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Psychological resilience and depression among college students during the COVID-19 pandemic: The mediating role of self-forgiveness and the moderating role of isolation

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Abstract

Previous research has consistently reported a negative association between psychological resilience and depression. However, the potential impact of other variables, such as self-forgiveness and isolation, on this relationship remains unexplored. The aim of this study was to investigate the mediating role of self-forgiveness and the moderating role of isolation in the association between psychological resilience and depression among college students in China. A total of 1,274 college students in China completed a screening questionnaire that included measures of psychological resilience, self-forgiveness, depression, and isolation. After excluding invalid data, 1,220 valid responses were used for the moderated mediation analysis. The results of the mediation analysis indicated that self-forgiveness had a significant mediating effect on the relationship between psychological resilience and depression ($ES = -.40$). Furthermore, the moderated mediation analysis revealed that isolation significantly moderated the first half of the mediating path and the direct path of the mediating model. These results provided a theoretical foundation for enhancing individual psychological resilience and self-forgiveness as coping mechanisms to manage depression in negative situations, as well as highlighting the negative impact of isolation on individual mental health. Moreover, the findings highlighted the importance of emphasizing the cultivation of psychological resilience and self-forgiveness as integral components of therapeutic programs to optimize their efficacy.

Keywords Psychological resilience · Depression · Self-forgiveness · Isolation · COVID-19

Introduction

Since late 2019, the COVID-19 pandemic has rapidly spread worldwide (Lu et al., 2020), prompting China to implement a series of lockdown measures to curb its transmission (Deng & Peng, 2020). Specifically, areas with severe outbreaks have been cordoned off and strictly managed, with suspected and confirmed cases, as well as close contacts, being placed in isolation. Additionally, enhanced measures have been implemented to identify infected individuals (Tian et al., 2020).

The COVID-19 pandemic has negative effects on both physical and psychological health. Anxiety, panic, insomnia, and depression are among the most prevalent psychological disorders during this pandemic (Grande et al., 2022; Rogers et al., 2020; Shigemura et al., 2020). Healthcare workers are at a higher risk of experiencing fatigue, worry, restlessness, and loneliness, depression, insomnia, psychological distress,

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anxiety, and COVID-19 anxiety syndrome than general population (Busch et al., 2021; Mansueto et al., 2021, 2022). University students also report high rates of probable acute stress, depression, and anxiety symptoms (34.9%, 21.1%, and 11.0%, respectively; Ma et al., 2020). In China, compared to the 4% prevalence of depression in 2019 (Huang et al., 2019), the prevalence of depression among the general adult population significantly increases during the COVID-19 pandemic (J. Li et al., 2020; W. Li et al., 2020b), reaching up to 17.35% after the implementation of lockdown measures ($N = 8079$, participants from 21 provinces and autonomous regions in 2020; Zhou et al., 2020). This figure even surges to 20.4% during the peak of the COVID-19 pandemic ($N = 5033$, participants from all over China in 2020; J. Li et al., 2020; W. Li et al., 2020b).

In response to the global spread of the second-generation Omicron variant in 2022, certain cities implemented citywide lockdowns to curb the worsening of the pandemic. These measures restricted individuals from leaving their apartment buildings and compounds, and in some cases, confined them to their apartments, which undoubtedly exacerbates to the psychological challenges mentioned earlier (Leigh-Hunt et al., 2017). Isolation, which disrupts normal life pace, is linked to an increase in anxiety, depression, and insomnia (Kumar & Nayar, 2020; J. Li et al., 2020; W. Li et al., 2020b). Even isolation periods of less than 10 days can prolong effects on mental well-being and contribute to the development of psychiatric symptoms (Brooks et al., 2020). During the COVID-19 lockdowns in China, the relative risk of depression surges to 16.5% (Wang et al., 2020). Individuals who were isolated or diagnosed with COVID-19 are at a higher risk of depression (J. Li et al., 2020; W. Li et al., 2020b; Zhang et al., 2020). Notably, Tan et al. (2020) found that workers who returned to work experience a decrease in negative psychological effects compared to ordinary people, which illustrates the potential negative impact of isolation on psychological well-being. Additionally, stress responses during quarantine have been linked to long-term anxiety and depression (Charles et al., 2013; O'Neill et al., 2004; Parrish et al., 2011), which may anticipate the impact of COVID-19 on public mental health. Therefore, this study aims to investigate the effect of isolation on depressive symptoms in individuals during province-wide lockdowns.

Researchers have increasingly highlighted the relationship between psychological resilience and depression as a means of alleviating depressive symptoms (Hu et al., 2020). Psychological resilience refers to the ability to adapt to difficulties (Schneiderman et al., 2005) and counteract the negative effects of stressors (Luthar & Cicchetti, 2000). Studies have shown that college students with high levels of resilience experience better psychological well-being (Berdida & Grande, 2023; Berdida et al., 2023). Specifically, psychological resilience is negatively correlated with depression (Hu et al., 2020; Serrão et al., 2021; Zhang et al., 2020). High-resilience individuals tend to experience positive emotions (Hefferon & Boniwell, 2011), which can help them recover from negative emotions in turn (Tugade & Fredrickson, 2004). Conversely, individuals with lower resilience may struggle to overcome negative emotions when under stress (Ong et al., 2006). Additionally, high-resilience individuals facing adversity or stressful events, such as quarantine measures implemented to prevent the spread of pandemics, tend to have a stronger positive social orientation and a more positive attitude towards negative events, which can reduce their negative emotions (Pinquart, 2009; Schmidt et al., 2006). These findings support the idea that individuals with higher psychological resilience experience lower levels of depression (Barzilay et al., 2020; Liu et al., 2020; Serrão et al., 2021).

Forgiveness is defined as replacing negative feelings and behaviors towards offenders with positive ones and plays a vital role in facilitating mental health (Nagra et al., 2016; Webb & Toussaint, 2020). Psychological resilience and forgiveness are positively correlated (Dwiwardani et al., 2014; Mary & Patra, 2015). Anthony (2006) found that highly resilient individuals have more positive emotional factors, and forgiveness is inextricably linked to positive emotions. Therefore, individuals with higher levels of positive emotional factors tend to have higher levels of forgiveness. Self-forgiveness is a crucial aspect of forgiveness that involves replacing negative emotions with benevolence and acceptance towards oneself (Enright, 1996). This process is linked to psychological well-being. Soni (2016) found a significant correlation between psychological resilience and self-forgiveness. Luo (2022) suggested that highly psychologically resilient individuals tend to maximize their strengths and weaken their weaknesses. In this way, these individuals are more inclined to adjust their mindset and forgive themselves after offending others. Additionally, significant negative relationships exist between forgiveness and depression (Akhtar & Barlow, 2018; Gençoğlu et al., 2018). A lower level of self-forgiveness is related to higher depression (Mauger et al., 1992). Self-forgiveness is found to be correlated with self-acceptance and self-compassion, both of which serve as protective factors against depression (Enright, 1996; Hall & Fincham, 2005). Therefore, individuals with higher levels of self-forgiveness are more likely to accept themselves and tend to have lower rates of depression (Mauger et al., 1992). Furthermore, Haroz et al. (2013) demonstrated that higher prosocial behaviors are negatively correlated with anxiety. Specifically, among adolescents experiencing adverse life events, those who engage in prosocial behaviors show significant improvement in mental well-being. It is logical to deduce a correlation between isolation (i.e., adverse life event) and forgiveness (i.e., prosocial behavior). Additionally, self-forgiveness is validated as both a mediating and

moderating variable between psychological resilience and subjective well-being (Dai et al., 2016).

The preceding evidence highlights significant correlations between psychological resilience, self-forgiveness, and depression. Additionally, self-forgiveness may serve as a mediator between psychological resilience and depression. These relationships may be influenced by isolation during the COVID-19 pandemic. Therefore, this study aims to identify factors that influence depression and provide implications for future treatments (e.g., focusing on psychological resilience and self-forgiveness) for managing emotional distress associated with COVID-19 or similar pandemics.

Hypothesized model

This study presents a moderated mediation model examining the influence of psychological resilience on depression. It also explores the mediating role of self-forgiveness and the moderating role of isolation (see Fig. 1). The study hypothesizes:

H1. Self-forgiveness mediates the association between psychological resilience and depression.
H2. Isolation moderates the first half of the mediating path between psychological resilience and depression.
H3. Isolation moderates the direct path of the mediating model.

Methods

Study design

This study employed a cross-sectional correlational design. The design examines demographic data during the COVID-19 pandemic, elucidating the relationships between events without providing causal explanations. To describe the study's findings, a moderated mediating model was constructed.

Participants, sampling and setting

Participants were obtained through convenience sampling. A total of 1,274 online survey forms were distributed and completed. The study's inclusion criteria were as follows: (a) participants had to be college students and (b) questionnaires needed to be filled out carefully, excluding those completed too quickly or with almost all items selected with the same option. After data cleaning, only 1,220 forms (response rate: 95.5%; $M_{age}=22.11$, $SD=2.47$; 65.82% female, see Table 1) met the criteria for data analysis.

Ethical considerations

This study has been approved by the Academic Ethics Committee of Shanghai Normal University (2022-057). Data collection commenced after fulfilling all ethical requirements. All participants provided informed consent and were assured of the anonymity and confidentiality of their responses. The survey instruments were administered in the Chinese language.

Measures

Psychological resilience

Psychological resilience was assessed using the Chinese version of the Connor-Davidson Resilience Scale (CD-RISC; Yu & Zhang, 2007). Given potential differences in resilience factor structures between Chinese and American populations, the 3-factor structure (tenacity, strength, and optimism) is deemed more appropriate for Chinese participants

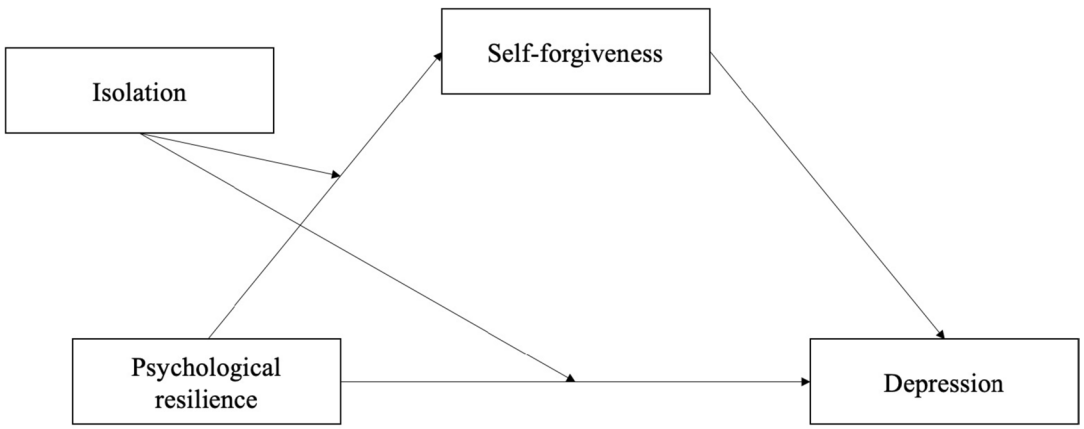

Fig. 1 The proposed moderated mediation model

Table 1 T-test results for psychological resilience, self-forgiveness, isolation, and depression among being-isolated situation and not-being-isolated situation

Variables	Being-isolated Male ($n=289$), Female ($n=632$)		Not-being-isolated Male ($n=128$), Female ($n=171$)		t	Cohen's d
	M	*SD*	*M*	*SD*		
Age	21.94	2.35	22.63	2.74	-4.18^{***}	−.28
CD-RISC	66.93	16.48	66.64	16.69	.27	/
HFS-SS	27.74	5.23	26.65	4.52	3.26^{***}	.22
PHQ	6.59	5.87	7.50	6.11	-2.31^{*}	−.15

$N=1{,}220$; *CD-RISC* Connor-Davidson Resilience Scale, *HFS-SS* Self subscale of Heartland Forgiveness Scale, *PHQ* Patient Health Questionnaire-9; $^{***}p<.001$, $^{*}p<.05$; Being-isolated individuals had significant higher levels of self-forgiveness ($M=27.74$, $SD=5.23$) than not-being-isolated individuals ($M=26.65$, $SD=4.52$), $t(1218)=3.51$, $p<.001$, Cohen's d = .22. Being-isolated individuals had significant lower levels of depression ($M=6.59$, $SD=5.87$) than not-being-isolated individuals ($M=7.50$, $SD=6.11$), $t(1218)=-2.26$, $p=.021$, Cohen's d = −.15. But there was no significant difference in the level of psychological resilience between being-isolated individuals ($M=66.93$, $SD=16.48$) and not-being-isolated ($M=66.64$, $SD=16.69$), $t(1218)=.27$, $p=.791$

than the 5-factor structure (Connor & Davidson, 2003; Yu & Zhang, 2007). The CD-RISC comprises 25 items, each rated on a 5-point Likert scale ranging from 0 (*never*) to 4 (*always*), with higher scores indicating greater resilience. Total scores range from zero to 100. The Chinese version of the CD-RISC demonstrates good internal consistency (Cronbach's alpha = 0.91) and test–retest reliability (intraclass correlation coefficient = 0.87) (Yu & Zhang, 2007). In this study, Cronbach's alpha for CD-RISC was 0.95.

Forgiveness

Forgiveness was assessed using the Heartland Forgiveness Scale (HFS; Thompson et al., 2005), which comprises three subscales: self-forgiveness, forgiveness of others, and forgiveness of situations. The HFS consists of 18 items, each rated on a 7-point Likert scale ranging from 1 (*mostly false for me*) to 7 (*mostly true for me*), with higher scores indicating greater forgiveness. Total scores range from 18 to 126. The HFS has been translated into Chinese and is widely utilized in China, demonstrating good reliability and validity (Chan, 2013; Ho & Fung, 2011). In this study, Cronbach's alphas were as follows: 0.82 for HFS, 0.61 for self-forgiveness, 0.52 for forgiveness of others, and 0.61 for forgiveness of situations.

Depression symptoms

Depression symptoms were assessed using the Patient Health Questionnaire-9 (PHQ-9; Spitzer et al., 1999), which is validated in the general population in China (Wang et al., 2014). The PHQ-9 comprises nine items, each rated on a 4-point Likert scale ranging from 0 (*not at all*) to 3 (*nearly every day*), reflecting symptoms experienced in the past two weeks (Spitzer et al., 1999). Total scores range from zero to 27, with higher scores indicating more severe depressive symptoms. The PHQ-9 demonstrates good reliability and validity (Du et al., 2017). In this study, Cronbach's alpha for PHQ-9 was 0.95.

Isolation

Isolation was assessed using a self-report question that asked participants whether they had ever experienced isolation or quarantine during the COVID-19 pandemic (1 = yes; 2 = no). Of the sample, approximately 75.5% ($n=921$) reported experiencing isolation during the pandemic.

Data collection

The administration of the questionnaires took place in April 2022. Due to COVID-19 safety protocols limiting face-to-face data collection, the survey instruments were distributed through WJX (https://www.wjx.cn). The survey link can be accessed via a computer or mobile device. Participants are required to answer each question in its entirety to submit the survey forms, but they have the freedom to withdraw at any time. Approximately 15 min were allotted to complete the survey forms. The data are exclusively accessible to the researchers.

Statistical analyses

Data analysis was conducted using IBM SPSS 25 (https://www.ibm.com/spss/), with statistical significance set at a p-value of 0.05. Descriptive statistics encompassed measures of central tendency (mean and standard deviation) as well as frequency and proportions. Initially, Spearman rank correlation analyses were performed to assess the relationships between psychological resilience, depression, self-forgiveness, and isolation. Subsequently, the Hayes PROCESS macro was employed to investigate the mediating effect of

self-forgiveness using Model 4, and Model 8 was utilized to assess whether isolation moderated the mediation process. Bootstrapping analysis was conducted with 5000 bootstrap samples and 95% confidence intervals (CIs) to assess the significance of indirect effects (Hayes, 2015). A 95% CI that does not encompass zero indicates a statistically significant effect.

Results

The statistical analysis of data from 1,220 participants ($M_{age}=22.11$, $SD=2.47$; 417 males and 803 females) revealed that although HFS and its subscales were successfully modeled using Model 4, only self-forgiveness met the criteria for Model 8 (i.e., all paths were significant). Therefore, the data analysis was conducted with self-forgiveness as the mediating variable.

This study used the participant self-evaluation method, which may have introduced common method bias. To address this, Harman's single-factor test was conducted (Zhou & Long, 2004). The results indicated that the eigenvalues of the eight factors were greater than one and that the explanatory power of the first factor was less than 40% of the critical value (with a value of 34.07%), suggesting that there was no significant common method bias in this study (Shiau & Luo, 2012).

Descriptive statistics and correlations of psychological resilience, depression, self-forgiveness, and isolation

Table 2 presents the descriptive statistics and correlation matrix depicting the relationships among psychological resilience, depression, self-forgiveness, and isolation. The results indicated that psychological resilience was positively correlated with self-forgiveness ($r=0.40$, $ES=0.43$) and negatively related to depression ($r=-0.29$, $ES=-0.30$). Additionally, self-forgiveness was negatively associated with depression ($r=-0.39$, $ES=-0.42$). Being-isolated was negatively related to self-forgiveness ($r=-0.09$, $ES=-0.09$) and positively correlated with depression ($r=0.07$, $ES=0.07$).

Mediation analysis

The mediating effect of self-forgiveness was examined while controlling for gender, age, and whether participants were front-line workers. Table 3 displays the results of the

Table 2 Means, standard deviations, and correlation between psychological resilience, self-forgiveness, depression, and isolation

Variable	*M*	*SD*	S_k	1	2	3	4	5	6
1 CD-RISC	66.86	16.53	−.29	1					
2 HFS-SS	27.47	5.08	.32	.40***	1				
3 PHQ	6.81	5.94	1.03	−.29***	−.39***	1			
4 Isolation	1.25	.43	1.19	−.01	−.09**	.07**	1		
5 Gender	1.66	.48	−.67	−.09**	−.03	−.07*	−.10***	1	
6 Age	22.11	2.47	.88	.13***	.07*	.02	.12***	−.08**	1

$N=1{,}220$; *M* sample mean, *SD* standard error, S_k Skewedness, *CD-RISC* Connor-Davidson Resilience Scale, *HFS-SS* Self subscale of Heartland Forgiveness Scale, *PHQ* Patient Health Questionnaire-9; Isolation: dummy variable, being-isolated = 1, not-being-isolated = 2; Gender: dummy variable, male = 1, female = 2; ***$p<.001$, **$p<.01$, *$p<.05$

Table 3 Testing the mediation effect of psychological resilience on depression

Predictor	Model 1 (PHQ)		Model 2 (HFS-SS)		Model 3 (PHQ)	
	B	*t*	*B*	*t*	*B*	*t*
Age	.03	.39	.05	.87	.04	.70
Gender	−.75	−2.20*	−.03	−.10	−.76	−2.35*
Front-line Workers	−3.21	−6.87***	.64	1.64	−2.97	−6.68***
CD-RISC	−.12	−11.92***	.13	15.21***	−.07	−6.88***
HFS-SS					−.38	−11.58***
R	.36		.41		.46	
R^2	.13		.16		.21	
F	44.50		59.72		66.30	

$N=1{,}220$; *PHQ* Patient Health Questionnaire-9, *HFS-SS* Self subscale of Heartland Forgiveness Scale, *CD-RISC* Connor-Davidson Resilience Scale; all variables in the model were unstandardized; Gender: dummy variable, male = 1, female = 2; ***$p<.001$, *$p<.05$

mediation analyses exploring the interrelationships among psychological resilience, depression, and self-forgiveness. The results showed that higher psychological resilience was associated with lower levels of depression (see Table 3 Model 1) and higher levels of self-forgiveness (see Table 3 Model 2). When controlling for psychological resilience, higher levels of self-forgiveness were related to lower levels of depression (see Table 3 Model 3). Bootstrapping analysis revealed that self-forgiveness had a significant mediating effect (ab = −0.05, Boot *SE* = 0.01, Boot 95% CI = [−0.06, −0.04]), accounting for 40.22% of the total effect.

Table 4 Testing the moderated mediating effect of psychological resilience on depression

Predictor	Model 1 (HFS-SS)		Model 2 (PHQ)	
	B	*t*	*B*	*t*
Age	.05	.98	.04	.59
Gender	−.10	−.36	−.78	−2.39*
Front-line Workers	.39	.99	−3.04	−6.77***
CD-RISC	.12	7.85***	−.07	−6.78*
Isolation	−1.06	−3.36***	−.12	−.33
HFS-SS			−.38	−11.76***
CD-RISC × Isolation	−.06	−2.98**	−.06	−2.67**
R	.42		.47	
R^2	.18		.22	
F	43.72		48.60	

N = 1,220. *HFS-SS* Self subscale of Heartland Forgiveness Scale, *PHQ* Patient Health Questionnaire-9, *CD-RISC* Connor-Davidson Resilience Scale; all variables in the model were unstandardized; Gender: dummy variable, male = 1, female = 2; Isolation: dummy variable, being-isolated = 1, not-being-isolated = 2; ***$p < .001$, **$p < .01$, *$p < .05$; the interaction between psychological resilience and isolation (Model 1) had a significantly positive correlation with self-forgiveness, indicating that isolation moderated the effect of psychological resilience on self-forgiveness (while controlling for gender, age, and front-line workers or not); the interaction between psychological resilience and isolation (Model 2) had a significantly negative correlation with depression, indicating that isolation moderated the effect of psychological resilience on depression, which suggests that isolation moderated the direct effect of psychological resilience on depression

The findings presented in Table 3 indicate the significance of the mediating model with self-forgiveness as the mediating variable. Based on these results, this study further explored the moderating role of isolation in the mediation model.

Moderated mediation analysis

The moderated mediation analysis was conducted while controlling for gender, age, and whether participants were front-line workers. Table 4 presents the moderating effect of isolation on the relationship between psychological resilience and depression, as well as the relationship between psychological resilience and self-forgiveness in the mediation model. The results of the simple slope test can be found in Fig. 2a and b. These findings revealed significant indirect effects at both levels of isolation. Specifically, compared to participants who reported being-isolated (β = −0.05, Boot *SE* = 0.01, Boot 95% CI = [−0.07, −0.04]), participants who reported not-being-isolated had a weaker indirect effect of psychological resilience on depression (β = −0.03, Boot *SE* = 0.01, Boot 95% CI = [−0.05, −0.02]).

Furthermore, researchers conducted additional data analysis and found that both the mediation model and the moderated mediation model were effective in both male and female groups (specific data can be found in the supplementary material).

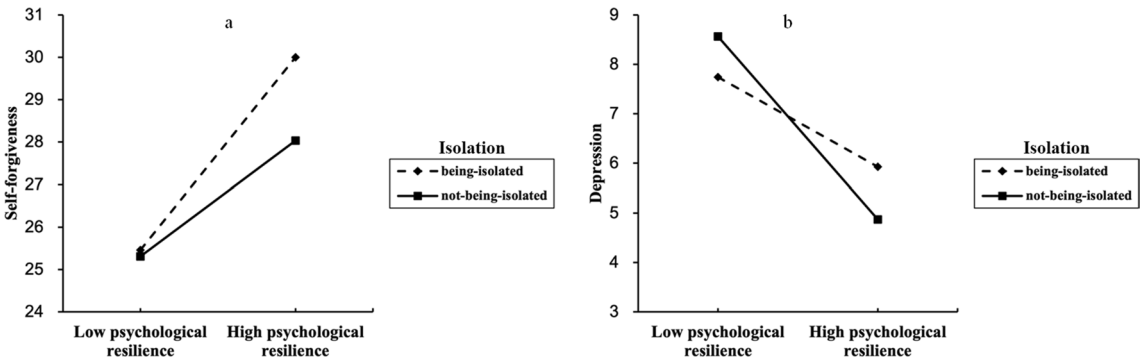

Fig. 2 The moderating effect of isolation. **a** isolation moderated the relationship between psychological resilience and self-forgiveness; the simple slope test showed that higher psychological resilience was associated with higher levels of self-forgiveness in both being-isolated ($B_{simple} = .14$, $t = 14.65$, $p < .001$) and not-being-isolated ($B_{simple} = .08$, $t = 5.09$, $p < .001$) individuals, and the slope of being-isolated individuals was greater than that of not-being-isolated individuals; **b** isolation moderated the relationship between psychological resilience and depression; the simple slope test showed that higher psychological resilience was related to lower levels of depression (Fig. 2b) in both being-isolated ($B_{simple} = -.06$, $t = -4.74$, $p < .001$) and not-being-isolated ($B_{simple} = -.11$, $t = -6.00$, $p < .001$) individuals, and the slope of not-being-isolated individuals was greater than that of being-isolated individuals

Discussion

The present study examined the relationship between psychological resilience and depression, with self-forgiveness acting as a mediator. A moderated mediation model was established in the context of isolation during the COVID-19 pandemic. The results indicated that both psychological resilience and self-forgiveness were significantly and negatively associated with depression, with self-forgiveness playing a mediating role. Moreover, isolation (i.e., being-isolated or not-being-isolated) moderated the relationship between psychological resilience and depression, as well as the relationship between psychological resilience and self-forgiveness in the mediation model.

This study found a negative correlation between psychological resilience and depression in the context of COVID-19, which is consistent with previous research (Karaşar & Canlı, 2020; Ran et al., 2020). Previous studies have suggested that individuals with higher psychological resilience tend to have a more optimistic and positive attitude when faced with adversity, which stimulates positive emotions and builds confidence in successfully handling crises. As a result, the negative impact of stressful events on the mental health is largely reduced, leading to lower levels of depression. Conversely, individuals with lower psychological resilience have lower levels of positive emotions and fewer available personal resources, making them more likely to develop depressive symptoms when faced with negative stress (Connor et al., 2003; Fredrickson, 2001; Niu et al., 2016). Therefore, higher psychological resilience is associated with better coping with stressful events or adverse situations (Joyce et al., 2018; Khanlou & Wray, 2014; Waugh et al., 2011).

Incorporating forgiveness and its sub-dimensions into the model, significant results were found only for the sub-dimension of self-forgiveness. These results suggest a strong relationship between self-forgiveness and health, which is consistent with previous research (Webb & Toussaint, 2020; Wilson et al., 2008). Self-forgiveness acts as a mediator between psychological resilience and depression, positively correlating with psychological resilience and negatively relating to depressive symptoms in the context of COVID-19. This finding is also consistent with relevant studies (Dai et al., 2016; Dwiwardani et al., 2014; Tilkeridou et al., 2021). Highly resilient individuals tend to perceive situations with a positive mindset and are more likely to exhibit forgiveness behaviors (Block & Kremen, 1996), which allows them to remain optimistic when faced with setbacks and difficulties (Anthony, 1974). These correlations are found to mitigate negative effects of adverse events by replacing negative emotions with positive one (McCullough et al., 1998; Worthington & Scherer, 2004), ultimately decreasing the likelihood of depression (Kaleta & Mróz, 2020). In the context of the COVID-19 pandemic, self-forgiveness as an emotion-centered coping strategy can effectively reduce individuals' negative emotions, thoughts, and behaviors while promoting positive emotions in response to negative events (Hall & Fincham, 2008; Ross et al., 2007). Conversely, individuals who struggle with self-forgiveness are vulnerable to physical and mental health impairment and have higher levels of depression and anxiety (Maltby et al., 2001).

This study found that isolation had significant moderating effects on the relationship between psychological resilience and self-forgiveness, as well as the relationship between psychological resilience and depression. Isolation was negatively associated with self-forgiveness and positively related to depression. These findings are supported by existing literature that shows isolation during the COVID-19 pandemic is negatively associated with mental health (Brooks et al., 2020). The loneliness caused by social disconnectedness have a negative impact on psychological health (Cecchetto et al., 2021; Pinedo et al., 2021). Brooks et al. (2020) suggested that individuals in isolation are more likely to experience depressive symptoms. During the COVID-19 pandemic, social distancing may make individuals more vulnerable to psychological discomfort. However, individuals with higher psychological resilience are found to be better equipped to cope with the pandemic-related stressors, which may lead to improved mental health outcomes (Osimo et al., 2021).

Limitations

The current study has several limitations that should be acknowledged. First, due to the cross-sectional nature of this study, causal relationships could not be examined. Secondly, this study concentrated on depressive symptoms rather than diagnosing depression. Thirdly, this study did not assess students' mental health prior to the COVID-19 pandemic and solely examined the current isolation circumstances, potentially restricting the interpretation of the findings. Fourthly, this study did not gather data on individuals' socioeconomic status or their history/current psychotherapy and medication usage, which could serve as confounding variables in the mediation/moderation model. Lastly, although this study yielded significant results, Cronbach's αs for the subscales of HFS were relatively low, and the effect size of depression scores was also relatively small. Therefore, further validation of the findings' reliability is necessary.

Recommendations

A longitudinal study is recommended to thoroughly investigate causality within this model. Secondly, researchers can analyze individuals diagnosed with depression to explore the impact of the pandemic on this specific population. Thirdly, future studies should quantify the duration of quarantine/isolation. Fourthly, future studies could incorporate confounding variables, such as individuals' socioeconomic status or their history/current psychotherapy and medication usage, into the model to enhance its validation and refinement.

Conclusions

Despite these limitations, this study holds significant implications: When addressing emotional distress related to COVID-19 or similar pandemics, especially depression, treatment approaches should emphasize psychological resilience and self-forgiveness, as they are linked to reduced depressive symptoms. Furthermore, it is crucial to acknowledge the detrimental effects of isolation on an individual's psychological well-being. Recognizing the positive association between psychological resilience and self-forgiveness is also essential. In conclusion, this study elucidates the connections among psychological resilience, depression, self-forgiveness, and isolation. Moreover, it highlights the synergistic impact of internal factors (self-forgiveness) and external factors (isolation) on depressive symptoms.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s12144-024-05701-6.

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Author contributions Shunrong Kuang: Formal analysis, Writing-original draft preparation Wenyuan Wang: Software, Investigation Sidan Yan: Software Yimei Wu: Software, Investigation Yuxuan Zhang: Software Jingwen Li: Language polishing Haijiang Li & Yuedong Wu: Conceptualization, Methodology, Writing-review and editing, Supervision.

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Data availability This data has been uploaded on the Open Science Framework (see https://osf.io/3sf8e/).

Declarations

Conflict of interest No potential conflict of interest was reported by the authors.

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