

# The Relationship Between Stressful Life Events and Depressive Symptoms in College Students: mediation by Parenting Style and Gender's Moderating Effect

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**Aim:** Stressful life events have a significant impact on the mental health of college students. Depression, as a prevalent psychological issue, has garnered attention in the field of college student mental health and is closely linked to it. Additionally, parenting style is identified as an important factor influencing the development of college students' mental health. Therefore, this study aims to explore the relationship between these three factors.

**Methods:** A total of 8079 first-year college students from two medical universities in Shandong Province, China were surveyed. The Beck Depression Inventory was utilized to evaluate depressive symptoms among the college students, while the Adolescent Self-rating Life Events Checklist and the Egna Minnen Beträfande Uppfostran were employed to gather data. Subsequently, the SPSS macro program PROCESS was utilized to analyze both the mediating and moderating effects. All statistical analyses were conducted using SPSS 26.0.

**Results:** The study found a detection rate of 6.3% for depressive symptoms among college students. The correlation analysis of this study showed that the stressful life events of college students were significantly positively correlated with depressive symptoms ( $r=0.261$ ,  $p<0.01$ ). Each dimension of parenting style was associated with depressive symptoms in different degrees and directions. At the same time, parenting styles of all sizes play a partial mediating role between stressful life events and depressive symptoms in college students, gender plays a crucial regulatory role in this mediation.

**Conclusion:** Stressful life events experienced by college students have a significant impact on their mental health. Early intervention through positive parenting styles from parents may prove to be beneficial in promoting the development of good mental health among college students.

**Keywords:** college students, stressful life events, depressive symptoms, parenting style, gender

## Introduction

### Epidemiological Characteristics of Depressive Symptoms

Depression is the fourth leading cause of illness and disability, according to a 2017 report published by the World Health Organization.<sup>1</sup> As of 2017, there were 258 million cases of depression worldwide.<sup>2</sup> In particular, the prevalence of depression among adolescents has increased dramatically over the past decade.<sup>3</sup> A cross-sectional study showed that the prevalence of depression among adolescents was 12.9%.<sup>4</sup> At the same time, adolescents have different forms of depression from adults. Adolescents are more inclined to the occurrence of physical symptoms such as fatigue, while adults are more likely to see changes in behavior patterns and the occurrence of adverse emotions.<sup>5</sup> A meta-analysis

showed that the prevalence of depressive symptoms in adolescents increased to 37% (95% CI 0.19–0.28) in the last decade.<sup>6</sup> The prevalence rate of college students varies across different studies. In China, A study conducted in Hong Kong revealed that 44.8% of college students exhibited depressive symptoms.<sup>7</sup> Additionally, a study utilizing a multi-stage, stratified, random sampling method conducted in 31 provinces and cities across China found that 7.3% of college students displayed depressive symptoms.<sup>8</sup> Internationally, a study in Mexico indicated that the prevalence of depressive symptoms among college students was 18.2% for males and 27.5% for females,<sup>9</sup> a study in Split, Croatia found a 9.2% prevalence of depressive symptoms among college students.<sup>10</sup> Among college students, depressive symptoms have severely affected their physical and mental health, learning, and other aspects.<sup>11</sup>

## The Relationship between Stressful Life Events, Parenting Style, and Mental Health

Stressful life events experienced by college students encompass a variety of stressors and challenges that they encounter in their daily lives. These stress-inducing events may stem from academic pressures such as exam results, establishing new interpersonal relationships, and concerns about future employment after graduation.<sup>11,12</sup> Additionally, factors such as relocation, illness, and romantic heartbreak can also contribute to the psychological pressure experienced by college students.<sup>13</sup> A cross-sectional study conducted in a medical school shows that up to 93.6% of medical students experience moderate to severe stress.<sup>14</sup> These stressful life events have a particular negative impact on the physical and mental health of college students, leading to depression symptoms, even suicide, and other serious consequences.<sup>13,15</sup> A meta-analysis showed that individuals who experienced stressful life events early on were more likely to develop a major depressive disorder (OR=2.50; 95% CI 2.08–3.00).<sup>16</sup>

Parenting style refers to the expectations that parents have for how they interact with their children during the process of parenting, as well as the methods, attitudes, and behaviors they employ to nurture and guide their children's growth and development.<sup>17,18</sup> Various studies have categorized parenting styles into four types: authoritative, authoritarian, indulgent, and neglectful.<sup>19</sup> The parenting style adopted by parents has been found to have a significant impact on the mental health of college students.<sup>20</sup> Research indicates that authoritative parenting is beneficial for the mental health development of adolescents, while authoritarian parenting acts as a hindrance.<sup>19</sup> Research has indicated that the parenting style and life stressors experienced by college students have a significant impact on their negative mental health behaviors, such as suicide.<sup>21</sup> Our study aims to investigate whether different parenting styles may influence individuals' ability to adapt to life events and potentially lead to depressive symptoms.

## Gender Differences in Depressive Symptoms and Parenting Styles

Gender differences have always played a significant role in the field of mental health research. There are distinct gender variations in depression, some studies have indicated a higher prevalence of depression among male students,<sup>22</sup> while others have shown that female students exhibit a higher prevalence of depression.<sup>23</sup> However, there are also studies suggesting that there is no significant gender difference in depression,<sup>24</sup> indicating inconsistency in the research on gender differences in depression. Additionally, depressive symptoms also demonstrate some gender disparities. A study on the impact of social isolation and loneliness on depressive symptoms revealed gender differences in their correlation. This suggests that female and male college students may require different interventions to adapt to college life,<sup>25</sup> and physical exercise can improve depressive symptoms to varying degrees based on gender differences.<sup>26</sup> Furthermore, with regards to parenting styles, studies have demonstrated that gender can moderate the direct influence of parenting styles on subjective well-being,<sup>27</sup> thus warranting further analysis of gender within this study.

## Research Contents and Objectives

In the study of the etiology of depressive symptoms in college students, it was found that depressive symptoms are not caused by a single factor but by a variety of factors that are directly or indirectly caused by interactions, which require a large number of studies to analyze and explore. Current research has explored the relationship between parenting styles and depressive symptoms. However, there is still little research on the influence of paternal or maternal parenting styles on depressive symptoms in college students, and research on the role of parenting styles in mediating between stressful life events and depressive symptoms is still lacking. This study aims to explore the mediating role of parenting style, both

paternal and maternal, between stressful life events and depressive symptoms. In addition, gender differences in the association between depression and stressful life events have been studied, but not with the mediation of parenting styles, as well as the moderating role of gender, to provide a theoretical basis for clinical intervention and social practice of depressive symptoms in college students.

## Methods

### Participants

This study selected first-year students from two medical universities in three prefecture-level cities (Jining, Rizhao, and Weifang) in Shandong Province, China, as research samples. The computer questionnaire survey in the libraries of the three campuses were conducted from April to October 2018. In total, 9929 university students were invited to participate and 8079 valid questionnaires were collected. Each question was completed independently by the students. Informed consent was obtained and signed by each participant prior to data collection. This study was approved by the Research Ethics Committee of Jining Medical University.

### Measurements

#### Beck Depression Inventory (BDI)

Depressive symptoms were assessed using the Beck Depression Inventory –1, the first version of the Beck Depression Inventory developed by Beck et al in 1961, which is used to assess the symptoms and extent of depression in both mentally ill and ordinary people.<sup>28,29</sup> The study utilized the Chinese version of the Beck Depression Inventory, which has been demonstrated to possess strong reliability and validity.<sup>30</sup> This scale encompasses a wide range of crucial depression symptoms in a well-balanced manner, allowing for comprehensive assessment of the diversity of depressive symptoms.<sup>31</sup> Research has shown that the Beck Depression Inventory is an effective diagnostic tool for depression in clinical settings and can be employed to evaluate the degree of improvement in depression resulting from treatment.<sup>31</sup> The Beck Depression Inventory consists of 21 items. Each item is scored on a 4-level scale: (0) “not at all”, (1) “slightly inconsistent”, (2) “slightly consistent”, (3) “highly consistent”. The higher the total score, the more severe the depressive symptoms of the subjects. The Chinese version of the Beck Depression Inventory was used in this study.<sup>30</sup> Cronbach’s  $\alpha$  of BDI in this study was 0.912.

#### Adolescent Self-Rating Life Events Checklist (ASLEC)

Stressful life events were assessed through the Adolescent Self-rating Life Events Checklist, a self-rating questionnaire compiled by Liu Xianchen et al based on domestic and foreign references to evaluate the social pressure of adolescents.<sup>32</sup> It has 27 items covering six aspects: relationships, learning stress, punishment, loss of family, friends, and possessions, health, and adjustment. Each item is a life event, and the study subjects according to whether the life event occurred: (0) “no”, (1) “yes”, if the event occurs, continue to choose the degree of impact: (0) “No effect”, (1) “mild effect”, (2) “moderate effect”, (3) “severe effect”, (4) “quite a severe effect”. The higher the score, the greater the pressure. Cronbach’s  $\alpha$  of ASLEC in this study is 0.888.

#### Egna Minnen Beträffande Uppfostran (EMBU)

The Egna Minnen Beträffande Uppfostran is a questionnaire developed in 1980 by Perris et al, a Swedish clinical psychologist, to assess parenting style. It was revised by Yue Dongmei et al in 1993 and has been widely used in China.<sup>33</sup> EMBU consists of two sub-scales, father and mother. The father parenting style subscale includes 58 items across six dimensions, including F1 (paternal emotional warmth), F2 (paternal over-protection), F3 (paternal rejection and denial), F4 (paternal severe punishment), F5 (paternal favoring subjects), and F6 (paternal excessive interference). The maternal parenting style subscale includes 57 items across five dimensions, including M1 (maternal emotional warmth), M2 (maternal over-protection), M3 (maternal rejection and denial), M4 (maternal severe punishment), and M5 (maternal favoring subjects). Each item is scored on a 4-point scale: (1) “never”, (2) “occasionally”, (3) “often”, and (4) “always”. Scores on one dimension of the scale are higher than the norm average, indicating that parents prefer parenting styles on this dimension. Cronbach’s  $\alpha$  of EMBU in this study was 0.941.

## Statistical methods

This study utilized SPSS26.0 software for data input, organization, and analysis. Initially, Pearson correlation analysis was employed to examine the relationship between stressful life events, depressive symptoms, and parenting styles among college students. A statistically significant correlation ( $p < 0.05$ ) was indicated by a correlation coefficient greater than 0 for positive correlation and less than 0 for negative correlation. Subsequently, age and sex were analyzed using one-way ANOVA and an independent sample *T*-test to assess differences in stressful life events, parenting styles, and depressive symptoms. Finally, the PROCESS macro was applied to investigate the mediating effect of parenting style on stressful life events and depressive symptoms of college students as well as the moderating effect of gender between them.<sup>34</sup> Specifically, model 4 was used to analyze the mediating effect of parenting style on stressful life events and depressive symptoms of college students in order to evaluate whether stressful life events can predict depressive symptoms in college students both with and without the mediating variable of parenting style included, and then, Model 8 was utilized to explore the moderating effect of gender on this mediator; subsequently, the strength of this moderating effect across different genders was assessed through a simple slope test.

## Results

### Characteristics of the Participants

Among the 8079 respondents in this study, 4854 (60.1%) were female, 3225 (39.9%) were male, 4428 (54.8%) were from Jining, 1066 (13.2%) were from Rizhao, 2585 (32.0%) were from Weifang. Table 1 shows more detailed demographic characteristics of the study subjects.

**Table 1** Participants' Demographic Information

Variables		N(%)	Mean±SD
Sex	Male	3225 (39.9)	
	Female	4854 (60.1)	
City	Jining	4428 (54.8)	
	Rizhao	1066 (13.2)	
	Weifang	2585 (32.0)	
Residence	Urban	2995 (37.1)	
	Rural	5084 (62.9)	
Single child	No	4922 (61.5)	
	Yes	3075 (38.5)	
Major	Non-medicine major	2349 (29.1)	
	Medicine major	5730 (70.9)	
ASLEC <sup>a</sup>	0–3	1794 (22.8)	
	4–6	2220 (28.2)	
	7–9	1944 (24.7)	
	≥10	1908 (24.3)	
Father parenting style dimension	Emotional warmth		53.90±10.84
	Severe punishment		16.92±5.171
	Excessive interference		19.44±4.091
	Favoring subjects		9.94±3.612
	Rejection and denial		8.97±2.821
	Over-protection		12.05±2.845

(Continued)

**Table 1** (Continued).

Variables		N(%)	Mean±SD
Mother parenting style dimension	Emotional warmth		54.45±10.555
	Over-protection		32.96±6.701
	Rejection and denial		12.22±3.791
	Severe punishment		12.16±3.896
	Favoring subjects		10.02±3.608
Depression <sup>b</sup>		509 (6.3)	3.31±5.598

Notes: <sup>a</sup>Stressful life events. <sup>b</sup>Depressive symptoms.

## Age-Specific and Gender-Specific Analysis

Due to the different physical and mental characteristics of college students of different ages and genders, there are specific differences in stressful life events, depressive symptoms, and other factors. To avoid the effect of age on the key variables, we use a one-way analysis of variance to test the effect of age on the variables studied. Table 2 shows that except for the absence of F5, there are statistically significant differences in the age of college students in all dimensions of stressful life events, depressive symptoms, and parenting styles, excluding F5 ( $p_a < 0.05$ ).

To further explore the relationship between parenting style and stressful life events and depressive symptoms, this study modifies the mediating model of parenting style by using gender as a moderating variable. Therefore, this study performed an independent sample *t*-test for the gender variable. Table 2 shows that gender has no statistical difference in depressive symptoms and F5 of college students, and there are statistically significant differences in stressful life events and other dimensions of parenting styles, excluding F5 ( $p_b < 0.05$ ).

## Correlation Analysis

Table 3 shows the correlation analysis of stressful life events, depressive symptoms, and parenting styles of college students in this study, and the results show that stressful life events are positively correlated with depressive symptoms of college students ( $r=0.261$ ,  $p < 0.01$ ); Stressful life events in college students were correlated with all dimensions of parenting style, and all dimensions of parenting style were correlated to varying degrees with depressive symptoms in

**Table 2** Single-Sample ANOVA for Age and Independent Sample *T*-Test for Gender

	Age		Gender			
	F <sub>a</sub>	P	Male(Mean±SD)	Female(Mean±SD)	F <sub>b</sub>	P
Depression <sup>a</sup>	2.822	<0.01	3.222±5.923	3.372±5.323	2.785	0.237
ASLEC <sup>b</sup>	5.509	<0.01	6.469±4.496	6.932±3.873	82.677	<0.01
F1 <sup>c</sup>	2.393	<0.01	53.468±11.017	54.181±10.620	6.75	<0.01
F2 <sup>d</sup>	3.067	<0.01	12.416±2.919	11.802±2.743	3.98	<0.01
F3 <sup>e</sup>	4.475	<0.01	9.548±3.107	8.579±2.515	172.32	<0.01
F4 <sup>f</sup>	5.465	<0.01	18.004±5.634	16.198±4.655	178.782	<0.01
F5 <sup>g</sup>	0.902	0.55	10.008±3.722	9.896±3.505	8.37	0.175
F6 <sup>h</sup>	3.206	<0.01	20.132±4.092	18.987±3.992	1.096	<0.01
M1 <sup>i</sup>	3.203	<0.01	53.782±10.950	54.888±10.170	18.464	<0.01
M2 <sup>j</sup>	5.38	<0.01	33.946±6.670	32.301±6.585	2.794	<0.01
M3 <sup>k</sup>	3.867	<0.01	12.767±4.084	11.851±3.503	94.465	<0.01
M4 <sup>l</sup>	4.988	<0.01	12.853±4.308	11.706±3.486	205.06	<0.01
M5 <sup>m</sup>	0.959	0.49	10.136±3.749	9.935±3.479	21.852	0.015

Notes: <sup>a</sup>Depressive symptoms. <sup>b</sup>Stressful life events. <sup>c</sup>Paternal emotional warmth. <sup>d</sup>Paternal over-protection. <sup>e</sup>Paternal rejection and denial. <sup>f</sup>Paternal severe punishment. <sup>g</sup>Paternal favoring subjects. <sup>h</sup>Paternal excessive interference. <sup>i</sup>Maternal emotional warmth. <sup>j</sup>Maternal over-protection. <sup>k</sup>Maternal rejection and denial. <sup>l</sup>Maternal severe punishment. <sup>m</sup>Maternal favoring subjects.

**Table 3** Correlation Analysis

Variables	ASLEC <sup>a</sup>	Depression <sup>b</sup>	1 <sup>i</sup>	2 <sup>j</sup>	3 <sup>k</sup>	4 <sup>l</sup>	5 <sup>m</sup>	6 <sup>h</sup>
ASLEC <sup>a</sup>	1	0.261*	-0.069*	0.238*	0.183*	0.118*	0.049*	-
Depression <sup>b</sup>	0.261*	1	-0.176*	0.234*	0.262*	0.239*	0.060*	-
1 <sup>c</sup>	-0.110*	-0.206*	1	-0.083*	-0.333*	-0.366*	0.226*	-
2 <sup>d</sup>	0.180*	0.194*	0.070*	1	0.629*	0.536*	0.230*	-
3 <sup>e</sup>	0.151*	0.246*	-0.341*	0.513*	1	0.771*	0.160*	-
4 <sup>f</sup>	0.116*	0.230*	-0.368*	0.469*	0.779*	1	0.154*	-
5 <sup>g</sup>	0.042*	0.048*	0.227*	0.232*	0.146*	0.135*	1	-
6 <sup>h</sup>	0.130*	0.156*	-0.173*	0.599*	0.602*	0.609*	0.135*	1

**Notes:** \*  $P < 0.01$ . The lower left corner of the diagonal represents the father's parenting styles, while the upper right corner of the diagonal represents the mother's parenting styles. <sup>a</sup>Depressive symptoms. <sup>b</sup>Stressful life events. <sup>c</sup>Paternal emotional warmth. <sup>d</sup>Paternal over-protection. <sup>e</sup>Paternal rejection and denial. <sup>f</sup>Paternal severe punishment. <sup>g</sup>Paternal favoring subjects. <sup>h</sup>Paternal excessive interference. <sup>i</sup>Maternal emotional warmth. <sup>j</sup>Maternal over-protection. <sup>k</sup>Maternal rejection and denial. <sup>l</sup>Maternal severe punishment. <sup>m</sup>Maternal favoring subjects.

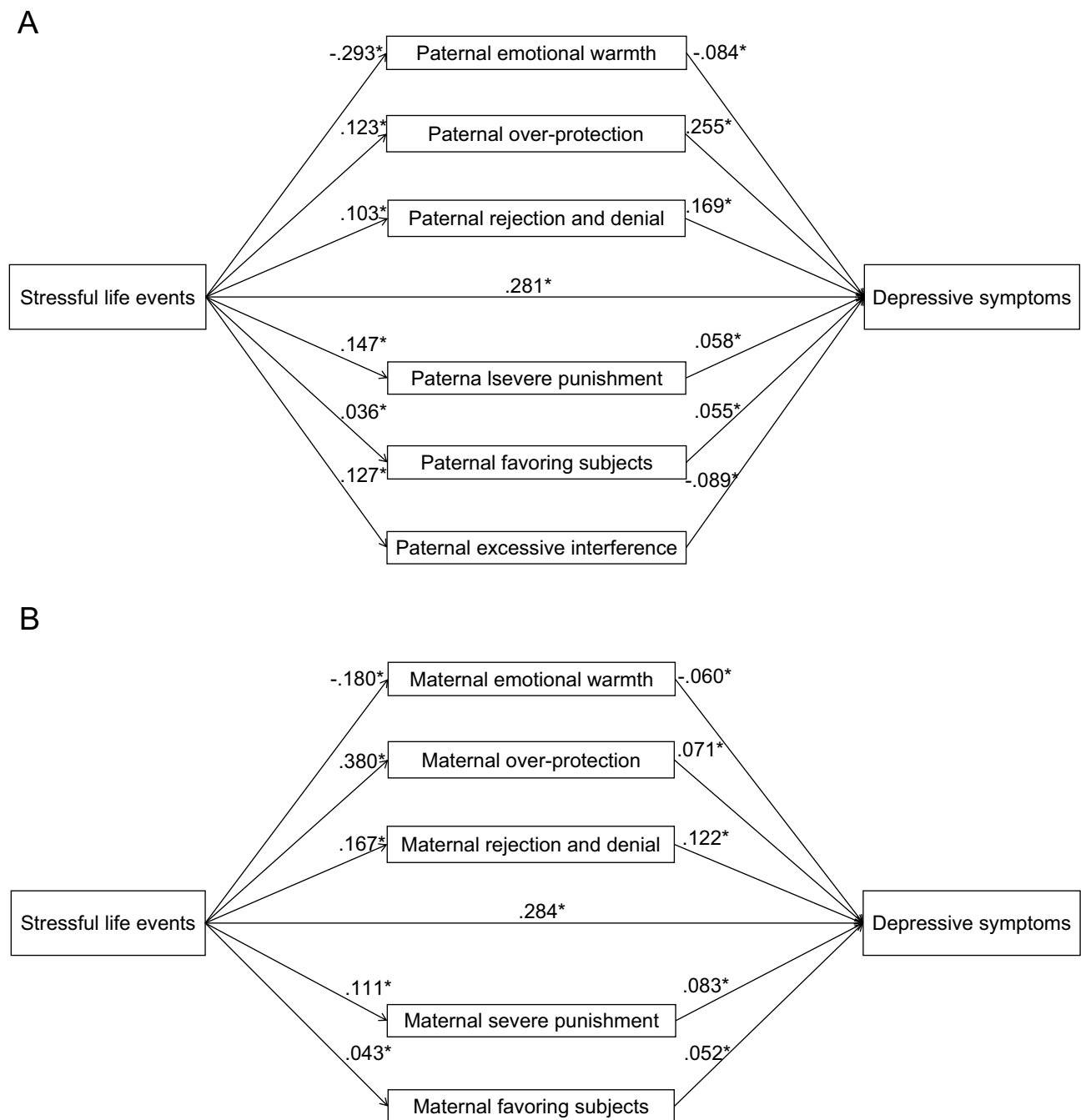
college students. In the dimension of paternal parenting style, over-protection, rejection and denial, severe punishment, favoring subjects, and excessive interference are positively correlated with depressive symptoms ( $r_1=0.180$ ,  $r_2=0.151$ ,  $r_3=0.116$ ,  $r_4=0.042$ ,  $r_5=0.130$ ,  $p < 0.01$ ). In the dimension of maternal parenting style, overprotection, rejection and denial, severe punishment and favoring subjects were positively correlated with depressive symptoms ( $r_1=0.234$ ,  $r_2=0.262$ ,  $r_3=0.239$ ,  $r_4=0.060$ ,  $p < 0.01$ ), parental warmth was negatively associated with depressive symptoms ( $r_1=-0.110$ ,  $r_2=-0.176$ ,  $p < 0.01$ ).

## Mediating Effect Analysis of Parenting Styles

To examine the mediating effect of parenting styles on stressful life events and depressive symptoms among college students, various dimensions of paternal and maternal parenting styles were used as mediating variables. This study found that stressful life events could significantly positively predict depressive symptoms ( $\beta=0.353$ ;  $p < 0.01$ ); after adding mediators, A and B in Figure 1 shows that regardless of whether the mediators are paternal or maternal parenting styles, stressful life events still significantly and positively predict depressive symptoms ( $\beta_1=0.281$ ,  $\beta_2=0.284$ ;  $p < 0.01$ ), indicating that parenting style plays a partial mediating role between stressful life events and depressive symptoms. When analyzing the predictive effects of parenting style and stressful life events on depressive symptoms, we found that stressful life events significantly positively predicted the paternal style of excessive interference ( $\beta=0.127$ ,  $p < 0.01$ ); however, paternal excessive interference negatively predicted depressive symptoms of college students ( $\beta=-0.089$ ,  $p < 0.01$ ), the indirect effect direction is opposite to the direct effect direction, considering that it may be related to the family background of the study object. In addition to the mediating variable, the study found that all dimensions of parental parenting style had significant effects on depressive symptoms of college students; stress life events of college students had significant effects on all dimensions of parenting style, and the stressful life events of college students have a significant negative predictive effect on the emotional warmth in the parenting style of father and the emotional warmth in the parenting style of mother, and both parenting styles have a significant negative predictive effect on depressive symptoms in college students.

## Moderating Effect of Gender

For additional analysis, we added gender as a moderating variable to the mediation effect. A and B in Figure 2 and Table 4 show that after adding gender variables for adjustment, each path of the mediation effect model is meaningful regardless of whether the mediating variable is each dimension of the paternal parenting style or each dimension of the maternal parenting style, but the interaction effect of gender has different significance on these paths. The interaction between gender and stressful life events, as well as parents' preferred parenting style ( $\beta_1=0.013$ ,  $p > 0.05$ ;  $\beta_2=0.004$ ,  $p > 0.05$ ), is found to be non-significant. However, it is significant with other dimensions of parenting style, the first half of the sex regulation mediation model. At the same time, the results of this study suggest that the mediation model is also

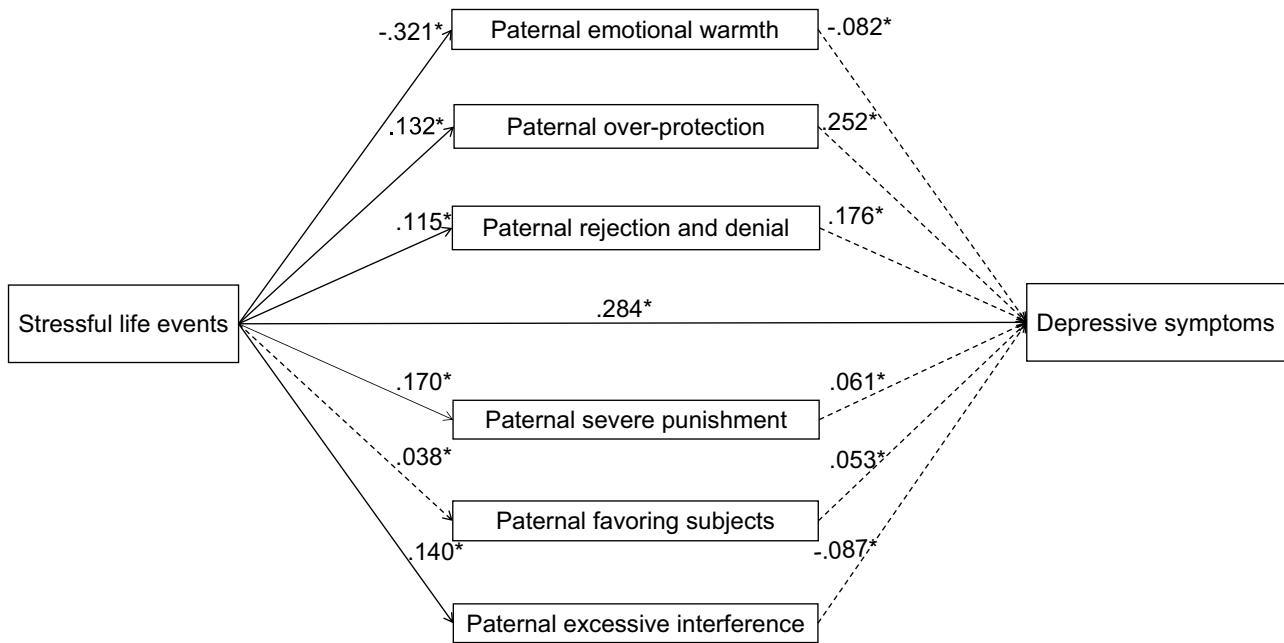


**Figure 1** Mediating model of parenting style. **(A)** The mediating effect of father's parenting style, **(B)** the mediating effect of mother's parenting style.  
**Note:** \* $P < 0.01$ .

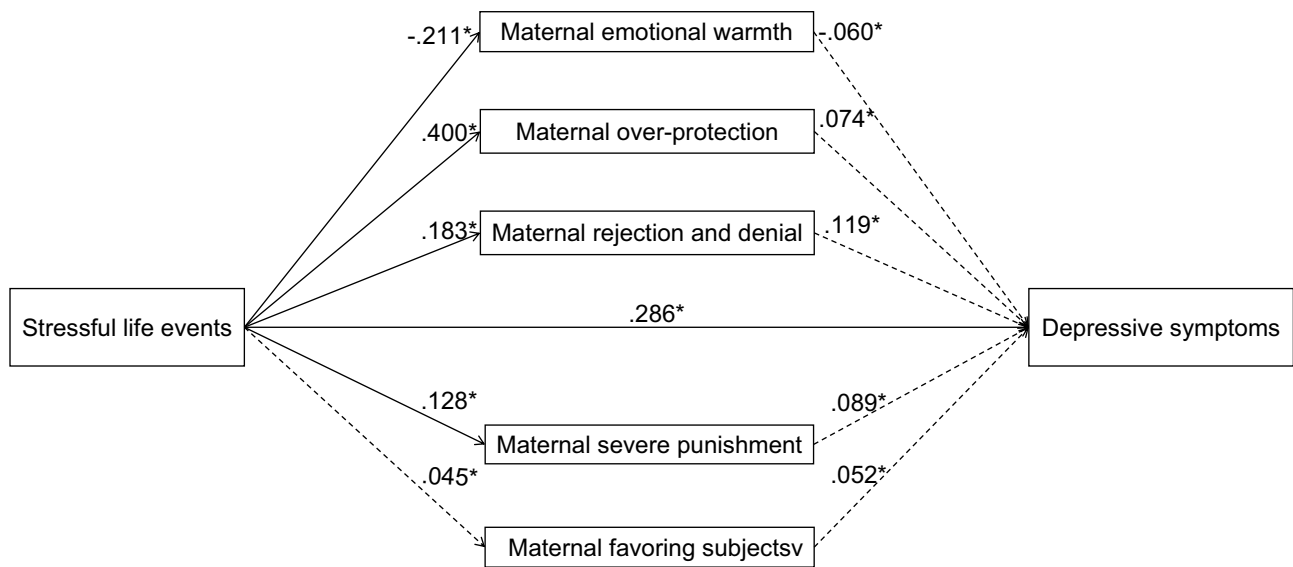
a moderating mediator. When the various dimensions of paternal or maternal parenting styles are used as mediating variables, the interaction effect between gender and life stressful events is significant in the depressive symptoms of college students ( $\beta_1=0.079$ ,  $p < 0.01$ ;  $\beta_2=0.081$ ,  $p < 0.01$ ).

In addition, a simple slope analysis is performed to analyze the moderating effect and its effect on the mediation model. A and B in Figure 3 shows that in the relationship between stressful life events and depressive symptoms in college students, stressful life events in women have a more significant effect on depressive symptoms than in men; that is, women are more likely to be affected by stressful life events that cause depressive symptoms. In the subsequent

A



B



**Figure 2** Models of the moderating effect of gender on the mediating effect of parenting style. **(A)** The moderating effect of gender on the mediating effect of father's parenting style, and **(B)** the moderating effect of gender on the mediating effect of mother's parenting style. **Note:** \*P < 0.01.

analysis of parenting styles, **Figure 4** shows that stressful life events have a more significant impact on parenting styles for women than for men, regardless of paternal or maternal parenting styles.

### Discussion

Through an analysis of relevant data from 8079 college students, the study found a correlation between stressful life events and depressive symptoms in college students and parenting styles, with parenting styles having a partial mediating



**Table 4** Analysis of Mediating Effects of Sex Regulation

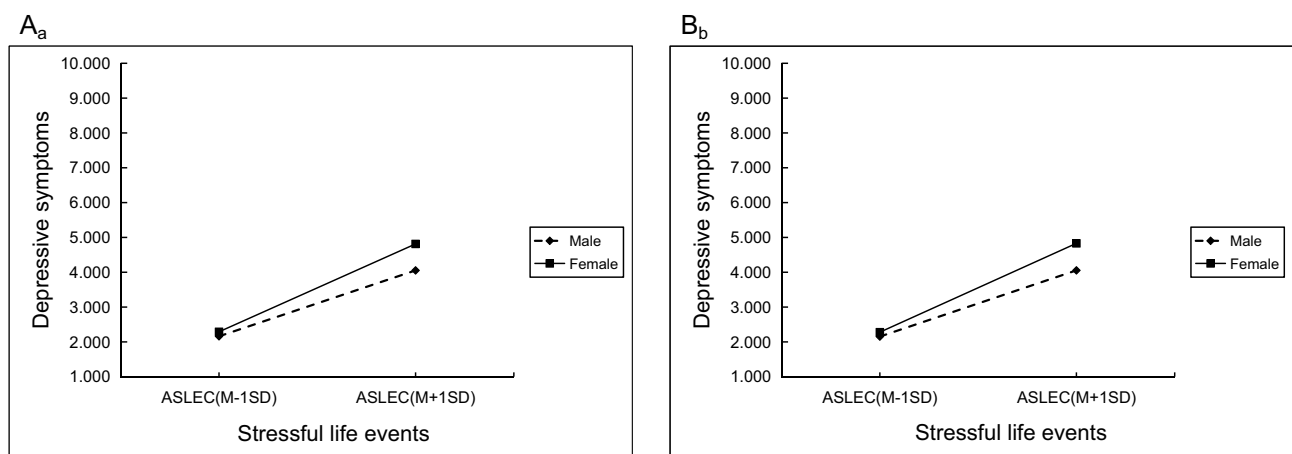
		Age			ASLEC <sup>b</sup>			Int (ASLEC <sup>b</sup> *Sex)			R2	F
		$\beta$	SE	t	$\beta$	SE	t	$\beta$	SE	t		
Father	Depression <sup>a</sup>	0.062	0.067	0.922	0.158	0.045	3.514*	0.079	0.028	2.821*	0.001	7.958*
	F1 <sup>c</sup>	-0.388	0.139	-2.803	-0.321	0.029	-11.021*	-0.318	0.058	-5.517*	0.004	30.433*
	F2 <sup>d</sup>	-0.013	0.036	-0.368	0.132	0.008	17.471*	0.06	0.015	4.000*	0.002	16.000*
	F3 <sup>e</sup>	0.050	0.035	1.424	0.115	0.07	15.438*	0.071	0.015	4.798*	0.003	23.02*
	F4 <sup>f</sup>	0.213	0.065	3.275*	0.170	0.014	12.425*	0.148	0.027	5.468*	0.004	29.896*
	F5 <sup>g</sup>	0.007	0.047	0.140	0.038	0.010	3.878*	0.013	0.019	0.648	0	0.419
Mother	F6 <sup>h</sup>	-0.045	0.052	-0.878	0.140	0.011	12.896*	0.073	0.022	3.400*	0.001	11.559*
	Depression <sup>a</sup>	0.062	0.067	0.092	0.286	0.015	19.545*	0.081	0.028	2.891*	0.001	8.360*
	M1 <sup>i</sup>	-0.466	0.135	-3.447*	-0.211	0.028	-7.418*	-0.317	0.056	-5.631*	0.004	31.709*
	M2 <sup>j</sup>	-0.259	0.083	-3.121*	0.400	0.017	22.896*	0.122	0.035	3.537*	0.001	12.514*
	M3 <sup>k</sup>	0.044	0.048	0.923	0.183	0.010	18.305*	0.131	0.020	6.625*	0.005	43.885*
	M4 <sup>l</sup>	0.091	0.049	1.858	0.128	0.010	12.394*	0.125	0.020	6.102*	0.004	37.240*
M5 <sup>m</sup>	0.015	0.046	0.328	0.045	0.010	4.587*	0.004	0.019	0.183	0	0.033	

**Notes:** <sup>a</sup>Depressive symptoms. <sup>b</sup>Stressful life events. <sup>c</sup>Paternal emotional warmth. <sup>d</sup>Paternal over-protection. <sup>e</sup>Paternal rejection and denial. <sup>f</sup>Paternal severe punishment. <sup>g</sup>Paternal favoring subjects. <sup>h</sup>Paternal excessive interference. <sup>i</sup>Maternal emotional warmth. <sup>j</sup>Maternal over-protection. <sup>k</sup>Maternal rejection and denial. <sup>l</sup>Maternal severe punishment. <sup>m</sup>Maternal favoring subjects.

effect between stressful life events and depressive symptoms in college students. Gender plays a significant role in this mediation model, acting as a moderating mediator.

The findings of this study indicate that the detection rate of depressive symptoms among college students is 6.3%, which is significantly lower than the 59% reported in previous studies.<sup>35</sup> Despite 70.9% of the participants being medical students, the result still falls below the reported 19% detection rate of depressive symptoms among medical students.<sup>36</sup> This disparity may be attributed to the fact that the questionnaire used in this study assessed the occurrence of depressive symptoms within the past week, resulting in a relatively short timeframe that potentially reduced the detection rate. However, it is worth noting that the detection rate of depressive symptoms in this study was slightly higher than a previous study's rate of 4.37%,<sup>37</sup> possibly due to differences in sample sources and cultural backgrounds.

This study found that age has a significant difference in depressive symptoms of college students, which is consistent with the results of previous studies showing that there are differences in depressive symptoms at different ages.<sup>38</sup> However, gender has no significant difference in the depressive symptoms of college students, which is different from the results of a previous study in terms of male and female depressive symptoms.<sup>39</sup> Two reasons are mainly considered: one



**Figure 3** Moderation effect of gender on stressful life events and depressive symptoms in college students.  
**Note:** <sup>a</sup>The intermediary is the father's parenting style. <sup>b</sup>The intermediary is the mother's parenting style.

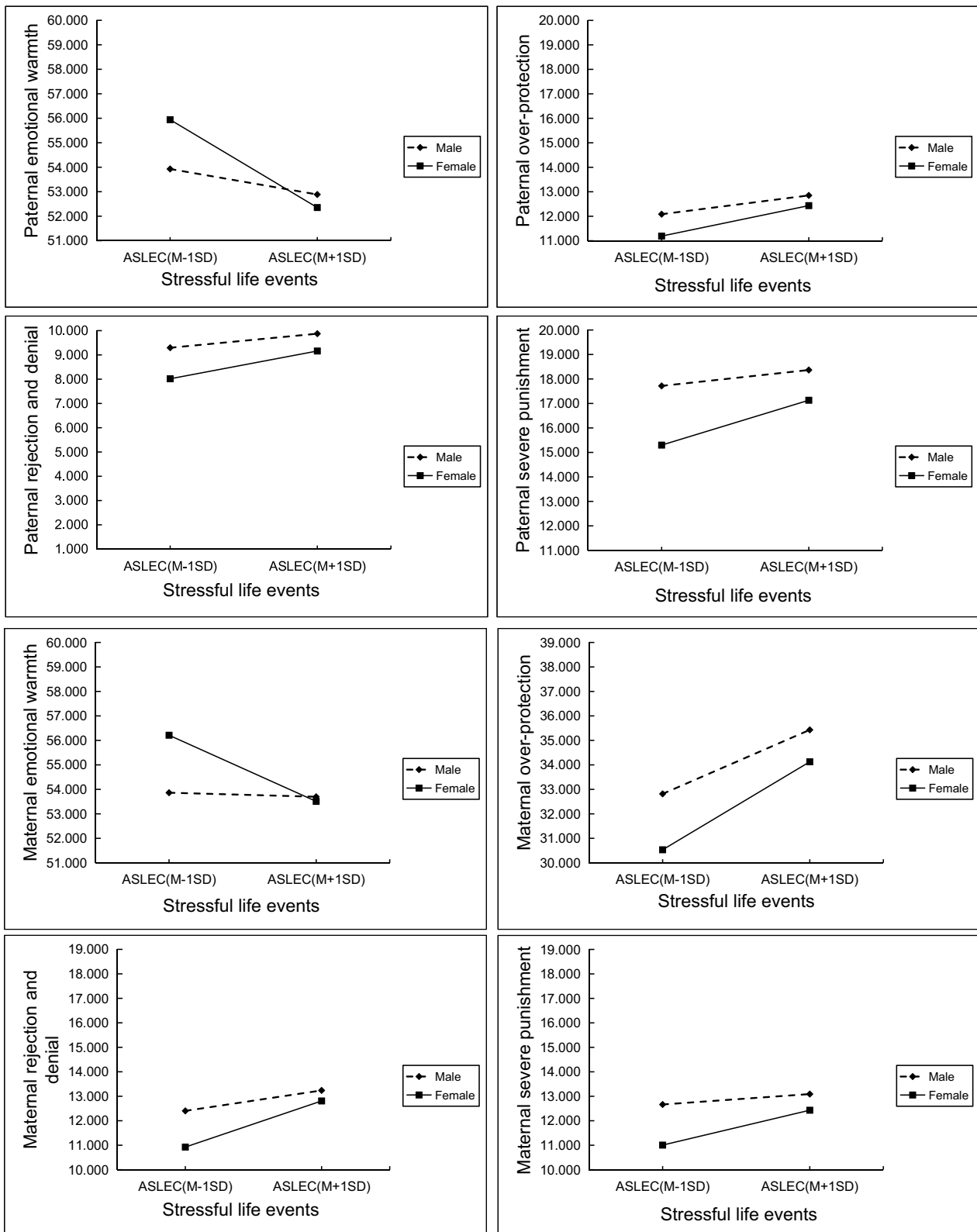


Figure 4 Moderation effects of gender on stressful life events and parenting styles in college students.

is the different ratio of males to females in this study; The other is the social factor, because with the progress and changes in society, many current studies are devoted to solving the problem of gender inequality, and the understanding and acceptance of gender roles are continuously changing,<sup>40</sup> which may lead to the current gender difference in depressive symptoms among college students. Studies have found that age and gender significantly differ in stressful life events, which indicates that at each age, individuals' role positioning is also undergoing potential changes, because the period before and after adolescence is the most susceptible to stress and that it is also a potent regulator of social-emotional behavior in adulthood.<sup>41</sup> In the research on differences in parenting styles, it is found that there is no significant difference in age and gender in parenting styles of parental favoring subjects. However, there are significant differences in other parenting styles. Under the traditional Chinese family education concept, there is a relatively obvious hierarchy within the family,<sup>42</sup> and parents have a relative preference for their children, especially for males. There are many more preferences.<sup>43,44</sup> This difference is insignificant in this study. Considering that the reason may be due to current progressive educational concepts, modern parents are more concerned with the uniqueness of each child and strive to provide fair opportunities and resources for each child rather than excessive preferences. However, the parents in each family are different due to their family concept, level of education, etc, which also determines the unique parenting style in each family.

The mediation effect analysis found that stressful life events in college students had a significant positive predictive effect on depressive symptoms. College students receive higher social education and face various stressful life events such as academic pressure, study and employment pressure, and interpersonal communication pressure.<sup>45</sup> If this pressure is not handled correctly, it can lead to negative emotions and experiences. In the case of depressive symptoms, studies have found that neural conduction is a crucial medium for emotional processing and plays an essential role in social behavior.<sup>46</sup> Some studies have shown that academic stress and living environment stressors have a negative impact on the mental health of college students. This conclusion is consistent with the findings of this study, which indicate that stressful life events can lead to depressive symptoms.<sup>47</sup> After adding parenting style as a mediating variable, the study found that stressful life events still had a significant predictive effect on depressive symptoms in college students, suggesting that parenting style may play a part in mediating the relationship between stressful life events and depressive symptoms in college students. It is important to note that previous studies have shown that excessive interference in a father's parenting style can lead to the development of depressive symptoms in adolescents.<sup>48</sup> However, this study has yielded unexpected findings regarding the relationship between stressful life events and depressive symptoms in college students. Further data collection and analysis may be necessary to fully understand these results.

Previous studies have categorized parenting styles into positive (emotional warmth/understanding) and negative (punishment/harshness, excessive interference, rejection/denial, overprotection, and preference).<sup>48,49</sup> This study discovered that positive parenting styles can mitigate the occurrence of depressive symptoms resulting from stressful life events while negative parenting may exacerbate the incidence of depressive symptoms. There may be several reasons for the results of this study. Firstly, in terms of emotional management ability, Studies have indicated that authoritative parenting is associated with an increase in children's self-confidence and independence, as well as the promotion of children's emotional management skills. In contrast, authoritarian parenting has been found to have a detrimental impact on children's emotional management abilities.<sup>50</sup> Furthermore, among college students, parenting styles may also influence their emotional management and responses when confronted with stressful life events, subsequently either promoting or weakening the occurrence of depressive symptoms. Secondly, in terms of self-esteem and self-confidence, research has shown a significant correlation between parenting styles and adolescent self-esteem.<sup>51</sup> Improving self-esteem can alleviate adolescent depression caused by negative parenting styles.<sup>52</sup> Positive parenting, which involves providing care and emotional support, can help cultivate children's self-esteem and promote their mental health.<sup>53</sup> Therefore, the occurrence of depressive symptoms caused by stressful life events may be influenced by parenting style through the self-esteem of college students. Finally, in terms of interpersonal communication, research has found that negative parenting styles are detrimental to the development of adolescents' social connections, whereas positive parenting styles can foster healthy social relationships.<sup>54</sup> Additionally, studies have indicated that the one-child policy has led to an increase in helicopter parenting, characterized by high warmth and protection, which has heightened interpersonal conflicts among college students 56. This trend is not conducive to maintaining harmonious relationships and can lead individuals to

experience negative psychological emotions.<sup>55</sup> Therefore, parenting style may indeed affect the interpersonal relationships of college students and either exacerbate or alleviate depressive symptoms resulting from stressful life events.

It is crucial for parents to prioritize a positive parenting style when raising children in order to create a nurturing environment and support system for them. Numerous studies have emphasized the benefits of positive parenting behaviors, including reduced behavioral problems, improved parent-child relationships, enhanced parenting skills and happiness for parents, as well as promoting healthy and comprehensive child development.<sup>56</sup> This research concept also holds relevance for college students targeted by our study, as a positive parenting style can help reduce the occurrence of depressive symptoms and promote the mental health of college students.

When analyzing the moderating role of gender in the mediating model of stressful life events in college students – parental rearing style – depressive symptoms. First, this study found that in the first half of the gender-mediated model, gender plays a moderating role in parental emotional warmth, over-protection, rejection and denial, and severe punishment, but does not regulate the parental favoring subjects, that is, women are more susceptible to the influence of parenting style than men. The reason may be that the traditional family model requires women to undertake additional housework, pay attention to maintaining family relations and intimate relationships,<sup>57</sup> and respond more strongly to emotional stimuli.<sup>58</sup> In the face of stressful life events, women may be more sensitive and passive in receiving and responding to their parent's parenting style, so female college students are more susceptible to the effects of their parents' parenting style than male college students. Second, gender has a significant regulatory effect on the relationship between stressful life events and depressive symptoms in college students, acting as a moderating agent; that is, women are more likely than men to experience depressive symptoms in response to stressful life events, consistent with previous findings.<sup>6</sup> The reasons may be as follows: First, physiological factors. Women have excessive hormonal fluctuations during the menstrual cycle, especially during the premenstrual and menstrual periods when depression and other negative emotions increase due to decreased levels of estrogen and progesterone, therefore, women have a specific regulation effect on emotions regarding physiological factors.<sup>59</sup> As a result, female college students are more likely to feel depressed and irritable, which can affect their emotional and mental health and increase the occurrence of depressive symptoms. Second, social factors. Women often face social discrimination and gender stereotypes in society,<sup>60</sup> which may lead to impaired self-esteem and increased negative emotions, aggravating their depressed symptoms. Third, cultural factors. In some traditional cultures, women are seen as dependent and in need of care. In one study, the autonomy of men is relatively higher than that of women,<sup>61</sup> which makes some female college students face contradictions with traditional expectations while pursuing independence, and such contradictions and struggles may increase their stress and depressive symptoms. Therefore, in order to protect the mental health of college students, we not only need to pay attention to mental health education, provide psychological support and resources, and cultivate college students' coping ability and emotional management abilities but also pay attention to the impact of the social environment, reduce gender discrimination and stereotypes of women.

When it comes to promoting the mental health of individual college students, parenting styles are an entry point that needs attention. Adopting a positive parenting style and avoiding negative parenting styles will be effective in alleviating depressive symptoms in college students. At the same time, proper attention should be paid to the female population, and more attention and support should be given to women, which will reduce the occurrence of depressive symptoms to some extent.

## Limitations

Firstly, it is important to note that this study is a cross-sectional study, and as such, it does not establish a causal relationship between stressful life events and depressive symptoms in college students. Secondly, there are numerous factors that can impact the mental health of college students, and this study specifically focuses on the mediating role of parental rearing styles in relation to stressful life events and depressive symptoms among college students. Additionally, it should be acknowledged that the scale used in this study to measure parenting styles may introduce recall bias, potentially influencing the results. Finally, with regards to the research findings, while previous studies have indicated that excessive interference from fathers' parenting styles can lead to increased depressive symptoms among college students; our study produced unexpected results. This discrepancy may be

attributed to a lack of consideration for family background and parental cultural influences among our subjects. Therefore, further data collection and more comprehensive analysis are necessary for a deeper understanding of these findings.

## Conclusion

College students are in the transition from adolescence to adulthood, and they are beginning to gradually recognize their responsibilities. They are also under pressure from studies, relationships, employment, etc. If they do not get timely intervention and adjustment, some destructive emotions will occur, leading to the onset of depressive symptoms. As primary educators on the path to personal growth, parents have a crucial impact on college students. Our study found that stressful life events in college students can directly promote the occurrence of depressive symptoms or indirectly cause them through the mediating role of parenting styles, with gender playing an essential role in mediating between them, when faced with stressful life events, women were more affected by their parenting style than men, and were also more likely to experience depressive symptoms. We believe that the results of this study help prevent the emergence of unhealthy psychology in college students from the early growth stage from the perspective of parenting styles and timely intervention and adjustment of parenting style in the face of stressful life events to improve the ability of college students to deal with stressful life events, and further promote the development of mental health of college students. This study is one of the few in China to analyze the mediating role of parenting styles in stressful life events and depressive symptoms of college students with a large sample size. It is also one of the few studies to explore parenting styles independently. Our conclusions not only reveal some potential family factors of depression symptoms in college students, but also provide a new direction and reference for the development of clinical intervention measures to prevent depression in college students. Additionally, it offers further theoretical support and new insights for the mental health of college students at the family and social levels.

## Data Sharing Statement

The raw data supporting the conclusions of this article will be available from the authors on reasonable requests.

## Ethics Approval and Consent to Participate

Informed consent was obtained from each participant prior to data collection. The Research Ethics Committee of Jining Medical University approved this study. The procedures used in this study adhere to the tenets of the Declaration of Helsinki.

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## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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## Disclosure

All authors declare that they have no conflicts of interest associated with this work.

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