TPM Vol. 33, No. 1, 2026
ISSN: 1972-6325
https://www.tpmap.org/

Open Access

EXAMINING THE EFFECTIVENESS OF BODY SCAN MEDITATION ON STRESS AMONG FIRST-YEAR UNIVERSITY STUDENTS

YASEMIN UZUN
ÇANAKKALE ONSEKIZ MART UNIVERSIT, TÜRKÇE VE SOSYAL BILIMLER EĞITIMI BÖLÜMÜ, CEVATPAŞA MAH., İNÖNÜ CAD., NO: 17/3, ÇANAKKALE MERKEZ, ÇANAKKALE, TÜRKIYE.

Abstract: Stress has become a pervasive problem significantly affecting university students' academic and social lives. This mixed-methods study examined the effectiveness of a 4-week guided body scan meditation program-involving sequential attention to body parts while observing sensations without judgment-on stress among first-year university students (N=43). Paired-samples t-test revealed statistically significant reductions in stress-related automatic thoughts from pre-test (M=23.42, SD=5.01) to post-test (M=17.09, SD=6.12), t(42)=5.63, p<.001, Cohen's d=1.12, representing a 27% decrease. Qualitative content analysis of participants' descriptions of emotional states and stress sources identified eight themes: physiological manifestations (87.5% reduction), cognitive restructuring, emotion regulation (90.7% improvement), social functioning, academic stress (85.7% reduction), existential concerns (84.6% reduction), self-efficacy enhancement, and coping strategies. Overall, 93% reported improvements across diverse domains. Convergence of quantitative and qualitative evidence demonstrates that brief body scan meditation effectively addresses the multifaceted, interconnected challenges of university transition, representing a feasible intervention for students' mental health needs.
Keywords: Body scan meditation; Stress reduction; First-year university students; Mixed-methods research; Mindfulness.

INTRODUCTION

Stress, one of the most critical issues of the 21st century, has become a pervasive problem that significantly affects the academic and social lives of university students. Research has demonstrated that university students experience test anxiety at functionally impairing levels (Bedewy & Gabriel, 2015; Pascoe et al., 2020). Prolonged stress not only undermines psychological well-being but also contributes to various physical health problems (Emmerton et al., 2024; Ribeiro et al., 2018). Stress is defined as spontaneous, reflexive cognitions that substantially influence emotional responses (Beck, 1976; Clark & Beck, 2010).

The transition to university brings academic demands, social adjustment, financial pressures, and geographical separation from family (Bewick et al., 2010; Cleary et al., 2011). First-year students are typically vulnerable to psychological distress, with significantly higher rates of anxiety and depression compared to other populations (Auerbach et al., 2016; Ibrahim et al., 2013).

The rapidly increasing high stress among university students has been found to be associated with poor academic performance, lack of self-confidence, and depression (Bedewy & Gabriel, 2015). The developmental context of late adolescence (ages 18-19) presents challenges such as identity formation, autonomy development, and establishing new social networks (Arnett, 2000).

The need for interventions to effectively reduce stress has been articulated by numerous researchers (Alvarado-García et al., 2025). Mindfulness-based practices that emphasize present-moment awareness have emerged as promising approaches for stress reduction (Gong et al., 2023; González-Martín et al., 2023; Khoury et al., 2015). Among these practices, body scan meditation, a core component of Mindfulness-Based Stress Reduction (MBSR) programs, has received increasing attention due to its systematic approach to cultivating present-moment awareness and somatic attention (Kabat-Zinn, 1990, 2003).

Body scan meditation, as a fundamental component of Mindfulness-Based Stress Reduction (MBSR) programs, involves systematically directing attention to bodily sensations in a gradual, sequential manner (Kabat-Zinn, 1990). The practice aims to cultivate awareness of the present moment (Mehling et al., 2012). Although quantitative research has established its effectiveness in stress reduction (Wielgosz et al., 2019; Khoury et al., 2015), qualitative research capturing the lived experiences of first-year university students remains considerably limited.

Body scan meditation involves sequentially directing attention to different parts of the body, observing physical sensations without judgment or reactivity (Dreeben et al., 2013). This practice is known to reduce stress, enhance mindfulness, and regulate mood (Mehling et al., 2012; Tang et al., 2015). Recent neuroimaging studies have demonstrated that body scan practice is associated with structural and functional changes in brain regions involved in attention, emotion regulation, and self-referential processing (Hölzel et al., 2011; Tang et al., 2015), with emerging evidence suggesting that these neural adaptations may be protective against stress-related cognitive maladaptations (Yeo et al., 2024).

Implementation outcomes support the stress-reducing effects of body scan meditation. A meta-analysis by Khoury et al. (2015) found that mindfulness-based interventions incorporating body scan practices yielded medium to large effect sizes for stress reduction in both clinical and non-clinical populations. More recently, Pan et al. (2024) conducted a GRADE-assessed systematic review demonstrating that MBSR significantly improved anxiety, depression, perceived stress, sleep quality, and overall quality of life among university students. Gallo et al. (2023) found that an 8-week mindfulness practice provided significant improvements in stress, depression, and insomnia symptoms among Brazilian university students. However, most research on body scan meditation has been conducted within multi-component MBSR programs, making it challenging to isolate the specific effects of body scan practice (Goldberg et al., 2018; Pan et al., 2024).

This study examines the effect of a 4-week guided body scan meditation program on stress reduction among first-year students at a university in western Turkey. Given recent evidence demonstrating the stress-reducing effects of body scan meditation (Prasartpornsirichoke et al., 2025), it was hypothesized that participants would show significant reductions in stress levels following the 4-week practice.

The main problem of this study is to determine to what extent and how a 4-week guided body scan meditation program reduces stress levels and influences stress experiences among first-year university students. In line with this main problem, the study is presented in two dimensions:

1. To what extent does participation in a 4-week body scan meditation program reduce stress-related automatic thoughts among first-year university students?
2. How do first-year university students describe their emotional states and perceived sources of stress before and after body scan meditation practice, and what changes are observed in their subjective stress experiences?

In this study, data regarding the extent to which body scan meditation reduces stress and influences students' subjective stress experiences were analyzed using a mixed-methods approach combining quantitative and qualitative methods. First, quantitative data regarding the extent to which stress-related automatic thoughts decreased following the intervention were analyzed using paired-samples t-test. Then, qualitative data regarding how participants described their emotional states and stress sources before and after the intervention were systematically examined using content analysis.

Given evidence from prior research demonstrating the stress-reducing effects of mindfulness-based body scan practices (Khoury et al., 2015; Pan et al., 2024), it was hypothesized that participants would show significant reductions in stress levels following the 4-week intervention, as reflected in both quantitative stress scores and qualitative descriptions of stress experiences.

METHOD

Design

This study employed a single-group pre-test/post-test quasi-experimental design (Shadish et al., 2002) to examine the effectiveness of a 4-week body scan meditation intervention on stress levels among first-year university students. While this design does not permit causal inferences due to the absence of a control group, it provides preliminary evidence regarding the intervention's potential efficacy and serves as a foundation for future controlled trials. The study utilized a mixed-methods approach (Creswell & Plano Clark, 2018), combining quantitative assessment of stress levels with qualitative exploration of participants' subjective experiences and stress attributions.

Sample

The sample of the study consisted of 43 first-year undergraduate students studying at a state university in western Turkey. The participants were selected on a voluntary basis using convenience sampling and participated in a 4-week body scan meditation program for stress management. First-year students were specifically targeted due to their heightened vulnerability to stress associated with geographical separation from family, academic adjustment, and the transition to university life. All 43 participants completed the entire program (100% retention rate). The quantitative data collected through the Stress Scale (Automatic Thinking) and qualitative data obtained from open-ended written responses before and after the intervention constituted the main data sources of the study.

Data Collection

The data were collected through the Stress Scale (Automatic Thinking) and open-ended written responses before and after a 4-week body scan meditation program. Participants completed the Stress Scale and provided written responses to two questions: (1) “How do you feel right now?” and (2) “What are the sources of your current stress?” at both pre-test (Week 1) and post-test (Week 4). The body scan meditation intervention consisted of 8 guided sessions (two 60-minute sessions per week for 4 weeks) conducted in a quiet campus room. All sessions followed a standardized protocol based on Mindfulness-Based Stress Reduction (MBSR) practices (Kabat-Zinn, 1990, 2003), including positioning and preparation (10 minutes), guided body scan (40 minutes), and integration and closure (10 minutes). All 43 participants completed all sessions with 100% attendance rate.

Data Analysis

The collected data were analyzed using both quantitative and qualitative methods. Quantitative data from the Stress Scale were analyzed using SPSS Statistics Version 27. Pre-test and post-test scores were compared using paired-samples t-test, with normality assumptions assessed through the Shapiro-Wilk test. Effect size was calculated using Cohen's d, with statistical significance set at $p < .05$.

Qualitative data from open-ended written responses were analyzed using content analysis. The analysis proceeded through systematic steps: responses were transcribed verbatim, read repeatedly for familiarization, coded into meaningful units, organized into categories based on thematic similarity, and refined through iterative review. Two independent coders analyzed the data separately to ensure reliability.

Validity and Reliability

The validity and reliability of the study were ensured by considering the credibility, transferability, consistency, and confirmability criteria, which are trustworthiness measures in mixed-methods research. To increase credibility, the coding process was conducted by two independent researchers, and inter-rater reliability was calculated using Cohen's kappa. Direct quotations from participant responses were provided to ensure that interpretations were data-based. For transferability, the study context, sample characteristics, intervention protocol, data collection procedures, and analysis stages were explained in detail to guide future studies in similar settings. To ensure consistency, the Stress Scale demonstrated good internal consistency ($\alpha = .82$ at pre-test, $\alpha = .86$ at post-test), and all quantitative and qualitative analysis steps were documented systematically. Inter-coder agreement was calculated to support the reliability of qualitative analyses, and discrepancies were resolved through discussion to reach consensus. To strengthen confirmability, the entire analysis process was recorded in detail to ensure that results were independent of researcher bias, and all coding decisions were documented transparently. This approach ensured the scientific rigor of the study and made the results valid and reliable in both academic and practical contexts.

Ethical Considerations

The study was conducted with the approval decision numbered 22/114 dated 24.10.2025 of the Social and Human Sciences Ethics Committee of a state university.

RESULTS

This study employed a mixed-methods approach to examine the effectiveness of a 4-week body scan meditation program on stress reduction among first-year university students. Results are presented in two sections: quantitative findings from the Stress Scale (Automatic Thinking) and qualitative findings from participants' written responses to open-ended questions.

Quantitative Findings

Preliminary Analyses

Prior to conducting the main analysis, assumptions for paired-samples t-test were evaluated. The Stress Scale (Automatic Thinking) demonstrated good internal consistency at both pre-test ($\alpha = .82$) and post-test ($\alpha = .86$).

Pre-test and Post-test Comparison

To determine whether the 4-week body scan meditation program significantly reduced stress-related automatic thoughts, participants' pre-test and post-test scores were compared using paired-samples t-test. Descriptive statistics and analysis results are presented in Table 1.

TABLE 1 *Paired-Samples t-Test Results for Stress Scale Scores Before and After the Intervention*

Measurement	***n***	***M***	***SD***	***df***	***t***	***p***	**Cohen's *d***
Pre-test	43	23.42	5.01	42	5.63	<.001	1.12
Post-test	43	17.09	6.12				

Note. M = Mean; SD = Standard Deviation; df = degrees of freedom.

Results indicated that participants reported significantly lower stress-related automatic thoughts at post-test ($M = 17.09$, $SD = 6.12$) compared to pre-test ($M = 23.42$, $SD = 5.01$), $t(42) = 5.63$, $p < .001$. The mean difference of 6.33 points represents a 27% reduction in stress scores. Cohen's d of 1.12 indicates a large effect size, demonstrating that the body scan meditation program had a substantial practical impact on stress reduction. These findings support the hypothesis that participation in a 4-week body scan meditation program would significantly reduce stress levels among first-year university students.

Qualitative Findings

Content analysis of participants' written descriptions of their stress levels and emotional states revealed eight major themes characterizing their stress experiences before and after the intervention. Notably, 93% of participants (40/43) reported some degree of improvement, with variations in magnitude and specific areas affected.

Theme 1: Physiological Manifestations of Stress

Prior to the intervention, eight participants (18.6%) reported somatic symptoms of stress. These symptoms included tremor ("My hands tremble frequently," P5), gastrointestinal distress ("I feel nauseous, my stomach hurts," P5), muscle tension ("My muscles are tense, I bite my lips," P22), freeze response ("When I'm stressed, I freeze," P33), and pain ("Thinking about it causes pain," P35).

Following the intervention, only one participant (2.3%) continued to report significant physiological symptoms, representing an 87.5% reduction in somatic stress manifestations. A representative participant described the change as follows: "The trembling of my hands, nausea, stomach pain, and anxiety have decreased significantly" (P5).

This dramatic reduction in somatic symptoms aligns with theoretical models suggesting that body scan meditation enhances interoceptive awareness, enabling individuals to detect and respond to early stress signals before they escalate into severe physiological symptoms (Farb et al., 2015). The practice may also reduce autonomic nervous system reactivity, thereby disrupting the stress-symptom cycle.

Theme 2: Cognitive Restructuring and Flexibility

Prior to the intervention, four participants (9.3%) explicitly described rigid cognitive patterns. These patterns included perfectionism ("I'm a perfectionist. I don't accept help," P3), catastrophic thinking ("I think about failure and constantly think negatively," P30), and rumination ("I overthink, I create scenarios in my head," P3).

Following the intervention, six participants (14%) described enhanced cognitive flexibility, representing a 50% increase in adaptive thinking patterns. These changes manifested as acceptance ("I don't dwell on things anymore and everything doesn't need to be perfect," P3), present-moment focus ("I started focusing on the moment," P22; "I try to live in the moment," P40), reframing ("I realized that stress is temporary and I can control it," P10), and future orientation ("I started dreaming," P8).

One participant's pre- and post-intervention statements clearly illustrate this transformation: "I feel both strong and very weak. I don't know how I'll succeed" (P27, pre-intervention) shifted to "I'm more peaceful. I'm stronger" (P27, post-intervention).

The emergence of cognitive flexibility suggests that body scan practice facilitates metacognitive awareness-the ability to observe thoughts without immediate identification or reactivity (Jankowski & Holas, 2014). The shift from perfectionist rigidity to acceptance parallels findings in mindfulness research showing decreased need for certainty and control (Teper et al., 2013).

Theme 3: Emotion Regulation and Affective States

Prior to the intervention, emotional dysregulation was nearly universal, with 41 participants (95.3%) reporting stress, anxiety, or related negative affective states. These states were expressed as pervasive stress ("I'm extremely stressed," P10, P20), anxiety ("I have anxiety," P23), fear ("I'm afraid," P5), and tension ("I feel tense lately," P2). Severity levels also varied: severe (10 participants, 23.3%), moderate (20 participants, 46.5%), and mild (11 participants, 25.6%).

Following the intervention, 39 participants (90.7%) reported improved emotional states, with affective descriptors shifting to calmness ("I'm calm," P8; "I'm calmer," P17, P39), peace ("I'm peaceful," P10; "I'm more peaceful," P27), happiness ("I'm happy," P8, P11, P18), and relaxation ("I feel relaxed," P30).

One participant's experience strikingly exemplifies this change: "I'm very stressed. I'm afraid... I speak faster and more incomprehensibly than normal" (P5, pre-intervention) transformed to "I feel more peaceful. I'm safe and happy" (P5, post-intervention).

This widespread improvement in emotional states suggests that body scan meditation may enhance emotion regulation capacity through multiple mechanisms: (1) exposure to distressing sensations or affects in a safe context, (2) development of non-reactive observation skills, and (3) increased parasympathetic activation (Desbordes et al., 2015).

Theme 4: Social Relationships and Interpersonal Functioning

Prior to the intervention, five participants (11.6%) described social challenges. These challenges were identified as social withdrawal ("I don't participate in any activities, I don't meet with my friends," P1), communication anxiety ("Speaking in front of crowds stresses me. I don't like communication," P28), and fear of judgment ("I'm afraid of making mistakes when talking with my friends," P2).

Following the intervention, all five participants reported improved social functioning. These improvements were observed as social engagement ("I spend most of my time going to activities. I'm very happy with my friends," P1), relationship quality ("I have friends now. I'm more comfortable," P28), and decreased social anxiety ("I'm not afraid of making mistakes when talking with my friends," P2).

One participant's statement clearly demonstrates the change in social functioning: "I don't participate in any activities, I don't meet with my friends" (P1, pre-intervention) shifted to "I have good and reliable friends. I spend most of my time going to activities. I'm very happy with my friends" (P1, post-intervention).

Enhanced social functioning likely reflects decreased social anxiety and increased self-confidence resulting from improved emotion regulation. The shift from avoidance to engagement patterns suggests that stress reduction freed psychological resources for relationship investment (Creswell et al., 2014).

Theme 5: Academic Stress and Performance Concerns

Prior to the intervention, seven participants (16.3%) identified academic-related stressors. These stressors were expressed as exam anxiety ("I get stressed during exam week because I feel like I won't pass," P1),

performance fears (“Exams stress me. Getting low grades stresses me,” P4), and learning concerns (“I think about how I'll learn the topics I didn't understand in class until I get home,” P1).

Following the intervention, only one participant continued to report significant academic stress, representing an 85.7% reduction. Notably, one participant stated: “Exams don't stress me much anymore. Thinking this way, my grades also increased” (P4).

One participant's experience exemplifies the change in academic stress and performance perception: “Exams stress me. Getting low grades stresses me” (P4, pre-intervention) shifted to “Exams don't stress me much anymore. Thinking this way, my grades also increased. My stress level decreased considerably” (P4, post-intervention).

The significant reduction in academic stress may reflect enhanced emotion regulation in evaluative situations and cognitive reframing of academic challenges as manageable rather than catastrophic. Notably, P4's report of grade improvement suggests potential performance benefits beyond subjective stress reduction. This finding is consistent with research showing that mindfulness enhances working memory and attentional control (Mrazek et al., 2013).

Theme 6: Existential Concerns and Future Uncertainty

Prior to the intervention, thirteen participants (30.2%) expressed existential concerns. These concerns were articulated as future anxiety (“I have anxiety about the future,” P7, P35, P37, P40, P41), intolerance of uncertainty (“Uncertainties stress me,” P6, P19, P22, P31, P39), adaptation struggles (“Trying to adapt to new conditions stresses me,” P35), and career doubts (“I know I won't be able to practice my profession in the future,” P20).

Following the intervention, only two participants continued to report significant existential anxiety, representing an 84.6% reduction. Changes were observed as decreased future focus (“I try not to think about the future,” P37) and reduced worry (“My anxiety about the future decreased,” P35, P40).

One participant's statement illustrates the change in future-oriented anxiety: “Trying to adapt to new conditions stresses me. I have anxiety about the future. It causes pain when I think about it” (P35, pre-intervention) shifted to “My anxiety about the future decreased” (P35, post-intervention).

This marked reduction in future-oriented anxiety suggests that present-moment awareness cultivated through body scan meditation disrupted patterns of chronic anticipatory worry and catastrophic future projection. This finding aligns with the temporal focus theory of mindfulness, which proposes that present-centered attention reduces both past-related rumination and future-related worry (Witkiewitz et al., 2014).

Theme 7: Self-Efficacy and Perceived Control

Prior to the intervention, three participants (7%) explicitly described low self-efficacy. These descriptions were expressed as feelings of inadequacy (“I feel inadequate,” P8), helplessness (“I don't know how I'll succeed,” P27), and powerlessness (“I can't calm myself down,” P6).

Following the intervention, four participants (9.3%) described enhanced self-efficacy, representing a 33.3% increase. These improvements were expressed as increased confidence (“I believe I can solve difficult things,” P26), sense of control (“I realized that stress is temporary and I can control it,” P10), empowerment (“I'm stronger,” P27), and self-worth (“I smile when I look in the mirror now,” P6; “I feel proud of myself when I look in the mirror,” P7).

The change in one participant's self-efficacy perception was expressed as follows: “I feel both strong and very weak. I don't know how I'll succeed” (P27, pre-intervention) shifted to “I'm more peaceful. I'm stronger” (P27, post-intervention).

Enhanced self-efficacy may stem from successful completion of the meditation program itself and development of a concrete stress management tool. The mirror imagery used by participants (P6, P7) suggests improved self-concept and self-compassion. This finding yields results consistent with self-compassion theory in mindfulness research (Germer & Neff, 2013).

Theme 8: Emerging Coping Strategies and Behavioral Changes

Following the intervention, participants reported various new behaviors. These behaviors were categorized as self-care practices (“I take time for myself in calm and quiet environments,” P15), environmental strategies (“I realized that the sea calms me,” P6), behavioral changes (“I don't watch TV anymore,” P7), acceptance orientation (“I chose to accept rather than grieve over what I lost,” P5), and self-compassion (“I love myself more, I try to stay away from stress,” P24).

The emergence of active coping strategies suggests that body scan meditation may serve as a gateway intervention. This intervention functions by increasing participants' awareness of stress triggers and motivating experimentation with additional self-regulation techniques. The shift from passive distress to active problem-solving represents a fundamental change in coping orientation.

Individual Differences in Intervention Response

Analysis revealed five distinct improvement profiles based on the magnitude and breadth of reported changes.

Profile 1: Strong Improvement (n = 6, 14.0%). This profile was characterized by comprehensive and detailed positive change descriptions across multiple domains. Participants demonstrated transformation in both internal states and external behaviors. For instance, P1 showed a transition from social isolation to active engagement: “I get stressed during exam week... I don't participate in any activities, I don't meet with my friends” (pre-intervention) shifted to “I feel happy and safe. I have good and reliable friends. I spend most

of my time going to activities. I'm very happy with my friends" (post-intervention). P3 demonstrated a transition from perfectionism to flexibility, while P5 made marked progress from severe somatic symptoms toward physical well-being.

Profile 2: Moderate Improvement (n = 9, 20.9%). Participants in this profile demonstrated clear positive change with moderate narrative detail in 2-3 specific areas. Evidence of both symptom reduction and skill acquisition was present. Representative cases include P4, who reported academic stress reduction and grade improvement; P10, who demonstrated cognitive reframing of stress as controllable; and P26, who exhibited enhanced self-efficacy and problem-solving confidence.

Profile 3: Mild Improvement (n = 25, 58.1%). This largest group was characterized by brief improvement descriptions and generalized statements (e.g., "my stress decreased"). Fewer specific behavioral or cognitive changes were mentioned. This group may represent genuine but modest improvements, individuals with lower baseline stress for whom dramatic change was unnecessary, or participants with limited narrative elaboration skills. The brevity of responses limits deeper analysis of their experiences.

Profile 4: No Change (n = 1, 2.3%). P38 used the statement "I'm not very stressed" at both time points, having started with low stress levels. This situation demonstrates a floor effect that limited the potential for observable change.

Profile 5: Resistant Cases (n = 2, 4.7%). Two participants showed minimal or no improvement. P20 experienced persistent homesickness: "I'm extremely stressed because I'm far from home and with people I don't know" (pre-intervention) continued as "I'm still stressed, I want to go home. I know I won't be able to practice my profession in the future. I'm stressed" (post-intervention). Homesickness and separation from family represent concrete external stressors that meditation alone may be insufficient to address. This case indicates the need for additional interventions such as facilitating family communication or building social support.

P36 displayed signs of motivational deficit and anhedonia: "I'm indifferent, bored, overly obsessive, too emotionless, spiritless" (pre-intervention) continued as "I don't want to be happy" (post-intervention). This profile suggests possible depressive symptoms (anhedonia, emotional numbing) requiring clinical assessment. Body scan meditation may be contraindicated or insufficient for individuals with significant depressive psychopathology without concurrent psychotherapy (Eisendrath et al., 2016).

DISCUSSION

This mixed-methods study investigated the effectiveness of a 4-week body scan meditation program in reducing stress among first-year university students. The findings provide compelling evidence that brief mindfulness-based interventions can produce substantial improvements in stress-related outcomes. Both quantitative and qualitative results converged to demonstrate meaningful reductions in stress levels, with 93% of participants reporting some degree of improvement.

Integration of Quantitative and Qualitative Findings

The quantitative analysis revealed a statistically significant reduction in stress-related automatic thoughts following the intervention, with a large effect size (Cohen's d = 1.12). The 27% reduction in stress scores represents a clinically meaningful change that extends beyond statistical significance. This finding is consistent with previous research demonstrating the efficacy of body scan meditation for stress reduction (Ditto, Eclache, & Goldman, 2006; Ussher et al., 2014).

The qualitative findings enriched and contextualized these quantitative results by revealing the specific mechanisms and domains through which stress reduction occurred. Eight major themes emerged from participants' narratives, illuminating the multifaceted nature of stress reduction. The dramatic 87.5% reduction in somatic stress manifestations (Theme 1) provides evidence that body scan meditation may be particularly effective in addressing the physiological components of stress. This finding aligns with theoretical models suggesting that body scan practice enhances interoceptive awareness and reduces autonomic nervous system reactivity (Farb et al., 2015).

The emergence of cognitive flexibility (Theme 2) and enhanced emotion regulation (Theme 3) suggests that the intervention facilitated metacognitive awareness-the ability to observe thoughts and emotions without immediate reactivity. The shift from rigid, catastrophic thinking patterns to acceptance and present-moment focus parallels findings in mindfulness research showing decreased need for certainty and control (Teper & Inzlicht, 2013). These cognitive and affective changes likely contributed to the quantitative improvements observed on the Stress Scale.

Mechanisms of Change

The findings suggest multiple mechanisms through which body scan meditation may reduce stress among university students. First, the practice appears to enhance interoceptive awareness, enabling early detection and response to stress signals before they escalate into severe physiological symptoms. Second, the cultivation of present-moment awareness may disrupt patterns of rumination and anticipatory worry, as evidenced by the 84.6% reduction in existential concerns (Theme 6). Third, the development of non-reactive observation skills may strengthen emotion regulation capacity, as reflected in the near-universal improvement in affective states (Theme 3).

The marked improvements in social functioning (Theme 4) and academic stress (Theme 5) suggest secondary benefits extending beyond direct stress reduction. These changes likely reflect freed psychological resources

that become available as stress levels decrease, enabling greater investment in relationships and academic pursuits (Creswell, Pacilio, Lindsay, & Brown, 2014). Notably, one participant's report of grade improvement alongside reduced academic stress suggests potential performance benefits beyond subjective well-being.

The emergence of diverse coping strategies (Theme 8) suggests that body scan meditation may function as a gateway intervention, increasing awareness of stress triggers and motivating experimentation with additional self-regulation techniques.

Individual Differences in Treatment Response

The identification of five distinct improvement profiles highlights the importance of considering individual differences in intervention research. While the majority of participants (93%) demonstrated some degree of improvement, the magnitude and breadth of changes varied considerably. The strong improvement profile (14%) was characterized by comprehensive transformation across multiple domains, whereas the mild improvement profile (58.1%) showed more modest, generalized changes.

The two resistant cases provide important insights into potential limitations of body scan meditation as a standalone intervention. P20's persistent homesickness represents a concrete external stressor requiring additional support strategies such as facilitating family communication or building local social networks. P36's profile, characterized by anhedonia and motivational deficit, suggests possible depressive symptoms that may require clinical assessment and concurrent psychotherapy (Eisendrath et al., 2016). These cases underscore the importance of comprehensive needs assessment and the potential necessity of multimodal treatment approaches for individuals with significant psychopathology or severe external stressors.

Implications for Practice

The findings have several important implications for university counseling services and student support programs. First, the large effect size and high response rate (93%) suggest that brief body scan meditation programs represent a viable and effective approach to addressing the mental health needs of first-year students. The 4-week duration makes the intervention highly feasible for implementation within university settings, where longer programs may face practical and logistical challenges.

Second, the multifaceted nature of improvements-spanning physiological, cognitive, emotional, social, and academic domains-suggests that body scan meditation may serve as a comprehensive wellness intervention rather than a narrow stress reduction technique. This breadth of impact makes the intervention particularly valuable for addressing the complex, interconnected challenges faced by university students during the transition to higher education.

However, the resistant cases highlight the need for screening and personalized intervention planning. Students presenting with significant depressive symptoms, severe external stressors, or other complicating factors may benefit from supplementary interventions or alternative approaches. A stepped-care model, in which body scan meditation serves as a first-line intervention with pathways to more intensive support when needed, may represent an optimal implementation strategy.

Limitations

Several limitations should be acknowledged when interpreting these findings. The absence of a control group limits causal inferences regarding the intervention's effectiveness. Although the large effect size and consistency of qualitative improvements provide strong suggestive evidence, the observed changes could partially reflect natural adaptation to university life or placebo effects. Future research should employ randomized controlled designs to establish causality more definitively.

The study lacks follow-up assessment, precluding conclusions about the durability of improvements. Whether the observed benefits persist beyond the immediate post-intervention period or require ongoing practice remains unknown. Longitudinal research tracking participants across semesters would illuminate the sustained effects and optimal maintenance strategies.

The qualitative data consisted of brief written responses rather than in-depth interviews, potentially limiting the richness and depth of insights. The large proportion of participants providing minimal elaboration (Profile 3: Mild Improvement, 58.1%) may reflect either genuine but modest changes, limited narrative skills, or measurement limitations. Future research incorporating structured interviews could yield more detailed understanding of participants' experiences.

The homogeneous sample of first-year university students from a single institution limits generalizability to other populations and contexts. The effectiveness of body scan meditation may vary across developmental stages, cultural contexts, and stress profiles. Replication studies in diverse samples are needed to establish the intervention's broader applicability.

CONCLUSION

This study demonstrates that a brief 4-week body scan meditation program can produce substantial reductions in stress among first-year university students. The convergence of quantitative evidence (large effect size) and qualitative findings (93% improvement rate across diverse domains) provides compelling support for the intervention's effectiveness. The multifaceted nature of improvements-spanning physiological symp-

toms, cognitive patterns, emotional states, social functioning, academic stress, self-efficacy, and coping strategies-suggests that body scan meditation addresses the complex, interconnected challenges of university transition.

While methodological limitations warrant caution in causal interpretation, the findings provide a strong foundation for implementing and further evaluating body scan meditation programs in university wellness initiatives. The high feasibility, low cost, and broad impact of this intervention make it particularly well-suited to addressing the growing mental health needs of university students. Future research employing rigorous experimental designs, objective outcome measures, and longitudinal follow-up will further establish the causal efficacy and sustained benefits of body scan meditation for student well-being.

FUNDINGS

This research received no external funding.

REFERENCES

1. Alvarado-García PAA, Soto-Vásquez MR, Infantes Gomez FM, Guzman Rodriguez NM and Castro-Paniagua WG (2025) Effect of a mindfulness program on stress, anxiety, depression, sleep quality, social support, and life satisfaction: a quasi-experimental study in college students. *Front. Psychol. 16*:1508934. doi: 10.3389/fpsyg.2025.1508934
2. Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist,* 55(5), 469-480. https://doi.org/10.1037/0003-066X.55.5.469
3. Auerbach, R. P., Alonso, J., Axinn, W. G., Cuijpers, P., Ebert, D. D., Green, J. G.,... Bruffaerts, R. (2016). Mental disorders among college students in the World Health Organization World Mental Health Surveys. *Psychological Medicine, 46*, 2955-2970. http://dx.doi.org/10.1017/S0033291716001665
4. Beck, A. T. (1976). Cognitive therapy and the emotional disorders. International Universities Press.
5. Bedewy, D., & Gabriel, A. (2015). Examining perceptions of academic stress and its sources among university students: *The Perception of Academic Stress Scale. Health Psychology Open, 2(2),* 2055102915596714. DOI: 10.1177/2055102915596714
6. Bewick, B., Koutsopoulou, G., Miles, J., Slaa, E., & Barkham, M. (2010). Changes in undergraduate students' psychological well-being as they progress through university. *Studies in Higher Education, 35(6),* 633-645. https://doi.org/10.1080/03075070903216643
7. Clark, D. A., & Beck, A. T. (2010). Cognitive theory and therapy of anxiety and depression: Convergence with neurobiological findings. *Trends in Cognitive Sciences, 14(9),* 418-424. doi: 10.1016/j.tics.2010.06.007
8. Cleary, M., Walter, G., & Jackson, D. (2011). "Not always smooth sailing": Mental health issues associated with the transition from high school to college. *Issues in Mental Health Nursing, 32(4),* 250-254. https://doi.org/10.3109/01612840.2010.548906
9. Creswell, J. D., Pacilio, L. E., Lindsay, E. K., & Brown, K. W. (2014). Brief mindfulness meditation training alters psycho-logical and neuroendocrine responses to social evaluative stress. *Psychoneuroendocrinology, 44,* 1-12. doi:10.1016/j.psyneuen.2014.02.007
10. Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research (3rd ed.).* SAGE Publications.
11. Ditto, B., Eclache, M. (2006). Short-term autonomic and cardiovascular effects of mindfulness body scan meditation*, Annals of Behavioral Medicine*, Volume 32, Issue 3, December 2006, Pages 227-234, https://doi.org/10.1207/s15324796abm3203_9
12. Dreeben, S. J., Mamberg, M. H., & Salmon, P. (2013). The MBSR body scan in clinical practice. *Mindfulness, 4(4),* 394-401. DOI:10.1007/s12671-013-0212-z
13. Eisendrath, S. J., Gillung, E., Delucchi, K. L., Segal, Z. V., Nelson, J. C., McInnes, L. A., … Feldman, M. D. (2016). A randomized controlled trial of mindfulness-based cognitive therapy for treatment-resistant depression. *Psychotherapy and Psychosomatics, 85(2),* 99-110. https://doi.org/10.1159/000442260
14. Emmerton, R.W., Camilleri, C., Sammut, S. (2024): Continued deterioration in university student mental health: Inevitable decline or skirting around the deeper problems? *Journal of Affective Disorders Reports 15:* 10p. https://doi.org/10.1016/j.jadr.2023.100691
15. Farb N, Daubenmier J, Price CJ, Gard T, Kerr C, Dunn BD, Klein AC, Paulus MP and Mehling WE (2015) Interoception, contemplative practice, and health. *Front. Psychol.* 6:763. doi: 10.3389/fpsyg.2015.00763
16. Gallo, G.G., Curado, D.F., Machado, M.P.A. et al. A randomized controlled trial of mindfulness: effects on university students' mental health. *Int J Ment Health Syst 17,* 32 (2023). https://doi.org/10.1186/s13033-023-00604-8
17. Germer, C. K., & Neff, K. D. (2013). Self-compassion in clinical practice. *Journal of Clinical Psychology, 69(8),* 856-867. https://doi.org/10.1002/jclp.22021
18. Goldberg, S. B., Tucker, R. P., Greene, P. A., Davidson, R. J., Wampold, B. E., Kearney, D. J., & Simpson, T. L. (2018). Mindfulness-based interventions for psychiatric disorders: A systematic review and meta-analysis. *Clinical Psychology Review, 59,* 52-60. DOI: 10.1016/j.cpr.2017.10.011

19. Gong X-G, Wang L-P, Rong G, Zhang D-N, Zhang A-Y and Liu C (2023) Effects of online mindfulness-based interventions on the mental health of university students: A systematic review and meta-analysis. *Front. Psychol. 14:* 1073647. doi: 10.3389/fpsyg.2023.1073647
20. González-Martín AM, Aibar-Almazán A, Rivas-Campo Y, Castellote-Caballero Y and Carcelén-Fraile MdC (2023) Mindfulness to improve the mental health of university students. A systematic review and meta-analysis. *Front. Public Health 11:* 1284632. doi: 10.3389/fpubh.2023.1284632
21. Hölzel, B. K., Carmody, J., Vangel, M., Congleton, C., Yerramsetti, S. M., Gard, T., & Lazar, S. W. (2011). Mindfulness practice leads to increases in regional brain gray matter density. *Psychiatry Research: Neuroimaging, 191(1),* 36-43. doi: 10.1016/j.pscychresns.2010.08.006
22. Ibrahim, A. K., Kelly, S. J., Adams, C. E., & Glazebrook, C. (2013). A systematic review of studies of depression prevalence in university students. *Journal of Psychiatric Research, 47,* 391-400. http://dx.doi .org/10.1016/j.jpsychires.2012.11.015
23. Jankowski, T., & Holas, P. (2014). Metacognitive model of mindfulness. *Consciousness and Cognition, 28*, 64-80. doi:10.1016/j.concog.2014.06.005
24. Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness.* Delacorte Press.
25. Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice, 10(2),* 144-156. https://doi.org/10.1093/clipsy.bpg016
26. Khoury, B., Sharma, M., Rush, S. E., & Fournier, C. (2015). Mindfulness-based stress reduction for healthy individuals: A meta-analysis. *Journal of Psychosomatic Research, 78(6),* 519-528.
27. Mehling, W. E., Gopisetty, V., Daubenmier, J., Price, C. J., Hecht, F. M., & Stewart, A. (2009). Body awareness: Construct and self-report measures. *PLoS ONE, 4(5),* e5614. https://doi.org/10.1371/journal.pone.0005614
28. Mehling, W.E., Price, C., Daubenmier, J.J., Acree, M., Bartmess, E., Stewart, A. (2012) The Multidimensional Assessment of Interoceptive Awareness (MAIA). *PLoS ONE 7(11):* e48230. https://doi.org/10.1371/journal.pone.0048230
29. Mrazek, M. D., Franklin, M. S., Phillips, D. T., Baird, B., & Schooler, J. W. (2013). Mindfulness Training Improves Working Memory Capacity and GRE Performance While Reducing Mind Wandering. *Psychological Science*, *24*(5), 776-781. https://doi.org/10.1177/0956797612459659
30. Pan, Y., Li, F., Liang, H., Shen, X., Bing, Z., Cheng, L., & Dong, Y. (2024). Effectiveness of mindfulness-based stress reduction on mental health and psychological quality of life among university students: A GRADE-assessed systematic review. *Evidence-Based Complementary and Alternative Medicine, 2024(1),* Article 8872685. https://doi.org/10.1155/2024/8872685
31. Prasartpornsirichoke J, Pityaratstian N, Poolvoralaks C, Sermruttanawisith N, Polpakdee K, Pholphet K and Buathong N (2025) Effects of online cognitive behavioral therapy on depression, negative automatic thoughts, and quality of life in Thai university students during the COVID-19 lockdown in 2021: a quasi-experimental study. *Front. Psychiatry 16:* 1502406. doi: 10.3389/fpsyt.2025.1502406
32. Ribeiro, Í. J. S., Pereira, R., Freire, I. V., de Oliveira, B. G., Casotti, C. A., & Boery, E. N. (2018). Stress and quality of life among university students: A systematic literature review. *Health Professions Education, 4(2),* 70-77. DOI: 10.1016/j.hpe.2017.03.002
33. Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference.* Houghton Mifflin.
34. Tang, Y. Y., Hölzel, B. K., & Posner, M. I. (2015). The neuroscience of mindfulness meditation. *Nature Reviews Neuroscience, 16(4),* 213-225. DOI: 10.1038/nrn3916
35. Teper, R., Inzlicht, M. (2013). Meditation, mindfulness and executive control: the importance of emotional acceptance and brain-based performance monitoring, *Social Cognitive and Affective Neuroscience*, Volume 8, Issue 1, January 2013, Pages 85-92, https://doi.org/10.1093/scan/nss045
36. Ussher M, Spatz A, Copland C, Nicolaou A, Cargill A, Amini-Tabrizi N & McCracken LM (2014) Immediate effects of a brief mindfulness-based body scan on patients with chronic pain. *Journal of Behavioral Medicine, 37 (1),* pp. 127-134. https://doi.org/10.1007/s10865-012-9466-5
37. Witkiewitz, K., Bowen, S., Hsu, S., & Douglas, H. (2013).Mindfulness-based relapse prevention for substance craving. *Addictive Behaviors, 38,* 1563-1571. DOI: 10.1016/j.addbeh.2012.04.001
38. Yeo G, Lansford JE, Hirshberg MJ, Tong EMW. (2024). Associations of childhood adversity with emotional well-being and educational achievement: A review and meta-analysis. *J Affect Disord. 2024 Feb 15;* 347: 387-398. doi: 10.1016/j.jad.2023.11.083