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Comparison of the Effectiveness of Cognitive Behavioral Therapy and Acceptance and Commitment Therapy Educational-Therapeutic Packages on Anxiety and Alexithymia in Students with Self-Harming Behaviors

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A B S T R A C T

Objective: This study aimed to compare the effectiveness of educational-therapeutic packages based on Cognitive Behavioral Therapy (CBT) and Acceptance and Commitment Therapy (ACT) in reducing anxiety and alexithymia among students with self-harming behaviors.
Methodology: This quasi-experimental study employed a pretest-posttest design with two intervention groups and a control group. The statistical population consisted of upper-secondary school students in Kermanshah, Iran. Using convenience sampling and screening with the Sansone et al. (1998) Self-Harm Inventory, 45 eligible students were selected and assigned to CBT, ACT, and control groups. Participants completed the Beck Anxiety Inventory (1990) and the Toronto Alexithymia Scale (1994) at pretest and posttest. The two experimental groups received educational-therapeutic interventions based on CBT and ACT, whereas the control group received no intervention during the study period. Data were analyzed using univariate and multivariate analyses of covariance (ANCOVA and MANCOVA) in SPSS version 26, with pretest scores controlled in the inferential analyses.
Findings: Univariate ANCOVA indicated a statistically significant group effect on posttest anxiety after controlling for pretest scores, with group membership accounting for approximately 78% of the variance in anxiety. A significant intervention effect was also found for total alexithymia, indicating a substantial reduction attributable to the therapeutic interventions. Multivariate covariance analysis of alexithymia dimensions revealed significant between-group differences in difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking, with the largest effect observed for externally oriented thinking. Bonferroni post-hoc comparisons demonstrated that both CBT and ACT significantly reduced anxiety, total alexithymia, and its dimensions compared with the control group. However, no statistically significant differences were observed between CBT and ACT in their effects on anxiety or alexithymia.
Conclusion: Both CBT- and ACT-based educational-therapeutic packages appear to be effective interventions for reducing anxiety and alexithymia among

students exhibiting self-harming behaviors. The absence of significant differences between the two approaches suggests that either intervention may be incorporated into school-based psychological and counseling programs according to students' needs and available clinical resources.
Keywords: *Self-Harming Behaviors; Anxiety; Alexithymia; Cognitive Behavioral Therapy; Acceptance and Commitment Therapy; Students*

1. Introduction

Self-harming behavior has emerged as an increasingly important psychological and public health concern among adolescents, particularly among students who are exposed to developmental, academic, interpersonal, and emotional pressures during a period of rapid psychological change. Self-harm generally refers to intentional behaviors through which individuals inflict injury on themselves, often without an explicit intention to die, although such behaviors may coexist with suicidal thoughts and may substantially increase subsequent suicide risk. Among adolescents, self-harming behaviors may function as maladaptive attempts to regulate intense emotional states, reduce psychological tension, communicate distress, cope with interpersonal difficulties, or regain a temporary sense of control. The school years constitute a particularly sensitive developmental period because adolescents must simultaneously negotiate identity formation, peer relationships, family expectations, academic demands, and increasing emotional autonomy. When adaptive coping strategies are insufficient, self-harm may become a repetitive method of managing overwhelming internal experiences. Evidence from Iranian high school students has demonstrated that self-harm is associated with elevated anxiety, depression, and stress, indicating that it should not be conceptualized as an isolated behavioral problem but rather as part of a broader pattern of psychological vulnerability (Abdollahi et al., 2023). Research among other vulnerable populations similarly suggests that loneliness and psychological distress are meaningful predictors of self-harming behavior, highlighting the importance of emotional and interpersonal processes in understanding why individuals engage in self-injury (Sabaghi Renani, 2024).

The clinical significance of self-harm extends beyond the physical consequences of injury. Recurrent self-harming behavior is associated with emotional dysregulation, impulsivity, interpersonal difficulties, social isolation, psychiatric symptoms, and increased vulnerability to suicidal behavior. Predictive research has shown that deliberate self-harm is influenced by a combination of psychological, social, and behavioral factors, suggesting that prevention and intervention require attention to multiple domains of functioning rather than a narrow focus on the behavior itself (Hamdan-Mansour et al., 2024). Contemporary research has also emphasized the changing contexts in which self-harm occurs. Digital environments and online communities may expose adolescents to self-harm-related material, provide spaces in which experiences of distress are shared, and potentially reinforce or normalize harmful coping behaviors. Methodological reviews of firsthand experiences with online self-harming and suicidal behavior therefore underscore the complexity of studying these phenomena and the need to understand adolescents' experiences across both offline and digital environments (Holm et al., 2024). In educational settings, these concerns have led to increasing interest in interventions that can be feasibly implemented or coordinated through schools, where vulnerable adolescents can be identified relatively early. A systematic review of interventions designed to prevent or manage self-harm among students has emphasized the importance of evidence-based approaches that address underlying psychological mechanisms while remaining suitable for educational contexts (Nawaz et al., 2024). Similarly, healthcare and school-based professionals increasingly require specific training to recognize self-harm risk, respond appropriately, and facilitate timely psychological intervention (Moussadek, 2024).

Among the psychological variables associated with adolescent self-harm, anxiety appears to be particularly important. Anxiety involves cognitive, emotional, behavioral, and physiological responses to perceived threat and may manifest as persistent worry, fear, autonomic arousal, avoidance, concentration difficulties, and somatic discomfort. Adolescents experiencing sustained anxiety may perceive emotional experiences as uncontrollable and may resort to maladaptive behaviors to obtain short-term relief. Network-based research examining non-suicidal self-injury among adolescents has demonstrated meaningful relationships between anxious and depressive symptoms and self-injurious behavior, suggesting that specific emotional symptoms may interact in ways that intensify vulnerability to self-harm (Guan et al., 2024). Iranian evidence similarly indicates that anxiety is significantly associated with self-harm among high school students (Abdollahi et al., 2023).

From a functional perspective, self-injury may temporarily reduce acute emotional arousal, distract attention from anxiety-provoking thoughts, or transform diffuse psychological distress into a concrete physical sensation. Although such short-term relief may reinforce the behavior, it does not resolve the underlying source of anxiety and may instead strengthen a maladaptive cycle in which distress increasingly triggers self-harming responses.

Anxiety also interacts with broader emotional and cognitive vulnerabilities. Individuals who lack effective strategies for identifying, interpreting, tolerating, and communicating emotional experiences may be particularly likely to respond to psychological distress through behavioral means. Studies of self-harm have increasingly emphasized experiential avoidance, maladaptive emotional schemas, and ineffective coping as relevant psychological processes. Structural research has shown that emotional schemas and experiential avoidance are related to self-harming behaviors, suggesting that the tendency to escape, suppress, or control unwanted internal experiences may contribute to the development or maintenance of self-injury (Mardani et al., 2022). Other research has identified loneliness as an important mediator or correlate of self-harm, further illustrating how interpersonal disconnection may interact with maladaptive emotional regulation processes (Ekhlaqi, 2023). These findings are particularly relevant to adolescents, whose social relationships and perceived acceptance by peers and family members strongly influence emotional functioning. Consequently, therapeutic approaches that reduce anxiety while simultaneously improving emotional awareness, acceptance, and adaptive coping may be especially valuable for students who self-harm.

Alexithymia represents another important construct in this context. Alexithymia is characterized by difficulty identifying emotions, difficulty describing feelings to others, and an externally oriented cognitive style in which attention is directed toward concrete events rather than internal affective states. Individuals with elevated alexithymia may experience physiological and psychological arousal without being able to adequately recognize or verbally represent what they are feeling. Such deficits can impair emotional regulation because effective regulation typically depends on the ability to identify an emotional state, understand its source, communicate it when necessary, and select an appropriate coping response. Among adolescents who engage in self-harm, alexithymia may therefore increase the likelihood that difficult emotions are expressed behaviorally rather than symbolically or verbally. A systematic review examining alexithymia as a risk factor for adolescent self-harm in depression concluded that difficulties in emotional identification and expression are clinically meaningful in understanding vulnerability to self-injurious behavior (Bordalo & Carvalho, 2022). Research among students has likewise shown that alexithymia and self-harming behaviors may co-occur with other problematic behavioral tendencies, including problematic internet use and impulsivity (Asghari, 2023).

The relationship between alexithymia and psychological flexibility is also theoretically important. Psychological flexibility refers to the capacity to remain in contact with present experiences, including uncomfortable thoughts and emotions, while choosing behavior that is consistent with personally meaningful values. Individuals with low psychological flexibility may become excessively entangled with distressing thoughts, avoid unwanted emotional experiences, and engage in short-term relief strategies even when these behaviors have harmful long-term consequences. Research has shown that psychological flexibility plays a meaningful role in explaining relationships among alexithymia, authenticity, and life satisfaction, reinforcing the idea that the ability to respond flexibly to internal experience is closely related to emotional awareness and adaptive functioning (Karakuş & Akbay, 2022). This conceptual overlap makes psychological flexibility a particularly relevant therapeutic target for adolescents with both alexithymia and self-harming behaviors.

Given these mechanisms, interventions for self-harming adolescents should ideally address both maladaptive cognitions and avoidance-based emotional processes. Cognitive Behavioral Therapy (CBT) represents one of the most established psychological approaches for anxiety and related emotional disorders. CBT is based on the proposition that psychological distress is maintained in part by dysfunctional interpretations, automatic thoughts, cognitive biases, avoidance patterns, and ineffective behavioral responses. Treatment typically involves identifying maladaptive thoughts, examining evidence for and against them, developing more balanced cognitive appraisals, reducing avoidance, strengthening problem-solving skills, and practicing adaptive behavioral coping. Contemporary developments in CBT have increasingly moved toward process-based models that identify functional psychological processes shared across diagnostic categories rather than restricting intervention to disorder-specific symptom protocols (Ong et al., 2022). Such an approach is particularly

relevant to self-harm because adolescents who self-injure often present with overlapping anxiety, emotional dysregulation, interpersonal difficulties, and maladaptive coping patterns.

The efficacy of CBT for anxiety is well documented across diverse populations. Systematic review and meta-analytic evidence has shown that CBT can significantly reduce anxiety, depressive symptoms, and stress, including in populations experiencing major life transitions and heightened psychological vulnerability (Li et al., 2022). CBT may be especially useful for self-harming adolescents because it can help them recognize anxiety-provoking situations, identify negative automatic thoughts, challenge catastrophic or perfectionistic beliefs, reduce avoidance, develop problem-solving skills, and replace self-injury with safer coping behaviors. Through repeated cognitive restructuring and behavioral practice, adolescents may also become better able to differentiate between thoughts, emotions, bodily sensations, and behavioral urges. This increased cognitive-emotional discrimination may indirectly reduce alexithymic tendencies by improving the individual's capacity to identify and articulate internal experiences.

Acceptance and Commitment Therapy (ACT) offers a different but complementary framework. Rather than primarily attempting to modify the literal content of distressing thoughts, ACT aims to transform the individual's relationship with thoughts and emotions. Its central objective is the development of psychological flexibility through six interrelated processes: acceptance, cognitive defusion, present-moment awareness, self-as-context, values clarification, and committed action. ACT conceptualizes many psychological difficulties as being maintained by experiential avoidance and cognitive fusion. From this perspective, attempts to suppress, escape, or eliminate unwanted internal experiences can paradoxically increase distress and narrow behavioral repertoires. Self-harming behavior may therefore be understood as an extreme form of experiential avoidance in which physical injury is used to escape, interrupt, or regulate painful emotional experiences.

Research supports the relevance of ACT to anxiety and emotional difficulties. ACT has been shown to reduce cognitive fusion and social anxiety by helping individuals develop a more flexible and accepting relationship with internal experiences (Enayati et al., 2024). Comparative research has also indicated that ACT and mindfulness-based approaches can improve anxiety-related outcomes in populations characterized by emotional vulnerability (Fallahi et al., 2024). ACT has demonstrated beneficial effects on depression, alexithymia, and related psychological outcomes in individuals with chronic medical conditions, suggesting that its mechanisms extend beyond anxiety reduction to broader emotional functioning (Rahnama Zadeh et al., 2022). Similarly, studies comparing ACT with other therapeutic approaches have reported significant improvements in alexithymia, supporting the applicability of acceptance-based processes to difficulties in identifying and expressing emotion (Hosseini et al., 2023). Evidence from nurses with chronic pain has likewise indicated that ACT can reduce anxiety sensitivity and alexithymia, further supporting the relevance of acceptance, mindfulness, and cognitive defusion for emotional processing difficulties (Bagheri et al., 2022).

More directly, ACT has been associated with improvements in emotional self-awareness and reductions in alexithymia among girls, which is especially relevant to adolescent female populations (Aghili & Hosseinzadeh, 2024). Recent research among individuals with a history of suicide attempts has also demonstrated the effectiveness of ACT in reducing alexithymia and improving mental health indicators, suggesting that the approach may be useful for individuals with severe emotion-related behavioral risk (Khajavi Godellou et al., 2025). A systematic review of psychological treatments for alexithymia further indicates that alexithymia is modifiable through structured psychological intervention rather than representing a fixed personality characteristic, although treatment effects may differ according to therapeutic model and population (Tsubaki & Shimizu, 2024). These findings provide a strong rationale for examining ACT as a treatment for students with self-harming behaviors, particularly because these students may have difficulty verbalizing emotional distress and may rely on behavioral strategies to manage internal discomfort.

Evidence also supports the potential value of ACT specifically in relation to self-harm and suicidality. Research with students has shown that ACT can reduce suicidal thoughts, tendencies toward self-harm, and existential anxiety, indicating that changes in acceptance, values-based action, and psychological flexibility may influence high-risk behavioral outcomes (Jalali-Azar et al., 2024). A systematic review examining ACT for suicidal ideation and deliberate self-harm has similarly suggested that acceptance- and flexibility-based interventions may contribute to reductions in suicidal and self-injurious outcomes, although additional rigorous comparative research remains necessary (Tighe et al., 2024). These findings are theoretically coherent with the ACT model because adolescents who learn to experience

distress without immediately acting to escape it may become less reliant on self-harm as an emotion-regulation strategy.

An important research question concerns whether CBT and ACT differ meaningfully in their effects. CBT focuses more explicitly on identifying, evaluating, and restructuring maladaptive cognitions, whereas ACT emphasizes acceptance, defusion, mindfulness, and value-consistent action. Despite these conceptual distinctions, the two approaches share several functional elements, including behavioral change, increased awareness of internal experiences, reduction of maladaptive avoidance, and development of more adaptive coping responses. Comparative research among emerging adults has demonstrated that both CBT and ACT can significantly reduce depression and anxiety, with both approaches showing therapeutic value (Ahmad Othman et al., 2023). Similarly, research conducted during the COVID-19 pandemic found both CBT and ACT to be effective in reducing test anxiety, suggesting that the two approaches may achieve comparable outcomes through partially different mechanisms (Uysal et al., 2023). Comparative findings in adult women with depression have also shown therapeutic benefits of both CBT and ACT for interpersonal and emotional difficulties (Oladian, 2024).

For adolescents with self-harming behavior, direct comparative evidence is particularly important. Research comparing cognitive-behavioral training and acceptance and commitment-based training in self-harming adolescents has shown that both approaches can improve distress tolerance, a construct closely associated with the capacity to withstand negative emotional states without resorting to maladaptive behavior (Gerili et al., 2023). This finding suggests that both interventions may influence mechanisms relevant to self-harm, but it does not establish whether they are equally effective in reducing specific internalizing outcomes such as anxiety and alexithymia. Furthermore, although previous studies have examined ACT in relation to alexithymia, anxiety, suicidality, and self-harm separately, fewer studies have directly compared ACT with CBT while simultaneously assessing both anxiety and multidimensional alexithymia in adolescent students who already exhibit self-harming behaviors.

This gap is clinically important because anxiety and alexithymia may represent complementary intervention targets. Anxiety reflects the intensity of distress experienced by the adolescent, whereas alexithymia reflects difficulty understanding and expressing that distress. A student may therefore experience high emotional arousal while simultaneously lacking the emotional vocabulary and awareness necessary to communicate the experience effectively. Under such circumstances, self-harm may function as both an emotion-regulation behavior and a nonverbal expression of distress. Interventions that merely reduce anxiety without improving emotional awareness may leave part of this vulnerability unresolved, whereas interventions that improve emotional awareness without adequately addressing maladaptive thoughts and behavioral avoidance may also be incomplete. Consequently, comparing CBT and ACT on both outcomes can clarify whether one approach has an advantage or whether both offer similarly useful pathways for reducing psychological risk.

Taken together, existing evidence indicates that self-harming behavior among adolescents is associated with anxiety, emotional distress, experiential avoidance, loneliness, impaired emotional awareness, and alexithymia; that both CBT and ACT address mechanisms plausibly involved in these difficulties; and that both approaches have demonstrated efficacy across anxiety, alexithymia, and related psychological outcomes. Nevertheless, direct comparative evidence remains limited for female secondary school students with identified self-harming behaviors, particularly when anxiety and the total and component dimensions of alexithymia are considered concurrently. Therefore, the present study aimed to compare the effectiveness of Cognitive Behavioral Therapy and Acceptance and Commitment Therapy educational-therapeutic packages in reducing anxiety and alexithymia among female secondary school students with self-harming behaviors.

2. Methods and Materials

2.1. Study Design and Participants

The present study employed a quasi-experimental pretest-posttest design with two experimental groups and one control group. The statistical population consisted of female upper-secondary school students aged 15–18 years who were studying in Kermanshah, Iran, during the 2025–2026 academic year. Because the study specifically targeted students exhibiting self-harming behaviors, participant recruitment was conducted in two stages. In the initial screening stage, 313 students were selected through random cluster sampling based on the sample-size recommendations of Krejcie and Morgan (1970). The selected students were screened using the Self-Harm Inventory developed by

Sansone et al. (1998). Following screening, 45 students who met the criteria for self-harming behavior and agreed voluntarily to participate in the study were recruited through convenience sampling. Eligible participants were subsequently randomly assigned to three groups of equal size: a Cognitive Behavioral Therapy (CBT) intervention group, an Acceptance and Commitment Therapy (ACT) intervention group, and a control group, with 15 participants in each group. The inclusion criteria were exhibiting self-harming behavior according to the Self-Harm Inventory, enrollment in upper-secondary education, being between 15 and 18 years of age, willingness to participate in the study, ability to attend the intervention sessions regularly, and willingness to cooperate with the therapeutic procedures and complete between-session assignments. Participants were also required not to be receiving another concurrent psychological or educational intervention that could interfere with the study treatments. Students were excluded when psychological assessment indicated a severe psychiatric disorder, such as a psychotic disorder, when they had a serious physical illness that could prevent meaningful participation in the intervention, when they received another structured psychological intervention before or during the study period, when they repeatedly failed to attend treatment sessions, or when they did not adequately cooperate with the therapeutic protocols and assignments. Before the interventions, participants in all three groups completed the anxiety and alexithymia measures as pretest assessments. The experimental groups then received their respective CBT- or ACT-based educational-therapeutic programs, whereas the control group did not receive either of these interventions during the study period. Following completion of the intervention programs, the outcome measures were administered again as posttest assessments. This design made it possible to examine changes in anxiety and alexithymia while statistically controlling for participants' baseline scores and to compare the relative effects of the two therapeutic approaches with those observed in the control condition.

2.2. Measures

Self-Harm Inventory (SHI). The Self-Harm Inventory (SHI), developed by Sansone et al. (1998), was used as the principal screening instrument for identifying students with a history of self-harming behaviors. The instrument consists of 22 items addressing a range of intentional self-harming behaviors and related experiences. Items are answered dichotomously using “yes” or “no” responses, with a “yes” response scored as 1 and a “no” response scored as 0. Accordingly, the total score is obtained by summing affirmative responses across the 22 items, with higher scores indicating a greater number or broader range of self-harming behaviors. The measure was used in the present study for eligibility screening rather than as a primary treatment outcome. The SHI has been employed in both clinical and research settings as a brief measure for identifying individuals who may require more detailed assessment of self-injurious behavior. Evidence from Iranian research has supported its psychometric adequacy; Jafarpour and Khalili (2021), for example, reported a Cronbach's alpha coefficient of .87. International studies have similarly demonstrated acceptable to strong internal consistency, with coefficients generally reported in the range of approximately .85 to .90, as well as satisfactory temporal stability. Previous research has also demonstrated meaningful associations between the SHI and other measures of deliberate self-harm, providing evidence of convergent validity. Klonsky and Glenn (2009), among others, reported evidence supporting the validity of self-harm assessment instruments in identifying clinically meaningful self-injurious behaviors. In the current study, responses to the SHI were considered together with the study's inclusion and exclusion criteria when determining eligibility for participation.

Beck Anxiety Inventory (BAI). Anxiety was assessed using the Beck Anxiety Inventory (BAI), a widely used self-report measure developed by Beck and colleagues for assessing the severity of anxiety symptoms in adolescents and adults. The inventory comprises 21 items describing common cognitive, subjective, somatic, and panic-related manifestations of anxiety. Participants indicate how much they have been bothered by each symptom using a four-point response scale ranging from 0 to 3, with higher item scores representing greater symptom severity. The item scores are summed to generate a total score ranging from 0 to 63, with higher total scores indicating more severe anxiety symptoms. Conventionally, scores from 0 to 7 reflect minimal anxiety, scores from 8 to 15 indicate mild anxiety, scores from 16 to 25 indicate moderate anxiety, and scores from 26 to 63 represent severe anxiety. The BAI has demonstrated satisfactory psychometric properties across clinical and nonclinical populations. In an Iranian study involving individuals with self-harming behaviors, Khalaji and Yousefi (2021) reported a Cronbach's alpha coefficient of .81, supporting the internal consistency of the instrument in the target population. International psychometric

investigations have reported internal consistency coefficients of approximately .92 and test-retest reliability coefficients of approximately .75 over short intervals. Convergent validity has also been supported through substantial correlations with other established measures of anxiety, including the State-Trait Anxiety Inventory, while comparatively weaker associations with measures of depression indicate that the instrument retains a meaningful degree of discriminant validity. In the present study, the BAI was administered at pretest and posttest to evaluate changes in anxiety following the CBT and ACT interventions.

Toronto Alexithymia Scale-20 (TAS-20). Alexithymia was assessed using the 20-item Toronto Alexithymia Scale (TAS-20), developed by Bagby, Parker, and Taylor (1994). The TAS-20 is one of the most extensively used standardized instruments for evaluating difficulties in emotional awareness and emotional processing. It contains 20 items organized into three dimensions: Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DDF), and Externally Oriented Thinking (EOT). The DIF dimension assesses difficulty recognizing and distinguishing emotional experiences from bodily sensations, the DDF dimension evaluates difficulty communicating emotional states to other people, and the EOT dimension reflects a cognitive style characterized by a reduced focus on internal emotional experiences and an increased orientation toward concrete external events. Items are rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Several items are reverse-scored before calculating the total score. The DIF dimension consists of items 1, 3, 6, 7, 9, 13, and 14; the DDF dimension includes items 2, 4, 11, 12, and 17; and the EOT dimension comprises items 5, 8, 10, 15, 16, 18, 19, and 20. Total scores can range from 20 to 100, with higher scores representing greater alexithymia. The instrument has demonstrated acceptable psychometric properties in Iranian and international populations. Asghari (2023) reported a Cronbach's alpha coefficient of .78 for the Persian version, indicating acceptable internal consistency. International studies have reported an overall internal consistency coefficient of approximately .81, with coefficients for the individual subscales generally ranging from approximately .66 to .78. Test-retest coefficients of approximately .77 over a three-week interval have also been reported. Factor-analytic findings and associations with theoretically related measures of personality and emotional functioning have further supported its construct validity across different cultural contexts (Parker et al., 2003). In the present study, both the total alexithymia score and the three TAS-20 dimensions were examined as treatment outcomes at pretest and posttest.

2.3. Interventions

Cognitive Behavioral Therapy Intervention. The CBT-based educational-therapeutic program was developed to reduce anxiety, maladaptive emotional responses, and behaviors associated with self-harm by modifying dysfunctional cognitive and behavioral processes. The intervention was informed primarily by contemporary cognitive-behavioral principles described by Dobson and Dozois (2019) and was delivered in eight approximately 75-minute sessions. The first session focused on establishing the therapeutic relationship, introducing the objectives and structure of treatment, explaining anxiety and its manifestations among adolescents, identifying anxiety-provoking situations, and introducing the cognitive-behavioral relationship among thoughts, emotions, and behaviors. Participants were introduced to automatic thoughts and were asked to record thoughts occurring during anxiety-provoking situations and formulate a specific treatment-related goal. The second session introduced the ABC framework, in which participants learned to distinguish activating events, beliefs or interpretations, and emotional and behavioral consequences. Real-life examples from students' experiences were analyzed to identify irrational or maladaptive beliefs associated with anxiety and self-harm. The third session focused on identifying and challenging negative automatic thoughts and dysfunctional beliefs through techniques such as Socratic questioning, examination of evidence, generation of alternative interpretations, and behavioral experiments. Participants also developed hierarchies of anxiety-provoking situations and began gradual exposure to situations they had previously avoided. The fourth session addressed physiological arousal and taught anxiety-management strategies, including diaphragmatic breathing, progressive muscle relaxation, guided imagery, and basic mindfulness exercises such as attention to breathing and body sensations. In the fifth session, participants learned activity scheduling, behavioral coping strategies, gradual reduction of avoidance, and structured problem-solving skills. Emphasis was placed on replacing maladaptive or self-harming responses with healthier behavioral alternatives and increasing engagement in pleasurable, meaningful, and adaptive daily activities. The sixth session focused on academic stress management and included time-management strategies, structured academic

planning, task segmentation, the Pomodoro technique, active review, and effective note-taking, with the aim of reducing school-related anxiety and improving students' perceived behavioral control. The seventh session addressed perfectionistic cognitions and fear of failure. Participants identified rigid standards, catastrophic interpretations of mistakes, and self-critical thinking patterns and practiced developing more balanced beliefs, tolerating imperfection, and approaching academic or interpersonal challenges with greater cognitive flexibility. The final session consolidated the intervention by reviewing major cognitive and behavioral techniques, evaluating individual progress, identifying anticipated future challenges, developing strategies for maintenance of treatment gains, and establishing a personal plan for continued use of the acquired skills. Posttest assessments of anxiety and alexithymia were administered after completion of the intervention.

Acceptance and Commitment Therapy Intervention. The ACT-based educational-therapeutic program was designed to reduce anxiety and difficulties in emotional awareness among students with self-harming behaviors by increasing psychological flexibility, willingness to experience difficult internal events, mindful awareness, and value-consistent behavior. The protocol was informed by the ACT framework described by Harris (2019) and was conducted across eight sessions of approximately 75 minutes each. The first session was devoted to establishing rapport, introducing the treatment rationale and objectives, discussing the nature and consequences of self-harming behaviors, and explaining the relationship among experiential avoidance, anxiety, emotional difficulties, and maladaptive coping. Participants were encouraged to monitor emotional experiences, anxiety-provoking circumstances, and self-harming urges or behaviors in a daily record. The second session introduced acceptance as an alternative to experiential avoidance. Students learned to identify distressing emotions and thoughts, recognize attempts to control or suppress unwanted internal experiences, and practice allowing unpleasant emotions to be present without judgment or immediate avoidance. ACT metaphors and experiential exercises were used to illustrate the costs of struggling against internal experiences, and participants practiced acceptance of a selected difficult emotion during the following week. The third session focused on cognitive defusion. Participants learned to recognize thoughts as transient mental events rather than literal truths that necessarily require behavioral responses. Defusion exercises included repetition of emotionally charged words, observing thoughts from a distance, altering the manner in which thoughts were verbalized, and imagery exercises such as placing thoughts on leaves floating down a stream. The fourth session addressed present-moment awareness and mindfulness. Participants practiced intentional attention to sensory experiences, mindful breathing, and observation of thoughts related to the past or future without becoming absorbed in them. Exercises emphasizing the five senses and brief daily mindfulness practice were assigned to strengthen attentional flexibility and reduce anxiety-driven rumination and avoidance. The fifth session introduced self-as-context, with participants learning to distinguish the observing self from thoughts, emotions, self-evaluations, and conceptualized identities. Exercises and metaphors, including observing thoughts and emotions as clouds moving across the sky, were used to develop a more flexible perspective toward internal experiences and facilitate recognition and description of emotions. The sixth session focused on values clarification. Students identified personally meaningful life domains and values, distinguished enduring values from short-term goals, examined ways in which self-harming behavior could interfere with valued living, and selected specific behaviors that would move them toward their identified values. The seventh session emphasized committed action. Participants identified behavioral patterns that were inconsistent with their values, generated adaptive alternatives to avoidance and self-harm, anticipated barriers to value-based behavior, and developed concrete plans for taking manageable steps toward valued goals despite the presence of difficult thoughts or feelings. The eighth and final session integrated the core ACT processes, reviewed participants' progress and changes, reinforced motivation to continue applying acceptance, mindfulness, defusion, values, and committed-action skills, and developed individualized plans for maintaining therapeutic gains. Participants were also encouraged to summarize the changes they had experienced and identify strategies for continued practice after termination. Anxiety and alexithymia measures were administered again at the conclusion of the intervention as posttest assessments.

2.4. Data Analysis

Data analysis was performed using IBM SPSS Statistics version 26 at both descriptive and inferential levels. At the descriptive level, the distribution and characteristics of self-harming behaviors identified during the screening stage

were examined, and measures of central tendency and dispersion, particularly means and standard deviations, were calculated for anxiety, total alexithymia, and the alexithymia subscales at the pretest and posttest stages for each study group. These descriptive indices were used to characterize baseline scores and illustrate the direction and magnitude of changes following the interventions. At the inferential level, relevant statistical assumptions were examined before conducting the principal analyses. Univariate analysis of covariance (ANCOVA) was used to compare the groups on posttest anxiety and total alexithymia while statistically controlling for the corresponding pretest scores. Multivariate analysis of covariance (MANCOVA) was employed to simultaneously examine between-group differences in the three alexithymia components—difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking—while adjusting for baseline differences. When significant omnibus group effects were detected, Bonferroni-adjusted post-hoc pairwise comparisons were performed to determine whether the CBT and ACT groups differed significantly from the control group and from each other. Effect-size indices were examined to estimate the proportion of variance in the dependent variables attributable to group membership and the interventions. Statistical significance was evaluated using the conventional alpha level of .05.

3. Findings and Results

Before conducting the inferential analyses, descriptive statistics were calculated for anxiety, total alexithymia, and the three dimensions of alexithymia across the CBT, ACT, and control groups at the pretest and posttest stages. Examination of the baseline means indicated that the three groups had relatively similar scores before the interventions. In contrast, the posttest scores showed substantial reductions in both experimental groups, particularly for anxiety and alexithymia, whereas comparatively little change was observed in the control group. The descriptive findings are presented in Table 1.

Table 1

Means and Standard Deviations of Anxiety and Alexithymia Scores by Group and Assessment Stage

Variable	Component	Stage	CBT M	CBT SD	ACT M	ACT SD	Control M	Control SD
Alexithymia	Total score	Pretest	65.40	12.50	64.80	12.30	65.10	12.30
		Posttest	48.20	9.30	47.60	9.10	63.80	11.80
	Difficulty Identifying Feelings	Pretest	20.10	4.80	19.90	4.70	19.90	4.70
		Posttest	14.50	3.20	14.20	3.10	19.40	4.40
	Difficulty Describing Feelings	Pretest	15.30	3.60	15.10	3.50	15.10	3.50
		Posttest	10.80	2.50	10.50	2.40	14.80	3.30
	Externally Oriented Thinking	Pretest	30.00	6.10	29.80	6.00	30.00	6.10
		Posttest	22.90	4.70	22.90	4.60	29.50	5.80
Anxiety	—	Pretest	32.50	8.20	31.80	7.90	31.90	7.80
		Posttest	18.30	6.10	17.60	5.80	30.60	7.30

As shown in Table 1, the pretest means were generally comparable across the three groups. Following the interventions, anxiety decreased from 32.50 to 18.30 in the CBT group and from 31.80 to 17.60 in the ACT group, whereas the control group showed only a small reduction from 31.90 to 30.60. A similar pattern was observed for total alexithymia, which decreased from 65.40 to 48.20 in the CBT group and from 64.80 to 47.60 in the ACT group, compared with a minor change from 65.10 to 63.80 in the control group. Reductions were also observed in all three alexithymia dimensions in the intervention groups. In addition, the smaller posttest standard deviations observed for most outcomes in the CBT and ACT groups suggest that participants' scores became somewhat more homogeneous following treatment. Overall, the descriptive findings indicate substantial improvement in both intervention groups, whereas the control group remained relatively stable across the two assessment stages.

Before performing the covariance analyses, the relevant statistical assumptions were examined. The distributions of anxiety, total alexithymia, and the alexithymia subscale scores were assessed for normality, and no substantial departures from normality were identified. The homogeneity of error variances across the three groups was also supported, indicating that the variability of the dependent variables was sufficiently comparable across conditions. Examination of the relationships between the covariates and posttest outcomes supported the assumption of linearity, and

the interactions between pretest scores and group membership were nonsignificant, confirming the homogeneity of regression slopes required for ANCOVA. For the multivariate analysis of the alexithymia dimensions, the assumptions concerning the intercorrelations among dependent variables and equality of covariance structures were also considered acceptable. Therefore, the data were considered appropriate for univariate and multivariate analyses of covariance.

Table 2

Results of ANCOVA and MANCOVA for Anxiety, Total Alexithymia, and Alexithymia Dimensions

Dependent Variable	Source	Sum of Squares	df	Mean Square	F	p	Partial η^2
Anxiety	Pretest	245.60	1	245.60	45.30	< .001	.45
	Group	1850.40	2	925.20	120.50	< .001	.78
	Error	345.50	45	7.67	—	—	—
Total Alexithymia	Pretest	310.20	1	310.20	52.10	< .001	.51
	Group	2100.80	2	1050.40	150.40	< .001	.82
	Error	314.10	45	6.98	—	—	—
Difficulty Identifying Feelings	Group	180.50	2	90.25	25.40	< .001	.54
	Error	158.20	45	3.51	—	—	—
Difficulty Describing Feelings	Group	95.40	2	47.70	18.60	< .001	.42
	Error	115.10	45	2.55	—	—	—
Externally Oriented Thinking	Group	240.80	2	120.40	30.20	< .001	.61
	Error	179.50	45	3.98	—	—	—

As presented in Table 2, after controlling for baseline anxiety scores, a statistically significant effect of group membership was observed on posttest anxiety, $F = 120.50$, $p < .001$, partial $\eta^2 = .78$. The effect size indicates that approximately 78% of the variance in posttest anxiety was associated with group membership after adjustment for pretest differences, demonstrating a substantial intervention effect. The pretest anxiety covariate was also statistically significant, $F = 45.30$, $p < .001$, partial $\eta^2 = .45$. Similarly, the adjusted group effect on total alexithymia was statistically significant, $F = 150.40$, $p < .001$, partial $\eta^2 = .82$, indicating that approximately 82% of the variance in posttest alexithymia was attributable to group differences after controlling for pretest scores. The multivariate follow-up analyses further demonstrated statistically significant group differences in all three dimensions of alexithymia. Significant effects were found for Difficulty Identifying Feelings, $F = 25.40$, $p < .001$, partial $\eta^2 = .54$; Difficulty Describing Feelings, $F = 18.60$, $p < .001$, partial $\eta^2 = .42$; and Externally Oriented Thinking, $F = 30.20$, $p < .001$, partial $\eta^2 = .61$. Among the alexithymia dimensions, the largest effect was observed for Externally Oriented Thinking, followed by Difficulty Identifying Feelings and Difficulty Describing Feelings. These results demonstrate that the interventions were associated with significant reductions not only in global alexithymia but also across its principal dimensions.

Table 3

Bonferroni Post-Hoc Pairwise Comparisons for Anxiety and Total Alexithymia

Dependent Variable	Group I	Group J	Mean Difference (I–J)	Standard Error	p
Anxiety	CBT	Control	-12.20*	1.15	< .001
	ACT	Control	-12.90*	1.15	< .001
	CBT	ACT	0.70	1.12	1.000
Total Alexithymia	CBT	Control	-15.50*	1.45	< .001
	ACT	Control	-16.10*	1.45	< .001
	CBT	ACT	0.60	1.40	1.000

The Bonferroni-adjusted pairwise comparisons presented in Table 3 clarified the direction of the significant omnibus group effects. For anxiety, participants receiving CBT had significantly lower adjusted posttest scores than participants in the control group, with a mean difference of -12.20, $p < .001$. Similarly, the ACT group demonstrated significantly

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lower anxiety scores than the control group, with a mean difference of -12.90, $p < .001$. However, the difference between the CBT and ACT groups was not statistically significant, with a mean difference of 0.70, $p = 1.000$. The same pattern was observed for total alexithymia. The CBT group demonstrated significantly lower alexithymia scores than the control group, with a mean difference of -15.50, $p < .001$, while the ACT group also scored significantly lower than the control group, with a mean difference of -16.10, $p < .001$. No statistically significant difference was identified between CBT and ACT in total alexithymia, with a mean difference of 0.60, $p = 1.000$. Taken together, these findings indicate that both therapeutic approaches were effective in reducing anxiety and alexithymia among female students with self-harming behaviors, but neither treatment demonstrated statistically superior effectiveness over the other within the present sample.

4. Discussion

The present study compared the effectiveness of Cognitive Behavioral Therapy (CBT) and Acceptance and Commitment Therapy (ACT) in reducing anxiety and alexithymia among female secondary school students with self-harming behaviors. The findings showed that both interventions produced significant reductions in anxiety compared with the control group after controlling for pretest scores. The magnitude of the group effect was substantial, indicating that a considerable proportion of the variance in posttest anxiety was attributable to participation in the therapeutic interventions. The results further demonstrated significant reductions in total alexithymia in both treatment groups relative to the control group. At the component level, significant improvements were observed in difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking. Among these dimensions, the largest effect was found for externally oriented thinking. Bonferroni post-hoc comparisons showed that both CBT and ACT were significantly more effective than the control condition in reducing anxiety and total alexithymia, whereas no statistically significant difference emerged between CBT and ACT. Overall, these findings suggest that both interventions constitute effective psychological approaches for adolescents who engage in self-harming behaviors and experience difficulties related to anxiety and emotional awareness.

The significant reduction in anxiety following CBT is consistent with the theoretical foundations of cognitive-behavioral interventions and with previous empirical findings. Anxiety is often maintained through maladaptive interpretations of threat, catastrophic thinking, avoidance, negative automatic thoughts, and ineffective coping responses. CBT directly targets these mechanisms by helping individuals identify dysfunctional thoughts, examine their accuracy, replace them with more balanced interpretations, and gradually engage in situations that were previously avoided. In the present study, the CBT protocol included cognitive restructuring, the ABC model, challenging irrational beliefs, relaxation techniques, behavioral activation, problem solving, time management, and strategies for addressing perfectionism and fear of failure. These components may have reduced anxiety by decreasing both cognitive threat appraisal and physiological arousal. The present findings are consistent with evidence demonstrating that CBT is effective in reducing anxiety across diverse populations (Li et al., 2022). They also align with contemporary process-based conceptualizations of CBT, which emphasize targeting transdiagnostic processes such as avoidance, rigid cognition, maladaptive emotional responses, and ineffective behavioral patterns rather than focusing exclusively on diagnostic categories (Ong et al., 2022).

The effectiveness of CBT may be particularly relevant for adolescents with self-harming behaviors because anxiety can function as a proximal trigger for self-injury. Adolescents who experience intense worry, physiological arousal, fear of failure, interpersonal sensitivity, or academic stress may resort to self-harm as a rapid strategy for interrupting emotional distress. Previous evidence has shown that anxiety, depression, and stress are strongly associated with self-harming behaviors among high school students (Abdollahi et al., 2023). Network analysis has also demonstrated that anxious and depressive symptoms are closely related to non-suicidal self-injury among adolescents, suggesting that internalizing symptoms may contribute directly to the maintenance of self-harming behavior (Guan et al., 2024). By teaching participants to reinterpret distressing situations, tolerate emotional activation, solve problems, and use adaptive behavioral alternatives, CBT may weaken the functional relationship between anxiety and self-harm. This interpretation is further supported by findings showing that emotional schemas and experiential avoidance are associated with self-harming behavior (Mardani et al., 2022). Accordingly, changing maladaptive beliefs and increasing adaptive coping may

reduce both subjective anxiety and the need to regulate distress through harmful behaviors.

ACT was likewise effective in significantly reducing anxiety. This finding is consistent with previous research showing that acceptance-based interventions can improve anxiety-related outcomes by increasing psychological flexibility rather than attempting to directly eliminate unwanted thoughts and feelings. ACT conceptualizes anxiety as problematic primarily when individuals become cognitively fused with threatening thoughts and engage in rigid efforts to avoid or control uncomfortable internal experiences. In the present intervention, participants were trained in acceptance, cognitive defusion, mindfulness, present-moment awareness, self-as-context, values clarification, and committed action. These processes may have helped students experience anxious thoughts and feelings without automatically interpreting them as intolerable or responding through avoidance and self-harming behavior. Previous research has found that ACT reduces cognitive fusion and social anxiety, supporting the proposition that changing one's relationship with anxious thoughts can reduce their behavioral influence (Enayati et al., 2024). The present results are also compatible with comparative evidence showing that ACT is effective in reducing anxiety in different clinical and nonclinical populations (Ahmad Othman et al., 2023; Fallahi et al., 2024).

The reduction in anxiety following ACT can also be understood in relation to self-harm as a form of experiential avoidance. Self-injury may provide immediate, although temporary, relief from intolerable emotional states and may therefore become negatively reinforced. ACT directly challenges this avoidance cycle by encouraging willingness to experience distress while selecting behavior in accordance with personal values. This may be particularly important for adolescents whose behavioral responses are driven by attempts to suppress, escape, or control intense emotions. Research has shown that ACT can reduce suicidal thoughts, self-harm tendencies, and existential anxiety among students (Jalali-Azar et al., 2024). A systematic review has similarly indicated that ACT may have beneficial effects on suicidal ideation and deliberate self-harm, although the evidence base continues to develop (Tighe et al., 2024). These findings support the interpretation that increased acceptance and psychological flexibility may reduce the reliance on maladaptive behavioral strategies for regulating emotional pain.

Another major finding of the present study was the significant reduction in total alexithymia following both interventions. This result is important because alexithymia is increasingly recognized as a clinically meaningful risk factor for self-harm. Adolescents with alexithymia may experience intense emotional activation without being able to identify, differentiate, or communicate their feelings effectively. Consequently, distress may be expressed behaviorally rather than verbally, and self-injury may become a nonverbal means of emotional discharge or self-regulation. A systematic review has identified alexithymia as a significant risk factor for self-harm among adolescents with depression (Bordalo & Carvalho, 2022). Research has also shown that students characterized by problematic behavioral patterns may demonstrate higher levels of alexithymia and self-harming behavior (Asghari, 2023). Therefore, the reduction in alexithymia observed in the present study may represent an important therapeutic pathway through which vulnerability to self-harm can potentially be reduced.

The effectiveness of ACT in reducing alexithymia is particularly consistent with prior findings. ACT encourages individuals to notice and accept emotional experiences rather than suppress or avoid them. Present-moment awareness increases sensitivity to internal emotional cues, while cognitive defusion helps individuals distinguish thoughts from feelings and reduces entanglement with self-critical or threatening cognitions. The self-as-context process may further enable individuals to observe emotional experiences without overidentifying with them. Values clarification and committed action may then help translate emotional awareness into adaptive behavior. Previous research has demonstrated that ACT improves emotional self-awareness and reduces alexithymia among girls (Aghili & Hosseinzadeh, 2024). Similar findings have been reported among individuals with chronic medical conditions, where ACT reduced alexithymia alongside other psychological symptoms (Bagheri et al., 2022; Rahnama Zadeh et al., 2022). ACT has also been found to improve alexithymia when compared with other therapeutic approaches (Hosseini et al., 2023). More recent evidence among individuals with a history of suicide attempts has likewise shown that ACT can reduce alexithymia and improve indicators of mental health (Khajavi Godellou et al., 2025). Together, these studies support the present finding that acceptance-based interventions can modify difficulties in emotional awareness and expression.

The findings regarding alexithymia also correspond with broader evidence that alexithymia is responsive to

psychological treatment. A systematic review of psychological interventions for alexithymia concluded that emotional identification and expression difficulties are not necessarily fixed characteristics and can be improved through structured psychological interventions (Tsubaki & Shimizu, 2024). This is clinically relevant because adolescents who self-harm may have developed longstanding patterns of avoiding, suppressing, or failing to verbalize difficult emotions. Treatment that explicitly increases awareness of emotional states and provides safer ways of responding to them may therefore reduce both alexithymia and reliance on behavioral expressions of distress.

CBT also significantly reduced alexithymia, although alexithymia is not always considered a primary target of traditional CBT. This finding can be explained by the fact that CBT requires individuals to identify the relationships among situations, thoughts, emotions, physiological sensations, and behaviors. Repeated monitoring of automatic thoughts and emotional responses may improve emotional differentiation and labeling. Cognitive restructuring further requires participants to articulate internal experiences, while behavioral experiments and problem-solving exercises encourage reflection on how specific emotions influence behavior. Consequently, CBT may indirectly enhance emotional awareness and communication. Contemporary process-based approaches to CBT increasingly recognize that therapeutic change involves multiple interacting cognitive, emotional, and behavioral processes (Ong et al., 2022). The present findings suggest that interventions focused on cognitive restructuring and behavioral coping may also benefit students whose emotional difficulties are characterized by poor identification and verbalization of affective states.

The significant improvements in all three alexithymia dimensions provide further insight into treatment effects. Both interventions reduced difficulty identifying feelings, indicating that participants became more capable of recognizing and differentiating their internal emotional states. This improvement is especially important in self-harming adolescents because inability to identify distress may prevent the use of adaptive coping before emotional tension becomes overwhelming. Both treatments also reduced difficulty describing feelings, suggesting that participants developed a greater capacity to communicate emotional experiences. Improved emotional expression may reduce interpersonal misunderstanding, isolation, and the need to communicate distress through self-injurious behavior. Previous studies have identified loneliness and psychological distress as important correlates and predictors of self-harming behavior (Ekhlaqi, 2023; Sabaghi Renani, 2024). Increased ability to describe feelings may therefore indirectly strengthen access to social support and facilitate help-seeking.

The largest effect among the alexithymia components was observed for externally oriented thinking. This finding may reflect the emphasis of both therapies on systematic attention to internal processes. CBT repeatedly directs attention toward thoughts, emotions, beliefs, bodily sensations, and behavioral consequences, while ACT emphasizes mindful observation of present-moment internal experiences. Adolescents who typically focus primarily on external events may therefore become increasingly capable of reflecting on internal states. This change may be particularly strong in ACT because mindfulness and self-as-context explicitly train participants to observe thoughts, emotions, and bodily sensations with curiosity and without judgment. The association between psychological flexibility and alexithymia reported in previous research supports this explanation (Karakuş & Akbay, 2022). Greater psychological flexibility may facilitate movement away from rigid externally oriented processing toward a more integrated awareness of internal experience.

An important result was that no statistically significant difference was found between CBT and ACT in reducing either anxiety or total alexithymia. This indicates that although the theoretical models and specific techniques differ, both approaches produced comparable therapeutic outcomes in the present sample. This finding is consistent with research comparing CBT and ACT among emerging adults, in which both interventions significantly reduced depression and anxiety (Ahmad Othman et al., 2023). Similar results have been reported for test anxiety, where both CBT and ACT demonstrated substantial effectiveness without clear evidence that one approach was consistently superior (Uysal et al., 2023). Comparative research in adult women with depression has also shown beneficial effects of both approaches on interpersonal and emotional outcomes (Oladian, 2024). These convergent findings suggest that CBT and ACT may reach similar clinical outcomes through overlapping but distinct mechanisms.

The similarity between CBT and ACT is also supported by research conducted specifically among adolescents with self-harming behavior. Gerili et al. found that both cognitive-behavioral training and acceptance and commitment-based training improved distress tolerance

among self-harming adolescents (Gerili et al., 2023). Distress tolerance is highly relevant to both anxiety and alexithymia because adolescents who can remain with uncomfortable internal states without impulsively responding may be less likely to rely on self-harm. CBT may improve distress tolerance by modifying catastrophic appraisals and developing coping skills, whereas ACT may improve it through acceptance and willingness. Despite different pathways, both interventions may ultimately increase the adolescent's capacity to experience distress without maladaptive behavioral responses.

The absence of significant differences between the treatments should not be interpreted as evidence that the approaches are identical. Rather, it may indicate that both interventions adequately targeted core transdiagnostic processes relevant to the participants' difficulties. CBT primarily emphasized cognitive restructuring, behavioral coping, problem solving, and reduction of avoidance, whereas ACT emphasized acceptance, defusion, mindfulness, values, and psychological flexibility. However, both interventions increased awareness of internal experiences, reduced maladaptive avoidance, promoted alternative coping strategies, and encouraged more deliberate behavioral choices. Their comparable effectiveness may therefore reflect shared therapeutic processes operating alongside model-specific mechanisms. In clinical practice, this suggests that intervention selection may reasonably consider individual preferences, therapeutic formulation, counselor expertise, and contextual feasibility rather than assuming that one approach will necessarily produce superior outcomes for all adolescents.

5. Conclusion

Overall, the present findings extend previous research by demonstrating that both CBT and ACT can significantly reduce anxiety and alexithymia among female secondary school students identified as engaging in self-harming behaviors. The findings are consistent with the broader literature linking self-harm to anxiety, emotional dysregulation, experiential avoidance, psychological inflexibility, loneliness, and impaired emotional awareness (Abdollahi et al., 2023; Bordalo & Carvalho, 2022; Mardani et al., 2022). They also support evidence that schools represent an important setting for structured psychological intervention, particularly because students at risk of self-harm can be identified and supported before difficulties become more severe (Nawaz et al., 2024). Given the complexity of adolescent self-harm and the need for appropriately trained professionals, interventions should be implemented within broader systems of psychological assessment, risk management, family involvement, and referral when necessary (Holm et al., 2024; Moussadek, 2024). The present results therefore suggest that both cognitive-behavioral and acceptance-based therapeutic packages can serve as useful components of school-based mental health services for adolescents experiencing self-harm, anxiety, and difficulties in emotional processing.

6. Limitations & Suggestions

The present study has several limitations that should be considered when interpreting the findings. First, the sample consisted only of female upper-secondary school students from Kermanshah, which limits the generalizability of the findings to male adolescents, younger students, adolescents outside formal education, and populations from other geographical or sociocultural settings. Second, the relatively small sample size may have reduced statistical power for detecting subtle differences between CBT and ACT and may partly explain the absence of significant differences between the two active treatments. Third, anxiety, alexithymia, and self-harming behavior were assessed primarily through self-report instruments, which may be influenced by social desirability, inaccurate recall, limited emotional insight, or reluctance to disclose stigmatized behaviors. Fourth, the study focused on post-intervention outcomes and therefore provides limited information regarding the long-term durability of treatment effects. Fifth, potentially influential variables such as family functioning, psychiatric comorbidity, frequency and severity of self-harm, medication use, interpersonal trauma, and socioeconomic conditions were not comprehensively controlled. Finally, because the study was quasi-experimental and participant recruitment included convenience sampling following screening, caution is required when drawing strong causal or population-level conclusions.

Future studies are recommended to replicate the present findings using larger and more diverse samples that include male and female adolescents from different educational levels, geographical regions, and socioeconomic backgrounds. Fully randomized controlled trials would strengthen causal inference and allow more precise comparisons of treatment efficacy. Future research should include follow-up assessments at multiple intervals, such as three, six, and twelve months, to determine whether

improvements in anxiety and alexithymia are maintained over time and whether reductions in these variables are accompanied by sustained decreases in the frequency or severity of self-harming behavior. Researchers should also examine potential mediating mechanisms, including psychological flexibility, experiential avoidance, cognitive fusion, emotion regulation, distress tolerance, dysfunctional beliefs, and mindfulness, to clarify how CBT and ACT produce therapeutic change. Studies comparing individual, group, school-based, and digitally delivered formats may help identify the most feasible modes of delivery. It would also be useful to investigate moderators of treatment response, including baseline severity, personality characteristics, family support, trauma history, treatment preference, and patterns of self-harm, in order to identify which adolescents may benefit most from each intervention.

In practical settings, school psychologists, counselors, and adolescent mental health professionals can consider incorporating structured CBT- and ACT-based programs into services for students who exhibit self-harming behaviors and elevated emotional distress. Schools should establish systematic procedures for early identification, confidential psychological assessment, referral, and follow-up of students at risk. CBT-based programs may be particularly useful when students present with prominent negative automatic thoughts, catastrophic beliefs, perfectionism, avoidance, and ineffective problem-solving, whereas ACT-based programs may be especially appropriate when experiential avoidance, emotional suppression, cognitive fusion, and disconnection from personal values are prominent. Because both approaches were effective, treatment selection can be guided by individual clinical formulation, student preference, therapist competence, and available resources. Practitioners should also involve families when clinically appropriate, strengthen students' emotional vocabulary and help-seeking skills, and ensure that intervention programs are accompanied by clear risk-management procedures for students whose self-harm is severe, escalating, or associated with suicidal intent.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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