Mindfulness and Negative Emotions: Chain Mediation Effect of Perceived Social Support and Interpersonal Sensitivity

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Abstract: Previous research has confirmed that mindfulness may decrease negative emotions in college students. However, there has been less focus on the mechanism of mindfulness’s effect on negative emotions. This study explores the relationship between mindfulness and negative emotions and examines the mediating role of perceived social support and interpersonal sensitivity among college students in China. A total of 386 college students (65.8% female, 34.2% male) completed measures of The Five Facet Mindfulness Questionnaire (FFMQ), The 21-item Depression Anxiety Stress Scale (DASS-21), The Multidimensional Scale of Perceived Social Support (MSPSS), and The Interpersonal Sensitivity Measure (IPSM). Using model 6 in SPSS PROCESS macro 3.3 software, we found:

1. Mindfulness was negatively related to negative emotions.
2. Interpersonal sensitivity mediated the relationship between mindfulness and negative emotions.
3. Mindfulness was negatively related to negative emotions through the chain mediating of perceived social support and interpersonal sensitivity. Mindfulness, perceived social support, interpersonal sensitivity, and negative emotions in college students exerted significant associations with each other. Students can try mindfulness training to increase the perception of social support, reduce interpersonal sensitivity, and reduce negative emotions. The findings of this study may shed new light on the prevention and treatment of negative emotions among college students.

1. INTRODUCTION

College is a peak period for the first episodes of depression, and the incidence of depression among college students is much higher than that of the general population [1]. College students are through a stage of identity exploration and transition, which increases their risk of psychological problems [2]; Additionally, academic pressure and competitiveness exacerbate negative emotions (e.g., depression and anxiety) [3]. Negative emotions are typically unpleasant or unhappy emotions elicited in individuals to convey a negative impact on an event or person and they are frequently measured by depression, anxiety, and stress [4,5]. In the survey of Chinese college students, depression symptom is detected at respective rates of 24.7% [6]. These negative emotions can lead to detrimental actions, including but not limited to smoking, unhealthy diet, lack of exercise, and poor sleeping patterns [7]. Therefore, it is essential to examine college students’ negative emotions and investigate strategies to enhance them. From the perspective of positive psychology, this research investigated the potential mechanisms of negative emotions in college students.

1.1 Mindfulness and negative emotions

Mindfulness is an individual’s conscious, non-judgmental focus on both internal and external stimuli in the current moment, including physical sensations, emotional responses, and thoughts, including the state and trait mindfulness [8]. The previous study indicated that mindfulness could enhance individuals’ psychological functioning and happiness [10] and decrease negative emotions [8,11]. Therefore, the study proposes the first hypothesis: mindfulness is negatively linked with negative emotions among college students.

1.2 The mediating role of perceived social support

Social support is regarded as a typical supportive resource that can provide individuals with effective problem-solving strategies, a secure environment, and positive emotional experiences [12]. Perceived social support is the perception that one is accepted by the people around them (e.g., parents, friends, or relatives) in daily interpersonal communication [13]. Studies have indicated...
a link between mindfulness and the perception of social support [14]. This may be related to the fact that mindfulness enables people to concentrate on the present moment and recognize the support they receive from social networks. Additionally, previous study has shown that social support is negatively related to negative emotions such as depression [15]. In conclusion, the study hypothesizes the second hypothesis: perceived social support mediates the relationship between mindfulness and negative emotions.

1.3 The mediating role of interpersonal sensitivity

Interpersonal sensitivity is an individual’s predisposition to be extremely sensitive to the emotional and behavioral reactions of others, especially to criticism and rejection [16,17]. Several studies have demonstrated that high levels of mindfulness can decrease interpersonal distress and sensitivity [18,19]. Meanwhile, individuals with high interpersonal sensitivity are more prone to overreact to social rejection and exhibit withdrawal and shyness, increasing the risk of depression and anxiety [20]. In summary, the present study hypothesizes the third hypothesis: interpersonal sensitivity mediates the relationship between mindfulness and negative emotions.

1.4 Chain-mediating role of perceived social support and interpersonal sensitivity

Furthermore, a study indicated that high parental social support could help satisfy college students’ basic needs, reducing the levels of interpersonal sensitivity [21]. Family, friends, or other essential relatives could provide high levels of material and spiritual support, which may be positively associated with low levels of interpersonal sensitivity. Thus, this study proposes the fourth hypothesis: perceived social support and interpersonal sensitivity mediate the relationship between mindfulness and negative emotions.

In conclusion, research on negative emotions in college students has shown that mindfulness, perceived social support, and interpersonal sensitivity are all relevant factors. However, to our knowledge, studies have yet to simultaneously investigate the relationships among all four constructs among college students. Thus, this study aims to elucidate the mechanisms underlying the significant associations between these psychosocial variables and negative emotions to aid in developing and improving interventions aimed at providing clinical practitioners and counselors.

2. METHODS

2.1 Participants

The participants in this study were college students who studied in different universities in China. A total of 466 individuals filled out the online survey questionnaires. They were collected through the online “SO JUMP” platform (https://www.wjx.cn), a popular Chinese online survey platform, and 386 valid questionnaires were left after excluding those that were regularly and not seriously answered in this questionnaire. The participation was anonymous and voluntary. The purpose of the study was introduced, and informed consent was obtained from the participants before the investigation. Participants indicated their age, gender, grade, urban/rural location, and whether they were the only child. There were 132 men (34.2%) and 254 women (65.8%), who ranged in age from 18 to 29 (M=20.53, SD=2.02).

2.2 Measures

2.2.1 Mindfulness

The Five Facet Mindfulness Questionnaire (FFMQ) is a 39-item self-report questionnaire measuring five domains of the construct of dispositional mindfulness, which are abbreviated here as FFMQ-Observing (e.g., I notice when I lose track of my body, whether eating, cooking, cleaning, or talking.), FFMQ-Describing (e.g., My natural tendency is to put my experiences into words.), FFMQ-Acting with Awareness (e.g., I am easily distracted.), FFMQ-Non-judging (e.g., I disapprove of myself when I have irrational ideas.) and FFMQ-Non-reactivity (e.g., I watch my feelings without getting lost in them.). This scale was developed by Baer [22] and revised by Deng [23]. Each item was rated on a five-point scale from 1 (‘never or very rarely true’) to 5 (‘very often or always true’). The range of scores spans from 39 to 195, whereby scores that are higher in value correspond to higher mindfulness. The Cronbach’s $\alpha$ of the FFMQ in this study was 0.730.

2.2.2 Perceived social support

The Multidimensional Scale of Perceived Social Support (MSPSS) is a 12-item self-report questionnaire measuring perceived social support. This scale was compiled by Zimet [24] and translated by Jiang [25]. The scale includes three dimensions: family support (e.g., my family really tries to help me.), friend support (e.g., I can talk about my problems with my friends), and other support (e.g., I have a special person who is a real source of comfort to me.), with responses on a seven-point scale from 1 (“strongly disagree”) to 7 (“strongly agree”). The range of scores spans from 12 to 84 points, whereby scores that are higher in value correspond to higher perceived social support. In this study, Cronbach’s $\alpha$ value of the MSPSS was 0.919.

2.2.3 Interpersonal sensitivity

The Interpersonal Sensitivity Measure (IPSM) is a 19-item self-report questionnaire measuring interpersonal sensitivity. This scale was compiled by Boyce and Parker [26]. The IPSM assesses the level of interpersonal sensitivity and has been widely used in different cultural countries [27]. The revised Chinese version selected for this study was 19 items [28]. There are five subscales:
separation anxiety (e.g., I feel insecure when I say goodbye to people), interpersonal awareness (e.g., I worry about what others think of me), kindness (e.g., I am always aware of how other people feel), need for approval (e.g., I feel happy when someone compliments me), and fragile inner self (e.g., If others knew the real me, they would not like me), with responses on a four-point scale from 1 (“very unlike me”) to 4 (“very like me”). The range of scores spans from 19 to 76 points, whereby scores that are higher in value correspond to higher interpersonal sensitivity. In this study, the internal consistency coefficient of IPSM was 0.913.

2.2.4 Negative emotions

The 21-item Depression Anxiety Stress Scale (DASS-21) was translated and revised by Gong [5], with no reverse scoring, including the depression sub-dimension (e.g., I felt that I had nothing to look forward to), anxiety sub-dimension (e.g., I found myself getting agitated), and stress sub-dimension (e.g., I found it difficult to relax). There are seven questions for each sub-scale, and participants indicate the frequency of a symptom over the previous week on a four-point scale from 1 (“never”) to 4 (“almost always”). The range of scores spans from 21 to 84 points, whereby scores that are higher in value correspond to higher negative emotions. The Cronbach's $\alpha$ of the DASS-21 in this study was 0.947.

2.3 Analytical Strategy

The SPSS 26.0 software was used in the analysis. We calculated descriptive statistics to summarize and analyze the explanatory variables: mean and standard deviation ($M \pm SD$).

Firstly, an independent samples t-test was run to compare differences in negative emotions by gender, urban/rural location, and whether or not being an only child. Table 1 presents the descriptive statistics ($M$ and $SD$) and the t-score for comparing the means of the three variables.

Secondly, a bivariate correlation analysis was performed to examine the relationships among age, mindfulness, perceived social support, interpersonal sensitivity, and negative emotions.

Thirdly, based on the hypothesis, the mediation models were examined with the SPSS PROCESS macro 3.3 software [29], which was developed specifically for testing complex models. Model 6 software was deployed to two mediators in PROCESS. The indirect effects were computed using a bootstrap method with bias correction. The mediation effect was significant if the 95% confidence interval (CI) did not include 0.

3. RESULTS

3.1 The Social demographic variable differences in negative emotions

Table 1 shows the comparison between social-demographic variables on negative emotions. Results showed that men had significantly higher negative emotions scores than women ($M \pm SD$: 33.07±12.07 vs. 28.84±8.69; $p < 0.01$); urban college students had significantly higher negative emotions scores than rural college students ($M \pm SD$: 31.34±10.55 vs. 29.72±9.86; $p < 0.05$), and there were no significant differences on the non-only child and only child ($p > 0.05$).

<table>
<thead>
<tr>
<th>Gender</th>
<th>Urban/rural location</th>
<th>Whether Only-Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men ($n=132$)</td>
<td>Women ($n=254$)</td>
<td>Urban Areas ($n=190$)</td>
</tr>
<tr>
<td>Negative emotions</td>
<td>$M \pm SD$</td>
<td>33.07±12.07</td>
</tr>
<tr>
<td>$t$</td>
<td>3.58**</td>
<td>2.025*</td>
</tr>
</tbody>
</table>

Note. *$p<0.05$; **$p<0.01$.

3.2 Correlations and descriptive statistics on key variables

Means, standard deviations, and correlations among the key variables in the study are presented in Table 2. Results show that age was negatively related to interpersonal sensitivity ($r = 0.122, p < 0.05$) and negative emotions ($r = 0.126, p < 0.05$). Mindfulness was positively related to perceived social support ($r = 0.47, p < .001$) and was negatively related to interpersonal sensitivity ($r = -0.41, p < .001$) and negative emotions ($r = -0.41, p < .001$). Perceived social support was negatively related to interpersonal sensitivity ($r = -0.27, p < .001$) and negative emotions ($r = -0.29, p < .001$). Interpersonal sensitivity was positively related to negative emotions ($r = 0.63, p < .001$).
Table 2. Correlations and descriptive statistics for all the variables (N=386)

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>1 Age</th>
<th>2 Mindfulness</th>
<th>3 Perceived social support</th>
<th>4 Interpersonal sensitivity</th>
<th>5 Negative emotions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20.53</td>
<td>2.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>124.29</td>
<td>12.19</td>
<td>-0.42</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>64.87</td>
<td>11.15</td>
<td>0.15</td>
<td>0.47**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>39.00</td>
<td>10.27</td>
<td>0.122</td>
<td>-0.41**</td>
<td>-0.27**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>30.28</td>
<td>10.16</td>
<td>0.126</td>
<td>-0.041**</td>
<td>-0.29**</td>
<td>0.63**</td>
<td></td>
</tr>
</tbody>
</table>

Note. M=mean. SD=standard deviations. *p<0.05. **p<0.001.

3.3 Chained mediating analyses

The results of chained mediating are presented in Table 3 and Fig 1. After controlling gender and urban/rural location, mindfulness was positively associated with perceived social support ($B = 0.425$, $p < 0.01$) and was negatively associated with interpersonal sensitivity ($B = -0.297$, $p < 0.01$) and negative emotions ($B = -0.127$, $p < 0.01$). Perceived social support was positively associated with interpersonal sensitivity ($B = -0.100$, $p < 0.05$). Interpersonal sensitivity was positively associated with negative emotions ($B = 0.529$, $p < 0.01$). There is no significant effect on the association between perceived social support and negative emotions ($p > 0.05$).

Table 3. Indirect effects on mindfulness, perceived social support, interpersonal sensitivity, and negative emotions (N=386).

<table>
<thead>
<tr>
<th></th>
<th>Perceived social support</th>
<th>Interpersonal sensitivity</th>
<th>Negative emotions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>t</td>
<td>B</td>
</tr>
<tr>
<td>Gender</td>
<td>1.214</td>
<td>1.145</td>
<td>-1.497</td>
</tr>
<tr>
<td>Urban/rural location</td>
<td>-1.657*</td>
<td>-1.650</td>
<td>-1.938*</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>0.425**</td>
<td>10.315</td>
<td>-0.297**</td>
</tr>
<tr>
<td>Perceived social support</td>
<td>-</td>
<td>-</td>
<td>-0.100*</td>
</tr>
<tr>
<td>Interpersonal sensitivity</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

$R^2 = 0.227$ . $R^2 = 0.190$ . $R^2 = 0.453$

$F = 37.301$ . $F = 22.288$ . $F = 62.816$

Note. *p<0.05; **p<0.01.

Figure 1. The mediation model.
Note. *p<0.05; **p<0.01.

As shown in Table 4, the bootstrapping method was used to repeat the sample 5,000 times to calculate a 95% CI. The results showed that the indirect effect on the character mindfulness → perceived social support → negative emotions path was $-0.028$, while the 95% CI was $[-0.072, -0.011]$. The mindfulness→interpersonal sensitivity→negative emotions path was $-0.157$, while the 95% CI was $[-0.224, -0.105]$. The mindfulness→perceived social support→interpersonal sensitivity→negative emotions path was $-0.023$, while the 95% CI was $[-0.046, -0.001]$. Therefore, there are two significant indirect effects: (1) interpersonal sensitivity mediated the relationship between mindfulness and negative emotions, (2) perceived social support and interpersonal sensitivity mediated the relationship between mindfulness and negative emotions.
Table 4. Chain mediating effect on mindfulness, perceived social support, interpersonal sensitivity and negative emotions (N = 386).

<table>
<thead>
<tr>
<th>Effect</th>
<th>BootLLCI</th>
<th>BootULCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mindfulness→perceived social support→negative emotions</td>
<td>-0.028</td>
<td>-0.072</td>
</tr>
<tr>
<td>2. Mindfulness→interpersonal sensitivity→negative emotions</td>
<td>0.157</td>
<td>-0.224</td>
</tr>
<tr>
<td>3. Mindfulness→perceived social support→interpersonal sensitivity→negative emotions</td>
<td>-0.023</td>
<td>-0.046</td>
</tr>
</tbody>
</table>

Note. *p<0.05; **p<0.01.

4. DISCUSSION

4.1 Mindfulness and negative emotions

As hypothesized, this study found that mindfulness is negatively related to negative emotions, which is consistent with previous studies [8,11]. Individuals with a high level of mindfulness are less likely to experience negative emotions in a global, undifferentiated manner. In addition to being less likely to resort to maladaptive coping mechanisms, they are also better able to make clear and focused assessments of events than bewildered interpretations muddled by competing assessments. [30].

4.2 The mediating role of interpersonal sensitivity

This study suggested that interpersonal sensitivity mediated the association between mindfulness and negative emotions, which confirmed the hypothesis of this study. Joss [19] suggested that an increase in mindfulness significantly contributed to the decrease in interpersonal sensitivity, which can be attributed to the psychological elements cultivated in the mindfulness-based intervention. The effect of interpersonal sensitivity on negative emotions can also be found in a review by Marin & Miller [20]. These findings indicated that college students with high levels of mindfulness are prone to decrease their interpersonal sensitivity, making them less sensitive to criticism and rejection from others and arousing more positive emotions.

4.3 Chain-mediating role of perceived social support and interpersonal sensitivity

One noteworthy finding of this study was the chain-mediating effect. Perceived social support and interpersonal sensitivity had a chain-mediating role between mindfulness and negative emotions. This result matched previous findings [21] and substantiated our hypothesis. This indicates that college students who practice mindfulness exercises more frequently tend to focus on the present moment and be aware of the social support they receive. Moreover, the perceived social support they got through the social relationships would decrease their interpersonal sensitivity, ultimately decreasing their negative emotions.

5. CONCLUSION

5.1 Limitations

The current study has certain limitations that should be noted. Firstly, only college students participated in this study. Future research should expand the sample size (e.g., to include other student cohorts, adults, and the general public). Secondly, the cross-sectional design of this study suggested connections between various variables. However, it neglected to provide a chronological order. Consequently, future research should assess the evolution of the relationship between four constructs over time. Finally, all the questionnaires used in this study are self-reported. We hope future research uses the other data-collection methodologies to investigate our study variables.

5.2 Practical implications

This study contributes to the literature in some crucial ways. In practice, the significant chain-mediation effects provide valuable insights into the efficacy of intervention programs. Utilizing and cultivating mindfulness could help design interventions to prevent negative emotions. College students should learn to be mindful (e.g., daily exercise to build their mindfulness and mindfulness-based intervention programs) to reduce negative emotions. Based on the chain-mediated model, improving students perceived social support and decreasing their interpersonal sensitivity should also be considered. For example, parents should talk with college students about their needs to give them essential supportive resources.

5.3 Conclusion

In conclusion, the present study contributes to the development of existing theoretical research on negative emotions by broadening the scope of mindfulness application in the domain of negative emotions. In particular, the findings suggest that perceived social support and interpersonal sensitivity can function as a chain-mediating process for comprehending the relationship between mindfulness and negative emotions in college students. Also, these findings provide an effective and practical prevention strategy for reducing college students’ negative emotions.
Reference


