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Positive psychological traits and psychological well-being: investigating roles of positive coping strategies and life stressors

Aamer Aldbyani^{1*} , Guiyun Wang², Yanxia Qi³, Zhang Chuanxia¹, Jiaojiao Li³, Jie Leng⁴ and Afnan Alhimaidi⁵

Abstract

The impact of positive psychological traits (mindfulness, gratitude, optimism, and hope) on psychological well-being has been studied well. However, the contributions of positive coping strategies and life stressors in these associations still need to be examined. This study investigated the mediating roles of positive coping strategies and life stressors among the associations of mindfulness, gratitude, optimism, and hope on psychological well-being. 1766 Chinese college students of Shandong Xiehe University were recruited to complete the Mindful Attention Awareness Scale (MAAS), the Gratitude Questionnaire (GQ-6), the Optimism Scale (OS), the Adult Hope Scale (AHS), the Ways of Coping Questionnaire (WCQ), the Student-Life Stress Inventory (SLSI), and the Global Well-being Scale (GWB). The study revealed that positive coping strategies and life stressors partially mediated the associations of mindfulness, gratitude, optimism, and hope on psychological well-being. The results support the critical roles that positive coping strategies and life stressors play in positive psychological traits' impacts. This study may contribute to understanding the possible mechanism behind the link between positive psychological traits (mindfulness, gratitude, optimism, and hope) and psychological well-being through their interplay with positive coping strategies and life stressors.

Keywords Hope, Life Stressors, Gratitude, Mindfulness, Optimism, Positive Coping Strategies, Psychological well-being

Introduction

Psychological well-being is an essential element in people's lives in general, and it is also considered a part of mental health, as it is one of its key outcomes. Achieving

well-being helps a person face life's hardships and difficulties, reach a decent and happy life, and contribute to achieving life's goals and objectives. Mental health is a critical domain within psychology that gained significant attention in the late twentieth century when the World Health Organization [70] defined mental health as a state of well-being where individuals are aware of their capabilities, can cope with life's stresses, are productive, and contribute positively to their community. Mental health not only influences adults but also plays a crucial role in children's development, as it enhances their ability to enjoy life and become healthy adults. Children's well-being can increase their ability to adapt to life and face the expected challenges in youth and beyond [3, 52].

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Psychological well-being is conceptualized as a combination of positive affective experiences, such as happiness, and optimal functioning in personal and social life, positioning it as the core of mental health [23, 46]. Among the positive psychological traits, mindfulness is particularly significant, as it is consistently associated with enhancing well-being [9]. Research has consistently shown that mindfulness involves maintaining a non-judgmental awareness of the present moment, which fosters a range of positive outcomes for psychological well-being [25, 35, 59]. It is important to note that while some studies have conceptualized mindfulness as a state, in the current study we conceptualize mindfulness as a trait—a stable characteristic that influences an individual's long-term psychological functioning.

In addition to mindfulness, other positive psychological traits, such as gratitude, optimism, and hope, play a vital role in enhancing positive emotions, which, in turn, lead to psychological well-being [4, 21, 75, 94]. Gratitude involves recognizing and appreciating positive aspects of life, which can enhance emotional resilience and satisfaction. Optimism contributes to well-being by promoting a positive outlook on life and future outcomes [6, 66, 69]. Hope is characterized by the motivation to achieve goals, and it directly influences mental health by driving individuals toward goal attainment, thereby enhancing satisfaction and happiness [69, 78, 87].

While previous studies have provided a strong foundation for understanding the beneficial effects of mindfulness, gratitude, optimism, and hope on psychological well-being, there remains a gap in understanding the mediating roles of positive coping strategies and life stressors in these relationships. Positive coping strategies involve adaptive responses to stress, promoting well-being, while life stressors are challenges that can negatively impact mental health. Our study aims to address this gap by investigating how positive coping strategies and life stressors mediate the associations of mindfulness, gratitude, optimism, and hope with psychological well-being, providing a more comprehensive understanding of these dynamics.

Positive psychological traits and psychological well-being

The field of positive psychology was started by Martin Seligman, president of the American Psychological Association, in 1998. This science aims to make people successful and happy. Positive psychology adopts an approach to enhancing individuals' strengths and positive traits to achieve psychological well-being. One of the most important of these positive traits is mindfulness. Mindfulness is one of the key elements that helps develop constructive mental abilities that benefit a person's psychological well-being. A wide range of educational

techniques are included in mindfulness, such as enhancing psychological well-being, life satisfaction, physical clarity, empathy, and mental clarity [24]. Several systematic studies and meta-analyses have shown that therapies like mindfulness training can improve psychological well-being [34, 48, 49, 58, 62, 63]. Higher levels of mindfulness are associated with improved personal abilities, more effective communication with others, greater acceptance, compassion, and empathy for oneself and others, and healthier lifestyles [30].

Gratitude is a positive trait, too, and is considered an interpreter of mental health [92]. Gratitude is described as a concept that includes virtue, emotion, motive, moral feeling, coping mechanism, attitude, and skill [27]. It becomes clear that having gratitude—which is the disposition to acknowledge and react to the kindness of others—is a desirable quality [64]. Even in difficult situations, this emotional quality entails appreciating and honoring the efforts of others [28, 47]. According to research, being grateful has several advantages, such as increased life satisfaction, better mental health, and generally favorable psychological effects [64, 91]. Studies revealed that gratitude enhances mental health and reduces feelings of anxiety and depression [4, 21, 75, 94].

The third positive trait is optimism, which is essentially defined as having optimistic expectations for the future. It is related to emotion, persistence, problem-solving, academic achievement, and being healthy, and is conceptualized differently in different studies [44, 73]. Studies revealed that optimism is significantly related to life satisfaction [1, 19, 79, 97], resilience [7, 67, 76], and well-being [6, 42, 71]. Studies found a strong relationship between optimism and well-being, optimism enhances well-being [6, 66, 69].

The last positive trait in our research model is hope. Hope is defined as a positive motivational state based on planning to meet goals and an interactively derived sense of successful goal-directed energy [84]. According to Boniwell [12], hope is having the will to accomplish objectives and the conviction that there are numerous other options. Several factors that are crucial for an individual's success and well-being are linked to hope: professional success [95], quality of life [72], psychological well-being [98], happiness and optimism [2, 43], emotional intelligence [82], self-efficacy [102], job performance and satisfaction [26, 74], the work environment and educational environment [101], creativity and leadership [77] and stress coping strategies [15, 32, 39].

The selection of mindfulness, gratitude, optimism, and hope as positive psychological traits in our study is based on their consistent associations with enhanced psychological well-being. These traits are not only widely recognized in positive psychology literature but also

demonstrate strong predictive power in improving mental health outcomes. While there are other positive psychological traits, these four were chosen for their distinct contributions to resilience, stress management, and life satisfaction, which align with the goals of our study.

Furthermore, our study explores potential pathways linking mindfulness with the other positive traits. We propose that mindfulness, by fostering enhanced present-moment awareness and reducing stress, may serve as a foundational element that facilitates the development of gratitude, optimism, and hope. These relationships were integrated into our mediation analysis, where the interconnections between mindfulness and the other traits were considered as part of the overall mechanism influencing psychological well-being.

Gratitude, optimism, and hope can be called psychological determinants of well-being. Several studies investigated the significant roles of these three psychological traits together in predicting well-being [5, 10, 44]. On the other hand, mindfulness plays a major role in enhancing positive emotions, which leads to life satisfaction and psychological well-being. Mindfulness also enhances and strengthens these positive emotions, as mindfulness predicts gratitude [16], optimism [88], and hope [11]. According to the above, we assumed that mindfulness, gratitude, optimism, and hope will predict psychological well-being. Therefore, our first hypothesis is as follows:

H1: Mindfulness, gratitude, optimism, and hope collectively may predict psychological well-being.

Positive coping strategies and life stressors as mediators

Coping strategies refer to the mental and physical approaches employed to deal with the demands of a stressful environment, both external and internal [85]. Coping is an individual's cognitive and behavioral effort to manage internal or external demands that are assessed as threatening and stressful [53]. Given that coping is inherently situational—where the adaptiveness of a strategy can vary based on context and timing—in this study, we conceptualize positive coping strategies as those adaptive and constructive methods that, when appropriately applied, generally promote stress reduction and enhance psychological well-being. Positive coping strategies include adaptive approaches such as problem-solving, seeking social support, practicing relaxation techniques, and maintaining a positive outlook. In contrast, negative coping strategies may involve avoidance, denial, substance abuse, or excessive disengagement, which can lead to worsened mental health outcomes.

Life stressors refer to the external challenges and demands that individuals encounter throughout their lives, and their impact can vary widely depending on

factors such as cultural context, socioeconomic status, and developmental stage. For example, what may be perceived as a significant stressor in one cultural or life stage context might be less impactful in another. These stressors directly influence personal lives by affecting how individuals handle changes and adversities [54, 55]. Effectively managing life stressors often depends on employing positive coping strategies, which can help buffer their adverse effects on mental health.

According to Brown, Ryan, and Creswell [13], mindfulness improves psychological health by linking to increased eudaimonic well-being and decreased levels of distress worldwide. The ability to manage stress and choose the right positive coping strategies has been proposed to mediate the relationships between mindfulness and higher positive and lower negative affect [36, 46, 81]. Therefore, building effective and positive coping strategies is important for healthy living, but it requires consistent effort and resilience. Studies showed that mindfulness can assist people in managing their coping strategies by reducing stress perception and promoting flexible coping [8, 22, 38, 45, 96]. Thus, mindfulness predicts positive coping strategies and life stressors and, in turn, enhances psychological well-being.

Another predictor of positive coping strategies and stress reduction is gratitude. Studies revealed that gratitude predicts adaptive coping, helps decrease stress and depression [93], reduces drug use [57], and promotes stress resilience [56]. Gratitude can also influence stress levels to increase satisfaction with life [100] and enhance psychological well-being [51].

As with mindfulness and gratitude, optimism and hope as positive psychological traits also predict constructive coping strategies and reduced stress. Studies found that optimism plays a crucial role in coping with stress, leading to an increase in well-being [17, 50, 80]. Furthermore, optimism and hope were shown to decrease the negative effect of stress on well-being [37, 89] and predict subjective health through effective coping strategies.

Our study investigates the mediating roles of positive coping strategies and life stressors among the associations of mindfulness, gratitude, optimism, and hope on psychological well-being. To our knowledge, no prior research has examined the combined contributions of positive coping strategies and life stressors in these associations, making this study a novel exploration of these dynamics. For more details about the study model, see Fig. 1. Our second hypothesis is as follows:

H2: Positive Coping Strategies and Life Stressors may mediate the associations of Mindfulness, Gratitude, Optimism, and Hope with Psychological Well-being

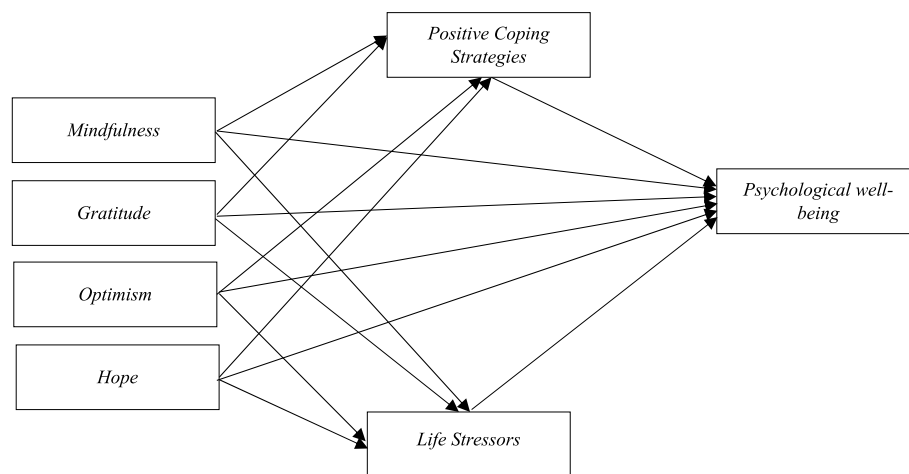


Fig. 1 The study model

Method

A cross-sectional study investigated the mediating role of positive coping strategies and the moderating role of life stressors among the associations of mindfulness, gratitude, optimism, and hope on psychological well-being among Chinese college students.

Participants

Participants in this study were 1766 college students recruited from Shandong Xiehe University in Jinan, China. Participants were selected using a convenience sampling procedure by inviting students via university online platforms and WeChat. Data collection was conducted using online questionnaires, which allowed participants to complete the survey in a self-paced manner during their free time. This approach ensured that the data collection process was standardized and accessible to a broad range of students. Their responses were kept confidential, and informed consent was obtained from all participants. The age distribution of the study sample ranged from 18 to 22 years ($M_{\text{age}} = 20.08 \pm 2.44$). None of the participants had prior experience with mindfulness training or comparable practices such as yoga, Qigong, or Tai Chi.

Sample size determination

An a priori power analysis was conducted using G*Power software to determine the minimum sample size required for detecting mediation effects. We selected the "linear multiple regression: fixed model, R^2 deviation from zero" option, setting the significance level (α) to 0.05 and the desired statistical power ($1 - \beta$) to 0.80. Based on previous mediation research, we

assumed a medium effect size ($f^2 = 0.15$) for the relationships among our variables. Considering the number of predictors in our mediation model (including both independent and control variables), the analysis indicated that approximately 1500 participants were necessary to achieve sufficient power. To account for potential attrition and non-response bias, we increased the sample size to 1766 participants.

The study adhered to the Helsinki Declaration of 1964, the academic committee guidelines of Shandong Xiehe University, and similar ethical standards for research involving human subjects. The demographics of the study participants are displayed in Table 1.

Table 1 Demographics of the study participants

Variable	Frequency	Percent%
Gender		
Male	698	39.52%
Female	1068	60.48%
Grade		
1st	69	3.91%
2nd	1008	57.08%
3rd	613	34.71%
4th	76	4.3%
Family Income		
3000–10000 RMB	1336	75.65%
10,000–20000 RMB	339	19.2%
20,000–above RMB	91	5.15%
Total	1766	100%

RMB The Chinese currency

Measurements

Mindfulness

The Chinese version of the Mindful Attention Awareness Scale (MAAS), which contains 15 items [14], has been proven as a reliable and valid scale in Chinese settings (e.g., Chen et al. [18]. Each item was rated on a 6-point Likert scale, with one indicating (Almost always) and six indicating (Almost never). In this study, Cronbach's alpha was 0.88.

Gratitude

The Chinese version of the Gratitude Questionnaire (GQ-6), which contains 6 items [65], has been proven as a reliable and valid scale in Chinese settings (e.g., Mo. [68]). Each item was rated on a 4-point Likert scale—these terms ranged from one (*strongly disagree*) to four (*strongly agree*). In our study, Cronbach's alpha was 0.92.

Optimism

The Chinese version of the Optimism Scale (OS), which contains 11 items [20], has been proven as a reliable and valid scale in Chinese settings (e.g., Lixin et al. [60]). Each item was rated on a 4-point Likert scale—these terms ranged from one (*Strongly Disagree*) to four (*Strongly agree*). In our study, Cronbach's alpha was 0.91.

Hope

The Chinese version of the Adult Hope Scale (AHS), which contains 12 items [83], has been proven as a reliable and valid scale in Chinese settings (e.g., Sun et al. [86]). Each item was rated on a 4-point Likert scale—these terms ranged from one (*Definitely false*) to four (*Definitely true*). In our study, Cronbach's alpha was 0.90.

Psychological well-being

The Chinese version of the Global Wellbeing Scale (GWS), which contains 25 items [29], is a trustworthy and accurate scale in Chinese settings (e.g., JH. [41]).

Each item was rated on a seven-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). In this study, Cronbach's alpha was 0.85.

Positive coping strategies

The Chinese version of the Ways of Coping Questionnaire (WCQ), which contains 20 items [31], has been proven as a reliable and valid scale in Chinese settings (e.g., [99]). Each item was rated on a 4-point Likert scale—these terms ranged from zero (*not adopted*) to three (*often adopted*). In this study, Cronbach's alpha was 0.86.

Life stressors

The Chinese version of the Student-Life Stress Inventory (SLSI), which contains 23 items [33], has been proven as a reliable and valid scale in Chinese settings (e.g., (Wang [90]). Each item was rated on a 5-point Likert scale—these terms ranged from one (*never*) to seven (*most of the time*). In this study, Cronbach's alpha was 0.82.

Data analysis

To explore the correlations between the study variables, Peterson's correlation coefficients were computed. Utilizing the PROCESS macro-Model 4 (version 3.5) in SPSS, the mediation analyses were carried out. 5000 bootstrap re-samples were used to construct 95% confidence intervals for the mediated effects in the models used in this experiment [40].

Results

Correlation among study variables

The results (Table 2) show that mindfulness, gratitude, optimism, hope, psychological well-being, and positive coping strategies are positively correlated. However, life stressors negatively correlated with all variables.

Table 2 Correlation among the study variables ($n = 1766$)

Variables	1	2	3	4	5	6	7
1. Mindfulness	1						
2. Gratitude	.52**	1					
3. Optimism	.49**	.39**	1				
4. Hope	.48**	.53**	.52**	1			
5. Psychological well-being	.53**	.58**	.50**	.56**	1		
6. Positive Coping Strategies	.55**	.53**	.52**	.50**	.60**	1	
7. Life Stressors	-.40**	-.38**	-.36**	-.30**	-.52**	-.40**	1
M	16.25	18.75	19.68	16.21	18.08	38.29	78.44
SD	4.363	4.145	4.284	4.262	4.754	8.176	10.259

Note. ** $p < 0.01$

Direct and indirect effects of positive psychological traits on psychological well-being

After controlling the factors influencing the study's main variables, such as gender, grade, and monthly family income, all control variables' effects were non-significant. The results (Table 3 and Fig. 2) show the mediating effects of positive psychological traits on psychological well-being, as follows:

- First, the positive psychological trait, *mindfulness*, the results revealed that the total effect of mindfulness on psychological well-being was significant ($\beta = 1.14$, $SE = 0.18$, $p < 0.05$, 95% and $CI = [0.002, 2.282]$). However, the direct effect of mindfulness on psychological well-being was significant ($\beta = 0.57$, $SE = 0.09$, $p < 0.05$, 95%, and $CI = [0.39, 0.76]$). The total indirect effect of mindfulness on psychological well-being was significant ($\beta = 0.57$, $SE = 0.14$, $p < 0.05$, 95%, and $CI = [0.29, 0.88]$). The mediating effect of positive coping strategies and life stressors were significant sequentially ($\beta = 0.35$, $SE = 0.11$, $p < 0.05$, 95% and $CI = [0.13, 0.57]$; $\beta = 0.22$, $SE = 0.07$, $p < 0.05$, 95% and $CI = [0.33, 0.60]$).

- Second, *gratitude*, the results revealed that the total effect of gratitude on psychological well-being was significant ($\beta = 1.24$, $SE = 0.08$, $p < 0.05$, 95% and $CI = [1.08, 1.40]$). However, the direct effect of gratitude on psychological well-being was significant ($\beta = 0.66$, $SE = 0.09$, $p < 0.05$, 95%, and $CI = [0.48, 0.84]$). The total indirect effect of gratitude on psychological well-being was significant ($\beta = 0.58$, $SE = 0.14$, $p < 0.05$, 95%, and $CI = [0.31, 0.85]$). The mediating effect of positive coping strategies and life stressors were significant sequentially ($\beta = 0.35$, $SE = 0.11$, $p < 0.05$, 95% and $CI = [0.13, 0.57]$; $\beta = 0.22$, $SE = 0.07$, $p < 0.05$, 95% and $CI = [0.08, 0.35]$).

- Third, *optimism*, the results revealed that the total effect of optimism on psychological well-being was significant ($\beta = 1.09$, $SE = 0.08$, $p < 0.05$, 95% and $CI = [0.93, 1.25]$). However, the direct effect of optimism on psychological well-being was significant ($\beta = 0.55$, $SE = 0.09$, $p < 0.05$, 95%, and $CI = [0.36, 0.74]$). The total indirect effect of optimism on psychological well-being was significant ($\beta = 0.54$, $SE = 0.14$, $p < 0.05$, 95%, and $CI = [0.27, 0.81]$). The mediating effect of positive coping strategies and life stressors were significant sequentially ($\beta = 0.34$, $SE = 0.11$, $p < 0.05$, 95% and $CI = [0.12, 0.56]$; $\beta = 0.21$, $SE = 0.07$, $p < 0.05$, 95% and $CI = [0.07, 0.34]$).

- Fourth, *hope*, the results revealed that the total effect of hope on psychological well-being was significant ($\beta = 1.12$, $SE = 0.08$, $p < 0.05$, 95% and $CI = [0.96, 1.28]$). However, the direct effect of hope on psychological well-being was significant ($\beta = 0.62$, $SE = 0.09$, $p < 0.05$, 95%, and $CI = [0.44, 0.80]$). The total indirect effect of hope on psychological well-being was significant ($\beta = 0.49$, $SE = 0.09$, $p < 0.05$, 95%, and $CI = [0.31, 0.67]$).

Table 3 The mediating effects

Predictors	Model 1 (Positive Coping Strategies)			Model 2 (Life Stressors)			Model 3 (Psychological well-being)		
	β	SE	t	β	SE	t	β	SE	t
Mindfulness	1.031*	0.16	6.37*	-0.94*	0.22	-4.22*	0.57*	0.09	6.32*
Gratitude	1.048*	0.16	6.35*	-0.94*	0.22	-4.16*	0.66*	0.09	7.21*
Optimism	0.995*	0.16	5.99*	-0.86*	0.22	-3.78*	0.55*	0.09	5.64*
Hope	0.958*	0.16	5.70*	-0.72*	0.23	-3.09*	0.62*	0.09	6.67*
Positive Coping Strategies							0.34*	0.09	3.86*
Life Stressors							-0.24*	0.05	-2.49*

Note: * $p < 0.01$

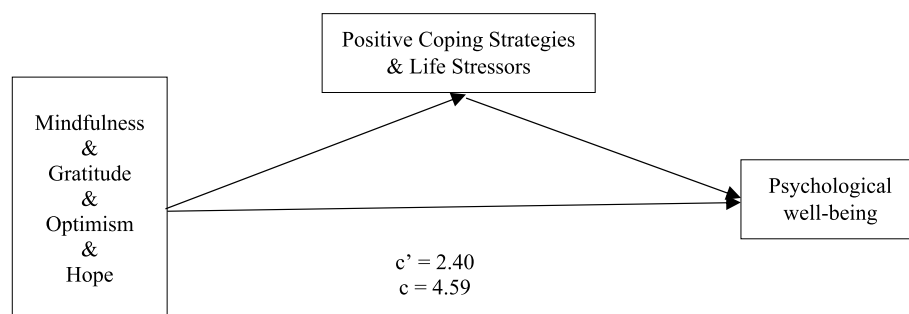


Fig. 2 The mediating effects

$=0.14$, $p < 0.05$, 95%, and $CI = [0.22, 0.76]$). The mediating effect of positive coping strategies and life stressors were significant sequentially ($\beta = 0.32$, $SE = 0.11$, $p < 0.05$, 95% and $CI = [0.10, 0.54]$; $\beta = 0.17$, $SE = 0.07$, $p < 0.05$, 95% and $CI = [0.03, 0.30]$).

Discussion

The first aim of this study was to investigate the relationship between positive psychological traits (mindfulness, gratitude, optimism, and hope), psychological well-being, and the relationships between these variables and positive coping strategies and life stressors. Our results revealed that mindfulness, gratitude, optimism, hope, psychological well-being, and positive coping strategies correlate positively. However, life stressors negatively correlated with all variables. These findings partially align with several studies that found mindfulness positively correlates with psychological well-being [48, 58, 62, 63] and with studies that found that gratitude, optimism, and hope, play a major role in enhancing positive emotions which lead to life satisfaction, and psychological well-being [4, 21, 75, 94]. These results explain the role of these positives in enhancing psychological well-being. Our study is different because we investigated the relationships between these positive psychological traits collectively and psychological well-being and two important mediating variables (positive coping strategies and life stressors) to understand the possible mechanism behind the link between these associations.

The second aim of our study was to explore the possibility that positive coping strategies and life stressors partially mediate the association of positive psychological traits (mindfulness, gratitude, optimism, and hope) with psychological well-being. The results confirmed our expectation, showing that positive coping strategies and life stressors partially mediated this association, highlighting that these mediators play a significant but not exclusive role in the influence of positive psychological traits on well-being.

Furthermore, our findings suggest that mindfulness may serve as a foundational trait that influences the development of other positive psychological characteristics, such as gratitude, optimism, and hope. By fostering non-judgmental present-moment awareness, mindfulness encourages individuals to reflect on their experiences more adaptively, thereby facilitating the emergence of gratitude, nurturing an optimistic outlook, and bolstering hope. These potential pathways were integrated into our mediation model, which allowed us to examine how the interplay between mindfulness and these related traits contributes collectively to psychological well-being.

Although our study is the first to examine these mediating roles comprehensively, previous theoretical

literature from positive psychology theories supports this finding. Each of the four positive psychological traits contributes uniquely to enhancing coping strategies and reducing stress: 1) Mindfulness improves adaptive coping strategies by enhancing present-moment awareness, which allows individuals to respond to stressors calmly and thoughtfully, reducing reactivity and stress perception [13]. 2) Gratitude encourages positive reframing of stressful situations, promoting acceptance and resilience and leading to better stress management and increased well-being [93]. 3) Optimism fosters a hopeful outlook on future outcomes, which strengthens problem-focused coping strategies and buffers the negative impacts of life stressors [17]. And 4) Hope motivates goal-oriented coping by providing a sense of direction and purpose, helping individuals navigate challenges with a proactive mindset, thus enhancing well-being [84].

In general, higher levels of mindfulness, gratitude, optimism, and hope are associated with improved well-being, as they contribute to better coping mechanisms and reduce stress, which in turn amplify psychological well-being. The results emphasize the critical roles that positive coping strategies and life stressors play in the impacts of positive psychological traits on well-being.

From a clinical perspective, these findings suggest that interventions aiming to enhance positive psychological traits (e.g., mindfulness training, gratitude exercises, optimism workshops, and hope-based therapy) could strengthen positive coping strategies and mitigate the effects of life stressors, leading to improved mental health outcomes. This study contributes to a deeper understanding of the mechanisms that link positive psychological traits to psychological well-being, offering valuable insights for clinical practices focused on mental health enhancement through the development of adaptive coping strategies and stress management techniques.

Our study has several limitations, similar to those in other research utilizing self-report measures to collect data. Self-reporting introduces potential bias, such as a tendency toward socially desirable responses, which could inflate the results. To mitigate this limitation, we ensured participant anonymity and emphasized honest responses during data collection. However, future studies should integrate multi-method approaches, including behavioral assessments, peer reports, or objective measures, to reduce self-report bias and enhance data validity. A second limitation is that we applied our study to only Shandong Xiehe University students, which limits the generalizability of the findings. It is imperative to broaden the research scope to include a wider range of educational institutions and more diverse student demographics, including varied academic backgrounds and ethnic origins. This expansion would help determine

whether the study's conclusions apply in different contexts and ensure representation from diverse populations, thus strengthening the generalization of findings.

Furthermore, our study used a cross-sectional design, which restricts the ability to establish causal relationships between positive psychological traits, coping strategies, life stressors, and psychological well-being. Mediation analysis with cross-sectional data is often considered undesirable, as the direction of influences cannot be definitively identified [61]. To address these limitations and mitigate potential biases inherent in self-report data, future research should consider employing longitudinal designs or experimental methods, as well as incorporating objective measures that minimize reliance on self-reporting. These approaches would allow for stronger causal inferences and a better understanding of the dynamic relationships among these variables over time. Finally, while the present research offers fresh insights into the effectiveness of mindfulness, gratitude, optimism, and hope among college students, further investigation is warranted to delve deeper into the empirical connections between these positive psychological traits and various aspects of student life, such as personality and academic performance.

Conclusion

Our study demonstrated that all four positive psychological traits—mindfulness, gratitude, optimism, and hope—are significantly and positively associated with psychological well-being, thereby underscoring their role as key determinants of mental health. Moreover, the mediation analyses revealed that positive coping strategies and life stressors partially mediate these relationships, indicating that the benefits of these traits on well-being are, in part, transmitted through the adoption of adaptive coping mechanisms and effective stress management. These findings highlight the practical importance of designing interventions, such as mindfulness training, gratitude exercises, optimism enhancement, and hope-based therapies, which not only foster these positive traits but also promote adaptive coping strategies to mitigate the adverse effects of life stressors. Ultimately, our results contribute to a deeper understanding of the mechanisms linking positive psychological traits to psychological well-being and provide valuable guidance for both theoretical development and practical interventions in positive psychology.

Abbreviations

MAAS	Mindful Attention Awareness Scale
GQ-6	Gratitude Questionnaire-6
OS	Optimism Scale
AHS	Adult Hope Scale
WCQ	Ways of Coping Questionnaire
SLSI	Student-Life Stress Inventory

GWS	Global Wellbeing Scale
RMB	Renminbi (Chinese currency)
SD	Standard Deviation
M	Mean
SPSS	Statistical Package for the Social Sciences
CI	Confidence Interval
G*Power	G*Power (power analysis software)

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s40359-025-02807-9>.

Supplementary Material 1.

Supplementary Material 2.

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Authors' contributions

Aamer Aldbyani: Writing – original draft, Visualization, Validation, Software, Resources, Methodology, Conceptualization, and Formal analysis. Guiyun Wang: Project administration. Zhang Chuanxia, Yanxia Qi and Jiaojiao Li: Data collection. And Jie Leng & Afnan Alhimaidi: Resources and Methodology.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the ethical standards set by the Academic Committee of the College of Humanities, Arts and Education at Shandong Xiehe University, the principles of the Declaration of Helsinki (1964), and other comparable guidelines governing research involving human subjects.

Consent for publication

All authors have read and approved the final version of the manuscript and hereby consent to its publication.

Competing interests

The authors declare no competing interests.

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