

The Effects of Cognitive Fusion on Depression in Primary School Principals During the COVID-19 Pandemic: The Mediating Role of Psychological Vulnerability and the Moderating Role of Self-Esteem

Jingyu Lv^{1,*}, Qing Qiu^{2,*}, Baojuan Ye^{1,*}, Qiang Yang¹

¹Center of Mental Health Education and Research, School of Psychology, School of Education, Jiangxi Normal University, Nanchang, People's Republic of China; ²School of Intercultural Studies, Post-Doctoral Research Station of Psychology, Jiangxi Normal University, Nanchang, People's Republic of China

*These authors contributed equally to this work

Correspondence: Qing Qiu, Jiangxi Normal University, 99 Ziyang Avenue, Nanchang, 330022, People's Republic of China, Tel +86-185-79113027, Email qiuqing26@qq.com

Purpose: The COVID-19 pandemic had triggered a serious crisis that had brought stress and challenges to primary school principals, as well as having a dramatic impact on their mental health. This study explored the relationship between cognitive fusion and depression among primary school principals during COVID-19, as well as the mediating role of psychological vulnerability and the moderation role of self-esteem in this process.

Patients and Methods: Cognitive Fusion Questionnaire (CFQ), Center for Epidemiological Studies Depression Scale (CES-D), psychological vulnerability scale, and self-esteem scale were used to measure 279 rural primary school principals. The data were analyzed by adopting Pearson's correlations and moderated mediation analysis.

Results: The results revealed that: (1) There were significant relationships among cognitive fusion, depression, psychological vulnerability and self-esteem. (2) The results showed that psychological vulnerability mediated the link between cognitive fusion and depression. (3) Self-esteem moderated the associations between cognitive fusion and depression, and also moderated the associations between cognitive fusion and psychological vulnerability. The relationship between cognitive fusion and depression was weaker for primary school principals with high levels of self-esteem. In contrast, the relationship between cognitive fusion and psychological vulnerability was stronger for primary school principals with low levels of self-esteem.

Conclusion: Psychological vulnerability played a mediating role in the relationship between cognitive fusion and depression. Moreover, self-esteem moderated the effect of cognitive fusion on depression, and also the effect of cognitive fusion on psychological vulnerability.

Keywords: COVID-19 pandemic, cognitive fusion, psychological vulnerability, depression, self-esteem, primary school principals

Introduction

With the deepening of educational reform in China, the public has higher expectations for principals in China and also puts forward higher requirements for them at the same time. Especially, as leaders and administrators of schools in rural primary and secondary schools, principals are more able to promote the development of teaching practices and methods effectively, thus promoting students' progress.¹ Therefore, we need to pay attention to the important role of primary school principals in the development of rural primary education. Principals in rural primary schools have been under a state of high pressure for a long time. Overloaded work, study and stressful educational environment would not only negatively impact the mental health of primary school principals, but also have a negative impact on the teaching work of the schools they manage.² Since covid-19 spread globally in 2020, the epidemic situation is an important risk factor for

teachers' depression and the prevalence of depression among teachers was high during the epidemic period.³ The higher the level of depressive symptoms of teachers, the worse the psychological pressure and the well-being of students.⁴

According to acceptance and commitment therapy, most mental health problems stem from psychological inflexibility.⁵ Cognitive fusion is one of the main processes of psychological inflexibility, which refers to the excessive control of individual behavior by the concept of some language rules. When the environment changes, individuals with high cognitive fusion cannot guide their behavior with current experience and form a benign interaction with the environment.⁶ Depression is a mental disease with persistent emotional stepping down, lack of pleasure and one or more physical disorders.⁷ The crucial point about improving the degree of symptoms in depressed individuals is to reduce the integration with cognition.⁸ Cognitive fusion is positively correlated with depression, and is likely to aggravate the severity of depression.⁹ Cognitive fusion and empiric avoidance are positively associated with depression, and individuals with depression have a higher degree of cognitive confusion and empiric avoidance than normal.¹⁰ Therefore, Individuals with high cognitive fusion may be more susceptible to depression. In the early years of the COVID-19 pandemic, the shift from online to in-person education, the constant closure and reopening of schools, and the requirement for schools to enforce social distancing rules brought enormous challenges and pressures to principals' jobs.^{11,12} In addition, principals need to be dynamic and flexible in allocating resources and funding, adhering to infection prevention guidelines, and motivating teachers and students to ensure learning and teaching activities.¹³ Therefore, these unprecedented workloads can cause great stress to the principal, which can lead to depression.¹¹

Psychological Vulnerability as a Mediator

The vast majority of ordinary people have psychological symptoms such as depression, anxiety and interpersonal sensitivity during the novel coronavirus pneumonia outbreak, showing high psychological vulnerability.¹⁴ However, little research has been done on the psychological vulnerability of principals during the epidemic. Principals in some elementary schools in rural China are not only burdened with a large amount of administrative work but also with teaching tasks.^{15,16} Therefore, principals are not only under pressure from leading and coordinating teaching tasks, but also feel pressure from teachers who have been performing distance learning tasks. Psychological vulnerability was defined as a pattern of cognitive beliefs reflecting a dependence on achievement or external sources of affirmation for one's sense of self-worth.¹⁷

The relationship between cognitive fusion and psychological vulnerability has rarely been discussed in previous studies. Research has found that psychological inflexibility predicts psychological vulnerability in a positive way.¹⁸ As mentioned earlier, cognitive fusion serves as one of the main processes of psychological inflexibility. Individuals with high cognitive fusion may be more inclined to psychological inflexibility.¹⁸ Individuals with high psychological inflexibility may be more inclined to psychological vulnerability, including more pain, negativity and failure.⁵ Individuals with high psychological vulnerability feel worthless if they fail and are not recognized by others.¹⁷

When an individual with high psychological vulnerability fails, he or she will have a lower sense of self-worth, which can easily lead to depression. Depression can decrease an individual's interest or pleasure, energy, and capacity to deal with daily tasks, and even increase the risk of suicide.¹⁹ Psychological vulnerability is a maladaptive cognitive pattern associated with dependency and perfectionism.^{17,20} Maladaptive perfectionism includes negative reactions to mistakes, fear of failure, critical self-evaluation, and concerns about the evaluation of others.²¹ Maladaptive perfectionism is thought to be one of the factors that increase the risk of depression in teachers, which gives rise to serious health consequences for those who are frequently exposed to stressful situations.^{21,22} Evidence suggests that maladaptive perfectionism is associated with higher levels of depression in primary educators.²¹ Studies had shown that psychological vulnerability is an influencing factor of depression.²³ Therefore, we speculate that psychological vulnerability plays a mediating role in the relationship between cognitive fusion and depression.

Self-Esteem as a Moderator

While cognitive fusion may affect the level of depression in elementary school principals through psychological vulnerability, the degree of cognitive fusion of elementary school principals may vary depending on the level of self-esteem. Self-esteem is a positive or negative evaluation of oneself, and individuals with high self-esteem are more positive about self-evaluation, while individuals with low self-esteem are more negative about self-evaluation.²⁴ In the

midst of a severe epidemic, principals had to quickly cope with school closures and fundamental shifts in education, such as a shift in teaching methods from offline to online. These changes created a high level of psychological uncertainty for school principals, which resulted in depression.²⁵ Low self-esteem, on the other hand, can cause individuals to develop information processing biases, which in turn can exacerbate negative emotions such as depression and anxiety.²⁶ Teachers with high self-esteem, on the contrary, had more psychological buffer resources and tended to choose positive coping strategies, which can reduce depression and anxiety.^{26,27} The vulnerability model believes that the individual's negative evaluation of self (ie, low self-esteem) is one of the risk factors leading to depression.²⁸ Low self-esteem as a cognitive vulnerability factor to depression causes individuals to develop negative thinking and negative cognition, in addition, individuals with high cognitive fusion are easily controlled by this negative cognition, which results in higher levels of depression.^{29–31} The buffering role of self-esteem hypothesis believes that individuals with high self-esteem have a positive cognition of themselves and possess a stronger processing ability for negative information or pressures from external life, which can alleviate the negative impact of adverse events on individuals to a certain extent. Primary educators with high self-esteem levels have a more flexible mindset and are able to cope effectively with their negative emotions.³² Protective factors, such as high self-esteem, can prevent the outcome of depressive symptoms by reducing the negative impact of depressive thoughts on the emotional, cognitive, behavioral, and physiological symptoms of depression.³³ Thus positive and self-affirming attitudes in individuals with high levels of self-esteem may reduce the effects of cognitive fusion on individual depression. Furthermore, the risk buffering model believes that protective factors can buffer or weaken the adverse effects of risk factors, commonly known as “sending charcoal in the snow” (雪中送炭).^{34,35} According to the model, self-esteem (a protective factor) can weaken or buffer the effects of cognitive fusion (risk factors) on depression. The degree of cognitive fusion in primary school principals may have different effects on depression at different levels of self-esteem. Primary school principals with low levels of self-esteem will have higher levels of depression when they have higher levels of cognitive fusion. The relationship between cognitive fusion and depression was weaker for primary school principals with high levels of self-esteem. The relationship between self-esteem and psychological vulnerability has received little research attention. Individuals' self-esteem levels can be affected by others' evaluation, which is perceived by individuals in social activities.³⁶ Individuals whose sense of self-worth is more susceptible to external evaluations by others and those who are overly dependent on others have higher levels of psychological vulnerability.¹⁷ Individuals with low self-esteem attach too much importance to others' evaluations, which are likely to aggravate psychological vulnerability. Individuals with higher levels of self-esteem and low levels of cognitive fusion are easier to free themselves from dependence on other people's evaluations, and are not easily confused with the reality; thus enabling them to reduce psychological vulnerability. In mental health studies, self-esteem is often used as a protective factor.^{37,38} Self-esteem is a stable self-emotion performing the social adaptation function that affects an individual's cognitive and behavioral patterns.³⁹ Self-esteem may play a moderating role between cognitive fusion and psychological vulnerability. According to the “drop-in-The-bucket”(杯水车薪) model,⁴⁰ positive traits are not enough to buffer the adverse effects of risk factors. Even in cases where protective factors are identified, once the risk factor reaches a certain level, they may lose the ability to resist the risk.⁴¹ So individuals exposed to severe adversity may have difficulty in showing positive results.⁴² According to this model, self-esteem is protective only in low-risk situations. Primary school principals with low self-esteem and also low levels of cognitive fusion would have higher levels of psychological vulnerability than those primary school principals with high self-esteem. Primary school principals with low self-esteem would keep the same high level of psychological vulnerability as those with high self-esteem when they all have higher levels of cognitive fusion.

The Present Study

The purposes of this research were threefold: (a) To test whether psychological vulnerability mediates the relationship between cognitive fusion and depression; (b) To test whether self-esteem moderates the relationship between cognitive fusion and depression; (c) To test whether self-esteem moderates the relationship between cognitive fusion and psychological vulnerability. The proposed model is illustrated in Figure 1. Based on the review of literature, we posit the following hypotheses:

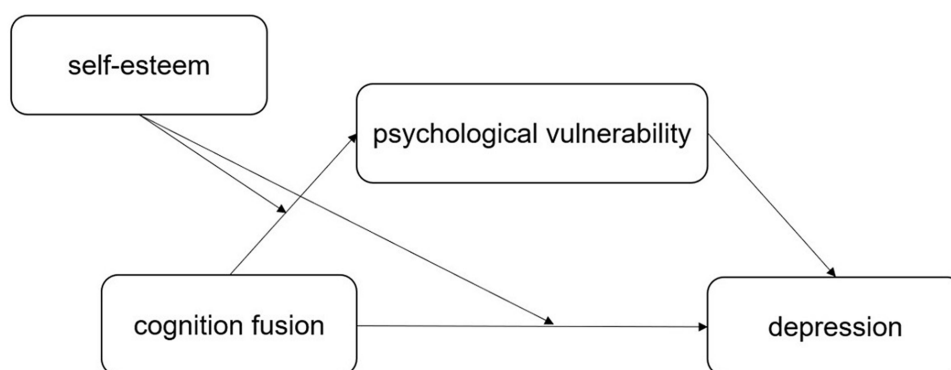


Figure 1 The proposed moderated mediation model.

Hypothesis 1 Psychological vulnerability mediates the relationship between cognitive fusion and depression.

Hypothesis 2 Self-esteem plays a mediating role between cognitive fusion and depression.

Hypothesis 3 Self-esteem plays a moderating role between cognitive fusion and psychological vulnerability.

Methods

Participants

In this study, 279 participants (Female=41.9%, Mage=37.87, SD=8.24) were investigated in the form of offline questionnaires. They are all primary school principals from rural areas. The participant characteristics are shown in Table 1. All participants consented to participate, and no identifiable information was collected. Participation in this study was entirely voluntary, and no compensation was given.

Measures

Cognitive Fusion Questionnaire

Cognitive fusion was measured using the Chinese version of the Cognitive Fusion Questionnaire (CFQ),⁴³ adapted from Gillanders.⁴⁴ The scale contains 9 items (eg, “Some thoughts make me feel annoyed and painful”). Participants rated each item on a seven-point scale ranging from 1 (Completely inconsistent) to 7 (Completely consistent) with higher scores showing higher levels of cognitive fusion. The scale has good reliability, validity and applicability in the study of the Chinese population.⁴³ The confirmatory factor analysis showed that the scale had good construct validity (CFI = 0.99, TLI = 0.99, RMSEA = 0.046 (90% CI = 0.00, 0.08), and SRMR = 0.02). In this study, the Cronbach alpha coefficient for this scale was 0.93.

Table 1 Participant Characteristics

Characteristics	Categories	Percentage (%)
Gender	Male	58.1
	Female	41.9
Marital status	Married	84.9
	Unmarried	14.3
	Divorced	0.8
Education	Junior college	20.7
	Undergraduate	78.2
	Master	0.8
	Doctor	0.4

Center for Epidemiological Studies Scale (CES-D)

Depression was measured using the Chinese version of the Center for Epidemiological Studies Depression Scale (CES-D), compiled by Radloff in 1977.^{45,46} The scale consists of 20 items and includes four dimensions: somatic symptoms, depressed affect, positive affect, and interpersonal problems (eg, “I was bothered by things that usually don’t bother me”). Participants rated each item on a four-point scale ranging from 1 (very few or never) to 4 (most of the time) with higher scores showing higher levels of depression. The scale has good reliability and validity in both Chinese adolescents and adults.^{45,47} The confirmatory factor analysis showed that the scale had good construct validity (CFI = 0.93, TLI = 0.92, RMSEA = 0.07 (90% CI = 0.06, 0.08), and SRMR = 0.05). In this study, the Cronbach alpha coefficient for this scale was 0.94.

Psychological Vulnerability Scale

The psychological vulnerability was measured by the Psychological Vulnerability Scale that contains 6 items (eg, “If I don’t achieve my goals, I feel like a failure as a person”).¹⁷ Participants rated each item on a five-point scale ranging from 1 (Does not describe me at all) to 5 (Describes me very well) with higher scores showing higher levels of psychological vulnerability. This study used a forward and backward translation technique to translate the Psychological Vulnerability Scale into Chinese.⁴⁸ The confirmatory factor analysis showed that the scale had good construct validity (CFI = 0.98, TLI = 0.95, RMSEA = 0.06 (90% CI = 0.00, 0.11), and SRMR = 0.03). In this study, the Cronbach alpha coefficient for this scale was 0.75.

Self-Esteem Scale

Self-esteem was measured by using the Chinese version of Self-Esteem Scale (SES), compiled by Rosenberg in 1965.^{24,49} The scale consists of 10 items (eg, “I feel that I have a number of good qualities”). Participants rated each item on a four-point scale ranging from 1 (strongly disagree) to 4 (strongly agree), with higher scores showing higher levels of self-esteem. The scale has good reliability and validity in both Chinese adolescents and adults.^{49,50} The confirmatory factor analysis showed that the scale had good construct validity (CFI = 0.98, TLI = 0.94, RMSEA = 0.08 (90% CI = 0.05, 0.11), and SRMR = 0.04). In this study, the Cronbach alpha coefficient for this scale was 0.93.

Procedure

This study was approved by the Research Ethics Committee of the first author’s unit. We distributed questionnaires to the primary school principals as participants through an officially organized training program for primary school principals. We used the structured questionnaire that included a set of measurement tools with validated psychometric properties, and was appropriately validated among Chinese participants. Before data collection, we obtained consent from all the primary school principals involved. All participants were informed of the importance of the authenticity and completeness of their answers, as well as the anonymity of the study. Participants were given questionnaires, and they provided demographic information and completed the measurements listed above. All participants completed the survey in their presence, and the researchers collected the questionnaires immediately after the participants completed the survey. All measures were administered by well-trained postgraduate students majored in psychology.

Data Analysis

First, data filtering showed that there were no outliers in our data, and answers to missing data (such as not reporting gender) were excluded from data processing. Then descriptive statistics and Pearson correlation calculation were calculated among research variables. Then we analyze the mediation model (as shown in Figure 1) and the steps are as follows. The PROCESS macro for SPSS (Model 4) was applied to examine the mediating effect of psychological vulnerability.⁵¹ The PROCESS macro (Model 8) was applied to examine the moderating effect of self-esteem on the indirect links between access to cognitive fusion and depression and between cognitive fusion and psychological vulnerability. The bootstrap confidence intervals (CIs) determine whether the effects in Model 4 and Model 58 are

significantly based on 5000 random samples.⁵¹ Significant effects were supported by the absence of zero within the confidence intervals.

Result

Preliminary Analyses

The means and Pearson-correlations among the study variables are presented in Table 2. Both cognitive fusion and depression were positively associated with psychological vulnerability ($r=0.54$, $p<0.01$; $r=0.48$, $p<0.01$). Cognitive fusion was positively correlated with depression ($r=0.52$, $p<0.01$). Both cognitive fusion and depression were negatively associated with self-esteem ($r=-0.41$, $p<0.01$; $r=0.68$, $p<0.01$). Self-esteem was negatively correlated with psychological vulnerability ($r=-0.33$, $p<0.01$).

Testing for Mediation Effect

Hypothesis 1 assumed that psychological vulnerability mediates the relationship between cognitive fusion and depression. To test this hypothesis, we used Model 4 of the SPSS macro-PROCESS compiled by Hayes. The results are shown in Table 3. Cognitive fusion was significantly positively correlated with psychological vulnerability ($\beta=0.54$, $t=10.67$, $p<0.001$). Psychological vulnerability was significantly positively correlated with depression ($\beta=0.27$, $t=4.57$, $p<0.001$). Cognitive fusion was significantly positively correlated with depression ($\beta=0.37$, $t=6.32$, $p<0.001$). So hypothesis 2 was supported, and psychological vulnerability played a mediating role between cognitive fusion and depression (indirect effect=0.15, $SE=0.36$, 95% CI= [0.08, 0.22]). The effect size of the mediating effect was 28%. The indirect effects of cognitive integration and depression are shown in Table 4.

Moderated Mediation Effect Analysis

Hypothesis 2 assumed that self-esteem moderates the relationship between cognitive fusion and depression. To test the moderated mediation model, we used Model 8 of the SPSS macro-PROCESS compiled by Hayes.⁵¹ The results of the self-esteem moderation test were shown in Table 5. The interaction of self-esteem and cognitive fusion had a significant association with depression ($\beta=-0.12$, $t=-0.32$, $p<0.001$). In order to make a clear demonstration of the moderating role of self-esteem, this study plotted the explored cognitive fusion against depression, separately for low and high levels of self-esteem (one SD below and one SD above the mean, respectively; Figures 2). Simple slope tests revealed that

Table 2 Descriptive Statistics and Correlations Among Variables

Variable	M	SD	1	2	3	4
1. Cognition fusion	28.38	9.99	1.00			
2. Psychological vulnerability	16.81	3.99	0.54**	1.00		
3. Depression	38.02	9.63	0.52**	0.47**	1.00	
4. Self-esteem	30.32	4.35	-0.41**	-0.33**	-0.68**	1.00

Note: ** $p<0.01$.

Table 3 Testing the Mediation Effect of Psychological Vulnerability on Depression

Predictors	Psychological Vulnerability		Depression	
	β	t	β	t
Cognition fusion	0.54	10.67***	0.37	6.32***
Psychological vulnerability			0.27	4.57***
R^2	0.29***		0.32***	
F	113.82***		64.89***	

Note: *** $p<0.001$.

Table 4 The Indirect Effect of the Link Between Cognition Fusion and Depression

Indirect Effects	Coefficient	Boot SE	Bootstrap 95% CI
Cognition fusion→Psychological vulnerability	0.15	0.04	0.08–0.22
Cognition fusion→Depression	0.52	0.05	0.42–0.62
Cognition fusion→Psychological vulnerability→Depression	0.37	0.06	0.26–0.49

Table 5 Testing the Moderated Mediation Effect

Predictors	Psychological Vulnerability		Depression	
	β	t	β	t
Cognition fusion	0.49	8.97***	0.18	3.73***
Self-esteem	−0.11	−2.03*	−0.56	−12.52***
Cognition fusion × Self-esteem	0.10	2.20*	−0.12	−3.22**
Psychological vulnerability			0.21	4.31***
R^2	0.32***		0.57***	
F	42.67***		90.58***	

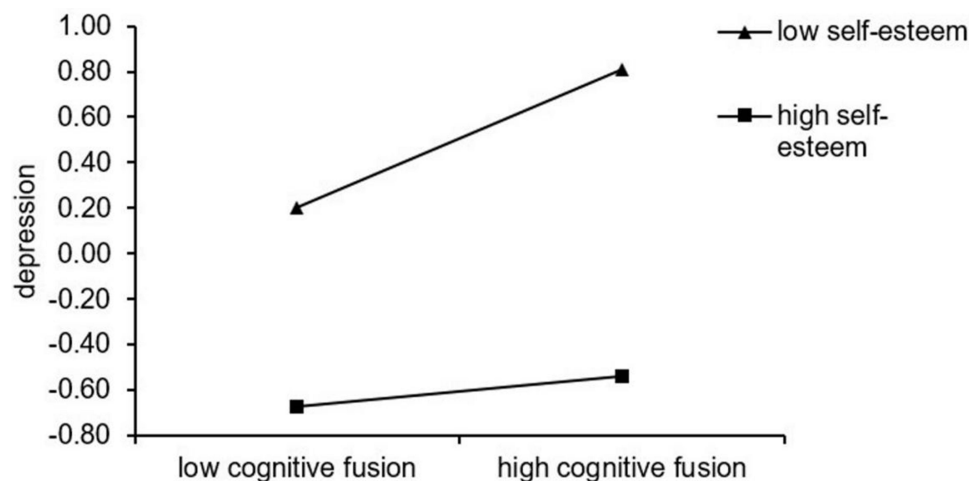
Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

cognitive fusion and depression are significantly associated at low levels of self-esteem ($b_{simple} = 0.30$, $p < 0.001$) and not significantly associated at high levels of self-esteem ($b_{simple} = 0.07$, $p = 0.31$). Hypothesis 2 was supported.

Hypothesis 3 assumed that self-esteem plays a moderation role between cognitive fusion and psychological vulnerability. Table 5 showed that the interaction of cognitive fusion and self-esteem had a significant association with psychological vulnerability ($\beta = 0.10$, $t = 2.20$, $p < 0.05$). Moreover, this study plotted explored cognitive fusion against psychological vulnerability, separately for low and high levels of self-esteem (one SD below and one SD above the mean, respectively; Figure 3). Simple slope tests revealed that cognitive fusion was positively associated with psychological vulnerability in primary school principals with both low ($b_{simple} = 0.39$, $p < 0.001$) and high levels of self-esteem ($b_{simple} = 0.59$, $p < 0.001$), but the correlation was notably stronger in the latter. Hypothesis 3 was supported.

Discussion

It is found that school principals tend to suffer more psychological problems than their colleagues. However, during the COVID-19 pandemic, few researchers focused on the mental health of primary school principals who faced high levels

**Figure 2** Interaction between cognitive fusion and self-esteem on depression.

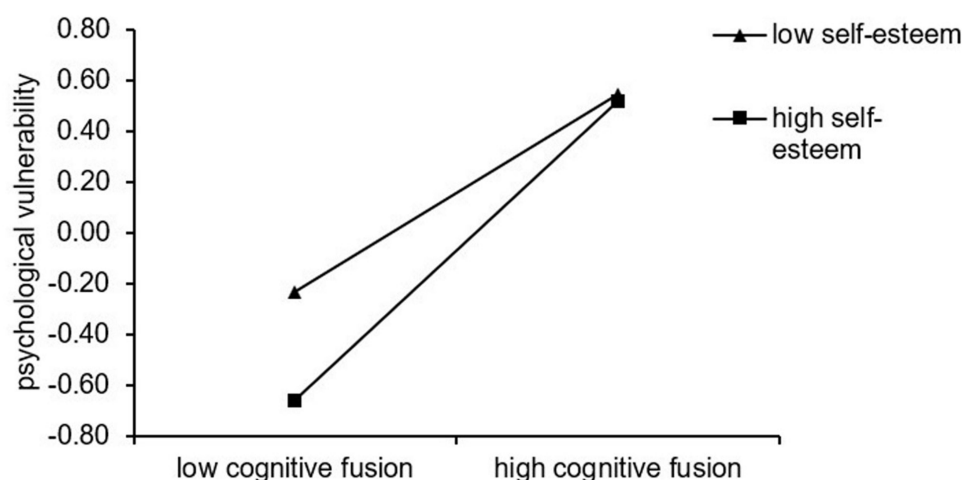


Figure 3 Interaction between cognitive fusion and self-esteem on psychological vulnerability.

of stress. Mental health problems among principals may induce additional adverse effects, such as burnout, sleep problems, and low productivity. Due to the lack of educational resources in rural areas, rural primary school principals may face additional difficulties and stress in order to provide online curriculums in rural primary schools during the epidemic. Promoting the mental health of rural primary school principals has a positive effect on the design of school activities and the maintenance of teachers' and students' mental health.

Affected by the epidemic, the work pressure and work tasks of principals have increased. Principals also need to address the difficulties brought about by rural students taking online courses via the Internet because of the economic backwardness of rural areas and the lack of computers and reliable Internet access.^{52–54} School administrators must deal with both changes in regulations and operating procedures and changes in teachers' daily lives and work schedules, as well as the health effects of a pandemic on teachers, students, and their own families.⁵⁵ The higher demands of the principal's supervisor during the pandemic and other additional tasks and pressures have placed greater professional and personal responsibility on principals.^{56,57} All of these jobs increase the stress and difficulty of the principal's work. Occupational stress can reduce a principal's overall physical and mental health, leading to depression.^{11,58} In China, rural primary school principals have contributed significantly to rural primary schools' educational development under challenging conditions. And rural primary school principals need to keep a healthy psychological state in order to provide better services for rural students.⁵⁹ Therefore, we need to pay more attention to the mental health problems of rural primary school principals.

The Relationship Between Cognitive Fusion and Depression

This study found that cognitive fusion of rural primary school principals was positively correlated with depression, which is consistent with the results of previous studies.^{10,60} Individuals with high cognitive fusion confuse distorted negative cognitions with facts and immerse themselves in negative thoughts, leading to the generation and aggravation of emotions such as anxiety and depression.⁶¹ Individuals with higher levels of cognitive fusion are likely to have higher levels of depression. As a special profession, primary school principals need to make interactions with various social relationships and parents, contact with diverse social groups, and require greater psychological flexibility (ie, lower levels of cognitive fusion). The lower the level of cognitive fusion of primary school principals, the lower their depression levels. During the pandemic, restricted lifestyles have brought inconvenience to all aspects of life, and the work of primary school principals certainly faces great difficulties and challenges.⁶² Primary school principals with a high degree of cognitive fusion are more susceptible to negative events and fall into these effects, leading to depression.

The Mediating Role of Psychological Vulnerability

Existing research found the effect of cognitive fusion on individual depression, but few studies have explored the mechanisms of psychological vulnerability in this relationship. Our study provides the first evidence that psychological vulnerability mediated the relationship between cognitive fusion and depression. Cognitive fusion was positively correlated with psychological vulnerability, and the higher the degree of cognitive fusion, the higher the degree of psychological vulnerability. Less research has focused on the relationship between cognitive fusion and psychological vulnerability and Uğur's research found that psychological flexibility was positively associated with psychological vulnerability.¹⁸ Psychological flexibility is the inverse variable of psychological inflexibility, and cognitive fusion is one of the main processes of psychological inflexibility.⁶ Individuals with psychological vulnerability are more likely to make negative attributions and negative evaluations of themselves,⁶³ and therefore may develop cognitive fusion. In order to avoid feelings of guilt, self-blame, anxiety and other feelings brought about by negative failure experiences, individuals with psychological vulnerability may deliberately avoid challenges, and detach themselves from the current real situation. They would gradually form and attach themselves to a conceptual self, being dominated by the conceptualized past and future, and thus they would get trapped in place and unable to take any effective actions that can bring about change, that is to say, they are involved in empirical avoidance and cognitive fusion. All of the responsibilities and challenges which principals faced during the COVID-19 pandemic have been amplified. And principals have been meeting new and urgent challenges related to public health, resource inequities, rapid instructional shifts, and mental health issues for students and staff.⁶⁴ These stressful events cause the principals with cognitive fusion to confuse reality with inappropriate self-concept and negative thinking content, and thus become more vulnerable to the impact of stressful events, resulting in depression.^{20,65} So, cognitive fusion had positive correlation with psychological vulnerability, and the results of this study provide a basis for such correlation. Second, psychological vulnerability was significantly positively correlated with depression, which has been proved by studies.²³ Individuals with higher psychological vulnerability are more likely to have high levels of depression. Overall, psychological vulnerability mediates the relationship between cognitive fusion and depression. Therefore, according to the perspective of acceptance commitment therapy, we should guide primary school principals to recognize the present, accept the present, improve their psychological flexibility and reduce their level of cognitive fusion, thereby decreasing their psychological vulnerability, as well as reducing the occurrence of depression.

The Moderating Role of Self-Esteem

In investigating the process of how psychological vulnerability mediates the relationship between cognitive fusion and depression, we also examined the moderating effect of self-esteem on the first half of the path of cognitive fusion on psychological vulnerability and the direct path of cognitive fusion and depression. And we found that self-esteem, as a variable, played an important role in moderating the relationship between cognitive fusion and depression, and the relationship between cognitive fusion and psychological vulnerability as well. It provided evidence for appropriate strategies to improve the mental health of principals during the pandemic. Individuals with low cognitive fusion had lower levels of self-esteem and lower levels of depression. According to the vulnerability model of depression, low self-esteem is a risk factor for depression, and negative perceptions of self by individuals with low self-esteem are a key trigger for depression.⁶⁶ Individuals who are cognitive confusion confuse negative cognition with negative information and facts, thus immersing themselves in the negative cognitive style, leading to depression. The results of this study also validated a buffer model of self-esteem, suggesting that individuals with high self-esteem have a protective effect on depression.³³ The positive affirmation of self-esteem of individuals is more likely to increase individual psychological flexibility, reduce the occurrence of cognitive fusion, and thus reduce levels of depression. Therefore, we should improve primary school principals' levels of self-esteem, increase their affirmation of themselves, enhance the psychological flexibility of primary school principals, and then reduce the level of depression among them and hence improve their mental health.

We also found that self-esteem moderates the path of cognitive fusion and psychological vulnerability. The moderation of self-esteem on the relationship between cognitive fusion and psychological vulnerability has not

drawn much attention in the past, and this relationship has been found in this study. At the low level of cognitive fusion, individuals with low self-esteem have higher psychological vulnerability than those with high self-esteem. The self-worth of individuals with high psychological vulnerability depends on the affirmation of others and events that seriously interfere with their ability to achieve their goals in life.¹⁷ Individuals with low self-esteem tend to seek self-protection and are used to avoiding positive evaluation, so that low self-esteem can be maintained (in fact, low self-esteem produces cognitive fusion), and then the individual experience of cognitive confusion produced high psychological vulnerability.^{67–69} Conversely, individuals with high self-esteem seek self-verification and accept even negative feedback.⁷⁰ In short, the lower the level of self-esteem and the higher the degree of cognitive confusion of primary school principals, the more likely they are to have higher psychological vulnerability. According to the inspiration of “a drop in the bucket” (杯水车薪) model, when the power of risk factors exceeds the power of protective factors, it is not enough to merely rely on protective factors, we also need to protect the development of individuals by intervening in risk factors.³⁴ Therefore, while promoting the positive evaluation of primary school principals to improve their self-esteem, we should reduce their cognitive fusion by adopting methods such as Acceptance Commitment Therapy for group treatment, thereby reducing their psychological vulnerability.

Based on this model, we found that there is a need to increase attention to the level of mental health in primary schools' principals. We can do this by promoting the psychological flexibility of primary school principals as well as reducing their cognitive fusion. We can also improve the self-esteem of elementary school principals by reinforcing a sense of professional identity, etc. During the epidemic, the government should provide more policy incentives for rural primary schools to reduce the pressure of primary school principals, which will help improve the mental health of primary school principals.

Limitations

Several limitations need to be considered when interpreting the implications of the findings. First of all, this study used a cross-sectional survey study, we could not make causal inferences about the results or investigate the dynamic process. Therefore, in the future, longitudinal research should be conducted to continue to test our mediated moderation model. Secondly, this study adopts a self-report method, which may have been subject to the social-desirability bias. Future studies should use multiple measurements and collect data from multiple informants. Finally, this study only collects data about primary school principals in rural China, and due to the differences between Chinese and Western cultures, the results need to be cautious when applied and generalized to other countries.

Conclusion

Although further replication and extensions were needed, this study was an important step in unpacking how cognitive fusion was related to depression in rural primary school principals. The findings suggested a significant positive correlation between cognitive fusion and depression among primary school principals, which was mediated by psychological vulnerability. In addition, self-esteem not only moderated the effect of cognitive fusion on depression, but also played a moderating role in the relationship between cognitive fusion and psychological vulnerability. We should focus on improving primary school principals' self-esteem and buffering cognitive fusion's impact on psychological vulnerability and depression.

Data Sharing Statement

The data that supporting the conclusions of this article will be made available by the corresponding author upon request.

Ethics Approval and Informed Consent

All procedures were approved by the Research Ethics Committee of Jiangxi Normal University and this study complied with the Declaration of Helsinki. Informed consent was obtained from all individual participants in this study.

Acknowledgments

Thanks to all the participants and volunteers who provided support for this study.

Author Contributions

All authors made significant contributions to the work reported, not only in the process of conception construing, study design, execution, acquisition of data, analysis and interpretation; but also in the parts of drafting, revising, critically reviewing and giving final approval to the article. They have reached an agreement on the submission of this article to the journal and also agreed to be accountable for all aspects of the work.

Funding

National Natural Science Foundation (72164018), The Humanities and Social Sciences Program of the Ministry of Education (22YJA190012) and Science and Technology Research Project of Jiangxi' Department of Education (GJJ200306, GJJ191698)

Disclosure

The authors report no conflicts of interest in this work.

References

1. Yu H, Guan T, Liu T. How does headmaster leadership affect students' academic achievements? -Based on the multiple mediating effects of teachers' collective effectiveness and school culture. *Forum Contemp Edu*. 2021;301(1):111–117. doi:10.13694/j.cnki.ddjylt.20201116.001
2. Tan C. Psychological stress factors and responses of rural primary school principals. *Teach Manage*. 2005;2:10–12. doi:10.3969/j.issn.1004-5872-B.2005.01.003
3. Zhou J, Yuan X, Huang H, et al. The prevalence and correlative factors of depression among Chinese teachers during the COVID-19 outbreak. *Front Mol Psychiatry*. 2021;12:1054. doi:10.3389/fpsy.2021.644276
4. Harding S, Morris R, Gunnell D, et al. Is teachers' mental health and wellbeing associated with students' mental health and wellbeing? *J Affective Disord*. 2019;253:460–466. doi:10.1016/j.jad.2018.08.08
5. Hayes SC, Luoma JB, Bond FW, Masuda A, Lillis J. Acceptance and commitment therapy: model, processes and outcomes. *Behav Res Ther*. 2006;44(1):1–25. doi:10.1016/j.brat.2005.06.006
6. Hayes SC. Acceptance and commitment therapy, relational frame theory, and the third wave of behavioral and cognitive therapies. *Behav Therapy*. 2004;35(4):639–665. doi:10.1016/s0005-7894(04)80013-3
7. Pizzagalli Diego A. Depression, stress, and anhedonia: toward a synthesis and integrated model. *Annu Rev Clin Psycho*. 2014;10(1):393–423. doi:10.1146/annurev-clinpsy-050212-185606
8. Bramwell K, Richardson T. Improvements in depression and mental health after acceptance and commitment therapy are related to changes in defusion and values-based action. *J Contemp Psychother*. 2017;48(1):9–14. doi:10.1007/s10879-017-9367-6
9. Zhao X, Liu J. Relation of depression severity to source monitoring cognitive fusion and ruminative responses in patients with depression. *Chin Ment Health J*. 2021;35(1):13–18. doi:10.3969/j.issn.1000-6729.2021.01.003
10. Yang C, Liu J, Liu L, Chen X, Qiu L. Relation of depression level to cognitive fusion and empirical avoidance. *Chin Ment Health J*. 2019;33(3):182–186. doi:10.3969/j.issn.1000-6729.2019.03.005
11. Duong TV, Nguyen MH, Lai CF, et al. COVID-19-related fear, stress and depression in school principals: impacts of symptoms like COVID-19, information confusion, health-related activity limitations, working hours, sense of coherence and health literacy. *Ann Med*. 2022;54(1):2064–2077. doi:10.1080/07853890.2022.2101688
12. Karakose T, Yirci R, Papadakis S. Examining the associations between COVID-19-related psychological distress, social media addiction, COVID-19-related burnout, and depression among school principals and teachers through structural equation modeling. *Int J Environ Res Public Health*. 2022;19(4):1951. doi:10.3390/ijerph19041951
13. Upadyaya K, Toyama H, Salmela-Aro K. School principals' stress profiles during COVID-19, demands, and resources. *Front Psychol*. 2021;12:731929. doi:10.3389/fpsyg.2021.731929
14. Zhao P, Wang Z, Li C, Ma L, Chen Z, Yang H. Investigation on psychological vulnerability and epidemic prevention of middle-aged family members during a public health emergency. *Henan Med Res*. 2020;29(31):5761–5764. doi:10.3969/j.issn.1004-437X.2020.31.001
15. Song Y. *Research on the endogenous development strategy of rural small-scale schools - based on the investigation of y county in Henan province* [Masters Thesis]. East China Normal University; 2021. doi: 10.27149/d.cnki.ghdsu.2021.001624.
16. Qin C. Feasibility study of management strategies for rural primary school principals. *Teach Learn New Curric*. 2020;87(03):98–99.
17. Sinclair VG, Wallston KA. The development and validation of the psychological vulnerability scale. *Cognit Ther Res*. 1999;23(2):119–129. doi:10.1023/A:1018770926615
18. Uğur E, Kaya Ç, Tanhan A. Psychological inflexibility mediates the relationship between fear of negative evaluation and psychological vulnerability. *Curr Psychol*. 2021;40(9):4265–4277. doi:10.1007/s12144-020-01074-8
19. Ribeiro JD, Huang X, Fox KR, Franklin JC. Depression and hopelessness as risk factors for suicide ideation, attempts and death: meta-analysis of longitudinal studies. *Br J Psychiatry*. 2018;212(5):279–286. doi:10.1192/bjp.2018.27

20. Nogueira MJ, Barros L, Sequeira C. Psychometric properties of the psychological vulnerability scale in higher education students. *J Am Psychiatr Nurses Assoc*. 2017;23(3):215–222. doi:10.1177/1078390317695261
21. Gluschkoff K, Elovainio M, Hintsanen M, et al. Perfectionism and depressive symptoms: the effects of psychological detachment from work. *Pers and Individ Differ*. 2017;116:186–190. doi:10.1016/j.paid.2017.04.044
22. Stoeber J, Rennert D. Perfectionism in school teachers: relations with stress appraisals, coping styles, and burnout. *Anxiety Stress Coping*. 2008;21(1):37–53. doi:10.1080/10615800701742461
23. Østergaard D, Dalton SO, Bidstrup PE, et al. Mental vulnerability as a risk factor for depression: a prospective cohort study in Denmark. *Int J Soc Psychiatr*. 2012;58(3):306–314. doi:10.1177/0020764010396409
24. Rosenberg M. *Society and the Adolescent Self-Image*. Rev ed. Princeton University Press; 1965.
25. Zhang G, Dai B. A summary of research on intolerance of uncertainty. *J Cap Norm Univ*. 2012;2:124–130.
26. Jiang R. Relationship between self-esteem and state anxiety of primary and secondary school teachers: mediating role of coping style. *J Environ Occup Med*. 2020;8:759–765. doi:10.13213/j.cnki.jeom.2020.20090
27. Yang R, Wang Q, He P, Xiang H, Deng X, Yang M. Relationship between perception of stress, depression and anxiety in primary and secondary school teachers: the mediating role of coping. *Chin J Health Psychol*. 2021;12:1842–1848. doi:10.13342/j.cnki.cjhp.2021.12.019
28. Orth U, Robins RW, Roberts BW. Low self-esteem prospectively predicts depression in adolescence and young adulthood. *J Pers Soc Psychol*. 2008;95(3):695. doi:10.1037/0022-3514.95.3.695
29. Hankin BL, Abramson LY. Development of gender differences in depression: an elaborated cognitive vulnerability–transactional stress theory. *Psychol Bull*. 2001;127(6):773–796. doi:10.1037/0033-2909.127.6.773
30. Hankin BL, Abramson LY, Miller N, Haefel GJ. Cognitive vulnerability–stress theories of depression: examining affective specificity in the prediction of depression versus anxiety in three prospective studies. *Cognit Ther Res*. 2004;28(3):309–345. doi:10.1023/b:cotr.0000031805.60529.0d
31. Beck AT. Cognitive therapy: a 30-year retrospective. *Am Psychol*. 1991;46(4):368. doi:10.1037/0003-066X.46.4.368
32. Li Q, Li Y, Zhang X. Influence of occupational stress of primary and secondary schools teachers on quality of mental life: the mediating effect of psychological resilience and self-esteem. *Chin J Health Psychol*. 2021;29(02):217–230. doi:10.13342/j.cnki.cjhp.2021.02.014
33. Abela JR, Webb CA, Wagner C, Ho MHR, Adams P. The role of self-criticism, dependency, and hassles in the course of depressive illness: a multiwave longitudinal study. *Pers Soc Psychol Bull*. 2006;32(3):328–338. doi:10.1177/0146167205280911
34. Bao Z, Li D, Zhang W, Wang Y, Sun W, Zhao L. Cumulative ecological risk and adolescents' academic and social competence: the compensatory and moderating effects of sense of responsibility to parents. *Psychol Dev Edu*. 2014;30(5):482–495. doi:10.16187/j.cnki.issn1001-4918.2014.05.018
35. Wang Y, Zhang W, Li D, Zhang X. Temperament and adolescent tobacco and alcohol use: a test of interaction effects. *Adv Psychol Sci*. 2012;28(3):292–300. doi:10.16187/j.cnki.issn1001-4918.2012.03.005
36. Leary MR, Baumeister RF. The nature and function of self-esteem: sociometer theory. *Adv Exp Soc Psychol*. 2000;32(1):1–62. doi:10.2307/1449687
37. Bastian C. Raising real people: creating a resilient family. *Aust Soc Work*. 2003;56(3):280–282. doi:10.1046/j.0312-407x.2003.00087.x
38. Hao Z, Cui L. A Study on the influence of self-esteem and locus of control on left-at-home children's social adaptation. *J Psychol Sci*. 2007;169(5):1199–1201+1207. doi:10.16719/j.cnki.1671-6981.2007.05.059
39. Liu H, Wang W. Effects of self-esteem, experiential avoidance and depression on the arising of suicide idea. *J Psychol Sci*. 2017;40(6):1498–1503. doi:10.16719/j.cnki.1671-6981.20170633
40. Li D. *Multiple ecological risk factors and adolescents' social adaptation: risk modeling and mechanism research* [dissertation]. China: South China Normal University; 2012.
41. Vanderbilt-Adriance E, Shaw DS. Conceptualizing and re-evaluating resilience across levels of risk, time, and domains of competence. *Clin Child Fam Psychol Rev*. 2008;11(1):30–58. doi:10.1007/s10567-008-0031-2
42. Li D, Zhang W, Li X, Li N, Ye B. Gratitude and suicidal ideation and suicide attempts among Chinese adolescents: direct, mediated, and moderated effects. *J Adolesc*. 2012;35(1):55–66. doi:10.1016/j.adolescence.2011.06.005
43. Zhang WC, Ji Y, Li X, Guo HN, Zhu HZ. Reliability and validity of the Chinese version of the cognitive fusion questionnaire. *Chin Ment Health J*. 2014;24(1):40–44. doi:10.3969/j.issn.1000-6729.2014.01.007
44. Gillanders DT, Bolderston H, Dempster M, et al. The cognitive fusion questionnaire: further developments in measuring cognitive fusion. Association for Contextual Behavioural Science, World Congress VIII; Reno, NV; 2010.
45. Zhang J, Wu Z, Fang G, Li J, Han B, Chen Z. Development of the Chinese age norms of CES-D in urban area. *Chin Ment Health J*. 2010;24(2):139–143. doi:10.3969/j.issn.1000-6729.2010.02.015
46. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Meas*. 1977;1(3):385–401. doi:10.1177/014662167700100306
47. Chen Z, Yang X, Li X. Psychometric features of CES-D in Chinese adolescents. *Chin J Clin Psychol*. 2009;17(4):443–445+448. doi:10.16128/j.cnki.1005-3611.2009.04.027
48. Brislin RW, Ed. *Applied Cross-Cultural Psychology*. Sage Publications; 1990.
49. Wang XD, Wang XL, Ma H. Rating scales for mental health. *Chin Ment Health J*. 1999;13(1):31–35.
50. Yan Y, Xie X, Gai X, Chen X, Wang H. Assessment results of the Rosenberg Self-Esteem Scale (RSES) in middle school and college students in China. *Chin Ment Health J*. 2021;35(10):863–868. doi:10.3969/j.issn.1000-6729.2021.10.011
51. Hayes AF. *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression Based Approach*. New York, NY: The Guilford Press; 2013.
52. Mao C. Reflections on the dilemma of online teaching implementation in rural schools and countermeasures. *Knowl Libr*. 2020;24:158+160.
53. Guo Y, Chen L, Wang H. The current situation, problems and suggestions of online teaching in rural areas during COVID-19 pandemic: based on the investigation and analysis of “disrupted classes, undisrupted learning classes suspended but learning continues” in H county, Henan province. *Mod Distance Educ*. 2020;5:81–88. doi:10.13927/j.cnki.yuan.20201015.001
54. Hayes SD, Flowers J, Williams SM. “Constant communication”: rural principals' leadership practices during a global pandemic. *Front Edu*. 2021;5:618067. doi:10.3389/educ.2020.618067

55. Karakose T, Yirci R, Papadakis S. Exploring the Interrelationship between COVID-19 phobia, work–family conflict, family–work conflict, and life satisfaction among school administrators for advancing sustainable management. *Sustainability*. 2021;13(15):8654. doi:10.3390/su13158654
56. Alma H, Michelle J. COVID 19 – school leadership in disruptive times. *Sch Leadership Manage*. 2020;40(4):243–247. doi:10.1080/13632434.2020.1811479
57. Karakose T. Global education in the shadow of the novel coronavirus: reflections on the Impact of COVID-19 outbreak on education systems. *Edu Process Int J*. 2020;9(4):201–204. doi:10.22521/edupij.2020.94.1
58. Desouky D, Allam H. Occupational stress, anxiety and depression among Egyptian teachers. *J Epidemiol Glob Hea*. 2017;7(3):191–198. doi:10.1016/j.jegh.2017.06.002
59. Gong X. Reflections and suggestions on the mental health status of rural primary school teachers. *New Curric*. 2021;571(15):4.
60. Xu X, Cui Y, Cao J, Zhu H. The relationship between experiential avoidance, cognitive fusion, and mindfulness and anxiety and depression in college students. *Chin J Public Health*. 2018;34(5):741–744. doi:10.11847/zggws1113866
61. Cookson C, Luzon O, Newland J, Kingston J. Examining the role of cognitive fusion and experiential avoidance in predicting anxiety and depression. *Psychol Psychother-T*. 2020;93(3):456–473. doi:10.1111/papt.12233
62. Catherine P, Joseph M, Summer S, Emily A. The perceived effects of the onset of the COVID-19 pandemic: a focus on educators' perceptions of the negative effects on educator stress and student well-being. *Sch Psychol Rev*. 2023;1–14. doi:10.1080/2372966X.2022.2158367
63. Sinclair VG, Wallston KA. Psychological vulnerability predicts increases in depressive symptoms in individuals with rheumatoid arthritis. *Nurs Res*. 2010;59(2):140–146. doi:10.1097/nnr.0b013e3181d1a6f6
64. Kaufman J, Diliberti M, Hamilton L. How principals' perceived resource needs and job demands are related to their dissatisfaction and intention to leave their schools during the COVID-19 Pandemic. *AERA Open*. 2022;8. doi:10.1177/23328584221081234
65. Yan J, Zhang X, Sun Q, Dong Y, Liu H. The effect of non-adaptive cognitive emotion regulation on depression in senior high school students: the chain mediating effect of experiential avoidance and cognitive fusion. *Chin J Clin Psychol*. 2022;(6):1303–1307. doi:10.16128/j.cnki.1005-3611.2022.06.008
66. Abramson LY, Seligman ME, Teasdale JD. Learned helplessness in humans: critique and reformulation. *J Abnorm Psychol*. 1978;87(1):49. doi:10.1037/0021-843X.87.1.49
67. Brown JD, Collins RL, Schmidt GW. Self-esteem and direct versus indirect forms of self-enhancement. *J Pers Soc Psychol*. 1988;55(3):445–453. doi:10.1037/0022-3514.55.3.445
68. Peng B, Xiao H, He Z, et al. Effect of parental rejection on depression in middle school students: the chain mediating effect of self-esteem and psychological inflexibility. *Chin J Clin Psychol*. 2021;23(4):773–777. doi:10.16128/j.cnki.1005-3611.2021.04.022
69. Zhong Y, Zhang J. The mediating effects of fears of evaluation on the relations between self-esteem and social anxiety for college students. *Psychol Dev Edu*. 2011;27(5):506–512. doi:10.16187/j.cnki.issn1001-4918.2011.05.002
70. Bernichon T, Cook KE, Brown JD. Seeking self-evaluative feedback: the interactive role of global self-esteem and specific self-views. *J Pers Soc Psychol*. 2003;84(1):194–204. doi:10.1037/0022-3514.84.1.194

Psychology Research and Behavior Management

Dovepress

Publish your work in this journal

Psychology Research and Behavior Management is an international, peer-reviewed, open access journal focusing on the science of psychology and its application in behavior management to develop improved outcomes in the clinical, educational, sports and business arenas. Specific topics covered in the journal include: Neuroscience, memory and decision making; Behavior modification and management; Clinical applications; Business and sports performance management; Social and developmental studies; Animal studies. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/psychology-research-and-behavior-management-journal>