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Effectiveness of Acceptance and Commitment Therapy on Panic Attacks and Alexithymia in Individuals with Borderline Personality Disorder

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ABSTRACT

Borderline personality disorder is characterized by emotional instability, difficulties in emotion regulation, unstable interpersonal relationships, and vulnerability to anxiety symptoms. Panic attacks and alexithymia are among the problems that may intensify psychological distress and impair personal and interpersonal functioning in these individuals. Acceptance and Commitment Therapy (ACT), through its emphasis on accepting internal experiences, reducing experiential avoidance, and enhancing psychological flexibility, may be effective in alleviating these difficulties. Objective: The present study aimed to investigate the effectiveness of Acceptance and Commitment Therapy on panic attacks and alexithymia in individuals with borderline personality disorder. Methods: This study employed a quasi-experimental pretest–posttest design with a control group. The statistical population consisted of individuals with borderline personality disorder who had referred to counseling and psychological service centers. Among eligible individuals, 30 participants were selected using convenience sampling and were randomly assigned to an experimental group and a control group, with 15 participants in each group. The experimental group received eight 90-minute sessions of Acceptance and Commitment Therapy, whereas the control group received no intervention during this period. The research instruments included the Panic Attack Scale and the Toronto Alexithymia Scale. Data were analyzed using multivariate analysis of covariance (MANCOVA). Results: The findings indicated that, after controlling for pretest scores, there were significant differences between the experimental and control groups in panic attack and alexithymia scores ($p < .05$). In other words, Acceptance and Commitment Therapy significantly reduced panic attacks and alexithymia in individuals with borderline personality disorder. Discussion and Conclusion: The findings suggest that Acceptance and Commitment Therapy may reduce panic symptoms and improve individuals' ability to identify and express emotions by enhancing psychological flexibility, reducing experiential avoidance, and fostering a more accepting relationship with distressing thoughts and emotions. Future studies are recommended to employ larger sample sizes, longer follow-up periods, and comparisons between this approach and other evidence-based psychotherapeutic interventions.

Keywords: Acceptance and Commitment Therapy, panic attacks, alexithymia, borderline personality disorder, psychological flexibility.

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Introduction

Borderline personality disorder (BPD) is a complex and severe psychiatric condition characterized by pervasive instability in affect regulation, self-image, interpersonal relationships, and behavioral control. Individuals with BPD commonly experience intense and rapidly shifting emotional states, marked sensitivity to interpersonal stress, fear of abandonment, impulsivity, recurrent self-damaging behaviors, and difficulties maintaining a coherent sense of self. These features frequently result in substantial impairment across social, occupational, and relational domains and are associated with considerable clinical burden for both patients and mental health services (1). BPD is also notable for its high rates of psychiatric comorbidity, including anxiety disorders, depressive disorders, substance use disorders, trauma-related symptoms, and recurrent suicidal or self-injurious behaviors, which can complicate assessment and treatment. The disorder occurs across a wide range of clinical and community contexts, and research has also demonstrated a considerable burden of borderline personality pathology among high-risk populations such as incarcerated adults, emphasizing the broad public health significance of the condition (2). Because emotional dysregulation is central to the clinical presentation of BPD, greater attention has increasingly been directed toward transdiagnostic psychological processes that may intensify distress and maintain dysfunctional behavior over time.

One such process is the difficulty experienced by individuals with BPD in identifying, differentiating, regulating, and communicating emotional states. Emotional experiences in BPD are often intense, poorly differentiated, and associated with rapid behavioral responses, which may reduce the individual's ability to reflect on internal states before acting. In this context, alexithymia is particularly relevant. Alexithymia refers to a multidimensional construct characterized primarily by difficulty identifying feelings, difficulty describing feelings to others, and a tendency toward externally oriented thinking. Although alexithymia is not itself a psychiatric diagnosis, it is increasingly recognized as an important transdiagnostic vulnerability factor associated with multiple forms of psychopathology, impaired emotion regulation, and poorer psychological functioning. A systematic review of alexithymia in personality disorders has shown that difficulties in emotional awareness and verbalization are common across personality pathology and may be especially important for understanding the affective and interpersonal disturbances associated with BPD (3). From a functional perspective, alexithymia may contribute to the persistence of maladaptive interpersonal patterns because individuals who cannot accurately identify or express their emotional states may have greater difficulty communicating needs, interpreting emotional cues, and responding adaptively during emotionally charged interactions.

The relationship between alexithymia and BPD is clinically significant because both constructs involve disturbances in emotional processing, yet they may operate through partially distinct mechanisms. Whereas BPD is characterized by affective instability and heightened emotional reactivity, alexithymia reflects impaired emotional awareness and symbolic processing. When these features coexist, the person may experience intense affect without being able to adequately name, organize, or communicate the experience, thereby increasing the likelihood of impulsive, avoidant, or dysregulated responses. This pattern is theoretically consistent with contemporary models of BPD that emphasize experiential avoidance, cognitive fusion, rigid self-related narratives, and behavioral attempts to escape or control unwanted internal experiences (4). These processes are especially relevant because efforts to suppress, avoid, or immediately

alter distressing emotional states may paradoxically strengthen their behavioral influence and reduce opportunities for adaptive emotional learning. Accordingly, interventions that focus not only on symptom reduction but also on changing the individual's relationship with difficult internal experiences may be particularly useful in this population.

Panic attacks represent another clinically important problem that may exacerbate psychological distress among individuals with borderline personality pathology. Panic attacks are abrupt episodes of intense fear or discomfort accompanied by cognitive and physiological symptoms such as palpitations, shortness of breath, chest discomfort, dizziness, trembling, fear of losing control, and fear of catastrophic consequences. Although panic attacks are classically associated with panic disorder, they can occur across a range of psychiatric conditions and may function as markers of broader affective vulnerability. In individuals with BPD, heightened emotional reactivity, sensitivity to bodily sensations, catastrophic interpretations of internal experiences, and difficulty tolerating distress may increase vulnerability to panic-like episodes. The presence of panic symptoms can further impair functioning by increasing anticipatory anxiety, avoidance, reassurance seeking, and fear of emotional or physiological arousal. Systematic evidence on panic disorder has highlighted the importance of emotion regulation, alexithymia, emotional intelligence, and coping processes in understanding the onset and maintenance of panic-related symptoms (5). These findings suggest that panic symptoms should not be viewed exclusively as isolated episodes of fear, but rather as part of a broader pattern involving maladaptive responses to internal sensations and emotional experiences.

Contemporary psychological models of panic emphasize the role of fear of bodily sensations, catastrophic misinterpretation, avoidance, and attempts to control internal experiences. Repeated avoidance may provide short-term relief but can maintain long-term fear by preventing corrective learning and increasing vigilance toward bodily and emotional cues. Psychotherapeutic interventions for panic disorder have therefore frequently targeted avoidance, fear of internal sensations, and maladaptive cognitions. Network meta-analytic evidence indicates that multiple psychotherapeutic approaches can be effective for panic disorder with or without agoraphobia, while also showing meaningful differences in acceptability and treatment response across interventions (6). Furthermore, evidence from controlled clinical research suggests that interventions directly addressing panic-related fear and internal experiences can produce substantial symptom improvement (7). These findings support the clinical value of treatments that reduce rigid avoidance of internal states and promote more flexible engagement with distressing sensations and emotions.

Acceptance and Commitment Therapy (ACT) is particularly relevant in this context because it conceptualizes psychological suffering in terms of psychological inflexibility rather than symptom presence alone. ACT is a contextual behavioral therapy that aims to enhance psychological flexibility through six interrelated processes: acceptance, cognitive defusion, present-moment awareness, self-as-context, values clarification, and committed action. Rather than encouraging individuals to eliminate or suppress unwanted thoughts and emotions, ACT teaches them to experience internal events with greater openness while directing behavior toward personally meaningful values. A growing body of research has supported ACT across a wide range of psychiatric and health-related conditions, with accumulating evidence indicating that reductions in experiential avoidance and increases in psychological flexibility are central mechanisms of therapeutic change (8). In individuals whose distress is maintained by persistent attempts to control or

escape internal experiences, ACT may therefore provide a useful therapeutic framework for reducing the functional impact of difficult emotions and bodily sensations.

The conceptual fit between ACT and BPD is particularly strong because psychological inflexibility can be observed in many core features of borderline pathology. Intense emotional experiences may trigger fusion with self-critical or catastrophic thoughts, while fear of abandonment or rejection may promote rigid behavioral patterns aimed at immediately reducing distress. Similarly, impulsive acts and self-damaging behaviors may function as forms of experiential avoidance when they temporarily reduce intolerable affective states. An ACT-based conceptualization of BPD emphasizes the role of avoidance, cognitive fusion, unstable self-conceptualization, and disconnection from personally meaningful values in maintaining dysfunctional patterns (4). By strengthening acceptance, defusion, self-as-context, and values-based action, ACT may help individuals respond to emotional pain in ways that are less impulsive and less avoidant. Evidence also suggests that ACT can reduce emotional instability and self-injurious behavior among individuals presenting with borderline personality symptoms, supporting its potential clinical relevance for this population (9).

At the same time, the broader psychotherapy literature on BPD has established that structured psychological interventions can meaningfully improve clinical outcomes. Systematic reviews indicate that several psychotherapeutic approaches are beneficial for individuals with BPD, although treatment effects vary according to intervention type, outcome domain, treatment intensity, and study quality (10). Dialectical behavior therapy, mentalization-based treatment, schema-focused approaches, and other structured interventions have received substantial empirical attention. For example, randomized clinical evidence has shown that dialectical behavior therapy can remain effective across different treatment durations, underscoring the importance of structured skills-based intervention in reducing BPD-related difficulties (11). Likewise, long-term follow-up research on mentalization-based treatment has demonstrated the clinical value of intensive and sustained psychotherapeutic care for patients with borderline personality disorder (12). However, because BPD is heterogeneous and often accompanied by multiple transdiagnostic problems, continued examination of alternative or complementary interventions remains necessary.

ACT may offer a particularly useful transdiagnostic framework for patients who present with overlapping difficulties in emotional processing, anxiety, panic symptoms, and alexithymia. One of its potential advantages is that the intervention does not require direct restructuring or elimination of every distressing cognition. Instead, it focuses on reducing the dominance of thoughts and emotions over behavior. This characteristic may be important for individuals with BPD, whose internal experiences can fluctuate rapidly and intensely. The ability to observe distressing internal events without immediate reaction may reduce behavioral escalation, improve distress tolerance, and create opportunities for more adaptive interpersonal responding. Additionally, values clarification may be especially important for individuals whose unstable self-concept interferes with consistent goal-directed behavior. In this regard, ACT offers a coherent framework for shifting the therapeutic focus from symptom control toward flexible, value-consistent action in the presence of distress.

There is also growing evidence that ACT can be useful for alexithymia. Because alexithymia involves difficulty identifying and expressing emotions, interventions that increase mindful awareness of internal experiences and reduce avoidance may facilitate more differentiated emotional processing. ACT encourages

contact with present-moment emotional experience without immediate judgment or suppression, potentially helping individuals develop greater familiarity with affective states. Empirical studies have reported reductions in alexithymia following ACT-based interventions across different clinical and nonclinical populations. For example, ACT has been shown to reduce alexithymia in women experiencing infidelity (13), in patients with diabetes (14), and in mothers of children with autism (15). These findings suggest that ACT may influence alexithymia across diverse forms of psychological distress, possibly by increasing emotional awareness, decreasing avoidance, and promoting more open contact with internal experience.

Additional studies have extended these findings to medical and trauma-related populations. ACT-based interventions have been associated with reductions in alexithymia among women with breast cancer (16), while other research has demonstrated improvement in alexithymic symptoms among women exposed to domestic violence (17). Similarly, comparative research has shown that ACT can improve alexithymia and related indicators of psychological functioning among women with breast cancer (18). Integrative interventions that incorporate ACT alongside motivational interviewing and compassion-focused therapy have also demonstrated beneficial effects on alexithymia in women with multiple sclerosis (19). Collectively, these findings indicate that alexithymia is potentially modifiable and that interventions targeting experiential openness, awareness, acceptance, and adaptive engagement may reduce difficulties in emotional identification and communication.

The broader evidence on psychological treatment of alexithymia further supports the possibility that this construct can be responsive to psychotherapy. A systematic review of psychological interventions for alexithymia concluded that multiple therapeutic approaches may reduce alexithymic features, although methodological heterogeneity and variation in intervention content remain important limitations in the literature (20). These findings are important because alexithymia has historically been regarded as a relatively stable personality characteristic, whereas contemporary evidence increasingly suggests that it may change in response to targeted psychological intervention. From this perspective, ACT may be especially suitable because several of its core processes—mindfulness, acceptance, defusion, and self-observation—directly increase contact with internal experiences while reducing avoidance of difficult affective states. This mechanism is also consistent with findings from other ACT studies demonstrating improvements in emotional and psychological functioning across different patient groups.

ACT has also shown promise in panic-related conditions. Internet-based ACT combined with interoceptive exposure has demonstrated effectiveness for panic disorder, indicating that acceptance-based methods can be integrated with direct exposure to feared bodily sensations and may improve panic-related outcomes (7). This is clinically meaningful because panic symptoms are often maintained by experiential avoidance and fear of internal sensations. ACT may reduce the secondary struggle surrounding panic by helping individuals experience physiological arousal without automatically interpreting it as intolerable or dangerous. In addition, acceptance-based exposure can weaken rigid avoidance patterns and promote greater behavioral flexibility. Such mechanisms may be especially useful in individuals with borderline personality features, who may experience both intense emotional arousal and difficulty regulating reactions to internal states.

The use of ACT for individuals with borderline personality features is also supported by emerging evidence that directly links this intervention to domains of emotional instability. Research has shown that ACT can reduce emotional instability and self-injurious behaviors among individuals with borderline personality

symptoms and comorbid substance-related problems (9). These results are consistent with the broader ACT literature demonstrating that targeting experiential avoidance can improve functioning even when symptoms are complex and comorbid. At the same time, the current evidence base remains smaller than that available for established BPD-focused treatments such as dialectical behavior therapy and mentalization-based treatment. Reviews of BPD psychotherapy emphasize the need for further research comparing treatment processes, identifying mechanisms of change, and examining outcomes beyond global symptom severity (1, 10). Panic attacks and alexithymia are two such clinically meaningful outcomes that have received comparatively less attention within ACT research on borderline personality pathology.

This gap is particularly important because panic attacks and alexithymia may interact in ways that amplify distress. An individual who has difficulty identifying and labeling emotions may interpret rising arousal as confusing, uncontrollable, or physically dangerous, thereby increasing fear and the likelihood of panic escalation. Conversely, repeated panic attacks may intensify vigilance toward bodily and emotional sensations and promote further avoidance, reducing opportunities to develop emotional understanding. Evidence linking panic disorder to emotion regulation deficits and alexithymia supports this possibility (5). Thus, targeting psychological flexibility may have simultaneous effects on panic symptoms and emotional processing. ACT may help patients remain in contact with difficult sensations and emotions, label and observe them more accurately, reduce avoidance-driven behavior, and act in accordance with values despite distress.

Although a growing body of research has examined ACT for anxiety, medical conditions, emotional dysregulation, and alexithymia, fewer studies have specifically evaluated its effects on both panic attacks and alexithymia among individuals with borderline personality features. Existing findings support the effectiveness of ACT for reducing alexithymia in different populations (13-19), while clinical and theoretical research suggests that ACT may be suitable for panic-related symptoms and borderline personality pathology (4, 7, 9). In parallel, evidence from established treatments for BPD demonstrates that structured psychotherapy can substantially improve severe emotional and behavioral difficulties (11, 12). These converging lines of evidence provide a strong rationale for examining whether ACT can simultaneously reduce panic-related distress and improve emotional awareness in individuals with borderline personality features.

Accordingly, the aim of the present study was to investigate the effectiveness of Acceptance and Commitment Therapy on panic attacks and alexithymia in individuals with borderline personality features.

Methods and Materials

Study Design and Participants

The present study was an applied, quasi-experimental investigation conducted using a pretest–posttest design with an experimental group and a control group. The study was designed to examine the effectiveness of Acceptance and Commitment Therapy (ACT) in reducing panic attacks and alexithymia among individuals with borderline personality features. The statistical population comprised individuals with borderline personality features who were referred to psychological clinics in Tehran, Iran, during 2025. Potential participants were initially screened through clinical assessment and completed the study measures at the pretest stage. The inclusion criteria were the presence of borderline personality features based on

psychological assessment and diagnostic evaluation, the absence of a severe psychiatric disorder requiring immediate clinical intervention, no concurrent participation in another psychological or psychotherapeutic intervention, and willingness to cooperate with the research procedures and regularly attend the treatment sessions. Following the initial screening, 30 eligible individuals who exhibited symptoms of panic attacks and relatively elevated levels of alexithymia were selected through purposive sampling. The selected participants were then randomly assigned to either the experimental group or the control group, with 15 participants in each group. The experimental group received Acceptance and Commitment Therapy, whereas the control group received no psychological intervention during the study period. Following completion of the intervention, both groups were reassessed using the same outcome measures administered at baseline. Pretest and posttest scores were subsequently compared to determine the effectiveness of ACT in reducing panic attacks and alexithymia. Participation was voluntary, participants were informed of the general procedures of the study, and the confidentiality of their information was maintained throughout the research process.

Data Collection Tools

The **Structured Clinical Interview for DSM-5 Disorders (SCID-5)** was used as the principal clinical assessment procedure for identifying borderline personality pathology and evaluating the presence of clinically significant psychiatric disorders. The SCID-5 is a structured or semi-structured diagnostic interview administered by trained clinicians according to the diagnostic criteria established in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5). It is widely used in clinical practice and psychological research to facilitate systematic psychiatric assessment and improve diagnostic reliability. In the present study, the interview was used to assess participants for borderline personality disorder features and to identify psychiatric conditions that could interfere with participation in the intervention. The diagnostic interview also assisted in determining whether participants met the study eligibility criteria. In addition, a demographic questionnaire was administered to collect background characteristics, including age, sex, educational level, marital status, and history of psychological or psychiatric treatment. The SCID-5 and its related diagnostic procedures are based on DSM-5 diagnostic criteria and have been extensively employed in clinical and research settings (Williams et al., 2016).

The **Panic Disorder Severity and Characteristics Questionnaire** developed by Liebowitz et al. (1984) was used to assess the severity and clinical characteristics of panic-related symptoms. The instrument consists of 27 items designed to evaluate the frequency, intensity, and characteristics of symptoms associated with panic disorder and panic attacks and has been used in both clinical and therapeutic settings. Respondents rate each item using a four-point response format ranging from *never* to *severe*, with higher scores indicating greater severity of panic-related symptoms. Previous psychometric evaluations of the instrument have demonstrated satisfactory reliability. A test–retest reliability coefficient of .78 and an internal consistency coefficient of .89 have been reported for the scale. Bandelow et al. (2000) also reported a reliability coefficient of .93, indicating a high level of consistency in the measurement of panic-related symptoms. In the present study, Cronbach's alpha coefficients of .80 and .82 were obtained across the assessment occasions, indicating acceptable internal consistency of the questionnaire within the study sample.

The **Toronto Alexithymia Scale (TAS-20)**, developed by Bagby, Parker, and Taylor (1994), was used to measure alexithymia. The TAS-20 is a 20-item self-report instrument and is among the most widely used measures of alexithymia in clinical and psychological research. It assesses three principal dimensions of the construct: difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking. Participants respond to each item using a five-point Likert-type scale ranging from *strongly disagree* to *strongly agree*. Higher total scores indicate a greater degree of alexithymic characteristics and greater difficulties in identifying, processing, and verbally communicating emotional experiences. Previous studies have supported the acceptable reliability and construct validity of the TAS-20 in a variety of clinical and nonclinical populations. In the present study, the internal consistency of the scale was evaluated using Cronbach's alpha, which yielded a coefficient of .80, demonstrating acceptable reliability within the present sample.

Intervention

Participants assigned to the experimental group received an eight-session Acceptance and Commitment Therapy program, with each session lasting approximately 90 minutes. The intervention was based on the principal processes of ACT, including acceptance, cognitive defusion, present-moment awareness, self-as-context, clarification of personal values, and committed action. The first session focused on establishing the therapeutic alliance, familiarizing participants with one another and with the therapeutic process, establishing group rules, introducing the theoretical foundations and objectives of ACT, explaining the assessment procedures, and completing the pretest measures. The second session focused on increasing participants' awareness of emotional control strategies and the consequences of persistent attempts to suppress or avoid unwanted internal experiences. Experiential avoidance was discussed in relation to anxiety, panic symptoms, and distressing emotional experiences, and participants were instructed to monitor recurrent thoughts and emotional reactions. Experiential exercises and metaphors, including the Unwanted Guest metaphor, the Yellow Jeep thought-suppression exercise, and the Hungry Tiger metaphor, were used to demonstrate the paradoxical effects of attempting to control unwanted thoughts and emotions. The third session emphasized cognitive defusion and contact with the present moment. Participants practiced purposeful breathing, mindful attention, the mindful raisin exercise, labeling thoughts, and observing the effects of language on behavior. The concept of being trapped by verbal rules was introduced, and the Bus Driver metaphor was used to strengthen psychological distance from distressing thoughts without attempting to eliminate them. The fourth session focused on strengthening self-as-context and the observing self. Different conceptualizations of the self were introduced, and participants were encouraged to distinguish between transient thoughts and feelings and the broader perspective from which those experiences could be observed; the Chessboard metaphor was used to facilitate this process. The fifth session was devoted to clarification of personal values, particularly values related to interpersonal relationships, emotional expression, personal growth, and meaningful living. Exercises included imagining one's own funeral, the Values Tree metaphor, and completion of a valued life domains exercise. During the sixth session, participants were introduced to committed action and were assisted in identifying potential internal and external barriers to value-consistent behavior. The relationship between values and behavior was discussed, and participants identified effective behavioral responses to panic-related distress, emotional

avoidance, and interpersonal difficulties. The Seedling metaphor was used to illustrate the gradual development of value-based behavioral patterns. The seventh session focused on sustained engagement in value-consistent activities and the formulation of behavioral goals. Homework from the previous session was reviewed, and participants developed short- and long-term goals consistent with their identified values while specifying concrete actions for pursuing those goals despite uncomfortable thoughts or emotions. The eighth and final session involved reviewing and integrating the therapeutic concepts and skills covered throughout the intervention, consolidating strategies for maintaining psychological flexibility, discussing continuation of value-based behavior after treatment termination, formally concluding the therapeutic process, and administering the posttest measures. The control group did not receive an intervention during the corresponding period.

Data Analysis

Data were analyzed using IBM SPSS Statistics version 26. Descriptive statistics were first calculated to summarize participants' demographic characteristics and the distributions of the primary study variables. Fisher's exact test was used, where appropriate, to examine comparability between the experimental and control groups with respect to categorical demographic variables. Before conducting the primary inferential analysis, the statistical assumptions required for repeated-measures analysis were evaluated. The Kolmogorov–Smirnov test was used to examine the normality of the distributions, Levene's test was applied to assess the homogeneity of variances between groups, and Mauchly's test of sphericity was considered for the repeated-measures assumption. The primary inferential analysis consisted of a two-way mixed-design analysis of variance with repeated measures, in which time constituted the within-subject factor with two levels, pretest and posttest, and group constituted the between-subject factor with two levels, experimental and control. Separate analyses were performed for panic attack and alexithymia scores to evaluate the main effects of time and group as well as, most importantly, the group × time interaction. A statistically significant interaction was interpreted as evidence that changes from pretest to posttest differed between the experimental and control groups and therefore reflected an intervention effect. Statistical significance for all analyses was set at $p < .05$.

Findings and Results

A total of 30 individuals with borderline personality features who met the study eligibility criteria participated in the study and were randomly assigned to the experimental and control groups, with 15 participants in each group. Regarding age, 5 participants (33.3%) in the experimental group and 4 participants (26.7%) in the control group were aged 20–30 years, 7 participants (46.7%) in the experimental group and 8 participants (53.3%) in the control group were aged 31–40 years, and 3 participants (20.0%) in each group were aged 41 years or older. In terms of educational attainment, 3 participants (20.0%) in the experimental group and 4 participants (26.7%) in the control group had a high school diploma or lower level of education, 8 participants (53.3%) and 7 participants (46.7%), respectively, held a bachelor's degree, and 4 participants (26.7%) in each group held a master's degree or higher. Regarding marital status, 9 participants (60.0%) in the experimental group and 8 participants (53.3%) in the control group were single, whereas 6 participants (40.0%) and 7 participants (46.7%), respectively, were married. With respect to

treatment history, 7 participants (46.7%) in the experimental group and 6 participants (40.0%) in the control group had received treatment for less than one year, 5 participants (33.3%) and 6 participants (40.0%), respectively, had a treatment history of one to three years, and 3 participants (20.0%) in each group had a treatment history of more than three years. Overall, the distribution of demographic characteristics was relatively similar across the two groups, indicating acceptable comparability of the experimental and control groups at baseline.

Table 1. Descriptive Statistics for Panic Attacks and Alexithymia by Group and Assessment Time

Variable	Assessment	Experimental Group M	Experimental Group SD	Control Group M	Control Group SD
Panic attacks	Pretest	18.40	3.21	17.93	3.48
	Posttest	10.13	2.78	16.87	3.29
Alexithymia	Pretest	69.20	5.83	68.47	6.12
	Posttest	54.60	5.21	67.13	5.96

As shown in Table 1, the mean panic attack score in the experimental group decreased from 18.40 (SD = 3.21) at pretest to 10.13 (SD = 2.78) at posttest, whereas the corresponding mean score in the control group showed only a slight decrease from 17.93 (SD = 3.48) to 16.87 (SD = 3.29). A similar pattern was observed for alexithymia. The mean alexithymia score in the experimental group decreased from 69.20 (SD = 5.83) at pretest to 54.60 (SD = 5.21) at posttest, whereas the mean score in the control group changed only slightly from 68.47 (SD = 6.12) to 67.13 (SD = 5.96). Thus, at the descriptive level, participants who received Acceptance and Commitment Therapy demonstrated substantially greater reductions in both panic attacks and alexithymia than participants in the control group.

Before conducting the covariance analyses, the relevant statistical assumptions were examined. The Shapiro–Wilk test indicated no significant departure from normality for panic attack scores, $W = .96$, $p = .260$, or alexithymia scores, $W = .97$, $p = .370$. Levene's tests were also nonsignificant for panic attacks, $F(1, 28) = 1.28$, $p = .267$, and alexithymia, $F(1, 28) = 0.74$, $p = .397$, supporting the assumption of homogeneity of error variances. Furthermore, Box's M test was nonsignificant, Box's $M = 3.86$, $p = .281$, indicating that the covariance matrices could be considered homogeneous across the experimental and control groups. Therefore, the principal assumptions required for multivariate and univariate analyses of covariance were satisfied. The multivariate analysis further showed a significant overall effect of group after controlling for pretest scores, Wilks' $\Lambda = .276$, $F(2, 25) = 35.84$, $p = .001$, partial $\eta^2 = .724$, indicating that the two groups differed significantly in the combined posttest scores of panic attacks and alexithymia.

Table 2. Results of Univariate Analyses of Covariance for Panic Attacks and Alexithymia

Dependent Variable	Source	SS	df	MS	F	p	Partial η^2
Panic attacks	Pretest	75.42	1	75.42	8.97	.006	.250
	Group	268.37	1	268.37	31.94	.001	.533
	Error	226.84	27	8.40	—	—	—
Alexithymia	Pretest	198.56	1	198.56	8.72	.006	.244
	Group	482.71	1	482.71	21.19	.001	.440

As presented in Table 2, after controlling for baseline panic attack scores, a statistically significant difference was observed between the experimental and control groups in posttest panic attack scores, $F(1, 27) = 31.94$, $p = .001$, partial $\eta^2 = .533$. This effect size indicates that approximately 53.3% of the variance in posttest panic attack scores, after adjustment for pretest scores, was associated with group membership.

The effect of the pretest covariate was also statistically significant, $F(1, 27) = 8.97$, $p = .006$, partial $\eta^2 = .250$. Similarly, after controlling for baseline alexithymia scores, the difference between the experimental and control groups in posttest alexithymia was statistically significant, $F(1, 27) = 21.19$, $p = .001$, partial $\eta^2 = .440$, indicating that approximately 44.0% of the adjusted variance in posttest alexithymia scores was associated with group membership. The pretest covariate for alexithymia was also significant, $F(1, 27) = 8.72$, $p = .006$, partial $\eta^2 = .244$. Considering the substantially lower posttest means observed in the experimental group, these findings demonstrate that Acceptance and Commitment Therapy was significantly associated with reductions in both panic attacks and alexithymia among individuals with borderline personality features.

Discussion and Conclusion

The present study examined the effectiveness of Acceptance and Commitment Therapy (ACT) on panic attacks and alexithymia in individuals with borderline personality features. The findings indicated that, after controlling for pretest scores, participants who received ACT showed significantly lower levels of panic attacks and alexithymia than those in the control group. The multivariate analysis demonstrated a significant overall group effect on the combined dependent variables, and the univariate analyses confirmed significant intervention effects for both panic attacks and alexithymia. The effect sizes were substantial, indicating that group membership accounted for a considerable proportion of the adjusted variance in posttest scores. These findings suggest that ACT can be effective in reducing both panic-related symptoms and difficulties in emotional identification and expression among individuals with borderline personality features. The results are theoretically meaningful because both panic symptoms and alexithymia are closely connected to difficulties in emotion regulation, experiential avoidance, cognitive fusion, and maladaptive responses to internal experiences, all of which are central targets within the ACT model.

The first major finding was that ACT significantly reduced panic attacks in participants with borderline personality features. This result is consistent with previous evidence indicating that acceptance-based interventions can reduce panic-related symptoms by modifying the way individuals relate to distressing internal sensations and emotions. In particular, Bäckman et al. demonstrated that internet-based ACT combined with interoceptive exposure was effective in the treatment of panic disorder, supporting the relevance of acceptance, willingness, and exposure to feared internal sensations in reducing panic symptoms (7). The present finding is also consistent with broader psychotherapy evidence showing that psychological interventions are effective in the treatment of panic disorder and that approaches targeting maladaptive cognitions, avoidance, and fear responses can substantially reduce panic-related distress (6). In this regard, the current results extend previous findings by suggesting that ACT may be effective even when panic symptoms occur in the context of broader personality pathology characterized by emotional instability and difficulties in self-regulation.

One possible explanation for this finding concerns the role of experiential avoidance in panic. Individuals who experience panic symptoms often attempt to suppress or escape bodily sensations, frightening thoughts, and emotional arousal. Although these strategies may produce short-term relief, they can reinforce the belief that internal experiences are dangerous and intolerable. ACT attempts to interrupt this cycle by teaching individuals to make room for distressing internal events rather than immediately attempting to control or

eliminate them. Through acceptance exercises, cognitive defusion, mindfulness, and present-moment awareness, participants may learn to experience bodily arousal and catastrophic thoughts without responding to them as if they necessarily signal danger. This process can decrease fear of fear and reduce secondary anxiety about panic symptoms. Research on panic disorder has emphasized the role of emotional regulation, coping deficits, alexithymia, and maladaptive responses to emotional experiences in the maintenance of panic symptoms (5). Therefore, increasing psychological flexibility may reduce not only overt panic episodes but also the internal struggle that often precedes or intensifies them.

The present findings may also be understood in light of the emotional characteristics of borderline personality pathology. Individuals with borderline personality features frequently exhibit heightened emotional sensitivity, rapid escalation of affect, intense distress, and difficulty returning to baseline after emotional activation. These characteristics may increase vulnerability to panic-like experiences because ordinary fluctuations in bodily arousal or negative emotion may be interpreted as overwhelming and uncontrollable. Comprehensive reviews of borderline personality disorder emphasize severe affective instability, heightened interpersonal sensitivity, impulsivity, and disturbed self-functioning as core clinical features (1). From an ACT perspective, such difficulties may become more problematic when individuals become fused with distressing thoughts and engage in repeated attempts to avoid, suppress, or rapidly terminate unwanted internal experiences. The ACT conceptualization of borderline personality disorder similarly highlights experiential avoidance, cognitive fusion, unstable self-related narratives, and disconnection from values as important processes that may maintain dysfunctional behavioral patterns (4). Thus, ACT may reduce panic symptoms by changing the individual's relationship with emotional and physiological arousal rather than by directly attempting to eliminate all anxiety.

The second major finding of the present study was that ACT significantly reduced alexithymia. This result is consistent with several previous investigations examining the effect of ACT on emotional awareness and alexithymic characteristics. Karimi et al. reported that ACT was effective in reducing alexithymia among women experiencing infidelity (13). Similarly, Naseri and Alimahdi found that ACT improved alexithymia among patients with diabetes (14), while Razmkhah et al. demonstrated beneficial effects of ACT on alexithymia among mothers of children with autism (15). More recent findings have also shown that ACT can reduce alexithymia among women with breast cancer (16), women who have experienced domestic violence (17), and other clinical populations in which emotional avoidance and difficulty processing internal experiences are prominent (18). These findings collectively support the interpretation that alexithymia is not necessarily a fixed or immutable personality characteristic and may be responsive to psychological interventions that enhance emotional awareness and openness.

The reduction in alexithymia observed in the present study can be explained through several core ACT processes. Mindfulness and present-moment awareness may help individuals attend more carefully to emotional and bodily cues as they arise, thereby increasing the ability to notice differences among internal states. Acceptance may reduce defensive avoidance of painful affect, allowing emotional experiences to be observed for longer periods and with less judgment. Cognitive defusion may help participants separate emotional experiences from rigid evaluations such as “I cannot tolerate this feeling” or “this emotion means something is wrong with me.” Self-as-context may further support emotional processing by allowing the individual to observe changing emotions without equating the self entirely with any particular emotional

state. These processes may gradually improve the capacity to identify and describe feelings. Such an interpretation is compatible with systematic evidence indicating that alexithymia can improve through psychological treatment and that interventions involving emotional awareness, experiential processing, and mindfulness-related techniques may be particularly useful (20).

This finding is particularly relevant in the context of borderline personality features because alexithymia may intensify several central difficulties associated with the disorder. Individuals with BPD may experience intense emotions but have difficulty identifying exactly what they feel, why they feel it, and how to communicate it. A systematic review of alexithymia in personality disorders has shown that alexithymic characteristics are strongly represented across personality pathology and may be especially important in disorders marked by affective and interpersonal dysfunction (3). When emotional experience is intense but poorly differentiated, individuals may be more likely to respond impulsively, use maladaptive coping strategies, or misinterpret interpersonal situations. By increasing awareness and acceptance of internal experiences, ACT may improve the transition from undifferentiated emotional arousal to more organized emotional recognition. This may partly explain the substantial reduction in alexithymia observed in the experimental group.

The current result is also aligned with studies showing that ACT and ACT-informed interventions can improve emotional functioning in other medical and psychological populations. For example, Rezaei et al. found that an integrated intervention incorporating ACT, motivational interviewing, and compassion-focused therapy reduced alexithymia and improved quality of life among women with multiple sclerosis (19). Nazeri et al. also reported beneficial effects of ACT on alexithymia and related mental health outcomes in women with breast cancer (18). Although these populations differ from individuals with borderline personality features, the convergence of findings suggests that ACT may influence common transdiagnostic mechanisms, particularly emotional avoidance, rigid control strategies, and reduced awareness of internal experiences. Accordingly, the present results add to the growing evidence that ACT may be useful for improving emotional processing across diverse clinical conditions.

The significant effects observed in both panic attacks and alexithymia may also reflect the interconnected nature of these two variables. Panic symptoms can be intensified when individuals are unable to identify or understand the emotions underlying physiological arousal. If an individual experiences increased heart rate, shortness of breath, trembling, or diffuse distress but cannot accurately label the accompanying emotional state, these sensations may be interpreted as confusing, dangerous, or uncontrollable. This uncertainty may facilitate catastrophic interpretations and contribute to panic escalation. Conversely, repeated panic attacks may increase avoidance of internal sensations and emotions, further reducing opportunities to develop emotional awareness. Oussi et al. emphasized the close relationship among panic disorder, emotion regulation, alexithymia, emotional intelligence, and coping strategies, suggesting that emotional processing difficulties constitute an important component of panic-related psychopathology (5). Therefore, an intervention that simultaneously increases acceptance of internal sensations and improves emotional awareness may have mutually reinforcing effects on both outcomes.

The present findings are further supported by earlier work demonstrating the effectiveness of ACT for problems related to emotional instability in borderline personality pathology. Dehghan et al. found that ACT reduced emotional instability and self-injurious behaviors in individuals presenting with borderline

personality symptoms and substance abuse (9). This is particularly relevant because emotional instability, panic symptoms, self-harm, and alexithymia may all share underlying difficulties involving low distress tolerance, experiential avoidance, and rigid responses to unwanted internal states. ACT does not primarily seek to remove distressing thoughts or emotions; instead, it attempts to increase the individual's ability to remain psychologically flexible in their presence. Such flexibility can create a greater interval between emotion and action, which may be especially important for individuals with borderline features who often experience rapid transitions from emotional activation to impulsive behavior.

At the same time, the findings should be considered within the broader psychotherapy literature on borderline personality disorder. Several structured psychotherapies have demonstrated effectiveness in reducing BPD-related symptoms and functional impairment. Dialectical behavior therapy, for example, has strong evidence supporting its effectiveness across different treatment durations, particularly for emotional dysregulation and self-harming behavior (11). Mentalization-based treatment has also demonstrated enduring benefits in long-term follow-up studies of individuals with borderline personality disorder (12). Systematic reviews further indicate that several specialized psychotherapies can produce meaningful improvements in borderline personality disorder, although the strength of evidence varies across treatments and outcomes (10). The present findings do not suggest that ACT should replace these established approaches; rather, they indicate that ACT may represent a useful alternative or complementary intervention, particularly when the therapeutic targets include panic symptoms, experiential avoidance, psychological inflexibility, and difficulty identifying and expressing emotions.

The effectiveness of ACT in the present study may also be related to its emphasis on personal values and committed action. Individuals with borderline personality features often experience instability in self-concept and interpersonal goals, which may lead to inconsistent behavior that is strongly governed by momentary emotional states. Values clarification can help individuals identify personally meaningful directions that remain relatively stable even when emotions fluctuate. By encouraging behavior in accordance with values rather than immediate emotional urges, ACT may reduce the behavioral impact of distress and improve a sense of continuity in personal functioning. This mechanism is central to the acceptance and commitment model of BPD, which emphasizes the importance of reducing avoidance while strengthening coherent, values-based behavior (4). Thus, the therapeutic effects observed in the current study may reflect not only reductions in distress but also the development of more adaptive responses to distress.

The findings also have implications for the conceptualization of treatment goals in borderline personality pathology. Traditional outcome measures often focus on self-harm, suicidality, hospitalization, or global symptom severity. Although these outcomes are crucial, the present results suggest that more specific transdiagnostic processes such as panic symptoms and alexithymia are also important treatment targets. Contemporary reviews of BPD emphasize the heterogeneity of the disorder and the need to examine mechanisms that cut across diagnostic categories (1). Similarly, systematic reviews of psychotherapy for BPD highlight the importance of identifying which treatments work for which outcomes and through which processes (10). By demonstrating significant changes in both panic attacks and alexithymia, the present study provides support for a process-oriented approach in which psychological flexibility and emotional openness are considered clinically meaningful outcomes.

Overall, the results of the present study suggest that ACT can reduce panic attacks and alexithymia among individuals with borderline personality features. These effects are consistent with previous evidence supporting ACT for panic-related conditions (7), alexithymia across a range of populations (13-19), and emotional instability in individuals with borderline personality symptoms (9). The findings are also theoretically compatible with the broader ACT framework, which conceptualizes psychological flexibility as a core mechanism of adaptive functioning (8). By reducing experiential avoidance, weakening cognitive fusion, increasing present-moment awareness, strengthening an observing perspective toward internal events, clarifying personal values, and promoting committed action, ACT may help individuals tolerate intense affective states without resorting to maladaptive control strategies. In this way, the intervention may simultaneously reduce panic-related distress and improve the ability to identify, understand, and express emotions.

One limitation of the present study was the relatively small sample size, which may restrict the statistical power and generalizability of the findings. Participants were selected from psychological clinics in Tehran and therefore may not fully represent all individuals with borderline personality features in community settings or other cultural and clinical contexts. The study also relied primarily on self-report measures for the assessment of panic attacks and alexithymia, which may be influenced by response biases, current mood, or participants' level of insight. In addition, the absence of a long-term follow-up assessment prevented evaluation of whether the observed improvements were maintained over time. The use of a no-treatment control group also made it impossible to determine whether the observed effects were specifically attributable to ACT techniques rather than nonspecific therapeutic factors such as therapist attention, group support, treatment expectations, or regular participation in structured sessions.

Future research should replicate these findings with larger and more diverse samples and recruit participants from multiple treatment centers and community settings. Studies should include follow-up assessments over several months to determine the stability and durability of treatment effects. It would also be useful to compare ACT directly with established interventions for borderline personality disorder, including dialectical behavior therapy, mentalization-based treatment, schema therapy, and cognitive-behavioral interventions. Future studies could employ active control conditions and incorporate clinician-rated measures, behavioral indices, and ecological assessments of emotional functioning in addition to self-report instruments. Research examining mediating mechanisms such as psychological flexibility, experiential avoidance, mindfulness, distress tolerance, emotion regulation, and cognitive fusion would also clarify how ACT produces changes in panic symptoms and alexithymia. Examining potential moderators such as symptom severity, comorbid anxiety, trauma history, treatment adherence, and baseline emotional awareness may further help identify which individuals are most likely to benefit from ACT.

In clinical practice, ACT may be considered a potentially useful intervention for individuals with borderline personality features who also present with panic symptoms, difficulty identifying emotions, or persistent experiential avoidance. Therapists may benefit from integrating exercises that increase awareness of bodily and emotional experiences, encourage willingness to remain in contact with distress without immediate avoidance, and help clients distinguish between thoughts, feelings, sensations, and behavioral urges. Greater emphasis on values clarification and committed action may also help clients develop more stable behavioral directions that are less dependent on momentary emotional states. Clinicians should adapt

the pace and complexity of experiential exercises to the patient's emotional tolerance and level of psychological stability, particularly when working with highly dysregulated individuals. ACT techniques may also be incorporated into broader treatment plans in conjunction with risk assessment, crisis management, interpersonal skills training, and other evidence-based strategies appropriate for borderline personality pathology.

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Authors' Contributions

All authors equally contributed to this study.

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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