

## Mindfulness and Life Satisfaction: Parallel Mediation by Self-Control and Nature Connectedness Using SmartPLS-SEM

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### Abstract

Although mindfulness has been consistently associated with life satisfaction, the mechanisms underlying this relationship remain insufficiently explored. There is a lack of empirical research exploring the role of multiple mediators through which mindfulness may influence life satisfaction. This study makes a novel attempt by testing a parallel mediation model that integrates two theoretically distinct mediators, self-control and nature connectedness, to examine whether mindfulness enhances life satisfaction both directly and indirectly through these mediators. Data were collected from 566 participants using purposive sampling via the mall intercept method. PLS-SEM was conducted using SmartPLS, and the results show that mindfulness has a significant direct impact on life satisfaction ( $\beta = 0.256, p < .001$ ). In addition, both self-control ( $\beta = 0.150, p < .001$ ) and nature connectedness ( $\beta = 0.164, p < .001$ ) significantly mediate the mindfulness-life satisfaction link. These findings reveal that mindfulness boosts life satisfaction not only through self-control but also through nature connectedness, emphasizing the value of mindfulness interventions that address both internal self-control and external connectedness with nature to foster comprehensive and sustainable well-being.

**Keywords:** Mindfulness, life satisfaction, self-control, nature connectedness, parallel mediation

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### Introduction

The escalating stress, burnout, and mental distress issues in the past decades created a concern about the individual well-being on the global level (Diener et al., 2018; Keng et al., 2011). The current trends of technological advancement, increased workloads, and less availability of opportunities to have a restful experience have made it all the more crucial to identify solutions that may help people improve individual life satisfaction, which is a primary factor of subjective well-being (Lyubomirsky et al., 2005). It has been reported that life satisfaction is related to reduced mortality rates, improved mental well-being, and even improved social relations (Boylan et al., 2022; Kim et al., 2021), which has made it an important area of concern in the psychological research and interventions. Conventional interventions have been mostly focused on either cognitive-emotional regulation or lifestyle factors individually, but the growing research indicates that more comprehensive approaches can be applied with great effectiveness to enhance life satisfaction in its entirety (Capaldi et al., 2014). Mindfulness has become a driving force in this respect since it has the potential of enhancing life satisfaction as it has the capacity of incorporating the pillars of affective regulation, self-awareness and openness to experience (Keng et al., 2011). Mindfulness can enhance resilience, decrease stress and increase a more enjoyable and

balanced life by instilling the focus of the current moment and nonjudgmental acceptance.

### Mindfulness and Life Satisfaction

Mindfulness is defined as “a state of consciousness that involves awareness and attention of the self, others, and the outside environment and substantially supports decision-making” (Brown & Ryan, 2003). Mindfulness is associated with decreased levels of stress, increased control over emotions, subjective and psychological health (Sharma et al., 2025; Sharma and Kumar, 2024; Sweetly and Singh, 2024). One of the most uniformly related outcomes to mindfulness is life satisfaction which has been described as the cognitive evaluation of how satisfying the circumstances of one’s life are (Diener et al., 1985). The studies identify a positive connection between mindfulness and life satisfaction, signifying that the higher the mindfulness rate, the greater the life satisfaction reported by individuals (Li et al., 2022; Liang et al., 2022; Kanda & Kalsi, 2025)

Although there is overwhelming evidence that mindfulness and life satisfaction have a positive relationship, the mechanisms that facilitate the relationship are not adequately examined. The present study examines two potential pathways, i.e., self-control, which facilitates the regulation of behavior in line with personal goals, and nature connectedness, which nurtures a feeling of harmony with the natural environment,

through which mindfulness may increase life satisfaction.

### **Connections among Self-Control, Mindfulness, and Life Satisfaction**

Self-control refers to “the ability to override or change one’s inner responses, as well as to interrupt undesired behavioural tendencies and refrain from acting on them” (Tangney et al., 2004). Mindfulness increases the attentional stability, metacognitive awareness, and emotion regulation which are associated with the increase in self-control (Norman, 2017; Prakash, 2021). It is also beneficial to enhance self-control as it makes people more mindful of their inner conditions, as well as motivating individuals not to respond unconsciously and making it simpler to decide how to react (Bowlin & Baer, 2012). Furthermore, life satisfaction is also motivated by self-control, eliminating stress levels, and can help meet the long-term objectives (Hofmann et al., 2014). Self-control teaches one to be able to withstand the unwanted wants and to uphold goal-directed actions, resulting to the promotion of the psychological well-being (De Ridder et al., 2012). Moreover, it has also been associated with less procrastination and better adaptive coping that reflects in greater life satisfaction (Rebetez et al., 2018). Moreover, the interrelation between mindfulness and well-being outcomes, including an improvement in the psychosocial functioning of a person is mediated by self-control (Sinha et al., 2021). Liang et al. (2022) demonstrated that self-control enhances the connection of mindfulness with life satisfaction, but Short et al. (2016) demonstrated that self-regulation mediates the role of mindfulness on well-being.

### **Connections among Nature Connectedness, Mindfulness, and Life Satisfaction**

Nature connectedness refers to “a person’s profound, experiential sense of oneness and harmony with the natural world” (Mayer & Frantz, 2004). Mindfulness fosters nature connectedness by fostering the current sensory experience and decreasing the cognitive distraction (Howell et al., 2011). A substantial positive relationship between mindfulness and nature connectedness is also supported by cumulative evidence of meta-analyses (Schutte and Malouff, 2018). In addition, nature connectedness is also positively related to life satisfaction (Capaldi et al., 2014). Being closely connected with nature was also proven to bring positive feelings, lessen stress, and increase

psychological resilience, all of which lead to increased satisfaction in life (Pritchard et al., 2020). Moreover, mindfulness improves well-being when exposing to nature by improving nature connectedness that subsequently decreases negative affect and promotes positivity (Nisbet et al., 2019). Empirical literature displays positive correlations between mindfulness and nature connectedness, and correlates among nature connectedness, happiness and life satisfaction (Howell et al., 2011; Capaldi et al., 2014).

### **Research Gap and Problem Statement**

Though there is substantial research evidence that mindfulness is correlated positively to satisfaction with life, the psychological and behavioral variables that explain this relationship are not well studied, and there is an apparent gap in investigating the mediators, including self-control and nature connectedness. Since these mediators have not been empirically studied much, there is a paucity of research which investigates them concurrently. The present research proposes and estimates a parallel mediation model (Figure 1), thus making the current research a new addition to the existing body of knowledge since it sheds light on how these two different yet complementary processes interact to explain the mindfulness-life satisfaction link.

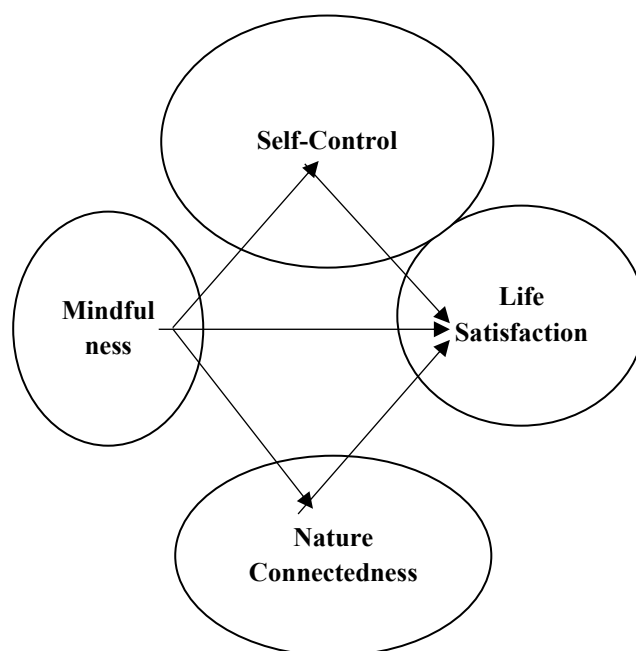


Figure 1: Conceptual framework

**Research Objectives**

1. To evaluate the direct influence of mindfulness on life satisfaction, self-control and nature connectedness.
2. To examine the influence of self-control and nature connectedness on life satisfaction.
3. To assess the role of self-control and nature connectedness as mediators in the mindfulness-life satisfaction link.

**Hypotheses of the study**

H<sub>1</sub>: Mindfulness positively impacts life satisfaction.

H<sub>2</sub>: Mindfulness positively impacts self-control.

H<sub>3</sub>: Mindfulness positively impacts nature connectedness

H<sub>4</sub>: Self-control positively impacts life satisfaction

H<sub>5</sub>: Nature connectedness positively impacts life satisfaction.

H<sub>6</sub>: The connection between mindfulness and life satisfaction is significantly mediated by self-control.

H<sub>7</sub>: The connection between mindfulness and life satisfaction is significantly mediated by Nature connectedness

**Methodology****Participants**

The sample of the study was composed of 566 adults residing in highly urbanized regions of Punjab, India, specifically Amritsar, Ludhiana, Sahibzada Ajit Singh Nagar, and Jalandhar, along with the Union Territory of Chandigarh, India, with at least a graduate degree as a qualification. Males represented 48.41% of the sample, while females accounted for 51.59%. In terms of education, 52.12% were graduates, 44.70% were postgraduates, and 3.18% had completed a doctorate qualification.

**Procedure**

This research utilized a cross-sectional design to examine the connections among study variables. The data were collected as a part of doctoral research by using mall intercept method through the purposive sampling. The malls were selected as data collection places due to the high footfalls in the urban places that

are central to people of a wide age range, education and career backgrounds. Purposive sampling was used to identify the sample that fits the required sample criteria. Inclusion criteria comprised individuals aged 18 years and above, having at least a graduate-level education, and able to comprehend the questionnaire. Exclusion criteria included incomplete and patterned responses and ineligible participants. Out of the total 600 respondents invited, 566 valid responses were obtained after the process of filtering out incomplete responses and this means that an effective response rate of about 94% was achieved. According to established methodological benchmarks, an adequate sample size corresponds to at least ten observations per measurement item (Hair et al., 2010). With 47 items, at least 470 responses were required; thus, the final sample of 566 was adequate for the analysis.

**Operational Definitions and Measures****Mindfulness**

Mindfulness was operationalised as present-moment awareness and attention to daily experiences and measured using the Mindful Attention Awareness Scale developed by Brown and Ryan (2003). Responses were recorded on a 7-point Likert scale. This scale is widely used due to its robust psychometric properties, with recent studies confirming its reliability and validity and continued application across research contexts (González-Blanch et al., 2022; Xiong et al., 2025).

**Life Satisfaction**

Life satisfaction was operationalized as the cognitive evaluation of the overall quality and satisfactoriness of one's life conditions and was assessed using the Satisfaction With Life Scale developed by Diener et al. (1985). Responses were recorded on a 7-point Likert scale.

**Self-Control**

Self-control was operationalized as the ability to override internal responses and inhibit undesired behavioral tendencies and was measured using the Brief Self-Control Scale developed by Tangney et al. (2004). Responses were recorded on a 5-point Likert scale.

**Nature Connectedness**

Nature connectedness was operationalized as the perceived sense of oneness and emotional connection with the natural world and was measured using the Connectedness to Nature Scale developed by Mayer and Frantz (2004).

Responses were recorded on a 5-point Likert scale.

**Results**

**Measurement Model Analysis**

The data were analyzed using PLS-SEM through the SmartPLS version 4.1.1.4 (Ringle et al., 2024). Measurement model was tested to confirm that the constructs were reliable and valid before proceeding to structural testing. The outer loading of all items was used to check the indicators' reliability, and the values more than 0.70 were deemed acceptable (Hair et al., 2020). The outer loading of all the construct items was above 0.7 with an exception of those items of self-control (SCT3 and SCT4) and nature connectedness (NAC12 and NAC13). These items were removed in order to enhance the model fit. The construct reliability was ensured utilizing Cronbach's alpha ( $\alpha$ ) as well as composite reliability measured through

$\rho_a$  and  $\rho_c$ , with values of 0.70 or higher indicating adequate reliability (Hair et al., 2017). All the constructs had Average variance extracted (AVE) more than threshold of 0.50, confirming convergent validity (Hair et al., 2017). Multicollinearity at the indicator level was checked using outer VIF values. The absence of problematic multicollinearity across items was confirmed by as all values were below the 3.3 criterion (Kock & Lynn, 2012). Table 1 displays that all of the indicator loadings,  $\alpha$ ,  $\rho_a$ ,  $\rho_c$  and AVE were all within acceptable thresholds. Discriminant validity was ensured by the criterion given by Fornell-Larcker and the HTMT ratio. Table 2 reveals that the AVE square root of each construct exceeded its inter-construct correlations, and Table 3 represents that HTMT values were below 0.85, signifying adequate discriminant validity (Fornell & Larcker, 1981; Henseler et al., 2015)

**Table 1**  
*Reliability and Validity Statistics*

Construct	Items	Factor loading	( $\alpha$ )	$\rho_a$	$\rho_c$	AVE
Mindfulness	MFN1	0.726	0.936	0.938	0.944	0.529
	MFN2	0.714				
	MFN3	0.781				
	MFN4	0.723				
	MFN5	0.728				
	MFN6	0.716				
	MFN7	0.73				
	MFN8	0.711				
	MFN9	0.724				
	MFN10	0.738				
	MFN11	0.711				
	MFN12	0.722				
	MFN13	0.721				
	MFN14	0.712				
	MFN15	0.747				
Self-Control	SCT1	0.712	0.919	0.92	0.932	0.554
	SCT2	0.738				
	SCT5	0.72				
	SCT6	0.781				
	SCT7	0.715				
	SCT8	0.72				
	SCT9	0.734				
	SCT10	0.766				
SCT11	0.715					

	SCT12	0.82				
	SCT13	0.756				
Nature Connectedness	NAC1	0.745	0.923	0.928	0.934	0.541
	NAC2	0.765				
	NAC3	0.751				
	NAC4	0.714				
	NAC5	0.724				
	NAC6	0.735				
	NAC7	0.706				
	NAC8	0.714				
	NAC9	0.724				
	NAC10	0.773				
	NAC11	0.714				
NAC14	0.757					
Life Satisfaction	LIS1	0.702	0.847	0.846	0.891	0.622
	LIS2	0.801				
	LIS3	0.818				
	LIS4	0.811				
	LIS5	0.803				
<i>Source: SmartPLS Results Compiled by author</i>						

**Table 2**  
*Fornell-Larcker Criterion*

Constructs	Life Satisfaction	Mindfulness	Nature Connectedness	Self-Control
Life Satisfaction	0.788			
Mindfulness	0.57	0.727		
Nature Connectedness	0.625	0.457	0.736	
Self-Control	0.606	0.502	0.498	0.744
<i>Source: SmartPLS Results Compiled by author</i>				

**Table 3**  
*HTMT Ratios*

Constructs	Life Satisfaction	Mindfulness	Nature Connectedness	Self-Control
Life Satisfaction				
Mindfulness	0.635			
Nature Connectedness	0.692	0.468		
Self-Control	0.682	0.534	0.51	
<i>Source: SmartPLS Results Compiled by author</i>				

**Structural Model Analysis**

The structural model was evaluated to assess the proposed hypothesis once the measurement model was validated. Inner VIF values were calculated to examine collinearity among latent predictor constructs, with all values falling

lower than the prescribed limit of 3.3, indicating the absence of multicollinearity (Kock & Lynn, 2012). As shown in Figure 2, mindfulness, nature connectedness, and self-control collectively explained 55.1% of the variance in life satisfaction, reflects a substantial level of

explanatory power as per Cohen’s (1988) guidelines. The significance and strength of the hypothesized paths were determined using a bootstrapping procedure with 10,000 resamples. As represented in Table 4, all path coefficients’ p-values were below 0.05, t-values were statistically significant and confidence intervals did not constitute zero, supporting all

proposed hypotheses (Hair et al., 2017). In terms of direct effects, mindfulness significantly and positively impacted life satisfaction, supporting H<sub>1</sub>. Mindfulness was also significantly associated with self-control and nature connectedness, supporting H<sub>2</sub> and H<sub>3</sub>, respectively.

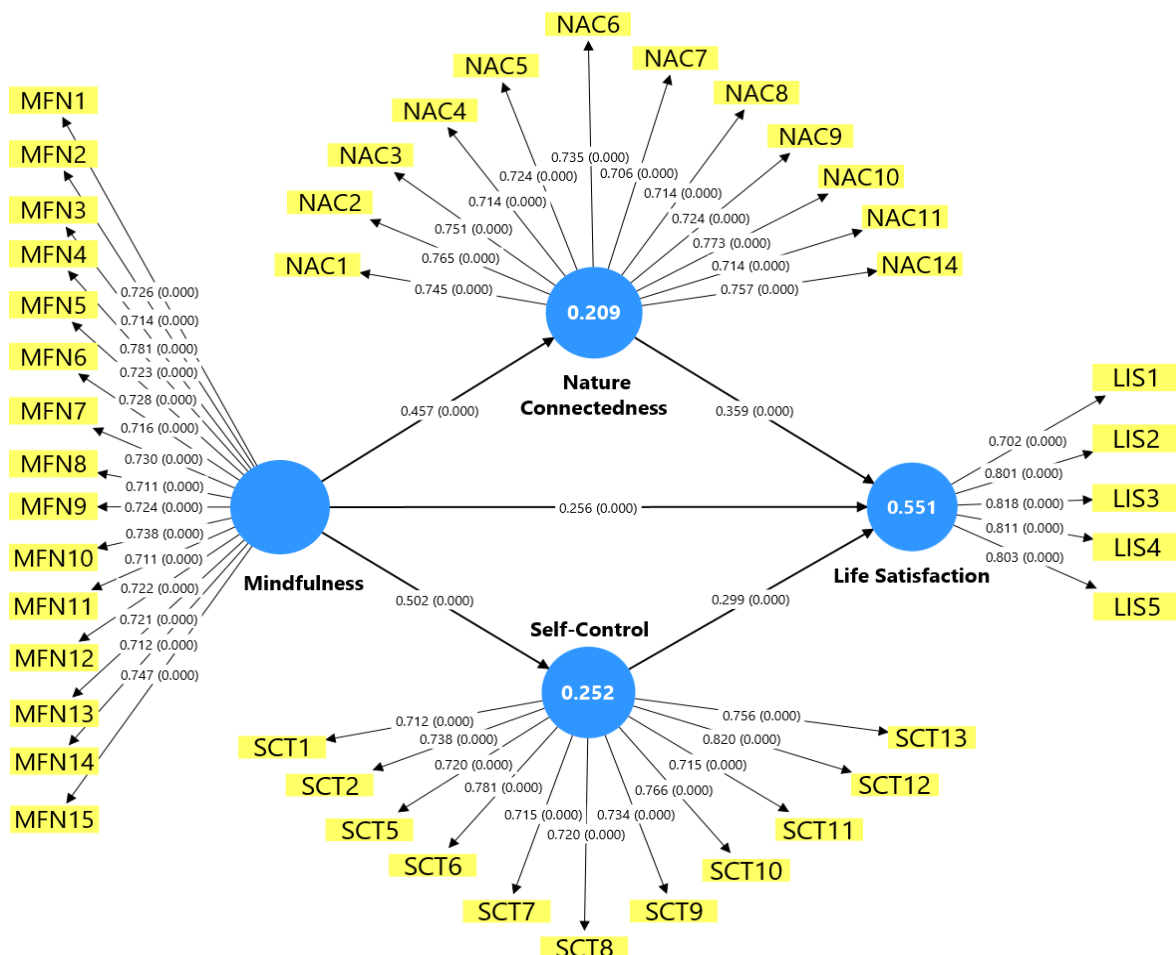


Figure 2: Final Bootstrapped PLS-SEM Model Showing Measurement and Structural Results (Generated through SmartPLS)

Both mediators i.e. self-control and nature connectedness, showed significant positive associations with life satisfaction, supporting H<sub>4</sub> and H<sub>5</sub>. The bootstrapped mediation analysis further confirmed significant indirect effects. Self-control significantly mediated the

connection of mindfulness with life satisfaction, supporting H<sub>6</sub>. Similarly, nature connectedness significantly mediated this relationship, supporting H<sub>7</sub>. All direct and indirect effect results are shown in Table 4.

Table 4: Path Analysis

Path	(β) value	Sample mean (M)	Standard deviation	T values	P values	Confidence intervals (Bias-corrected)	
						2.5% Lower	97.5% Upper
Mindfulness to Nature Connectedness	0.457				0.000		
Mindfulness to Self-Control	0.502				0.000		
Mindfulness to Life Satisfaction	0.256				0.000		
Nature Connectedness to Life Satisfaction	0.359				0.000		
Self-Control to Life Satisfaction	0.299				0.000		

Direct effects							
H <sub>1</sub> : Mindfulness → Life Satisfaction	0.256	0.256	0.033	7.724	0.000	0.191	0.322
H <sub>2</sub> : Mindfulness → Self-control	0.502	0.504	0.034	14.819	0.000	0.429	0.563
H <sub>3</sub> : Mindfulness → Nature Connectedness	0.457	0.459	0.037	12.333	0.000	0.378	0.523
H <sub>4</sub> : Self-control → Life Satisfaction	0.299	0.299	0.040	7.435	0.000	0.220	0.376
H <sub>5</sub> : Nature Connectedness → Life Satisfaction	0.359	0.359	0.042	8.609	0.000	0.273	0.438
Indirect effects							
H <sub>6</sub> : Mindfulness → Self-control → Life Satisfaction	0.150	0.151	0.022	6.676	0.000	0.109	0.196
H <sub>7</sub> : Mindfulness → Nature Connectedness → Life Satisfaction	0.164	0.165	0.024	6.915	0.000	0.120	0.212
<i>Source</i> : SmartPLS Results Compiled by author							

## Discussion

The findings provide much evidence of a positive association of mindfulness with life satisfaction either directly or indirectly through self-control and nature connectedness. This developed correlation of mindfulness with life satisfaction aligns with the previous literature that suggest that mindfulness leads to satisfaction with life and psychological health due to increased awareness, emotional control, and present experience (Ajilchi et al., 2021). Additionally, the connection of mindfulness with nature connected was also found to be positive, which was in line with earlier studies that suggested that mindfulness strengthens the connection between a person and nature by increasing present-moment mindfulness and minimizing cognitive distractions that separate a human being and nature (Schutte and Malouff, 2018). Equally, mindfulness had a positive influence on self-control. This observation is also in line with the prior literature that found a positive effect of mindfulness on self-control through its increases in attentional control and decreases in automatic impulsive behaviours (Suarez-Garcia et al., 2020). Additionally, the results present

also show that self-control affects life satisfaction in a positive manner, and it is consistent with previous literature revealing that individuals with high self-control have higher well-being because they can restrain different impulses and can achieve long-term goals (Li et al., 2022; Wenzel et al., 2021). Similarly, the findings indicate that nature connectedness also has a positive association with life satisfaction, which aligns with the research findings that a sense of connectedness with nature positively correlates with well-being in terms of positive affect and less stress (Nisbet and Zelenski, 2022; Asan et al., 2023). This connectedness has been associated with restorative experiences, positive affect and meaning in life, and all these make us well-being contributors. Notably both variables had a significant mediation role in the mindfulness-life satisfaction link, which means that mindfulness can improve well-being by developing better self-regulatory skills and improving emotional commitment to the natural world. The fact that parallel mediators are present indicates that mindfulness has more than one, theoretically different pathway i.e. one intrapersonal (self-control) and one

relational (nature connectedness). The results add to the literature by bringing self-control and nature connectedness together as a parallel mediation model that explains the mindfulness-life satisfaction correlation and provide a more refined insight into how the mindfulness practice may lead to long-term well-being gains. The implications of the study are that mindfulness interventions can be used to improve life satisfaction because it can augment self-control and connectedness to nature. The interventions may be implemented in educational, work, and clinical settings to promote personal wellness and environmental awareness that could be a practical solution to rising mental health and environmental issues.

### Limitations and Future Research

Although the study has significant findings, there are some weaknesses that need to be considered as the findings can be interpreted. The employed research design is the cross-sectional research design and the interrelations between mindfulness, self-control, nature connectedness, and life satisfaction were obtained; the future research that utilizes the longitudinal or experimental study design could provide more insight in regard to the sequences of time and causation. In addition, the self-report instruments were appropriate to consider the subjective experiences of the participants, yet the mixed-method study that incorporates both quantitative and qualitative designs could have offered more in-depth and detailed information. Finally, the sample was chosen in Punjab and Chandigarh (Union Territory) in India. Although this geographical setting offers depth in a significant way, it also limits the extrapolative ability of the findings to other geographical areas. This limitation would be countered by expanding the future research to include subjects with diverse socio-demographics to understand the strength of observed relationships. Future research can examine how these pathways differ between geographical areas, cultures and generations, to encompass more of the mechanisms and which mediators and moderators might exist that may influence such relationships.

### Conclusion

This research provides new empirical findings supporting the role of mindfulness in increasing life satisfaction. These findings also show that self-control and nature connectedness are parallel mediators in this association, indicating

that mindfulness is an effective psychological resource, which has implications on how people behave, their connection with the natural environment, and their personal life satisfaction. The findings contribute to the development of the theoretical knowledge since they unite self-control and nature connectedness into the parallel mediation model and imply that the advantages of mindfulness extend beyond individual well-being to encompass a more profound connection with the natural environment. Overall, the study underscores that mindfulness, by enhancing self-control and fostering a deeper connection with nature, serves as a powerful pathway to greater life satisfaction.

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