

Research Article



Modern Psychological Care for Test Anxiety: The Impact of Acceptance and Commitment Therapy and Metacognitive Interventions on Students' Academic Well-Being and Self-Efficacy

Noura Farhadi ¹, Fatemeh Sadat Marashian* ¹, Parvin Ehteshamzadeh ¹, Zahra Dasht Bozorgi ¹

¹Department of Psychology, Ahv.C., Islamic Azad University, Ahvaz, Iran.

ABSTRACT

Received: 2025/12/27

Revised: 2026/07/07

Accepted: 2026/07/18

Introduction: Exam-related anxiety is a widespread psychological challenge that significantly hinders students' educational success and daily functioning.

Objectives: This study aimed to evaluate and contrast the efficacy of metacognitive therapy (MCT) and acceptance and commitment therapy (ACT) for boosting scholastic well-being and academic self-efficacy in female adolescents struggling with exam-related anxiety.

Methods: We conducted a randomized controlled trial featuring a pretest, posttest, and a two-month follow-up. The sample consisted of female high school students in Ahvaz, Iran, enrolled during the 2023–2024 school year. Utilizing multistage cluster sampling, 45 participants who met the criteria for test anxiety (screened via the Friedman Test Anxiety Scale) were identified and randomly divided into an ACT cohort, an MCT cohort, and a non-intervention control group (15 students each). Participants in the active treatment conditions attended eight 90-minute weekly therapy sessions. Outcome measures were collected using the Academic Well-Being Scale and the Academic Self-Efficacy Questionnaire. The data were subsequently evaluated using repeated-measures analysis of variance.

Results: Compared to the untreated controls, participants in the MCT and ACT groups demonstrated substantial gains in academic well-being and self-efficacy ($p < 0.001$). However, differential effects emerged between the two therapeutic modalities: MCT yielded significantly greater improvements in academic self-efficacy, whereas ACT was more beneficial for increasing overall academic well-being ($p < 0.001$).

Conclusions: Although both ACT and MCT successfully mitigate the negative consequences of test anxiety, their specific advantages differ based on the desired psychological outcome. Educational psychologists and school counselors can optimize student support by selecting the therapeutic approach that best aligns with whether a student primarily requires an intervention for academic self-efficacy or scholastic well-being.

Corresponding Author: Department of Psychology, Ahv.C., Islamic Azad University, Ahvaz, Iran
Email: fsmarashian@iaui.ac.ir

Keywords: Acceptance and commitment therapy (ACT), Metacognitive therapy (MCT), Self-efficacy, Test anxiety, Well-being.



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How to Cite: Farhadi N, Marashian F S, Ehteshamzadeh P, Dasht Bozorgi Z. Modern Psychological Care for Test Anxiety: The Impact of Acceptance and Commitment Therapy and Metacognitive Interventions on Students' Academic Well-Being and Self-Efficacy. Mod Care J 2026; 23 (3):20-28. <https://doi.org/10.21859/ModCareJ.23.3.20>

1. Introduction

Adolescence is a pivotal developmental transition marked by profound physical, cognitive, and social shifts that ultimately shape an individual's long-term mental health and societal integration (1). In educational settings, students encounter various stressors, with exam-related anxiety emerging as one of the most prevalent psychological hurdles (2). This form of anxiety is a complex reaction characterized by physical tension, physiological arousal, and intense apprehension regarding performance in assessment contexts (3). Research highlights the high frequency of test anxiety among high school populations, linking it to impaired cognitive processing, poor memory recall, diminished academic success, and compromised long-term psychological health (4). Consequently, mitigating the negative impacts of exam anxiety remains a central priority in both educational and clinical psychology.

Academic self-efficacy represents a learner's confidence in their capacity to plan and execute the steps necessary to meet educational goals (5). Grounded in social cognitive theory, these beliefs drive a student's motivation, emotional state, and behavior; highly efficacious learners view demanding assignments as opportunities for growth rather than threats to avoid (6, 7). Simultaneously, academic well-being is a multifaceted construct encompassing school satisfaction, active learning engagement, positive educational attitudes, and minimal burnout (8, 9). Exam anxiety frequently erodes both critical domains, culminating in increased task avoidance and emotional depletion (7, 10, 11).

While Acceptance and Commitment Therapy (ACT) and Metacognitive Therapy (MCT) are well-established interventions across various clinical settings, limited research has evaluated their comparative impact on the self-efficacy and well-being of students struggling with test anxiety. ACT builds psychological flexibility by encouraging individuals to accept their internal states and pursue values-driven behaviors, an approach that can reduce experiential avoidance and boost academic vitality (12-15). Conversely, MCT focuses on modifying maladaptive metacognitive beliefs and dismantling the cognitive attentional syndrome (CAS), thereby enhancing attentional control and fostering a greater sense of scholastic competence (16-19). To date, no Iranian research has compared the efficacy of these third-wave therapies on the well-being and self-efficacy of female high school students facing exam anxiety. The current study bridges this knowledge gap by directly contrasting the outcomes of ACT and MCT. Evaluating these treatments side by side offers significant clinical and theoretical insights, as their unique therapeutic mechanisms—fostering psychological flexibility in

ACT versus modifying metacognitive regulation in MCT—may yield distinct advantages depending on the targeted academic variable.

2. Objectives

This study aimed to assess and compare the relative effectiveness of MCT and ACT. Specifically, this study evaluated how successfully these two interventions enhanced scholastic well-being and academic self-efficacy among female high school students experiencing test anxiety.

3. Methods

3.1 Study Design

This research utilized a randomized controlled trial (RCT) framework, incorporating pretest, posttest, and two-month follow-up assessments. Participants assigned to the experimental conditions engaged in eight weekly 90-minute therapy sessions, whereas the control cohort received no active treatment over the same period. Table 1 outlines the specific procedural components for both the ACT and MCT protocols.

3.2 Participants

The study population comprised female high school students enrolled in Ahvaz, Iran, during the 2023–2024 academic year. A multi-stage cluster sampling approach was applied: two of the city's four educational districts were randomly selected, followed by two schools per district, and finally three classes per school. From this initial pool, 45 adolescents were recruited based on strict inclusion criteria: scoring above the clinical threshold for exam anxiety, lacking concurrent psychiatric care, and providing informed consent. Participants were excluded if they missed more than two treatment sessions or experienced acute psychological distress during the trial.

An a priori power analysis was conducted using G*Power 3.1 to determine the necessary sample size for a repeated-measures analysis of variance (ANOVA) (within-between interaction). Assuming a medium-to-large effect size ($f = 0.25$), an alpha level of $\alpha = 0.05$, statistical power of $1 - \beta = 0.80$, and a repeated-measures correlation of 0.5, the model required a minimum of 42 participants. To accommodate potential dropouts, 45 students were enrolled (15 per condition); ultimately, zero attrition was recorded. An independent statistician used a computer-generated block-randomization sequence (block size of three) to assign students to the

ACT, MCT, or control groups, ensuring allocation concealment until baseline testing concluded (Figure 1).

The final cohort consisted of 45 girls with a mean age of 16.42 years (SD = 0.82, range = 15–18 years).

Table 1: Summary of Session Content for Acceptance and Commitment Therapy (ACT) and Metacognitive Therapy (MCT)

Session	ACT	MCT
1	Creative hopelessness: Identifying ineffective anxiety control strategies	Case conceptualization: Identifying triggers and components of the Cognitive Attentional Syndrome (CAS)
2	Control as the problem: Exploring how avoidance and struggle exacerbate distress	Challenging negative metacognitive beliefs about the uncontrollability and danger of worry
3	Cognitive defusion: Techniques for distancing from literal thoughts	Introducing detached mindfulness: Observing thoughts without engagement
4	Acceptance and willingness: Cultivating openness to experiencing anxiety	Challenging positive metacognitive beliefs about the utility of worry
5	Self-as-context: Fostering the observing self-perspective	Attention Training Technique (ATT): Practicing flexible attentional control
6	Present-moment contact: Mindfulness exercises tailored to evaluative contexts	Reducing threat monitoring and maladaptive coping behaviors
7	Values clarification: Identifying personally meaningful academic directions	Consolidating adaptive metacognitive beliefs and strategies
8	Committed action: Planning values-consistent behaviors; relapse prevention	Relapse prevention: Reviewing gains and developing a maintenance plan

3.3 Scales

3.3.1 Friedman Test Anxiety Scale:

This 23-item instrument measures exam-related distress on a 4-point Likert scale (0 = rarely to 3 = almost always), yielding total scores between 0 and 69 (20). The Persian translation exhibits sound psychometric properties among Iranian adolescents (21). Only students exceeding the diagnostic threshold of 48 were eligible for inclusion.

3.3.2 Academic Self-efficacy Questionnaire:

Comprising 27 items, this tool assessed a learner's perceived competence in executing educational duties, such as test-taking and studying. Responses were recorded on a 10-point Likert scale (0 = not confident at all to 10 = extremely confident), with higher total scores indicating stronger self-efficacy beliefs (22). Prior research in Iran supports its reliability, reporting alpha coefficients above 0.80 (23). In the current investigation, the scale demonstrated excellent internal consistency (Cronbach's $\alpha = 0.84$).

3.3.3 Academic Well-Being Scale:

This comprehensive 31-item questionnaire evaluated multiple facets of scholastic well-being, including schoolwork engagement, perceived school value, and academic burnout. Participants responded on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree), where higher scores denote better well-being and reduced exhaustion (24). Its validity has been previously confirmed in Iranian populations (25). For this study, the instrument showed robust internal reliability (Cronbach's $\alpha = 0.82$).

3.3.4 Interventions:

A credentialed clinical psychologist with specialized training and over five years of clinical expertise in third-wave behavioral therapies facilitated both treatment conditions. To ensure treatment fidelity, all sessions strictly adhered to the standardized ACT and MCT manuals, and an independent clinical supervisor randomly audited 20% of the session audio recordings.

3.4 Data Collection

-Data collection took place across three phases: baseline (pretest), immediately post-intervention (posttest), and two months after the final session (follow-up).

-**Pretest Assessment:** Prior to the first session, all participants completed the Friedman Test Anxiety Scale, the Academic Self-Efficacy Questionnaire, and the Academic Well-Being Scale in a quiet classroom environment. An independent evaluator, who was blinded to the study hypotheses and group allocations, administered the scales to minimize bias.

- **Posttest Assessment:** Within three days of completing the eighth session, the same blinded evaluator administered the academic self-efficacy and academic well-being scales to all participants across the three groups under identical environmental conditions.

- **Follow-up Assessment:** Two months after the posttest, participants in all three cohorts were reassessed using the same instruments to evaluate the long-term stability and maintenance of the treatment effects.

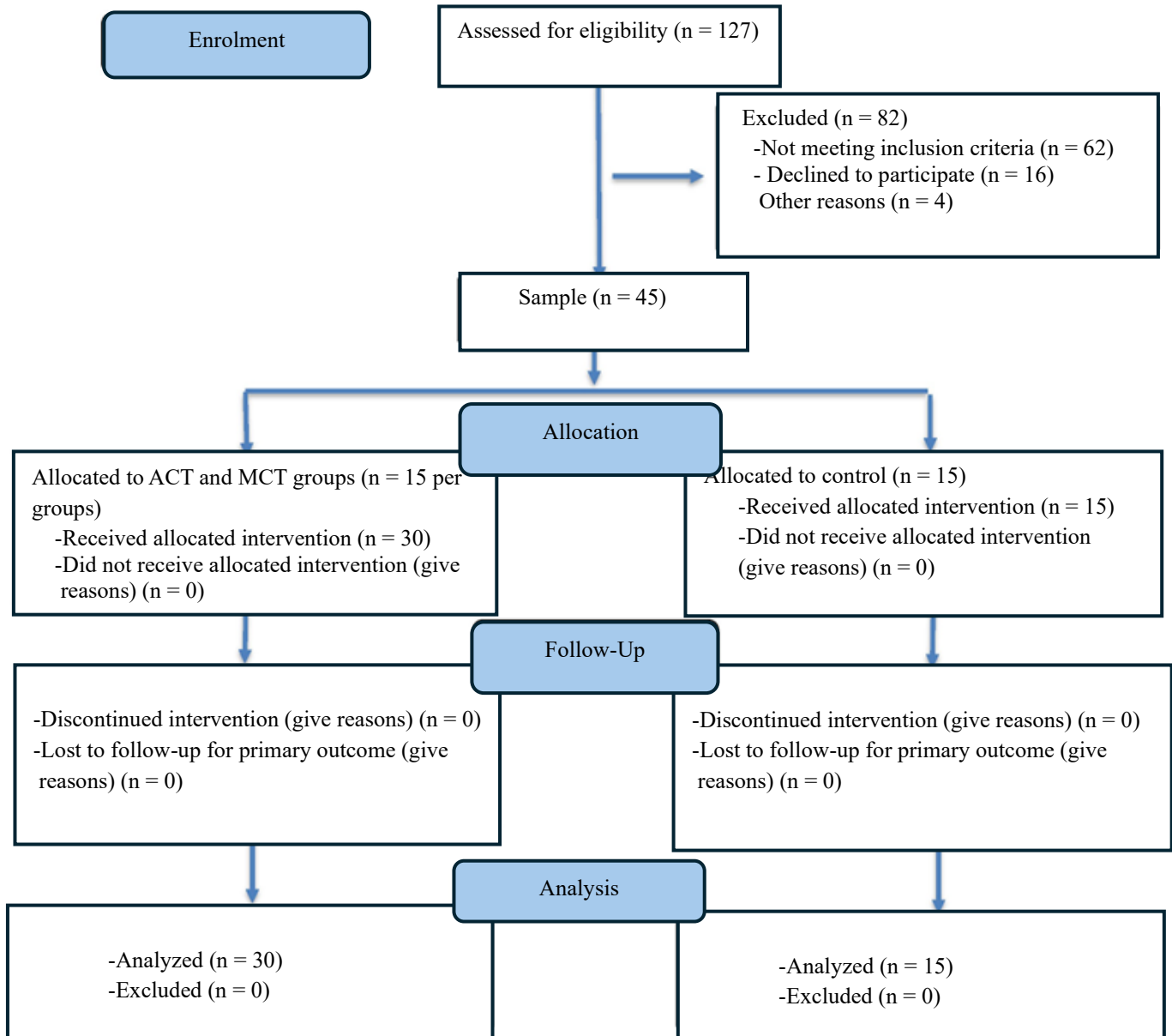


Figure 1: CONSORT Flow Diagram of the Study Participants

Throughout the data collection process, participants used unique identification numbers instead of their names to ensure confidentiality, and all completed paper questionnaires were securely stored.

3.5 Data Analysis

Data were processed using SPSS (version 27), with descriptive statistics summarized as means and standard deviations. To evaluate the primary hypotheses regarding inter-group variations and temporal changes across the three assessment phases (pretest, posttest, and follow-up), a repeated-measures ANOVA was conducted.

3.6 Ethical consideration

The research protocol adhered strictly to ethical guidelines. Informed consent was secured from all participants, data privacy was rigorously maintained throughout the study, and waitlist control subjects were offered the therapeutic intervention upon the trial's conclusion. (IR.IAU.AHVZ.REC.1404.042)

4. Results

The study sample comprised 45 adolescent girls with an average age of 16.42 years (SD = 0.82, range = 15–18 years). Table 2 presents the descriptive statistics (means and standard deviations) for academic well-

being and self-efficacy across the three measurement intervals. The data indicate substantial growth in both active treatment groups following the interventions, with these therapeutic benefits persisting or even expanding by the follow-up assessment. Specifically, academic self-efficacy scores in the ACT cohort rose from a baseline of 67.40 ± 4.30 to 77.67 ± 3.47 at post-treatment, reaching 79.13 ± 3.22 at follow-up. The MCT group exhibited even greater gains in self-efficacy, advancing from 69.33 ± 5.08 to 83.73 ± 4.63 (posttest) and 87.73 ± 4.07 (follow-up). Conversely, the control group's self-efficacy remained stagnant across all

phases (pretest: 66.93 ± 4.28 ; posttest: 68.80 ± 3.32 ; follow-up: 68.80 ± 2.56). Regarding academic well-being, the ACT condition yielded a pronounced increase from 78.93 ± 6.39 to 91.60 ± 6.43 and ultimately 95.27 ± 6.38 . The MCT group also demonstrated improvements, though more moderate, progressing from 75.80 ± 6.27 to 84.40 ± 6.15 and stabilizing at 85.13 ± 5.95 . As expected, control group well-being scores fluctuated minimally over the study period (pretest: 76.87 ± 4.54 ; posttest: 76.53 ± 4.43 ; follow-up: 77.27 ± 4.04).

Table 2: Descriptive Statistics: Means and Standard Deviations for Academic Self-efficacy Beliefs and Academic Well-being by Group and Assessment Phase

Variable	Phases	ACT group	MCT group	Control group
		Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD
Self-efficacy beliefs	Pretest	67.40 ± 4.30	69.33 ± 5.08	66.93 ± 4.28
	Posttest	77.67 ± 3.47	83.73 ± 4.63	68.80 ± 3.32
	Follow-up	79.13 ± 3.22	87.73 ± 4.07	68.80 ± 2.56
Academic well-being	Pretest	78.93 ± 6.39	75.80 ± 6.27	76.87 ± 4.54
	Posttest	91.60 ± 6.43	84.40 ± 6.15	76.53 ± 4.43
	Follow-up	95.27 ± 6.38	85.13 ± 5.95	77.27 ± 4.04

Abbreviations: ACT, acceptance and commitment therapy; MCT, metacognitive therapy; SD, standard deviation.

Preliminary diagnostic tests were conducted to confirm the data met the necessary assumptions for parametric analysis. Shapiro-Wilk evaluations verified that scores for both dependent variables were normally distributed across all conditions and timeframes ($p > 0.05$). Baseline homogeneity of variance was supported by Levene's test ($p > 0.05$). While Mauchly's test generally indicated that the assumption of sphericity was satisfied, Greenhouse-Geisser adjustments were applied in isolated instances of violation.

The outcomes of the repeated-measures ANOVA are detailed in Table 3. The analysis revealed highly significant main effects for time and group, as well as a significant time-by-group interaction for both academic self-efficacy and well-being ($p < 0.001$). Furthermore, the interventions produced substantial effect sizes for both group disparities (partial $\eta^2 = 0.71$ - 0.76) and temporal changes (partial $\eta^2 = 0.66$ - 0.70), underscoring the robust impact of the psychological treatments.

Table 3: Repeated-Measures ANOVA Results for Academic Self-efficacy Beliefs and Academic Well-being

Variable	Source	SS	df	MS	F	p	η^2
Self-efficacy beliefs	Group	2929.83	1.64	1758.33	991.65	0.001	0.76
	Time	1140.74	3.28	347.56	193.05	0.001	0.70
	Group $\times$ Time	3296.01	2	1648.01	37.42	0.001	0.44
Academic well-being	Group	1906.71	1.47	1294.94	456.97	0.001	0.71
	Time	1108.71	2.95	386.49	132.86	0.001	0.66
	Group $\times$ Time	3113.91	2	1556.95	16.69	0.001	0.24

Abbreviations: SS, sum of squares; MS, mean square; df, degrees of freedom; η^2 , eta-squared; ANOVA, analysis of variance.

Subsequent Bonferroni-corrected pairwise comparisons (Table 4) indicated that both therapy conditions achieved significant therapeutic gains from baseline to posttest and from baseline to the two-month follow-up (all $p < 0.001$). The control condition showed

no meaningful statistical shifts over time (all $p > 0.999$). Treatment effects were largely preserved at follow-up, with the MCT cohort displaying additional continuous enhancement in self-efficacy (mean difference = 4.00 , $p = 0.012$) and the ACT group demonstrating further -

gains in well-being (mean difference = 3.67, $p = 0.018$).

Analysis of between-group differences (Table 5) verified that all three cohorts were statistically comparable at baseline ($p > 0.05$). At both post-intervention and follow-up intervals, both active treatments significantly outperformed the control condition on all measures (all $p < 0.001$). When

comparing the two therapeutic modalities directly, MCT proved significantly more effective at boosting academic self-efficacy (e.g., posttest mean difference = 6.06, $p < 0.001$). In contrast, ACT was demonstrably superior at enhancing academic well-being (e.g., follow-up mean difference = 10.14, $p < 0.001$).

Table 4: Within-Group Post-hoc Comparisons (Bonferroni-Corrected) for Changes in Academic Self-efficacy Beliefs and Academic Well-being

Variable	Time	ACT group		MCT group		Control group	
		Mean Difference	p	Mean Difference	p	Mean Difference	p
Self-efficacy beliefs	Posttest and pretest	10.27	0.001	14.40	0.001	1.87	0.999
	Follow-up and pretest	11.73	0.001	18.40	0.001	1.87	0.999
	Follow-up and posttest	1.46	0.264	4.00	0.012	0.00	0.999
Academic well-being	Posttest and pretest	12.67	0.001	8.60	0.001	-0.34	0.999
	Follow-up and pretest	16.34	0.001	9.33	0.001	0.40	0.999
	Follow-up and posttest	3.67	0.018	0.73	0.999	0.74	0.999

Abbreviations: ACT, acceptance and commitment therapy; MCT, metacognitive therapy.

5. Discussion

This study aimed to evaluate the comparative effectiveness of ACT and MCT in improving the academic well-being and self-efficacy of students experiencing test anxiety. The data revealed that both therapeutic modalities yielded significant, long-lasting improvements over the control condition; however, each therapy displayed distinct advantages for specific outcomes.

Notably, MCT produced greater gains in academic self-efficacy than ACT. This outcome makes theoretical sense, given MCT's emphasis on the mechanisms underlying thought processes. By addressing the CAS and altering dysfunctional beliefs about the danger and uncontrollability of worry, MCT diminishes repetitive negative thinking and rehabilitates attentional flexibility (16). As students disengage from rumination and refocus, their confidence in handling scholastic challenges naturally grows. Minimizing cognitive clutter allows learners to fully utilize their intellectual capacities during assessments. These results resonate with earlier work demonstrating MCT's capacity to alleviate exam-related distress and bolster academic tenacity (18). However, while prior investigations examined general educational variables, our study advances the literature by pinpointing MCT's specific benefits for task-related confidence when evaluated alongside ACT. Ultimately, the evidence positions MCT as a highly

appropriate intervention for students primarily burdened by intrusive thoughts and poor academic self-belief (26).

Conversely, ACT was significantly superior to MCT in fostering academic well-being. This aligns with ACT's foundational focus on cultivating psychological flexibility and pursuing value-driven actions rather than merely attempting to eliminate symptoms. This therapy trains students to view anxiety as a temporary internal state, freeing them to pursue academic objectives that reflect their personal ideals (27). Transitioning from experiential avoidance to present-moment awareness enhances school connectedness and mitigates academic burnout. These findings parallel earlier literature establishing the value of ACT for increasing student vitality, involvement, and general wellness (28). Crucially, whereas previous trials typically tested ACT against waitlist groups or alone, our randomized design provides robust evidence of its distinct superiority over an active alternative (MCT) in promoting holistic academic well-being. Collectively, the data indicate that the unique operational mechanisms of these therapies—psychological flexibility in ACT and metacognitive regulation in MCT—provide specialized advantages based on the targeted outcome.

Clinically, these findings highlight the divergent functional pathways of the two modalities. MCT acts as a targeted intervention to sharpen cognitive focus and build performance-based confidence. In contrast, ACT provides a broader framework to nurture emotional resilience and elevate overall student

quality of life. Consequently, practitioners should tailor their treatment selection to the individual's presenting issues. Students grappling with feelings of

academic inadequacy may benefit most from MCT, while ACT likely better serves those battling school-related exhaustion or disconnection.

Table 5: Between-Group Post-Hoc Comparisons (Bonferroni-Corrected) for Academic Self-efficacy Beliefs and Academic Well-being

Variable	Groups	Pretest		Posttest		Follow-up	
		Mean Difference	p	Mean Difference	p	Mean Difference	p
Self-efficacy beliefs	ACT– MCT	-1.93	1.000	-6.06	0.001	-8.60	0.001
	ACT – Control	0.47	1.000	8.87	0.001	10.33	0.001
	MCT - Control	2.40	0.642	14.93	0.001	18.93	0.001
Academic well-being	ACT– MCT	3.13	0.876	7.20	0.001	10.14	0.001
	ACT – Control	2.06	1.000	15.07	0.001	18.00	0.001
	MCT - Control	-1.07	1.000	7.87	0.001	7.86	0.001

Abbreviations: ACT, acceptance and commitment therapy; MCT, metacognitive therapy.

5.1 Limitation

Several methodological limitations must be acknowledged. First, the modest sample size ($n = 45$) provided adequate power to detect substantial effects but limited ability to detect smaller statistical differences and constrained the precision of overall estimate. Second, because the participants were exclusively female high school students from Ahvaz, the findings cannot be readily extrapolated to males, other age groups, or different sociocultural contexts. Therefore, application to the wider adolescent demographic requires caution. Finally, the use of self-report measures introduces the potential for response bias. Future investigations would benefit from longitudinal tracking, larger and more heterogeneous cohorts, and the integration of objective metrics, such as academic transcripts and teacher appraisals, to comprehensively evaluate these therapeutic impacts.

5.2 Conclusion

To summarize, this study confirms that both ACT and MCT successfully alleviate test-related distress in female high school students. Importantly, these modalities offer distinct therapeutic advantages: MCT is notably superior at bolstering academic self-efficacy, whereas ACT excels at promoting overall academic well-being. These outcomes emphasize the utility of aligning clinical approaches with specific educational goals—leveraging metacognitive regulation to build academic confidence, and applying psychological flexibility to cultivate broader school connectedness. Consequently, school psychologists and counselors can use these insights to provide individualized interventions that enhance both student mental health and scholastic resilience. To build upon these findings and ensure broader applicability, future

studies must recruit larger, demographically diverse samples, specifically including males and individuals from varied cultural backgrounds. Furthermore, implementing rigorous methodologies—such as active control conditions, extended follow-up intervals, multi-informant evaluations, and the direct assessment of therapeutic change mechanisms (i.e., shifts in metacognitive beliefs and psychological flexibility)—will deepen our understanding of how these treatments operate. Such efforts will ultimately pave the way for the routine adoption of these third-wave behavioral therapies in educational environments.

Acknowledgments

The authors thank the participating students, their families, and the school staff for their cooperation.

Statements

AI Use: Artificial intelligence was used only for language editing and manuscript refinement. The authors reviewed and approved the final content and take full responsibility for the accuracy and integrity of the manuscript.

Authors' Contribution: N.F. and F.S.M. conceptualized the study and designed the methodology. N.F. conducted the interventions, collected the data, and drafted the manuscript. P.E. and Z.D.B. performed statistical analyses and contributed to the interpretation of the results. F.S.M. supervised the research project and critically revised the manuscript for significant intellectual content. All authors have read, reviewed, and approved the final version of the manuscript.

Conflict of Interests: The authors declared no conflicts of interest.

Data Availability: The datasets generated and analyzed during the current study are not publicly available due to privacy and confidentiality restrictions regarding the participants, but are available from the corresponding author upon reasonable request.

Ethical Approval: The research was approved by the Islamic Azad University Ethics Committee (reference: IR.IAU.AHVAAZ.REC.1404.042).

Funding/Support: This research did not receive any specific grants from funding agencies in the public, commercial, or not-for-profit sectors

Informed Consent: Written informed consent was obtained from all participants included in the study. Because the participants were high school students (minors), written informed consent was also obtained from their parents or legal guardians prior to the study's commencement.

RCT Code: IRCT20250530065978N1.

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