



## Research article

# Influential factors of depression: The impact of harsh parenting, school support, and rumination

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## ARTICLE INFO

## Keywords:

Harsh Parenting  
School support  
Rumination  
Adolescent  
Depression

## ABSTRACT

Building on Beck's cognitive model of depression, this study examined the link between harsh parenting and adolescent depression via rumination. In addition, this study examined the moderating effect of school support. A survey of 4991 high school students in China was conducted utilizing the Harsh Parenting Scale, Rumination Responses Scale, Beck Depression Inventory, and The Multidimensional Scale of Perceived Social Support. The results of this study unveiled a positive association between harsh parenting and adolescent depression. Furthermore, it was observed that rumination partially mediated the relationship between harsh parenting and adolescent depression. Notably, the results indicated that school support exerted a negative regulatory influence on the latter part of the mediation model, demonstrating that higher levels of school support effectively mitigated the adverse impact of rumination on depression. These findings highlight the crucial role of interventions targeted at reducing harsh parenting practices and bolstering school support in mitigating adolescent depression. By addressing these factors, we can make noteworthy progress in promoting the overall well-being and mental health of adolescents.

## This article is co-first author

Mengge Li and Lijun Fan are co-first authors, and their contributions to the paper are equal.

## Funding

This research was funded by 2021 Annual Project of Henan Philosophy and Social Science Planning, title "The Influence and Intervention Research of Autobiographical Memory on Learning Adaptation in Adolescents" (Project No. 2021BJY004); the Graduate Research and Innovation Fund of the School of Psychology, South China Normal University, for the academic year 2022–2023 (Project No. PSY-SCNU202211).

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<https://doi.org/10.1016/j.heliyon.2024.e25014>

Received 30 August 2023; Received in revised form 16 January 2024; Accepted 18 January 2024

Available online 26 January 2024

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## Ethics statement

The studies involving human participants were reviewed and approved by Human Research Ethics Committee for Nonclinical Faculties, The School of Psychology, South China Normal University. Approval number is : SCNU-PSY-2023-208. All participants in this study obtained informed consent, with teenage participants not only obtaining their own informed consent but also obtaining informed consent from their guardians (All participants under the age of 18 obtained informed consent from their parents or legal guardians).

## 1. Introduction

2022 blue book on national depression pointed out that the population with depression showed a trend of younger age [1] The prevalence rate of depression among adolescents had reached 15 %–20 %, among which 69.57 % were caused by family reasons, and 63 % of student patients believed that they felt parents' strictness, control, neglect, conflict and domestic violence in their families. Depression, a common mental health issue among adolescents, can have various negative effects. It not only causes feelings of sadness, loss of interest, and decreased academic performance, but also puts adolescents at risk of engaging in self-harming behaviors, suicide, and other dangerous actions that threaten their well-being and lives [2]. Therefore, exploring the influencing factors of adolescent depression has important practical significance for deeply understanding of the causes of adolescent depression and prevention of adolescent depression. Beck's cognitive model of depression suggests that depression arises from negative, pessimistic, and irrational thoughts [3]. Specifically, individuals who are influenced by this cognitive pattern often hold negative beliefs about their abilities, worth, and attractiveness, which further intensifies their depressive emotions. As a result, harsh parenting, a known risk factor for adolescent depression, may contribute to the development of negative cognitive patterns. Studies have demonstrated that individual cognitive factors, such as rumination, mediate the link between harsh parenting and adolescent depression [4]. However, these studies often overlook the impact of the interaction between social environmental factors and family factors on the development of adolescent depression. Some empirical evidence suggests that school support, as a protective factor, promotes positive self-perception in individuals [5]. Therefore, it is crucial to explore the potential moderating effect of school support on the relationship between harsh parenting and adolescent depression, particularly through the mechanism of rumination. This study aims to examine the internal mechanisms through which harsh parenting influences adolescent depression. By providing data support for relevant research, it will contribute to identifying feasible directions for subsequent interventions targeting adolescent mental health concerns.

### 1.1. Harsh parenting and adolescent depression

Harsh parenting encompasses a range of behaviors, emotions, and attitudes exhibited by parents during the upbringing of their children. These behaviors can include physical aggression, verbal aggression, neglect, rejection, threats, and denial [6]. Beck's cognitive model of depression underscores the significance of individual cognitive processes in the emergence and development of depression. Several studies have demonstrated that harsh parenting may function as a familial risk factor for adolescent depression, leading to negative cognitive patterns among adolescents and the adoption of a passive coping style focused on managing threats and negative information [7–9]. Specifically, in the context of harsh parenting, children may frequently envision scenarios of abuse, which can contribute to the manifestation of depressive symptoms such as anxiety, despair, and feelings of helplessness [10,11]. Several studies have found a positive association between harsh parenting and adolescent depression, primarily focusing on European and American adolescent populations [12]. However, there is a scarcity of research examining the mechanisms underlying depression development in Chinese adolescents who have experienced adverse parenting. Based on the existing research, it is reasonable to speculate that the impact of harsh parenting on depression observed in children from Western cultural backgrounds may also extend to Chinese adolescents. Thus, Hypothesis 1 proposes that there exists a significant association between harsh parenting and levels of adolescent depression.

### 1.2. The mediating effect of rumination

Rumination refers to an individual's inability to restrain thinking about the cause, course and outcome of a negative life event after experiencing it [13]. Beck's interactive model of depression highlights how an individual's interactions with significant figures can impact the onset, duration, and recurrence of their depression [3]. It is possible that parents, being the primary caregivers and influential figures in adolescents' lives, may convey negative self-related messages to them through strict disciplinary approaches, such as expressing sentiments like "I am unworthy of love" or "I am worthless". Consequently, adolescents may develop negative cognitive processing patterns, interpret their distress in a negative light, and engage in persistent rumination as a result [14]. Therefore, rumination may be an individual difference risk factor that connects parental rough parenting and adolescent depression. Empirical evidence has also provided support for this perspective. For instance, studies conducted by Gibb and Abela have indicated that emotional abuse from parents can contribute to the development of negative cognitive reasoning styles in children, subsequently exacerbating their depressive symptoms [15]. While direct research specifically exploring the relationship between strict parental discipline, rumination, and adolescent depression is limited, previous literature strongly suggests that strict parental discipline can have a significant impact on the development of negative self-perceptions in adolescents, increasing their vulnerability to depression. Building on these findings, Hypothesis 2 proposes that rumination serves as a mediating factor between harsh parenting and adolescent depression.

### 1.3. The moderating effect of school support

School support refers to the various forms of help, support, care, and emotional connections that individuals receive in their social networks, including friend support, peer support and teacher support, etc. It is an important psychological resource that can enhance individuals' ability to cope with stress, alleviate negative emotions and mental health problems, and promote their physical and mental health development [16]. According to the stress-buffering model, school support can assist adolescents in developing positive cognitive strategies for reattribution and problem-solving after experiencing stressful events. This, in turn, reduces the likelihood of negative adaptation reactions. It is hypothesized that school support can serve as a protective factor in adverse family environments. Specifically, When adolescents encounter negative family factors like conflicts or parental divorce, receiving support from friends, peers, or teachers can aid them in managing stress and negative emotions, consequently decreasing the risk of depression. In addition, previous research has indicated that high-quality school support can enhance individuals' resilience in the face of stressful events, provide warmth and support, protect against the negative effects of rumination, and reduce levels of depression [17,18]. Based on these findings, Hypothesis 3 proposes that school support plays a moderating role in the latter part of the mediating effect of harsh parenting on adolescent depression through rumination.

## 2. Hypotheses of the current study

In summary, drawing upon Beck's cognitive model of depression, this study aims to investigate a moderated mediation model. Firstly, we aim to explore the direct impact of harsh parenting on adolescent depression. Secondly, we seek to examine the mediating role of negative self-cognition in the link between harsh parenting and adolescent depression. Lastly, we aim to test whether peer acceptance can moderate this indirect relationship. Three hypotheses are proposed as follows.

- (1) There exists a significant association between harsh parenting and levels of adolescent depression;
- (2) rumination serves as a mediating factor between harsh parenting and adolescent depression;
- (3) School support plays a moderating role in the latter part of the mediating effect of harsh parenting on adolescent depression through rumination.

The hypothesized model is presented in Fig. 1.

## 3. Methods

### 3.1. Participants

In this study, the participants were selected from Henan province in China, and the valid sample consisted of 4991 adolescents. Among them, there were 2311 male students and 2680 female students. Additionally, 2386 students were in their first year of high school, 1219 were in their second year, and 1386 were in their third year. The average age of the participants was 16.65 years (SD = 1.22, Range: 14–20 years).

### 3.2. Research tools

#### 3.2.1. Harsh parenting scale

Referring to the study of Wang, the harsh parenting questionnaire was used to ask the teenagers in the study to assess the degree of harsh parenting by their fathers or mothers [19]. The questionnaire has four items (such as "When I do something wrong or make my father/mother angry, they will hit me with their hand or kick me with their foot"). The questionnaire employed a 5-point Likert scale, where 1 indicates the respondent never engages in the behavior and 5 indicates that they often engage in the behavior. The participants were asked to rate their actual experiences, and the average scores of the questions relating to harsh parenting were calculated as the overall measure of harsh parenting experienced by the respondents. The results of the factor analysis for the one-factor model showed the following:  $\chi^2/df = 306.74$ , NFI = 0.70, CFI = 0.69, GFI = 0.75, SRMR = 0.07. These values indicate that the data fitting and the

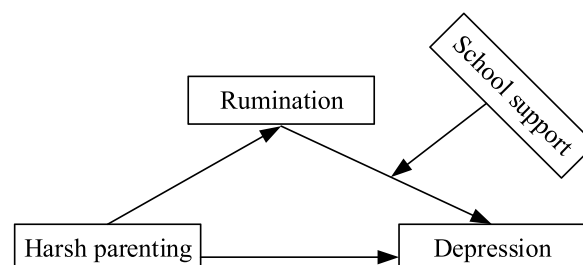


Fig. 1. The hypothesized model.

model itself were acceptable. Additionally, the Cronbach's  $\alpha$  coefficient for the scale used in this study was found to be 0.83.

### 3.2.2. Ruminative responses scale

In this study, the researchers used the revised version of the Ruminative Responses Scale (RRS), as developed by Han and Yang. The purpose of using the RRS was to measure the degree to which respondents engage in rumination [20]. The scale consists of 22 questions, using a four-point scale, 1 means never, 4 means always, according to the description of the topic, the subject chose the option that best matches his or her description of the question. Finally, the scores of the subjects on each topic were summed to calculate the scores of the subjects on the rumination scale. The higher the score, the more serious the tendency of rumination. The results of the factor analysis for the one-factor model showed the following:  $\chi^2/df = 38.05$ , NFI = 0.90, CFI = 0.90, GFI = 0.85, SRMR = 0.03. These values indicate that the data fitting and the model itself were acceptable. Additionally, the Cronbach's  $\alpha$  coefficient for the scale used in this study was found to be 0.96.

### 3.2.3. Beck depression inventory

In this study, the researchers utilized the Beck Depression Inventory (BDI), a widely validated self-report questionnaire developed by Beck et al. The purpose of the BDI was to measure the presence and severity of depression symptoms experienced by the participants in the past two weeks [21]. The scale comprises 21 items, and respondents rate each item on a 3-point scale. Higher scores on the BDI indicate higher levels of depression. The results of the factor analysis for the one-factor model showed the following:  $\chi^2/df = 14.75$ , NFI = 0.93, CFI = 0.93, GFI = 0.94, SRMR = 0.02. These values indicate that the data fitting and the model itself were acceptable. Additionally, the Cronbach's  $\alpha$  coefficient for the scale used in this study was found to be 0.92.

### 3.2.4. Multidimensional scale of perceived social support

Using the Multidimensional Scale of Perceived Social Support (MSPSS) revised by Zhao and Li [22], which is a more widely used social support scale in recent years and has been widely used both nationally and internationally. A total of 12 questions are included, using a 5-point scoring method. The scale used in this study consists of three factors: family support, friend support, and significant other support, which can be used to evaluate the level of social support that individuals receive from their family, friends, or significant others. For this study, significant other support was replaced with teacher support, following the approach used by Zhao and Li. The total scores for teacher support and friend support were combined to form the school support dimension, and the average total score for the two factors was calculated as the level of support received by the participants from their teachers and peers. A higher average score indicated a greater level of campus support for the individual. In this study, the Cronbach  $\alpha$  coefficient of this scale was 0.91.

## 3.3. Research procedure

This study followed the approved protocol and obtained ethical clearance from the scientific research ethics committee of the respective institution. Data collection took place in a high school located in central China. Prior to conducting the study, we sought approval from the school administration by providing a detailed explanation of our research plan. Subsequently, we informed the students and their parents about the nature of the tests in their respective classrooms. After obtaining consent from both the students and their parents, we conducted assessments for students in grades 10 to 12 throughout the entire school. During the formal questionnaire process, 4991 valid questionnaires were collected online in the school computer room through a teacher-led and psychology professional-supervised process, which took four days. Before the survey, all participants were informed of their right to withdraw from the study at any time. They were assured that their privacy would be protected and that the data collected was strictly for academic research purposes and would not be shared with others. After providing clear guidelines and instructions, participants were asked to respond based on their own personal experiences. Once they completed the questionnaire, they were free to leave the room. All of the students in the selected grades participated in the study and received appropriate compensation. No students refused to participate in the research. However, 9 students provided responses that were deemed unserious or random, so their questionnaire data was excluded from the formal analysis.

## 3.4. Data analysis

Data analysis was conducted using SPSS 26.0 for descriptive and correlation analysis. Additionally, moderated mediation model analysis was performed using Mplus 7.4 software.

## 4. Results

### 4.1. Common methods bias test

To test for common method bias, the two-factor method was employed. Following the suggestion of Wen et al. [23], the inclusion of the method factor resulted in an increase of more than 0.1 in both CFI and TLI, as well as a decrease of more than 0.05 in RMSEA and SRMR. These changes indicate the presence of a potential common method bias. However, in the present study, the inclusion of the method factor did not significantly improve the model fit. Specifically, the results (as shown in Table 1) indicated that CFI and TLI decreased by 0.006, SRMR increased by 0.035, and RMSEA increased by 0.001. This suggests that there was insignificant common method bias present in the analysis.

## 4.2. Descriptive statistics and correlations

Descriptive statistical analysis and Pearson correlation analysis were conducted to examine the variables of interest. The results revealed significant correlations between harsh parenting, rumination, school support, and adolescent depression. Please refer to [Table 2](#) for the specific correlation coefficients.

## 4.3. The impact of harsh parenting on adolescent depression: the role of rumination and school support

### 4.3.1. Mediation model test

In this study, given the complexity of the model and the numerous estimated parameters, the topic packing method was employed to streamline the model. Following the suggestion of Wu and Wen [24], the depression scale was packed into three groups using the high-high loading method of the factorial method. This involved categorizing the depression scale items based on their high and low factor loading values. According to the dimensions of the scale, the harsh parenting scale was packaged into two groups, the rumination scale was packaged into three groups, and the school support scale was packaged into three groups in turn, which could reduce the differences within the groups and increase the consistency of the indicators.

Based on the theoretical assumptions, a structural equation model was constructed, and the fit indices indicated an acceptable model fit: CFI = 0.98, TLI = 0.96, SRMR = 0.02, and RMSEA = 0.09 (with a 90 % confidence interval of [0.08, 0.09]). These values suggest that the model fits the data well according to the established criteria.

The results showed that the effect of harsh parenting on depression was significant ( $\beta = 0.47$ ,  $Z = 22.44$ ,  $p < 0.001$ ). When rumination was added, the effect of harsh parenting on depression was still significant ( $\beta = 0.20$ ,  $Z = 8.50$ ,  $p < 0.001$ ), and the effect of rumination on depression was significant ( $\beta = 0.67$ ,  $Z = 36.69$ ,  $p < 0.001$ ); harsh parenting had a significant effect on rumination ( $\beta = 0.41$ ,  $Z = 21.35$ ,  $p < 0.001$ ) (see [Fig. 2](#)). Furthermore, the 95 % confidence intervals for the direct effect of harsh parenting on depression and the mediating effect of rumination, as calculated by the BCbootstrap method, did not include 0 (refer to [Table 3](#)). These results suggest that harsh parenting not only has a direct effect on depression, but also indirectly influences it through the mediating role of rumination. Specifically, the direct effect (0.20) and mediating effect (0.27) accounted for 42.55 % and 57.45 % of the total effect (0.47), respectively.

## 4.4. Moderated mediation model fit test

Based on the recommendations of Fang and Wen (2018) and with reference to the Mplus procedure based on the Latent Moderated Structural equations (LMS) approach. The first step is to test the fit of the baseline model without the latent conditioning term. The baseline model was fitted as follows: CFI = 0.97, TLI = 0.95, AIC = 78164.76, BIC = 78412.34, SRMR = 0.05, RMSEA = 0.08 (90 %CI: [0.07, 0.08]). The results showed that the benchmark SEM model was valid.

In the second step, the SEM model with latent moderating term was tested. As Mplus does not provide the usual fit metrics when performing LMS and only provides non-standardized solutions, the fit of the model with the inclusion of a latent conditioning term can be tested by AIC and likelihood ratio [25]. (1) AIC test. The benchmark model AIC = 78164.76, the adjusted mediation model AIC = 78075.91, reduced by 88.85, indicating that compared with the benchmark model, the adjusted mediation model has improved its fitting index. (2) Likelihood ratio test. Log Likelihood = -39044.38 for the baseline model, and Log Likelihood = -38997.96 for the mediated model, an increase of 46.42, namely, the -2LL value is 92.84, the degree of freedom is increased by 2, and the Chi-square test of the -2LL value is significant ( $p < 0.001$ ). The moderated mediation model is better than the benchmark model. The results of both tests indicated that the mediated model with moderation was acceptable.

### 4.4.1. Moderated mediation effect test

After adding school support into the model, the results showed (see [Table 4](#)) that the product of rumination and school support had a significant effect on depression ( $\beta = -0.06$ ,  $Z = -3.47$ ,  $p < 0.01$ ); using the product coefficient method,  $a_1b_1 = -0.04[-0.05, -0.02]$ , 95 %BCBootstrap interval excluding 0, indicating that the product term  $a_1b_1$  was significant. This suggested that the mediating effect of harsh parenting on depression through rumination was moderated by school support and moderated the latter half of the pathway (see [Fig. 3](#)).

Simple slopes were used to further examine the predictive effect of rumination on adolescent depression under different school support conditions (plus or minus one standard deviation). The results showed that the mediating effect was significant when the school support was M-1SD ( $\beta = 0.26$ ,  $Z = 11.79$ ,  $p < 0.001$ ), and the results revealed significant mediating effects at school support of M-1SD ( $\beta = 0.26$ ,  $Z = 11.79$ ,  $p < 0.001$ ) and at school support of M+1SD ( $\beta = 0.21$ ,  $Z = 13.04$ ,  $p < 0.001$ ) (where the upper and lower limits of the 95 % confidence interval do not contain 0). The results were shown in [Table 5](#). This result suggested that higher school

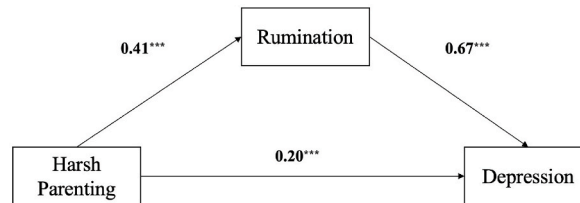
**Table 1**  
Common methods bias test.

ML	$\chi^2/df$	CFI	TLI	SRMR	RMSEA
Measurement model	7.85	0.908	0.904	0.043	0.037
Bifactor model	8.24	0.902	0.898	0.078	0.038
$\Delta$		0.006	0.006	-0.035	-0.001

**Table 2**  
Descriptive statistical analysis and correlation analysis of each variable ( N = 4991).

variable	M	SD	1	2	3	4	5	6	7
Gender	1.54	0.25							
Age	3.65	1.48	-0.04**						
Harsh parenting	1.47	0.5	-0.07**	-0.09**					
Harsh maternal parenting	1.54	0.58	0.01	-0.08**	0.87**				
Harsh paternal parenting	1.39	0.58	-0.13**	-0.07**	0.86**	0.50**			
Depression	12.09	9.29	0.08**	-0.08**	0.37**	0.34**	0.31**		
Rumination	42.47	12.93	0.02	0.01	0.32**	0.28**	0.28**	0.69**	
School support	9.66	1.94	0.01	0.07**	-0.26**	-0.25**	-0.21**	-0.42**	-0.33**

Note: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ , the same as below; In Table 2, the scoring for gender is as follows: 1 = Male, 2 = Female.



Note: \*\*\* $P < 0.001$ . All estimated are standardized estimates

**Fig. 2.** Schematic diagram of model.

**Table 3**  
Decomposition of total effect, direct effect and mediating effects.

	Estimate	S.E.	Est./S.E.	Lower 2.5 %	Upper 2.5 %	Percentage
Direct effect	0.20	0.02	8.50***	0.15	0.25	42.55 %
Indirect effect	0.27	0.01	18.84***	0.24	0.30	57.45 %
Total effect	0.47	0.02	22.44***	0.44	0.62	-

Note: Lower 2.5 % and Upper 2.5 % refer to the interval estimates using BCBootstrap of 2.5 % and 97.5 %. The same as below.

**Table 4**  
Tests for moderated mediating effects with moderation.

DV	IV	Estimate	S.E.	Est./S.E.	Lower 2.5 %	Upper 2.5 %
Depression	Harsh parenting	0.08	0.02	3.66***	0.04	0.12
	Rumination	0.34	0.01	32.55***	0.33	0.37
	School support	-0.10	0.01	-12.96***	-0.12	-0.09
	INT(Rumination * School support)	-0.06	0.01	-5.02***	-0.09	-0.04

Note: DV represents the outcome variable and IV represents the prediction variable. \*\*\* $P < 0.001$ .

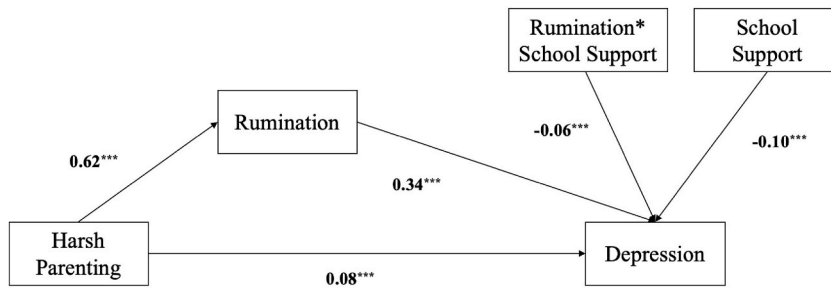
support can alleviate the negative impact of rumination on adolescent depression. The simple effect diagram was shown in Fig. 4.

## 5. Discussion

Drawing on Beck’s cognitive model of depression, the present study aimed to investigate the association between harsh parenting and adolescent depression, as well as the mediating and moderating effects of rumination and school support. The findings of this study provide additional evidence that supports the developmental theory of depression and offer theoretical guidance for psychological crisis intervention among adolescents.

### 5.1. Influence of harsh parenting on adolescent depression

The findings of this study support hypothesis 1, indicating a positive relationship between harsh parenting and adolescent depression. This aligns with previous research [26]. In line with Beck’s cognitive model of depression, it is proposed that parents who employ critical, angry, and hostile parenting styles may convey a message of excessive flaws to their adolescents, thereby fostering the formation of a negative self-cognitive schema. This negative self-schema can contribute to negative experiences such as feelings of



Note: \*\*\* $P < 0.001$ . All estimated are standardized estimates

Fig. 3. Internal mechanism model of harsh parenting on adolescent depression.

Table 5  
Analysis of simple effects.

	school support	Estimate	S.E.	Est./S.E.	Lower 2.5 %	Upper 2.5 %
Mediation	M-1SD	0.24	0.02	12.56***	0.20	0.28
	M+1SD	0.18	0.02	12.44***	0.15	0.21

Note: \*\*\* $P < 0.001$ .

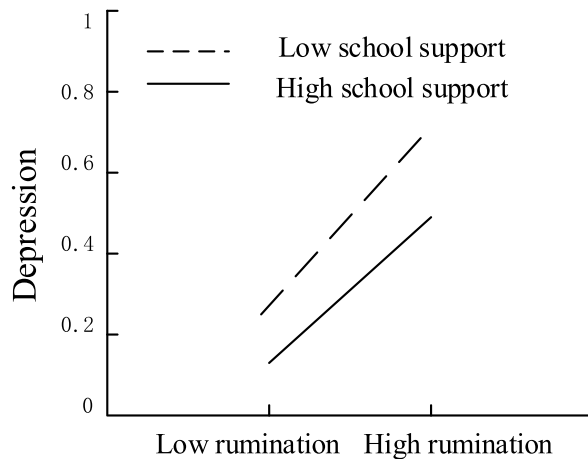


Fig. 4. Simple slope plot of school support moderating rumination and depression.

loneliness, low self-esteem, and self-abandonment, ultimately increasing the vulnerability of adolescents to depression. Additionally, attachment theory holds that the emotional connection between adolescents and their parents is closely related to their mental health, and the relationship between adolescents and their parents can significantly predict their depression level [27]. However, harsh parenting behaviors such as beating, scolding and denial displayed by parents in the process of raising will destroy this relationship, and cause adolescents to become more negative, pessimistic and hopeless, exacerbating depressive symptoms [28]. The results of our study are consistent with previous research showing a positive correlation between higher levels of harsh parenting and increased levels of adolescent depression.

### 5.2. Mediating effect of rumination

The present study confirms hypothesis 2, indicating that rumination mediates the relationship between harsh parenting and adolescent depression. Specifically, the results suggest that higher levels of harsh parenting are associated with increased rumination, which in turn is related to higher levels of depression among adolescents. Previous research has shown that adolescents who experience authoritative parenting styles characterized by warmth, support, and understanding tend to have better mental health outcomes [29]. And when parents often display harsh parenting behaviors such as denial, aggression and judgement in their parenting, it often leads to adolescents being more likely to develop learned helplessness and negative passive reaction style [30,31]. And this may induce



the formation of rumination in adolescents, exacerbating individuals' adverse cognition [32], increasing the use of negative emotion regulation strategies [33], and further aggravating adolescent depressive symptoms. Thus, the present study provides evidence to support the role of rumination as a mediator in the relationship between harsh parenting and adolescent depression.

According to the path that harsh parenting affects adolescents' depression through rumination, in order to reduce adolescents' depressive symptoms and improve their mental health, except for intervening adolescents' rumination, we can also intervene parents' harsh parenting behavior from the source. The World Health Organization has proposed three parenting programs to prevent child abuse, including the ACT Raising Safe Kids Program, which aims to raise physically and mentally healthy children by improving the parenting style and adopting a more active parenting style [34]. Altafim and Linhares demonstrated the positive impact of ACT program on children's behavior and emotion through controlled intervention studies, and verified the influence of parental rearing patterns on children's behavior [35]. This intervention on parents' harsh parenting behavior may provide an intervention target that is more likely to be changed and can also achieve a relatively good intervention effect.

### 5.3. Moderating effect of school support

This study further tested Hypothesis 3, revealing an important moderating effect of school support on adolescent depression. First, school support is a direct and negative predictor of adolescent depression. The more support adolescents received from teachers or peers, the lower their depression levels were. This is consistent with previous findings [36]. Second, school support moderates the second half of the mediating effect of harsh parenting on adolescent depression through rumination. That is, adolescents with high school support are more able to mitigate the adverse effects of rumination than those with low school support. This result fits the buffering model of social support [37]. From the perspective of positive psychology, school support, as a positive psychological resource, is conducive to the physical and mental development of individuals. Strong support from others can help individuals buffer the negative emotion-negative cognitive pathway activated by negative stress stimulus. At the same time, it can also help individuals relieve the negative emotional impact caused by negative stress stimulation [38]. The more such psychological resources one has, the better one's ability to cope with the effects of adverse external circumstances and stress.

## 6. Implications

The present study makes a significant contribution to the existing literature by providing a thorough analysis of the complex interplay between adolescent depression, harsh parenting, rumination, and social support. The findings of this study underscore the association between harsh parenting and elevated levels of rumination, which in turn predicts heightened depressive symptoms among adolescents. Additionally, our study demonstrates that school support can serve as a protective factor that mitigates the adverse impact of rumination on adolescent depression.

From a practical standpoint, these results have significant implications for both the prevention and treatment of adolescent depression. By recognizing the impact of harsh parenting on adolescent mental health, interventions can be implemented at both the individual and systemic levels. For instance, regular parent-teacher meetings can serve as a platform to inform parents about the various forms of harsh parenting and their detrimental effects on their child's mental well-being. Additionally, professionals in the field of psychology can deliver lectures or workshops on adolescent education to enhance parenting skills and promote healthier parent-child interactions. Furthermore, our study highlights the moderating role of school support, indicating that it can buffer the negative impact of rumination on adolescent depression. This finding emphasizes the importance of prioritizing mental health support within school environments. School staff should pay close attention to students' mental well-being and create a supportive atmosphere that fosters positive peer relationships. Organizing group activities aimed at improving interpersonal connections among adolescents can enhance peer support, foster a harmonious campus environment, and promote overall mental health among students.

## 7. Limitations and prospects

The findings of this study enrich the existing literature on the mechanisms underlying the development of adolescent depression and provides valuable insights into potential intervention strategies. However, certain limitations should be acknowledged. First, the cross-sectional design of the study prevents us from establishing the directionality and causality of the observed associations between adolescent depression, harsh parenting, rumination, and school support. Reverse causality may exist, as higher levels of depression may hinder adolescents' ability to develop positive cognitive patterns for dealing with negative emotions, thereby impeding their ability to establish supportive relationships with peers and teachers, or leading to increased harsh parenting behavior. Future longitudinal research would be beneficial in clarifying the temporal order and directionality of these relationships. Second, our sample was limited to high school students, which may restrict the generalizability of our findings. Therefore, future studies should include participants from different age groups or populations to increase the external validity of the results. Additionally, although social support was operationalized as school support, including support from teachers and peers, it should be noted that social support can take various forms, such as family support, friend support, and community support. Future research could explore potential variations in the relationships between adolescent depression, harsh parenting, rumination, and social support by considering different sources of support. Additionally, researchers could examine how different dimensions of social support (e.g., emotional support, instrumental support, informational support) may influence the associations among these variables. Moreover, it is important to acknowledge that the use of self-report measures in this study may introduce biases related to social desirability or recall issues. To address these limitations, future research should employ multiple data sources and methods to enhance the accuracy and reliability of the findings.



By addressing these potential limitations, a more comprehensive understanding of the mechanisms underlying adolescent depression can be achieved, thereby guiding future research in this field. Despite these limitations, the present study still provides valuable insights for the prevention and intervention of adolescent depression within the context of Chinese culture.

## 8. Conclusion

In summary, this study investigated the associations among harsh parenting, adolescent depression, rumination, and school support. The main findings are as follows: (1) Harsh parenting is positively and significantly related to adolescents' levels of rumination and depression; (2) Rumination plays a mediating role in the relationship between harsh parenting and adolescent depression; (3) School support moderates the latter half of the mediation process through which harsh parenting affects adolescent depression via rumination.

## Ethics declarations

This study was reviewed and approved by [Institutional Review Board of Henan Provincial Key Laboratory of Psychology and Behavior], with the approval number: [SCNU-PSY-2023-208]. All participants and their parents provided informed consent to participate in the study.

## Data availability statement

Data will be made available on request.

## Funding

This research was funded by 2021 Annual Project of Henan Philosophy and Social Science Planning, title "The Influence and Intervention Research of Autobiographical Memory on Learning Adaptation in Adolescents" (Project No. 2021BJY004); the Graduate Research and Innovation Fund of the School of Psychology, South China Normal University, for the academic year 2022–2023 (Project No. PSY-SCNU202211).

## CRedit authorship contribution statement

**Mengge Li:** Writing – original draft, Supervision, Project administration, Methodology, Conceptualization. **Lijun Fan:** Writing – original draft, Conceptualization. **Jirui Wang:** Writing – review & editing, Supervision. **Peng Ma:** Formal analysis. **Huoliang Gong:** Writing – original draft. **Zikan Deng:** Writing – review & editing. **Jiankun Su:** Investigation. **Yuan Gao:** Funding acquisition.

## 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.

## Acknowledgements

After the initial submission of the manuscript, Lijun Fan passed away unexpectedly. Later, Jirui Wang took over the main revision work of this article. Therefore, he was added to the author list and listed as the second author. In addition, Zikan Deng added some embellishment to the manuscript during the subsequent revision work, and therefore was added to the author list. Jiankun Su provided assistance during the initial experiment, and therefore was added to the author list.

## References

- [1] G.S. Malhi, J.J. Mann, Depression, *Lancet* 392 (2018) 2299–2312.
- [2] A. Thapar, O. Eyre, V. Patel, D. Brent, Depression in young people, *Lancet* 400 (10352) (2022) 617–631.
- [3] A.T. Beck, in: R.L. Leahy, E.T. Dowd (Eds.), *Clinical Advances in Cognitive Psychotherapy: Theory and Application*, Springer, New York, 2002, pp. 29–61.
- [4] A.M. Tang, X.L. Deng, X.X. Du, M.Z. Wang, Harsh parenting and adolescent depression: mediation by negative self-cognition and moderation by peer acceptance, *Sch. Psychol. Int.* 39 (2018) 22–37.
- [5] J.W. Fredrick, S.P. Becker, J.M. Langberg, Low school support exacerbates the association between peer difficulties and sluggish cognitive tempo in adolescents, *J. Clin. Child Adolesc. Psychol.* 51 (6) (2022) 1024–1038.
- [6] Z.L. Wen, B.B. Huang, D.D. Tang, Preliminary work for modeling questionnaire data, *J. Psychol. Sci.* 41 (1) (2018) 204–210.
- [7] D.A. Cole, J.M. Martin, F.M. Jacquez, A.E. Truss, L.G. Peeke, Peer victimization and harsh parenting predict cognitive diatheses for depression in children and adolescents, *J. Clin. Child Adolesc. Psychol.* 45 (5) (2016) 668–680.
- [8] D.A. Cole, J.M. Martin, K. Sinclair-McBride, L.D. Doane, C.P. Fagundes, Peer victimization (and harsh parenting) as developmental correlates of cognitive reactivity, a diathesis for depression, *J. Abnorm. Psychol.* 123 (2) (2014) 336–349.
- [9] S. Park, B.N. Kim, M.H. Park, The relationship between parenting attitudes, negative cognition, and the depressive symptoms according to gender in Korean adolescents, *Int. J. Ment. Health Syst.* 10 (2016) 35.

- [10] T. Yoshizumi, S. Murase, T. Murakami, J. Takai, Dissociation as a mediator between perceived parental rearing style and depression in an adult community population using college students, *Pers. Individ. Differ.* 43 (2007) 353–364.
- [11] M. Kingsbury, et al., Adolescent mental health following exposure to positive and harsh parenting in childhood, *Can. J. Psychiatr.* 65 (6) (2020) 392–400.
- [12] B.H. Calhoun, T.A. Ridenour, D.H. Fishbein, Associations between child maltreatment, harsh parenting, and sleep with adolescent mental health, *J. Child Fam. Stud.* 28 (2019) 116–130.
- [13] J.B. Hinnant, S.A. Erath, M. El-Sheikh, Harsh parenting, parasympathetic activity, and development of delinquency and substance use, *J. Abnorm. Psychol.* 124 (2015) 137–151.
- [14] J.S. Benas, B.E. Gibb, Peer victimization and depressive symptoms: the role of body dissatisfaction and self-esteem, *J. Cognit. Psychother.* 21 (2007) 107–116.
- [15] B.E. Gibb, J.Z. Abela, Emotional abuse, verbal victimization, and the development of children's negative inferential styles and depressive symptoms, *Cognit. Ther. Res.* 32 (2008) 161–176.
- [16] S.E. Taylor, Social support: a review, in: H.S. Friedman (Ed.), *The Oxford Handbook of Health Psychology*, Oxford University Press, New York, 2011, pp. 189–214.
- [17] E. Puterman, A. DeLongis, G. Pomaki, Protecting us from ourselves: social support as a buffer of trait and state rumination, *J. Soc. Clin. Psychol.* 29 (7) (2010) 797–820.
- [18] K.M. Lyell, S. Coyle, C.K. Malecki, A.M. Santuzzi, Parent and peer social support compensation and internalizing problems in adolescence, *J. Sch. Psychol.* 83 (2020) 25–49.
- [19] M. Wang, Harsh parenting and peer acceptance in Chinese early adolescents: three child aggression subtypes as mediators and child gender as moderator, *Child Abuse Negl.* 63 (2017) 30–40.
- [20] X. Han, H.F. Yang, Chinese version of Nolen-Hoeksema ruminative responses scale (RRS) used in 912 college students: reliability and validity, *Chin. J. Clin. Psychol.* 17 (5) (2009) 550–551+549.
- [21] A.T. Beck, G.K. Brown, R.A. Steer, *Beck Depression Inventory II Manual*, Psychological Corporation, San Antonio, TX, 1996.
- [22] J.X. Zhao, Z. Li, The relationships between parent-child attachment and adolescent anxiety: the protective role of teacher's support, *PPsychol. Dev. Educ* 33 (2017) 361–367.
- [23] Z.L. Wen, B.B. Huang, D.D. Tang, Preliminary work for modeling questionnaire data, *J. Psychol. Sci* 41 (1) (2018) 204–210.
- [24] Y. Wu, Z.L. Wen, Item parceling strategies in structural equation modeling, *Adv. Psychol. Sci.* 19 (12) (2011) 1859–1867.
- [25] J. Fang, Z.L. Wen, The analyses of moderated mediation effects based on structural equation modeling, *J. Psychol. Sci* 41 (2) (2018) 453–458.
- [26] S. Gimenez-Serrano, F. Garcia, O.F. Garcia, Parenting styles and its relations with personal and social adjustment beyond adolescence: is the current evidence enough? *Eur. J. Dev. Psychol.* 19 (5) (2022) 749–769.
- [27] J. Bowlby, Attachment and loss: retrospect and prospect, *Am. J. Orthopsychiatry* 52 (4) (1982) 664–678.
- [28] D.A. Cole, Relation of social and academic competence to depressive symptoms in childhood, *J. Abnorm. Psychol.* 99 (4) (1990) 422–429.
- [29] S.D. Lamborn, N.S. Mounts, L. Steinberg, S.M. Dornbusch, Patterns of competence and adjustment among adolescents from authoritative, authoritarian, indulgent, and neglectful families, *Child Dev.* 62 (5) (1991) 1049–1065.
- [30] M.E.P. Seligman, *Helplessness: on Depression, Development, and Death*, W H Freeman/Times Books/Henry Holt & Co, 1975.
- [31] S. Nolen-Hoeksema, A. Wolfson, D. Mumme, K. Guskin, Helplessness in children of depressed and nondepressed mothers, *Dev. Psychol.* 31 (3) (1995) 377.
- [32] A. Hasegawa, Y. Kunisato, H. Morimoto, H. Nishimura, Y. Matsuda, How do rumination and social problem solving intensify depression? A longitudinal study, *J. Ration. Emot. Cogn. Behav. Ther.* 36 (1) (2018) 28–46.
- [33] N. Zuzama, A. Fiol-Veny, J. Roman-Juan, M. Balle, Emotion regulation style and daily rumination: potential mediators between affect and both depression and anxiety during adolescence, *Int. J. Environ. Res. Publ. Health* 17 (18) (2020) 6614.
- [34] K.A. Hardcastle, M.A. Bellis, K. Hughes, D. Sethi, *Implementing Child Maltreatment Prevention Programmes: what the Experts Say*, World Health Organization. Regional Office for Europe, 2015. <https://apps.who.int/iris/handle/10665/326346>.
- [35] E.R.P. Altafim, M.B.M. Linhares, Preventive intervention for strengthening effective parenting practices: a randomized controlled trial, *J. Appl. Dev. Psychol.* 62 (2019) 160–172.
- [36] Y.W. Qiu, Y.X. Lou, Y. Lei, Depression in adolescent: a perspective based on social support, *Psychol. Dev. Educ.* 37 (2021) 288–297.
- [37] S. Cohen, T.A. Wills, Stress, social support, and the buffering hypothesis, *Psychol. Bull.* 98 (2) (1985) 310.
- [38] T. Miao, J.J. Wang, G.W. Song, Harsh parenting and adolescents' depression: a moderated mediation model, *Chin. J. Spec. Educ* 6 (2018) 71–77.