



Effectiveness of Acceptance and Commitment Therapy on Pain Catastrophizing, Pain Self-Efficacy, and Psychological Flexibility in Individuals with Chronic Pain: A Quasi-Experimental Study

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1. Round 1

1.1 Reviewer 1

Reviewer:

In the Introduction, the sentence “Consequently, catastrophizing is not merely a description of pain-related thinking; it is a modifiable process that can influence how people respond to pain and whether they continue meaningful activity” is conceptually useful, but the manuscript should support this claim with more direct empirical evidence on catastrophizing as a mediator or treatment mechanism in chronic pain interventions. The current citation pattern is adequate for defining catastrophizing, but insufficient for establishing it as a change process within ACT.

In the second paragraph of the Introduction, the manuscript states that “The Acceptance and Action Questionnaire-II (AAQ-II) is often used to assess psychological inflexibility and experiential avoidance, with higher scores reflecting poorer flexibility.” Because the study interprets lower AAQ-II scores as improved psychological flexibility, the authors should

consistently refer to the measured construct as psychological inflexibility or experiential avoidance in the Methods and Results, while explaining that reductions indicate improved flexibility. This would prevent conceptual ambiguity between the construct targeted by ACT and the directionality of the measurement instrument.

In the final paragraph of the Introduction, the statement “The present study examined whether an eight-session online ACT group intervention could reduce pain catastrophizing and improve pain self-efficacy and psychological flexibility...” is clear, but the manuscript would benefit from explicit hypotheses. The authors should state directional hypotheses for each outcome and for maintenance at follow-up, because the statistical design includes repeated measurement and the interpretation depends on expected time-by-group effects.

In the Methods section, the paragraph beginning “Thirty eligible participants were selected using purposive sampling and then randomly assigned...” requires substantially more detail on the randomization process. The authors should specify the allocation method, concealment procedure, person responsible for assignment, whether block randomization was used, and whether allocation occurred after baseline assessment. Without these details, the claim of random assignment is difficult to evaluate.

In Table 3, descriptive changes are interpreted as “clinically meaningful,” for example “the descriptive results showed a clinically meaningful pattern of improvement.” The manuscript should either provide established minimal clinically important difference values for PCS, PSEQ, and AAQ-II or revise the wording to “descriptively substantial” or “statistically supported.” Clinical meaningfulness should not be asserted without reference to accepted thresholds or patient-centered outcomes.

In Table 4, ANOVA and Bonferroni pairwise comparisons are combined into one table, which makes the statistical presentation difficult to audit. The authors should separate inferential ANOVA results from post hoc comparisons and report full ANOVA parameters, including degrees of freedom, error terms, mean squares, exact p-values where possible, and partial eta-squared rather than the ambiguous “ η^2 .” This is necessary for APA-style reporting and for reproducibility.

In Table 4, the Bonferroni mean differences appear to be averaged across groups rather than presented within each group, yet the central claim depends on differential change between ACT and control conditions. The authors should clarify whether pairwise comparisons were conducted for the full sample, within the ACT group, within the control group, or for estimated marginal means by group. Ideally, post hoc tests should compare time points separately within each group and report between-group differences at posttest and follow-up.

Authors revised the manuscript and uploaded the updated document.

1.2 Reviewer 2

Reviewer:

In the Methods section, the sentence “The sample size was modest but acceptable for a preliminary quasi-experimental study” is too general and should be replaced by an a priori or post hoc power justification. The manuscript should report the assumed effect size, alpha level, power, number of groups, number of repeated measurements, expected attrition, and the software or formula used. Given the very large reported eta-squared values, the absence of power planning raises concern about effect-size inflation in a small sample.

In the participant eligibility paragraph, the inclusion criterion “experience of chronic pain for more than three months” is clinically appropriate but insufficiently specific. The authors should report pain diagnosis or pain location, pain duration

distribution, pain intensity at baseline, medication use, comorbid physical conditions, and whether participants had neuropathic, musculoskeletal, widespread, or mixed pain. Chronic pain is heterogeneous, and treatment response to ACT may differ substantially across pain conditions.

In the same Methods paragraph, the exclusion criteria do not mention severe psychiatric disorders, substance use disorders, suicidality, cognitive impairment, or unstable medical conditions. Because ACT involves emotional exposure, acceptance exercises, and group-based online participation, the authors should explain how psychological and medical safety were screened and monitored during the intervention.

In the intervention description, the sentence “The protocol was adapted from established ACT principles and clinical processes described by Hayes et al. (2012)” is too broad for reproducibility. The authors should specify whether a manual was used, who delivered the sessions, the therapist’s training and supervision, whether fidelity was assessed, and whether any sessions were recorded or independently rated. Treatment fidelity is especially important in ACT trials because competence in metaphors, experiential exercises, and values work strongly affects intervention quality.

In Table 1, the ACT protocol lists metaphors such as the “polygraph machine,” “chessboard,” “bus,” “train,” “beggar,” “tree planting,” and “bubble” metaphors, but the manuscript does not explain how these were adapted for chronic pain. The authors should revise the table or accompanying text to show pain-specific applications of each process, for example how defusion was applied to pain-related catastrophic thoughts or how values-based action was linked to activity pacing.

In the Measures section, the PCS, PSEQ, and AAQ-II are described with internal consistency values from the present study, but there is no information about translation, cultural adaptation, or validation in the target population. If Persian versions were used, the authors should cite validation studies and report whether the wording was modified for online administration. If English versions were used, this must be justified given the participant context.

In the Measures section, the manuscript reports Cronbach’s alpha values of .87, .86, and .71, but with only 30 participants, alpha estimates are unstable. The authors should interpret these reliability coefficients cautiously and, preferably, cite established reliability evidence from prior validation studies. Reporting confidence intervals for alpha would also strengthen the psychometric transparency of the study.

In the Data Analysis section, the authors state that repeated-measures ANOVA was used, but they do not report assumption testing. The manuscript should include checks for normality, outliers, homogeneity of variance, sphericity, and equality of covariance matrices where applicable. With three time points and small groups, Mauchly’s test and Greenhouse–Geisser correction are especially relevant. If assumptions were violated, the corrected degrees of freedom and p-values should be reported.

In the Results section, demographic characteristics are limited to sex, marital status, and age. The authors should add baseline comparability tests for demographic and clinical variables, including baseline scores of PCS, PSEQ, and AAQ-II. Although the descriptive means appear similar at pretest, formal baseline comparison would help demonstrate that post-intervention differences are not attributable to initial imbalance.

Authors revised the manuscript and uploaded the updated document.

2. Revised

Editor’s decision after revisions: Accepted.

Editor in Chief’s decision: Accepted.