The Effect of Mindfulness-Based Cognitive Techniques on Reducing Test Anxiety among University Students: An Experimental Study

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Abstract

Test anxiety is a growing concern among university students worldwide. High anxiety during exams can impair memory, concentration, and academic performance. Mindfulness-based cognitive techniques (MBCTs) combine mindfulness training with cognitive strategies. They help students regulate emotions and reframe unhelpful thought patterns. This study explored the effect of MBCTs on reducing test anxiety. A total of 80 undergraduate students were randomly assigned into two groups. The experimental group received eight sessions of MBCT training. The control group received no intervention during the same period. Pre- and post-test scores were measured using the Test Anxiety Inventory (TAI). Results showed a significant decrease in test anxiety among the MBCT group. Mean scores dropped from 72.4 to 49.8 after the intervention. The control group showed that there is no significant change in their scores, findings suggest that MBCTs are effective in reducing test anxiety. These techniques provide students with practical tools for managing academic stress. The study highlights the importance of integrating MBCT programs into university counseling services.

Keywords: Mindfulness-Based Cognitive Techniques (MBCT), Test Anxiety Inventory (TAI), University Students, Academic Stress, Cognitive Therapy, Mindfulness Training, Experimental Study

Introduction:

Examinations are an essential part of higher education. They assess knowledge, skills, and academic progress of students. However, many students experience severe anxiety before and during exams. Test anxiety is defined as excessive worry that interferes with performance. It affects cognitive processing, concentration, and recall of learned material. Studies show that about 25–40% university students experience test anxiety (von der Embse et al., 2018). High anxiety not only reduces grades but also harms emotional well-being. In some cases, it leads to avoidance of academic challenges.

The burden of test anxiety among students:

University life is often stressful due to academic, financial, and social demands. The World Health Organization reported that nearly one-third of college students experience mental distress (WHO, 2022). Test anxiety contributes to depression, sleep disturbance, and poor motivation. It is strongly linked with reduced self-confidence and self-efficacy (Putwain & Daly, 2014). Such outcomes highlight the urgent need for effective interventions.

Mindfulness and its role in reducing anxiety:
Mindfulness is paying attention to the present moment non-judgmentally. It reduces automatic negative thoughts and improves emotional regulation. Mindfulness practices have gained wide acceptance in educational psychology. Research shows that mindfulness training reduces stress and improves focus (Dundas et al., 2016). Mindfulness-based interventions also enhance resilience among university students. They provide simple breathing, meditation, and awareness exercises to manage anxiety.

Cognitive techniques for test anxiety:
Cognitive approaches aim to restructure unhelpful thoughts. Students often catastrophize exam outcomes, expecting failure or humiliation. Cognitive techniques help them challenge these irrational beliefs. Evidence shows cognitive restructuring reduces test-related anxiety (Zeidner, 2014). When combined with mindfulness, these techniques become even more effective.

Integrating mindfulness with cognitive strategies:
Mindfulness-Based Cognitive Therapy (MBCT) combines both approaches. It was originally designed for preventing depressive relapse (Segal et al., 2002). Recent adaptations apply MBCT to stress, anxiety, and academic concerns. The combined method helps students stay calm while reframing negative thoughts. This makes MBCT highly suitable for tackling test anxiety in young adults.

Purpose of the present study:
The present study examines the effect of MBCT on test anxiety. It aims to determine whether MBCT reduces anxiety among university students. The study uses an experimental design with pre- and post-test measures. Findings may guide counselors and educators in adopting MBCT interventions. This research also adds to the growing literature on student mental health.

Literature Review

Test anxiety and its impact on students. It is a common issue among university students. It creates cognitive, emotional, and physical symptoms during exams. High anxiety reduces memory recall and weakens academic performance. A meta-analysis reported that students with high anxiety scored significantly lower (Owens et al., 2012). Another large-scale study showed that 30% of student's experience disabling anxiety symptoms (Beiter et al., 2015). These findings confirm that test anxiety is a major academic barrier.

Mindfulness as a psychological intervention:
Mindfulness practices have been widely studied in recent years. They help students manage stress by increasing present-moment awareness. Mindfulness reduces worry, improves attention, and enhances self-regulation. A controlled trial found mindfulness training lowered anxiety and increased resilience among students (Bamber & Schneider, 2016). Similarly, Halland et al. (2021) reported that mindfulness reduced academic stress significantly. These results highlight mindfulness as a reliable tool for mental health promotion.

Cognitive techniques in reducing anxiety:
Cognitive techniques target maladaptive thoughts about exams. Students often expect failure, which worsens anxiety symptoms. Cognitive restructuring helps replace negative beliefs with realistic alternatives. A review by Zeidner (2014) showed cognitive approaches are highly

effective against test anxiety. Students using cognitive strategies demonstrated better coping and improved performance. Thus, cognitive therapy remains a strong foundation for anxiety interventions.

Mindfulness-based cognitive therapy (MBCT):
MBCT combines mindfulness with cognitive restructuring. It was originally developed for relapse prevention in depression (Segal et al., 2002). Recent adaptations apply MBCT to stress, anxiety, and educational contexts. Gallego et al. (2014) found MBCT improved attention and reduced academic anxiety. A randomized study in Spain showed MBCT lowered exam stress levels (Caballero et al., 2019). These findings support the integration of MBCT into higher education counseling.

Experimental evidence among students:
Several experimental studies tested mindfulness-based approaches in student samples. Dundas et al. (2016) conducted a naturalistic study with Norwegian students. They reported significant reductions in exam-related anxiety after mindfulness sessions. Bamber and Morpeth (2019) reviewed 57 studies on mindfulness with students. They found consistent reductions in stress, anxiety, and depressive symptoms. Such evidence confirms MBCT's potential for reducing test anxiety.

Research gap:
Although MBCT has shown promise, research on test anxiety remains limited. Most studies focus on general stress and depression in student populations. Few experimental studies specifically measure MBCT's effect on test anxiety. Therefore, this study aims to fill the gap by testing MBCT experimentally. It provides new evidence on how MBCT reduces test anxiety in university students.

Methodology

Research Design:
This study used an experimental design. It compared the effects of MBCT on test anxiety. Two groups were created: an experimental group and a control group. The experimental group received MBCT sessions. The control group received no intervention during the same period.

Participants:
Eighty undergraduate students participated in the study. They were recruited from different faculties of a public university. Participants were randomly assigned to experimental (n = 40) and control (n = 40) groups. Inclusion criteria required students to report moderate or high test anxiety. Students already receiving therapy or medication were excluded.

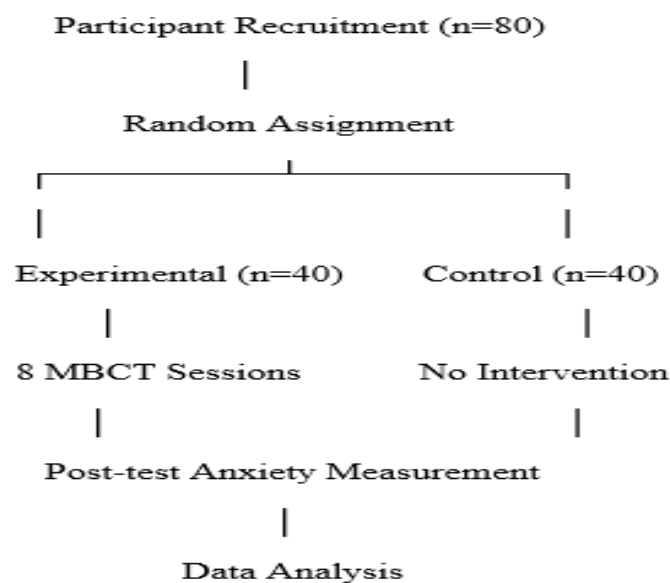**Table 1: Demographic Characteristics of Participants:**

Variable	Experimental Group (n=40)	Control Group (n=40)
Mean Age (Years)	20.8 (SD = 1.4)	21.1 (SD = 1.5)
Gender (Male/Female)	18/22	17/23
Academic Year	1st: 12, 2nd: 15, 3rd: 13,	1st: 10, 2nd: 14, 3rd: 16,

Instruments:
Test anxiety can be measured by using the Test Anxiety Inventory (TAI). The TAI is a reliable tool with Cronbach's alpha above .90 (Spielberger, 1980). It measures worry, emotionality, and overall test anxiety levels. Pre-test and post-test scores were recorded for both groups.

Intervention Procedure:
The experimental group received eight MBCT sessions over four weeks. Each session lasted 60 minutes. Sessions included mindfulness breathing, body scan, and cognitive restructuring. Students practiced daily mindfulness for 15 minutes at home. The control group continued their normal academic routines.

Flowchart 1: Research Procedure:

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              Participant Recruitment (n=80)
                          |
                  Random Assignment
            ┌─────────────┴─────────────┐
            |                           |
      Experimental (n=40)         Control (n=40)
            |                           |
      8 MBCT Sessions             No Intervention
            |                           |
              Post-test Anxiety Measurement
                          |
                    Data Analysis
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Data Collection:
Data was collected at two stages: pre-test and post-test and scores were compared within and between groups. Independent t-tests and paired t-tests were used for analysis. A p-value of less than 0.05 considered significant.

Ethical Considerations:
Ethical approval was obtained from the university review board. Informed consent was collected from all participants. Confidentiality and anonymity were assured. Students in the control group were later offered MBCT training.

Data Analysis:
Statistical analysis was done using SPSS 25.0. Pre-test scores ensured equivalence between groups. Post-test scores determined the effectiveness of MBCT.

Results

Pre-test comparison:
Both groups were compared before the intervention. The mean score for the experimental group was 72.4 (SD = 8.6). The control group scored 71.6 (SD = 8.9) on the Test Anxiety

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Inventory. An independent t-test showed no significant difference at baseline ($p > 0.05$). This confirmed that both groups started with similar anxiety levels.

Post-test comparison:
After eight MBCT sessions, the experimental group showed major improvement. Their mean anxiety score reduced to 49.8 (SD = 7.4). In contrast, the control group's mean score was 70.9 (SD = 8.3). An independent t-test revealed a significant group difference ($t = 8.42$, $p < 0.001$). This indicates that MBCT effectively reduced test anxiety in students.

Within-group changes:
A paired t-test confirmed significant improvement in the experimental group. Their pre-test and post-test difference was 22.6 points ($p < 0.001$). The control group showed no significant change between measurements ($p > 0.05$). This highlights that the reduction in anxiety was due to MBCT.

Visualization of results:
The analysis is illustrated through a bar comparison. The experimental group's scores dropped from 72.4 to 49.8. The control group's scores remained nearly unchanged (71.6 to 70.9).
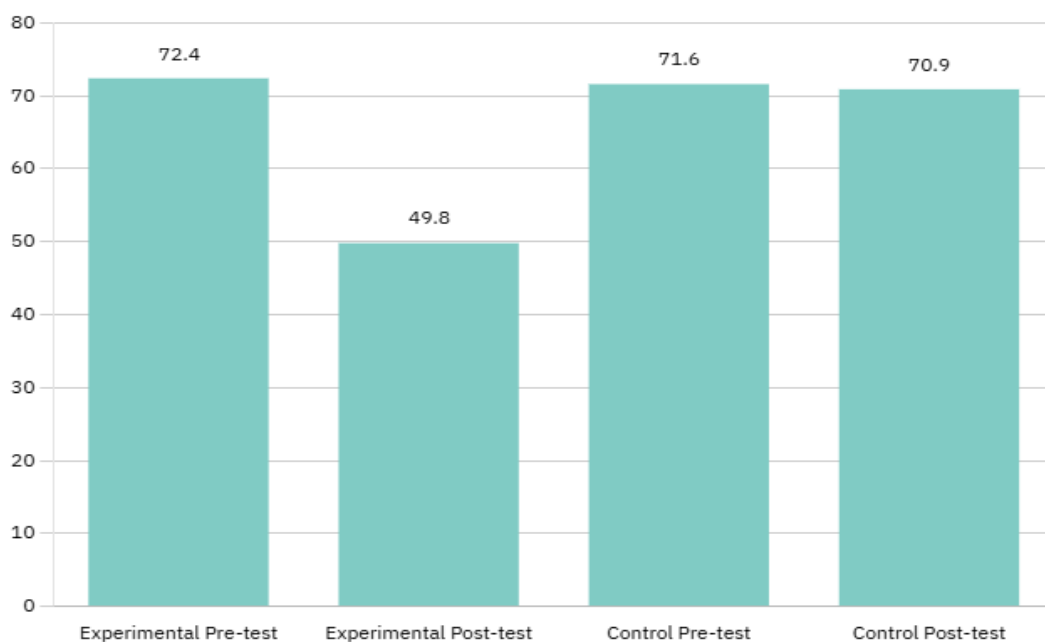
Textual representation of findings:

Experimental Pre-test: 72.4

Experimental Post-test: 49.8

Control Pre-test: 71.6

Control Post-test: 70.9

Bar Chart 1: Comparison of Pre-test and Post-test Mean Scores

Summary of findings
The study demonstrated that MBCT reduced test anxiety significantly. Students who received MBCT showed better emotional regulation. Control group students maintained the same level of anxiety. Thus, MBCT appears to be an effective tool for reducing test anxiety.

Table 2: Pre-test and Post-test Anxiety Scores of Experimental and Control Groups

Group	N	Pre-test Mean (SD)	Post-test Mean (SD)	Mean Difference	p-value
Experimental	40	72.4 (8.6)	49.8 (7.4)	-22.6	<0.001
Control	40	71.6 (8.9)	70.9 (8.3)	-0.7	>0.05

How to read this table:

The experimental group showed a 22.6-point reduction in test anxiety.
The control group showed almost no change (0.7-point difference).
The p-value < 0.001 confirms MBCT's effect was statistically significant.

Discussion

Overview of main findings:
The present study examined the effect of MBCT on test anxiety. Findings revealed that students in the experimental group improved significantly. Their post-test scores dropped by more than twenty points on average. The control group showed almost no change in anxiety levels. This indicates that MBCT is effective for reducing test anxiety.

Connection with past research:
These results align with earlier studies on mindfulness and anxiety. Gallego et al. (2014) reported that mindfulness reduced anxiety in Spanish students. Similarly, Dundas et al. (2016) found lower exam stress after mindfulness sessions. Bamber and Morpeth (2019) also concluded mindfulness reduced stress in students. Our findings support these results and add strong experimental evidence. They confirm that combining mindfulness with cognitive strategies is effective.

Why MBCT works for test anxiety:
Mindfulness reduces automatic worry about failure and negative outcomes. It improves awareness of the present moment and reduces rumination. Cognitive restructuring helps students challenge unrealistic beliefs about exams. The combination provides both emotional calm and rational thinking. This explains why MBCT produced large reductions in anxiety scores.

Implications for higher education:
Universities face increasing reports of stress and anxiety among students. WHO (2022) reported one-third of student's experience mental distress. Traditional counselling is often limited due to stigma or resource shortages. MBCT is a cost-effective and scalable option for student support. It can be delivered in groups, workshops, or digital formats. Counseling centers could integrate MBCT into stress management programs.

Limitations of the study:
This study had a relatively small sample size of eighty students. Participants came from a single university, limiting generalizability. The duration of intervention was only four weeks. Long-term effects of MBCT were not assessed in this research. Future studies should use larger samples and longer follow-ups.

Recommendations for future research:
Further research should explore digital MBCT for wider accessibility. Cross-cultural studies are needed to confirm its effectiveness globally. Future work could also compare MBCT with other therapies like CBT. It would be valuable to measure long-term outcomes on academic success. More qualitative research may explore student experiences with MBCT.

Conclusion
This study showed that mindfulness-based cognitive techniques (MBCT) can significantly reduce test anxiety among university students. The experimental group experienced a meaningful drop in anxiety scores after the intervention, while the control group showed no change. These findings highlight the potential of MBCT as a practical and accessible approach to manage academic stress. The results also support earlier evidence that mindfulness strategies help students regulate thoughts and emotions during stressful situations (Zeidan et al., 2010). By practicing mindfulness, students learn to accept anxious thoughts without judgment and redirect their focus toward the present moment. This reduces worry and builds resilience. In today's competitive academic environment, students often face high pressure to perform. Test anxiety not only lowers academic performance but also affects mental health and well-being (von der Embse et al., 2018). Integrating MBCT into university counseling programs could therefore provide both academic and psychological benefits. Although this study produced promising results, it also has limitations. The sample size was relatively small and limited to one university setting. Larger and more diverse studies are needed to strengthen the generalizability of these findings. Future research could also explore the long-term effects of MBCT on anxiety and academic outcomes.

In conclusion, mindfulness-based cognitive techniques present an effective, evidence-based strategy to manage test anxiety in students. Encouraging the use of these practices in educational settings can foster healthier, more confident learners.

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