Original Article

Mindfulness-based stress reduction and emotion-focused therapy for test-anxious students: Impacts on anxiety and academic self-handicapping

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Abstract

Background: Test anxiety significantly impairs adolescents' academic functioning and psychological well-being. The current study examined the relative effectiveness of Mindfulness-Based Stress Reduction (MBSR) and Emotion-Focused Therapy (EFT) in alleviating test anxiety and academic self-handicapping among ninth-grade male students.

Methods: During the 2025–2026 academic year, we conducted a randomized, multi-group study utilizing pretest-posttest measures and a one-month follow-up evaluation. The target population comprised ninth-grade male students with test anxiety in Ahvaz, Iran. Following administration of the Ahvaz Test Anxiety Inventory (ATAI) and structured clinical interviews, students scoring more than one standard deviation above the mean (ATAI > M + 1 SD) were identified as having elevated test anxiety. Sixty eligible participants (mean age=14.52 years, SD=0.48) were selected and randomly assigned to three groups: MBSR (n=20), EFT (n=20), or a waitlist control group (n=20). Data were gathered using the ATAI and the Academic Self-Handicapping Scale.

Results: Both MBSR and EFT significantly reduced test anxiety and academic self-handicapping relative to the control group (time × group interaction for test anxiety: F=83.52, P<0.001, η^2_p=0.67; for academic self-handicapping: F=86.37, P<0.001, η^2_p=0.62). MBSR produced significantly greater reductions in test anxiety than EFT (posttest MD=−5.11, P=0.012; follow-up MD=−5.14, P=0.018), whereas EFT yielded significantly larger reductions in academic self-handicapping (posttest MD=4.19, P=0.009; follow-up MD=4.87, P=0.007).

Conclusion: Both interventions appear promising for reducing test-related distress and maladaptive academic behaviors in male adolescents. Pending longer-term follow-up data and replication in more diverse samples, cautious integration of these approaches into school counseling programs may be considered.

Keywords: Emotion-focused therapy, Mindfulness, Performance anxiety, Students, Underachievement.

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Introduction

Education systems constitute foundational structures for societal development, with students at their core (1). Adolescence represents a particularly vulnerable developmental window during which multifaceted psychological challenges can deplete cognitive and emotional resources (2, 3).

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Among the frequent challenges observed in educational settings, test anxiety represents a situational form of trait anxiety. This condition is defined by distinctive cognitive, somatic, and behavioral reactions stemming from a fear of failure during assessments (4–6). Test anxiety produces cognitive interference, impaired concentration, diminished academic performance, reduced motivation, and elevated risk of school dropout (7–9).

Closely related yet conceptually distinct is academic self-handicapping, defined as any proactive action or contextual arrangement that enables students to externalize the causes of potential academic failure while internalizing success (10). Unlike procrastination, which primarily involves voluntary delay of intended tasks, academic self-handicapping encompasses deliberate creation of obstacles (e.g., reduced effort, strategic withdrawal, or claim of impediments) specifically to protect self-esteem from the implications of failure (11). Contemporary measurement literature further distinguishes behavioral self-handicapping (observable actions that genuinely impede performance) from claimed self-handicapping (verbal assertions of obstacles that may not actually impair performance). Highly test-anxious students are particularly prone to these self-sabotaging strategies, generating a reciprocal cycle of underachievement and psychological distress (12).

Mindfulness-Based Stress Reduction (MBSR) targets the cognitive-interference component of test anxiety by cultivating non-judgmental present-moment awareness (13). Through systematic training in body-scan techniques, breath awareness, and attentional re-orientation, MBSR is theorized to reduce the impact of intrusive worry and enhance task-focused attention during evaluative situations (14). Empirical work has shown that mindfulness training attenuates test anxiety, negative automatic thoughts, and academic self-handicapping among student populations (5, 13, 15, 16).

Emotion-Focused Therapy (EFT) addresses the affective underpinnings of self-handicapping. Rather than suppressing emotional experience, EFT engages primary maladaptive emotions (e.g., shame, inadequacy, self-criticism), facilitates their processing, and transforms them into adaptive self-compassion and emotion regulation (17, 18). By facilitating access to and processing of these primary maladaptive emotions, EFT may help reduce reliance on anticipatory self-sabotaging strategies (19, 20).

Although both modalities have demonstrated independent efficacy in reducing anxiety-related symptoms, direct head-to-head comparisons of MBSR and EFT remain scarce. Prior single-modality trials have primarily examined university or adult samples, with only a limited number of studies including adolescents. Existing mindfulness research has more frequently targeted test anxiety as a primary outcome, whereas emotion-focused approaches have more often addressed broader anxiety, self-criticism, or defensive avoidance rather than test anxiety specifically. Academic self-handicapping has rarely been examined as a primary or secondary outcome in comparative trials of these two interventions, and systematic contrasts of MBSR and EFT that simultaneously address both test anxiety and academic self-handicapping within the same adolescent sample remain limited in the available literature. Identifying relative strengths can therefore inform targeted, evidence-based support protocols within educational counseling services. Consequently, the current investigation examined the comparative effects of MBSR and EFT on both test anxiety and academic self-handicapping within a cohort of ninth-grade male students identified as having elevated test anxiety.

Methods

Design

We implemented a randomized, multi-group pretest-posttest trial featuring a

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waitlist control condition and a follow-up assessment one month post-intervention. Participants were allocated to the three study arms through simple random assignment after eligibility screening using a computer-generated random sequence prepared by an independent researcher who had no contact with participants or therapists. Allocation concealment was maintained by means of sequentially numbered, opaque, sealed envelopes opened only after baseline assessment. Therapists and participants could not be blinded to intervention condition due to the nature of the psychological treatments; however, outcome assessors and the data analyst remained blinded to group assignment throughout the study.

Participants

The target population comprised all ninth-grade male students with elevated test anxiety in Ahvaz, Iran, during the 2025–2026 academic year. Initial recruitment occurred through educational counseling centers using purposive sampling. Diagnostic screening involved administration of the Ahvaz Test Anxiety Inventory (ATAI). Students scoring more than one standard deviation above the mean (ATAI > M + 1 SD) were invited to a structured clinical interview conducted by a licensed clinical psychologist independent of the research team. The interview followed a standardized protocol based on DSM-5 criteria for anxiety disorders, focusing on the presence, severity, and functional interference of test-related anxiety symptoms (excessive worry about evaluation, somatic arousal, cognitive interference, and avoidance behaviors) while ruling out other primary psychiatric conditions. Interviewers were blinded to participants' exact ATAI scores and were trained to apply predetermined decision rules. Inter-rater reliability, assessed on a randomly selected 20% of interviews by a second independent clinician, yielded Cohen's $\kappa = 0.86$. The threshold of one standard deviation above the mean was selected because it is a conventional and widely used criterion in educational and clinical research for identifying students with clinically elevated test anxiety who are likely to experience meaningful functional impairment (21). Of the 72 students who met the screening threshold, 12 were excluded (8 declined participation after receiving study information; 4 failed to meet additional inclusion criteria during the clinical interview). Using the computer-generated sequence described above, we randomly assigned the remaining 60 eligible students into three equal groups (n = 20 each): MBSR, EFT, and waitlist control (Figure 1).

A priori power analysis for a 3 (group) × 3 (time) mixed-design repeated-measures ANOVA indicated that a total sample of 54 participants (n = 18 per arm) would provide 80% power to detect a medium-to-large interaction effect ($f = 0.30$) at $\alpha = .05$ (G*Power 3.1). The final sample of 60 participants therefore exceeded the minimum requirement and provided adequate power to detect differential treatment effects between the two active interventions.

Inclusion criteria were: (a) absence of serious somatic illness, (b) no participation in psychotherapy during the preceding month, and (c) an ATAI score exceeding one standard deviation above the mean (21). Exclusion criteria included missing more than two treatment sessions, engaging in concurrent psychotherapy, or expressing a desire to withdraw. No participants dropped out after randomization; all 60 completed the full protocol. Participant flow is summarized as follows: 72 students screened → 12 excluded (8 declined, 4 ineligible) → 60 randomized (20 MBSR, 20 EFT, 20 waitlist) → 60 completed posttest and one-month follow-up assessments (0 attrition). Because retention was 100%, the complete-case analysis is equivalent to both an intention-to-treat and a per-protocol analysis.

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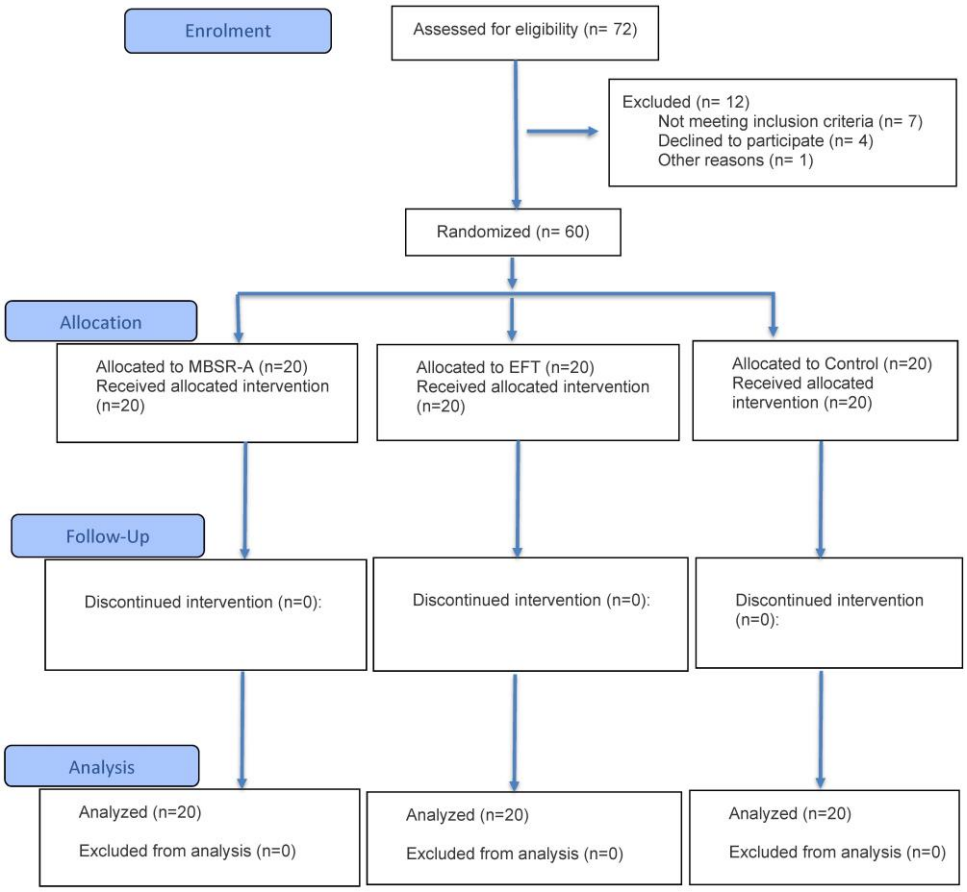

Fig.1: CONSORT diagram of the study

Measures:

Ahvaz Test Anxiety Inventory (ATAI): Test anxiety symptoms were evaluated using the Ahvaz Test Anxiety Inventory (ATAI; Abolghasemi et al., 21), a 25-item self-report scale scored from 0 (Never) to 3 (Often). Total scores (range: 0–75) reflect overall anxiety level (<12: negligible, 13-37: mild, 38-62: moderate, >63: severe). Beyond its established concurrent validity with general anxiety (r=0.67), the scale showed strong reliability in this study (Cronbach's α=.83; split-half reliability = 0.85).

Academic Self-Handicapping Scale (ASHS): Formulated by Schwinger and Stiensmeier-Pelster (22), this 7-item scale assesses students' tendencies to construct obstacles to academic success. Participants rate each item on a 5-point scale (1 = Strongly Disagree, 5 = Strongly Agree), with composite scores ranging between 7 and 35. Although originally conceptualized as unidimensional, contemporary literature distinguishes behavioral from claimed self-handicapping; the present study retained the total score in accordance with the validated Iranian version (RMSEA = 0.01, α = 0.86). The Iranian adaptation used in the present study has been previously examined for psychometric properties in adolescent student samples of comparable age and educational level (23).

Interventions:

Both interventions were delivered by two independent clinical psychologists (one for MBSR, one for EFT), each holding a doctoral degree in clinical psychology, a minimum of five years of specialized training in the respective modality, and prior supervised experience delivering the protocol to adolescent populations. The MBSR therapist had completed formal MBSR teacher training and maintained ongoing supervision in the mindfulness tradition; the EFT therapist had completed advanced training in Emotion-Focused Therapy (including Level 1 and Level 2

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certification) and had previous supervised experience applying EFT with adolescents. Therapists were independent of the research team and had no role in data analysis. Treatment fidelity was monitored through weekly supervision sessions with a senior supervisor, review of randomly selected audio-recorded sessions (20% of all sessions), and completion of standardized adherence checklists after each session; mean adherence ratings exceeded 90% for both protocols.

Both protocols were adapted for delivery in a four-week format (eight 90-minute biweekly sessions) to fit the constraints of the school calendar while preserving core therapeutic processes, yielding a total of 12 contact hours per intervention. Homework was assigned after every session and monitored via weekly written logs and brief check-ins at the start of each subsequent session; therapists recorded adherence rates (percentage of assigned practices completed) for each participant. Mean homework adherence exceeded 85% in both groups. Specific session protocols for each arm are provided in Tables 1 and 2.

Table 1. Outline of mindfulness-based stress reduction (MBSR) sessions

Session	Topic	Key Content / Activities
1	Introduction & Automatic Pilot	Orientation, establishing rapport, conceptualizing MBSR, introducing body awareness and relaxation exercises.
2	Relaxation & Obstacles	Seated meditation, pleasant events awareness homework, body scan meditation, facing mindfulness barriers.
3	Deepening Relaxation	Muscle group relaxation (6 groups), mindful seeing/hearing, seated breathing meditation focusing on body sensations.
4	Mindful Breathing	Techniques for calm breathing without cognitive distraction; assignment of 24-minute pre-sleep breathing meditation.
5	Body Monitoring	Tracking body movement during respiration, somatic focus exercises, mindful eating homework.
6	Mindful Thoughts	Observing positive/negative mental states non-judgmentally; writing logs of pleasant/unpleasant experiences.
7	Full Mindfulness	Intensive practice synthesizing sessions 4–6 techniques (20–30 minutes per practice routine).
8	Review & Posttest	Reviewing homework, summarizing key concepts, final debriefing, and posttest administration.

Table 2. Outline of emotion-focused therapy (EFT) sessions

Session	Topic	Key Content / Activities
1	Rapport & Conceptualization	Building therapeutic alliance, explaining anxiety dynamics, introducing EFT principles, evaluating internal focus capacity.
2	Identifying Emotional Cycles	Uncovering dysfunctional interactional cycles, underlying core emotions, ambivalence, and self-critical attitudes.
3	Cognitive-Affective Links	Examining irrational beliefs driving emotional distress, identifying faulty emotional processing patterns.
4	Awareness & Underlying Processes	Enhancing emotional cohesion, uncovering underlying cognitive-affective mechanisms and situational triggers.
5	Schema Work & Exposure	Progressive relaxation, identifying emotional schemas, empty-chair / hot-seat techniques, fostering emotional acceptance.
6	Voice Tone & Emotion Expression	Exploring distress/anger levels, resolving initial feelings of helplessness through structured dialogue.
7	Emotional Transformation	Processing unresolved feelings, restructuring core emotions, generating support for adaptive affective states.
8	Consolidation & Posttest	Developing new coping mechanisms, transitioning from hopelessness/anger to constructive adaptation, posttest administration.

Data Analysis

All statistical computations were conducted via SPSS (v. 27). Group scores at baseline, posttest, and follow-up were summarized using means and standard deviations, with distributional normality confirmed by

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Kolmogorov-Smirnov tests. We applied mixed-design repeated-measures ANOVAs to evaluate time, group, and time-by-group interaction effects, employing Greenhouse-Geisser adjustments whenever Mauchly's sphericity test was violated. Significant interactions were decomposed using Bonferroni-adjusted post hoc tests. Because retention was complete, the primary analyses constitute both intention-to-treat and per-protocol analyses.

Results

Retaining 100% participant attendance across pretest, posttest, and follow-up (N = 60), our complete-sample analyses were equivalent to both intention-to-treat and per-protocol analyses. The cohort consisted of ninth-grade male students from secondary schools in Ahvaz, Iran. Age ranged from 13 to 16 years. The overall sample mean age was 14.52 years (SD = 0.48). Group-specific means were MBSR: 14.52 (SD = 0.48), EFT: 14.34 (SD = 0.57), and Control: 14.69 (SD = 0.32). Age distributions did not differ significantly across arms at baseline, F = 1.76, P = 0.18.

Table 3 displays the descriptive statistics for the main study outcomes. At baseline, mean levels of test anxiety were similar across the three groups and fell within the moderate-to-severe range (MBSR: 50.19 ± 8.23; EFT: 53.08 ± 9.70; Control: 51.71 ± 8.92). One-way ANOVAs confirmed the absence of statistically significant baseline differences among groups for test anxiety, F = 0.58, P = 0.56, and for academic self-handicapping, F = 0.24, P = 0.79. After the interventions, both active treatment conditions showed marked decreases in test anxiety at posttest and one-month follow-up, while scores in the waitlist control group remained virtually stable. The same overall pattern emerged for academic self-handicapping. Pretest means were high and comparable across groups (MBSR: 24.10 ± 7.18; EFT: 24.62 ± 7.69; Control: 25.76 ± 9.04). Following treatment, the EFT condition demonstrated the greatest reduction, followed by MBSR, with virtually no change observed in the control group.

Normality assumptions were supported by the Kolmogorov–Smirnov test for both outcome variables at all three assessment occasions (all P > 0.05; test statistics ranged from D = 0.07 to D = 0.11). Greenhouse-Geisser corrections were implemented following Mauchly's test indicating non-sphericity for both scales. Mixed-design repeated-measures ANOVA confirmed significant main effects of group and time, as well as a significant time × group interaction, for both test anxiety and academic self-handicapping (Table 4).

Table 3. Descriptive statistics for test anxiety and academic self-handicapping across groups and time points

Variable	Group	MBSR	EFT	Control
		Mean±SD	Mean±SD	Mean±SD
Test anxiety	Pretest	50.19±8.23	53.08±9.70	51.71±8.92
	Posttest	29.01±3.50	34.12±5.02	52.03±9.06
	Follow-up	29.77±3.81	34.91±6.21	52.41±9.23
Academic self-handicapping	Pretest	24.10±7.18	24.62±7.69	25.76±9.04
	Posttest	17.23±5.26	13.04±2.43	26.02±9.80
	Follow-up	17.82±5.78	12.95±2.10	25.51±8.94

MBSR: Mindfulness-Based Stress Reduction; EFT: Emotion-Focused Therapy; SD: Standard Deviation

Table 4. Mixed-design ANOVA outputs for treatment outcomes across time points and study groups

Variable	Source	SS	df	MS	F	P	η^2_p
Test anxiety	Time	12607.39	1.82	6927.13	171.12	< 0.001	0.71
	Group × Time	8027.05	2.85	2816.50	83.52	< 0.001	0.67
	Group	9012.08	2	4506.04	57.02	< 0.001	0.61
Academic self-handicapping	Time	3094.21	1.72	1798.95	104.06	< 0.001	0.64
	Group × Time	2147.06	2.13	418.53	86.37	< 0.001	0.62
	Group	11825.02	2	5912.51	53.24	< 0.001	0.60

SS: Sum of Squares; MS: Mean Square; η^2_p: partial eta-squared

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Effect sizes are reported as partial eta-squared (η^2_p), which quantifies the proportion of variance attributable to each effect after partialling out other effects in the model. For test anxiety, effect sizes were large (time: $\eta^2_p = 0.71$; group: $\eta^2_p = 0.61$; time × group: $\eta^2_p = 0.67$). Parallel findings emerged for academic self-handicapping (η^2_p ranging from 0.60 to 0.64).

Bonferroni-corrected pairwise comparisons (Tables 5 and 6) further clarified the nature of the group differences. Test anxiety decreased significantly from pretest to posttest and follow-up in both MBSR and EFT conditions (P < 0.001), with maintenance of gains from posttest to follow-up (MBSR: P = 0.214; EFT: P = 0.198); control participants showed no significant changes over time. At post-intervention and follow-up, both active conditions produced significantly lower test anxiety scores than waitlist control (P < 0.001). MBSR was superior to EFT in reducing test anxiety at posttest (P = 0.012) and follow-up (P = 0.018). Conversely, EFT demonstrated greater efficacy than MBSR in mitigating academic self-handicapping at posttest (P = 0.009) and follow-up (P = 0.007), though both interventions were superior to control. The lack of change between posttest and follow-up is interpreted descriptively, as two one-sided or other formal equivalence tests were not conducted.

Table 5. Bonferroni post-hoc comparisons within groups across time points

Variable	Time	MBSR group		EFT group		Control group	
		MD (SE) [95%CI]	P	MD (SE) [95%CI]	P	MD (SE) [95%CI]	P
Test anxiety	Pretest and Posttest	21.18 (1.42) [17.89, 24.47]	< 0.001	18.96 (1.68) [15.08, 22.84]	< 0.001	−0.32 (0.95) [−2.52, 1.88]	0.812
	Pretest and Follow-up	20.42 (1.51) [16.93, 23.91]	< 0.001	18.17 (1.79) [14.03, 22.31]	< 0.001	−0.70 (1.02) [−3.06, 1.66]	0.621
	Posttest and Follow-up	−0.76 (0.48) [−1.87, 0.35]	0.214	−0.79 (0.52) [−1.99, 0.41]	0.198	−0.38 (0.61) [−1.79, 1.03]	0.745
Academic self-handicapping	Pretest and Posttest	6.87 (1.21) [4.07, 9.67]	< 0.001	11.58 (1.35) [8.46, 14.70]	< 0.001	−0.26 (1.12) [−2.85, 2.33]	0.889
	Pretest and Follow-up	6.28 (1.28) [3.32, 9.24]	< 0.001	11.67 (1.31) [8.64, 14.70]	< 0.001	0.25 (1.08) [−2.25, 2.75]	0.876
	Posttest and Follow-up	−0.59 (0.55) [−1.86, 0.68]	0.312	0.09 (0.41) [−0.86, 1.04]	0.891	0.51 (0.72) [−1.15, 2.17]	0.678

MBSR: Mindfulness-Based Stress Reduction; EFT: Emotion-Focused Therapy; MD: Mean Difference; SE: Standard Error; CI: Confidence Interval

Table 6. Bonferroni post-hoc comparisons between groups at posttest and follow-up

Variable	Groups	Posttest		Follow-up	
		MD (SE) [95% CI]	P	MD (SE) [95% CI]	P
Test anxiety	MBSR and EFT	−5.11 (1.68) [−9.00, −1.22]	0.012	−5.14 (1.79) [−9.28, −1.00]	0.018
	MBSR and Control	−23.02 (1.95) [−27.53, −18.51]	< 0.001	−22.64 (2.01) [−27.29, −17.99]	< 0.001
	EFT and Control	−17.91 (2.12) [−22.81, −13.01]	< 0.001	−17.50 (2.18) [−22.54, −12.46]	< 0.001
Academic self-handicapping	MBSR and EFT	4.19 (1.35) [1.07, 7.31]	0.009	4.87 (1.42) [1.59, 8.15]	0.007
	MBSR and Control	−8.79 (1.98) [−13.37, −4.21]	< 0.001	−7.69 (1.92) [−12.13, −3.25]	< 0.001
	EFT and Control	−12.98 (1.85) [−17.26, −8.70]	< 0.001	−12.56 (1.79) [−16.70, −8.42]	< 0.001

MBSR: Mindfulness-Based Stress Reduction; EFT: Emotion-Focused Therapy; MD: Mean Difference; SE: Standard Error; CI: Confidence Interval

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Discussion

The primary objective of this investigation was to evaluate and compare the therapeutic efficacy of MBSR and EFT in mitigating test anxiety and academic self-handicapping among ninth-grade male students. Both active interventions produced statistically significant reductions relative to the waitlist control condition, with gains maintained at the one-month follow-up. Comparative analyses indicated differential patterns of improvement: MBSR was associated with larger reductions in test anxiety, whereas EFT was associated with larger reductions in academic self-handicapping. These patterns should be interpreted cautiously pending independent replication with larger and more diverse samples.

The pronounced effect of MBSR on test anxiety supports theoretical frameworks positing that present-moment mindfulness reduces intrusive thoughts and cognitive interference in evaluative contexts (14). Given that the current study relied on self-report tools without incorporating autonomic physiological indices like electrodermal activity or heart-rate variability, the mechanism linking MBSR to the decoupling of somatic arousal and catastrophic appraisal remains speculative rather than directly demonstrated. The finding aligns with prior single-modality mindfulness trials conducted with school-aged and college populations that have reported reductions in test anxiety and related cognitive symptoms (15, 16, 24).

Conversely, the relatively stronger effect of EFT on academic self-handicapping is consistent with the view that this behavior can function as an ego-protective strategy linked to core affective experiences such as shame, inadequacy, and self-criticism (9, 10). By facilitating access to and processing of these primary maladaptive emotions, EFT may help reduce reliance on anticipatory self-sabotaging strategies (17, 18). This interpretation remains provisional, as the present findings derive from self-report measures in a relatively small controlled trial and do not directly demonstrate changes in underlying emotional schemes or the psychological necessity of self-handicapping. This interpretation is supported by emotion-focused treatment studies addressing self-criticism and defensive avoidance (25, 26), although direct head-to-head comparisons of MBSR and EFT for academic self-handicapping remain scarce. The present results therefore contribute preliminary comparative evidence in a domain where most existing literature has examined each modality in isolation (13, 16, 19).

The exclusive recruitment of male adolescents constitutes a clear boundary condition rather than a minor limitation. Gender differences in emotional expression, help-seeking, and responses to mindfulness versus emotion-focused interventions have been documented in the broader literature; consequently, the differential patterns observed here may not generalize to female students or mixed-gender samples. In addition, cultural factors specific to Iranian adolescents warrant consideration. Within collectivist educational contexts that place high value on academic achievement and family reputation, the fear of failure underlying both test anxiety and self-handicapping may be particularly salient. Mindfulness practices emphasizing non-judgmental acceptance may interact differently with culturally reinforced self-critical standards than emotion-focused techniques that directly target shame and self-worth. Future research should examine whether these cultural dynamics moderate the relative effectiveness of the two approaches.

Despite its methodological strengths, including random assignment after eligibility screening and a follow-up assessment, several constraints limit generalizability. Because our sample comprised solely male ninth-graders from one city in Iran, and because we relied on

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self-reported data subject to social desirability, caution is warranted when generalizing these results. Multi-informant assessments, physiological markers, more diverse demographic samples, and extended longitudinal tracking are needed to clarify the durability and boundary conditions of these interventions.

Conclusion

Both MBSR and EFT produced meaningful reductions in test anxiety and academic self-handicapping among male adolescents relative to a waitlist control, with differential patterns favoring MBSR for anxiety symptoms and EFT for self-handicapping behaviors. These findings are preliminary. Given the demographic homogeneity of the sample, the brief follow-up interval, and the absence of independent replication, recommendations for routine integration into school counseling programs should remain cautious until longer-term data from more diverse populations become available.

Ethical Approval

Ethical considerations were rigorously observed; the study was approved by the regional ethics committee (Code: IR.IAU.AHVAZ.REC.1405.039) and registered in the clinical trials database (Code: IRCT20260512069378N1).

Authors' Contributions

H.S. contributed to the study design, data collection, and initial drafting of the manuscript. S.B. supervised the research process, contributed to data interpretation, and critically revised the manuscript for important intellectual content. P.A. participated in statistical analysis and manuscript revision. All authors read and approved the final version of the manuscript.

Informed Consent

Written informed consent was obtained from all participants and their legal guardians prior to inclusion in the study.

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Conflict of Interest

The authors declare that they have no competing interests.

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