Developmental trajectories of children's educational expectations in China: Contributions of academic achievement and maternal expectations

Surina He [a,c,1], Xiaolin Guo [a,1,*], Tiantian Bi [a], Tingdan Zhang [a], Liang Luo [b,*]

[a] Collaborative Innovation Center of Assessment Toward Basic Education Quality, Beijing Normal University, Beijing, China
[b] Institute of Developmental Psychology, Faculty of Psychology, Beijing Normal University, Beijing, China
[c] Department of Educational Psychology, University of Alberta, Edmonton, Canada

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ABSTRACT

This longitudinal study examined the overall and heterogeneous developmental trajectories of children's educational expectations and the effects of children''s previous academic achievements and maternal educational expectations on these trajectories. The educational expectations of 3868 Chinese children (1839 girls; M_{age} = 9.42 ± 0.52) were investigated six times from the 4th to 6th grades. Children's previous academic achievement and maternal educational expectations were also collected during the first wave. The results showed that Chinese children's educational expectations generally increased in middle childhood and could be categorized into four classes: high stable-increasing, low stable-increasing, low quickly-increasing, and high quickly-decreasing. Furthermore, maternal educational expectations have the greatest influence on the initial level of children's educational expectations, whereas previous academic achievement has the greatest impact on the increasing rate of children's expectations. In addition, both factors contribute to classifying children into a high-stable increasing class in comparison to the other three classes. The findings indicate that Chinese children increase their educational expectations in middle childhood and continually adapt their expectations mainly based on their previous achievements. These findings could advance our understanding of the development of children's educational expectations in the middle childhood period and provide educational practitioners with prospective factors to increase children's educational expectations.

1. Introduction

In recent decades, educational attainment has become increasingly important for youth to obtain better future occupations and higher income, especially in developing countries (Barro & Lee, 2013). Numerous studies have shown that expectations for educational attainment are a critical determinant of educational attainment (Beal & Crockett, 2010) and will gradually change as individuals grow up (Mello, 2008). Given the importance of educational expectations, researchers have investigated the development of educational expectations and the factors that influence them (Johnson & Reynolds, 2013; Lawson et al., 2020; Mello, 2008, 2009; Perez-Brena et al., 2017). However, most previous studies focused on the development of educational expectations in 14–20-year-old Western adolescents, which may not be comparable for younger children and children from other nations. Furthermore, there is an

argument about the dominant process for the formation of educational expectations, specifically whether children form their educational expectations primarily by adopting their parental educational expectations or by adapting self-reflective academic information. Therefore, the main purpose of this study is to examine the potential trajectories and the dominant process of the development of children's educational expectations in the Chinese context.

1.1. Development of educational expectations

Educational expectation refers to a realistic assessment of future educational attainment taking into account potential barriers or constraints in the given context (Bohon et al., 2006; Reynolds & Pemberton, 2001; Smyth, 2020). Under the framework of situated expectancy-value theory (SEVT; Eccles & Wigfield, 2020; Muenks et al., 2018),

* Corresponding authors at: 312 Jingshixuetang Building, Beijing Normal University, No. 19, XinJieKouWai St., HaiDian District, Beijing, China, 100875 (X Guo). 306 Jingshixuetang Building, Beijing Normal University, No. 19, XinJieKouWai St., HaiDian District, Beijing, China, 100875 (L Luo).
E-mail addresses: xlguo129@163.com (X. Guo), luoliang@bnu.edu.cn (L. Luo).
[1] These authors contributed equally to this work.

educational expectations are typically seen as related to expectancies for success, given that educational expectations can be viewed as individuals' expectancies for success for a long-term educational attainment task (Bravo et al., 2017; May & Witherspoon, 2019; Perez-Brena et al., 2017; Tynkkynen et al., 2012). According to the SEVT, the mean level of expectancies for success declines across middle childhood and into adolescence. Previous studies have focused mainly on the developmental trajectory of educational expectations in the adolescent period and have consistently demonstrated that the mean level of educational expectations of American students decreases gradually from 14 to 26 years old (Lawson et al., 2020; Mello, 2008, 2009; Perez-Brena et al., 2017). However, fewer studies have explored the formation of educational expectations in the earlier period preceding any educational tracking or transition. Only one study covered the childhood age range in their research. Using a single item, "How much schooling do you expect to get?", Lee et al. (2012) examined the development of American children's educational expectations from age 10 (grade 5) to age 18 (grade 12). The results showed that the average score of children's educational expectations increased from 5th grade to 6th grade but continuously decreased until 12th grade.

Furthermore, since the entire population is hardly homogeneous, identifying different subpopulations with distinct developmental patterns could obtain more fine-grained details about the population. According to the SEVT, while the overall tendency is a decline in general, there are a variety of patterns of change in children's expectancy beliefs, including increases for some children (Eccles & Wigfield, 2020). For example, Lee et al. (2012) showed that there were four distinct subpopulations with different developmental trajectories: high-stable (66.8 %; children who initially expected high college attainment and maintained their expectations), decreasing (15.6 %; children who initially had higher expectations but decreased their expectations later), low-stable (8.8 %; children who initially believed it was unlikely they would pursue higher education and maintained these low expectations over time) and increasing (8.8 %; children who initially had lower expectations but increased their expectations later). In addition, Tynkkynen et al. (2012) investigated the development of Finland 9th grade adolescents' educational expectations over three years and discovered five distinct subgroups: stable university (38 %; adolescents having a high level of expectation at first and maintain it), stable polytechnic (24 %; adolescents having a medium level of educational expectation at first and maintain it), stable vocational (18 %; adolescents having a low level of educational expectation at first and maintain it), increasing (10 %; adolescents having a low level of educational expectation at first and increase it), and decreasing (10 %; adolescents having a high level of educational expectation at first and decrease it).

1.2. Development of educational expectations in the Chinese context

According to the SEVT, the overall declining pattern is also subject to cultural differences, indicating that the development of expectancy beliefs among young people in other countries may differ from that of American adolescents (Eccles & Wigfield, 2020; Wigfield et al., 2015). There has not been any cross-national research comparing the development of children's expectancy beliefs across cultures to directly support this claim. However, a few studies shed some light on this question by comparing different ethnic groups in America. For instance, Mello (2009) found that Asian Americans and African Americans had higher educational expectations than European Americans, who, in turn, had higher educational expectations than Hispanic and American Indians. Mau and Bikos (2000) showed that Asian American students had a greater increase in their educational expectations than Hispanic-American, Black, and White students. Furthermore, a cross-national study about the development of a broader concept of motivational beliefs in the United States and China also provides additional evidence to the cultural difference claim by revealing that there was a decline in motivational beliefs in early adolescent American students but not in

Chinese students' beliefs (Wang & Pomerantz, 2009). Moreover, Zhang (2014) measured Chinese students' educational expectations in the 4th and 8th grades and found that children's expectations increased between the two waves, contrary to the findings of adolescents from Western countries.

This cross-national difference in motivational beliefs may reflect the cross-cultural difference in the philosophical perspective of learning between the two countries, which shed light on the potential that Chinese children may have a diverse educational expectations developmental trajectory. According to the Sociocultural Learning Models (SCLMs; Li & Yamamoto, 2020), the American philosophy of learning stems from the ancient Greeks, who were keen on examining the external world to arrive at reliable and invariant knowledge. A series of studies on American students revealed that they place a premium on cognition and stress mental functions (e.g., deductive and inductive reasoning), ability, skills, and understanding of the world as their learning purposes (Li & Yamamoto, 2020). However, as explained by the SEVT, children's understanding of ability becomes more realistic or sometimes more pessimistic as they receive increasing feedback about their performance (Muenks et al., 2018), which may be a reason to lower their expectations for future educational attainment. On the other hand, the Chinese philosophical outlook of learning is heavily influenced by Confucius, who was more concerned with how a person can become a full human than with the ontology of the natural world and human mind (Li & Yamamoto, 2020). Studies on Chinese students found that they view learning as a process of cultivating personal virtue to become a socially responsible and better person rather than just the acquisition of specific types of knowledge and skills (Li, 2004). To achieve these lofty goals, individuals may cultivate traits such as self-exertion, diligence, hardship endurance, and perseverance, which promotes the need for more effort to continuously improve oneself and may result in raising children's expectations for higher educational attainment.

Furthermore, since culture depends on society to function, to penetrate the mind of the young (Li & Yamamoto, 2020), introducing the educational system in China may assist in better understanding the development of Chinese children's expectations for educational attainment. As illustrated in Fig. 1, the Chinese education system encompasses preschool education, primary education, junior secondary education (i.e., middle school), senior secondary education (i.e., high school), and higher education (Jiang, 2017). Before college graduation, students usually experience three key educational transitions, each of which deepens their understanding of the importance of academic achievement. The earliest one occurs when students transition from primary school to middle school. According to the Nearby Enrollment Policy (i.e., primary school students attend the middle school nearest to their residence; Liu et al., 2018), most primary school graduates attend middle school near their residence, while only a few students choose to attend vocational middle school to learn practical skills and earn money early on. Three years later, students experience more challenging, formal ability tracking when they transition from middle school to high school. Based on their scores on the high school entrance exam, <60 % of middle school graduates are eligible for admission to regular high school, and the higher their score is, the better high school they can enter. The remaining students attend vocational high school or drop out of school, most of whom eventually will not pursue college. Finally, approximately 50 % of high school graduates enroll in college, and a small percentage of them enroll in prestigious universities, whose graduates typically have better jobs and higher incomes. Given that attending a high-quality high school is an excellent foundation for enrolling in a promising university in the future, most parents and teachers increasingly emphasize academic success from primary school, which may be internalized by children as a value placed on educational attainment.
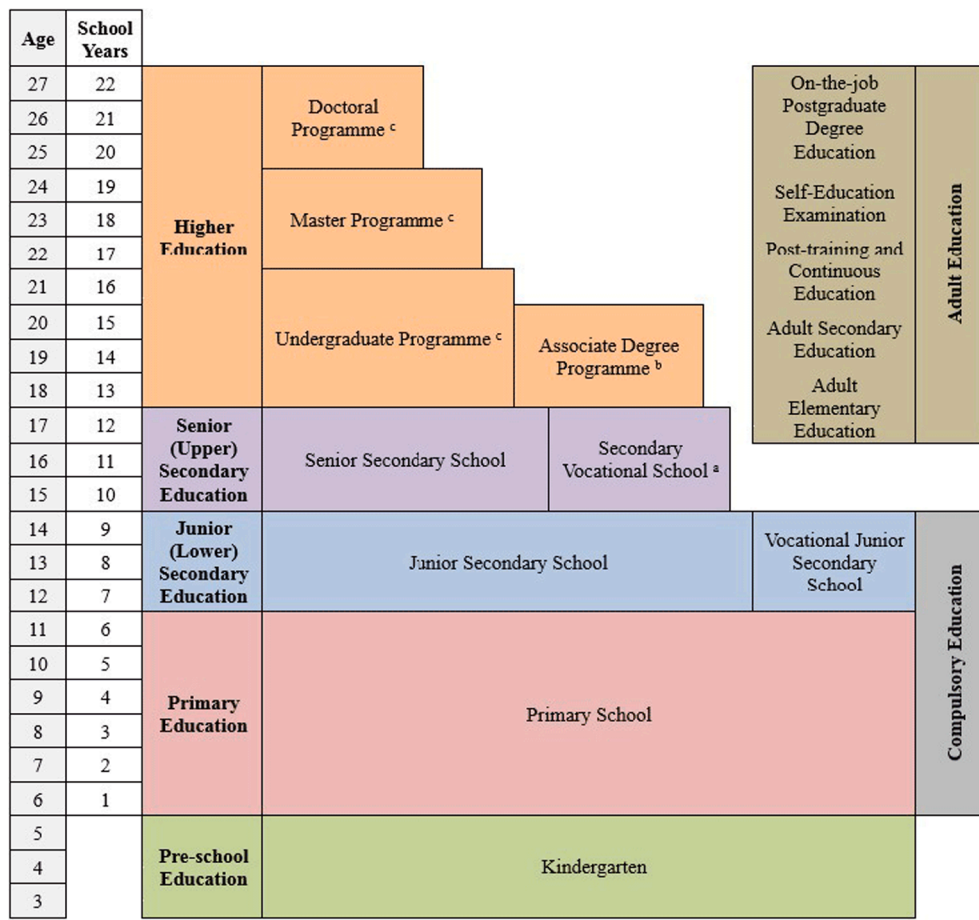
Age	School Years				
27	22	**Higher Education**	Doctoral Programme [c]		On-the-job Postgraduate Degree Education
26	21				
25	20				
24	19		Master Programme [c]		Self-Education Examination
23	18				
22	17				Post-training and Continuous Education
21	16		Undergraduate Programme [c]		
20	15			Associate Degree Programme [b]	Adult Secondary Education
19	14				
18	13				Adult Elementary Education
17	12	**Senior (Upper) Secondary Education**	Senior Secondary School	Secondary Vocational School [a]	
16	11				
15	10				
14	9	**Junior (Lower) Secondary Education**	Junior Secondary School		Vocational Junior Secondary School
13	8				
12	7				
11	6	**Primary Education**	Primary School		
10	5				
9	4				
8	3				
7	2				
6	1				
5		**Pre-school Education**	Kindergarten		
4					
3					

(Adult Education spans the right-hand column of the upper section; Compulsory Education spans Junior Secondary, Primary, and associated grades.)

Fig. 1. The education system in China (Jiang, 2017).

1.3. Adoption and adaptation process in the development of educational expectations

Regarding the formation of educational expectations, there are two contrasting points of view: do children adopt their educational expectations from others such as parents, or do they actively adapt their educational expectations based on self-reflective information (Andrew & Hauser, 2011; Morgan, 2005)? According to the Status Attainment Model (Robert, 1980; Sewell et al., 2003), individuals' educational expectations are largely adopted from significant social others such as parents as a means of intergenerational transmission of socioeconomic status and stabilize early in their educational career. However, Morgan (2005) makes a counterargument to this adoption argument by drawing on the Bayesian learning theory's assertion of combining information from prior beliefs with new observations to make decisions. He argues that purposive self-reflective processes dominate expectation formation and that students adapt their expected future educational attainment based on new and pertinent information about their academic potential.

Some research has examined this argument about the dominant role of the adoption process and adaptation process in children's educational expectations. For instance, Carolan (2017) investigated to what extent adolescents adapt their educational expectations in response to parental educational expectations and previous academic achievement. Based on a longitudinal cross-lagged design, the results showed that a one-unit increase in GPA and parents' educational expectations in 7th grade predicts a 0.830 point and 0.197 point increase in student expectations in 11th grade, respectively, which implies that the adaptation process is more dominant than the adoption process. Nevertheless, no study has addressed this argument by examining the relative importance of parental educational expectations and prior academic achievement on

the developmental process of children's educational expectations.

1.4. The present study

Previous research has carefully studied the development of children's educational expectations in Western culture and discussed the roles of adoption and adaptation processes based on a longitudinal cross-lagged design. However, two questions remain to be further examined. First, how might children develop their educational expectations in East Asian countries, especially in China? Second, is the adaptation process still more dominant than the adoption process for the longitudinal development of children's educational expectations? Therefore, the primary goal of this study is to investigate the development of children's educational expectations in the Chinese context using both variable-centered and person-centered approaches. Based on the Situated Expectancy-Value Theory and Sociocultural Learning Models, we hypothesized that while children from Western countries decrease their expectations over time, Chinese children may increase their educational expectations. In addition, we also assume that the distribution of sub-populations along different developmental trajectories in the Chinese environment may differ from that in the American context. More Chinese children may increase rather than decrease their educational expectations over time. Another aim of this study is to investigate the roles of adoption and adaptation processes by examining the relative importance of parental educational expectations (adoption process) and prior academic achievement (adaptation process) in the development of children's educational expectations. We assumed that previous academic achievement would be more prominent than parental educational expectations in the development of children's educational expectations since academic achievement could provide children with more solid and

realistic evaluative feedback about their competencies directly.

2. Method

2.1. Participants

The data used in the current study were collected as part of the Child Academic and Psychological Development Study (CAPS), an ongoing longitudinal project examining the role of family and school on children's academic achievements and psychological development in China. The project started in November 2016 when the children were in their first semester of fourth grade in primary school. Data were collected every half a year and had been collected six times thus far. In the first wave, 4015 fourth-grade children (1903 girls; $M_{age} = 9.42 \pm 0.52$, *range* $= 9$–11) from 36 primary schools participated in this subproject. Mothers of 3563 students ($M_{age} = 35.96 \pm 4.33$, *range* $= 22$–53) participated in the first waves of investigation, and 81.3 % of mothers had a junior high school education or above. In each subsequent wave, some children were lost to follow-up due to being sick or moving to other schools; thus, 4004 children participated in the second wave, 3892 participated in the third wave, 3852 participated in the fourth wave, 3512 participated in the fifth wave, and 3726 participated in the sixth wave. A comparison of the participants who continued to participate with those who were lost to follow-up showed no participation bias found in children's age or gender between the first and sixth waves of children. However, the children whose mothers had lower educational levels had a slightly higher attrition rate than the children whose mothers had higher educational levels, $t(1, 3999) = -2.25$, $p < 0.05$. Given the relatively low absolute value of the t statistic, we are not deeply concerned with this result. Furthermore, to investigate the changes in children's educational expectations, participants who had missing educational expectation data four times or more were excluded. Hence, we ultimately used the data of 3868 children (1839 girls, $M_{age} = 9.42 \pm 0.52$, *range* $= 9$–11) and 3563 mothers in this study.

2.2. Procedure

All procedures in this study were approved by the Institutional Review Board of the Collaborative Innovation Center of Assessment toward Basic Education Quality at Beijing Normal University. Written informed consent to participate in the study was obtained from one of the parents of the participating children before evaluation. At each wave, children were assessed during regular classes at school by trained research assistants. The mothers received a letter with information about the study as well as the maternal questionnaires. They completed the questionnaires at home and submitted them to the school the next day. In addition, the school administrators provided the children's math and Chinese transcripts.

2.3. Measures

2.3.1. Children's educational expectations

In all six waves, the children reported their educational expectations ("As things stand now, how far in school do you think you will get?") using a 6-point scale (1 = *primary school or below*, 2 = *lower secondary school*, 3 = *upper secondary school*, 4 = *junior college degree*, 5 = *bachelor's degree*, and 6 = *master's degree or above*). This single-item measurement of educational expectations has been widely used by various studies (Benner & Mistry, 2007; Mello, 2008, 2009) and nationally representative projects (e.g., the National Education Longitudinal Study of 1988 in America, the Longitudinal Study of Young People in England, the National Education Panel Study in Germany, and the China Family Panel Studies).

2.3.2. Maternal educational expectations

In the first wave, the mothers reported their educational expectations

for their children ("As things stand now, how far in school do you think your child will get?") using the same scale as children (1 = *primary school or below*, 2 = *lower secondary school*, 3 = *upper secondary school*, 4 = *junior college degree*, 5 = *bachelor's degree*, and 6 = *master's degree or above*) (Benner & Mistry, 2007; Mello, 2008, 2009).

2.3.3. Academic achievements

Children's math and Chinese school transcripts from their final exams during the first wave were used in this study. The recorded grades were originally numerical, ranging from 0 to 100. The grades were standardized within the school to account for differences among the grading criteria for each school (Cheung & Pomerantz, 2011). To synthesize a single indicator of children's academic achievements, the standardized math and Chinese scores were averaged, with higher numbers reflecting higher academic achievements.

2.3.4. Control variable

Considering the potential effects on children's educational expectations, this study controlled for children's gender (1 = *male*, 2 = *female*), maternal educational level (1 = *primary school or below*, 6 = *master's degree or above*) and mother's reported annual family income in 2015 (1 = *3600 CNY or below*, 10 = *500001 CNY or more*).

2.4. Statistical analysis

First, three unconditional latent growth curve models (i.e., the free time scores model, the linear slope time scores model, and the quadratic slope time scores model) were conducted to determine the optimal estimation model of the overall trajectory of children's educational expectations over three years. Second, several unconditional growth mixture models (GMMs; Muthén, 2004) were applied to examine the different classes of trajectories of children's educational expectations. Third, a conditional LGCM with three time-invariant covariates was run to estimate the effects of previous academic achievement and maternal educational expectations on the overall trajectory of children's educational expectations. Finally, three-step conditional GMMs were conducted to examine the roles of predictive variables on the differential trajectories of children's educational expectations (Vermunt, 2010). Regarding the process of introducing covariates into the GMM, there is a debate about using either the one-step approach or the three-step approach. In the one-step approach, latent classes are estimated simultaneously with covariates in one model. Therefore, the predictors of the latent classes contribute to defining class memberships. In contrast, the three-step approach consists of three procedures, which are identifying the latent classes based on an unconditional model (step 1), creating the most likely class membership using participants' posterior membership probabilities (step 2), and running multinomial logistic regression to estimate the roles of predictor variables (step 3) (Asparouhov & Muthén, 2014; Bakk et al., 2013; Vermunt, 2010). Both methods have their advantages and disadvantages. The one-step approach obtains a more precise estimation of the covariates' effects and class membership while increasing the chances of mis-specifications. The three-step approach is logically acceptable but increases standard errors (Li & Harring, 2017). To obtain more logically understandable results, this study used the three-step approach to examine the impact of predictive variables on the differential trajectories of children's educational expectations. Full information maximum likelihood estimation was used in all models to handle missing data. All analyses were conducted in IBM SPSS Statistics (Version 26) and Mplus 8.3 (Muthén & Muthén, 2017).

3. Results

3.1. Descriptive statistics

The means, standard deviations, and correlations of all study variables, are presented below (see Table 1). The distribution and mean

Table 1
Descriptive Statistics.

	M (SD)	1	2	3	4	5	6	7	8	9	10	11
1. Children's gender	1.48 (0.50)	1										
2. Family income	4.27 (1.88)	−0.02	1									
3. Maternal educational level	2.11 (0.88)	−0.01	0.28***	1								
4. Maternal expectations	4.29 (1.11)	0.06***	0.12***	0.30***	1							
5. Academic achievement	0 (0.91)	0.18***	0.06**	0.14***	0.42***	1						
6. Children's expectations T1	4.21 (1.35)	0.04*	0.08***	0.19***	0.38***	0.28***	1					
7. Children's expectations T2	4.41 (1.26)	0.05**	0.12***	0.21***	0.36***	0.31***	0.50***	1				
8. Children's expectations T3	4.45 (1.21)	0.04*	0.09***	0.20***	0.36***	0.31***	0.47***	0.56***	1			
9. Children's expectations T4	4.70 (1.19)	0.02	0.11***	0.20***	0.35***	0.33***	0.44***	0.53***	0.57***	1		
10. Children's expectations T5	4.73 (1.14)	0.01	0.11***	0.19***	0.34***	0.32***	0.40***	0.47***	0.52***	0.58***	1	
11. Children's expectations T6	4.80 (1.13)	0.01	0.12***	0.20***	0.35***	0.35***	0.37***	0.46***	0.50***	0.55***	0.62***	1

Note. *$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

levels of children's educational expectations over the six waves showed an increasing trend. In addition, children's educational expectations at the six waves were significantly correlated ($rs > 0.35$). Moreover, family income, maternal educational level, maternal educational expectations, and children's academic achievement were positively correlated with children's educational expectations at each wave.

3.2. Overall developmental trajectory of children's educational expectations

The results of three unconditional latent growth curve models showed that the linear slope time scores model ($\chi^2 = 167.583$, $df = 16$, $p < 0.001$; CFI = 0.982, TLI = 0.984, RMSEA = 0.049, SRMR = 0.027; see the dashed line in Fig. 2) outperformed the free time scores model ($\chi^2 = 1458.116$, $df = 16$, $p < 0.001$; CFI = 0.833, TLI = 0.843, RMSEA = 0.153, SRMR = 0.091) and the quadratic slope time scores model (no convergence). The estimated means of the initial level of and rate of change in children's educational expectations were both significantly positive ($M_{intercept} = 4.256$, $M_{slope} = 0.118$, $ps < 0.001$), indicating a generally significant increasing trend in children's educational expectations over three years. In addition, the variances of the intercept and slope were also significant ($S^2_{intercept} = 0.963$, $S^2_{slope} = 0.024$, $ps < 0.001$), indicating that individual differences existed in the initial levels of and changing slopes of children's educational expectations. In addition, the correlation between the intercept and slope was significantly negative ($r_{ce} = -0.470$, $p < 0.001$), suggesting that individuals who had higher initial levels of educational expectations showed a lower rate of increase in their educational expectations.

3.3. Differential developmental trajectories of children's educational expectations

To identify the individual differences in the development of educational expectations, a series of unconditional GMMs with one to six classes were tested, and the fit indexes of each model were compared (see Table 2). The results showed that the entropy values of the 2-class model, the 4-class model, and the 5-class model were larger than 0.75. However, one of the classes of the 5-class model had less than a 5 % population. Moreover, the 2-class model theoretically provided less information than the 4-class model. Hence, in the current study, the 4-class model was considered the best solution both statistically and theoretically. Fig. 2 displays the growth trajectories of the overall sample and the four different classes. Specifically, class 1 had a high intercept and stable rate of increase over time (named high stable-increasing); class 2 had a low intercept but a stable rate of increase (named low stable-increasing); class 3 had a higher intercept but a sharply decreasing trend (named high quickly-decreasing); and class 4 had a low intercept but increased quickly over time (named low quickly-increasing) (see the detailed parameters in Table 3).

3.4. Adoption and adaptation process in the development of educational expectations

The conditional LGM fit the data well ($\chi^2 = 190.221$, $df = 36$, $p < 0.001$; CFI = 0.980, TLI = 0.975, RMSEA = 0.038, SRMR = 0.019), and the results are presented in Table 4. Both children's academic achievement ($\beta = 0.203$, $p < 0.001$) and maternal educational expectations ($\beta =$

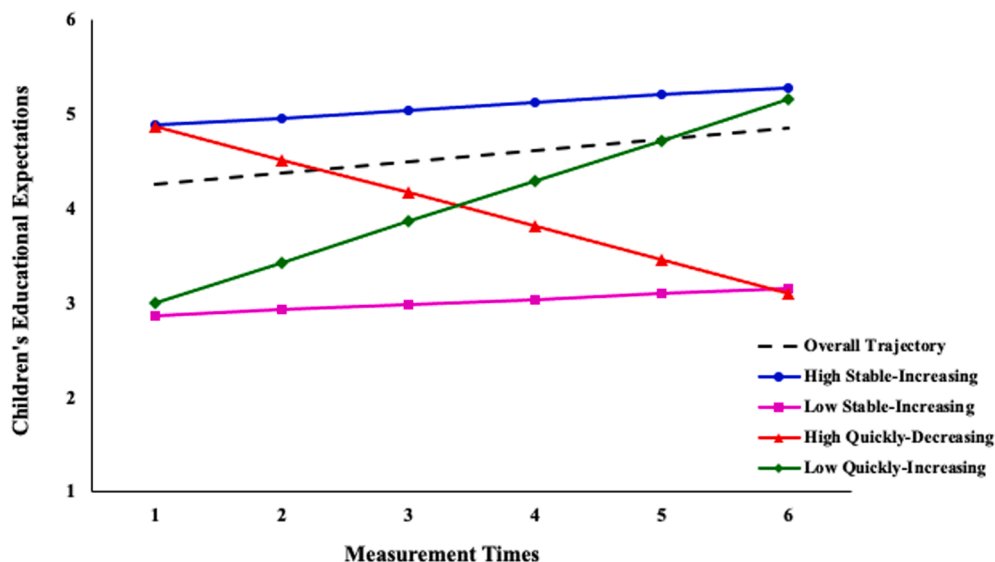**Fig. 2.** Overall and Differential Trajectories of Children's Educational Expectations.

Table 2
Fit Statistics for Growth Mixture Models.

Class	Log-likelihood	AIC	BIC	aBIC	VLMR-LRT p-value	LMR-LRT p-value	Entropy	Class Proportions
1	−31316.370	62654.740	62723.605	62688.652	N/A	N/A	N/A	1
2	−30959.108	61946.216	62033.863	61989.378	<0.001	<0.001	0.832	0.189/0.811
3	−30920.384	61874.767	61981.196	61927.178	0.028	0.031	0.721	0.712/0.106/0.182
4	**−30795.944**	**61631.889**	**61757.099**	**61693.548**	**<0.001**	**<0.001**	**0.770**	**0.166/0.647/0.134/0.053**
5	−30780.790	61607.580	61751.571	61678.488	0.004	0.005	0.763	0.201/0.010/0.132/0.056/0.595
6	−30762.489	61576.979	61739.751	61657.135	0.022	0.024	0.748	0.613/0.102/0.107/0.088/0.012/0.078

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; aBIC = sample-size adjusted BIC; VLMR-LRT = Vuong-LoMendell-Rubin likelihood ratio test; LMR-LRT = Lo-Mendell-Rubin likelihood ratio test; BLRT = Bootstrap likelihood ratio test (Feldman et al., 2009; Jung & Wickrama, 2008). Estimates of the chosen four-factor solution are bolded.

Table 3
Growth Parameters for Each Class.

Class # (% of sample)	InterceptEst. (S.E.)	SlopeEst. (S.E.)	Correlation between intercept and slope
Overall Trajectory (100 %)	4.256 (0.019)***	0.118 (0.004)***	−0.470***
Class 1 High Stable-Increasing (64.7 %)	4.879 (0.027)***	0.080 (0.006)***	0.015***
Class 2 Low Stable-Increasing (13.4 %)	2.866 (0.061)***	0.058 (0.014)***	0.015***
Class 3 High Quickly-Decreasing (5.3 %)	4.872 (0.105)***	−0.354 (0.028)***	0.015***
Class 4 Low Quickly-Increasing (16.6 %)	2.998 (0.059)***	0.430 (0.015)***	0.015***

Note. $*p < 0.05$. $** p < 0.01$. $*** p < 0.001$. Coefficients of correlation are standardized.

Table 4
Regression Predicting the Overall Trajectory of Children's Educational Expectations.

Predictors	Intercept		Slope	
	Est.	S.E.	Est.	S.E.
Intercept			−0.593***	0.030
Academic achievement	0.203***	0.022	0.198***	0.026
Maternal expectations	0.377***	0.021	0.022	0.030
Children's gender	0.003	0.020	−0.081**	0.023
Family income	0.033	0.020	0.039	0.024
Maternal educational level	0.133***	0.021	0.065**	0.025

Note. $*p < 0.05$. $** p < 0.01$. $*** p < 0.001$. All coefficients above are standardized.

0.377, $p < 0.001$) positively influenced the intercept of children's educational expectations. Furthermore, maternal educational expectations play a larger role than children's previous academic achievement. However, maternal expectations do not significantly influence the change in children's educational expectations ($\beta = 0.022$, $p = 0.570$). Only academic achievement had significant positive effects on the increasing rate of children's expectations ($\beta = 0.198$, $p < 0.001$) after controlling for children's gender, maternal educational level, and family income. Furthermore, among the covariate variables, only maternal educational level positively influenced the intercept of children's educational expectations ($\beta = 0.133$, $p < 0.001$). Both children's gender ($\beta = -0.081$, $p < 0.01$) and maternal educational level ($\beta = 0.065$, $p < 0.01$) significantly influenced the increasing rate of children's expectations.

Multivariate multinomial logistic regression models were run to determine the roles of previous academic achievement and maternal educational expectations in differentiating between different developmental types of educational expectations. The results are shown in

Table 5. The reference category was changed across regressions to make all pairwise comparisons. First, when the high stable-increasing class was used as the reference class, the results showed that previous academic achievement was more powerful than maternal educational expectations in predicting children's membership in the high-stable increasing class than in the other three classes. Second, when the low stable-increasing class was used as the reference class, academic achievement was a positive indicator of children's membership in the low quickly-increasing class. In other words, when two children have the same low level of educational expectations at the beginning, the children who have higher academic achievement tended to increase their expectations more rapidly than another one. However, maternal educational expectations contributed to children being classified as high quickly-decreasing rather than low-stable increasing class. Finally, the results also showed that academic achievement was a significant predictor for differentiating the low quickly-increasing class from the high-quickly decreasing class. Specifically, when academic achievement increased by one unit, the log odds of being classified into the high quicky-decreasing rather than a low quickly-increasing class would be expected to decrease by 0.399 units while holding all other variables in the model constant. Regarding the effects of the covariate variables, gender had a negative effect on contributing to low stable-increasing rather than low-quickly increasing, indicating that when they begin with low expectations, females are more likely to increase their expectations quickly than males. In addition, a higher maternal educational level contributes to the classification of students into the high stable-increasing group and hinders their classification into the low stable-increasing, high quickly-decreasing, and low quickly-increasing groups.

4. Discussion

The present study investigated the overall and heterogeneous developmental trajectories of Chinese children's educational expectations using variable-centered and person-centered approaches. Furthermore, this study also examined the roles of adoption and adaptation processes by comparing the relative impact of previous academic achievement and maternal expectations in predicting the development of educational expectations.

4.1. Overall developmental trajectory of educational expectations

The overall developmental trajectory of Chinese children's educational expectations presented an increasing pattern from the 4th grade to the 6th grade. This finding differs from the declining pattern discovered in previous studies on American children, lending credence to the Situated Expectancy-Value Theory's claim of cultural difference. One possible explanation for these contradictory findings could be the differences in learning philosophy between Western and East Asian cultures mentioned in the Sociocultural Learning Models (Li & Yamamoto, 2020). Westerners have a mind-oriented cultural model of learning. They view learning as a means of examining the world and emphasize cognition, mental functions, ability, and skills. However,

Table 5
Multivariate Multinomial Logistic Regression Predicting the Class Memberships of the Trajectories of Children's Educational Expectations.

Predictors	Reference Class: High Stable-Increasing			Reference Class: Low Stable-Increasing		Reference Class: Low Quickly- Increasing
	Low Stable-Increasing	High Quickly-Decreasing	Low Quickly-Increasing	Low Quickly-Increasing	High Quickly-Decreasing	High Quickly-Decreasing
	Est. (S.E.)	Est. (S.E.)	Est. (S.E.)	Est. (S.E.)	Est. (S.E.)	Est. (S.E.)
Academic Achievement	−1.293*** (0.145)	−1.285*** (0.157)	−0.886*** (0.156)	0.407*** (0.101)	0.008 (0.103)	−0.399*** (0.111)
Maternal Expectations	−0.854*** (0.089)	−0.589*** (0.115)	−0.782*** (0.085)	0.072 (0.101)	0.265* (0.130)	0.193 (0.117)
Gender	0.095 (0.167)	−0.130 (0.234)	−0.284 (0.158)	−0.379* (0.191)	−0.225 (0.272)	0.154 (0.243)
Family Income	−0.056 (0.045)	−0.080 (0.068)	−0.038 (0.044)	−0.018 (0.050)	−0.025 (0.075)	−0.042 (0.069)
Maternal Educational Level	−0.300* (0.125)	−0.470** (0.155)	−0.337** (0.117)	−0.037 (0.155)	−0.170 (0.194)	−0.132 (0.169)

Note. *$p < 0.05$. **$p < 0.01$. ***$p < 0.001$. All coefficients above are standardized. A negative coefficient indicates that the predictor contributes to membership in the reference group. For example, a logistic value of −1.293 indicates that for every one-unit increase in academic achievement, the log odds of being in the low stable-increasing class rather than a high stable-increasing class would be decreased by 1.293 units.

children's sense of their abilities becomes more realistic or sometimes more pessimistic as they receive increasing feedback about their performance (Muenks et al., 2018), which results in lowering their expectations for future educational attainment. However, Chinese people have a virtue-oriented cultural model of learning, in which learning is viewed as a means to become a better person. Encouraged by this long-term developmental viewpoint, people may increasingly improve their educational attainment to better themselves. Another probable explanation, from a sociological perspective, is the widespread practice of the "college for all" norm. In recent decades, obtaining a bachelor's degree has become increasingly regarded as an essential part of the life course of young adults (Goyette, 2008). Barro and Lee (2013) analyzed the global trend in educational attainment from 1950 to 2010 and discovered that the global population aged 15 and over completed tertiary education at six times the rate in 1950, increasing from 1.1 % to 6.7 %. However, in China, this rate has shifted dramatically. The proportion of the population that had completed tertiary education was 0.6 % in 1972, while it increased to 8.9 % in 2010 and 13 % in 2018 (National Bureau of Statistics of China, 2019). As a result of this norm, the young generation may expect higher educational levels to obtain a good job (Goyette, 2008).

4.2. Individual differences in the development of educational expectations

The current study identified four different developmental trajectories of educational expectations, which is consistent with the number of categories in Lee et al. (2012). However, the class into which the majority of participants were classified was different from that of the previous study; most of the participants (64.7 %) in the present study belonged to the high stable-increasing class, while 66.8 % of the students in Lee et al. (2012) belonged to the stable-high class. This difference corroborates that the trend of children increasing their expectations is a norm in China rather than a stable or even declining trend in Western countries. In addition, there were two categories with a similar number of participants in this study: the low quickly-increasing class (16.6 %) and the low stable-increasing class (13.4 %). We found that the plausible reason the two classes have different increasing rates is because of academic achievement. Children who had higher academic achievement quickly increased their educational expectations even though they had a lower level of initial educational expectations. This is beneficial information for practitioners since they can improve children's educational expectations by helping them with their academic achievement. Finally, there was also a small number of children in the high quickly-decreasing class (5.3 %), who initially had a higher level of educational expectations but had lower expectations over time. This phenomenon

corresponds with the "optimism early and realism later" pattern proposed by expectancy-value theory, which means these children might be quite optimistic about their competencies but adjust their expectations as they receive more realistic feedback from surrounding environments (Wigfield et al., 2015).

4.3. Adoption and adaptation process in the development of educational expectations

This study found that maternal educational expectations are more potent than prior academic achievement on the initial level of children's educational expectations. One possible explanation is that when children are young, their primary source of learning the value of education is their parents. Therefore, children can only rely on their parents and directly adopt and internalize their parents' educational values (Aceves et al., 2020). This finding implies that the adoption process is more powerful than the adaptation process, especially when children are young. Academic achievement, on the other hand, is the most influential factor in the increasing rate of children's educational expectations. The reason for this could be that as children grow older, they develop more decision-making autonomy in their schoolwork and rely less on their parents (Wray-Lake et al., 2010). Furthermore, they may come to realize that academic achievement is a more solid and realistic form of evaluative feedback about their abilities (Bouchey & Harter, 2005). Therefore, they actively adjust their educational expectations based on a reinterpretation and integration of previous evaluative feedback about their abilities (Muenks et al., 2018). This finding supports the significance of the long-term role of the adaptation process in the development of children.

One intriguing finding was that maternal educational expectations had contradictory effects on the differential developmental trajectories of children's educational expectations. Maternal education expectations contributed either to children's membership in the high stable-increasing class or to their membership in the high quickly-decreasing class rather than the low-increasing class. The former has a protective effect on children, whereas the latter has a negative impact on children. This finding indicates that maternal educational expectations are a mixed blessing. The potential moderators could be maternal control and autonomy support, which were framed in both self-determination theory (Joussemet et al., 2008; Moe et al., 2020; Schiffrin et al., 2019) and the Beliefs, Expectations, Autonomy Support, and Relationships (BEAR) model (Froiland, 2021). Specifically, although previous research demonstrated that higher parental expectations typically have positive effects on children's psychological health and academic outcomes (Castro et al., 2015), the BEAR model revealed that this effect will be

enhanced only by combining it with autonomy-supportive communication. If the parent conveys high expectations in a controlling way, children will show a decrease in autonomous motivation to learn, an increase in anxiety (Curran & Hill, 2022), and decreased academic performance (Froiland, 2021). Future research could investigate how parental educational expectations combined with an autonomy-supportive or controlling attitude affect the formation of children's educational expectations in different ways.

4.4. Strengths, limitations, and future direction

The current study makes two main contributions to the field of the development of educational expectations. The first contribution is that this is the first study to examine the developmental trajectories of children's educational expectations in the middle childhood period, as well as in East Asian countries. The increasing trend discovered in this study contrasts with the declining pattern observed in children in Western culture, lending credence to the SEVT's cultural differences assumption. The second contribution of this study is that it sheds light on the recent adoption and adaptation argument about the formation of children's expectations by revealing that the adoption process occurs in the early stages of children's development, but the adaptation process becomes more dominant as children grow older.

This study has several limitations that should be mentioned. First, the current study supports the cultural difference assumption of educational expectation development based on findings in only one Asian country. The current study, however, was unable to reveal how cultural differences ultimately result in different trajectories of the development of children's educational expectations. Therefore, future studies could delve deeper into this question by explicitly examining cross-cultural comparisons. Second, this study examined the developmental trajectories of educational expectations over six waves of data from 4th to 6th grade. Given that previous studies have examined the development of educational expectations from 14 to 26 years old in Western culture (Mello, 2008, 2009), researchers should examine the long-term development of educational expectations of Chinese adolescents or adolescents from other cultures to obtain more comprehensive and representative conclusions. Third, while the current study used the first wave of data on maternal educational expectations and children's academic achievement as predictors, previous research has shown that both maternal educational expectations (Goldenberg et al., 2001) and children's academic achievements (Fu et al., 2016) change over time. Hence, future research could examine how changes in parental educational expectations and children's academic achievement affect the development of children's educational expectations over time. Finally, in addition to parental educational expectations and previous academic achievement, there are also various potential contextual influences (e.g., peers, teachers, school counselors) that might influence the development of children's educational expectations. Moreover, future research could also explore the potential mediation roles of other student characteristics (e.g., perceived competence, student engagement) on the relationship between academic achievement and the development of educational expectations.

5. Conclusion and practical implications

The current study revealed that Chinese children gradually increase their educational expectations in their middle childhood period. Due to the diversity of the students, there were four distinct developmental trajectories, which were the high quickly-decreasing, low quickly-increasing, low stable-increasing, and high stable-increasing classes. Previous academic achievement was the most influential determinant of the development of children's educational expectations, indicating that the adaptation process outperformed the adoption process. However, maternal educational expectations were more important in determining the initial level of children's educational expectations, implying that the

adoption process predates the adaptation process.

The results from this study could advance our understanding of the trajectories and determinants of the development of children's educational expectations in the middle childhood period. These findings could also assist parents and teachers with empirical guidance. For parents, since children mainly adopt parental expectations as their initial level of expectations, it is desirable for parents to maintain higher educational expectations for their children's future educational attainment, in conjunction with more supportive and autonomous parenting. For teachers, considering that children dynamically adapt their expectations based on their academic performances, teachers could avoid giving very low scores to children, especially when they are young, and provide additional encouragement to students with low achievement scores.

Ethical Statement

All procedures involving human participants in this study were approved by the Institutional Review Board of the Collaborative Innovation Center of Assessment toward Basic Education Quality, Beijing Normal University.

Informed Consent.

Written informed consent to participate in the study was obtained from the parents of all individual participants before evaluation.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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