International Journal of Psychology and Cognitive Science
2021; 7(1): 1-12
http://www.aascit.org/journal/ijpcs
ISSN: 2472-9450 (Print); ISSN: 2472-9469 (Online)

AASCIT American Association for Science and Technology

Family Risk and Promotive Factors for Chinese Adolescent Cognitive Development: A Moderated Mediation Model

Wenxiao Fu[1], Fei Deng[2, *], Wenlong Zhao[1]

[1]School of Humanities and Social Sciences, Xi'an Jiaotong University, Xi'an, P.R. China
[2]School of Education, Xi'an International Studies University, Xi'an, P.R. China

Email address

dengfei@xisu.edu.cn (Fei Deng)
[*]Corresponding author

Citation

Wenxiao Fu, Fei Deng, Wenlong Zhao. Family Risk and Promotive Factors for Chinese Adolescent Cognitive Development: A Moderated Mediation Model. *International Journal of Psychology and Cognitive Science.* Vol. 7, No. 1, 2021, pp. 1-12.

Received: September 6, 2021; **Accepted**: October 15, 2021; **Published**: November 17, 2021

Abstract: Cognitive development is a matter of primary importance for Chinese adolescents. Over the past 70 years, family structure and function have changed dramatically and the implementation of the One-Child policy in China has been more than 30 years, which has undoubtedly had a profound impact on the cognitive development of adolescents. This study aims to examine whether the relationship between family risk and promotive factors and adolescent cognitive development is mediated by parental educational expectations and if these mediation effects are moderated by family size. Data were obtained from the China Education Panel Survey (n=14,737). Stata 14.0 and structural equation modeling (SEM) were employed in this study. The results indicated that cumulative family risk and promotive factors had a significant direct and independent effect on Chinese adolescents' cognitive development. In addition, Family promotive factors tend to be stronger predictors of adolescent's cognitive development than family risk factors. Mediation analysis shown that parental educational expectations significantly mediated the association among family risk and promotive factors and cognitive development. Moderated mediation analysis also found that the association between parental educational expectation and cognitive development was moderated by family size. Based on the findings, the study indicates that interventions should focus on increasing the number of family promotive factors, enhancing parental educational expectations, and updating family planning policies.

Keywords: Cognitive Development, Cumulative Family Risk Factors, Cumulative Family Promotive Factors, Parental Educational Expectation, Family Size

1. Introduction

Cognitive competence plays an important role in adolescent development [1]. It is closely related to human capital, academic achievement, salaries, and health [2]. A previous study, published in the *Lancet,* shows that basic cognitive skills are a key predictor of adolescent development, and that children in developing countries are more likely to be at risk for delayed cognitive development [3]. Several Hong Kong researchers have indicated that interventions aimed at promoting cognitive skills in developed countries may not work or be as effective in developing countries, given their different economic and cultural backgrounds [4]. Many Chinese mainland educators report high rates of cognitive delay in China, which may lead to poor school performance and low levels of subjective well-being in adolescents' later-life [5, 6]. As the largest developing country, using Chinese samples for research can not only explore the causes of Chinese adolescent cognitive delay but also provide evidence for adolescents from other developing countries.

Many factors are responsible for the differences in cognitive development. Ecological theory posits that adolescents live in multiple ecological systems; therefore, their cognitive ability is more influenced by their surroundings, especially their families [7]. Increased emphasis has been placed on how family risk and protective factors affect adolescent cognitive development [8, 9]. However, many researchers exploring adolescent development have focused

on the effects of either family risk or promotive factors [10]. Given their shared impact on adolescent development, the failure to combine both these areas of research is not only surprising but may have led to misleading conclusions. For example, when studying adolescent problem behaviors, only focusing on the effects of multiple risk factors in families, without including the buffer effects of protective factors, may exaggerate the negative effects [11].

No study, to the best of our knowledge, has tested the effect of both family risk and promotive factors on Chinese adolescent cognitive development. Thus, we explore whether family risk and promotive factors influence Chinese adolescent cognitive development and whether they increase or decrease the impact on Chinese adolescents' cognitive development through other variables. We also examine whether variables moderate these associations. Examining the underlying mechanism may explain why some adolescents attain better cognitive development despite multiple family risk factors and why some adolescents suffer poor cognitive development despite multiple promotive factors.

Family Risk and Promotive Factors as Predictors of Adolescent Cognitive Development

The family system and resilience theories are predominantly used in explaining the impact of family risk and promotive factors on adolescent cognitive development. Whitchurch and Constantine demonstrated that individual members are held together in a family and their behaviors exhibit mutual influence [12]. The family system theory explains family's role in adolescent cognitive development. Generally, resilience is a commonly-used notion but is difficult to define precisely. Porterfield et al. uses the term to refer to "the process of adapting well in the face of adversity." [13]. Masten defines resilience as the capacity of individuals who are at-risk to help themselves stay positive and deal with stress effectively [14]. Although each expert defines resilience differently, most discussions agree on the nature of resilience — that is, resilience refers to the competence needed to overcome adversity and positively recover from trauma [15]. The compensatory model of resilience emphasizes that risk and promotive factors jointly predict the development of adolescents and play negative and positive roles, respectively, while remaining independent [16]. Hsieh and her colleagues explored the association between risk and promotive factors and Chinese adolescents' problem behaviors, using the compensatory model of resilience as a framework [17].

According to Masten and Gewirtz [18], the term "family risk factor" is used to describe family factors that can increase the likelihood of future adverse outcomes for adolescents. The correlation between family poverty and adolescent outcome has been confirmed by several researchers [19]. Brooks-Gunn and Duncan demonstrated that children from poor families are more likely to drop out of school and have learning disabilities than other adolescents [20]. Similarly, Chinese researchers have also confirmed the link between family poverty and children's low cognitive development [21]. Several factors are partially responsible for family poverty, such as parental unemployment [22]. Researchers have found that adolescents in long-term unemployed families are more likely to show delinquent behaviors and have cognitive problems [23]. A recent study in China provided evidence that paternal unemployment reduces child health [24]. Additionally, marital conflicts negatively impact children's mental health and cognitive development [25]. Li et al. found a negative correlation between parents' ability to successfully resolve conflict and their children's anxiety levels [26]. Moreover, marital conflict is often accompanied by parents' poor involvement in their children's development. The Head Start program is the largest federally funded early childhood compensatory program in the United States, which provides early education for children and enhances parenting skills [27]. Ansari and Gershoff sought to understand the extent to which "Head Start programs" are successful and found that the cognitive stimulation activity for parents was a salient factor in their children's development [28]. Parents' every move profoundly affects the growth of their children. Parental alcoholism may impair a child's potential to become a competent adolescent [29], and alcohol expectancies may originate from observed parental alcohol use, thus, prevention efforts may need to begin from early adolescence onward [30]. As noted by Neighbors et al., 90% of college students drink on their birthdays and 23% drink regularly; most of these students have alcoholic parents [31].

Fergus and Zimmerman published a series of articles to popularize the term "promotive factors" to describe environmental capital and individual traits that can help adolescents avoid harm from risk factors [32]. Several family promotive factors affect adolescent cognitive skills. Froyen et al. discovered a positive relationship between good parent-child relationships and the cognitive health of children [33]. A systematic review showed that 87% of the related studies published between 1988 and 2012 show a positive association between parent-child communication interventions and adolescent sex-related behavior [34]. In Ecuador, researchers documented a clear association between parental education and cognitive development among adolescents, namely the higher the degree of parental education, the better the cognitive development of adolescents [35]. Schaub pointed out that adolescents in families with highly educated mothers are more likely to have better cognitive abilities [36]. She also noted that parents' education is significantly and positively correlated with their involvement in their children's schooling. Wu identified this positive effect from the perspective of family cultural capital and concluded that the more cultural capital a family has, the higher the cognitive development of its children and the higher the education level of the parents, the higher the return rate of cultural capital [37].

Rutter found that family risk factors tend to cluster and accumulate [38]. Therefore, we need to test the cumulative effect of family risk factors on adolescent cognitive development. Rutter's seminal work identified several social context risk factors and illustrated the cumulative risk approach [39]. He constructed a "family adversity index," rating each child on a scale of 0 to 4+, reflecting the risk

factors in their lives. We use the same method to understand promotive factors. Some researchers have already used this method to test the cumulative effect of risk factors on adolescent cognitive development. Ungar et al. listed eight family attributes to mitigate risk factors [40]. Ostaszewski and Zimmerman found 15 promotive factors from multiple-level domains, including peer-, parent-, and religion-level factors [41]. Chen et al. examined whether a cumulative promotive index moderated the association between exposure to community violence and youth delinquency [42].

Parental Educational Expectation as a Mediator

Many students achieve healthy cognitive development despite multiple family risks [43]. Therefore, it is important to explore the mechanism of cumulative family risk and promotive factors and cognitive development. Owing to the influence of traditional Chinese culture as encapsulated by the idea of "every family member, especially children, bears the responsibility to ensure that the family is prosperous," most Chinese parents have high hopes for their children [44]. Mothers who expect too much are called "tiger moms" for being too demanding [45]. Stull examined the links between family socioeconomic status (SES) and parental educational expectation and found that parents' expectations rise with family SES [46]. Räty and Kasanen indicated that family SES is a significant predictor of parental educational expectations in a seven-year follow-up study [47]. Although a large and growing body of literature has suggested that parents' higher education pertains to positive effects on children's cognitive outcomes, the literature has also indicated that it can affect educational expectations of the parent [48]. Similarly, family risk factors influence parental educational expectations. Loughlin-Presnal and Bierman conducted an intervention to promote parents' educational expectations and found that parents from socioeconomically-disadvantaged families had unclear educational expectations before the intervention [49]. Veas et al. demonstrated that parents' low involvement was correlated with their educational expectations [50]. A significant interaction was found between drinking expectancies and parental expectation [51]. Research has shown that family risk and promotive factors influence parental educational expectation.

Modern expectancy-value theory postulates that individuals' achievements and performance are directly linked to expectancy-related and task-value beliefs [52]. Several interdisciplinary studies have examined parental educational expectation and consider it an important factor that affects children's cognitive ability [53]. Ma investigated the impact of peer, teacher, and parental expectations on math participation and found that peer and teacher expectations had no significant effects, whereas parental expectations had a significantly strong effect [54]. This was in line with Doren et al. [55], who found a significant and direct effect between parental educational expectations and their children's cognitive development.

Hence, it is reasonable to assume that parental educational expectation mediates the relationship between family risk and promotive factors and adolescent cognitive development.

Family Size as a Moderator

Although family risk and promotive factors may affect adolescent cognitive development, not all adolescents prone to adversity in the family environment have low levels of cognitive development. Thus, testing certain influences that may moderate the relationships that family factors and parental educational expectation form with cognitive development is useful. The term "family size" is used here to refer to "sibsize," as the point of reference is the offspring and its different degrees of cognitive development, which are affected by the number of siblings [56]. The One-Child policy was introduced in the 1970s in China to curb population growth. The implementation of the policy has varied widely. Families with two or more children do exist in some places [57]. Jiao et al. reported that the cognitive development of an only child was significantly better than that of a child with siblings in China [58]. Yang et al. revealed that only-children had higher scores in creativity than non-only-children, as reported in behavioral and anatomical structural studies [59].

The long-running one-child policy in China has made parents pin all their hopes on their only-children. As the family's only hope for the future, the only child has to meet higher expectations. Li et al. conducted a mediation analysis and confirmed that parental educational expectation acts as a mediator between family size and science literacy [60]. Baer et al. examined the possibility that family size moderates the association between the children's birth order and their imagination, and whether they had relatively more siblings of a similar age or of the opposite sex, and found that firstborns were more creative [61].

One way to understand these findings is through a resource dilution model. The model posits that parental resources are limited and that the share received by any child is diminished by the presence of siblings [62]. Family size is crucial for children's access to familial resources. The dilution model has implications for understanding the relationship between family size and cognitive development. However, to the best of our knowledge, no study has examined whether family size is a moderator between family risk and promotive factors and adolescent cognitive development.

Purpose and Hypotheses

This study aimed to explore the direct and indirect relationship among family risk and promotive factors, parental educational expectation, and adolescent cognitive development.

We tested whether parental education expectation mediated the relationship between family risk and promotive factors and cognitive development and whether family size moderated this effect.

Based on the family system theory and the compensatory model of resilience, we proposed two hypotheses for further testing (H1a-H1b). Additionally, we also tested the modern expectancy-value theory using three hypothese (H2a-H2c). Finally, based on the dilution model, we proposed two hypotheses for further examination (H3a-H3b).

The hypotheses and related theories are presented in Table 1. Figure 1 presents the theoretical model.

Table 1. *Research hypotheses and related theories.*

Related theory	Hypotheses
Family system theory Resilience theory	H1a: Family cumulative risk factors index is negatively correlated with adolescent cognitive development
	H1b: Family cumulative promotive factors index positively affects adolescent cognitive development
Modern expectancy-value theory	H2a: Parental educational expectation is positively associated with adolescent cognitive development
	H2b: Parental educational expectation mediates the relationship between cumulative family risk factors and adolescent cognitive development
	H2c: Parental educational expectation mediates the relationship between cumulative family promotive factors and adolescent cognitive development
Resource dilution model	H3a: The mediating effect of family cumulative risk factors on adolescent cognitive development through parental educational expectation is moderated by family size such that this effect is stronger for adolescents with siblings
	H3b: The mediating effect of family promotive risk factors on adolescent cognitive development through parental educational expectation is moderated by family size such that this effect is stronger for adolescents without siblings

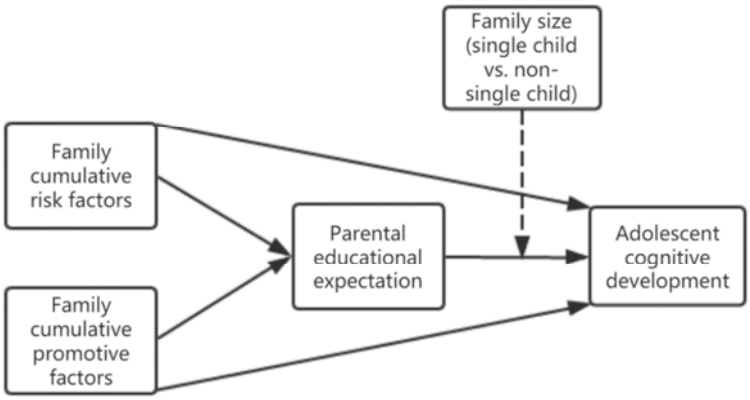

Figure 1. *The theoretical model of the influence of family cumulative risk and promotive factors on the cognitive development of Chinese adolescents.*

2. Materials and Methods

2.1. Data

The China Education Panel Survey (CEPS) is the first national longitudinal survey database for junior high school students. As we did not have direct interaction with human participants, no Institutional Review Board (IRB) ethics approval or informed consent were necessary for this study. CEPS, funded by the Chinese government and managed by the Renmin University of China, aims to explore the impact of multiple ecosystems on individual educational achievement. It was conducted from the academic year 2013-2014, starting from grades 7 and 9 of junior middle school. CEPS baseline survey adopted multi-stage Probability Proportional to Size (PPS) sampling. Finally, all the students (about 20,000) from 438 classes were selected.

2.2. Participants

The respondents of CEPS come from different socioeconomic and socio-cultural backgrounds. After deleting the missing values, the final sample size in the study included 14,737 students from grades 7 (53.25%) and 9 (46.75%). Specifically, approximately 50.13% of the respondents were girls and 49.87% were boys; 53.56% of the respondents were from rural areas and 46.44% were from urban cities.

2.3. Measures

2.3.1. Cognitive Development

To test the students' cognitive competence accurately, CEPS designed a set of internationally comparable and nationally standardized cognitive test questions from three dimensions (α=0.72). The language, graphics and space, and computation and logic sections contain two, three, and six questions, respectively. Participants answered the questionnaire in a classroom in 15 minutes. The test was the same for all participants and did not examine the basic skills they acquired at school. The cognitive test carried out by CEPS followed an approach similar to that of the Taiwan Education Panel Survey and the National Education Panel Study in Germany [63]. Then, we standardized the scores to produce an index with a value ranging from 0 to 100. The higher the number, the higher the cognitive competence.

2.3.2. Cumulative Family Risk and Promotive Factors

Five family risk items (alcohol use by parents, low family income, low marital quality, unemployed parents, and low parent involvement) and five family promotive items (rich cultural capital, positive parent-child relationship, parental support, parental supervision, and parent with higher education) were selected based on literature reviews. The cumulative family risk and promotive indexes were built in two steps. First, we dichotomized variables at meaningful cutoff points (1=risk

exposure and 0=low or no risk exposure) [64]. Table 2 shows the sample items for each variable and summarizes the criteria used to classify the risk status of each risk variable and the promotive status of each promotive variable. Second, the number of risk and promotive factors were counted according to the sum of each binary risk and promotive factor to obtain the overall cumulative risk and promotive scores with values between 0 and 5. The cumulative percentage of the scores on the indexes is presented in Table 2. The higher the score, the higher the number of family risk or protective factors.

Table 2. *Description of family risk and promotive indicators and cumulative risk and promotive indexes.*

Risk factors (Status Criterion)	Mean	*SD*	Sample item (type of scale used)			
Alcohol use by parents (=1)	.077	.26	Do you agree with the statement "My father [mother] often gets drunk?" (0=no, I don't agree, 1=yes, I agree)			
Low marital quality (=2)	1.84	.35	Do you agree with the statement "My parents quarrel a lot?" (1=no, 2=yes)			
Unemployed parent (=1)	0.14	.34	Are either of your parents unemployed or laid-off workers? (0=no, 1=yes)			
Low parental involvement (=1)	2.25	1.39	How often do you go out to watch movies, shows, sports, etc., with your parents? (1=never, 6=More than once a week)			
Low family income (=1)	1.89	0.30	Does your family receive a subsistence allowance at present? (1=Yes, we do. 2=No, we don't)			
Promotive factors (Status Criterion)			Sample item (Type of scale used)			
Rich cultural capital (≥4)	3.21	1.19	How many books does your family own? (Not including textbooks or magazines) (5-point Likert, 1=very few, 5=a great many)			
Positive parent-child relationship (=3)	2.61	0.52	How is the general relationship between you and your parents? (1=not close 3=very close)			
Parental support (=3)	10.84	2.82	How often do your parents discuss the following with you? (5=never, 15=often) Things that happened at school (1=never, 3=often) The relationship between you and your friends (1=never, 3=often) The relationship between you and your teachers (1=never, 3=often) Your feelings (1=never, 3=often) Your worries and troubles (1=never, 3=often)			
Parental supervision (=4)	4.51	2.05	How often did your parents do the following to check up on your study last week? (2= never, 8=almost every day) Checking up on your homework (1= never, 4=almost every day) Giving instructions for you to follow while doing your homework (1=never, 4=almost every day)			
Parent with higher education (≥4)	4.56	2.02	What is the highest level of education your mother has attained? What is the highest level of education your father has attained? (1=none, 9=Master's degree or higher)			
Number	0	1	2	3	4	5
Cumulative risk (%)	25.7	73.2	94.5	99.4	99.9	100
Cumulative promotive (%)	10.7	36.8	66.5	86.6	97.1	100

2.3.3. Parental Educational Expectation

We used an indicator to measure the variables for parents' educational expectation. The indicator was the expected stage of education, where the CEPS question was "What is the highest level of education your parents expect you to receive?" We reassigned the values for this variable to different educational stages, ranging from junior middle school graduation to the doctoral degree level, and obtained a continuous variable with a value between 1 and 8.

2.3.4. Family Size

Adolescents were asked how many FULL OR HALF siblings they had. They filled in 0 if they did not have any siblings. Adolescents without any siblings were classified into the one-child group. Almost half the adolescents (45%, N= 6,640) reported that they were the only children in their families.

2.4. Data Analytic Plan

All variables had a missing rate of 5% or less. We used multiple imputations to impute missing data *n* times to create *n* complete datasets, analyzed each dataset, and combined the *n* results into one [65]. First, for preliminary analyses, Harman's single-factor test was adopted to assess if the database is prone to a common method bias. Next, we analyzed the descriptive statistics and correlations among variables with Stata version 14.0. Third, SEMs were fit in AMOS to understand the direct and indirect relationships among cumulative family risk, promotive factors, and cognitive development through parental educational expectation. The bootstrap method based on 5,000 random samples was used to test the mediation effect. Finally, following the procedures proposed by Muller et al. [66], we investigated whether the mediation was moderated by family size. All continuous variables were standardized for interaction terms in the analysis to eliminate non-essential multicollinearity. Significant moderating effects were presented by plotting simple slopes for adolescents with and without siblings.

3. Results

3.1. Common Method Bias

As the study is cross-sectional and all data were self-reported, the common method bias was a problem. CEPS minimized it by strengthening procedural designs before collecting data (i.e., use of different scale formats, counterbalancing the order of the questions, etc.). To test whether the data are prone to common method bias, Harman's single-factor test was applied. The results showed that no single factor accounted for most of the variance, and the first

factor accounted for 21.46% of the overall variance, less than the threshold of 50% for a severe common method bias, which indicates that it was not a threat [67].

3.2. Correlations

Tables 3 and 4 show the bivariate correlations among the family risk and promotive items and other variables. Each family risk item was correlated with parental educational expectation (-0.018 to -0.162), family size (-0.015 to 0.197), and cognitive development (-0.024 to 0.182). Each family promotive item was correlated among themselves (0.033 to 0.334) and with other variables (-0.023 to 0.250).

Table 3. *Matrix of correlations among risk and outcome variables.*

	1	2	3	4	5	6	7	8
1. Alcohol use by parents	1.000							
2. Low marital quality	.003	1.000						
3. Unemployed parent	.141**	.038**	1. 000					
4. Low parental involvement	.040**	.074**	.072**	1.000				
5. Low family income	.032**	.128**	.021**	.109**	1.000			
6. Parental educational expectation	-.045**	-.018*	-.038**	-.162**	-.092**	1.000		
7. Family size	-.015	.064**	-.017*	.197**	.124**	-.144**	1.000	
8. Cognitive development	-.042**	-.052**	-.024**	-.182**	-.135**	.287**	-.217**	1.000

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 4. *Matrix of correlations among family promotive and outcome variables.*

	1	2	3	4	5	6	7	8
1. Rich cultural capital	1.000							
2. Positive parent-child relationship	.100**	1.000						
3. Parental support	.180**	.158**	1.000					
4. Parental supervision	.061**	.106**	.083**	1.000				
5. Parent with higher education	.334**	.049**	.130**	.033**	1.000			
6. Parental educational expectation	.250**	.120**	.140**	.086**	.240**	1.000		
7. Family size	-.263**	-.040**	-.110**	-.023**	-.356**	-.144**	1.000	
8. Cognitive development	.244**	.065**	.095**	.066**	.224**	.227**	-217**	1.000

** Correlation is significant at the 0.01 level (2-tailed).

3.3. Hypotheses Testing

3.3.1. Mediation Effect

To test H1a and H2a, we built a direct and indirect effect model with paths from family cumulative risk and promotive factors to adolescent cognitive development via parental educational expectation using AMOS software (Table 5). To eliminate non-essential multicollinearity, we used the mean-centered variables for interaction terms in the analysis. The results provided an acceptable fit to the total sample. The Chi-square value for the model was statistically significant ($\chi 2/df=0.199$, $p<0.001$). The comparative (CFI=1.00) and the normed fit indexes (NFI=1.00) indicated a reasonable model fit, whereas the root mean square error of approximation (RMSEA) showed an approximate fit at 0.000, with a 90% confidence interval of 0.000-0.016. All direct effects of the risk and promotive factors and parental educational expectation on students' cognitive development were statistically significant. Family cumulative risk factors index was negatively correlated with cognitive development, supporting H1a. Family cumulative promotive factors index and parental educational expectation had a positive impact on adolescent cognitive development, thus proving H1b and H2a.

The results of the bias-corrected bootstrap tests (95% confidence intervals; 5000 bootstrap samples) revealed that both family cumulative risk and promotive factors had significant indirect effects on adolescent cognitive development through parental educational expectation (Table 6). As Table 5 shows, the direct effect existed. Thus, H2b and H2c were partially supported.

Table 5. *Direct effects between cumulative family risk and promotive factors, parental educational expectation, and cognitive development.*

Direct Path			Unstandardized total effects	Standardized total effects	C. R.
Cognitive development	←	Risk factor	-0.42 (.035) ***	-0.09	-11.96
Cognitive development	←	Promotive factor	0.45 (.025) ***	0.15	18.34
Cognitive development	←	Parental educational expectation	0.56 (.020) ***	0.23	27.92
Parental educational expectation	←	Risk factor	-0.12 (-.065) ***	-0.05	-7.93
Parental educational expectation	←	Promotive factor	0.34 (.010) ***	0.28	43.65

N=14,737
*p<.05, **p<.01, ***p<.001.

Table 6. *Direct and indirect effects of cumulative family risk and promotive factors on cognitive development through parental educational expectation.*

Path			Type of effect	β	SE	95% CI	
						Low	High
Cognitive development	←	Risk factor	Indirect effect	-.07***	0.01	-.08	-.04
			Direct effect	-.42***	0.04	-.49	-.35
Cognitive development	←	Promotive factor	Indirect effect	0.20***	0.01	0.17	0.21
			Direct effect	0.46***	0.03	0.40	0.51

N=14,737
*p<.05, **p<.01, ***p<.001.

3.3.2. Moderated Mediation Effect

The final hypothesis predicted that the mediation effect of family cumulative risk and promotive factors and adolescent cognitive development through parental educational expectation would be moderated by family size. As observed in Figure 2, the main effect of the cumulative family risk and promotive factors on adolescent cognitive development is significant, and the effect of the interactions among family size and family risk and promotive factors on cognitive development is not significant. The results also showed a significant effect of cumulative family risk and promotive factors on parental educational expectation, and the interactions between family size and parental educational expectations were significant in predicting adolescent cognitive development. The effect of cumulative family risk and promotive factors on adolescent cognitive development through parental educational expectation was moderated by family size. However, only the second stage of the mediation process moderated the family size (i.e., the association between parental educational expectation and adolescent cognitive development), partially favoring H3a and H3b.

To examine the significant moderating effect of parental educational expectations further, this study plotted parental educational expectations on cognitive development with simple slopes estimated concerning only- and non-only-child families. Figure 2 shows that the relationship between parental educational expectations and cognitive development was significantly positive across two kinds of family sizes, and the relationship was stronger when the family had only one child (b=0.60, p<0.001) than in non-only-child families (b=0.49, p<0.001) in China.

As presented in Tables 7 and 8, the bias-corrected percentile bootstrap (95% confidence intervals; 5000 bootstrap samples) results indicated that the indirect effect of cumulative family risk factors on adolescent cognitive development via parental educational expectations was buffered by family size, and the indirect effect of cumulative family promotive factors on adolescent cognitive development via parental educational expectation was strengthened by family size. For adolescents without siblings, the conditional indirect effect of cumulative family risk factors was weaker and the conditional indirect effect of cumulative promotive factors was stronger [68].

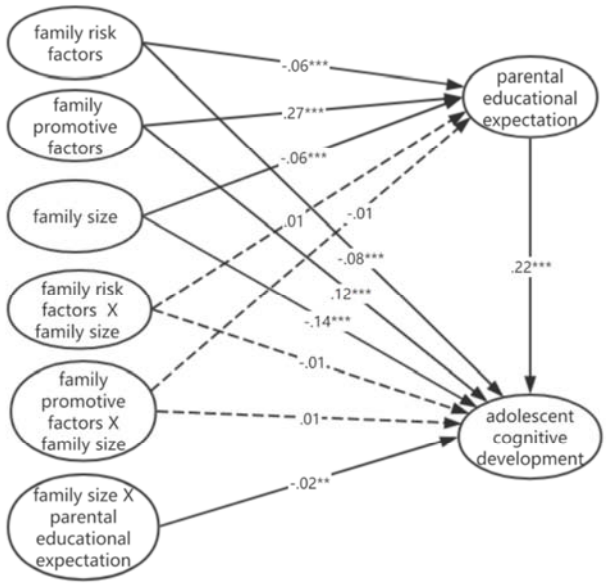

Figure 2. *The moderated mediation model.*

Table 7. *The conditional indirect effect of cumulative risk factors on cognitive development via parental educational expectation across family size.*

Family size	Indirect effect	SE	95% CI	
			Low	High
Only child	-0.31	0.05	-0.41	-0.20
Non-only child	-0.42	0.04	-0.48	-0.30

Table 8. *The conditional indirect effect of cumulative promotive factors on cognitive development via parental educational expectation across family size.*

Family size	Indirect effect	SE	95% CI	
			Low	High
Only child	0.36	0.03	0.43	0.01
Non-only child	0.31	0.03	0.41	0.01

4. Discussion

This study tested a moderated mediation model to explore the mechanisms between family risk and promotive factors, parental educational expectation, family size, and adolescent cognitive development. Consistent with the literature, this study found that adolescents exposed to multiple family risk factors are more likely to acquire lower cognitive ability and family promotive factors mitigate the negative effects of

family risk factors. Another important finding was that parental educational expectation mediated the influence of family risk and promotive factors on adolescent cognitive development. The strength of the association between parental educational expectation and adolescent cognitive development is moderated by family size.

4.1. Relations Between Cumulative Family Risk and Promotive Factors and Cognitive Development

This study emphasized that cumulative family risk and promotive factors have a significant direct impact on Chinese adolescents' cognitive development, regardless of whether there are mediators. Although a few researchers have focused on the effect of family risk and promotive factors on cognitive development, they all presented similar findings. Walker et al. found that biological and psychosocial risk factors exert a negative effect on children's early cognitive development, whereas adverse effects of risk factors are mitigated by protective factors [69]. Burchinal et al. demonstrated that family risk factors were negatively correlated with adolescents' early cognitive development and Ayoub et al. revealed that family promotive factors were associated with an increase in cognitive skills [70, 71]. Family promotive factors play an independent and significant role in this process. Thus, our results support the compensatory model of resilience.

Our study shows that the effect of accumulation of family promotive factors may overpower the accumulation of family risk factors. Family promotive factors tend to be stronger predictors of cognitive development than family risk factors, and increasing the number of promotive factors may be an effective means to reduce the negative effects of family risk factors, thus improving cognitive development levels. These findings show that interventions are urgently necessary to enhance promotive factors instead of reducing risk factors. Zimmerman et al. carried out a program named "Father and Son" to enhance the frequency and quality of father-child communication, improve parenting methods, and ultimately offer a good family environment to children [72]. To some extent, the engagement of a father can be a resilience source for children. Our study indicates that interventions could concentrate on building assets and resources for adolescents exposed to risk rather than rely on risk reduction.

4.2. The Mediating Role of Parental Educational Expectations

Consistent with the hypothesis, in the path of family risk and promotive factors on cognitive development, parental educational expectation plays the role of a mediating variable. The findings show that parental educational expectation serves as a buffer against adverse family contexts; the youth who reported higher educational expectation of their parents also reported fewer negative influences from family risk factors on their cognitive development. This is in line with the literature that demonstrated the negative influences of family adversity conditions like poverty on adolescent cognitive development; however, once parents have higher expectations for their children's future, the negative impact will be weakened [73, 74]. Findings also showed that parental educational expectation increases the positive influence of cumulative family promotive factors on cognitive development. Parental educational expectation is a crucial mechanism that mediates the association between family promotive factors and adolescent development [75, 76]. Based on the ratio of indirect to total effects, we found that the mediation effect between family risk factors and cognitive development and that between family promotive factors and cognitive development account for 14% and 30% of the total effect, respectively. Therefore, we can conclude that, when compared to family risks, family promotive factors are more likely to affect cognitive development through parental educational expectation. According to this finding, promotive factors served as a stronger predictor of cognitive development, increasing both the number of family promotive factors and parental educational expectation, and would thus be more conducive to the improvement of cognitive ability.

4.3. The Moderating Role of Family Size

Another important aim of this study was to test the moderating effect of family size on the direct and indirect associations between cumulative family risk and promotive factors and adolescent cognitive development via parental educational expectations. However, family size only moderated the second stage of the mediation process (i.e., the relationship between parental educational expectation and cognitive development). For adolescents with siblings, the relationship between parental educational expectation and cognitive development was much weaker. The resource dilution model and expectancy-value theory can provide theoretical explanations for these findings. Only-children receive more financial and emotional resources from their families than do children with siblings.

This study also showed that the indirect effect of cumulative family risk factors on adolescent cognitive development via parental educational expectation was buffered by family size and that the indirect effect of cumulative family promotive factors on adolescent cognitive development via parental educational expectations was strengthened by family size.

We introduce Chinese culture to further explain this. The Confucian value system emphasizes that the family lineage could only be continued through sons [77], promoting dual interests among parents under the one-child policy control. Parents could either have one boy, have one girl, thus ignoring Confucian values, or continue their lineage, thus defying the policy. Moreover, the Chinese government uses several measures, including rewarding parents with only one child and punishing those with two or more, to ensure that the policy is adhered to [78].

Based on the evidence presented thus far, the cognitive development of adolescents with siblings was lower than that of those without siblings because of the one-child policy and Confucian value system, which calls for respect for family, kin, and filial piety. Therefore, under the premise that the Chinese

traditional culture cannot be changed in the short term, changing the policy is an available means to improve the environment for youth development. Fortunately, the Chinese government began to implement a universal Two-child policy, which significantly reduces the unapproved abortions and normalizes the sex ratio [79].

4.4. Limitations and Future Directions

Some limitations of our study should be noted. First, although CEPS comprises longitudinal data, our study uses only the cross-sectional data from the 2013-2014 wave of this survey, which means that we can only explore the links between the variables within the same period; Being limited to cross-sectional data, only the proximal factors that affect adolescent cognitive development were selected, without considering the family historical situation and adolescents' previous cognitive ability. Future research should adopt panel data to track individual dynamic development, considering both distal and proximal factors to gain a more comprehensive understanding of the factors that influence the trajectory of cognitive development in adolescents.

Second, it is noteworthy that we only included risk and promotive factors at the family level. Our family level factors were somewhat limited as they did not include extrinsic influences, such as school system education, peer influence, and community culture. Ecological theory emphasizes that adolescents belong to multiple domain ecosystems and are influenced by many factors pertaining to those ecosystems. Future studies should include more contextual factors to predict adolescent cognitive development more accurately and also compare the weight of the factors at different ecosystem levels to propose more targeted intervention measures.

Finally, although a major strength of the cumulative index method is predicting a range of factors related to adolescent cognitive development, this method is used to equate all the risks and promotive variables that may have different effects. Considering that certain factors may play a more important role than others, future studies should compare the different weights among the factors to better predict each factor's influence on the cognitive development of adolescents. Additionally, the cumulative index method implies a linear relation between the number of factors encountered and the outcome, but a previous study found evidence of non-linear effects of cumulative factors and outcome variables [80]. Further studies should re-examine the relationship between cumulative factors and outcome variables to provide evidence for linear or non-linear effects.

5. Conclusion

We explored the multiple family risk and promotive factors that shaped Chinese adolescents' cognitive development, highlighted important mediation effects of parental educational expectation, and found that family size could moderate the relationship between parental educational expectation and adolescent cognitive development.

We found that cumulative family risk and promotive factors have a significant direct and independent effect on Chinese adolescents' cognitive development. Unlike previous studies set in Western contexts, our findings show that cumulative family promotive factors mattered more for adolescent cognitive development than cumulative family risks. Parental educational expectations serve as a buffer against the negative effects of family risk factors on adolescents. The findings also verified the proposition that, when compared to children with siblings, only-children did better in terms of cognitive development. Therefore, continued interventions are necessary to increase the number of family promotive factors to weaken the influence of family risk factors on adolescent development. Interventions from the perspective of parental educational expectation may be beneficial in improving adolescent cognitive development.

Data Availability Statement

All data that support the findings of this study are publicly available from the National Survey Research Center (NSRC) at the Renmin University of China at https://ceps.ruc.edu.cn/index.php?r=index/index&hl=en.

Disclosure Statement

No potential conflict of interest was reported by the authors.

Acknowledgements

This study received financial funding and/or support from National Social Science of China [Grant BDX210285].

References

[1] Van Ijzendoorn, M. H., Juffer, F., & Poelhuis, C. W. K. (2005). Adoption and cognitive development: a meta-analytic comparison of adopted and nonadopted children's IQ and school performance. *Psychological Bulletin, 131* (2), 301.

[2] Schick, A., & Steckel, R. H. (2015). Height, human capital, and earnings: The contributions of cognitive and noncognitive ability. *Journal of Human Capital, 9* (1), 94-115.

[3] Black, M. M., Walker, S. P., Fernald, L. C., Andersen, C. T., DiGirolamo, A. M., Lu, C.,... & Devercelli, A. E. (2017). Early childhood development coming of age: science through the life course. *The Lancet, 389* (10064), 77-90.

[4] Rao, N., Sun, J., Chen, E. E., & Ip, P. (2017). Effectiveness of early childhood interventions in promoting cognitive development in developing countries: a systematic review and meta-analysis. *Hong Kong Journal of Paediatrics, 22* (1), 14-25.

[5] Huang, G., Xie, Y., & Xu, H. (2015). Cognitive ability: Social correlates and consequences in contemporary China. *Chinese Sociological Review*, *47* (4), 287-313.

[6] Zhou, H., Ye, R., Sylvia, S., Rose, N., & Rozelle, S. (2020). "At three years of age, we can see the future": Cognitive skills and the life cycle of rural Chinese children. *Demographic Research, 43*, 169-182.

[7] Bronfenbrenner, U. (2005). The bioecological theory of human development. In U. Bronfenbrenner (Ed.), *Making human beings human: Bioecological perspectives on human development* (pp. 3 – 15). Thousand Oaks, CA: Sage. (Original work published in 2001)

[8] Bann, C. M., Wallander, J. L., Do, B., Thorsten, V., Pasha, O., Biasini, F. J.,... & Carlo, W. A. (2016). Home-based early intervention and the influence of family resources on cognitive development. *Pediatrics, 137* (4).

[9] Suor, J. H., Sturge‐Apple, M. L., Davies, P. T., Cicchetti, D., & Manning, L. G. (2015). Tracing differential pathways of risk: Associations among family adversity, cortisol, and cognitive functioning in childhood. *Child Development, 86* (4), 1142-1158.

[10] Crosnoe, R., & Elder, G. H. (2004). Family Dynamics, Supportive Relationships, and Educational Resilience During Adolescence. *Journal of Family Issues*, *25* (5), 571–602.

[11] Gerard, J. M., & Buehler, C. (1999). Multiple risk factors in the family environment and youth problem behaviors. *Journal of Marriage and the Family*, *61* (2), 343-361.

[12] Whitchurch, G. G., & Constantine, L. L. (2009). Systems theory. *In Sourcebook of family theories and methods* (pp. 325-355). Springer, Boston, MA.

[13] Porterfield, K., Akinsulure-Smith, A. M., Benson, M. A., Betancourt, T., Heidi Ellis, B., Kia-Keating, M., & Miller, K. (2010). Resilience & recovery after war: Refugee children and families in the United States. Report of the APA task force on the psychosocial effects of war on children and families who are refugees from armed conflict residing in the United States. Washington, DC: American Psychological Association.

[14] Masten, A. S. (2014). Global perspectives on resilience in children and youth. *Child Development, 85* (1), 6-20.

[15] Goldstein, S., & Brooks, R. B. (2013). Why study resilience?. *In Handbook of resilience in children* (pp. 3-14). Springer, Boston, MA.

[16] Garmezy, N., Masten, A. S., & Tellegen, A. (1984). The study of stress and competence in children: A building block for developmental psychopathology. *Child Development, 55* (1), 97–111.

[17] Hsieh, H. F., Zimmerman, M. A., Bauermeister, J. A., Caldwell, C. H., Xue, Y., Wang, Z., & Hou, Y. (2016). Cumulative risks and promotive factors for Chinese adolescent problem behaviors. *Journal of Applied Developmental Psychology, 43*, 71-82.

[18] Masten, A. S., & Gewirtz, A. H. (2006). Vulnerability and resilience in early child development. In K. Mc Cartney, & D. Phillips (Eds.), *Blackwell handbook of early childhood development* (pp. 22–43). Malden, MA: Blackwell.

[19] Schoon, I., Jones, E., Cheng, H., & Maughan, B. (2012). Family hardship, family instability, and cognitive development. *J Epidemiol Community Health, 66* (8), 716-722.

[20] Brooks-Gunn, J., & Duncan, G. (1997). The effects of poverty on children. *The Future of Children, 7* (2), 55–71.

[21] Jiang, S., & Dong, L. (2020). Association between deprivation and cognitive ability among Chinese adolescents: Examining the mechanisms of parental involvement in a rural–urban dual system. *Current Psychology*, 1-10.

[22] Paul, M., Darity, W., Hamilton, D., & Zaw, K. (2018). A path to ending poverty by way of ending unemployment: A federal job guarantee. *RSF: The Russell Sage Foundation Journal of the Social Sciences, 4* (3), 44-63.

[23] Harland, P., Reijneveld, S. A., Brugman, E., Verloove-Vanhorick, S. P., & Verhulst, F. C. (2002). Family factors and life events as risk factors for behavioural and emotional problems in children. *European Child & Adolescent Psychiatry, 11* (4), 176-184.

[24] Pieters, J., & Rawlings, S. (2020). Parental unemployment and child health in China. *Review of Economics of the Household, 18* (1), 207-237.

[25] Hinnant, J. B., El‐Sheikh, M., Keiley, M., & Buckhalt, J. A. (2013). Marital conflict, allostatic load, and the development of children's fluid cognitive performance. *Child Development, 84* (6), 2003-2014.

[26] Li, C., Jiang, S., Fan, X., & Zhang, Q. (2018). Exploring the impact of marital relationship on the mental health of children: Does parent–child relationship matter? *Journal of Health Psychology*, (7), 1-12.

[27] Administration for Children and Families. (2014). *Head Start program facts Fiscal Year 2013*. Washington, DC: U.S. Department of Health and Human Services.

[28] Ansari, A., & Gershoff, E. (2016). Parent involvement in head start and children's development: Indirect effects through parenting. *Journal of Marriage and Family, 78* (2), 562-579.

[29] Bickelhaupt, S. E., Lohman, B. J., & Neppl, T. K. (2019). The influence of parental alcoholism on parent–adolescent relationships from adolescence into emerging adulthood: A qualitative inquiry. *Emerging Adulthood.* https://doi.org/10.1177/2167696818824186.

[30] Kuntsche, E., & Kuntsche, S. (2018). Even in early childhood offspring alcohol expectancies correspond to parental drinking. *Drug and Alcohol Dependence*, *183*, 51-54.

[31] Neighbors, C., Spieker, C. J., Oster-Aaland, L., Lewis, M. A., & Bergstrom, R. L. (2005). Celebration intoxication: An evaluation of 21st birthday alcohol consumption. *Journal of American College Health*, *54* (2), 76-80.

[32] Fergus, S., & Zimmerman, M. A. (2005). Adolescent resilience: A framework for understanding healthy development in the face of risk. *Annual Review of Public Health, 26* (1), 399–419.

[33] Froyen, L. C., Skibbe, L. E., Bowles, R. P., Blow, A. J., & Gerde, H. K. (2013). Marital satisfaction, family emotional expressiveness, home learning environments, and children's emergent literacy. *Journal of Marriage and Family*, *75* (1), 42-55.

[34] Sutton, M. Y., Lasswell, S. M., Lanier, Y., & Miller, K. S. (2014). Impact of parent-child communication interventions on sex behaviors and cognitive outcomes for black/African-American and Hispanic/Latino youth: A systematic review, 1988–2012. *Journal of Adolescent Health, 54* (4), 369-384.

[35] Paxson, C., & Schady, N. (2007). Cognitive development among young children in Ecuador the roles of wealth, health, and parenting. *Journal of Human resources, 42* (1), 49-84.

[36] Schaub, M. (2010). Parenting for Cognitive Development from 1950 to 2000: The Institutionalization of Mass Education and the Social Construction of Parenting in the United States. *Sociology of Education, 83* (1), 46–66.

[37] Wu, Y. (2008). Cultural capital, the state, and educational inequality in China, 1949–1996. *Sociological Perspectives*, *51* (1), 201-227.

[38] Rutter, M. L. (1999). Psychosocial adversity and child psychopathology. *The British Journal of Psychiatry, 174* (6), 480-493.

[39] Rutter, M. (1978). Family, area and school influences in the genesis of conduct disorders. *Book Supplement to the Journal of Child Psychology and Psychiatry*, *1* (1), 95-113.

[40] Ungar, M., Dumond, C., & Mcdonald, W. (2005). Risk, resilience and outdoor programmes for at-risk children. *Journal of Social Work, 5* (3), 319-338.

[41] Ostaszewski, K. and Zimmerman, M. A. (2006). The Effects of Cumulative Risks and Promotive Factors on Urban Adolescent Alcohol and Other Drug Use: A Longitudinal Study of Resiliency. *American Journal of Community Psychology, 38* (3-4), 251-262.

[42] Chen, P., Voisin, D. R., & Jacobson, K. C. (2016). Community violence exposure and adolescent delinquency: examining a spectrum of promotive factors. *Youth & Society, 48* (1), 4-8.

[43] Mak, W. W., Ng, I. S., & Wong, C. C. (2011). Resilience: enhancing well-being through the positive cognitive triad. *Journal of Counseling Psychology, 58* (4), 610-617.

[44] Chan, Y. Y., & Li, J. (2020). An early look at parental expectation towards early childhood education among Pakistani parents in Hong Kong: The role of culture and acculturation. *Children and Youth Services Review, 119*.

[45] Zhang, H., Qin, X., & Zhou, J. (2020). Do tiger moms raise superior kids? The impact of parenting style on adolescent human capital formation in China. *China Economic Review*, *63*, 101537.

[46] Stull, J. C. (2013). Family Socioeconomic Status, Parent Expectations, and a Child's Achievement. *Research in Education, 90* (1), 53–67.

[47] Räty, H., & Kasanen, K. (2010). A seven‐year follow‐up study on parents' expectations of their children's further education. *Journal of Applied Social Psychology, 40* (11), 2711-2735.

[48] Pinquart, M., & Ebeling, M. (2020). Parental educational expectations and academic achievement in children and adolescents—A meta-analysis. *Educational Psychology Review, 32* (2), 463–480.

[49] Loughlin-Presnal, J. E., & Bierman, K. L. (2017). Promoting parent academic expectations predicts improved school outcomes for low-income children entering kindergarten. *Journal of School Psychology, 62*, 67-80.

[50] Veas, A., Castejón, J. L., Miñano, P., & Gilar-Corbí, R. (2019). Relationship between parent involvement and academic achievement through metacognitive strategies: A multiple multilevel mediation analysis. *British Journal of Educational Psychology, 89* (2), 393-411.

[51] Simons-Morton, B. (2004). Prospective association of peer influence, school engagement, drinking expectancies, and parent expectations with drinking initiation among sixth graders. *Addictive Behaviors, 29* (2), 299-309.

[52] Eccles, J., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J., & Midgley, C. (1983). *Expectancies, values and academic behaviors*. In J. T. Spence (Ed.), Achievement and achievement motives. San Francisco: W. H. Freeman.

[53] Froiland, J. M., Peterson, A., & Davison, M. L. (2013). The long-term effects of early parent involvement and parent expectation in the USA. *School Psychology International, 34* (1), 33-50.

[54] Ma, X. (2001). Participation in Advanced Mathematics: Do Expectation and Influence of Students, Peers, Teachers, and Parents Matter? *Contemporary Educational Psychology, 26* (1), 132-146.

[55] Doren, B., Gau, J. M., & Lindstrom, L. E. (2012). The relationship between parent expectations and postschool outcomes of adolescents with disabilities. *Exceptional Children, 79* (1), 7-23.

[56] Blake, J. (1981). Family size and the quality of children. *Demography, 18* (4), 421-442.

[57] Feng, X. T., Poston Jr, D. L., & Wang, X. T. (2014). China's one-child policy and the changing family. *Journal of Comparative Family Studies, 45* (1), 17-29.

[58] Jiao, S., Ji, G., & Jing, Q. (1996). Cognitive development of Chinese urban only children and children with siblings. *Child Development, 67* (2), 387-39.

[59] Yang, J., Hou, X., Wei, D., Wang, K., Li, Y., & Qiu, J. (2017). Only-child and non-only-child exhibit differences in creativity and agreeableness: evidence from behavioral and anatomical structural studies. *Brain Imaging and Behavior, 11* (2), 493-502.

[60] Li, L., Shi, J., Wu, D., & Li, H. (2020). Only Child, Parental Educational Expectation, Self-Expectation and Science Literacy in Zhuang Adolescents in China: A Serial Mediation Model. *Children and Youth Services Review, 115*.

[61] Baer, M., Oldham, G. R., Hollingshead, A. B., & Costa Jacobsohn, G. (2005). Revisiting the birth order-creativity connection: The role of sibling constellation. *Creativity Research Journal, 17* (1), 67-77.

[62] Downey, D. B. (2001). Number of siblings and intellectual development. the resource dilution explanation. *American Psychologist, 56* (6-7), 497-504.

[63] Xu, D., Zhang, Q., & Zhou, X. (2020). The Impact of Low-Ability Peers on Cognitive and Non-Cognitive Outcomes: Random Assignment Evidence on the Effects and Operating Channels. *Journal of Human Resources.* https://doi.org/10.3368/jhr.57.2.0718-9637r2.

[64] Evans, G. W., Li, D., & Whipple, S. S. (2013). Cumulative risk and child development. *Psychological bulletin, 139* (6), 1342-1396.

[65] Rubin, D. B. (1996). Multiple imputation after 18+ years. *Journal of the American Statistical Association, 91* (434), 473-489.

[66] Muller, D., Judd, C. M., & Yzerbyt, V. Y. (2005). When moderation is mediated and mediation is moderated. *Journal of Personality and Social Psychology, 89* (6), 852-863.

[67] Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology, 63*, 539-569.

[68] Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research, 42* (1), 185-227.

[69] Walker, S. P., Wachs, T. D., Grantham-McGregor, S., Black, M. M., Nelson, C. A., Huffman, S. L., ... & Gardner, J. M. M. (2011). Inequality in early childhood: risk and protective factors for early child development. The Lancet, 378(9799), 1325-1338.

[70] Burchinal, M. R., Roberts, J. E., Hooper, S., & Zeisel, S. A. (2000). Cumulative risk and early cognitive development: a comparison of statistical risk models. *Developmental Psychology, 36* (6), 793-807.

[71] Ayoub, C., O'Connor, E., Rappolt-Schlictmann, G., Vallotton, C., Raikes, H., & Chazan-Cohen, R. (2009). Cognitive skill performance among young children living in poverty: Risk, change, and the promotive effects of Early Head Start. *Early Childhood Research Quarterly, 24* (3), 289-305.

[72] Zimmerman, M. A., Salem, D. A., & Notaro, P. C. (2000). Make room for daddy II: The positive effects of fathers' role in adolescent development. In R. D. Taylor & M. C. Wang (Eds.), *Resilience across contexts: Family, work, culture, and community* (pp. 233-253). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.

[73] Guo, X., Lv, B., Zhou, H., Liu, C., Liu, J., Jiang, K., & Luo, L. (2018). Gender Differences in How Family Income and Parental Education Relate to Reading Achievement in China: The Mediating Role of Parental Expectation and Parental Involvement. *Frontiers in Psychology, 9*, 1-12.

[74] Kirby, A. V. (2016). Parent expectations mediate outcomes for young adults with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 46* (5), 1643-1655.

[75] Long, H., & Pang, W. (2016). Family socioeconomic status, parental expectations, and adolescents' academic achievements: A case of China. *Educational Research and Evaluation, 22* (5-6), 283-304.

[76] Fang, S., Huang, J., Wu, S., Jin, M., Kim, Y., & Henrichsen, C. (2020). Family assets, parental expectation, and child educational achievement in China: A validation of mediation analyses. *Children and Youth Services Review*, *115*.

[77] Hu, Y., & Scott, J. (2016). Family and Gender Values in China: Generational, Geographic, and Gender Differences. *Journal of Family Issues, 37* (9), 1267–1293.

[78] Feng, W., Cai, Y., & Gu, B. (2013). Population, policy, and politics: how will history judge China's one-child policy? *Population and Development Review, 38*, 115-129.

[79] Zeng, Y., & Hesketh, T. (2016). The effects of China's universal two-child policy. *The Lancet, 388* (10054), 1930-1938.

[80] Sameroff, A. J., Seifer, R., Zax, M., & Barocas, R. (1987). Early indicators of developmental risk: Rochester Longitudinal Study. *Schizophrenia Bulletin*, *13* (3), 383-394.