

Parental Bonding and Depressive Symptoms among Chinese College Students during the COVID-19 Pandemic: The Roles of Neuroticism and Social Support

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How to cite this paper: Yu, T. X., & Hu, J. S. (2022). Parental Bonding and Depressive Symptoms among Chinese College Students during the COVID-19 Pandemic: The Roles of Neuroticism and Social Support. *Open Journal of Social Sciences*, 10, 158-171. <https://doi.org/10.4236/jss.2022.109011>

Received: July 20, 2022

Accepted: August 12, 2022

Published: August 15, 2022

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Abstract

This study aims to examine the influence of parental care/control on depressive symptoms and the mediating roles of neuroticism and social support in their association among Chinese college students during the COVID-19. A sample of 2561 college students with an age range of 16 - 26 ($M_{age} = 18.37$, $SD = 1.13$, 29.05% boys) completed the care and control subscales of the Parental Bonding Instrument, the Beck Depression Inventory-II, the neuroticism scale of the Eysenck Personality Questionnaire, and the Social Support Rating Scale. Structural equation models indicated that parental care/control negatively/positively predicted depressive symptoms. Furthermore, neuroticism and social support mediated the relationship between parental care/control and depressive symptoms, separately and sequentially. These findings may advance our understanding of the influences of multiple factors on Chinese college students' depressive symptoms under the background of COVID-19.

Keywords

COVID-19, Parental Care and Control, Depressive Symptoms, Neuroticism, Social Support, Multiple Mediating Effect, College Students

1. Introduction

Since the World Health Organization (WHO) announced the outbreak of the novel coronavirus disease (COVID-19), the pandemic has induced huge costs and severe psychological trauma to people worldwide. To limit its spread among college students, Chinese universities have promoted online teaching and restricted

face-to-face social contact for a specified period. However, these restrictions may indirectly have led to more negative emotions and caused additional stress among students. Several empirical studies have indicated that COVID-19-related stressors could bring about more anxiety (Chen et al., 2020) and depressive symptoms (Wang et al., 2022).

Depression is characterized by high recurrence rates and a high probability of causing disability and even morbidity (Paykel et al., 2005; Maalouf et al., 2011). College students experience increased stressors, such as interpersonal problems, and thus face higher risks of mental problems (Cheng et al., 2021; Fu et al., 2020; Gao et al., 2020). Furthermore, as the transition from high school to college may easily cause various maladjustments, college students are thus at risk of depression. During COVID-19, Chinese college students are restricted to participate in extracurricular activities only with those they have already come into contact with, such as their roommates. Therefore, they may have problems in building new interpersonal relationships and thus experience more depressive symptoms within COVID-19. In a cross-sectional study, researchers found that the prevalence of depressive symptoms among Chinese college students during the COVID-19 pandemic was as high as 56.8% (Yu et al., 2021). Taken together, we selected Chinese college students as the research subjects and explore the antecedents of their depressive symptoms within COVID-19.

1.1. Parental Bonding and Depressive Symptoms

Parental bonding, an important environmental factor, is closely related to depressive symptoms. Loas (1996) proposed a model of depressive vulnerability and pointed out that genetic and environmental factors jointly affected individuals' depressive symptoms. Specifically, environmental factors, such as parental bonding may influence one's personality traits and cognitive style, subsequently leading to an increase or decrease in depressive symptoms. Moreover, according to the diathesis-stress model of depression, chronic stress caused by unhealthy parental bonding may have long-term negative effects on mental health, causing more depressive symptoms (Ingram & Luxton, 2005). Existing studies have also verified the correlation between parental bonding and depressive symptoms (Fei et al., 2021; Hall et al., 2004; Hou et al., 2020; Shute et al., 2019). Specifically, a lack of parental care and excessive control (overprotection) were positively associated with depressive symptoms (Gao et al., 2012). For example, Fei et al. (2021) focused on the association between parental control and depressive symptoms among college freshmen. They found that maternal and paternal control both had significant positive effects on depressive symptoms. However, few studies have investigated this issue and its mechanisms in Chinese culture and under the background of COVID-19.

1.2. Neuroticism as a Mediator

Neuroticism is a personality trait related to negative emotions, nervousness, and

insecurity (Suls & Martin, 2005). Previous studies found that neuroticism was related to both parental bonding and depressive symptoms. First, parental bonding directly affects the formation and development of the neuroticism trait in college students (Liu, Zhang, & Chen, 2020b). Second, high neuroticism is generally recognized as a risk factor for depression (Liu, Chen, & Chen, 2020a). Individuals with higher levels of neuroticism are found to be more depressive than those with lower levels of neuroticism (Li et al., 2021), and more likely to develop depression in the future (Mu et al., 2020).

Moreover, in line with the diathesis-stress perspective (Monroe & Simons, 1991), negative parenting style and neuroticism may have a sequential effect on depressive symptoms. Specifically, individuals in a stressful family environment, such as those who experience or have experienced dysfunctional parenting styles may become more neurotic. Higher neuroticism then leads to more depressive symptoms. This mediating effect of neuroticism between parenting style and depressive symptoms has been verified by previous studies. Zhang et al. (2018) investigated the effects of parental maltreatment and personality traits on depressive symptoms in a cross-sectional study. They found that parental maltreatment not only directly predicted depressive symptoms but also indirectly affected depressive symptoms through the mediating role of neuroticism.

1.3. Social Support as a Mediator

Social support can be defined as the experience of being valued, respected, cared about, and loved by others who are present in one's life (Cobb, 1976). On one hand, a series of cross-sectional and longitudinal studies have verified the association between social support and depressive symptoms (Ren et al., 2018). Individuals who receive inadequate social support are more likely to experience depressive symptoms. On the other hand, according to Bronfenbrenner's ecological systems theory, a positive/negative family climate (parental care/control) may promote/disturb individuals' socialization processes (Bronfenbrenner, 1977). The correlation between parental bonding and social support has also been confirmed by a series of empirical studies (Zhou et al., 2019).

Furthermore, the Social Support Deterioration model suggests that social support plays a mediating role between family stress and psychological distress, impairment, and maladjustment (Barrera, 1986). The buffering hypothesis also indicates that social support played a buffering role in the relationship between adverse family context and individuals' mental health (Cohen & Wills, 1985). In line with this perspective, some researchers found that adverse family climate decreased individuals' perception/reception of social support, leading to depressive symptoms (Wang et al., 2020a).

1.4. The Multiple Mediating Roles of Neuroticism and Social Support

According to the developmental psychopathology perspective, psychological, biological, and social factors jointly contribute to the formation of maladaptive

outcomes (Cicchetti, 2016). Thus, the predictive effect of parental bonding on depressive symptoms may be mediated by sequential factors. First, the attachment theory suggested that intimate relationships are related to later personality development (Bowlby, 1977; Oshri et al., 2015). From this perspective, parental care/control as a secure/insecure attachment pattern may promote/harm individuals' sense of security and then influence the development of neurotic personality (Shu et al., 2007). Second, neuroticism has been negatively associated with measures of social support (Han et al., 2021; Zhou et al., 2019). Finally, according to the Social Support Deterioration model, individuals who do not receive enough social support tend to experience more depressive symptoms (Qi et al., 2020). Additionally, in one cross-sectional study, neuroticism and social support have been found to play sequential mediating roles in the link between parental emotional abuse and depressive symptoms (Zhou et al., 2019). Taken together, we have reason to deduce that neuroticism and social support play multiple mediating roles in the relationship between parental bonding and depressive symptoms.

To further disentangle the nature and mechanism of this relationship between parental bonding and college students' depressive symptoms. The present study selected parental care and control and tested a conceptual model. In this model, we hypothesize that 1) parental care/control negatively/positively predicts college students' depressive symptoms; 2) there would be two indirect pathways from parental care/control to depressive symptoms through neuroticism and social support, respectively; 3) parental care/control would indirectly affect depressive symptoms via the sequential mediating roles of neuroticism and social support. The proposed conceptual model is shown in **Figure 1**.

2. Method

2.1. Participants

The datasets for this study were collected during September and October 2021. A total of 2768 college students in a university in China's Liaoning province were recruited. They completed questionnaires on a specially designed mobile app. We eliminated 207 invalid questionnaires, whose completion time was less than three minutes. Thus, we finally retained 2561 valid questionnaires, with 744 males and 1817 females. Students' mean age was 18.37 years (range 1626, $SD = 1.13$).

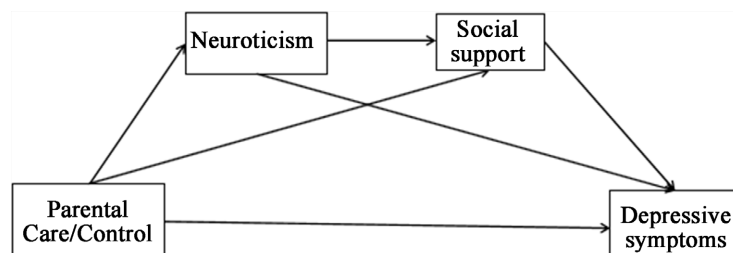


Figure 1. Proposed conceptual model.

2.2. Measures

Parental Care and Control scales of Parental Bonding Instrument (PBI)

Parker et al. (1979) compiled the 25-item PBI. The items are rated on a four-point Likert scale, ranging from 0 (very likely) to 3 (very unlikely). Yang et al. (2009) revised and explored the factorial structure of the Chinese version of PBI. The final revised “Mother version” (PBI-M) and “Father version” (PBI-F) both contained 23 items and each included three subscales: care (11 items), encouraging autonomy (6 items), and control (6 items). A higher total score indicated stronger corresponding parenting attributes. In this study, care and control subscales were selected. The Cronbach’s α for maternal care and control were 0.89 and 0.75, respectively. The Cronbach’s α for paternal care and control were 0.92 and 0.75, respectively. The Cronbach’s α for integrated parental care and control were 0.93 and 0.83, respectively.

Beck Depression Inventory-II (BDI-II)

The BDI-II (Beck et al., 1996) contains 21 items that are associated with the symptoms of depression. Each item consists of four statements. These statements scored from 0 - 3 in turn, with higher total scores implying an increase in a symptom’s severity. People who score 0 - 13 are considered to be free of depression, people scoring 14 - 19 are seen as “mildly” depressed, those scoring 20 - 28 are seen as “moderately” depressed, and those scoring 29 - 63 are seen as being “severely” depressed. The Cronbach’s α in the study was 0.89.

Neuroticism scale of Eysenck Personality Questionnaire (EPQ)

Eysenck and Eysenck (1975) developed the EPQ. We used the Chinese version of the neuroticism scale, which was revised and translated by Gong (1986). This scale consists of 24 items. The participants answered “yes” or “no” on this scale, which were each assigned a value of 1 or 0, respectively. A higher score indicated a higher level of neuroticism. In this study, the Cronbach’s α was 0.89.

Social Support Rating Scale (SSRS)

The SSRS compiled by Xiao (1994) contained 10 questions divided into three dimensions: subjective support, objective support, and utilization of support. In this scale, answers 1 - 4 to questions 1 - 4 and 8 - 10 correspond to 1 - 4 points, respectively. For question 5, according to the support degree of the a-d options, participants answered 1 - 4 to each option to obtain 1 - 4 points. As for questions 6 and 7, the numbers of support sources ranging from 1 to 9 are exactly equal to the scores one could obtain. A higher score indicates a higher level of social support. In this study, Cronbach’s α was 0.70.

2.3. Procedure

The college students entered the classroom in batches. First, the research assistants explained the procedure and requirements. They thereafter told the students how to enter the mobile app via WeChat. The participants immediately completed the online questionnaires. Ethical approval was obtained from the Ethics Committee for Scientific Research at the corresponding author’s university.

2.4. Statistic Analysis

We used the Statistical Package for the Social Sciences (SPSS) version 20.0 and Mplus 7.0 to organize and analyze the data. The correlations between each variable were analyzed via SPSS 20.0. Then, structural equation modeling (SEM) through Mplus 7.0 was used to analyze the proposed model, with all the regression coefficients tested by the bias-corrected percentile Bootstrap method. We tested the mediation effects in the proposed model by estimating their 95% confidence interval (CI) with 1000 resampled samples. Age and gender were controlled for in all the correlation and regression analyses.

3. Results

3.1. Descriptive Statistics and Correlations

Table 1 showed the means, standard deviations, and correlation matrices of each variable. As shown in **Table 1**, the depressive symptoms were positively associated with maternal control ($r = 0.28, p < 0.001$), paternal control ($r = 0.24, p < 0.001$), and neuroticism ($r = 0.70, p < 0.001$). The depressive symptoms were negatively associated with maternal care ($r = -0.37, p < 0.001$), paternal care ($r = -0.38, p < 0.001$), and social support ($r = -0.36, p < 0.001$). Neuroticism was positively associated with maternal control ($r = 0.30, p < 0.001$) and paternal control ($r = 0.28, p < 0.001$) and negatively associated with maternal care ($r = -0.37, p < 0.001$), paternal care ($r = -0.38, p < 0.001$), and social support ($r = -0.33, p < 0.001$). Social support was positively associated with maternal care ($r = 0.35, p < 0.001$) and paternal care ($r = 0.38, p < 0.001$) and negatively associated with maternal control ($r = -0.18, p < 0.001$) and paternal control ($r = -0.11, p < 0.001$). The two parental bonding variables for maternal and paternal bonding were significantly correlated with each other.

3.2. The Multiple Mediation Model

The multiple mediation models with parental care and parental control as the

Table 1. Descriptive statistics and correlations among variables.

	1	2	3	4	5	6	7
1. Maternal care	1						
2. Maternal control	-0.36***	1					
3. Paternal care	0.59***	-0.26***	1				
4. Paternal control	-0.32***	0.59***	-0.27***	1			
5. Depressive symptoms	-0.37***	0.28***	-0.38***	0.24***	1		
6. Neuroticism	-0.37***	0.30***	-0.38***	0.28***	0.70***	1	
7. Social support	0.35***	-0.18***	0.38***	-0.11***	-0.36***	-0.33***	1
<i>M</i>	32.00	5.67	28.38	4.27	7.87	48.01	30.67
<i>SD</i>	5.86	3.64	6.89	3.27	7.96	12.83	8.32

Note: *** $p < 0.001$.

independent variables both showed a great fit (Parental care: RMSEA = 0.037, SRMR = 0.024, CFI = 0.992, TLI = 0.983; Parental control: RMSEA = 0.042, SRMR = 0.027, CFI = 0.987, TLI = 0.975). In the Parental-care model shown in **Figure 2**, parental care negatively predicted neuroticism ($\beta = -0.48, p < 0.001$) and depressive symptoms ($\beta = -0.15, p < 0.001$) and positively predicted social support ($\beta = 0.41, p < 0.001$). Neuroticism negatively predicted social support ($\beta = -0.13, p < 0.001$) and positively predicted depressive symptoms ($\beta = 0.60, p < 0.001$). Social support had a significant and negative effect on depressive symptoms ($\beta = -0.097, p < 0.001$). Furthermore, the upper and lower bounds of the bootstrapped 95% CI for the mediating effect of neuroticism in the relationships between parental care and depressive symptoms did not include 0 (indirect effect = -0.52 , SE = 0.031, 95% CI = $[-0.57, -0.48]$). The upper and lower bounds of the bootstrapped 95% CI for the mediating effect of social support did not include 0 (indirect effect = -0.073 , SE = 0.014, 95% CI = $[-0.094, -0.050]$). The upper and lower bounds of the bootstrapped 95% CI for the mediating effect of neuroticism and social support also did not include 0 (indirect effect = -0.011 , SE = 0.003, 95% CI = $[-0.016, -0.007]$). Additionally, the total effect of parental care on depressive symptoms was 0.879. The effect size was based on the ratio of the mediating effect to the total effect. Therefore, the mediating effect sizes of neuroticism, social support, and neuroticism and social support were 59.27%, 8.30%, and 1.25%, respectively.

In the Parental-control model shown in **Figure 3**, parental control positively predicted neuroticism ($\beta = 0.38, p < 0.001$) and depressive symptoms ($\beta = 0.074, p < 0.001$) and negatively predicted social support ($\beta = -0.084, p < 0.01$). Neuroticism negatively predicted social support ($\beta = -0.29, p < 0.001$) and positively predicted depressive symptoms ($\beta = 0.63, p < 0.001$). Social support had a significant and negative effect on depressive symptoms ($\beta = -0.14, p < 0.001$). Furthermore, the upper and lower bounds of the bootstrapped 95% CI for the mediating effect of neuroticism in the relationships between parental control and depressive symptoms did not include 0 (indirect effect = 0.65, SE = 0.048, 95% CI = $[0.57, 0.73]$). The upper and lower bounds of the bootstrapped 95% CI for the mediating effect of social support did not include 0 (indirect effect = 0.033,

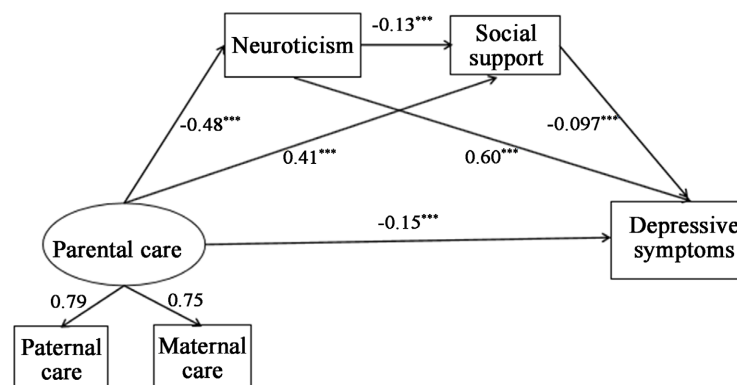


Figure 2. Path model of the Parental-care model. Note: *** $p < 0.001$.

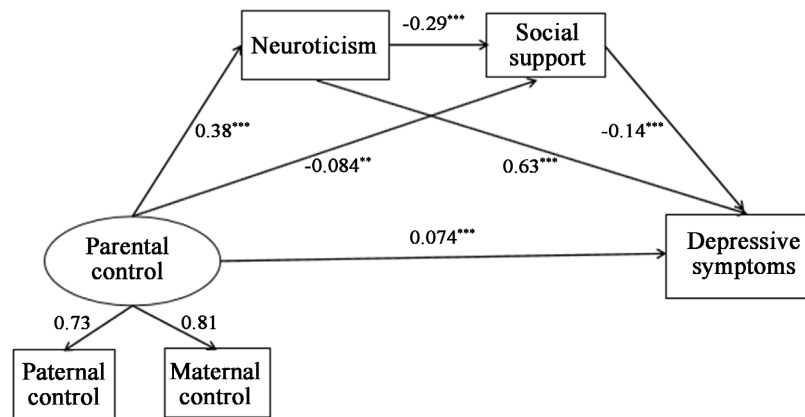


Figure 3. Path model of the Parental-control model. Note: *** $p < 0.001$, ** $p < 0.01$.

SE = 0.010, 95% CI = [0.017, 0.050]). The upper and lower bounds of the bootstrapped 95% CI for the mediating effect of neuroticism and social support also did not include 0 (indirect effect = 0.044, SE = 0.007, 95% CI = [0.034, 0.056]). Additionally, the total effect of parental control on depressive symptoms was 0.926. The effect size was based on the ratio of the mediating effect to the total effect. Therefore, the mediating effect sizes of neuroticism, social support, and neuroticism and social support were 69.87%, 3.56%, and 4.75%, respectively.

4. Discussion

As the COVID-19 pandemic has been continuing to spread at breakneck speed worldwide since its outbreak, restrictions on social contact (large-scale lockdowns) have been implemented on Chinese university campuses. Under this background, more attention should be paid to the mental health of college freshmen who are at high risk of depression (Gao et al., 2021). To explore the antecedents and mechanisms underlying college students' depressive symptoms, this study selected parental bonding (parental care and control) and further examined its direct and indirect effects via the mediating role of neuroticism and social support on college students' depressive symptoms. The results showed that low care and high control are associated with more depressive symptoms, separately. This finding is consistent with that of previous studies (Ono et al., 2017; Valiente et al., 2014). According to the model of depressive vulnerability, stressful life events like unhealthy parenting were closely associated with depressive symptoms (Kendler & Gardner, 2016). The perspective of developmental psychopathology also suggested that extreme parenting was a risk factor for mental disorders (Cicchetti, 2016). However, gender was controlled and not analyzed in the model. Fei et al. (2021) investigated the role of gender in the association between parental control and depressive symptoms and found that paternal control had a greater influence on males' depressive symptoms. Therefore, future studies should further examine the role of gender in this association.

4.1. The Separate Mediating Role of Neuroticism and Social Support

Besides the direct effects of parental care/control on depressive symptoms, their indirect effects via the mediating roles of neuroticism and social support were also found. First, neuroticism was found to mediate the link between parental care/control and depressive symptoms. Higher parental care/control predicted lower/higher levels of neuroticism, which resulted in less/more depressive symptoms. These results were consistent with previous studies (Ono et al., 2017). Based on the biological basis of neuroticism, converging evidences have verified that neuroticism was a heritable trait underlying the risk of various mental disorders, such as depression and social anxiety (Liu et al., 2021). The developmental psychopathology model also indicates that negative parenting may lead to the formation of neurotic personality, which then causes individuals to be more vulnerable to mental disorders (Cicchetti, 2016). Second, results showed that social support also played a mediating role in the relationship between parental care/control and depressive symptoms. College students under parental care/control parenting receive more/less social support, thus leading to less/more depressive symptoms. These findings were in line with previous studies (Zhou et al., 2019). According to the buffering hypothesis, social support can play an important protective role against mental disorders (Barrera, 1986). Therefore, if individuals who once experienced inappropriate parenting (such as parental control, maltreatment, etc.) receive enough social support from other aspects, they are not likely to develop depressive symptoms (Zhou et al., 2019). On the contrary, the ecological systems theory suggests that individuals' external environments can be divided into different layers that interact with each other (Bronfenbrenner, 1977). Therefore, a positive family climate (parental care) as a kind of support may encourage individuals to obtain more social support from other layers of the environment, which protect them against depression.

4.2. The Sequential Mediating Role of Neuroticism and Social Support

Findings from this study further demonstrate that neuroticism and social support mediate the link between parental bonding and college students' depressive symptoms sequentially. Specifically, college students under parental care/control parenting tend to be less/more neurotic, which means they can easily/struggle to access social support. Finally, those who obtain enough social support are less likely to experience depressive symptoms, while those who do not receive enough social support tend to be depressive. This finding was consistent with previous studies, suggesting that family experience indirectly affects individuals' mental health through the chain function of multiple factors (Ono et al., 2017; Wang et al., 2020b; Zhou et al., 2019). In line with the developmental psychopathology model, the current findings verify that depressive symptoms are caused by many emotional, cognitive, social, and personality factors (Cicchetti, 2016). In the

present study, parental control and neuroticism were vulnerable factors increasing college students' risks of depression; while parental care and social support were found to play a protective role against depression. Further, the relationship between personality and social support has been verified by a series of theoretical and empirical studies (Yu & Hu, 2022). Regarding emotions, individuals with high levels of neuroticism are more likely to experience its negative effects and thus less likely to gain social support (Miller et al., 2009; Robinson et al., 2007).

4.3. Limitations and Implications

There are some limitations to this study: first, the causality among parental bonding, neuroticism, social support, and depressive symptoms cannot be deduced from this study because of its cross-sectional design. Future studies could adopt a longitudinal design to examine the causal relationships among the three variables. Second, gender was controlled in this study. However, a Chinese saying states, "raising a son should be economical and raising a daughter should be done generously." Thus, parenting styles may vary according to an individual's gender. This may interfere with the results of this study. A Chinese study focusing on the relationship between parental control and college students' depressive symptoms found that both maternal and paternal control had more significant positive effects on males' depressive symptoms (Fei et al., 2021). Thus, in future studies, the gender variable should be considered. Third, only neuroticism was selected and its mediating effect between parental bonding and depressive symptoms was examined. However, other personality traits such as extraversion have also been found to be related to parental bonding (Yao et al., 2014), social support (Tan et al., 2018), and depressive symptoms (Yu & Hu, 2022). Therefore, future studies should further explore the roles of extraversion among these variables. Finally, some interference factors, like the status quo of COVID-19 or negative emotions caused by the COVID-19 may affect the results. Thus future studies should control these factors.

The study's findings are of practical and theoretical significance. First, the study's results support the diathesis-stress theory of depression, which claims that environmental factors (parental bonding and social support) and individual factors (neuroticism) jointly contribute to one's depressive symptoms. Second, it has social and practical implications. From the social perspective, social resources like parental care and social support are vitally important for the prevention of college students' depressive symptoms. Once students at high risk of depression receive enough support from either families or other areas, they are not likely to develop depressive symptoms. From the practical perspective, colleges or other institutions committing to reducing college students' depressive symptoms should take measures to reduce their neuroticism level. In summary, families, colleges, and society should collaborate to protect students from developing depressive symptoms.

5. Conclusion

In conclusion, this study revealed the roles of parental care/control, neuroticism, and social support in the development of depressive symptoms during COVID-19 among college students. Specifically, parental care/control was negatively/positively correlated with college students' depressive symptoms. Furthermore, neuroticism and social support mediated the relationship between parental care/control and depressive symptoms, separately and sequentially. Appropriate intervention or prevention programs in both families and colleges should be implemented to reduce college students' depressive symptoms, especially under the background of the COVID-19 pandemic.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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