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Comparison of Group Logotherapy and Acceptance and Commitment Therapy (ACT) Group Treatment on Pain Catastrophizing in Individuals with Chronic Pain

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ABSTRACT

Chronic pain is one of the most common medical problems worldwide, affecting a large number of individuals who often fail to find adequate treatment. The present study aimed to compare the effects of group logotherapy and group-based Acceptance and Commitment Therapy (ACT) on pain catastrophizing in individuals with chronic pain. This study employed a quasi-experimental design with pretest–posttest, follow-up, and a control group. The study population included all individuals with chronic musculoskeletal pain in the city of Qom who either visited the orthopedic specialist department of Ali ibn Abi Talib Hospital in Qom during the year 2025 or responded to the online recruitment call for the study. A total of 45 participants were purposefully selected and randomly assigned to three groups of 15 participants each, including two experimental groups (ACT group therapy and group logotherapy) and one control group. One experimental group received eight 90-minute sessions of ACT, and the other received eight 90-minute sessions of logotherapy. The control group received no intervention. The measurement instrument was the standardized Pain Catastrophizing Scale (PCS) (Sullivan, 1995). Data were analyzed using repeated-measures ANOVA and Bonferroni post hoc tests. The findings indicated that both ACT group therapy and group logotherapy significantly reduced pain catastrophizing in individuals with chronic pain during the posttest and follow-up phases. Based on the study findings, both ACT and logotherapy can be utilized by clinicians as effective interventions for reducing pain catastrophizing in individuals with chronic pain.

Key words: Chronic pain, pain catastrophizing, Acceptance and Commitment Therapy, logotherapy

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Introduction

Chronic pain is a pervasive and debilitating health problem that affects physical, psychological, and social functioning, and it is increasingly recognized as a multidimensional phenomenon rather than a purely biomedical condition (1). Among the psychological factors implicated in the maintenance and exacerbation of chronic pain, pain catastrophizing has received particular attention as a robust cognitive–affective predictor of pain-related outcomes (1, 2). Pain catastrophizing is typically defined as a maladaptive set of

cognitions characterized by magnification of pain-related threat, persistent rumination about pain, and feelings of helplessness in the face of pain (1). Empirical evidence indicates that higher levels of catastrophizing are associated with greater pain intensity, emotional distress, functional disability, and poorer treatment response across a range of chronic pain conditions (2, 3).

Research on chronic musculoskeletal and neuropathic pain consistently shows that catastrophizing is one of the strongest psychological predictors of pain interference, work limitations, and reduced quality of life (3, 4). In patients with chronic low back pain and obesity, for example, pain catastrophizing and kinesiophobia jointly predict pain-related disability and higher pain intensity, even after controlling for biomedical variables (3). Other studies have highlighted that catastrophizing contributes to fear-avoidance beliefs, which in turn foster inactivity, deconditioning, and a vicious cycle of increased pain and disability (4). At the same time, health psychology research suggests that catastrophizing is not merely a cognitive style but is intertwined with broader affective vulnerability, including anxiety, depression, and negative affect (5, 6).

The clinical relevance of catastrophizing is further underscored by findings that it shapes important medical outcomes, such as opioid consumption and postoperative recovery. In patients undergoing spine surgery, higher preoperative catastrophizing predicts greater in-hospital opioid use, more intense pain, and poorer quality of recovery, even after accounting for anxiety and depressive symptoms (5). In personality research, catastrophizing and negative affect have been shown to mediate the association between borderline personality traits and pain outcomes, highlighting how emotional dysregulation can be translated into maladaptive pain-related cognitions (6). Recent work has also identified interoceptive awareness, illness perception, and socio-demographic and clinical factors as important determinants of catastrophizing, suggesting a complex interplay between bodily awareness, cognitive appraisal, and contextual variables in chronic pain populations (7, 8).

From a health services and psychosomatic perspective, there is strong evidence that catastrophizing is linked not only to subjective suffering but also to broader health outcomes and healthcare utilization. Longitudinal and cross-sectional studies have shown that higher pain catastrophizing is associated with greater functional impairment, reduced adherence to treatment, and poorer general health indices (2, 3). Catastrophizing is also a relevant process in mixed medical and functional syndromes such as functional dyspepsia, where the addition of group psychotherapeutic interventions to medical treatment improves psychological and somatic outcomes (9). These findings highlight the need to integrate evidence-based psychological interventions into routine multidisciplinary care for chronic pain patients (10).

Given the central role of catastrophizing in chronic pain, many contemporary interventions explicitly target cognitive–affective processes, of which Acceptance and Commitment Therapy (ACT) has emerged as a prominent third-wave behavioral approach. ACT conceptualizes chronic pain-related suffering as rooted in experiential avoidance, cognitive fusion, and a narrowed behavioral repertoire that is disconnected from personally valued directions (11). Rather than attempting to reduce pain intensity directly, ACT focuses on enhancing psychological flexibility through acceptance of unpleasant internal experiences, cognitive defusion, mindfulness, self-as-context, values clarification, and committed action (11, 12). Systematic reviews and meta-analyses show that ACT for chronic pain produces small-to-moderate improvements in

pain interference, emotional distress, and catastrophizing, often comparable to other active psychotherapies (11).

Clinical studies in interdisciplinary and outpatient settings have demonstrated that ACT-based rehabilitation programs can lead to meaningful reductions in pain catastrophizing and distress, alongside improvements in functioning and quality of life (10). Group-based ACT has also been applied successfully to other health-related problems such as severe health anxiety, where changes in cognitive processes and avoidance patterns mediate reductions in anxiety and functional impairment (13). In the Iranian context, several quasi-experimental and clinical trials have shown that ACT is effective in reducing distress, catastrophizing, and pain intensity in patients with chronic physical conditions such as diabetes, multiple sclerosis, fibromyalgia, and irritable bowel syndrome (14-18). ACT-based group interventions have also improved broader psychosocial outcomes, including responsibility, self-efficacy, and adherence in vulnerable groups such as divorced women and patients with chronic gastrointestinal disorders (15, 19).

Despite these promising findings for ACT, there is growing interest in exploring whether meaning-centered approaches rooted in existential and humanistic traditions may offer complementary or even superior benefits for some chronic illness populations. Meaning therapy and other logotherapy-inspired interventions conceptualize suffering as a challenge to one's sense of life meaning, purpose, and values, and aim to help patients reconstruct a sense of coherence and significance in the face of adversity (20). Meta-analytic evidence indicates that psychological meaning-centered therapies can significantly enhance quality of life and reduce psychological stress in individuals facing serious health-related and existential challenges (20).

In health and psychiatric settings, meaning-centered and logotherapy-based programs have been used to address self-stigma, depression, and identity disruption in stigmatized groups such as housewives living with HIV/AIDS, emphasizing the role of meaning, identity reconstruction, and family psychoeducation in recovery (21). In oncology and chronic disease populations, meaning therapy has been associated with reduced death anxiety, increased pain acceptance, and lower levels of pain catastrophizing and perceived pain severity (22). Studies on patients with multiple sclerosis and other chronic neurological conditions suggest that meaning therapy can improve resilience, hope, and general well-being, even under prolonged stressors such as the COVID-19 pandemic (23, 24).

Empirical work conducted in Iran has begun to compare meaning therapy directly with mindfulness-based and ACT-based approaches in patients with chronic pain and neurological disorders. For example, meaning therapy and mindfulness-based cognitive therapy have each been shown to enhance pain self-efficacy and quality of life in men with chronic headache, highlighting meaning-centered work as a viable alternative to other third-wave interventions (25). Likewise, comparative studies of meaning therapy and ACT-based training in patients with multiple sclerosis indicate that both approaches can enhance general well-being, although their specific mechanisms and profiles of change may differ (24). Similar comparative patterns have been observed for other outcomes, such as death anxiety, hopelessness, and resilience, suggesting that meaning-focused and ACT-based interventions may target overlapping yet distinct psychological processes (23).

At the same time, there is accumulating evidence that the success of psychological interventions in chronic pain hinges on their ability to modify key cognitive–affective mechanisms such as catastrophizing, fear

avoidance, and illness perception (1, 4, 7). Studies that explicitly measure catastrophizing as an outcome show that ACT can produce reductions in catastrophizing in chronic pain and medically ill populations by increasing acceptance, mindfulness, and engagement with valued activities (10, 11, 14, 16). Meaning-centered interventions, in contrast, may reduce catastrophizing by fostering a more coherent life narrative, reframing suffering as an opportunity for growth, and shifting attention from uncontrollable symptoms to personally significant projects and responsibilities (20, 22). However, direct head-to-head trials comparing the effects of ACT and meaning therapy on pain catastrophizing in chronic pain populations remain scarce, particularly in Iranian samples with chronic musculoskeletal pain (18, 25).

Research methodology texts in the humanities and social sciences emphasize the importance of rigorous quasi-experimental designs, appropriate sampling, and valid measurement strategies when comparing psychological interventions to ensure that observed differences can be attributed to the treatments rather than confounding factors (26). In line with these methodological recommendations, recent Iranian studies on chronic pain have used controlled group designs, standardized instruments such as the Pain Catastrophizing Scale, and systematic follow-up assessments to evaluate the stability of treatment gains (14, 17, 22). Building on this emerging evidence base, further comparative work is needed to clarify whether ACT, meaning therapy, or their combination yields the most robust and enduring reductions in catastrophizing and its components—magnification and rumination—among individuals with chronic musculoskeletal pain.

Considering the high prevalence and burden of chronic pain, the central role of catastrophizing in amplifying pain and disability, and the growing but still limited comparative evidence on ACT and meaning-centered interventions in Iranian clinical contexts (14, 17, 18, 22, 25), the present study was designed to compare the effectiveness of group-based Acceptance and Commitment Therapy and group meaning therapy on pain catastrophizing and its components in individuals with chronic pain.

Methods and Materials

Study Design and Participants

The present study was applied in terms of its objective and employed a quasi-experimental design with a pretest–posttest structure, a 3-month follow-up, and a control group. The study population consisted of all individuals with chronic musculoskeletal pain in the city of Qom who either visited the orthopedic specialist department of Ali ibn Abi Talib Hospital in Qom during the year 2025 or responded to the online recruitment call for participation in this study. The samples were selected through purposive sampling. To this end, an online announcement was distributed through virtual channels and pages in Qom Province, and individuals with chronic musculoskeletal pain were invited to complete the Pain Catastrophizing Scale either online or in person at the orthopedic specialist department of Ali ibn Abi Talib Hospital in Qom. Based on Delavar's recommendation that the minimum sample size for quasi-experimental studies is 15 participants per group (Delavar, 2020), a total of 45 individuals who scored below the mean on the questionnaire were selected.

Then, after applying inclusion and exclusion criteria, participants were randomly assigned to three groups of 15 people: two experimental groups (Acceptance and Commitment Therapy group and group logotherapy) and one control group. Inclusion criteria consisted of providing informed consent, having experienced musculoskeletal pain for at least three months and receiving a diagnosis from a specialist physician, persistence of pain during the week prior to the intervention, having at least a high school diploma, being

between 40 and 60 years of age, not receiving any psychological interventions during the group therapy phase, not having any diagnosed major psychological disorders based on a semi-structured interview and DSM-5 criteria, and scoring below the mean on the questionnaire. Exclusion criteria consisted of being absent for more than one session during the intervention period and having comorbid physical illnesses that could justify the severity of pain or comorbid psychiatric disorders (such as schizophrenia or bipolar disorder).

Ultimately, participants in the two experimental groups received eight sessions of ACT-based intervention and logotherapy. The sessions were conducted in person by the researcher at Rayan Psychology Clinic in Qom. During this period, the control group received no intervention. At the end of the intervention, all three groups—experimental and control—completed the posttest. In accordance with ethical principles, therapeutic sessions were offered to the control group after completion of the study.

Measures

Pain Catastrophizing Scale (PCS): This standardized questionnaire consists of 13 items and was developed in 1995 by Sullivan et al. to measure the level of pain catastrophizing. The PCS assesses three subscales: rumination, magnification, and helplessness, and is scored on a Likert scale ranging from 0 to 4. The scale has no cut-off score, and higher total scores indicate greater levels of pain catastrophizing. The Cronbach's alpha coefficient for the total scale is 0.87, and for the subscales of rumination, helplessness, and magnification is 0.87, 0.79, and 0.60, respectively (Sullivan et al., 1995). In an Iranian sample, Cronbach's alpha coefficients were reported as 0.84 for the total scale, 0.65 for rumination, 0.81 for helplessness, and 0.53 for magnification.

Intervention

The Acceptance and Commitment Therapy (ACT) group protocol was implemented in eight 90-minute weekly sessions based on the treatment protocol of Hayes et al. (2013) by the researcher for the experimental group, with a pretest administered before the intervention and a posttest after completion of the full protocol. The first session focused on initial acquaintance among group members and with the therapist, establishing rapport, introducing ACT, clarifying treatment goals, setting group rules, providing psychoeducation about chronic physical pain, reviewing previous treatments, and discussing their costs and benefits. In the second session, the therapist reviewed experiences from the previous session and home assignments, obtained feedback, facilitated discussion of patients' experiences and their evaluations, assessed willingness to change, explored expectations from ACT, induced creative hopelessness, and concluded with a summary and new home assignment. The third session involved reviewing prior experiences and feedback, identifying ineffective control and avoidance strategies and their futility, explaining the concept of acceptance and its distinction from failure, despair, denial, and resistance, discussing struggles around accepting illness, and summarizing and assigning home practice. In the fourth session, after reviewing prior practice and feedback, the focus was on behavioral tasks and commitment, introducing and clarifying self-as-content fusion and cognitive defusion, practicing defusion techniques, intervening in problematic verbal chains and metaphors, and weakening overidentification with thoughts and emotions, followed again by summary and homework. The fifth session emphasized demonstrating the

distinction between self, inner experiences, and behavior, cultivating self-as-context, and weakening rigid self-concept and self-narratives; participants practiced focusing mindfully on activities such as breathing and walking, maintaining moment-to-moment awareness of their internal states, and observing emotions, sensations, and cognitions nonjudgmentally as they arise and pass, with subsequent summarizing and homework assignment. In the sixth session, the therapist reviewed prior experiences and feedback, helped patients identify and clarify their life values, focus on these values and their own power of choice, and used mindfulness strategies with emphasis on present-moment awareness, again ending with summary and homework. The seventh session involved reviewing experiences, deepening work on each person's values, explaining the difference between values and goals and common mistakes in value selection, discussing internal and external barriers to pursuing values, highlighting the risks of over-focusing on outcomes, and assigning final home practice. In the eighth session, the group worked on understanding the nature of willingness and commitment (training commitment to action), identifying value-consistent behavioral plans and building commitment to enact them, explaining the concept of relapse and preparing strategies to cope with it, reviewing assignments and summarizing the entire course with the participants, sharing group members' experiences and both achieved and unmet expectations, expressing gratitude for participation, and finally administering the posttest.

The group logotherapy protocol was also implemented in eight 90-minute weekly sessions based on the treatment protocol of Britt-Bart and Potito (2014) by the researcher for the experimental group, with a pretest administered before the intervention and a posttest after completion of the protocol. In the first session, the leader and group members were introduced, patients shared the story of their illness, they were asked to define "meaning" in their own words, and then a scientific definition of meaning was presented; an experiential exercise on a "meaningful moment" was conducted, followed by a homework assignment. In the second session, feedback was obtained on the first session and homework, methods for finding, maintaining, and enhancing meaning were discussed, and an exploratory exercise was performed on "identity and who I am" and "identity and illness," with a new homework task assigned. The third session focused on meaning in a historical context, exploring "the meaning of one's life in the past, present, and future," and included an exercise titled "life as a legacy that has been given to us," emphasizing the past, followed by homework. In the fourth session, the third session was analyzed, and historical sources of meaning were examined, conceptualizing life as a legacy that is given both in the present moment and in the future; an experiential exercise was conducted and homework was assigned. The fifth session analyzed the previous session and explored attitudinal sources of meaning, including an exploratory exercise focused on the present and future, again ending with homework. The sixth session involved analyzing the fifth session, working on creative sources of meaning, and conducting an exploratory exercise on the nature of creativity and the nature of responsibility, followed by homework. In the seventh session, the therapist and group analyzed the sixth session and examined experiential sources of meaning, emphasizing "connecting with life through love, beauty, and humor," and a final homework task was given. In the eighth session, the group reflected on the previous session, engaged in discussion and examination of "legacy projects," shared and received feedback on patients' group experiences, elaborated on meaningful moments in life, completed the posttest, expressed thanks to the group members, and formally closed the group.

Data Analysis

For data analysis, descriptive and inferential statistical indices were used, including frequency, mean, standard deviation, repeated-measures ANOVA, and the Bonferroni post hoc test. Data analysis was performed using SPSS version 25.

Findings and Results

Given the experimental method and the pretest–posttest multi-group design, to test the study hypotheses, a univariate analysis of covariance with Bonferroni post hoc tests was used to compare the effects of the two therapeutic interventions—group logotherapy and group-based Acceptance and Commitment Therapy—on the reduction of pain catastrophizing in individuals with chronic pain.

Before running this test, its assumptions were examined. The Kolmogorov–Smirnov test for assessing the normality assumption showed that the distribution of the pain catastrophizing variable in all three study groups at all three measurement stages was normal, with significance levels greater than .05. Levene's test, with significance levels greater than .05, confirmed the equality of variances in all three groups and at all three measurement stages. The regression slope assumption for all three variables was confirmed using an analysis of variance test with significance levels greater than .05.

In the following, the statistical findings are reported as descriptive findings (frequency, mean, and standard deviation) separately for the study groups, and as inferential findings (univariate analysis of covariance with Bonferroni post hoc tests).

Table 1. Descriptive findings for the pain catastrophizing variable by the three study groups (n = 15)

Variable	Group	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD	Adjusted Mean	Follow-up Mean	Follow-up SD
Pain catastrophizing	Group logotherapy	50.80	6.43	45.53	6.40	43.17	45.46	6.32
Pain catastrophizing	ACT group therapy	48.86	6.46	44.73	6.45	44.09	44.86	6.06
Pain catastrophizing	Control	45.33	6.23	45.26	6.61	48.27	–	–
Magnification	Group logotherapy	25.60	3.60	23.53	3.22	22.35	23.26	3.21
Magnification	ACT group therapy	24.60	3.43	22.46	2.99	22.21	22.86	3.75
Magnification	Control	22.93	3.26	22.40	3.60	23.83	–	–
Rumination	Group logotherapy	25.20	3.34	22.00	3.48	20.72	22.20	3.44
Rumination	ACT group therapy	24.26	3.19	22.26	3.89	21.99	22.00	2.87
Rumination	Control	22.40	3.22	22.86	3.13	24.42	–	–

Table 1 shows the descriptive findings for the pain catastrophizing variable by the three study groups. The mean and standard deviation of pain catastrophizing in the logotherapy group at the pretest stage were 50.80 and 6.43, respectively; at the posttest stage they were 45.53 and 6.40; and at follow-up they were 45.46 and 6.32.

The mean and standard deviation of pain catastrophizing in the Acceptance and Commitment Therapy group at the pretest stage were 48.86 and 6.46, respectively; at the posttest stage they were 44.73 and 6.45; and at follow-up they were 44.86 and 6.06.

The mean and standard deviation of pain catastrophizing in the control group at the pretest stage were 45.33 and 6.23, respectively, and at the posttest stage they were 45.26 and 6.61.

Table 2. Results of univariate analysis of covariance for comparing the three study groups on pain catastrophizing

Dependent Variable	Source	Sum of Squares	df	Mean Square	F	p	Effect Size (η^2)	Power
Pain catastrophizing	Pretest	1692.03	1	1692.03	894.29	.001	.95	1.00
	Group	196.61	2	98.31	51.96	.001	.72	1.00
	Error	77.57	41	1.89	–	–	–	–
	Total	93621.00	45	–	–	–	–	–

As shown in Table 2, the difference in adjusted mean scores of the three groups on pain catastrophizing is significant ($F = 51.96$, $p < .01$). This finding indicates that there is a significant difference between the experimental and control groups in the mean pain catastrophizing score. The statistical power for pain catastrophizing is 1.00, which indicates an adequate sample size for this conclusion. The eta coefficient shows that 72% of the variance in pain catastrophizing is attributable to the treatments.

To determine the differences between the groups, the Bonferroni post hoc test was used. Table 3 presents the results of this analysis.

Table 3. Summary of Bonferroni post hoc test results comparing group mean differences on pain catastrophizing

Dependent Variable	Group 1	Group 2	Mean Difference	Standard Error	p
Pain catastrophizing	Group logotherapy	ACT group therapy	-1.12	0.50	.095
Pain catastrophizing	Group logotherapy	Control	-5.18	0.53	.001
Pain catastrophizing	ACT group therapy	Control	-4.05	0.51	.001

Table 3 shows that the mean differences between each of the two treatment groups and the control group are significant ($p < .01$). Given that the adjusted means of both experimental groups are lower than that of the control group (48.25), it can be concluded that both therapeutic interventions—group logotherapy and group-based Acceptance and Commitment Therapy—are effective in reducing pain catastrophizing in individuals with chronic pain.

The difference in mean pain catastrophizing between the two treatment groups is not significant ($p > .05$). Therefore, it can be stated that the effects of group logotherapy and Acceptance and Commitment Therapy in reducing pain catastrophizing are approximately the same.

In the next step, repeated-measures analysis of variance was used to examine the long-term stability of the effects of both therapeutic interventions.

Table 4. Results of repeated-measures analysis of variance for examining the stability of the effects of group logotherapy and ACT group therapy on pain catastrophizing

Treatment Type	Source	Sum of Squares	df	F	p	Effect Size (η^2)	Power
Logotherapy	Stages	280.93	1	230.45	.001	.94	1.00
	Error	17.07	18.33	–	–	–	–
ACT group therapy	Stages	165.51	2	71.32	.001	.83	1.00
	Error	32.49	28	–	–	–	–

Based on the results in Table 4, the F ratio from repeated-measures analysis of variance across the three stages shows that there is a significant difference among the three measurement stages in the group

logotherapy condition (F = 230.45, p < .01) and in the Acceptance and Commitment Therapy group (F = 71.32, p < .01). The results of the Bonferroni pairwise comparison test are presented in Table 5.

Table 5. Results of Bonferroni post hoc test in the group logotherapy and ACT group therapy conditions on pain catastrophizing

Dependent Variable	Group	Stage 1	Stage 2	Mean Difference	Standard Error	p
Pain catastrophizing	Group logotherapy	Pretest	Posttest	5.27	0.31	.001
		Pretest	Follow-up	5.33	0.35	.001
		Posttest	Follow-up	0.07	0.15	.96
Pain catastrophizing	ACT group therapy	Pretest	Posttest	4.13	0.41	.010
		Pretest	Follow-up	4.00	0.47	.001
		Posttest	Follow-up	-0.13	0.29	.95

As shown in Table 5, in the group logotherapy condition there is a significant difference between the pretest and posttest stages with a mean difference of 5.27, and between the pretest and follow-up stages with a mean difference of 5.33 (p < .01). Therefore, group logotherapy has a significant effect on reducing pain catastrophizing in individuals with chronic pain. There is no significant difference between the posttest and follow-up stages, with a mean difference of 0.07 and a significance level of .96 (p > .05), indicating that the effect of group logotherapy on reducing pain catastrophizing in individuals with chronic pain is stable in the long term.

In the Acceptance and Commitment Therapy group, there is a significant difference between the pretest and posttest stages with a mean difference of 4.13, and between the pretest and follow-up stages with a mean difference of 4.00 (p < .01). Thus, Acceptance and Commitment Therapy has a significant effect on reducing pain catastrophizing in individuals with chronic pain. There is no significant difference between the posttest and follow-up stages, with a mean difference of -0.13 and a significance level of .95 (p > .05). Therefore, the effect of Acceptance and Commitment Therapy on reducing pain catastrophizing in individuals with chronic pain is also stable in the long term.

Next, multivariate analysis of covariance was used to compare the effects of the therapeutic interventions on the components of pain catastrophizing. The results of multivariate analysis of covariance showed that there is a significant difference among the three study groups in the linear combination of the two components of pain catastrophizing (p < .01, F = 12.46, Pillai's Trace = .77).

Table 6. Results of univariate analysis of covariance within the multivariate analysis for comparing the three study groups on the components of pain catastrophizing

Dependent Variable	Source	Sum of Squares	df	Mean Square	F	p	Effect Size (η^2)	Power
Magnification	Pretest	33.11	1	33.11	21.39	.001	.35	.99
	Group	22.13	2	11.06	7.15	.002	.26	.91
	Error	61.91	40	1.55	–	–	–	–
Rumination	Pretest	40.04	1	40.04	24.90	.001	.59	.99
	Group	92.75	2	46.37	28.84	.001	–	1.00
	Error	23061.00	40	1.61	–	–	–	–

As shown in Table 6, the adjusted mean scores of the three groups differ significantly on both components of pain catastrophizing. This finding indicates that there is a significant difference between the experimental and control groups in the mean scores of the pain catastrophizing components. The eta coefficients show that 26% and 59% of the variance in magnification and rumination, respectively, are attributable to the treatments.

The results of the Bonferroni post hoc test indicated that, for the magnification component, there was no significant difference between the logotherapy and Acceptance and Commitment Therapy groups ($p > .05$). Therefore, based on the adjusted means, it can be concluded that there is no significant difference between the two therapeutic interventions in reducing magnification.

For the rumination component, there was a significant difference between the two experimental groups at the .01 alpha level ($p < .01$). Given that the adjusted mean of the logotherapy group was lower than that of the Acceptance and Commitment Therapy group (Table 1), it can be concluded that the effect of group logotherapy on reducing rumination is significantly greater than that of Acceptance and Commitment Therapy.

Next, repeated-measures analysis of variance was used to examine the long-term stability of the effects of both therapeutic interventions on the components of pain catastrophizing (Table 7).

Table 7. Results of repeated-measures analysis of variance for examining the stability of the effects of group logotherapy and ACT group therapy on the components of pain catastrophizing

Dependent Variable	Treatment Type	Source	Sum of Squares	df	F	p	Effect Size (η^2)	Power
Magnification	Logotherapy	Stages	48.93	2	24.47	.001	.58	1.00
		Error	35.73	–	–	–	–	–
Magnification	ACT group therapy	Stages	38.58	2	12.07	.001	.46	.99
		Error	44.75	–	–	–	–	–
Rumination	Logotherapy	Stages	96.40	2	35.89	.001	.72	1.00
		Error	37.60	–	–	–	–	–
Rumination	ACT group therapy	Stages	46.04	2	10.99	.001	.44	.98
		Error	58.62	–	–	–	–	–

Based on the results in Table 7, the F ratios from repeated-measures analysis of variance across the three stages indicate that, in both the group logotherapy and Acceptance and Commitment Therapy conditions, there are significant differences among the three measurement stages for both magnification and rumination. According to the Bonferroni post hoc test results, in both the group logotherapy and Acceptance and Commitment Therapy conditions, for the magnification and rumination components, there were no significant differences between the follow-up and posttest stages ($p > .05$). Therefore, the effects of group logotherapy and Acceptance and Commitment Therapy remain stable over the long term.

Discussion and Conclusion

The purpose of this study was to compare the effectiveness of group-based Acceptance and Commitment Therapy (ACT) and group meaning therapy on reducing pain catastrophizing and its components—magnification and rumination—among individuals with chronic musculoskeletal pain. The findings demonstrated that both interventions produced significant reductions in total pain catastrophizing scores immediately after treatment and at follow-up, indicating that both ACT and meaning-centered approaches have stable and enduring therapeutic effects. Moreover, while both interventions were effective in reducing magnification, meaning therapy showed a significantly stronger effect in decreasing rumination, suggesting differential mechanisms of change across treatment modalities. These results offer important insights into the cognitive–affective processes linked to chronic pain and support the integration of psychological interventions targeting maladaptive thought patterns into multidisciplinary pain management.

The overall reductions in catastrophizing observed in both intervention groups align with a large body of literature demonstrating that psychological interventions, especially ACT-based programs, meaning-centered therapies, and other third-wave approaches, can meaningfully reduce maladaptive cognitions associated with chronic pain (10, 11, 20). The present findings are consistent with research showing that ACT reduces cognitive fusion, avoidance, and distress in chronic pain conditions, leading to decreased catastrophizing and improved functioning (14, 16). By cultivating psychological flexibility, ACT directly targets mechanisms known to maintain catastrophizing, including the tendency to over-identify with pain-related thoughts and the habitual avoidance of discomfort (11, 12). The sustained reductions observed at the three-month follow-up also correspond to evidence that ACT-related changes are often stable over time because they involve shifts in core processes rather than symptom-specific strategies (13).

The findings also show that meaning therapy effectively reduced pain catastrophizing, corroborating empirical evidence that existentially oriented interventions enhance resilience, shape adaptive appraisal of suffering, and improve psychosocial outcomes in chronic illness (20, 22). Meaning therapy conceptualizes pain and suffering as challenges to one's sense of purpose and identity, which may help patients interpret pain as controllable or meaningful rather than overwhelming. This aligns with research suggesting that meaning-centered psychological therapies increase emotional stability, reduce distress, and promote adaptive coping by strengthening one's sense of coherence and existential meaning (21, 24). The reductions in catastrophizing found in this study are consistent with research demonstrating that meaning therapy decreases death anxiety, hopelessness, and maladaptive responses to chronic illnesses, often outperforming cognitive or behavioral approaches on existentially relevant outcomes (23, 25).

The comparative effectiveness of ACT and meaning therapy observed here also reflects broader findings in the literature indicating that both modalities influence catastrophizing but through different mechanisms. ACT focuses on mindfulness, acceptance, and defusion, allowing patients to loosen the grip of catastrophic thoughts by observing them without judgment (11, 12). In contrast, meaning therapy helps individuals reinterpret their experiences within a broader existential framework and shift attention away from symptom-focused thinking toward values, purpose, and life narratives (20). The similar overall reductions in catastrophizing across both interventions are consistent with Iranian studies that found comparable impacts of ACT and meaning-based interventions on well-being, psychological distress, and resilience in chronic illness populations (23, 24).

A particularly notable finding in this study is that meaning therapy produced greater reductions in the rumination component of catastrophizing. Rumination involves repetitive negative thinking about pain and is strongly associated with emotional distress and fear-avoidance patterns (1). Meaning therapy may be especially effective in addressing rumination because it challenges the underlying existential concerns and identity disruptions that often fuel repetitive negative thoughts. This interpretation is supported by research demonstrating that meaning-based interventions are uniquely effective in modifying identity-related cognitions, contextualizing suffering, and reducing persistent negative ideation (20, 21). Additionally, studies of meaning-centered treatments for patients with chronic or terminal medical conditions suggest that exploring past, present, and future sources of meaning encourages cognitive reframing and shifts attention away from persistent worry and distress (22).

By contrast, ACT works to reduce rumination indirectly by promoting acceptance and cognitive defusion. Although ACT effectively reduces pain-related rumination, meaning therapy may have a distinctive ability to reshape core belief systems and narrative structures, leading to more substantial change in this domain. The present findings parallel those of Miragha Pour Tarrah et al. (25), who reported that meaning therapy led to greater improvement than mindfulness-based cognitive therapy in certain cognitive outcomes related to pain. This suggests that existentially oriented interventions may produce deeper shifts in thought patterns specifically tied to meaning, worry, and repetitive cognition.

The stable improvements found at follow-up in both treatment groups suggest that ACT and meaning therapy produce enduring cognitive change, consistent with previous research showing that reductions in catastrophizing tend to mediate long-term improvements in pain, functioning, and emotional well-being (2, 4). ACT's maintenance of effects aligns with evidence indicating that psychological flexibility is a durable trait-like capacity that continues to improve after treatment as individuals integrate mindful awareness and values-based action into daily life (10). Similarly, meaning therapy's long-term impact is consistent with the notion that once individuals clarify values and reconstruct meaning frameworks, existential understanding continues to guide coping behavior over time (20).

This study also contributes to the growing literature emphasizing the importance of examining catastrophizing components separately rather than solely focusing on total scores. Research suggests that magnification and rumination are differentially associated with disability, emotional reactivity, and treatment responsiveness (3, 6). The current findings support this distinction by revealing that while both therapies reduced magnification similarly, meaning therapy had a superior effect on rumination. This pattern parallels observations in prior work demonstrating that existential interventions are more effective than acceptance-based or cognitive-based treatments in shifting deeply ingrained negative thought loops tied to self-concept and life purpose (22, 24).

The results also resonate with studies identifying psychosocial predictors of catastrophizing. Research shows that catastrophizing correlates with negative affect, identity disruption, and maladaptive illness perceptions (6-8). Meaning therapy may have exerted its stronger impact on rumination because it targets these psychosocial and existential variables more directly. By helping participants reframe their suffering and reconnect with meaningful life domains, meaning therapy likely enhanced personal coherence and reduced the cognitive preoccupation characteristic of rumination.

The reductions in catastrophizing observed in this study also align with Iranian research showing that ACT-based group interventions reduce pain intensity, improve treatment adherence, and lower emotional distress in patients with irritable bowel syndrome, multiple sclerosis, diabetes, and fibromyalgia (14-17). Likewise, meaning therapy has been shown to improve psychological well-being, reduce death anxiety, and increase resilience in chronic illness populations (22, 23). Together, these findings underscore the relevance of both models in chronic pain treatment and justify continued comparative research to refine clinical decision-making.

Furthermore, the methodological rigor of this study, including pretest–posttest–follow-up assessments and controlled group design, aligns with recommended standards for intervention research in psychology (26). Similar designs have been used in Iranian chronic pain research, allowing for reliable cross-study comparisons (14, 22). The stable follow-up effects observed here further strengthen the evidence base

supporting ACT and meaning therapy as viable approaches to addressing catastrophizing in chronic musculoskeletal pain.

This study had several limitations. The sample size was modest, which reduces the generalizability of the results to broader chronic pain populations. Participants were recruited from a single city and clinical setting, limiting diversity in demographic and socioeconomic backgrounds. The interventions were delivered by one therapist, which may introduce therapist-specific effects. Self-report measures were used to assess catastrophizing, raising the possibility of response bias. Additionally, the three-month follow-up period, although informative, does not capture longer-term maintenance of treatment effects.

Future studies should incorporate larger and more diverse samples to improve generalizability. Comparative trials across multiple clinical settings and with multiple therapists would clarify whether differences in outcomes are intervention-specific or therapist-dependent. Research should also examine longer follow-up intervals to determine the durability of changes in catastrophizing. Including behavioral and physiological measures alongside self-reports may provide a more comprehensive understanding of treatment effects. Future work might explore hybrid interventions that integrate ACT and meaning therapy components to determine whether combined approaches yield enhanced benefits.

Clinicians treating chronic pain may consider offering both ACT and meaning therapy as effective interventions for reducing catastrophizing. Meaning therapy may be particularly useful for patients who struggle with repetitive negative thinking, identity disruption, or existential concerns. ACT may be especially appropriate for individuals experiencing avoidance, emotional reactivity, or difficulty engaging in valued behavior. Integrating these approaches into multidisciplinary pain rehabilitation programs could enhance patient outcomes and support more holistic care.

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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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References

1. Petrini L, Arendt-Nielsen L. Understanding Pain Catastrophizing: Putting Pieces Together. Frontiers in psychology. 2020;11:603420. doi: 10.3389/fpsyg.2020.603420.

2. Suso-Ribera C, García-Palacios A, Botella C, Ribera-Canudas MV. Pain Catastrophizing and Its Relationship with Health Outcomes: Does Pain Intensity Matter? Pain research & management. 2017;2017:9762864. doi: 10.1155/2017/9762864.

3. Varallo G, Giusti EM, Scarpina F, Cattivelli R, Capodaglio P, Castelnuovo G. The association of kinesiophobia and pain catastrophizing with pain-related disability and pain intensity in obesity and chronic lower-back pain. Brain Sciences. 2020;11(1):11. doi: 10.3390/brainsci11010011.

4. Doménech J, Angulo AE, Peñalver-Barrios L, Rio-González ED, Herrero R, García-Palacios A, et al. Catastrophizing and Fear Avoidance Beliefs in Chronic Low Back Pain: A Cross-Sectional Study. European Journal of Physical and Rehabilitation Medicine. 2025;61(2). doi: 10.23736/s1973-9087.25.08419-9.

5. Dunn LK, Durieux ME, Fernández LG, Tsang S, Smith-Straesser EE, Jhaveri HF, et al. Influence of catastrophizing, anxiety, and depression on in-hospital opioid consumption, pain, and quality of recovery after adult spine surgery. Journal of Neurosurgery Spine. 2018;28(1):119-26. doi: 10.3171/2017.5.SPINE173.

6. Stein A, Johnson BN, Kelly AG, Cheavens JS, McKernan LC. Negative Affect and Pain Catastrophizing Link Borderline Personality Disorder to Pain: Replicating and Extending the Borderline Personality Disorder–pain Association. Personality Disorders Theory Research and Treatment. 2025;16(2):173-83. doi: 10.1037/per0000704.

7. Hooshmandi R, Aljaberi MA, Hammadi F, Ma J. The Impact of Interoceptive Awareness on Pain Catastrophizing and Illness Perception. Journal of Personality and Psychosomatic Research (JPPR). 2024;2(2):4-10. doi: 10.61838/kman.jppr.2.2.2.

8. Asanova A, Хаустова O, Skrynnyk O, Mukharovska I. Psychological, Clinical and Socio-Demographic Predictors of Pain Catastrophizing in Chronic Pain Patients: Insights From a Cross-Sectional Study. International Neurological Journal. 2025;20(8):411-21. doi: 10.22141/2224-0713.20.8.2024.1124.

9. Orive M, Barrio I, Orive VM, Matellanes B, Padierna JA, Cabriada J, et al. A randomized controlled trial of a 10 week group psychotherapeutic treatment added to standard medical treatment in patients with functional dyspepsia. Journal of psychosomatic research. 2015;78(6):563-8. doi: 10.1016/j.jpsychores.2015.03.003.

10. Craner JR, Lake ES, Bancroft KA, George LL. Treatment outcomes and mechanisms for an ACT-based 10-week interdisciplinary chronic pain rehabilitation program. Pain Practice. 2020;20(1):44-54. doi: 10.1111/papr.12824.

11. Hughes LS, Clark J, Colclough JA, Dale E, McMillan D. Acceptance and Commitment Therapy (ACT) for Chronic Pain: A Systematic Review and Meta-Analyses. The Clinical Journal of Pain. 2017;33(6):552-68. doi: 10.1097/AJP.0000000000000425.

12. Duenas JA. Acceptance and Commitment Therapy for Adolescent Difficulties with Emotion Regulation: An Open Trial. Kalamazoo, Michigan: Western Michigan University; 2016.

13. Eilenberg T, Hoffmann D, Jensen JS, Frostholm L. Intervening variables in group-based acceptance & commitment therapy for severe health anxiety. Behaviour research and therapy. 2017;92:24-31. doi: 10.1016/j.brat.2017.01.009.

14. Imankhah R, Kharazai F, Sanagoh Maharrar G. Effectiveness of Group Psychotherapy Based on Acceptance and Commitment on Reducing Distress and Catastrophizing Pain in Diabetic Patients with Chronic Pain. Diabetes Nursing. 2019;8(1):1020-31.

15. Moqtadaei K, Ebrahimi A, Haghayegh SA, Rezaei Jamaloui H, Adibi P. Investigating the effectiveness of acceptance and commitment therapy on treatment compliance and pain intensity in patients with irritable bowel syndrome. Journal of Research in Behavioral Sciences. 2023;21(1):22-31.

16. Jahangiri F, Karimi J, Rouzbahani M, Razani M. Effectiveness of acceptance and commitment therapy with compassion-focused approach on pain catastrophizing and pain acceptance in patients with multiple sclerosis. Armagh Danesh. 2023;29(1):0-. doi: 10.61186/armaghanj.29.1.1.

17. Rasti L, Maredpour A. Comparison of the Effectiveness of Hypnotherapy and Acceptance and Commitment Therapy on Pain Intensity in Patients with Fibromyalgia in Tehran. Quarterly of Experimental and Cognitive Psychology. 2024;1(3):73-88.

18. Seif M, Golpour R, Abdollahzadeh H. Comparing the Effectiveness of Compassion Therapy and Acceptance and Commitment Therapy on the Body Image in Patients with Chronic Musculoskeletal Pain. International Journal of Musculoskeletal Pain Prevention. 2024;9(2):1043-50.

19. Hadian S, Havasi soomar N, Hosseinzadeh Taghvaei M, Ebrahimi MI, Ranjbaripour T. Comparing the effectiveness of acceptance and commitment therapy and reality therapy on the responsibility and self-efficacy of divorced women. Advances in Cognitive Sciences. 2023;25(3):47-63. doi: 10.30514/icss.25.3.47.

20. Vos J, Vitali D. The effects of psychological meaning-centered therapies on quality of life and psychological stress: A metaanalysis. Palliative and Supportive Care. 2018;16(5):608-32. doi: 10.1017/S1478951517000931.

21. Sri Suyanti T, Keliat BA, Helena Catharina Daulima N. Effect of logo-therapy, acceptance, commitment therapy, family psychoeducation on self-stigma, and depression on housewives living with HIV/AIDS. Enfermería Clínica. 2018;28(1):98-108. doi: 10.1016/S1130-8621(18)30046-9.

22. Haghdoust MR, Saraj Khorami N, Makundi B. Investigating the Effectiveness of Meaning Therapy on Death Anxiety, Catastrophizing Pain, Pain Acceptance, and Pain Severity in Patients with Prostate Cancer. Journal of Jundishapur Medical Sciences. 2021;20(3):216-25. doi: 10.32598/JSMJ.20.3.2538.

23. Esmkhani Akbari Nejad H, Bayrampour A, Faroughi P. Comparison of the Effectiveness of Meaning Therapy and Acceptance and Commitment Therapy on Death Anxiety, Resilience, and Hopelessness in Women with Multiple Sclerosis. Journal of Medical Sciences of Islamic Azad University. 2021;31(1):97-106.

24. Najafi E, Mousavi Pour S, Sajadi Nejad MA-S. Comparative Effectiveness of Meaning Therapy and Acceptance and Commitment-Based Training on the General Well-Being of Patients with Multiple Sclerosis During COVID-19. Journal of Disability Studies. 2023;13:62-.

25. Miragha Pour Tarrah A, Asadian K, Esmkhani Akbari Nejad H. Comparison of the Effectiveness of Mindfulness-Based Cognitive Therapy and Meaning Therapy on Pain Self-Efficacy and Quality of Life in Men with Chronic Headache. Anesthesia and Pain. 2024;15(1):1-12.

26. Delavar A. Theoretical and Practical Foundations of Research in Humanities and Social Sciences. Tehran: Roshd Publications; 2020.