in Table 3.

Table 3. Descriptive statistics results and correlation matrix.

	Self-educational aspiration	Instrumental motivation	Self-efficacy	Anxiety	Mathematics achievement
Self-educational aspiration	—				
Instrumental motivation	.16**	—			
Self-efficacy	.08**	.35**	—		
Anxiety	-.09**	.12**	-.03*	—	
Mathematics achievement	.22**	.16**	.14**	-.19**	—
Mean	4.33	3.51	2.90	2.60	16.11
SD	0.85	0.58	0.73	0.82	5.14

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

The results indicated that self-educational aspiration, self-efficacy, mathematics achievement, and instrumental motivation were positively related to each other ($p < .01$); self-educational aspiration, self-efficacy, mathematics achievement were negatively correlated with anxiety ($p < .01$); instrumental motivation and anxiety were positively related ($p < .01$). These results provided certain prerequisites for the following modeling processes.

Gender Differences

Previous research suggested that there were significant differences between males and females (Spelke & Elizabeth, 2005). To exclude the gender effect, difference tests were conducted on each variable in each grade (fourth and fifth grade). The results are shown in Table 4 and Table 5.

Table 4. Gender differences (4 th grade) in all variables.

	<i>t</i>	<i>df</i>	<i>sig</i>	<i>Mean Difference</i>	<i>Std. Error Difference</i>	<i>Cohen's d</i>
Self-educational aspirations	0.58	2783	.562	0.03	0.05	0.02
Self-efficacy	-3.43	2532	.001	-0.29	0.09	0.14
Instrumental motivation	3.13	2528	.002	0.29	0.09	0.12
Anxiety	4.32	2595	.000	0.42	0.10	0.17
Mathematics achievement	0.44	2789	.658	0.08	0.18	0.02

In fourth grade, there were significant differences in gender on self-efficacy, instrumental motivation and anxiety, but the effect sizes were very small (0.14, 0.12 and 0.17). Moreover, gender had no significant influence on self-

educational aspirations and mathematics achievement. These results indicated that the gender differences on casual variables would not result in differences on mathematics achievement in fourth grade.

Table 5. Gender differences (5 th grade) in all variables.

	<i>t</i>	<i>df</i>	<i>sig</i>	<i>Mean Difference</i>	<i>Std. Error Difference</i>	<i>Cohen's d</i>
Self-educational aspirations	-1.88	2802	.060	-0.08	0.04	0.07
Self-efficacy	-4.89	2800	.000	-0.41	0.08	0.18
Instrumental motivation	3.52	2757	.000	0.32	0.09	0.13
Anxiety	6.81	2799	.000	0.61	0.09	0.26
Mathematics achievement	2.14	2973	.032	0.42	0.20	0.08

In fifth grade, although the gender differences on mathematics achievement was significant, there were no significant differences on self-educational aspirations which showed that the influence of gender on mathematics achievement was not originated from independent variable self-educational aspirations. Furthermore, the effect size of gender on mathematics achievement was tiny (0.08). Therefore,

the gender differences were ignored in the following analyses.

Grade Differences

In addition, grade differences were tests on each variables. The results are shown in Table 6.

Table 6. Grade differences in all variables.

	<i>t</i>	<i>df</i>	<i>sig</i>	<i>Mean Difference</i>	<i>Std. Error Difference</i>	<i>Cohen's d</i>
Self-educational aspirations	2.14	5596	.032	0.07	0.03	0.06
Self-efficacy	-6.08	5306	.000	-0.36	0.06	0.17
Instrumental motivation	-2.47	5303	.014	-0.16	0.07	0.07
Anxiety	-0.27	5415	.784	-0.02	0.07	0.01
Mathematics achievement	-18.95	5767	.000	-2.56	0.14	0.50

There were no significant differences in grade on anxiety, while there were significant differences on self-educational aspiration, self-efficacy, instrumental motivation (effect sizes was small: 0.06, 0.17, 0.07) and mathematics achievement. However, the grade differences were not the original goal of this study. They would not be discussed below.

A moderated chained mediation model

A latent variable SEM was run upon the hypothetical model illustrated above. And the final model fitted well ($\chi^2/df = 11.78$, $RMSEA = 0.04$, $CFI = 0.96$, $TLI = 0.93$, $SRMR = 0.03$).

Figure 3 displays the final model with standardized path coefficients. Both self-educational aspiration and self-efficacy can positively predict instrumental motivation ($r =$

0.14, $p < .01$; $r = 0.37$, $p < .01$). And these three variables can significantly predict the mathematics achievement ($r = 0.15$, $p < .01$; $r = 0.08$, $p < .01$; $r = 0.16$, $p < .01$). Self-educational aspiration negatively predicts anxiety ($r = -0.10$, $p < .01$), while anxiety predicts mathematics achievement negatively ($r = -0.29$, $p < .01$), which suggests that anxiety may play a mediated role between self-educational aspiration and mathematics achievement. Additionally, instrumental motivation can positively predict anxiety ($r = 0.20$, $p < .01$), which suggests that instrumental motivation and anxiety work as the chained mediation.

In addition, self-efficacy predicts anxiety negatively ($r = -0.14$, $p < .01$) and its interaction with self-educational aspiration also affects anxiety negatively ($r = -0.13$, $p < .01$). In other words, self-efficacy plays a moderated role in the relationship between self-educational aspiration and anxiety.

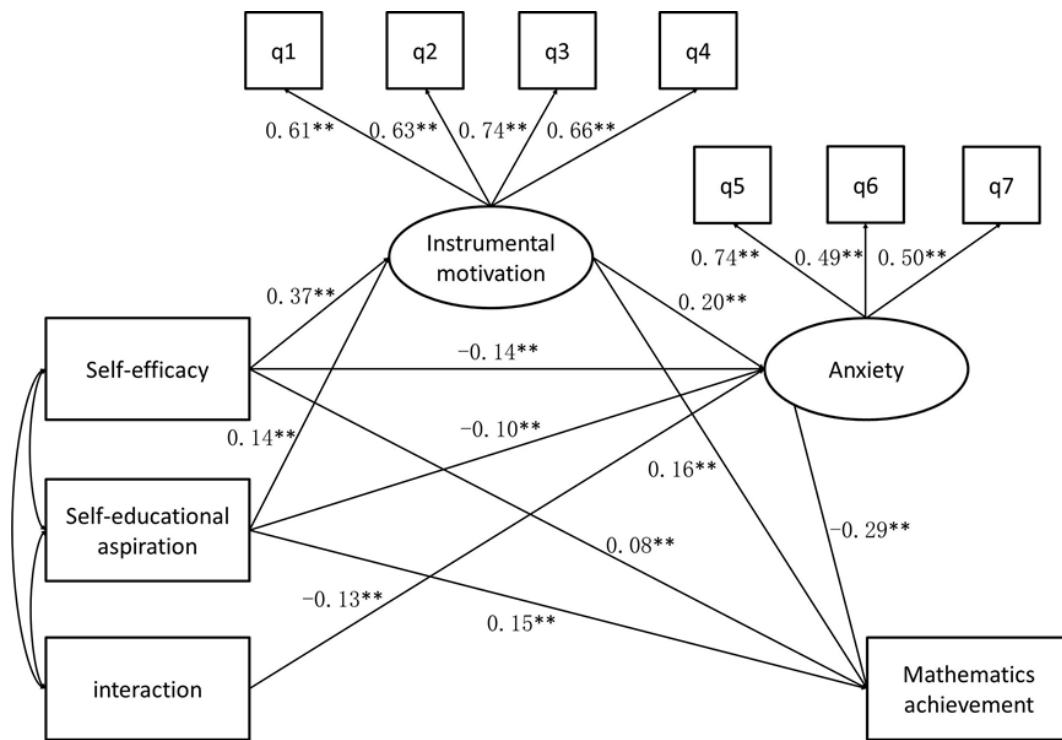


Figure 3. The moderated chained mediation model with standardized estimates.

Table 7. The effect sizes of direct and indirect mediation.

Effects	B	Proportion
SA→ MA→ achievement	0.029	13.87%
SA→ IM→ achievement	0.022	10.53%
SA→ IM→ MA→ achievement	-0.008	3.83%
SA→ achievement	0.150	71.77%
SA Total	0.209	
SE→ MA→ achievement	0.041	20.40%
SE→ IM→ achievement	0.059	29.35%
SE→ IM→ MA → achievement	-0.021	10.45%
SE→ achievement	0.080	39.80%
SE Total	0.201	

Note: SA = self-educational aspirations; MA = anxiety; IM = instrumental motivation; SE = self-efficacy.
 * $p < .05$, ** $p < .01$, *** $p < .001$.

Furtherly, Table 7 presents the indirect effect sizes and direct effect sizes. As presented, both indirect effect size of student’s self-educational aspiration and self-efficacy on mathematics achievement via instrumental motivation and anxiety are significant. In the relationship between self-educational aspirations and mathematics achievement, instrumental motivation explain 10.53% of variance, and anxiety explains 13.87% of variance, instrumental motivation together with anxiety explain 28.23% of variance. Likewise, in the relationship between self-efficacy and mathematics achievement, instrumental motivation explains 29.35% of variance, and anxiety explains 20.40% of variance, instrumental motivation together with anxiety explain 60.20% of variance.

Discussion

It can be seen from Figure 2 that the mathematics achievement levels of primary school students in western China are less than satisfactory. To figure out what factors can enhance children’s mathematics achievement from western China, the present study took self-educational aspiration, self-efficacy, instrumental motivation, and anxiety into consideration, and proposed a moderated chained mediation model. This model provided a proper mechanism about how children’s self-educational aspiration affects mathematics achievement.

The model results showed that either students’ self-educational aspiration or self-efficacy would positively predict mathematics achievement not only in direct way but also in indirect way via instrumental motivation. The effect of self-educational aspiration had been proved by Purnami, Widodo, and Prahmana (2018). Students with high levels of self-educational aspirations were more likely to have high instrumental motivations which would get their mathematics performances improved. This is because higher self-educational aspirations may stimulate learning motivation, and then the mathematics achievement rises. But things turn into their opposites when they reach the extreme, as the level of instrumental motivation enhances, students will get a stronger sense of anxiety which may lead to poor mathematics achievement (Recher & Isiksal, 2018; Wu, Barth, Amin, Malcarne, & Menon, 2012). That means self-educational aspirations only can positively affect mathematics achievement when it is moderate.

In addition, consistent with previous studies, self-efficacy plays a crucial role in mathematics achievement (Akin & Kurbanoglu, 2011; Kalaycioglu, 2015). Self-efficacy can predict individual mathematics achievement directly and predict it indirectly via the chain-mediating role of instrumental motivation and anxiety. According to self-efficacy theory, individual behavior is codetermined by outcome expectation and efficacy expectation (Bandura, 1977). Students with a high level of self-efficacy are more likely to believe they can succeed if they want, so students with high self-efficacy always have higher instrumental motivation, but higher motivation brings higher level of anxiety which may decrease students' mathematics achievement (Khalaila, 2015). It follows that instrumental motivation plays an important role in the relationship. Thus, students should maintain moderate learning motivation and do not put too much pressure on themselves.

The results of this study also indicated that children's self-efficacy played a moderated role in the relationships between self-educational aspirations and anxiety. Which means when students' self-educational aspirations are high, those who with lower self-efficacy may be more likely to be nervous and anxious, while those who with higher self-efficacy are less likely to produce excessive anxiety (Xu, Lou, Wang, & Pang, 2017). This is probably because students with higher self-efficacy consider the bad situations as an opportunity to exercise personal abilities and make progress. When situation gets worse, they will strengthen and sustain their efforts. On the contrary, students with lower self-efficacy always disbelieve in their abilities and are more likely to give up when they encounter difficulties (Stetz, Stetz, & Bliese, 2006).

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Conclusions

Based on the research results above, the following conclusions can be drawn. (1) Both children's self-efficacy and self-educational aspirations have directly positive effects on mathematics achievement. (2) Self-educational aspirations and self-efficacy have indirectly negative effects on mathematics achievement via the chained mediation of instrumental motivation and anxiety. (3) The relationships between self-educational aspirations and anxiety were moderated by children's self-efficacy.

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