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Comparing The Effectiveness of Acceptance and Commitment Therapy and Emotional Self-Regulation on Alexithymia in Depressed Adolescents

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ABSTRACT

Objective: This study aimed to compare the effectiveness of Acceptance and Commitment Therapy (ACT) and emotional self-regulation in reducing alexithymia among depressed adolescents in Tehran.

Methods: The statistical population consisted of all ninth-grade female secondary school students in District 5 of Tehran during the 2023–2024 academic year. A total of 45 students were selected through purposive sampling and randomly assigned into three groups of 15 (two experimental and one control group). Data were collected using the Toronto Alexithymia Scale (Bagby, Parker & Taylor, 1994) and the Beck Depression Inventory (1996). Data analysis was performed using SPSS-22 software.

Results: The results indicated that the mean alexithymia scores of both the ACT and emotional self-regulation groups were significantly lower than those of the control group. Furthermore, the mean alexithymia score of the ACT group was significantly lower than that of the emotional self-regulation group.

Conclusions: Both ACT and emotional self-regulation were effective in reducing alexithymia among depressed adolescents. However, ACT showed greater effectiveness compared to emotional self-regulation.

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Introduction

According to reports from the World Health Organization (2013), mental disorders represent the fourth major global health concern, with depression being the leading cause of disability worldwide. Mental health and behavioral science specialists agree that depression has been the most prevalent and fundamental psychological disorder, particularly among adolescents, over the past two decades. After phobia and substance abuse, depression ranks as the third most common psychological disorder (Abutorabian & Sajadian, 2023).

Epidemiological findings from cross-sectional studies indicate that the prevalence of depressive symptoms among Iranian students ranges from 15% to over 70%, while the confirmed prevalence of depression, based on valid diagnostic criteria, has been reported between 2.3% and 9.8% among Iranian adolescents (Shakibaee & Esmaeili, 2014). Moreover, the prevalence of depression is generally higher among adolescent girls compared to boys (Avanoli et al., 2015). Similar trends have been observed in international studies, where girls are found to be more susceptible to depression than boys (Golparvar & Tabatabaei-Nejad, 2020).

In addition, alexithymia is considered a deficit in emotional-cognitive functioning, in which individuals are unable to communicate their emotional experiences effectively in the form of feelings and imagery (Scimenty et al., 2017). According to Mahapatra and Sharma (2018), the core features of alexithymia include: (1) difficulty distinguishing emotions from bodily sensations, (2) difficulty describing emotions to others, and (3) an externally oriented cognitive style that reflects three social deficits: impaired cognitive components of emotional response systems, poor regulation of emotions in interpersonal relationships, and a limited capacity for fantasy. Individuals with alexithymia face serious challenges in finding appropriate words to define and describe their feelings, as well as in labeling their emotions (Huo et al., 2016).

Mood states play a critical role in the psychopathology of emotional disorders such as depression and anxiety (Farhomandi et al., 2022). When an individual fails to adequately express or verbalize emotions, they may become more vulnerable to depression (Hemming, Haddock, Shaw, & Pratt, 2019).

Various therapeutic approaches have been applied in the treatment of depression. One approach widely used today for a range of chronic conditions is Acceptance and Commitment Therapy (ACT) (Feil, Vahid, Taymy, Shaban, & Amani, 2019). ACT is an effective experiential therapy

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with coherent philosophical and theoretical foundations (Ong, Levin, & Twohig, 2020). This approach combines acceptance- and mindfulness-based strategies with commitment and behavior-change processes to enhance psychological flexibility (Hayes, Luoma, Bond, Masuda, & Lillis, 2015). ACT helps individuals live more fully in the present moment, focusing on personal values and meaningful goals instead of painful thoughts, feelings, and experiences. Through the use of metaphors, paradox, and experiential exercises, clients learn to establish a healthier relationship with distressing thoughts, emotions, memories, and sensations. In doing so, they develop the skills to accept and, when possible, change such experiences, clarify personal values, and commit to necessary behavioral changes (Harris, 2009).

Another effective approach in reducing psychological problems is emotional self-regulation training. Emotional self-regulation refers to initiating, enhancing, sustaining, or reducing one's positive and negative emotions in ways that are congruent with environmental events (Miles et al., 2015). In other words, it involves managing emotional responses and regulating their intensity and duration by employing adaptive strategies in intrapersonal and social contexts (Mairena & Kamoudka, 2021). Emotional regulation relies on three core skills: emotional awareness (the ability to recognize and describe emotional experiences and understand emotional responses), emotional acceptance (responding to all emotions in a non-judgmental manner without negative reactions toward specific emotions), and the use of diverse regulation strategies (Paas & Greenberg, 2007).

Emotional self-regulation training is an integrated and innovative intervention, developed by expanding traditional cognitive approaches and incorporating principles from cognitive psychology, attachment theory, object relations, Gestalt, and constructivist approaches into a unified conceptual framework (Cleary, Vollrath, & Schneidman, 2017). Teaching emotional self-regulation strategies enables students to plan, organize, and self-monitor their academic and daily activities in a task-oriented manner. By employing these strategies, students can re-evaluate past failures and ultimately improve their active learning. Such students also become more aware of effective problem-solving strategies and their role in enhancing learning outcomes (Meltzer, 2018).

Given the theoretical and clinical significance of both ACT and emotional self-regulation, these approaches may be considered suitable therapeutic strategies for addressing alexithymia among

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depressed adolescents in Tehran. However, to the best of the researcher's knowledge, no studies have been conducted on the effectiveness of these approaches in this specific population. Neglecting to examine ACT and emotional self-regulation in depressed students constitutes a serious gap in the research literature. Therefore, the present study seeks to address this gap by comparing the effectiveness of ACT and emotional self-regulation in reducing alexithymia among depressed adolescents in Tehran, aiming to answer the question: Is there a significant difference between the effectiveness of ACT and emotional self-regulation in reducing alexithymia among depressed adolescents in Tehran?

Material and Methods

This study employed a quasi-experimental design with a pretest–posttest control group. Participants in both the experimental and control groups were assessed at two stages: pretest and posttest. The statistical population consisted of all ninth-grade female secondary school students in District 5 of Tehran during the 2023–2024 academic year. For initial screening, students completed the Beck Depression Inventory (BDI-II). Students scoring between 32 and 62 (indicative of moderate to severe depression) were identified. Based on effect size (0.25), alpha level (0.05), and statistical power (0.80) calculated using G*Power software, a sample size of 15 participants per group was required. Thus, 45 students meeting the inclusion and exclusion criteria were purposively selected and then randomly assigned to two experimental groups (Acceptance and Commitment Therapy [ACT], Emotional Self-Regulation Training) and one control group (15 participants each).

Instruments

Toronto Alexithymia Scale (TAS-20): Developed by Bagby, Parker, and Taylor (1994), this 20-item measure assesses alexithymia across three subscales: difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking. Items are rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Psychometric properties of the Persian version demonstrate good internal consistency ($\alpha = 0.85$ overall; subscales ranging from 0.72 to 0.82) and concurrent validity with measures of emotional intelligence, psychological well-being, and psychological distress (Besharat & Ganji, 2012).

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Beck Depression Inventory-II (BDI-II): This 21-item self-report measure evaluates the severity of depressive symptoms on a 4-point scale (0–3), yielding a total score of 0–63. Reliability coefficients reported by Beck et al. (1996) range from 0.73 to 0.92 (Cronbach's alpha), with validity coefficients ranging from 0.48 to 0.86. In Iranian studies, test–retest reliability of 0.93 and Cronbach's alpha of 0.92 have been confirmed (Dobson & Mohammadkhani, 2005).

Intervention Protocols

Two therapeutic interventions were delivered over **eight 90-minute sessions across four weeks**, following standardized manuals. Summaries are presented in Tables 1 and 2.

Table 1. Summary of Acceptance and Commitment Therapy (ACT) Sessions (Hayes, Strosahl, & Wilson, 2011)

Session	Content
1	Introduction of therapist, group familiarization, therapeutic alliance, overview of ACT goals and principles, rules for sessions, psychoeducation on depression, review of treatment options, costs and benefits.
2	Review of previous experiences, feedback, discussion of expectations for ACT, motivation for change, summary and reflection.
3	Identifying ineffective control strategies, recognizing futility of avoidance, introduction to acceptance (vs. denial, resistance), exploration of coping strategies, summary and homework.
4	Behavioral commitment, introduction of cognitive fusion and self-as-content, language-based interventions and metaphors, feedback and practice.
5	Differentiating self from experiences and behaviors, fostering self-as-context, feedback and reflection.
6	Identifying and clarifying life values, mindfulness exercises emphasizing present-moment awareness, summary and practice.
7	Deepening value clarification, distinguishing values from goals, identifying internal/external barriers, group sharing of key values and goals, planning value-based behaviors.
8	Commitment to value-based action, relapse prevention, review of group experiences, summary of outcomes, closure and appreciation.

Table 2. Summary of Emotional Self-Regulation Training Sessions (Allen et al., 2016)

Session	Content
1	Introduction to program, group rules, goals, importance of emotion regulation, pretest. Homework: write personal goals.
2	Normal vs. problematic emotions, emotional self-awareness, labeling and differentiating emotions, recognizing physiological and psychological signs. Homework: record emotions in daily life.
3	Pathological emotions, symptoms of emotional disorders, cognitive errors, relationship between physiological, behavioral, and cognitive responses, introduction to CBT principles. Homework: record major negative emotions.
4	Relationship between emotions, thoughts, and behaviors; identifying automatic thoughts and interpretations; flexibility in reinterpretation. Homework: self-exploration questionnaire.
5	Emotional avoidance, suppression vs. experiencing emotions, behavioral consequences. Homework: self-exploration form.
6	Exposure-based regulation: attending to bodily sensations, confronting avoidance behaviors, reappraisal. Homework: self-exploration form.
7	Identifying core beliefs related to rejection and helplessness. Homework: write examples of core beliefs.
8	Modifying dysfunctional core beliefs, strengthening adaptive beliefs, posttest, summary and program closure.

All data were coded and entered into SPSS version 22. Hypotheses were tested using repeated-measures analysis of variance (ANOVA).

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Ethical Considerations

This study was conducted in accordance with the ethical standards of the Declaration of Helsinki. Participation was voluntary, with informed consent obtained from students and their parents/guardians. Participants were assured of confidentiality and the right to withdraw at any time without consequences. The intervention posed no physical risks, and psychological risks were minimized by providing access to school counselors for additional support. The study protocol was reviewed and approved by the relevant university ethics committee.

Results

To compare the effectiveness of Acceptance and Commitment Therapy (ACT) and Emotional Self-Regulation training on alexithymia in depressed adolescents, a repeated-measures between-groups ANOVA was conducted. The results of this test and its assumption checks are presented in follow tables.

Table 3. Levene's Test for Homogeneity of Variances

Variable	F	df1	df2	Sig.
Pre-test: Difficulty identifying feelings	0.059	2	42	0.942
Post-test: Difficulty identifying feelings	0.678	2	42	0.513
Follow-up: Difficulty identifying feelings	0.392	2	42	0.678
Pre-test: Difficulty describing feelings	0.079	2	42	0.924
Post-test: Difficulty describing feelings	1.796	2	42	0.178
Follow-up: Difficulty describing feelings	1.069	2	42	0.353
Pre-test: Externally-oriented thinking	0.573	2	42	0.568
Post-test: Externally-oriented thinking	0.091	2	42	0.913
Follow-up: Externally-oriented thinking	0.038	2	42	0.963

As shown in Table 3, none of the Levene's test results were statistically significant. Therefore, the null hypothesis of homogeneity of variances was confirmed.

Table 4. Mauchly's Test of Sphericity

Variable	Mauchly's W	χ^2	df	Sig.
Difficulty identifying feelings	0.455	32.265	2	0.001
Difficulty describing feelings	0.711	13.963	2	0.001
Externally-oriented thinking	0.615	19.922	2	0.001

As can be seen, Mauchly's test of sphericity was statistically significant, indicating a violation of the sphericity assumption. Such a violation increases the likelihood of Type II error; therefore, the reported significance levels (p-values) in the multivariate test cannot be considered reliable.

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Accordingly, the Greenhouse-Geisser and Huynh-Feldt corrections, which adjust the degrees of freedom, were applied.

Table 5. Multivariate Within-Subjects Effects for Comparing Alexithymia in Control and Experimental Groups

Effect	Test	Value	F	df Effect	df Error	Sig.	Effect Size
Repetition	Pillai's Trace	0.828	19.536	6	166	0.001	0.414
	Wilks' Lambda	0.180	37.086	6	164	0.001	0.576
	Hotelling's Trace	4.511	60.903	6	162	0.001	0.693
	Roy's Largest Root	4.502	124.548	3	83	0.001	0.818
Repetition × Group	Pillai's Trace	0.756	7.070	12	252	0.001	0.252
	Wilks' Lambda	0.278	11.276	12	217.243	0.001	0.348
	Hotelling's Trace	2.481	16.677	12	242	0.001	0.453
	Roy's Largest Root	2.432	51.075	4	84	0.001	0.709

As shown in Table 5, the multivariate tests revealed significant differences in the mean scores of alexithymia across the control, emotional self-regulation, and acceptance and commitment therapy groups over the course of treatment. The findings indicate significant main effects of repetition (pre-test, post-test, and follow-up) as well as significant interaction effects between group and repetition (i.e., differences between groups across measurement stages).

Table 6. Univariate Within-Subjects Effects for Comparing Components of Alexithymia in Control and Experimental Groups

Source	Variable	Test	Sum of Squares	df	Mean Square	F	Sig.	Effect Size
Repetition	Difficulty identifying feelings	Sphericity assumed	481.111	2	240.556	82.980	0.001	0.664
		Greenhouse-Geisser	481.111	1.295	371.602	82.980	0.001	0.664
		Huynh-Feldt	481.111	1.382	348.086	82.980	0.001	0.664
		Lower-bound	481.111	1	481.111	82.980	0.001	0.664
Repetition	Difficulty describing feelings	Sphericity assumed	317.048	2	158.524	103.332	0.001	0.711
		Greenhouse-Geisser	317.048	1.552	204.280	103.332	0.001	0.711
		Huynh-Feldt	317.048	1.677	189.029	103.332	0.001	0.711
		Lower-bound	317.048	1	317.048	103.332	0.001	0.711
Repetition	Externally-oriented thinking	Sphericity assumed	307.244	2	153.622	51.774	0.001	0.552
		Greenhouse-Geisser	307.244	1.444	212.745	51.774	0.001	0.552
		Huynh-Feldt	307.244	1.553	197.822	51.774	0.001	0.552
		Lower-bound	307.244	1	307.244	51.774	0.001	0.552
Repetition × Group	Difficulty identifying feelings	Sphericity assumed	247.378	4	61.844	21.333	0.001	0.504
		Greenhouse-Geisser	247.378	2.589	95.535	21.333	0.001	0.504
		Huynh-Feldt	247.378	2.764	89.489	21.333	0.001	0.504
		Lower-bound	247.378	2	123.689	21.333	0.001	0.504

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Repetition × Group	Difficulty describing feelings	Sphericity assumed	157.252	4	39.313	25.626	0.001	0.550
		Greenhouse-Geisser	157.252	3.104	50.660	25.626	0.001	0.550
		Huynh-Feldt	157.252	3.354	46.878	25.626	0.001	0.550
		Lower-bound	157.252	2	78.626	25.626	0.001	0.550
Repetition × Group	Externally-oriented thinking	Sphericity assumed	260.178	4	65.044	21.921	0.001	0.511
		Greenhouse-Geisser	260.178	2.888	90.077	21.921	0.001	0.511
		Huynh-Feldt	260.178	3.106	83.759	21.921	0.001	0.511
		Lower-bound	260.178	2	130.089	21.921	0.001	0.511

The results in Table 6 show the univariate within-subjects effects for comparing the components of alexithymia (difficulty identifying feelings, difficulty describing feelings, and externally-oriented thinking) across the control, emotional self-regulation, and Acceptance and Commitment Therapy (ACT) groups. The F-values for the interaction effects between group and repetition (i.e., differences between groups over measurement stages) were statistically significant for all three components of alexithymia at $\alpha = 0.01$. This significance indicates that the patterns of change in alexithymia scores over time differed across the three groups.

To further investigate pairwise differences across measurement stages, the Bonferroni post-hoc test was applied, as shown below.

Table 7. Bonferroni Post-Hoc Comparisons

Group	Dependent Variable	Stage 1	Stage 2	Mean Difference	Std. Error	Sig.
Control	Difficulty identifying feelings	Pre-test	Post-test	0.600	0.689	1
		Pre-test	Follow-up	0.333	0.760	1
		Post-test	Follow-up	-0.267	0.328	1
	Difficulty describing feelings	Pre-test	Post-test	0.200	0.526	1
		Pre-test	Follow-up	0.333	0.490	1
		Post-test	Follow-up	0.133	0.311	1
	Externally-oriented thinking	Pre-test	Post-test	-0.267	0.656	1
		Pre-test	Follow-up	-0.200	0.767	1
		Post-test	Follow-up	0.067	0.410	1
Emotional Self-Regulation	Difficulty identifying feelings	Pre-test	Post-test	4.133	0.689	0.001
		Pre-test	Follow-up	3.933	0.760	0.001

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		Post-test	Follow-up	-0.200	0.328	1
	Difficulty describing feelings	Pre-test	Post-test	3.933	0.526	0.001
		Pre-test	Follow-up	3.400	0.490	0.001
		Post-test	Follow-up	-0.533	0.311	0.281
	Externally-oriented thinking	Pre-test	Post-test	3.067	0.656	0.001
		Pre-test	Follow-up	2.733	0.767	0.003
		Post-test	Follow-up	-0.333	0.410	1
Acceptance and Commitment Therapy	Difficulty identifying feelings	Pre-test	Post-test	7.600	0.689	0.001
		Pre-test	Follow-up	7.400	0.760	0.001
		Post-test	Follow-up	-0.200	0.328	1
	Difficulty describing feelings	Pre-test	Post-test	6.067	0.526	0.001
		Pre-test	Follow-up	5.500	0.490	0.001
		Post-test	Follow-up	-0.567	0.311	0.226
	Externally-oriented thinking	Pre-test	Post-test	6.733	0.656	0.001
		Pre-test	Follow-up	7.133	0.767	0.001
		Post-test	Follow-up	0.400	0.410	1

Table 7 presents pairwise comparisons of alexithymia scores across measurement stages for the control, emotional self-regulation, and ACT groups. In the emotional self-regulation and ACT groups, the differences between pre-test and post-test, as well as pre-test and follow-up, were statistically significant ($p < 0.01$). These results indicate that alexithymia scores significantly decreased from pre-test to post-test and follow-up. Differences between post-test and follow-up scores were not significant ($p > 0.05$), indicating that the treatment effects were maintained over time. In the control group, no significant differences were observed across any stages ($p > 0.05$).

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Table 8. Between-Subjects Effects for Comparing Mean Alexithymia Scores Across Groups

Source of Variation	Variable	Sum of Squares	df	Mean Square	F	Sig.
Group	Difficulty identifying feelings	662.044	2	331.022	17.743	0.001
	Difficulty describing feelings	400.559	2	200.280	17.369	0.001
	Externally-oriented thinking	700.044	2	350.022	16.244	0.001
Error	Difficulty identifying feelings	783.556	42	18.656		
	Difficulty describing feelings	484.300	42	11.531		
	Externally-oriented thinking	905.022	42	21.548		

Table 8 presents the results of the between-subjects effects test comparing the mean alexithymia scores among the control, emotional self-regulation, and Acceptance and Commitment Therapy (ACT) groups. The results show that the F-values for all alexithymia components were statistically significant ($p < 0.01$), indicating significant differences between the groups.

Table 9. Bonferroni Post-hoc Comparisons of Alexithymia Scores Between Groups

Dependent Variable	Group 1	Group 2	Mean Difference	Std. Error	Sig.
Difficulty identifying feelings	Control	Emotional Self-Regulation	2.844	0.911	0.010
	Control	ACT	5.422	0.911	0.001
	Emotional Self-Regulation	ACT	2.578	0.911	0.021
Difficulty describing feelings	Control	Emotional Self-Regulation	2.333	0.716	0.007
	Control	ACT	4.211	0.716	0.001
	Emotional Self-Regulation	ACT	1.878	0.716	0.036
Externally-oriented thinking	Control	Emotional Self-Regulation	2.756	0.979	0.022
	Control	ACT	5.578	0.979	0.001
	Emotional Self-Regulation	ACT	2.822	0.979	0.019

Table 9 presents pairwise comparisons of alexithymia scores between groups. The results indicate that the mean alexithymia scores in the emotional self-regulation and ACT groups were significantly lower than those in the control group ($p < 0.05$). Additionally, the ACT group showed significantly lower alexithymia scores than the emotional self-regulation group ($p < 0.05$).

Discussion

The results of the present study indicate that the mean alexithymia scores in the emotional self-regulation and Acceptance and Commitment Therapy (ACT) groups were significantly lower than those in the control group. Furthermore, the alexithymia scores of the ACT group were

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significantly lower than those of the emotional self-regulation group. In other words, both ACT and emotional self-regulation interventions were effective in reducing alexithymia in depressed adolescents, with ACT demonstrating greater effectiveness compared to emotional self-regulation. Regarding the effectiveness of ACT in reducing alexithymia in depressed adolescents, these findings are consistent with previous research. For example, Sadeghi et al. (2021) reported that ACT significantly reduced alexithymia in women affected by marital infidelity. Rahmani et al. (2021) found that group-based ACT improved alexithymia, resilience, and mental well-being in divorced women. Tahmasbipour et al. (2020) showed that ACT reduced alexithymia and interpersonal problems in men with substance use disorders, with effects maintained at follow-up. Similarly, Iraqi et al. (2020) demonstrated that ACT significantly reduced emotional alexithymia and hopelessness in couples seeking divorce. Norouzi Mighandust and Gholami Heydarabadi (2019) reported that ACT effectively decreased maladaptive attitudes and alexithymia in depressed women. Tilki et al. (2018) found that ACT training enhanced psychological flexibility and reduced alexithymia in women with chronic pain. Batmani and Heydari (2018) reported that ACT significantly reduced alexithymia in students at post-test. The therapeutic mechanisms of ACT, such as promoting acceptance of difficult experiences without attempting to control them, help adolescents build resilience against personal, familial, and social challenges, which in turn reduces avoidance, distress, and ultimately alexithymia. By increasing psychological flexibility, ACT enables individuals to choose adaptive responses to stressors, improves psychological well-being, and helps them recognize and express emotions effectively.

Similarly, the observed effectiveness of emotional self-regulation training in reducing alexithymia is consistent with prior studies. Shahi and Zadeh Mohammadi (2023) reported that emotion regulation strategies indirectly reduced emotional alexithymia through self-compassion. Soltani Anaqizi et al. (2021) found that training in emotional self-regulation and self-compassion positively impacted emotional maturity, alexithymia, and social functioning. Ahmadi and Belqan Abadi (2019) showed that teaching emotion regulation in schools reduced alexithymia and enhanced students' mental health. Akram Heidari (2018) reported that emotion regulation training significantly improved alexithymia, sleep quality, and rumination in female students, with effects maintained at follow-up. Emotional self-regulation interventions focus on consciously managing and modifying emotional responses. Techniques such as enhancing emotional awareness and self-

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monitoring enable participants to understand and adaptively respond to their emotional experiences. By emphasizing cognitive and behavioral regulation of emotions, these interventions increase emotional awareness, foster adaptive attitudes, and improve the ability to implement emotion regulation strategies, ultimately reducing alexithymia (Sten & Balden, 2014).

Despite the promising results, this study has several limitations. First, the sample was limited to adolescents in specific educational settings, which may limit the generalizability of the findings to other populations or cultural contexts. Second, the study relied primarily on self-report measures of alexithymia and emotional functioning, which may be subject to response biases. Third, the follow-up period was relatively short, and long-term maintenance of treatment effects remains uncertain. Additionally, the study did not examine potential mediators or moderators that could influence the effectiveness of ACT or emotional self-regulation interventions, such as baseline emotional intelligence or family support.

Future research should aim to replicate these findings with larger and more diverse adolescent populations, including different cultural and socioeconomic backgrounds. Longitudinal studies with extended follow-up periods are recommended to assess the durability of treatment effects over time. It would also be valuable to investigate potential mediators and moderators of treatment outcomes, such as self-compassion, coping strategies, or peer support, to better understand the mechanisms underlying reductions in alexithymia. Finally, combining ACT and emotional self-regulation interventions could be explored to determine whether an integrated approach provides additive or synergistic benefits in reducing alexithymia and improving emotional well-being in adolescents.

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Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by ethics committee of Islamic Azad University.

Author contributions

All authors contributed to the study conception and design, material preparation, data collection and analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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