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The Effectiveness of Acceptance and Commitment Therapy on Hostile Attribution Bias, Anger Rumination, and Anger Suppression in Women with Physical–Motor Disabilities

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ABSTRACT

The present study aimed to investigate the effectiveness of Acceptance and Commitment Therapy (ACT) on hostile attribution bias, anger rumination, and anger suppression in women with physical–motor disabilities. The research employed a quasi-experimental design with a pretest–posttest control group. The statistical population included women aged 20 to 30 years with physical–motor disabilities residing in Bushehr County. Using purposive sampling, 30 participants were selected and randomly assigned to experimental and control groups (15 participants in each group). The ACT intervention was administered to the experimental group over eight sessions, each lasting 90 minutes, while the control group received no intervention. The instruments used included the Hostile Attribution Bias Questionnaire (HDS; Arnot et al., 2003), the Anger Rumination Scale (ARS; Sukhodolsky et al., 2001), and the State–Trait Anger Expression Inventory (STAXI-2; Spielberger, 1993). The Acceptance and Commitment Therapy protocol developed by Bond et al. (2011) was implemented in eight 90-minute weekly group sessions for the experimental group. Data were analyzed using multivariate analysis of covariance (MANCOVA). The findings indicated that, after controlling for pretest effects, there was a statistically significant difference at the 0.05 level between the experimental and control groups in posttest scores of hostile attribution bias, anger rumination, and anger suppression. Therefore, the Acceptance and Commitment Therapy approach can be considered an effective intervention for women with physical–motor disabilities.

Keywords: Acceptance and Commitment Therapy (ACT), anger suppression, hostile attribution bias, physical–motor disability, anger rumination.

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Introduction

Individuals with physical–motor disabilities face not only functional limitations but also profound psychosocial challenges that often influence their emotional regulation, cognitive processing, and interpersonal adjustment. Research consistently shows that physical impairment is frequently accompanied by secondary emotional difficulties, including heightened anger, rumination, and biased social cognitions that exacerbate maladaptive responses to stress and social interactions (1, 2). Hostile attribution bias—the tendency to interpret ambiguous situations as intentionally aggressive—and anger rumination—the repetitive focus on anger-provoking experiences—are key mechanisms contributing to persistent emotional

distress and interpersonal dysfunction among individuals with disabilities (3, 4). These cognitive–emotional processes can be particularly detrimental for women with physical–motor disabilities, whose daily lives are shaped by pain, dependency, and social stigma, thereby amplifying vulnerability to anger suppression and internalized distress (5-7).

Emotional dysregulation among individuals with disabilities is not an isolated psychological phenomenon but often a consequence of accumulated social and biological stressors. Studies have demonstrated that physical–motor impairment affects one's perceived control, autonomy, and social participation, leading to maladaptive emotional patterns such as suppression and rumination (8, 9). Theories of anger and aggression, including social–cognitive models, emphasize that hostile attribution bias serves as a mediator between early adversity, rejection sensitivity, and aggressive reactivity (3, 10). Individuals who habitually interpret neutral or ambiguous cues as threatening are more likely to experience and express anger in maladaptive ways, whether through external aggression or internal suppression (11). These patterns are reinforced over time by rumination—a repetitive cognitive focus on the causes and consequences of anger—which impairs problem-solving, prolongs arousal, and hinders recovery from emotional episodes (4, 12).

Anger rumination has been identified as a critical factor linking cognitive biases to emotional disorders across populations. Evidence from adolescent and adult samples shows that rumination magnifies the effects of hostile attribution and contributes to both externalizing behaviors and internalizing problems such as depression and anxiety (12, 13). Among individuals with physical disabilities, the chronic stress of discrimination and dependency may intensify these cognitive-emotional cycles (5, 7). Women with motor disabilities, in particular, often experience reduced self-efficacy and social isolation, which can heighten anger suppression—an emotion regulation strategy that maintains internal tension and increases psychological strain (14, 15). Suppressed anger, while reducing external conflict, has been linked to higher physiological stress and increased vulnerability to depressive and somatic symptoms (1, 11).

Emerging literature underscores the importance of targeted psychological interventions that address these cognitive–emotional mechanisms in individuals with disabilities. Acceptance and Commitment Therapy (ACT), as a third-wave behavioral therapy, has demonstrated considerable efficacy in improving emotional regulation, psychological flexibility, and well-being in populations with chronic physical and psychological conditions (16-18). ACT operates on the principle of increasing psychological flexibility through six core processes: acceptance, cognitive defusion, contact with the present moment, self-as-context, values clarification, and committed action (19). By helping individuals accept internal experiences rather than attempting to control them, ACT reduces maladaptive avoidance behaviors and fosters engagement in value-based actions (20, 21).

The relevance of ACT for people with disabilities lies in its focus on acceptance and mindfulness, which counter the emotional avoidance and cognitive rigidity frequently observed in this group. Individuals with chronic physical–motor conditions often struggle to reconcile their bodily limitations with social expectations and personal goals, leading to cycles of frustration and anger (9, 22). Studies have shown that ACT enhances resilience, hope, and adjustment in individuals facing chronic illness or disability by promoting adaptive acceptance and reducing the emotional impact of pain and stigma (14, 23). For example, in patients with fibromyalgia and chronic pain, ACT significantly reduced anxiety, depression, and anger-

related symptoms by restructuring maladaptive cognitive patterns (16, 18). Similar outcomes have been observed in rehabilitation contexts where ACT improved motivation and participation in therapy (1).

From a cognitive–behavioral perspective, hostile attribution bias can be modified through mindfulness and acceptance-based strategies that encourage decentering from automatic hostile interpretations (3, 24). ACT differs from traditional cognitive restructuring approaches by emphasizing the functional role of thoughts rather than their factual content. Rather than disputing the validity of hostile cognitions, clients learn to observe them nonjudgmentally, reducing their impact on behavior (20, 21). Recent neurocognitive research has shown that interventions targeting cognitive bias and interpretation processes can alter neural patterns associated with hostility and reactive aggression, highlighting the potential of ACT's mindfulness mechanisms to promote cognitive flexibility (24).

Anger suppression, while often socially reinforced, has been associated with heightened physiological arousal and diminished emotional awareness (11). ACT's emphasis on experiential acceptance allows individuals to recognize and express anger in adaptive, non-destructive ways (17). Moreover, its mindfulness component strengthens metacognitive awareness, enabling participants to perceive emotions as transient experiences rather than threats that must be controlled or avoided (20). This process of defusion helps disrupt rumination loops by shifting focus from repetitive thought content to the act of mindful observation, thus reducing the persistence of negative affect (4, 12).

Women with physical–motor disabilities represent a particularly vulnerable population for anger-related dysregulation. Social exclusion, limited accessibility, and discrimination contribute to experiences of helplessness, frustration, and internalized stigma (5, 25). Psychological studies report that women in this demographic are more prone to internalizing anger through suppression and rumination rather than expressing it outwardly, which further perpetuates distress and maladaptive coping (6, 7). These findings align with the broader literature on trauma and disability, which emphasizes that psychosocial adaptation requires addressing both emotional regulation and cognitive reframing (10, 26).

ACT's value-based interventions are especially beneficial for this group, as they help participants identify meaningful life directions and reengage with goals that transcend disability-related limitations (22, 23). Through the cultivation of mindfulness and committed action, individuals learn to align their behaviors with personal values rather than with avoidance or self-criticism (14, 17). Group-based ACT interventions have also been shown to foster a sense of shared understanding and psychological safety, which are critical for individuals experiencing chronic stigma or isolation (9, 27).

In recent years, the application of ACT to anger management has expanded beyond clinical populations to include adolescents, trauma survivors, and individuals with neurological or developmental disabilities (21, 26). In people with intellectual or physical impairments, ACT demonstrates efficacy comparable to or exceeding traditional cognitive–behavioral therapy (CBT) in reducing externalized aggression and improving emotional balance (16, 28). Furthermore, ACT has been adapted for telehealth and hybrid delivery modes, offering accessibility for individuals with mobility limitations (9, 19). These interventions highlight ACT's flexibility as an inclusive therapeutic framework for individuals who face compounded challenges of disability and emotional dysregulation.

The current psychological landscape increasingly recognizes anger rumination and hostile attribution bias as transdiagnostic factors linked to multiple forms of psychopathology (11, 12). Interventions that target

these cognitive mechanisms hold potential not only for reducing anger-related problems but also for enhancing overall emotional resilience and adaptive functioning. For women with physical–motor disabilities, addressing these maladaptive cognitive processes through ACT may yield multifaceted benefits, including greater acceptance of bodily limitations, enhanced emotional awareness, and improved interpersonal functioning (1, 14, 15).

Despite growing empirical support, research specifically focusing on ACT's effectiveness in reducing anger rumination, hostile attribution bias, and anger suppression in women with physical–motor disabilities remains scarce. Existing studies have primarily examined general psychological outcomes such as hope, resilience, or cognitive flexibility without isolating anger-related mechanisms (22, 23). Addressing this gap is crucial, as unregulated anger and hostile cognition not only impair emotional well-being but also hinder rehabilitation outcomes and social integration (7, 29).

Therefore, the present study aims to examine the effectiveness of Acceptance and Commitment Therapy (ACT) on hostile attribution bias, anger rumination, and anger suppression in women with physical–motor disabilities.

Methods and Materials

Study Design and Participants

The present study was a quasi-experimental research with a pretest–posttest design and a control group. The statistical population of this study included women aged 20 to 30 years with physical–motor disabilities residing in Bushehr County. Using purposive sampling, 30 individuals were selected and randomly assigned to experimental and control groups (15 participants in each group). The Acceptance and Commitment Therapy (ACT) intervention was administered to the experimental group in eight sessions, each lasting 90 minutes, while the control group did not receive any intervention.

The inclusion criteria were interest and consent to participate in the study, a minimum literacy level equivalent to fifth grade in elementary school, and being between 20 and 30 years old. The exclusion criteria included being absent from more than one therapy session, failure to complete research questionnaires, use of psychiatric medication, and unwillingness to continue participation in the study.

The research procedure was as follows: the study questionnaires were arranged systematically and administered to participants in both experimental and control groups before and after the ACT intervention. Before completing the questionnaires, participants were informed about the study procedure and were assured that all data would remain strictly confidential and collected anonymously. The study was conducted in full compliance with privacy and confidentiality principles, and informed consent was obtained from all participants prior to data collection. All stages of the research were carried out under the supervision of the university ethics committee, and no physical or psychological harm was inflicted on participants. The results were shared solely for scientific purposes without revealing participants' identities.

Data Collection

Hostile Attribution Bias Questionnaire (HDS): This questionnaire was developed by Arnot et al. (2003) and consists of 20 items. It is scored on a five-point Likert scale ranging from "strongly agree = 5" to "strongly disagree = 1." Items 3, 8, 11, and 15 are reverse-scored. Construct validity was examined through

confirmatory factor analysis, with CFI, AGFI, and GFI indices of 0.92, 0.92, and 0.95, respectively, indicating good fit, while RMSEA and RMR values of 0.064 and 0.042, respectively, indicated relatively good model fit (Diduči Hazar et al., 2019). Arnot et al. (2003) assessed reliability using the test–retest method, reporting a significant positive correlation of 0.79 between two testing stages. In the study by Khansazi et al. (2022), the Cronbach's alpha coefficient for this questionnaire was 0.86. In the present study, reliability was calculated using Cronbach's alpha, yielding 0.74.

Anger Rumination Scale (ARS): This scale was developed by Sukhodolsky et al. (2001) and includes 19 items across four subscales: *angry thoughts* (items 7, 8, 9, 17, 18, 19), *thoughts of revenge* (items 4, 6, 13, 15), *angry memories* (items 1, 2, 3, 5, 14), and *understanding causes* (items 10, 11, 12, 16). The questionnaire is rated on a five-point Likert scale from "strongly disagree = 1" to "strongly agree = 5." Sukhodolsky et al. (2001) reported that exploratory factor analysis of the 19 items explained 54% of the total variance, with Cronbach's alpha reliability of 0.93 and test–retest reliability of 0.71. In a study by Mohseni (2013), the Cronbach's alpha coefficient for this questionnaire was 0.76, confirming its reliability. Similarly, in a study by Mahmoudi et al. (2014), concurrent validity coefficients of this scale with the Buss–Perry Aggression Questionnaire (1992) were 0.49, and Cronbach's alpha was 0.90. In the present study, the Cronbach's alpha coefficient for this questionnaire was 0.72.

State–Trait Anger Expression Inventory (STAXI-2): Developed by Spielberger (1993), this inventory consists of 57 items divided into three main sections: *state anger* (including subscales of angry feelings—items 1, 2, 3, 6, 10; verbal expression of anger—items 4, 9, 12, 13, 15; and physical expression of anger—items 5, 7, 8, 11, 14), *trait anger* (including angry temperament—items 16, 17, 18, 21; and angry reaction—items 19, 20, 22, 23, 24, 25), and *anger expression and control* (including outward anger expression—items 27, 31, 35, 39, 43, 47, 51, 55; inward anger expression—items 29, 33, 37, 41, 45, 49, 53, 57; outward anger control—items 26, 30, 34, 38, 42, 46, 50, 54; and inward anger control—items 28, 32, 36, 40, 44, 48, 52, 56). Responses are rated on a four-point Likert scale ranging from "almost never" to "almost always."

For norming and psychometric evaluation, Spielberger et al. (1993) administered STAXI-2 to 1,644 healthy adults and 276 psychiatric patients. Based on collected data, means, standard deviations, alpha coefficients, percentile ranks, and T-scores for each scale and subscale were reported in the manual. The concurrent validity of the *trait anger* scale was confirmed through a study on 280 undergraduate students and 270 navy soldiers who completed the STAXI, hostility scales, and MMPI hostility measures. The correlation coefficients between *trait anger* and hostility measures ranged from 0.32 to 0.71 among male students and from 0.31 to 0.66 among soldiers, all statistically significant. In the present study, reliability of this questionnaire was confirmed with a Cronbach's alpha coefficient of 0.75.

Intervention

The intervention was conducted over eight 90-minute weekly sessions for two months, following the Acceptance and Commitment Therapy (ACT) protocol developed by Bond et al. (2011). During the first session, participants were introduced to one another, group rapport and confidentiality were established, group rules were explained, empathy was fostered, clients' distress was explored, and the "two mountains" metaphor was introduced. The second session focused on explaining the "worlds" metaphor to enhance self-

awareness and included a mindfulness breathing exercise. In the third session, participants learned about control issues, clean and dirty suffering, and inner versus outer worlds through metaphors. The fourth session emphasized acceptance using the "psychological space" metaphor to expand mental flexibility. The fifth session explained the effects of acceptance and how to live according to personal values through metaphoric exercises. In the sixth session, participants identified and clarified their values using related metaphors. The seventh session explored the distinction between the conceptualized self and the observing self through the "chessboard" metaphor and a mindful walking exercise. Finally, the eighth session taught problem-solving strategies for external difficulties and methods to address internal obstacles to living according to one's values and commitments, again using metaphors to consolidate learning and application.

Data Analysis

After collecting the completed questionnaires, data were analyzed using multivariate analysis of covariance (MANCOVA) via SPSS software version 26.

Findings and Results

The mean age of the participants in this study was 24.10 years, with a standard deviation of 2.98. Regarding educational level, 10 participants (33.3%) had less than a high school diploma, 8 participants (26.7%) held a high school diploma, 7 participants (23.3%) had an associate degree, 3 participants (10%) held a bachelor's degree, and 2 participants (6.7%) held a master's degree.

Table 1. Mean and Standard Deviation of Hostile Attribution Bias, Anger Rumination, and Anger Suppression in Experimental and Control Groups in Pretest and Posttest

Group	Variable	Component	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD
Experimental	Hostile attribution bias	–	128.60	14.55	84.60	10.52
	Anger rumination	Angry thoughts	21.93	4.13	10.66	2.38
		Revenge thoughts	14.13	2.79	7.33	1.34
		Angry memories	18.26	3.05	8.66	1.63
		Identifying causes	13.53	2.69	6.86	1.72
		Total anger rumination	67.86	10.62	33.53	3.62
	Anger suppression	State anger	45.20	6.55	24.40	3.13
		Trait anger	31.53	3.37	17.80	2.93
		Anger expression and control	116.33	17.12	58.46	9.42
		Total anger suppression	193.06	17.73	100.66	12.73
Control	Hostile attribution bias	–	131.66	12.05	131.40	12.04
	Anger rumination	Angry thoughts	22.86	3.37	23.06	2.71
		Revenge thoughts	15.73	2.57	15.86	2.58
		Angry memories	18.66	3.37	18.66	3.37
		Identifying causes	14.53	3.44	14.33	3.30
		Total anger rumination	71.80	11.06	71.93	10.23
	Anger suppression	State anger	42.60	3.33	42.60	3.33
		Trait anger	31.06	3.47	31.06	3.47
		Anger expression and control	118.60	14.18	118.60	14.18
		Total anger suppression	192.26	16.42	192.26	16.42

The data in Table 1 show that the mean scores of the experimental group in hostile attribution bias, anger rumination, and anger suppression decreased from pretest to posttest. To examine the statistical significance

of these changes and determine the effectiveness of the experimental intervention, analysis of covariance (ANCOVA) was used.

Initially, the assumptions of ANCOVA, including normal distribution of data, homogeneity of variances, and homogeneity of regression slopes, were tested for all dependent variables.

The normality of data distribution was examined using the Kolmogorov–Smirnov test for hostile attribution bias (Z = 1.05, P = 0.21), anger rumination (Z = 0.87, P = 0.41), and anger suppression (Z = 0.71, P = 0.43). Since none of the results were statistically significant, the assumption of normal distribution was confirmed. Levene's test for equality of variances indicated homogeneity across groups for hostile attribution bias (F = 2.17, P = 0.14), anger rumination (F = 0.91, P = 0.34), and anger suppression (F = 2.23, P = 0.15). The assumption of homogeneity of regression slopes was tested by examining the significance of the group × pretest interaction effect for hostile attribution bias (F = 0.49, P = 0.61), anger rumination (F = 0.27, P = 0.14), and anger suppression (F = 1.50, P = 0.24). As all assumptions were met, conducting ANCOVA was appropriate and valid for examining the significance of observed changes.

Table 2. Results of Multivariate Analysis of Covariance (MANCOVA) for Research Variables

Source	Variable	Sum of Squares	df	Mean Square	F	P	Effect Size
Group	Posttest Hostile Attribution Bias	14,123.61	1	14,123.61	156.58	0.001	0.86
	Posttest Anger Rumination	9,237.05	1	9,237.05	370.05	0.001	0.93
	Posttest Anger Suppression	61,823.97	1	61,823.97	474.08	0.001	0.95
Pretest Hostile Attribution Bias	Posttest Hostile Attribution Bias	957.48	1	957.48	10.61	0.003	0.29
Pretest Anger Rumination	Posttest Anger Rumination	1,016.82	1	1,016.82	40.73	0.001	0.62
Pretest Anger Suppression	Posttest Anger Suppression	2,009.62	1	2,009.62	15.41	0.001	0.38
Error	Posttest Hostile Attribution Bias	2,254.96	25	90.19			
	Posttest Anger Rumination	624.03	25	24.96			
	Posttest Anger Suppression	3,260.15	25	130.40			
Total	Posttest Hostile Attribution Bias	369,928.00	30				
	Posttest Anger Rumination	96,134.00	30				
	Posttest Anger Suppression	712,552.00	30				

The results in Table 2 indicate that, after adjusting for the covariate (pretest), the performance of the experimental and control groups in posttest scores of hostile attribution bias (F = 156.58, P ≤ 0.001), anger rumination (F = 370.05, P ≤ 0.001), and anger suppression (F = 474.08, P ≤ 0.001) differed significantly. The posttest scores of the experimental group significantly decreased compared to the pretest, whereas no significant difference was found between pretest and posttest scores in the control group. These findings demonstrate the effectiveness of the experimental intervention (Acceptance and Commitment Therapy) in the experimental group. Additionally, the effect size indices indicate that 86% of the variance in hostile attribution bias scores, 93% of the variance in anger rumination scores, and 95% of the variance in anger suppression scores were attributable to the intervention.

Discussion and Conclusion

The findings of this study demonstrated that Acceptance and Commitment Therapy (ACT) significantly reduced hostile attribution bias, anger rumination, and anger suppression among women with physical–

motor disabilities. After controlling for pretest effects, participants in the experimental group showed a substantial decrease in all three variables compared to the control group. These results indicate that ACT was effective in improving emotional and cognitive regulation processes in this population by fostering greater psychological flexibility, acceptance of internal experiences, and adaptive value-based behavior. The findings are consistent with contemporary research showing that ACT reduces maladaptive cognitive–emotional processes, particularly those involving rigid thinking and emotional avoidance, which are common among individuals experiencing chronic physical and psychosocial stressors (16, 17, 21).

The significant reduction in hostile attribution bias aligns with the theoretical foundation of ACT, which emphasizes mindfulness and cognitive defusion as mechanisms for altering the function of maladaptive cognitions rather than their content. In this study, participants learned to observe their thoughts without judgment, thereby reducing the automatic interpretation of ambiguous social cues as threatening or hostile. This is consistent with evidence that mindfulness-based interventions and acceptance-oriented approaches can attenuate hostile interpretation patterns and reactive aggression by promoting awareness and non-reactivity (3, 24). Similarly, research by Vanwalleghem, Miljkovitch, and Vinter (10) found that individuals with developmental or intellectual limitations often exhibit heightened hostile intent attribution, which can be mitigated through therapeutic strategies that target perspective-taking and emotional awareness. ACT's experiential exercises, such as observing thoughts as transient mental events, may weaken the cognitive rigidity that sustains hostile attribution tendencies, leading to improved social cognition and interpersonal adjustment (4, 20).

The results regarding anger rumination further highlight ACT's capacity to disrupt repetitive negative thinking cycles. Participants in the experimental group reported marked decreases in the frequency and intensity of ruminative thoughts about anger-provoking events. ACT addresses rumination by cultivating acceptance of inner experiences and redirecting attention to present-moment awareness, which prevents the escalation of maladaptive cognitive loops. These findings are consistent with research indicating that rumination serves as a key mediator linking hostile attribution to psychological maladjustment (4, 12). Similarly, studies in both clinical and nonclinical populations have shown that ACT can reduce rumination and cognitive fusion, leading to lower emotional reactivity and distress (18, 21). The improvement observed in this study supports the notion that mindfulness and cognitive defusion foster a more flexible mental stance, enabling individuals to notice anger-related thoughts without becoming entangled in them (19, 20).

The reduction in anger suppression also corresponds with the principles of experiential acceptance and emotional openness inherent to ACT. Participants reported greater awareness and healthier expression of anger, rather than suppressing or internalizing it. These results are consistent with prior studies indicating that ACT decreases emotional suppression and promotes adaptive emotion regulation strategies in individuals with chronic health conditions (14, 16). Suppression has been shown to contribute to elevated physiological stress and reduced well-being, particularly among women with disabilities who face limited social support and greater emotional strain (7, 15). By contrast, the present study suggests that ACT provides an alternative pathway through mindful awareness and values-based action, which empowers individuals to acknowledge and express emotions safely. The combination of acceptance and value clarification facilitates transformation of anger into a motivational force for adaptive coping rather than a source of internalized tension (9, 22).

The observed improvements across all three dimensions—hostile attribution bias, anger rumination, and anger suppression—reflect the integrated nature of ACT in addressing both cognitive distortions and emotional regulation deficits. Previous meta-analyses confirm that ACT is effective in treating psychological distress associated with chronic physical conditions, including pain, fatigue, and mobility limitations (16, 18). The therapeutic mechanisms underlying these improvements can be attributed to enhanced psychological flexibility, which allows individuals to shift from experiential avoidance to acceptance, aligning behavior with personally meaningful values (17, 21). Through exercises involving metaphors and mindfulness, participants develop greater tolerance for uncomfortable emotions and learn to view them as part of a broader, valued life experience rather than as obstacles to be eliminated (20, 24).

Another explanation for the effectiveness of ACT in this population may lie in its contextual sensitivity to lived experience and identity. Women with physical–motor disabilities often encounter stigma, dependency, and social marginalization, which exacerbate feelings of helplessness and anger (5, 25). ACT's emphasis on self-as-context helps clients differentiate their sense of self from their physical conditions, fostering self-compassion and autonomy. This process aligns with prior research showing that ACT interventions enhance self-acceptance and reduce emotional distress among individuals with disabilities by reframing limitations as experiences to be lived with awareness rather than as defining features of identity (14, 23). Furthermore, the group-based delivery of ACT may have amplified therapeutic gains through social connection and shared understanding, reducing isolation and reinforcing commitment to behavioral change (9, 27).

These findings resonate with the broader literature demonstrating ACT's versatility across populations and conditions. For example, Faulkner et al. (17) reported similar effects in individuals with mild traumatic brain injury, where ACT led to improvements in emotional regulation and quality of life. In studies with caregivers of children with disabilities, ACT interventions also decreased psychological distress and improved coping through enhanced mindfulness and acceptance (20, 27). Comparable results have been observed in patients with fibromyalgia, where ACT reduced anger and depression by increasing acceptance of chronic pain (16). The present study extends these findings to women with physical–motor disabilities, emphasizing that the same mechanisms of change—acceptance, mindfulness, and value-based action—can successfully modify anger-related cognitive and emotional dysfunctions in this population.

The pattern of results is also supported by prior research highlighting the role of anger cognitions in mediating psychological adjustment. Scaini et al. (12) identified anger rumination and hostile cognitions as predictors of both internalizing and externalizing problems in adolescence, suggesting their transdiagnostic relevance. By addressing these cognitive processes, ACT not only reduces symptoms of anger but also promotes general emotional resilience. Similarly, Iselin et al. (4) found that rumination mediates the relationship between hostile attribution and maladjustment, reinforcing the importance of targeting both constructs simultaneously—a goal effectively achieved in the current study. These outcomes are consistent with the proposition that ACT modifies underlying processes of psychological inflexibility rather than merely suppressing symptoms (19, 21).

In relation to anger suppression, the results of this study echo the findings of Sharifi, Kakabrayi, and Afshariniya (14), who demonstrated that ACT enhances cognitive emotion regulation and reduces maladaptive strategies among individuals with physical disabilities. Similarly, Aghili and Gharaman Izadi (22) reported increased hope and reduced distress among women with chronic pain following ACT,

emphasizing the role of acceptance in mitigating anger and frustration arising from physical limitations. These parallels suggest that ACT is particularly effective for populations experiencing long-term physical constraints, where resistance to internal experiences often perpetuates suffering. Through mindfulness-based techniques and metaphoric exercises, participants in ACT learn to "make space" for difficult emotions, thereby breaking the cycle of suppression and rumination (18, 20).

The results also support the growing recognition that anger management in disability contexts requires interventions that go beyond behavioral control to encompass acceptance, meaning-making, and psychological flexibility. Traditional cognitive–behavioral techniques primarily focus on restructuring maladaptive thoughts, whereas ACT emphasizes changing the individual's relationship to those thoughts (16, 21). This functional approach may be particularly beneficial for individuals whose anger stems not from distorted cognition alone but from persistent psychosocial adversity. ACT's focus on values clarification allows participants to reorient their emotional energy toward meaningful goals, fostering empowerment and self-efficacy (22, 23).

From a theoretical standpoint, the present study contributes to a deeper understanding of how acceptance-based therapies address cognitive biases such as hostile attribution. Research suggests that hostile interpretations are maintained by automatic threat schemas and rigid self-concepts (10, 24). ACT facilitates defusion from these schemas by promoting flexible awareness and detachment from evaluative judgments, which may explain the observed reductions in hostility and anger suppression. The process of self-as-context, emphasized in ACT, encourages clients to view their experiences from a broader perspective, thereby weakening identification with transient emotional states (19, 20). Such mechanisms may underlie the substantial effect sizes observed in this study, indicating that ACT not only reduces anger but also restructures fundamental patterns of emotional appraisal.

The reduction in anger rumination observed here also aligns with cognitive neuroscience findings suggesting that mindfulness and acceptance interventions modulate neural circuits associated with self-referential processing and emotional reactivity (24). By decreasing the salience of anger-related thoughts, ACT may reduce activation in brain regions linked to rumination, such as the medial prefrontal cortex. Although this study did not include neurophysiological measures, the psychological changes observed are consistent with those documented in similar ACT-based interventions (17, 18).

Overall, these findings contribute to the growing body of evidence supporting ACT as an effective framework for addressing anger-related dysfunctions in populations with chronic disabilities. The integration of acceptance, mindfulness, and values-based commitment provides a comprehensive model that simultaneously targets emotional suppression, maladaptive cognition, and loss of agency. The improvements in hostile attribution bias, anger rumination, and anger suppression underscore the utility of ACT in restoring cognitive flexibility and emotional equilibrium, essential components for mental health and adaptive functioning among women with physical–motor disabilities (14, 22, 23).

Despite its promising results, this study has several limitations. First, the small sample size (N = 30) and the quasi-experimental design limit the generalizability of findings to broader populations of individuals with physical–motor disabilities. Second, the reliance on self-report instruments may have introduced response biases, including social desirability and recall bias, which could affect the accuracy of measured emotional constructs. Third, the study focused exclusively on women aged 20–30, limiting its applicability

to other age groups or to men with similar disabilities. Fourth, the intervention period of eight sessions, while effective, may not have captured long-term maintenance of therapeutic gains, as no follow-up data were collected. Lastly, the study did not include physiological or behavioral measures of anger expression, which could have provided a more comprehensive understanding of emotional regulation changes resulting from ACT.

Future research should employ randomized controlled trials with larger and more diverse samples to confirm the generalizability of these findings across gender, age, and disability types. Longitudinal studies with follow-up assessments are also necessary to evaluate the sustainability of ACT's effects over time. Incorporating mixed-method designs, including qualitative interviews, could provide deeper insight into participants' subjective experiences and the contextual factors influencing treatment outcomes. Neurocognitive and psychophysiological measures should also be included to explore the biological mechanisms underlying ACT's effects on anger regulation and cognitive biases. Comparative studies examining ACT alongside other interventions such as Cognitive Behavioral Therapy or Dialectical Behavior Therapy could help determine the unique contributions of mindfulness and acceptance processes.

Practitioners working with women with physical–motor disabilities should consider integrating Acceptance and Commitment Therapy into rehabilitation and counseling settings to address anger-related issues and cognitive rigidity. Group-based ACT sessions may be particularly beneficial for fostering mutual support and reducing social isolation. Therapists should emphasize experiential exercises that enhance mindfulness and value-based action, allowing clients to reframe their emotional experiences within the context of personal meaning. Training rehabilitation professionals in ACT principles can further promote holistic care that supports psychological flexibility, resilience, and adaptive coping among individuals facing chronic physical limitations.

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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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