






The Effectiveness of Cognitive Analytic Therapy for Chronic Depression with High Self-Criticism: A Digital Health Perspective

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ABSTRACT

Chronic depression accompanied by high self-criticism remains difficult to treat and is often associated with persistent functional impairment. This study examined whether Cognitive Analytic Therapy (CAT), delivered with digital support tools, reduced depressive symptoms and self-criticism in adults diagnosed with persistent depressive disorder (PDD). The study used a randomized pretest-posttest-follow-up design. Sixty participants with PDD and elevated self-criticism were allocated to either CAT (16 weekly sessions) or a waitlist treatment-as-usual (TAU) condition. Outcomes were assessed with the Beck Depression Inventory-II (BDI-II) and the Levels of Self-Criticism Scale (LSCS) at baseline, post-treatment, and 2-month follow-up. Data were analyzed using mixed-design analysis of variance. Significant Group x Time interaction effects were observed for depression, $F(2, 116) = 45.32, p < .001, \eta_p^2 = .438$, and self-criticism, $F(2, 116) = 52.18, p < .001, \eta_p^2 = .473$. In the CAT group, BDI-II scores declined from 32.45 (SD = 4.12) at baseline to 18.20 (SD = 3.85) at post-test and 17.10 (SD = 3.90) at follow-up, whereas the TAU group showed only modest change. LSCS scores in the CAT group declined from 85.60 (SD = 8.45) to 58.30 (SD = 7.20) and 55.40 (SD = 6.95), while the TAU group remained comparatively stable. Within the limits of the present design, CAT supplemented with digital monitoring and self-help tools was associated with substantial and sustained reductions in depressive symptoms and self-critical thinking. The findings support CAT as a promising intervention for chronic depressive presentations marked by harsh self-relating.

Keywords: cognitive analytic therapy; chronic depression; persistent depressive disorder; self-criticism; digital mental health

1. Introduction

Persistent depressive disorder (PDD) and other chronic depressive presentations impose a substantial clinical and public health burden because symptoms are prolonged, relapse is common, and psychosocial impairment often remains severe even when acute episodes partially improve (American Psychiatric, 2022; Cuijpers et al., 2010; Jobst et al., 2016). Compared with more episodic forms of

depression, chronic depression is more strongly associated with interpersonal difficulties, hopelessness, and poorer treatment response, which makes intervention planning especially challenging (Furukawa et al., 2018; Wiersma et al., 2014). One of the mechanisms most consistently implicated in chronic depression is self-criticism. Self-criticism is more than ordinary self-evaluation: it reflects a harsh, persistent, and often hostile mode of relating to the self that is associated with shame, feelings of inferiority,

and an enduring expectation of failure (Dunkley et al., 2009; Löw et al., 2020; Werner et al., 2019). Across clinical and community samples, higher self-criticism has been linked to greater depression severity, a more maladaptive clinical presentation, and poorer psychotherapy outcomes (Löw et al., 2020; Luyten et al., 2007). Evidence also suggests that self-critical perfectionistic concerns are prospectively related to depressive symptoms, supporting the view that self-criticism is not merely an epiphenomenon of low mood, but a meaningful vulnerability and maintenance factor (Smith et al., 2021). This issue has practical treatment implications. Patients with chronic depression who present with marked self-criticism often struggle to benefit fully from standard symptom-focused approaches because they experience themselves as fundamentally defective, approach the therapeutic relationship with fear of judgment, and rapidly transform setbacks into evidence of personal failure (Ehret et al., 2015; Jobst et al., 2016; Löw et al., 2020). For this reason, interventions that can address both depressive symptoms and the underlying relational logic of self-attack may be especially relevant for this subgroup.

Cognitive Analytic Therapy (CAT) offers one such framework. CAT is a time-limited, integrative psychotherapy that combines cognitive, developmental, and relational ideas to explain how maladaptive patterns are learned, repeated, and maintained (Ryle & Kerr, 2020). A core concept in CAT is that of reciprocal roles: internalized relationship patterns that shape how people respond to others and to themselves. In chronic depression, self-criticism can be understood as an enactment of internalized critical or abusive roles, in which the person repeatedly occupies both the attacking and the attacked position (Ryle & Kerr, 2020). By identifying these patterns collaboratively, mapping them in sequential diagrammatic reformulations, and creating exits from them, CAT aims to reduce repetitive self-defeating procedures rather than only disputing isolated thoughts. The empirical CAT literature remains smaller than the literature for cognitive-behavioral therapy, yet the available evidence is encouraging. A systematic review and meta-analysis found large pre-post improvements in depression and durable gains across follow-up periods among patients receiving CAT, with small-to-moderate advantages over comparator conditions in controlled studies (Hallam et al., 2021). Additional work has shown that brief CAT can be effective for anxiety and depression in routine clinical settings, that group CAT may be feasible for mood and anxiety difficulties, and that

specific CAT processes such as narrative reformulation, alliance development, and exits from maladaptive procedures are clinically meaningful in depression treatment (Kellett et al., 2018; Martin et al., 2021; Merzhvynska et al., 2021; Sandhu et al., 2017; Wakefield et al., 2021). The digital mental health literature also points to a useful opportunity. Smartphone-based and internet-supported interventions can improve access, support adherence, and extend therapeutic work between sessions when used as adjuncts to clinician-delivered care (Donkin et al., 2011; Firth et al., 2017; Torous et al., 2020). Digital monitoring tools can help patients recognize symptom fluctuations and situational triggers in real time, while structured self-help content may strengthen practice outside therapy sessions. Although artificial intelligence and advanced analytics are increasingly discussed within mental health services, the most immediately relevant contribution of digital tools in psychotherapy remains practical: improving continuity, self-monitoring, and personalized feedback (Graham et al., 2019; Torous et al., 2020). For CAT in particular, digital diaries and mood tracking may enhance recognition of reciprocal roles and target problem procedures as they unfold in everyday life. Despite these converging lines of evidence, research specifically examining CAT for chronic depression characterized by high self-criticism remains limited. Much of the available chronic depression literature has focused on pharmacotherapy, broader psychotherapy meta-analyses, or the Cognitive Behavioral Analysis System of Psychotherapy (CBASP), which is the psychotherapy most specifically developed for chronic depression (Cuijpers et al., 2010; Furukawa et al., 2018; Jobst et al., 2016; Wiersma et al., 2014). CAT may be particularly relevant for this population because it directly targets internalized critical relationships and repetitive self-attacking procedures, yet relatively few controlled studies have centered this mechanism explicitly. Accordingly, the present study evaluated the effectiveness of CAT for adults with chronic depression and high self-criticism, while also describing a digital support package used to reinforce treatment between sessions. It was hypothesized that, relative to treatment as usual, CAT would be associated with larger reductions in depressive symptoms and self-criticism from pretest to post-test, and that these gains would be maintained at the 2-month follow-up. Because reciprocal-role revision was not directly measured, the study was designed to test outcomes rather than mediation.

2. Methods and Materials

2.1. Design

The study used a randomized pretest-posttest-follow-up design with two parallel conditions: Cognitive Analytic Therapy (CAT) and a waitlist treatment-as-usual (TAU) control condition. Time (pretest, post-test, follow-up) served as the within-subject factor and group (CAT vs. TAU) served as the between-subject factor. The primary outcomes were depressive symptoms and self-criticism.

2.2. Participants and sampling

Participants were adults aged 18 to 65 years residing in Tehran who sought help for chronic depressive symptoms. Recruitment was conducted through outpatient psychiatric clinics, community mental health centers, and local advertisements between September 2025 and January 2026. A purposive sampling approach was used at the recruitment stage, and eligible participants were then randomly allocated to study conditions.

An a priori power analysis was reportedly conducted with G*Power to estimate the target sample size, and 60 participants were enrolled to account for possible attrition. The analytic sample reported in the source manuscript comprised 60 participants, with 30 assigned to CAT and 30 assigned to TAU (Faul et al., 2009).

2.2.1. Eligibility criteria

Inclusion criteria were: (a) diagnosis of persistent depressive disorder according to DSM-5-TR criteria; (b) confirmation of diagnosis by structured clinical interview; (c) BDI-II score of 20 or higher at baseline; (d) elevated self-criticism on the Levels of Self-Criticism Scale; (e) age between 18 and 65 years; and (f) provision of written informed consent. Exclusion criteria were psychotic symptoms, bipolar disorder, current substance use disorder, imminent suicide risk requiring immediate hospitalization, receipt of CAT or another structured psychotherapy during the previous 6 months, and major medication changes during the 8 weeks before or during the intervention phase.

2.2.2. Randomization and masking

Randomization was carried out using a computer-generated sequence prepared by an independent researcher. Allocation was concealed in sealed opaque envelopes. Because of the nature of the intervention, participants and

therapists could not be blinded; however, the source manuscript reported that data analysts were kept unaware of group allocation during statistical analysis.

2.3. Measures

Diagnosis was established with the Structured Clinical Interview for DSM-5. The clinical version of the interview is a widely used semistructured diagnostic instrument for DSM-5 disorders (First et al., 2016). For Persian-speaking samples, acceptable psychometric properties have been reported for a Persian DSM-5 research version, including strong internal consistency and satisfactory kappa values across diagnostic categories (Mohammadkhani et al., 2020).

Depressive symptoms were assessed with the Beck Depression Inventory-II (BDI-II), a 21-item self-report instrument scored from 0 to 63, with higher scores indicating greater severity of depressive symptoms (Beck et al., 1996). The Persian BDI-II has demonstrated good internal consistency and acceptable test-retest reliability in Iranian samples (Ghassemzadeh et al., 2005).

Self-criticism was assessed with the Levels of Self-Criticism Scale (LSCS), a 22-item self-report measure that captures comparative self-criticism and internalized self-criticism (Thompson & Zuroff, 2004). The source manuscript reported administration of a Persian-translated version. Because a peer-reviewed validation report for that exact translated version was not clearly documented in the source file, the present manuscript cites the original scale development paper and reports the scale as used in the study without adding unverified psychometric claims.

2.4. Intervention

Participants in the experimental condition received 16 weekly individual CAT sessions of approximately 50 minutes each. The intervention followed the standard CAT sequence of reformulation, recognition/revision, and termination (Parry et al., 2021; Ryle & Kerr, 2020). In Sessions 1-4, therapists developed a collaborative formulation of the patient's target problem procedures and reciprocal roles, culminating in a reformulation letter and sequential diagrammatic reformulation. In Sessions 5-12, the focus shifted to recognition of triggers and exits from self-critical procedures through monitoring, role-based reflection, and behavioral experiments. Sessions 13-16 emphasized consolidation, review of gains, preparation for future setbacks, and the therapeutic ending.

The TAU group continued routine psychiatric care, primarily pharmacotherapy and periodic psychiatric follow-up, and was asked not to begin another structured psychotherapy during the study period. After completion of the post-test phase, participants in TAU were to be offered CAT.

2.4.1. *Digital support package*

Alongside face-to-face CAT, participants in the intervention group used a digital support package consisting of: (a) a daily mood and self-criticism monitoring application; (b) a digital thought and trigger diary for documenting events, automatic responses, and emotional reactions in real time; and (c) a structured smartphone-based self-help module containing psychoeducation and CAT-consistent exercises. The digital components were designed to support between-session recognition of maladaptive procedures rather than to function as a separate treatment arm. Usage metrics were reportedly recorded within the platform, although these metrics were not presented as outcomes in the source manuscript.

2.5. *Procedure*

After telephone prescreening, eligible candidates completed a face-to-face baseline assessment, provided informed consent, and underwent diagnostic interviewing.

Participants then completed the BDI-II and LSCS and were randomized. The CAT condition began therapy within one week of allocation. Post-test assessments were conducted immediately after the 16-session treatment window, and follow-up assessments were conducted two months later at comparable time points for both groups.

2.6. *Data analysis*

Data analysis was conducted in SPSS 29. Preliminary analyses assessed missingness, normality, and homogeneity of variance. Descriptive statistics were computed for demographic and clinical variables. The primary hypotheses were tested using 2 x 3 mixed-design analyses of variance, with time as the repeated factor and group as the between-subject factor. Partial eta squared was reported as the effect size index. The significance threshold was set at $p < .05$.

3. **Findings and Results**

Baseline demographic and clinical characteristics are presented in Table 1. The CAT and TAU groups were comparable with respect to age, gender distribution, marital status, education, duration of illness, and medication status, with no statistically significant between-group differences at baseline (all $ps > .05$). These findings support the adequacy of randomization for the measured background variables.

Table 1

Demographic and Clinical Characteristics of Participants by Group

Variable	CAT (n = 30)	TAU (n = 30)	Statistic	p
Age, years, M (SD)	34.23 (6.45)	35.10 (6.82)	t(58) = -0.50	.617
Gender, female, n (%)	19 (63.3)	17 (56.7)	chi2 = 0.30	.583
Marital status, single, n (%)	14 (46.7)	15 (50.0)	chi2 = 0.27	.873
Education, bachelor's degree, n (%)	15 (50.0)	14 (46.7)	chi2 = 0.60	.740
Duration of illness, years, M (SD)	6.45 (3.20)	6.80 (3.50)	t(58) = -0.34	.735
On medication, n (%)	23 (76.7)	24 (80.0)	chi2 = 0.09	.764

Descriptive statistics for the two outcome variables are shown in Table 2. The CAT group demonstrated marked reductions in BDI-II and LSCS scores from pretest to post-test, with gains maintained at follow-up. In contrast, the

TAU group showed only modest change across the same period. The mean trajectories for both outcomes are displayed in Figures 1 and 2.

Table 2

Descriptive Statistics for Depression and Self-Criticism Scores by Group and Time

Group	Variable	Pre-test M (SD)	Post-test M (SD)	Follow-up M (SD)
CAT	BDI-II	32.45 (4.12)	18.20 (3.85)	17.10 (3.90)
CAT	LSCS	85.60 (8.45)	58.30 (7.20)	55.40 (6.95)
TAU	BDI-II	31.80 (4.30)	29.15 (4.10)	28.90 (4.25)
TAU	LSCS	84.90 (8.20)	81.40 (7.95)	80.75 (8.10)

For depressive symptoms, the mixed-design ANOVA yielded a significant Group x Time interaction, $F(2, 116) = 45.32, p < .001, \eta_p^2 = .438$. Follow-up contrasts reported in the source manuscript indicated a statistically significant reduction in BDI-II scores for the CAT group from pretest to post-test, whereas the TAU group did not show a comparable improvement. The small difference between post-test and follow-up scores in the CAT group

suggested maintenance of treatment gains over the 2-month follow-up period.

For self-criticism, the Group x Time interaction was also significant, $F(2, 116) = 52.18, p < .001, \eta_p^2 = .473$. Participants receiving CAT showed a pronounced decline in LSCS scores from pretest to post-test, and this lower level of self-criticism was preserved at follow-up. By contrast, LSCS scores in the TAU group remained relatively stable across assessment points.

Table 3

Summary of Mixed-Design ANOVA Results for the Primary Outcomes

Source	Dependent variable	Type III SS	df	MS	F	p	η_p^2
Time	BDI-II	4850.32	2	2425.16	112.45	< .001	.660
Time	LSCS	8950.14	2	4475.07	145.20	< .001	.715
Time x Group	BDI-II	1950.45	2	975.22	45.32	< .001	.438
Time x Group	LSCS	2250.60	2	1125.30	52.18	< .001	.473
Error(Time)	BDI-II	2505.12	116	21.59			
Error(Time)	LSCS	3575.40	116	30.82			

Figure 1

Mean BDI-II scores over time for the CAT and TAU groups (error bars represent standard deviations).

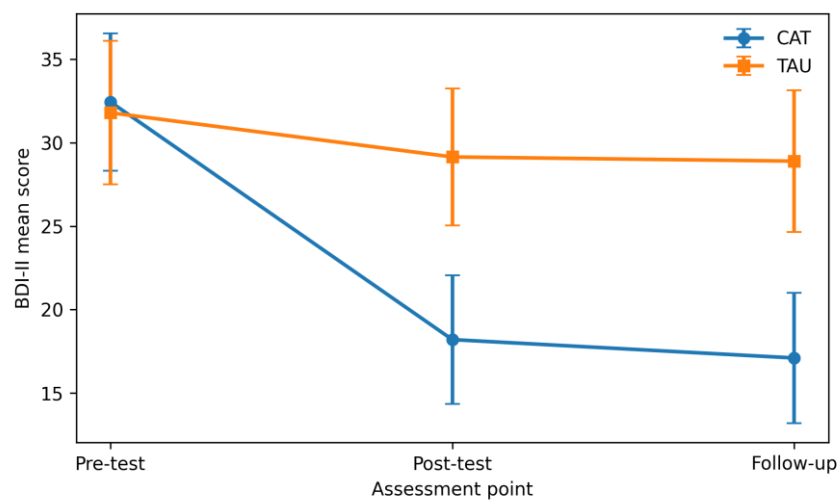
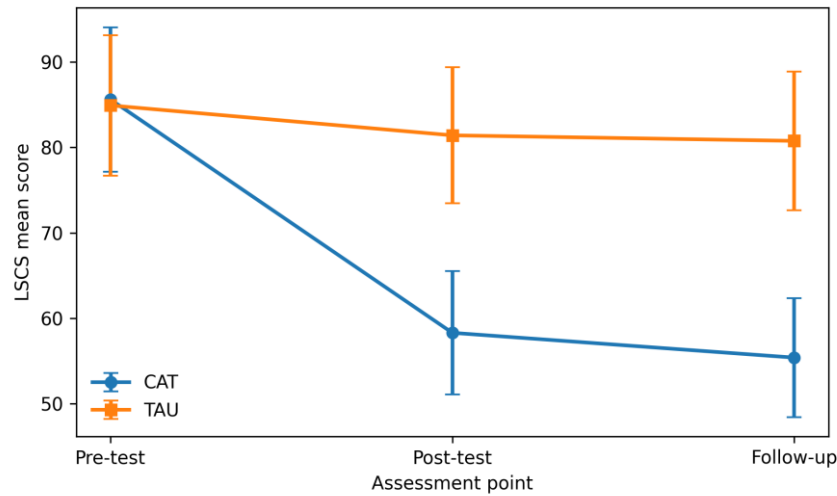


Figure 2

Mean LSCS scores over time for the CAT and TAU groups (error bars represent standard deviations).



Taken together, the pattern of means and interaction effects indicates that CAT was associated with clinically meaningful improvement across both outcomes in this sample. Because no mediation analyses were reported, the findings support differential change over time but do not permit causal claims about the specific role of reciprocal-role revision or digital engagement in producing the observed effects.

4. Discussion

The present study examined whether CAT could reduce depressive symptoms and self-criticism in adults with chronic depression and elevated self-critical thinking. The results supported both hypotheses. Relative to TAU, CAT was associated with a substantial decline in BDI-II scores and a similarly strong reduction in LSCS scores, and both effects were preserved at the 2-month follow-up. The effect sizes for the interaction terms were large, suggesting that the differences between trajectories were not only statistically significant but also practically meaningful within the context of this sample. The reduction in depressive symptoms is broadly consistent with the developing CAT evidence base. Hallam et al. (2021) reported large pre-post reductions in depression across CAT studies, while Wakefield et al. (2021) found that brief CAT achieved meaningful symptom improvement for anxiety and depression in routine practice (Hallam et al., 2021; Wakefield et al., 2021). The current study extends this line of work by focusing on a subgroup that is particularly difficult to treat: adults with chronic depression whose presentation is marked by strong self-critical

processes. Although the present trial was not designed to compare CAT directly with another structured psychotherapy, the observed improvement is also compatible with the broader literature showing that chronic depression benefits from psychotherapeutic approaches that target entrenched interpersonal and procedural patterns rather than symptoms alone (Cuijpers et al., 2010; Furukawa et al., 2018; Jobst et al., 2016; Wiersma et al., 2014).

The findings for self-criticism are especially important. High self-criticism is associated with depression severity, a more malignant clinical presentation, and poorer treatment response across therapies (Dunkley et al., 2009; Löw et al., 2020; Luyten et al., 2007). The present data indicate that CAT can be useful not only for reducing mood symptoms but also for changing a central vulnerability factor that may otherwise sustain chronic depression. This is consistent with CAT theory, which frames self-criticism as a recurring role-based procedure rather than merely an inaccurate thought. When patients can identify the self-attacking pattern, locate its triggers, and practice exits from it, they may become less likely to collapse into shame, helplessness, or repetitive self-punishment (Ryle & Kerr, 2020; Sandhu et al., 2017). The present findings also align with the wider self-criticism literature. Werner et al. (2019) showed that self-criticism is transdiagnostically associated with a range of psychopathology, and Löw et al. (2020) concluded that pretreatment self-criticism predicts worse psychotherapy outcome on average (Löw et al., 2020; Werner et al., 2019). From this perspective, the marked decline in LSCS scores after CAT is clinically notable

because it suggests movement on a process that often proves resistant to change. CAT may be especially suitable in this respect because the reformulation letter, sequential diagrammatic reformulation, and recognition of exits give patients a concrete language for observing how self-attack is enacted and maintained. The digital adjuncts used in the intervention likely contributed to feasibility and continuity, even though their independent effects cannot be isolated from the present design. The broader digital mental health literature suggests that self-monitoring, ecological recording, and structured between-session practice can improve engagement and extend therapeutic learning beyond the consulting room (Donkin et al., 2011; Firth et al., 2017; Graham et al., 2019; Torous et al., 2020). In CAT, these tools may be especially useful because recognition of maladaptive procedures depends on repeated observation of patterns as they occur in everyday contexts. Nonetheless, because app adherence and digital behavior were not analyzed as predictors or mediators, the current study should be interpreted as evaluating CAT with digital support rather than testing a digital intervention per se.

Several limitations should be considered. First, the sample was modest and drawn from a single urban setting, which limits generalizability. Second, the follow-up period was relatively short, so the durability of gains over 6 to 12 months remains unknown. Third, outcome measurement relied on self-report instruments, and the study did not report observer-rated depression measures or behavioral indices of self-critical responding. Fourth, although CAT theory emphasizes reciprocal-role revision, that mechanism was not measured directly in this trial; therefore, any explanation of how CAT produced change remains inferential. Fifth, the source manuscript described digital usage monitoring but did not provide adherence results, which limited the extent to which the digital-health component could be evaluated empirically.

These limitations point to clear directions for future research. Larger multisite trials should compare CAT not only with TAU but also with active psychotherapies for chronic depression. Longer follow-up periods are needed to determine whether changes in self-criticism predict sustained protection against relapse. Future studies would also benefit from incorporating direct process measures, ecological momentary assessment, and formal analyses of digital engagement to test whether improvement is mediated by recognition of reciprocal roles, reductions in self-attack, or stronger between-session practice.

5. Conclusion

In this randomized study, CAT supplemented with digital monitoring and self-help tools was associated with substantial reductions in depressive symptoms and self-criticism among adults with chronic depression. The improvements were maintained over the 2-month follow-up interval, whereas the TAU group showed comparatively little change. The study therefore supports CAT as a credible treatment option for chronically depressed patients whose difficulties are organized around severe self-criticism. At the same time, stronger trials with longer follow-up and explicit process measurement are needed before firm claims can be made about mechanisms of change or the added value of the digital components.

Authors' Contributions

Fereshteh Alikhani: Conceptualization, Investigation, Writing – original draft. Fatemeh Abdali: Methodology, Supervision, Writing – review and editing. Fatemeh Moghtadaie Rad: Formal analysis, Validation, Writing – review and editing. Mandana Delfani: Data curation, Investigation. Nasim Samadifard: Visualization, Validation, Writing – review and editing. All authors approved the final manuscript.

Declaration

The authors declare that artificial intelligence tools were used only to assist with language editing, translation, and improvement of the manuscript's readability. All conceptualization, study design, data collection, data analysis, interpretation of findings, and final approval of the manuscript were performed by the authors. The authors take full responsibility for the accuracy, integrity, and originality of the content.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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