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Comparison of the Effectiveness of Schema Therapy and Dialectical Behavior Therapy on Interpersonal Cognitive Distortions in Patients with Borderline Personality Disorder

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A B S T R A C T

The present study aimed to compare the effectiveness of dialectical behavior therapy and schema therapy on interpersonal cognitive distortions in patients with borderline personality disorder. This study employed a quasi-experimental methodology with a pretest–posttest design and parallel groups. The statistical population comprised all patients diagnosed with borderline personality disorder who referred to clinics, psychiatric hospitals, and psychological and counseling centers in the city of Tehran during the years 2024 to 2025. The study sample consisted of 45 patients who were selected through purposive non-random sampling and were then randomly assigned to three groups of 15 participants each (two experimental groups and one control group). The first experimental group received group schema therapy in 16 sessions of 60 minutes, and the second experimental group received dialectical behavior therapy in 16 sessions of 60 minutes, while the control group did not receive any therapeutic intervention during the study period. The data collection instruments included the Structured Clinical Interview for Personality Disorders, the Borderline Personality Questionnaire, and the Interpersonal Cognitive Distortions Scale. The collected data were analyzed using repeated measures analysis of variance. The results indicated a significant difference between the effectiveness of the two therapeutic approaches in the components of unrealistic expectations ($p = 0.030$), rejection in interpersonal relationships ($p = 0.001$), and the total score of interpersonal cognitive distortions ($p = 0.001$), such that the reduction in these components and the total score of interpersonal cognitive distortions was significantly greater in the schema therapy group compared to the dialectical behavior therapy group. Accordingly, it can be concluded that schema therapy, compared to dialectical behavior therapy, is more effective in reducing interpersonal cognitive distortions in patients with borderline personality disorder and can be considered an efficient intervention for improving the cognitive and interpersonal patterns of these patients.

Keywords: *Dialectical behavior therapy; schema therapy; interpersonal cognitive distortions; borderline personality disorder*

1. Introduction

Borderline personality disorder (BPD) is a severe and impairing condition characterized by pervasive instability in affect regulation, interpersonal functioning, self-image, and impulse control, with substantial clinical heterogeneity and high service utilization. Contemporary assessment frameworks emphasize that evidence-based personality disorder evaluation should integrate structured diagnostic procedures, multi-method measurement, and careful attention to functional impairment and comorbidity patterns, because misclassification can obscure mechanism-based case formulation and dilute treatment effects (Widiger et al., 2024). In BPD specifically, the clinical picture frequently includes recurrent crises, intense and rapidly shifting emotions, and interpersonal patterns marked by hypersensitivity to rejection, fear of abandonment, and oscillations between idealization and devaluation, which together complicate the treatment trajectory and amplify risk behaviors. Recent conceptual work in Iranian contexts has also underscored the developmental and educational foundations of BPD-related vulnerabilities, highlighting how early relational contexts may scaffold later difficulties in emotion regulation, self-coherence, and social learning, thereby motivating preventive and early-intervention perspectives alongside psychotherapy for established disorder (Allah Rabi et al., 2024).

A core clinical challenge in BPD is that symptom expression is deeply intertwined with interpersonal meaning-making. Patients commonly interpret social cues through rigid, threat-salient lenses, and these interpretations can escalate affective arousal and impulsive behavioral responses. The concept of interpersonal cognitive distortions—systematic biases and errors in interpreting relational situations—provides a useful bridge between cognitive processes and observable interpersonal instability. The Interpersonal Cognitive Distortions Scale (ICDS) was developed to operationalize these relational thinking errors and captures key domains such as unrealistic expectations in relationships, perceived rejection, and misperceptions of interpersonal events (Hamamci & Büyüköztürk, 2004). Empirical work in nonclinical and student populations has indicated that interpersonal cognitive distortions are meaningfully related to borderline personality organization and interpersonal problems, suggesting that distorted relational appraisals may function as proximal cognitive mechanisms linking enduring vulnerability to moment-to-moment interpersonal dysregulation (Askari Zadeh et al., 2022). In addition, cognitive–emotional pathways that connect biased appraisals to distress and maladaptive coping have been documented across other clinical contexts, supporting the broader proposition that biased cognition is not merely epiphenomenal but may be an actionable treatment target (Kiosses et al., 2014).

Interpersonal distortions are particularly salient in BPD because relational stress is one of the most potent triggers for affective destabilization and high-risk behaviors. Studies focusing on aggression and externalizing behaviors have demonstrated that BPD features can be associated with aggressive responding, and modern nosologies—such as the DSM-5 alternative model—have facilitated more nuanced analyses of how personality functioning and maladaptive traits relate to aggressive behavior and interpersonal conflict (Leucci et al., 2024). Gender-related clinical presentation has also received increasing attention; narrative syntheses have pointed to meaningful gender differences in prevalence patterns, symptom profiles, comorbidity, and help-seeking, which in turn can shape how interpersonal problems are manifested and interpreted in clinical settings (Bozzatello et al., 2024). These complexities reinforce the need for precise assessment and targeted interventions that address both the emotional and cognitive-interpersonal substrates of BPD.

From a measurement standpoint, rigorous sampling and diagnostic procedures require reliable identification of BPD and careful screening for differential diagnoses. The Borderline Personality Inventory (BPI) was originally developed as a self-report tool to assess borderline personality organization and has been used in clinical and nonclinical contexts (Leichsenring, 1999). Its psychometric validation in Iranian samples has provided further support for its use in local research and clinical screening, enabling more consistent operationalization of BPD features in Iranian populations (Mohammadzadeh & Rezaei, 2011). Given that affective lability and agitation may overlap with bipolar-spectrum symptoms, structured approaches to mood assessment can also be relevant in BPD research designs, particularly when the aim is to isolate interpersonal cognition as an outcome; the Young Mania Rating Scale is a widely recognized instrument for quantifying manic symptom severity (Young et al., 2000). Aligning diagnostic decisions and measurement selection with evidence-based assessment principles is therefore essential for strengthening internal validity in psychotherapy outcome studies (Widiger et al., 2024).

At the level of psychological theory, two complementary traditions have strongly influenced contemporary

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interventions for BPD: schema-based models and skills-based behavioral models. Schema therapy conceptualizes psychopathology as rooted in early maladaptive schemas and schema modes—momentary states that organize emotions, cognitions, bodily sensations, and action tendencies—particularly under interpersonal stress (Young et al., 2006). Within this framework, interpersonal cognitive distortions can be understood as schema-consistent appraisals that bias social perception toward themes of abandonment, mistrust, defectiveness, or subjugation, thereby intensifying affective arousal and impulsive coping. Evidence for the cross-diagnostic relevance of maladaptive schemas comes from clinical areas such as eating disorders, where maladaptive schemas have been documented and linked to clinically meaningful outcomes, strengthening confidence that schema processes are robust therapeutic targets (Damiano et al., 2015). Iranian studies have further demonstrated the applicability of schema-informed interventions for emotion and relationship processes, including improvements in couples' communication patterns when schema-based emotion management strategies are implemented (Darvish Nejad Sikaroudi et al., 2024), as well as reductions in rumination and worry following schema therapy relative to alternative approaches in other populations (Sahour et al., 2024). These findings collectively support the plausibility that schema-focused change processes could modify interpersonal appraisals in BPD.

Dialectical behavior therapy (DBT), in contrast, is grounded in a biosocial theory emphasizing emotion dysregulation arising from biological vulnerability and invalidating environments, and it targets BPD through a structured program of skills acquisition, behavioral analysis, and dialectical strategies balancing acceptance and change. Review-level evidence and contemporary summaries continue to position DBT as a first-line evidence-based treatment for BPD, particularly for reducing self-harm and crisis behaviors and improving emotion regulation (Ellison, 2020; Sayyadi, 2019). More recent systematic reviews of randomized controlled trials have reinforced DBT's efficacy for BPD, although the magnitude of effects may vary by outcome domain and program components (Hernandez-Bustamante et al., 2024). In Iranian samples, DBT has been associated with improvements in constructs relevant to intrapersonal and interpersonal functioning, including self-compassion and integrative self-knowledge, which are theoretically linked to more adaptive self–other representations (Sadeghian-Lemraski et al., 2024). DBT-informed protocols that integrate mindfulness and emotion regulation techniques have also shown promise for reducing self-harm and substance-related outcomes in BPD, further emphasizing DBT's relevance to high-risk clinical presentations (Hozh et al., 2024; Mahmud Alilu et al., 2023).

Despite the established efficacy of both DBT and schema therapy, a persistent question in psychotherapy research is whether different evidence-based treatments yield distinct profiles of change across cognitive, emotional, and interpersonal targets. Treatment-comparison discussions in the broader psychotherapy literature highlight that "type of treatment" may matter particularly when the outcome is closely aligned with a therapy's putative mechanisms (e.g., schema change for schema therapy; skills use and behavioral regulation for DBT) (Ellison, 2020). Schema therapy has accumulated substantial evidence in BPD, including landmark outpatient trials comparing schema-focused psychotherapy with other specialized treatments and demonstrating favorable outcomes (Giesen-Bloo et al., 2025). More recently, a randomized clinical trial has shown the effectiveness of predominantly group schema therapy and combined individual-plus-group schema therapy for BPD, supporting the scalability of schema-based approaches and their capacity to impact core BPD features in real-world formats (Arntz et al., 2022). Complementing these BPD-specific trials, applied schema therapy research in other high-impairment contexts (e.g., anorexia nervosa with comorbid BPD presentations) has further showcased schema therapy's potential utility when standard treatments are insufficient, suggesting that schema-based work can be particularly valuable for entrenched patterns of emotion and relationship dysfunction (Hepworth & Simpson, 2025). Iranian research has likewise reported beneficial effects of group schema therapy on self-control, emotion regulation, and distress tolerance, supporting the feasibility of schema-based group delivery and its effects on self-regulatory capacities that are often compromised in BPD (Boldanazar et al., 2023). More recent Iranian evidence has also indicated that schema therapy can improve frustration tolerance and reduce internalized shame in individuals with BPD—processes closely related to negative self-appraisals and relational threat sensitivity (Taj Iliayifar et al., 2025).

The relevance of interpersonal cognitive distortions as an outcome becomes clearer when considering that distorted appraisals can serve as cognitive "gateways" through which emotional vulnerability translates into interpersonal escalation. For example, unrealistic expectations in relationships can generate chronic disappointment and

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resentment, while rejection-focused interpretations can intensify abandonment fears and trigger impulsive protest behaviors. These cognitive tendencies are not restricted to young clinical samples; research in older adults suggests that cognitive and emotional factors are strongly implicated in suicide risk, underscoring the clinical importance of cognition–emotion interactions across the lifespan (Kiosses et al., 2014). In Iranian studies of older populations, interpersonal cognitive distortions have been linked to suicidal thoughts alongside affective states and perceived social support, indicating that relational thinking errors may be clinically consequential beyond BPD and may contribute to severe outcomes when combined with distress and low support (Sadri Damirchi et al., 2020). Additionally, cognitive errors have been associated with self-evaluative processes in high-stress contexts; for instance, self-esteem has been examined as a predictor of thinking errors in incarcerated individuals, supporting the broader claim that distorted cognition can be embedded in social identity and self-worth processes (Clark, 2020). In clinical models of BPD, these connections are particularly salient because self-worth and relational appraisal are tightly coupled, and momentary shifts in perceived acceptance can rapidly alter affect and behavior.

Another clinically relevant intersection concerns maladaptive coping behaviors, including substance use and self-harm, which can be conceptualized as attempts to manage dysregulated affect or escape aversive self-states. Motivational models of substance use emphasize that coping motives—using substances to reduce negative affect—are robust drivers of problematic use, which is pertinent given the high rates of comorbidity and emotion-driven behavior in BPD (Cooper et al., 2016). Iranian studies applying DBT-based emotion regulation or meta-awareness components have reported reductions in negative emotions (e.g., depression, anxiety, anger) in BPD, which may indirectly reduce reliance on maladaptive coping strategies (Mahmud Alilu et al., 2023). Further, DBT-oriented emotion regulation and mindfulness approaches have been evaluated for reducing substance abuse and self-harm in BPD, aligning with the theoretical expectation that improving regulation skills can weaken the reinforcement cycle that maintains maladaptive coping (Hozh et al., 2024). From a schema perspective, avoidant or self-punitive coping can be understood as schema-driven mode responses, suggesting that modifying schemas and modes could also affect the cognitive interpretations that precipitate interpersonal crises and the downstream reliance on impulsive coping (Young et al., 2006).

Within this landscape, a focused empirical comparison of schema therapy and DBT on interpersonal cognitive distortions is theoretically and clinically justified. Both interventions plausibly influence interpersonal distortions, but they may do so through different pathways. Schema therapy directly targets early maladaptive schemas and schema modes using experiential techniques (e.g., imagery, chairwork) and corrective relational experiences, which could more strongly modify deep relational assumptions and, consequently, persistent interpersonal thinking errors (Arntz et al., 2022; Young et al., 2006). DBT, conversely, emphasizes mindfulness, distress tolerance, emotion regulation, and interpersonal effectiveness skills, which can reduce the intensity and behavioral consequences of distorted thoughts and potentially reshape cognitive appraisals through repeated skills-based successes and decreased emotional arousal (Hernandez-Bustamante et al., 2024; Sayyadi, 2019). Comparative psychotherapy research in BPD has repeatedly indicated that specialized treatments can be effective, yet differences may emerge depending on the targeted mechanism and the specificity of the outcome measure (Ellison, 2020; Giesen-Bloo et al., 2025). Notably, schema-based interventions have shown comparative advantages over certain alternative specialized treatments in some trials, reinforcing the plausibility that schema-focused change may be particularly impactful for relational-cognitive outcomes (Giesen-Bloo et al., 2025). At the same time, DBT's robust evidence base for crisis behaviors and emotion dysregulation raises the possibility that its impact on interpersonal distortions might be mediated by reduced emotional intensity and improved interpersonal skill execution rather than by direct restructuring of deep relational schemas (Hozh et al., 2024; Sadeghian-Lemraski et al., 2024).

Research gaps remain salient in at least three respects. First, while BPD treatment research is extensive, fewer studies isolate interpersonal cognitive distortions as a primary outcome, despite strong theoretical reasons to treat these distortions as modifiable drivers of relational instability (Askari Zadeh et al., 2022; Hamamci & Büyüköztürk, 2004). Second, evidence from Iranian samples is growing for both schema-based and DBT-based interventions, yet direct head-to-head comparisons focusing on relational cognition are limited, constraining context-sensitive clinical decision-making (Boldanazar et al., 2023; Sadeghian-Lemraski et al., 2024; Taj Iliayifar et al., 2025).

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Third, heterogeneity in BPD presentation—potentially shaped by gender, aggression risk, shame, and comorbid behaviors—necessitates outcome measures that are sensitive to interpersonal cognition and that can detect sustained changes beyond immediate symptom relief (Bozzatello et al., 2024; Leucci et al., 2024; Taj Iliayifar et al., 2025). By focusing on interpersonal distortions and examining maintenance at follow-up, research can contribute to mechanism-informed treatment selection and to understanding the durability of cognitive-interpersonal change.

The present study therefore draws on established assessment tools for BPD and interpersonal cognitive distortions and is grounded in contemporary evidence supporting both schema therapy and DBT as credible treatments for BPD (Arntz et al., 2022; Hamamci & Büyüköztürk, 2004; Hernandez-Bustamante et al., 2024; Leichsenring, 1999; Mohammadzadeh & Rezaei, 2011). It also aligns with broader evidence emphasizing the centrality of cognition–emotion processes in severe outcomes such as self-harm and suicidality, and with research underscoring that relational interpretations and self-evaluations can be systematically biased yet clinically modifiable (Clark, 2020; Kiosses et al., 2014; Sadri Damirchi et al., 2020). By integrating these theoretical and empirical strands, the study contributes to the ongoing effort to specify which interventions are most effective for which targets within the complex clinical phenotype of BPD (Ellison, 2020; Widiger et al., 2024).

The aim of this study was to compare the effectiveness of schema therapy and dialectical behavior therapy in reducing interpersonal cognitive distortions (unrealistic expectations, perceived rejection in interpersonal relationships, misperception in interpersonal relationships, and the total interpersonal cognitive distortions score) in patients with borderline personality disorder.

2. Methods and Materials

2.1. Study Design and Participants

The present study employed a quasi-experimental research design with a pretest–posttest control group and a three-month follow-up. The statistical population of the study included all patients with borderline personality disorder who referred to psychiatric, psychological, and therapeutic clinics and hospitals in the city of Tehran during the years 2024 to 2025 and who, in the initial clinical interview conducted by a psychologist, were identified as presenting symptoms and signs of borderline personality disorder and meeting the inclusion criteria of the study. The sample size for each group was determined to be 15 participants, resulting in a total final sample size of 45 individuals. To prevent sample attrition, 80 patients were initially selected. After conducting the Structured Clinical Interview for Personality Disorders based on the diagnostic criteria for borderline personality disorder in the DSM-5-TR and completing the Borderline Personality Inventory developed by Leichsenring (1999), 45 individuals who simultaneously met the diagnostic criteria for borderline personality disorder, satisfied the study inclusion criteria, and obtained at least the minimum required score based on the questionnaire cutoff point were selected as the final sample using purposive non-random sampling. Ultimately, these 45 participants were randomly assigned to three groups: dialectical behavior therapy (15 participants), schema therapy (15 participants), and a control group (15 participants).

The inclusion criteria were as follows: meeting the diagnostic criteria for borderline personality disorder based on the DSM-5-TR through the Structured Clinical Interview for Axis II disorders, obtaining a score equal to or higher than the specified cutoff score on the Borderline Personality Inventory (BPI), having at least a high school diploma, being between 18 and 50 years of age, having the ability to participate in therapy sessions, not having received prior psychological treatment specifically aimed at treating borderline personality disorder, not receiving concurrent psychotherapy or another intervention program, and not having an active substance use disorder that could affect the treatment process or participation in the study. The exclusion criteria included lack of cooperation, absence from treatment sessions, or failure to complete the questionnaires. These criteria were confirmed through clinical interviews and review of participants' clinical records.

2.2. Measures

Structured Clinical Interview for Personality Disorders: This instrument is a semi-structured diagnostic interview developed by First and colleagues for the diagnosis of personality disorders according to the DSM-5. The SCID-5-PD covers all 10 personality disorders listed in the DSM-5 as well as other specified disorders. One of the features of the SCID-5-PD is that it incorporates a self-report personality questionnaire as a screening tool. This questionnaire consists of 106 items and can be administered

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in less than 20 minutes. The minimum educational level required for responding is completion of the eighth grade. Based on the items to which the patient responds positively, the examiner guides the interview accordingly. Although precise information regarding the reliability and validity of the SCID-5-PD is limited, several studies have examined the reliability of its predecessor, the SCID-II. Lobbestael et al. (2010) reported interrater agreement (kappa coefficient) for the SCID-II ranging from 0.69 for paranoid personality disorder to 0.95 for borderline personality disorder, with an overall kappa of 0.78. Sharifi et al. (2006) reported acceptable reliability of diagnoses obtained using the Persian version of the SCID and satisfactory feasibility of its administration. In a study conducted by Ghahrai (2022), the internal consistency of the SCID-5-PD self-report personality questionnaire indicated that this instrument has acceptable reliability. Overall, the SCID-5-PD is considered a valid and reliable tool for the diagnosis of personality disorders.

Borderline Personality Inventory: This questionnaire was used to screen the research sample and diagnose borderline personality disorder. The Borderline Personality Inventory (BPI) was developed by Leichsenring (1999) to assess borderline personality traits in clinical and non-clinical samples and is answered in a dichotomous yes/no format. The questionnaire consists of 51 items based on Kernberg's concept of borderline personality organization as well as the diagnostic criteria of the DSM-IV. This instrument includes factors measuring identity diffusion, primitive defense mechanisms, impaired reality testing, and fear of intimacy. In Leichsenring's (1999) study, the reliability of the instrument, assessed using Cronbach's alpha, ranged from 0.68 to 0.89, and its discriminant and diagnostic validity were reported as satisfactory. In Iran, Mohammadzadeh and Rezaei (2011) reported concurrent validity of this questionnaire with a coefficient of 0.70, correlations between subscales and the total scale and among subscales ranging from 0.71 to 0.80, and three types of reliability—test–retest, split-half, and internal consistency—with coefficients of 0.80, 0.83, and 0.85, respectively.

Interpersonal Cognitive Distortions Scale: The Interpersonal Cognitive Distortions Scale (ICDS) was developed by Hamamci and Büyüköztürk in 2004 to measure rigid beliefs in interpersonal relationships. This instrument consists of 19 items and three subscales, including rejection in interpersonal relationships, unrealistic expectations in relationships, and misperception in interpersonal relationships. The scale is scored on a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Hamamci and Büyüköztürk (2004) reported the reliability of this instrument using internal consistency with Cronbach's alpha as 0.67. The reliability coefficients for the subscales of rejection, unrealistic expectations, and misperception in interpersonal relationships were reported as 0.73, 0.66, and 0.43, respectively. The validity of this scale was also supported through correlations with the Irrational Beliefs Scale, the Suicide Ideation Scale, and the Interpersonal Conflict Tendency Scale, with coefficients of 0.45, 0.53, and 0.53, respectively, all of which were statistically significant. In Iran, the reliability coefficients for the subscales of rejection, unrealistic expectations, misperception in interpersonal relationships, and the total scale were reported as 0.79, 0.82, 0.81, and 0.85, respectively.

2.3. Interventions

Schema therapy was delivered in 16 group sessions (60 minutes each) over 8 weeks (two sessions per week) based on Schema Therapy for Borderline Personality Disorder by Arntz et al. (2009). The protocol began with comprehensive diagnostic interviewing; systematic collection and organization of the patient's presenting problems; exploration of early attachment relationships (parents/caregivers) and adverse developmental experiences linked to maladaptive schema formation; establishment of a "healthy" therapeutic relationship using limited reparenting with firm boundaries; and completion of pretest measures. The middle phase focused on psychoeducation and formulation, including discussion of the developmental origins of schemas and modes, construction of an individualized life-history narrative linking past experiences to current difficulties, brief imagery exercises to connect "then-and-now," explanation of the treatment rationale using a BPD schema-mode conceptual model, clarification of how current problems are maintained by schemas/modes and their emotion–cognition–behavior patterns, and crisis management when required. The intervention then targeted key modes through experiential and behavioral techniques: work on the detached protector mode by fostering safety and trust, using chairwork (e.g., empty-chair) to access and express emotion, naming and evaluating the costs/benefits and triggers of this mode, and imagery rescripting to loosen avoidance; homework emphasized increasing social engagement and confiding in trusted others. Treatment of the abandoned child mode emphasized a supportive context,

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trust-building, imagery-based nurturing and therapist empathy within a limited-reparenting stance, and assertiveness via role-play; homework involved approaching significant others, expressing vulnerability, and actively seeking support. Work on the angry/impulsive child mode included maintaining a secure alliance while setting limits on aggressive behaviors, coaching expression of anger within boundaries, empathic linkage to underlying schemas, reality testing of triggers/intensity, assertiveness and social-skills training to (a) express emotions and (b) defend needs, imagery for expressing anger toward harmful others, and cognitive restructuring of dysfunctional beliefs about feeling or expressing anger; homework involved practicing assertiveness and anger-management strategies. Subsequent sessions focused on protection from the punitive parent mode through limited reparenting with boundaries, availability planning during crises, imagery rescripting, historical role-play, chairwork to challenge punitive messages, self-compassionate appraisal of mistakes using techniques such as pie charts and "courtroom" methods to calibrate responsibility, and strengthening adaptive schemas through positive-data logs and historical testing, while fostering more flexible standards; homework included coping cards and engagement in pleasurable or mastery activities. The final sessions consolidated gains by strengthening the healthy adult mode, shifting the internal parent–child dynamic toward adult self-governance, replacing maladaptive schemas with healthier alternatives, reality testing of thoughts that precipitate negative affect or impulsive behavior, and supporting adult-consistent decisions about maintaining, ending, or initiating relationships.

Dialectical behavior therapy (DBT) was delivered in 16 sessions (60 minutes each) over 8 weeks (two sessions per week) based on a protocol described in Borderline Personality Disorder by Alilo et al. (2022). The program opened with a comprehensive diagnostic interview, assessment of psychosocial skills, orientation to DBT and the biosocial theory of BPD, completion of pretest measures, and obtaining written or verbal commitment regarding three core agreements: remaining alive for one year (no suicide attempts), collaborating with the therapist, and adhering to the treatment process within the specified timeframe. This was followed by DBT case conceptualization framing BPD as a systemic disturbance in emotion-regulation processes, and explicit goal-setting that prioritized reducing life-threatening behaviors (e.g., suicidality), reducing therapy-interfering behaviors, reducing behaviors that interfere with quality of life, increasing behavioral skills, reducing posttraumatic stress, and enhancing self-respect. The early skills phase implemented acceptance-based validation strategies to build sustained therapeutic engagement and communicate full acceptance of the patient as they are, including observing and describing emotional/cognitive responses and behavioral patterns and acknowledging painful situational contexts; homework emphasized practicing validation toward self and others. The protocol then introduced change-oriented problem-solving strategies to cultivate active, effective coping, beginning with behavioral analysis to develop insight into repetitive behavior chains and providing psychoeducation on behavioral principles and norms; subsequent sessions focused on generating and implementing alternative solutions via solution analysis and selecting change strategies that maximize patient benefit. Dialectical strategies were used to identify core dialectical tensions and restore balance between acceptance (deep empathy and understanding of the patient's experience) and change (modifying maladaptive behaviors), alongside training and modeling dialectical thinking through cognitive challenges, psychoeducation on dialectics, and addressing splitting. The protocol also addressed therapist–patient interaction styles by balancing reciprocal vulnerability strategies (therapist authenticity, warm empathic responding, and appropriate self-disclosure) with strategic irreverent communication (e.g., irony or deliberate non-attendance) intended to transiently disrupt rigid patterns and invite alternative perspectives. Skills training then progressed through mindfulness (observing, describing, participating, nonjudgmental stance, one-mindful attention to the present moment, and effectiveness) with homework (e.g., three-step practice toward "wise mind"), interpersonal effectiveness (assertiveness, self-expression, conflict management, relationship maintenance, self-respect, and identification of beliefs that undermine effectiveness; including steps akin to describe, express, assert, reinforce, stay mindful, appear confident, negotiate) with homework practice, distress tolerance (accepting current reality and painful emotions without judgment while resisting impulsive change; including distraction/engagement strategies and self-soothing via the five senses) with homework assignments, and emotional regulation training in the final session using mood induction (music or video clips) to elicit affective and somatic responses and guide nonjudgmental attention to internal experience while sharing thoughts, actions, bodily

sensations, and urges; the intervention concluded with a structured review of prior skills and treatment consolidation.

2.4. Data analysis

To analyze the data, descriptive and inferential statistics were used, employing repeated measures analysis of variance in SPSS version 26.

3. Findings and Results

In the present study, 45 patients with borderline personality disorder were allocated to three groups: dialectical behavior therapy (7 women and 8 men), schema therapy (8 women and 7 men), and a control group (7 women and 8 men). In the dialectical behavior therapy group, the mean age and standard deviation of participants were 32.80 and 8.12 years, respectively; in the schema therapy group, they were 31.47 and 5.53 years, respectively; and in the control group, they were 29.53 and 6.44 years, respectively. In the dialectical behavior therapy group, 6 participants had a high school diploma, 7 held a bachelor's degree, and 2 held a master's or doctoral degree. In the schema therapy group, 5 participants had a high school diploma, 7 held a bachelor's degree, and 3 held a master's or doctoral degree. In the control group, 6 participants had a high school diploma, 6 held a bachelor's degree, and 3 held a master's or doctoral degree. Finally, in the schema therapy and control groups, 9 participants were single and 6 were married, whereas in the dialectical behavior therapy group, 8 participants were single and 7 were married.

Table 1

Means, Standard Deviations for Components and Total Score of Interpersonal Cognitive Distortions

Variable	Component	Group	Pretest M (SD)	Posttest M (SD)	Follow-up M (SD)
Interpersonal Cognitive Distortions	Unrealistic expectations	Dialectical behavior therapy	24.93 (5.01)	21.33 (3.84)	22.35 (3.69)
		Schema therapy	25.60 (4.82)	19.13 (2.91)	17.70 (2.74)
		Control	26.80 (4.93)	26.67 (3.89)	26.13 (4.10)
	Rejection in interpersonal relationships	Dialectical behavior therapy	25.73 (4.81)	20.67 (3.48)	21.27 (3.43)
		Schema therapy	24.87 (4.36)	18.07 (3.91)	16.73 (2.46)
		Control	25.33 (4.27)	24.60 (4.73)	25.47 (4.62)
	Misperception in interpersonal relationships	Dialectical behavior therapy	8.93 (2.05)	6.40 (1.59)	6.33 (1.63)
		Schema therapy	8.71 (2.15)	6.27 (1.44)	5.07 (1.67)
		Control	9.07 (1.75)	9.40 (2.10)	9.33 (2.02)
	Total score	Dialectical behavior therapy	59.60 (9.73)	48.40 (6.96)	49.93 (6.09)
		Schema therapy	59.20 (9.19)	43.47 (6.22)	39.47 (5.76)
		Control	61.27 (7.78)	60.67 (7.68)	60.93 (8.41)

As shown in Table 1, in both experimental groups, the mean scores of the components and the total score of interpersonal cognitive distortions decreased at the posttest and follow-up stages. In contrast, no comparable changes were observed at these stages in the control group. Moreover, the Shapiro–Wilk values for none of the components or the total score of interpersonal cognitive distortions across the three groups and three measurement occasions were statistically significant, indicating normal distributions of the components and the total score of interpersonal cognitive distortions across groups and stages.

In this study, Levene's test was used to examine the assumption of homogeneity of error variances of the dependent variable across groups, and the results showed that differences in error variances of scores across the three groups and three measurement occasions were not statistically significant. This finding indicates that the assumption of homogeneity of error variances was met. In addition, the assumptions of homogeneity of covariance matrices of the dependent variables were examined using Box's M statistic, and the sphericity assumption (equality of error covariance matrices) was examined using Mauchly's test. The results of the assumption testing indicated that the value of Box's M statistic was not statistically significant for any of the components or the total score of interpersonal cognitive distortions. This finding indicates that the assumption of homogeneity of covariance matrices of the dependent variables for interpersonal cognitive distortions and its components was satisfied. The chi-square values obtained from Mauchly's test were not statistically

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significant for any of the components or the total score of interpersonal cognitive distortions. Accordingly, the sphericity assumption was also met for the levels of the dependent variable. After evaluating the assumptions of the analysis and confirming that they were satisfied, the data were analyzed using repeated measures analysis of variance. Table 2 presents the results of the multivariate analysis comparing the effects of dialectical behavior therapy and schema therapy on interpersonal cognitive distortions.

Table 2

Results of Multivariate Analysis Testing the Effects of Independent Variables on Interpersonal Cognitive Distortions

Dependent Variable	Wilks' Lambda	F	df	p	η^2	Power
Unrealistic expectations	.703	3.94	4, 82	.006	.161	.889
Rejection in interpersonal relationships	.713	3.78	4, 82	.007	.156	.874
Misperception in interpersonal relationships	.647	4.99	4, 82	.001	.196	.953
Total score	.617	5.60	4, 82	.001	.215	.972

As shown in Table 2, the effects of the independent variables on unrealistic expectations (Wilks' Lambda = .703, η^2 = .161, p = .001, F = 3.94), rejection in interpersonal relationships (Wilks' Lambda = .713, η^2 = .156, p = .001, F = 3.78), misperception in interpersonal relationships (Wilks' Lambda = .647, η^2 = .196, p = .001, F = 4.99), and the total score of interpersonal cognitive distortions (Wilks' Lambda = .617, η^2 = .215, p = .001, F = 5.60) were statistically significant. Table 3 subsequently presents the results of repeated measures analysis of variance explaining the effects of dialectical behavior therapy and schema therapy on interpersonal cognitive distortions.

Table 3

Results of Repeated Measures Analysis of Variance for the Effects of Independent Variables on Interpersonal Cognitive Distortions

Variable	Effect	Sum of Squares	Error Sum of Squares	F	p	η^2
Unrealistic expectations	Group	758.80	556.60	26.68	< .001	.577
	Time	313.60	556.93	23.65	< .001	.360
	Group × Time	257.73	1304.13	4.15	.004	.165
Rejection in interpersonal relationships	Group	618.90	448.09	29.01	< .001	.580
	Time	388.54	669.60	24.37	< .001	.367
	Group × Time	283.63	1179.38	5.05	< .001	.194
Misperception in interpersonal relationships	Group	166.64	160.89	21.75	< .001	.509
	Time	90.00	147.93	25.51	< .001	.378
	Group × Time	72.43	265.64	5.73	< .001	.214
Total score	Group	4202.95	1723.02	51.23	< .001	.709
	Time	2200.28	2491.60	37.09	< .001	.469
	Group × Time	1640.74	5651.64	6.10	< .001	.225

As shown in Table 3, in addition to the main effects of group and time, the Group × Time interaction effect was statistically significant for unrealistic expectations (η^2 = .165, p = .004, F = 4.15), rejection in interpersonal relationships (η^2 = .194, p = .001, F = 5.05), misperception in interpersonal relationships (η^2 = .214, p = .001, F = 5.73), and the total score of interpersonal cognitive distortions (η^2 = .225, p = .001, F = 6.10). These findings indicate that the implementation of the independent variables significantly affected the components and the total score of interpersonal cognitive distortions. Table 4 presents the results of the Bonferroni post hoc tests for interpersonal cognitive distortions across the three groups and three measurement occasions.

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Table 4

Bonferroni Post Hoc Test Results for Pairwise Comparisons of Group and Time Effects on Interpersonal Cognitive Distortions

Time Comparisons	Variable	Comparison	Mean Difference	SE	p
	Unrealistic expectations	Pretest–Posttest	3.40	0.96	.003
		Pretest–Follow-up	3.73	0.77	.001
		Posttest–Follow-up	0.33	0.75	1.000
	Rejection in interpersonal relationships	Pretest–Posttest	4.20	0.86	.001
		Pretest–Follow-up	4.16	0.84	.001
		Posttest–Follow-up	−0.04	0.65	1.000
	Misperception in interpersonal relationships	Pretest–Posttest	1.56	0.35	.001
		Pretest–Follow-up	2.00	0.40	.001
		Posttest–Follow-up	0.44	0.38	.729
	Total score	Pretest–Posttest	9.16	1.87	.001
		Pretest–Follow-up	9.89	1.62	.001
		Posttest–Follow-up	0.73	1.68	1.000
Group Comparisons					
	Unrealistic expectations	DBT – Schema therapy	2.07	0.77	.030
		DBT – Control	−3.67	0.77	.001
		Schema therapy – Control	−5.73	0.77	.001
	Rejection in interpersonal relationships	DBT – Schema therapy	2.67	0.69	.001
		DBT – Control	−2.58	0.69	.002
		Schema therapy – Control	−5.24	0.69	.001
	Misperception in interpersonal relationships	DBT – Schema therapy	0.53	0.41	.610
		DBT – Control	−2.04	0.41	.001
		Schema therapy – Control	−2.58	0.41	.001
	Total score	DBT – Schema therapy	5.27	1.35	.001
		DBT – Control	−8.29	1.35	.001
		Schema therapy – Control	−13.56	1.35	.001

The results of the Bonferroni test for time effects shown in Table 4 indicate that the mean differences in the components and the total score of interpersonal cognitive distortions between the pretest and posttest, as well as between the pretest and follow-up stages, were statistically significant, whereas the mean differences between the posttest and follow-up stages were not statistically significant. Furthermore, the results of the Bonferroni test for group effects in Table 4 indicate that the mean differences in the components and the total score of interpersonal cognitive distortions in both the dialectical behavior therapy and schema therapy groups, compared with the control group, were statistically significant. Specifically, the implementation of both therapeutic approaches resulted in reductions in the mean scores of the components and the total score of interpersonal cognitive distortions in the experimental groups at the posttest and follow-up stages compared with the pretest stage.

Consistent with the results related to group effects in the Bonferroni test, the trend of changes in the mean scores of interpersonal cognitive distortions depicted in the Figure 1 plots indicates that the effects of dialectical behavior therapy and schema therapy on interpersonal cognitive distortions were maintained after the completion of the intervention period.

The results presented in Table 4 further indicate that the difference in the effects of dialectical behavior therapy and schema therapy on the components of unrealistic expectations ($p = .030$), rejection in interpersonal relationships ($p = .001$), and the total score of interpersonal cognitive distortions ($p = .001$) was statistically significant. Specifically, the reductions in these components and the total score of interpersonal cognitive distortions were greater in the schema therapy group than in the dialectical behavior therapy group. Accordingly, it was concluded that schema therapy, compared with dialectical behavior therapy, is a more effective method for reducing interpersonal cognitive distortions in patients with borderline personality disorder.

4. Discussion

The present study examined and compared the effectiveness of schema therapy and dialectical behavior therapy (DBT) in reducing interpersonal cognitive distortions in patients with borderline personality disorder (BPD). The findings demonstrated that both therapeutic approaches led to significant reductions in unrealistic

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expectations, perceived rejection in interpersonal relationships, misperception in interpersonal relationships, and the total score of interpersonal cognitive distortions from pretest to posttest, and that these improvements were maintained at follow-up. These results are consistent with the broader literature indicating that structured, evidence-based psychotherapies can meaningfully alter maladaptive cognitive–emotional patterns in individuals with BPD (Ellison, 2020; Hernandez-Bustamante et al., 2024). However, a key contribution of the present study is the finding that schema therapy produced significantly greater reductions than DBT in unrealistic expectations, perceived rejection in interpersonal relationships, and the total interpersonal cognitive distortions score, suggesting differential effectiveness depending on the targeted cognitive–interpersonal mechanism.

The overall reduction of interpersonal cognitive distortions across both experimental groups aligns with theoretical models emphasizing that distorted interpersonal appraisals are not fixed traits but modifiable cognitive processes embedded within broader emotion regulation and relational systems (Askari Zadeh et al., 2022; Hamamci & Büyüköztürk, 2004). In BPD, interpersonal situations are often appraised through schemas related to abandonment, mistrust, defectiveness, or emotional deprivation, which heighten sensitivity to perceived rejection and generate unrealistic expectations of others. Both DBT and schema therapy address these processes, albeit through different therapeutic pathways. DBT emphasizes skills acquisition—particularly mindfulness, emotion regulation, distress tolerance, and interpersonal effectiveness—which can reduce the intensity of emotional responses and improve behavioral responses to interpersonal stress, thereby indirectly modifying distorted interpretations (Sadeghian-Lemraski et al., 2024; Sayyadi, 2019). Schema therapy, in contrast, directly targets the underlying cognitive–emotional structures (early maladaptive schemas and schema modes) that give rise to these distortions, which may explain its stronger impact on core interpersonal cognitions (Arntz et al., 2022; Young et al., 2006).

The significant time effects observed for all components of interpersonal cognitive distortions indicate that both interventions facilitated meaningful change over the course of treatment, with stability of gains at follow-up. This maintenance effect is clinically important given the chronic and relapsing nature of BPD and the tendency for interpersonal stressors to reactivate maladaptive cognitive patterns. The durability of treatment effects is consistent with prior evidence showing that specialized psychotherapies for BPD can produce sustained improvements beyond immediate symptom reduction (Ellison, 2020; Giesen-Bloo et al., 2025). In particular, schema therapy trials have demonstrated long-term benefits in personality functioning and relational stability, supporting the notion that modifying deep-seated schemas may yield enduring cognitive and interpersonal change (Arntz et al., 2022; Hepworth & Simpson, 2025). The present findings extend this evidence by demonstrating sustained reductions in interpersonal cognitive distortions, a construct closely tied to relational functioning and emotional reactivity.

The superiority of schema therapy over DBT in reducing unrealistic expectations and perceived rejection warrants particular attention. Unrealistic expectations in relationships often reflect entrenched beliefs about how others "should" behave to meet unmet emotional needs, and when these expectations are violated, individuals with BPD may experience intense emotional distress and interpersonal conflict. Schema therapy explicitly addresses these beliefs by linking them to early developmental experiences and unmet core needs, using experiential techniques such as imagery rescripting, chairwork, and limited reparenting to promote corrective emotional experiences (Arntz et al., 2022; Young et al., 2006). This direct engagement with the emotional memory networks underlying unrealistic expectations may account for the greater reductions observed in the schema therapy group. Similar patterns have been reported in other clinical contexts, where schema-based interventions have led to meaningful changes in maladaptive expectations, shame, and relational sensitivity (Damiano et al., 2015; Taj Iliayifar et al., 2025).

Perceived rejection in interpersonal relationships is another core feature of BPD, closely linked to fear of abandonment and affective instability. The finding that schema therapy outperformed DBT in reducing perceived rejection is consistent with research emphasizing the centrality of abandonment-related schemas in BPD and the effectiveness of schema-focused techniques in modifying these schemas (Leichsenring, 1999; Young et al., 2000). While DBT's interpersonal effectiveness skills can improve communication and assertiveness, they may not fully address the deeply rooted expectation of rejection that persists even in objectively supportive relationships. Schema therapy's focus on the "abandoned child" and "punitive parent" modes may provide a more comprehensive framework for transforming these expectations, which is reflected in the greater magnitude of change observed in this

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study. Prior Iranian research has similarly suggested that schema-based interventions can effectively reduce maladaptive relational beliefs and improve emotional regulation capacities (Boldanazar et al., 2023; Darvish Nejad Sikaroudi et al., 2024).

In contrast, no significant difference was found between schema therapy and DBT in reducing misperception in interpersonal relationships. This finding suggests that both approaches may be similarly effective in addressing moment-to-moment misinterpretations of social cues, possibly through different but converging mechanisms. DBT's emphasis on mindfulness and nonjudgmental awareness may help patients observe interpersonal situations more accurately and reduce automatic cognitive distortions, while schema therapy may achieve similar outcomes by increasing awareness of schema-driven reactions and promoting reflective functioning. The equivalence of the two treatments on this component aligns with evidence indicating that mindfulness-based and cognitive–behavioral elements can effectively reduce perceptual biases and improve cognitive flexibility (Hozh et al., 2024; Sahour et al., 2024). This convergence suggests that certain interpersonal distortions may be particularly responsive to general improvements in emotion regulation and attentional control rather than to deep schema modification alone.

The significant group × time interaction effects observed across all components further support the conclusion that the observed changes were attributable to the therapeutic interventions rather than to spontaneous remission or repeated testing effects. The absence of comparable changes in the control group reinforces the internal validity of the findings and is consistent with prior controlled studies demonstrating the necessity of structured psychotherapeutic intervention for meaningful cognitive–interpersonal change in BPD (Ellison, 2020; Hernandez-Bustamante et al., 2024). Moreover, the pattern of results aligns with comparative psychotherapy research suggesting that while multiple evidence-based treatments can be effective for BPD, differences may emerge when outcomes are closely aligned with a treatment's theoretical focus (Giesen-Bloo et al., 2025; Widiger et al., 2024).

The present findings also resonate with broader research linking interpersonal cognitive distortions to clinically significant outcomes such as emotional dysregulation, self-harm, and suicidality. Distorted perceptions of rejection and interpersonal threat have been implicated in suicidal ideation and emotional distress across age groups, highlighting the clinical importance of targeting these cognitions (Kiosses et al., 2014; Sadri Damirchi et al., 2020). By demonstrating that schema therapy and DBT can reduce these distortions—and that schema therapy may do so more robustly for certain components—the study contributes to a mechanism-focused understanding of how psychotherapy may reduce risk behaviors indirectly by altering maladaptive interpersonal appraisals. This interpretation is further supported by evidence linking improvements in emotion regulation and self-compassion to reductions in maladaptive coping strategies in BPD (Mahmud Alilu et al., 2023; Sadeghian-Lemraski et al., 2024).

From a cultural and contextual perspective, the findings are particularly relevant for Iranian clinical settings, where empirical comparisons of evidence-based treatments for BPD remain limited. Prior Iranian studies have documented the effectiveness of both DBT-based and schema-based interventions for various emotional and interpersonal outcomes, but direct comparisons focusing on interpersonal cognition have been scarce (Askari Zadeh et al., 2022; Boldanazar et al., 2023). The present study addresses this gap and provides locally relevant evidence that can inform clinical decision-making. Additionally, given evidence of gender-related differences in BPD presentation and interpersonal behavior (Bozzatello et al., 2024), future analyses may further elucidate whether treatment effects on interpersonal cognitive distortions vary by gender or other demographic factors.

5. Conclusion

Overall, the findings support the conclusion that while both schema therapy and DBT are effective in reducing interpersonal cognitive distortions in patients with BPD, schema therapy may offer added benefits for modifying deeper relational expectations and rejection-related cognitions. These results align with contemporary models emphasizing the importance of matching therapeutic approaches to specific psychological mechanisms and outcome targets rather than assuming equivalence across all domains (Ellison, 2020; Widiger et al., 2024). By focusing on interpersonal cognitive distortions as a central outcome, the study contributes to a more nuanced understanding of treatment effects in BPD and underscores the value of mechanism-informed psychotherapy research.

Several limitations should be considered when interpreting the findings of this study. The sample size was relatively small, which may limit the generalizability of the results and reduce statistical power for detecting smaller

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effects. The use of a single clinical setting and reliance on self-report measures for interpersonal cognitive distortions may also introduce context-specific biases and shared method variance. In addition, the follow-up period was limited, and longer-term maintenance of treatment effects could not be fully evaluated. Finally, potential moderating variables such as comorbid disorders, medication use, or therapist effects were not systematically examined.

Future studies should replicate these findings with larger and more diverse samples across multiple clinical centers to enhance generalizability. Longer follow-up periods would allow for examination of the durability of changes in interpersonal cognitive distortions over time. Research exploring mediators and moderators of treatment effects—such as specific schema modes, emotion regulation skills, or attachment styles—could further clarify the mechanisms through which schema therapy and DBT exert their effects. Comparative studies integrating qualitative data may also enrich understanding of patients' subjective experiences of cognitive and interpersonal change.

Clinicians working with patients with borderline personality disorder should consider assessing interpersonal cognitive distortions as a routine part of case formulation and outcome monitoring. Schema therapy may be particularly beneficial for patients whose difficulties are dominated by entrenched relational expectations and sensitivity to rejection, while DBT remains a strong option for individuals requiring intensive skills training and crisis management. Integrating elements from both approaches in a flexible, individualized treatment plan may further enhance outcomes, especially in settings with limited resources or heterogeneous patient needs.

Authors' Contributions

S.G. conceptualized the study, designed the research framework, and supervised the therapeutic interventions; A.T. was responsible for participant recruitment, data collection, and administration of the assessment instruments; N.B. conducted the statistical analyses, interpreted the findings, and drafted the manuscript. All authors contributed to critical revision of the manuscript, approved the final version, and agreed to be accountable for all aspects of the work.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

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Declaration of Interest

The authors report no conflict of interest.

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Ethical 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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