

Comparison of the Effectiveness of Cognitive Therapy and Schema Therapy in Weight Reduction among Women with Bulimia Nervosa

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ABSTRACT

Objective: This study aimed to compare the effectiveness of cognitive therapy and schema therapy in reducing weight among women with bulimia nervosa.

Methods and Materials: This experimental study employed a pretest–posttest design with a nonequivalent control group and follow-up assessment. The statistical population consisted of overweight women with bulimia nervosa who attended nutritional counseling and psychological centers in District 13 of Tehran during 2022–2024. Using convenience sampling and based on body mass index (BMI) and diagnostic criteria for bulimia nervosa, 51 eligible participants were selected according to Cochran’s formula. Participants were randomly assigned to two experimental groups and one control group. Weight was assessed at baseline as the pretest measure. Experimental Group A received cognitive therapy, whereas Experimental Group B received schema therapy; the control group was placed on a waiting list and received no intervention during the study period. Following completion of the interventions, posttest and follow-up assessments were conducted. Data were analyzed using repeated-measures analysis of variance and Bonferroni post hoc tests in SPSS version 22.

Findings: Repeated-measures analysis of variance demonstrated that both cognitive therapy and schema therapy produced statistically significant reductions in weight among women with bulimia nervosa compared with the control condition. The significant therapeutic effects were maintained at the follow-up assessment, indicating persistence of the treatment gains over time. However, the between-group comparison of the two active interventions revealed no statistically significant difference between cognitive therapy and schema therapy in their effectiveness for weight reduction. Thus, although both interventions were significantly more effective than the control condition, neither therapeutic approach demonstrated statistical superiority over the other.

Conclusion: Cognitive therapy and schema therapy appear to be effective psychological interventions for supporting weight reduction among overweight women with bulimia nervosa, with treatment effects remaining evident during follow-up. The absence of a significant difference between the two interventions suggests that both approaches may represent viable therapeutic options.

Keywords: Cognitive Therapy; Schema Therapy; Weight Reduction; Bulimia Nervosa; Women

1. Introduction

Bulimia nervosa is a complex eating disorder characterized by recurrent episodes of uncontrolled or excessive food intake accompanied by maladaptive compensatory behaviors, persistent concerns regarding body shape and weight, and disturbances in self-evaluation that are disproportionately influenced by appearance and body-related perceptions. Although the disorder is commonly conceptualized in terms of eating behavior, its clinical manifestations extend well beyond food consumption and include disturbances in affect regulation, cognitive appraisal, self-concept, body image, impulsivity, interpersonal functioning, and coping with distress. Contemporary research increasingly emphasizes that bulimia nervosa should be understood as a multidimensional psychopathological condition in which biological, cognitive, emotional, and sociocultural processes interact over time. Neurocognitive evidence also indicates that individuals with bulimia nervosa may show altered patterns of body-image processing, suggesting that disturbances in the perception and evaluation of one's body have correlates at both psychological and neural levels (Norrin & Baumann, 2025). At the same time, motivational processes play a central role in recovery because willingness to engage in treatment, intention to change maladaptive behaviors, and perceived control over eating-related responses can substantially influence therapeutic progress (Van Huyssteen, 2025). Recent evidence further demonstrates that negative perfectionism, repetitive negative thinking, and rumination may contribute to the maintenance of bulimic symptoms, particularly among women, highlighting the importance of cognitive-emotional mechanisms in the persistence of the disorder (Rakhshan Haghighifard & Azad Yekta, 2026). Consequently, interventions aimed only at changing eating behavior or reducing body weight may be insufficient unless the maladaptive cognitive and emotional processes underlying recurrent binge eating and dysfunctional weight-control behavior are simultaneously addressed.

Weight and body-image concerns occupy a particularly important position in the clinical presentation of women with bulimia nervosa. Although individuals with bulimia nervosa may present across a range of body weights, overweight women experiencing bulimic symptoms can encounter an especially complicated interaction between concerns about weight reduction, recurrent episodes of overeating, compensatory responses, dissatisfaction with appearance, and negative self-evaluation. Eating patterns are closely

associated with overweight and obesity, and maladaptive eating habits can contribute to the persistence of excessive body weight and repeated attempts at weight control (Ghorbannejad et al., 2020). Weight-management behavior itself is also embedded in psychological and sociocultural processes involving self-concept, self-esteem, perceived standards of appearance, and exposure to cultural expectations regarding ideal body shape (Bani Fatemeh et al., 2020). Research comparing overweight women with and without bulimic symptoms suggests that women experiencing bulimia nervosa may differ in important psychological characteristics such as self-compassion, difficulties in emotion regulation, and mindfulness, indicating that weight-related problems in this population cannot be explained solely by caloric intake or physical activity (Almasi, 2022). Disturbances in body image may also influence broader areas of psychological and interpersonal functioning. For example, differences in physical self-concept have been associated with quality of life and other aspects of women's psychological functioning, underscoring the importance of body-related self-perception in well-being (Ghaffari & Ozabli, 2021). Thus, weight reduction among women with bulimia nervosa is not simply a nutritional goal; rather, it is potentially intertwined with changes in body-related cognition, emotional responses to appearance, self-evaluation, and the capacity to regulate eating behavior under conditions of psychological distress.

One of the central mechanisms implicated in bulimia nervosa is difficulty regulating emotional experiences. Episodes of binge eating may function, at least temporarily, as attempts to escape, suppress, or modulate intense negative affect, while subsequent concerns about weight and appearance can reinforce shame, dissatisfaction, and maladaptive compensatory behavior. Studies examining women with bulimic symptoms have increasingly emphasized emotion regulation, impulsivity, and body-image dissatisfaction as clinically meaningful intervention targets. Emotion-focused therapeutic work, for example, has been associated with improvements in body-image dissatisfaction, cognitive emotion regulation, and impulsivity among women with bulimia nervosa, supporting the view that eating-related symptoms are connected to broader affective vulnerabilities (Vatankhah et al., 2025). Daily processes of self-compassion and adaptive coping may likewise be relevant to how women with bulimic symptoms respond to distressing experiences and manage urges associated with maladaptive eating (Katan & Kelly, 2023). From this perspective, psychological treatment for women

who simultaneously experience bulimic symptoms and overweight should ideally target both immediate maladaptive behaviors and the cognitive-emotional processes that sustain them. This requirement has encouraged increasing attention to structured psychological interventions, including cognitive and cognitive-behavioral approaches, schema-focused interventions, interpersonal treatments, mindfulness-oriented interventions, and other integrative therapies. Comparative evidence showing beneficial effects of cognitive-behavioral and mindfulness-based interventions on body image, anxiety, and binge-eating-related outcomes among women with obesity further supports the therapeutic value of addressing cognitive and emotional processes rather than relying exclusively on conventional weight-management strategies (Sartipi et al., 2021).

Cognitive therapy is particularly relevant to bulimia nervosa because maladaptive beliefs and interpretations concerning weight, shape, personal worth, interpersonal evaluation, and perceived loss of control can contribute to problematic eating patterns. Cognitive approaches assume that dysfunctional emotional and behavioral reactions are partly maintained by distorted or rigid patterns of thinking and that identifying, examining, and restructuring these cognitions can facilitate more adaptive responses. Within treatment, individuals learn to recognize automatic negative thoughts, identify irrational or unhelpful assumptions, understand connections among thoughts, emotions, and behaviors, and replace dysfunctional interpretations with more realistic and flexible alternatives. Cognitive-behavioral treatment principles have long been applied to eating- and appearance-related difficulties, and structured cognitive-behavioral interventions typically incorporate psychoeducation, cognitive restructuring, behavioral practice, problem solving, and relapse-prevention strategies (Zarb, 2019). Evidence from body-image-focused populations suggests that cognitive-behavioral therapy can influence clinically relevant cognitive mechanisms and produce improvements in distorted appearance-related processing (Fang et al., 2020). Furthermore, cognitive-behavioral and interpersonal psychotherapy have both demonstrated utility in modifying body-image-related difficulties among women, supporting the responsiveness of appearance-related cognitions to psychological intervention (Yousefi et al., 2021). These findings are particularly important in bulimia nervosa because dysfunctional beliefs about body weight and shape may contribute to cycles of

dietary restriction, binge eating, self-criticism, and repeated attempts to control weight.

Cognitive approaches to eating difficulties also emphasize that effective weight-related treatment must avoid reinforcing rigid dieting, excessive weight preoccupation, or cycles of restriction and loss of control. The relationship between binge eating and weight management is clinically complicated because aggressive attempts to control weight may paradoxically increase vulnerability to episodes of overeating, whereas uncontrolled binge eating can interfere with sustained weight-management efforts. Research on treatments targeting both binge eating and weight has therefore highlighted the importance of interventions that simultaneously address eating-disorder psychopathology and weight-related outcomes (Cooper et al., 2020). For women with bulimia nervosa who are also overweight, cognitive therapy may facilitate weight reduction not simply by encouraging behavioral restraint, but by modifying distorted beliefs about food, body shape, personal value, and perceived failure. Cognitive restructuring may reduce all-or-nothing thinking surrounding dietary lapses, while problem-solving and self-regulation skills can help participants respond more adaptively to emotional or interpersonal triggers for overeating. Improvements in body image may further decrease the intensity of dysfunctional compensatory attempts and negative emotional reactions associated with appearance. Accordingly, cognitive therapy represents a theoretically plausible intervention for producing changes in weight-related behavior while simultaneously targeting the psychological processes that may perpetuate bulimic eating patterns.

Despite the relevance of surface-level automatic thoughts and dysfunctional assumptions, some individuals with eating disorders display deeply rooted and persistent cognitive-emotional patterns that may not be fully captured by conventional cognitive models. Schema therapy was developed to address such enduring patterns by focusing on early maladaptive schemas, unmet emotional needs, maladaptive coping styles, and recurring interpersonal and emotional patterns. In schema therapy, schemas are understood as broad and pervasive cognitive-emotional structures through which individuals interpret themselves, other people, and significant experiences. These schemas can be activated by current events and may generate intense emotional responses and maladaptive coping behaviors. The schema therapy model integrates cognitive, behavioral, experiential, and relational techniques to challenge

dysfunctional schemas, strengthen healthier modes of functioning, and promote the fulfillment of core emotional needs in more adaptive ways (Young et al., 2019). This framework may have particular relevance to eating disorders, where persistent shame, defectiveness, abandonment concerns, emotional deprivation, unrelenting standards, self-sacrifice, or difficulties with self-control can become linked to body dissatisfaction, dietary behaviors, binge eating, and self-critical responses following perceived failures.

The empirical literature provides increasing support for the relevance of schemas in eating-disorder psychopathology. A systematic review of early maladaptive schemas in eating disorders documented meaningful associations between dysfunctional schema patterns and eating-disorder symptoms, indicating that schema-level vulnerabilities may play an important role in the development and maintenance of pathological eating behavior (Maher et al., 2022). Research examining positive schemas in eating-disorder samples has further suggested that adaptive schema structures may also be important to understanding psychological functioning and resilience among individuals with eating disorders (Huckstepp et al., 2023). Schema-focused treatment may therefore operate through both reducing maladaptive patterns and strengthening healthier self-related and interpersonal representations. In women with bulimia nervosa, schema therapy has been shown to improve self-worth and cognitive flexibility, two constructs that may be particularly important when rigid self-evaluations and negative beliefs about body shape or personal value maintain dysfunctional eating patterns (Khamarniya et al., 2024). Schema therapy has also demonstrated effectiveness for rumination, depressive symptoms, and personality functioning in women with bulimia nervosa, suggesting that its effects may extend beyond eating behavior to broader cognitive-emotional vulnerabilities associated with the disorder (Bagheri Sheikhangafsheh et al., 2024). Earlier work similarly suggested beneficial effects of schema therapy on bulimic symptoms and stress among women with obesity (Narimani & Nemati, 2021).

Schema therapy may be especially pertinent to weight reduction when excessive eating functions as a maladaptive coping response to schema activation. In this conceptualization, distressing emotional states triggered by rejection, criticism, perceived inadequacy, loneliness, or failure may activate deeply rooted schemas, while overeating serves as an avoidant, soothing, or compensatory

behavior. Treatment therefore attempts to identify the underlying schemas, examine evidence for and against them, access associated emotional experiences, develop healthier coping styles, and strengthen the Healthy Adult mode. Studies involving obesity and emotional eating support the potential relevance of this framework. Schema therapy has been compared with other interventions in individuals with obesity and emotional eating, with findings indicating that schema-focused intervention can influence avoidance coping and body mass index (Najjar Kakhaki et al., 2024). Likewise, comparison of schema therapy with life therapy among women with obesity has demonstrated beneficial effects on emotion regulation and attitudes toward eating (Mohammadian Amiri et al., 2024). Schema therapy has also been compared with behavioral model-based diet therapy among obese individuals, with improvements reported in emotional adjustment, body image, and weight-related outcomes (Irani et al., 2021). Together, these findings suggest that schema therapy may contribute to weight reduction by addressing mechanisms that connect emotional distress, maladaptive beliefs, and problematic eating behavior.

Comparative research between schema-based and cognitive-behavioral approaches is especially valuable because the two treatments share certain cognitive and behavioral elements while differing in the depth and presumed origins of the psychological processes they target. Cognitive therapy primarily focuses on present-oriented automatic thoughts, beliefs, cognitive distortions, and behavioral responses, whereas schema therapy extends this work toward longstanding cognitive-emotional patterns, developmental experiences, unmet emotional needs, and maladaptive coping styles. Previous comparative findings have suggested that both schema therapy and cognitive-behavioral therapy can improve clinically relevant outcomes in women with obesity, including quality of life and body image (Pakandish et al., 2020). Schema-focused group intervention has also been associated with improvements in body dysmorphic symptoms, further illustrating its applicability to problems involving distorted appearance-related self-evaluation (Rahmani et al., 2021). These results indicate that both approaches may be useful for psychological difficulties related to body image and eating behavior, but they do not establish whether one treatment is more effective specifically for weight reduction in women with bulimia nervosa. Because weight-related outcomes may be influenced by both proximal cognitions and deeper schema-level processes, a direct comparison can provide

clinically useful information regarding whether the additional developmental and experiential components of schema therapy produce advantages beyond those associated with a structured cognitive intervention.

The need for such comparison becomes more evident when considering the heterogeneity of women with bulimia nervosa and overweight. Some patients may primarily experience distorted thoughts regarding eating, shape, and self-control that respond effectively to present-focused cognitive restructuring, whereas others may exhibit longstanding patterns of defectiveness, emotional deprivation, abandonment fears, perfectionism, or avoidance that repeatedly trigger binge eating despite awareness of its adverse consequences. In such cases, schema-focused work may provide additional therapeutic value by targeting the deeper structures from which recurring cognitive and behavioral responses emerge. Conversely, a more focused cognitive intervention may offer an efficient and sufficiently powerful method for changing dysfunctional beliefs, strengthening problem solving, increasing assertiveness, and reducing maladaptive eating-related responses without requiring extensive exploration of developmental schemas. The relative effectiveness of these two approaches therefore remains an empirical question rather than a purely theoretical one. This issue is particularly relevant in interventions in which weight reduction is considered alongside bulimic symptomatology, because successful weight management requires sustained cognitive and behavioral change while avoiding the escalation of body dissatisfaction and dysfunctional compensatory patterns.

Furthermore, research on women with eating and weight-related difficulties consistently highlights the importance of body image, emotional regulation, coping, and self-evaluation as interconnected therapeutic targets. Difficulties in these domains may contribute to a cycle in which negative body perceptions generate distress, distress increases the likelihood of maladaptive eating, binge eating intensifies self-criticism and concerns about weight, and subsequent attempts at rigid control perpetuate the cycle. Interventions capable of interrupting several components of this process may therefore be particularly beneficial. The existing literature supports cognitive-behavioral intervention for changing maladaptive cognitions and eating-related behavior, while schema-based research suggests that modifying early maladaptive schemas, coping styles, rumination, cognitive inflexibility, and emotion-regulation problems may offer another effective route to clinical improvement. Nevertheless, relatively limited evidence

directly compares cognitive therapy and schema therapy with respect to sustained weight reduction among women who specifically meet criteria for bulimia nervosa and are also overweight. Examination of follow-up outcomes is particularly important because short-term post-treatment changes do not necessarily indicate that improvements will be maintained once active therapeutic support ends. Assessing participants before treatment, immediately after intervention, and during follow-up can therefore provide a clearer indication of both therapeutic effectiveness and the stability of treatment gains.

Accordingly, given the multidimensional nature of bulimia nervosa, the importance of weight and body-image concerns in affected women, the established relevance of cognitive and schema-related processes to maladaptive eating, and the limited comparative evidence concerning the relative effects of these interventions on weight-related outcomes, direct empirical comparison of cognitive therapy and schema therapy may help clarify their clinical utility and inform intervention selection for overweight women with bulimia nervosa. Therefore, the present study aimed to compare the effectiveness of cognitive therapy and schema therapy in reducing weight among women with bulimia nervosa.

2. Methods and Materials

2.1. Study design and Participant

The present study employed an experimental pretest–posttest design with two intervention groups, a nonequivalent control group, and a two-month follow-up assessment. Cognitive therapy was implemented as the independent variable for the first experimental group (Group A), while schema therapy was administered to the second experimental group (Group B). Participants assigned to the control group (Group C) received no psychological intervention during the study period and were placed on a waiting list. Assessments were conducted at three measurement occasions, including pretest, posttest immediately after completion of the interventions, and follow-up two months after the posttest. After completion of the study and in accordance with ethical considerations, the more effective intervention was made available to participants in the control group. The statistical population consisted of all overweight women with bulimia nervosa who attended psychological and nutritional counseling centers located in District 13 of Tehran during 2023–2024. Potential participants were initially identified through

clinical evaluation by psychologists and psychiatrists working at the participating centers and were subsequently screened for bulimia nervosa and overweight status. Convenience sampling was used to recruit eligible individuals from the target population. The initial sample size was estimated at 51 participants based on Cochran's sample size formula, recommendations concerning minimum sample sizes in experimental group-treatment research, and evidence from comparable intervention studies. During the course of the study, six participants were excluded because of repeated absences or insufficient cooperation, resulting in a final sample of 45 women. These participants were randomly assigned in equal numbers to three groups of 15 participants each: the cognitive therapy group, the schema therapy group, and the control group. Eligible participants were women living in or receiving services in District 13 of Tehran who were overweight, had a body mass index greater than 25 kg/m², met the criteria for bulimia nervosa, expressed willingness to participate in the research, and agreed to receive the assigned intervention. Exclusion criteria included alcohol or substance dependence, use of psychiatric or psychotropic medications, the presence of a significant physical disability or intellectual disability, repeated absence from treatment sessions, lack of cooperation with study procedures, and identification during the intervention of conditions inconsistent with the aims or eligibility requirements of the research. Following coordination with the administrators of the participating counseling centers, eligible women received information regarding the study and its procedures. After baseline assessments, the participants were allocated to the three study conditions. Group A participated in cognitive therapy, Group B received schema therapy, and Group C remained on the waiting list. After completion of the therapeutic programs, all three groups underwent the posttest assessment, and the same assessments were repeated two months later to evaluate the maintenance of treatment effects.

2.2. Measures

Body Mass Index. Body mass index (BMI) was used as the principal anthropometric index for determining overweight status and evaluating weight-related change in the participants. BMI represents an individual's body weight relative to height and is calculated by dividing body weight in kilograms by the square of height in meters (kg/m²). In adults, a BMI ranging approximately from 18.5 to 24.9

kg/m² is generally considered within the normal-weight range, whereas a BMI of 25 kg/m² or higher indicates overweight status. In the present study, height and body weight were assessed at baseline to calculate BMI and determine eligibility for participation. Only women with a BMI greater than 25 kg/m² who also met the criteria for bulimia nervosa were included in the sample. Weight-related measurements were subsequently obtained during the posttest and two-month follow-up assessments to determine changes following cognitive therapy and schema therapy. The BMI measure therefore served both as an eligibility criterion and as an objective indicator associated with the primary study outcome of weight reduction.

Assessment of Bulimia Nervosa. The presence of bulimia nervosa was established as part of the participant screening procedure before entry into the study. Women referred to the participating counseling centers were initially evaluated by psychologists and psychiatrists, and a bulimia nervosa assessment was administered to identify individuals presenting with symptoms consistent with the disorder. The screening procedure was used in conjunction with professional clinical judgment to determine whether potential participants met the required criteria for bulimia nervosa. Only women who demonstrated the relevant symptoms and fulfilled the study's eligibility requirements were included. The bulimia nervosa assessment was therefore primarily employed as a screening and participant-selection measure rather than as the principal outcome variable, whereas weight and BMI-related measures were used to evaluate the effects of the interventions across the pretest, posttest, and follow-up stages.

2.3. Interventions

Schema Therapy Protocol. Participants assigned to the schema therapy group received a ten-session intervention based on the schema therapy framework developed by Young and colleagues. The first session focused on establishing therapeutic rapport, introducing participants to the group process, providing psychoeducation concerning the psychological dimensions of bulimia nervosa, and explaining the rationale, objectives, and potential mechanisms of schema therapy. Difficulties experienced by participants, particularly those associated with body image and assertiveness, were conceptualized within a schema-based framework. During the second session, participants examined objective evidence supporting or contradicting their maladaptive schemas by reviewing experiences from

both their current and past lives, and maladaptive schemas were compared with healthier and more adaptive alternatives. The third session introduced cognitive schema therapy techniques, including testing the validity of schemas, developing alternative interpretations of evidence that appeared to confirm maladaptive schemas, and evaluating the advantages and disadvantages of existing coping styles. In the fourth session, emphasis was placed on strengthening the concept of the Healthy Adult mode, identifying unmet emotional needs, and teaching strategies for accessing and expressing previously blocked or suppressed emotions. The fifth session focused on developing healthier interpersonal communication and using imagery-based or imaginary-dialogue exercises to process problematic emotional experiences. During the sixth session, experiential techniques were introduced, including guided imagery of distressing or problematic situations and systematic confrontation with situations that were particularly difficult for participants. The seventh session addressed the therapeutic relationship, relationships with significant individuals in participants' lives, and the use of role-playing techniques to explore and modify dysfunctional interpersonal patterns. During the eighth session, participants practiced healthier behavioral responses through role-play and completed therapeutic assignments designed to establish new and more adaptive behavioral patterns. The ninth session focused on comparing the advantages and disadvantages of healthy and unhealthy behaviors, identifying obstacles to behavioral change, and developing strategies for overcoming those barriers. Finally, the tenth session was devoted to reviewing the major concepts and skills covered throughout the intervention, consolidating therapeutic gains, practicing acquired strategies, and strengthening participants' ability to apply schema-based cognitive, emotional, interpersonal, and behavioral skills after termination of the structured sessions.

Cognitive Therapy Protocol. Participants in the cognitive therapy group received an eight-session group-based cognitive therapy program. The first session was devoted to introducing group members to one another, establishing group rules and expectations, and providing general psychoeducation about bulimia nervosa, overweight, and their associated psychological difficulties. Participants were introduced to the concepts of automatic thoughts, body image, and assertiveness, as well as the influence of these processes on mood, emotional experiences, eating behavior, and episodes of overeating. In the second session, participants identified individual and interpersonal

therapeutic goals, with particular attention given to interpersonal relationships and the ways in which maladaptive interpersonal patterns could influence emotional states and eating behaviors. The third session focused on strategies for managing reactions to other people's comments and judgments, particularly those related to appearance or eating, and included instruction and group practice in relaxation techniques intended to reduce psychological and physiological arousal. In the fourth session, participants examined the role of negative automatic thoughts and irrational beliefs in quality of life, overeating, assertiveness, body image, and related psychological experiences, and were introduced to the cognitive formulation linking thoughts, emotions, and behaviors. During the fifth session, participants learned strategies for identifying and modifying negative thoughts and were encouraged to replace maladaptive internal dialogue with more balanced and constructive self-statements. The sixth session concentrated on assertiveness and self-expression, including the ability to communicate opinions calmly, establish appropriate interpersonal boundaries, and cope adaptively with negative feedback from others. The seventh session introduced structured problem-solving strategies and emphasized their application to everyday difficulties, emotional challenges, interpersonal conflicts, and situations associated with maladaptive eating behavior. The eighth and final session consisted of a comprehensive review and consolidation of the skills introduced throughout treatment, discussion of participants' progress, identification of strategies for maintaining therapeutic gains, future-oriented planning, and the formulation of personal goals intended to support continued adaptive cognitive and behavioral functioning after completion of treatment.

2.4. Data Analysis

Data were analyzed using both descriptive and inferential statistical procedures. Descriptive statistics, including frequency distributions, means, and standard deviations, were used to summarize the demographic and study variables and to describe changes in the outcome measures across the pretest, posttest, and two-month follow-up assessments. To determine whether changes in weight differed significantly across time and between the three study groups, repeated-measures analysis of variance was employed. This analysis allowed simultaneous evaluation of the effect of measurement time, the effect of treatment group, and the interaction between time and group, thereby

determining whether the pattern of change from pretest to posttest and follow-up differed among participants receiving cognitive therapy, schema therapy, and the control condition. When statistically significant differences were identified, the Bonferroni post hoc test was used to conduct adjusted pairwise comparisons between measurement occasions and treatment conditions while controlling for inflation of the Type I error rate resulting from multiple comparisons. All statistical analyses were conducted using IBM SPSS Statistics version 22.

3. Findings and Results

The final sample consisted of 45 women with bulimia nervosa and overweight status, with participants equally allocated to the cognitive therapy, schema therapy, and control groups, such that each group included 15 participants (33.3% of the total sample). Regarding age, the majority of participants were aged 41 years or older in all three groups. Specifically, 10 participants (66.7%) in the cognitive therapy group, nine participants (60.0%) in the schema therapy

group, and nine participants (60.0%) in the control group were aged 41 years or older. In the cognitive therapy group, two participants (13.3%) were aged 20–30 years and three (20.0%) were aged 31–40 years; in the schema therapy group, three participants (20.0%) were aged 20–30 years and three (20.0%) were aged 31–40 years; and in the control group, two participants (13.3%) were aged 20–30 years and four (26.7%) were aged 31–40 years. With respect to educational attainment, the largest proportion of participants in the cognitive therapy group held a bachelor's degree ($n = 7$, 46.7%), followed by a master's degree or higher ($n = 5$, 33.3%) and a high-school diploma ($n = 3$, 20.0%). In the schema therapy group, six participants (40.0%) held a bachelor's degree, six (40.0%) had a master's degree or higher, and three (20.0%) had a high-school diploma. In the control group, the reported frequencies indicated that six participants held a bachelor's degree and seven had a master's degree or higher, while one participant held a high-school diploma; therefore, educational information for one participant in this group was not reported in the source data.

Table 1

Descriptive Statistics for Weight Across the Three Measurement Stages by Study Group

Variable	Group	Pretest M	Pretest SD	Posttest M	Posttest SD	Follow-up M	Follow-up SD
Weight	Schema therapy	28.80	0.327	24.80	0.430	23.90	0.530
Weight	Cognitive therapy	29.27	0.419	25.40	0.423	24.04	0.506
Weight	Control	27.12	0.345	28.29	0.439	27.83	0.466

As shown in Table 1, the descriptive results indicated a clear reduction in the mean values of the weight-related outcome from pretest to posttest in both intervention groups, whereas the control group did not demonstrate a comparable pattern of improvement. In the schema therapy group, the mean decreased from 28.80 at pretest to 24.80 at posttest and further to 23.90 at the two-month follow-up. Similarly, the cognitive therapy group demonstrated a decline from a pretest mean of 29.27 to 25.40 at posttest and 24.04 at follow-up. In contrast, the mean in the control group changed from 27.12 at pretest to 28.29 at posttest and 27.83 at follow-up. Thus, descriptively, both cognitive therapy and schema therapy were associated with reductions in the outcome measure following treatment, and these improvements were generally maintained or continued through the follow-up period. The pattern of means also suggested that changes in both experimental groups were substantially greater than those observed in the control condition.

Before conducting the repeated-measures analysis of variance, the statistical assumptions underlying the parametric analyses were examined. The Kolmogorov–Smirnov test indicated that the distribution of the weight-related outcome did not significantly deviate from normality in any of the three groups; the test statistics were 0.63 ($p = .82$) for the cognitive therapy group, 0.80 ($p = .53$) for the schema therapy group, and 0.67 ($p = .74$) for the control group. The homogeneity of variance assumption was also supported by Levene's test, with nonsignificant results at pretest ($F = 1.677$, $p = .19$), posttest ($F = 0.541$, $p = .58$), and follow-up ($F = 0.612$, $p = .54$). The homogeneity of variance–covariance matrices was supported by Box's M test (Box's $M = 22.678$, $F = 1.693$, $p > .05$). Bartlett's test was statistically significant ($\chi^2 = 164.085$, $p < .01$), indicating sufficient associations among repeated measurements to justify the repeated-measures analysis. Mauchly's test of sphericity, however, was significant for the weight-related outcome ($W = .827$, $\chi^2 = 7.76$, $df = 2$, $p = .021$), indicating violation of the sphericity assumption. Accordingly, the

Greenhouse–Geisser correction was considered in interpreting the within-subject effects, with an estimated epsilon of .85.

Table 2

Repeated-Measures Analysis of Variance for Weight

Comparison	Effect	SS	df	MS	F	p	Partial η^2
All three groups	Time	9.970	2	5.845	15.320	<.001	.267
All three groups	Time $\times$ Group	5.363	4	1.572	4.120	.007	.164
All three groups	Group	25.659	2	12.830	1.559	.222	.069
Cognitive therapy vs. Control	Time	3.467	2	1.733	6.911	.005	.198
Cognitive therapy vs. Control	Time $\times$ Group	3.822	2	1.564	7.620	.003	.214
Cognitive therapy vs. Control	Group	7.511	1	7.511	0.894	.352	.031
Schema therapy vs. Control	Time	7.400	2	3.700	10.918	<.001	.281
Schema therapy vs. Control	Time $\times$ Group	6.289	2	3.144	9.279	.001	.249
Schema therapy vs. Control	Group	50.417	1	31.211	3.990	.056	.125

The repeated-measures analysis presented in Table 2 revealed a statistically significant main effect of time across the three study groups, $F = 15.320$, $p < .001$, partial $\eta^2 = .267$, demonstrating that the weight-related outcome changed significantly across the pretest, posttest, and follow-up assessments. More importantly, the Time $\times$ Group interaction was statistically significant, $F = 4.120$, $p = .007$, partial $\eta^2 = .164$, indicating that the trajectory of change over time differed significantly according to study condition. The overall between-group main effect, however, was not statistically significant, $F = 1.559$, $p = .222$, partial $\eta^2 = .069$. Separate analyses comparing each intervention with the control condition further clarified the treatment effects. For cognitive therapy compared with the control group, a significant effect of time was found, $F = 6.911$, $p = .005$, partial $\eta^2 = .198$, together with a significant Time $\times$ Group interaction, $F = 7.620$, $p = .003$, partial $\eta^2 = .214$. These findings indicate that changes across the measurement

occasions differed significantly between participants receiving cognitive therapy and those in the control condition. The between-group main effect averaged across measurement occasions was not significant, $F = 0.894$, $p = .352$. Likewise, comparison of schema therapy with the control group demonstrated a significant effect of time, $F = 10.918$, $p < .001$, partial $\eta^2 = .281$, and a significant Time $\times$ Group interaction, $F = 9.279$, $p = .001$, partial $\eta^2 = .249$. The corresponding between-group main effect approached but did not reach the conventional level of statistical significance, $F = 3.990$, $p = .056$, partial $\eta^2 = .125$. Collectively, the significant interaction effects indicate that both therapeutic conditions produced patterns of change over time that differed from those observed in the control group, whereas the nonsignificant overall group effects indicate that the groups did not differ significantly when scores were averaged across all measurement occasions.

Table 3

Bonferroni Post-Hoc and Pairwise Comparisons for Weight

Comparison	Mean Difference	p
Cognitive therapy: Pretest vs. Posttest	0.467	.004
Cognitive therapy: Pretest vs. Follow-up	0.333	.012
Cognitive therapy: Posttest vs. Follow-up	-0.133	.494
Schema therapy vs. Control	-1.178	.056

The post-hoc comparisons presented in Table 3 provided further information concerning the pattern of change associated with treatment. In the cognitive therapy condition, the Bonferroni-adjusted comparison between pretest and posttest was statistically significant (mean difference = 0.467, $p = .004$), indicating a significant

improvement following the intervention. The difference between pretest and the two-month follow-up assessment was also statistically significant (mean difference = 0.333, $p = .012$), showing that the improvement remained evident during the follow-up period. In contrast, the difference between posttest and follow-up was not statistically

significant (mean difference = -0.133 , $p = .494$). The absence of a significant posttest-to-follow-up difference indicates that the treatment effect achieved following cognitive therapy was generally maintained over the subsequent two months rather than showing a significant reversal. For schema therapy, the reported pairwise comparison between the schema therapy and control groups yielded a mean difference of -1.178 and approached, but did not reach, conventional statistical significance ($p = .056$). Nevertheless, the significant Time $\times$ Group interaction obtained in the repeated-measures analysis for schema therapy versus the control group ($p = .001$) indicates that the longitudinal pattern of change differed significantly between the two conditions. Taken together with the descriptive findings, these results support the effectiveness of both cognitive therapy and schema therapy in producing favorable changes over time among women with bulimia nervosa, while the overall analysis did not demonstrate a statistically significant general between-group effect averaged across measurement occasions.

4. Discussion

The present study compared the effectiveness of cognitive therapy and schema therapy in reducing weight among women with bulimia nervosa and examined whether treatment-related changes were maintained at a two-month follow-up. The findings showed a significant effect of time on the weight-related outcome and, more importantly, a significant Time $\times$ Group interaction, indicating that the pattern of change across pretest, posttest, and follow-up differed among the cognitive therapy, schema therapy, and control groups. Participants in both intervention conditions demonstrated reductions in the weight-related outcome from pretest to posttest, whereas the control group did not show a comparable improvement. The changes observed in the intervention groups were generally maintained during follow-up. Separate analyses further indicated significant Time $\times$ Group interactions when cognitive therapy was compared with the control group and when schema therapy was compared with the control group. In the cognitive therapy group, Bonferroni comparisons showed significant differences from pretest to posttest and from pretest to follow-up, while the posttest-to-follow-up difference was nonsignificant, suggesting maintenance of treatment gains. For schema therapy, the longitudinal interaction with the control group was significant, although the overall pairwise difference between schema therapy and control averaged

across measurement occasions did not reach conventional statistical significance. Finally, the overall between-group effect across the three groups was nonsignificant, indicating that neither intervention demonstrated clear statistical superiority when scores were averaged across all measurement stages. Overall, these findings suggest that both cognitive therapy and schema therapy can contribute to favorable weight-related changes among women with bulimia nervosa, particularly when change is considered longitudinally rather than solely through an overall between-group comparison.

The effectiveness of cognitive therapy observed in the present study is consistent with the theoretical proposition that dysfunctional thoughts and beliefs concerning eating, body shape, weight, self-control, and personal worth are central mechanisms in bulimic behavior. Cognitive interventions seek to identify automatic thoughts and irrational assumptions, examine their validity, and replace them with more balanced and adaptive interpretations. In women with bulimia nervosa, rigid beliefs such as equating self-worth with body weight, perceiving minor dietary deviations as complete failure, or interpreting negative emotional states as uncontrollable may contribute to recurrent cycles of restriction, overeating, guilt, and compensatory behavior. By modifying these patterns, cognitive therapy may reduce the emotional and behavioral triggers associated with uncontrolled eating and facilitate more stable weight-management behaviors. The present findings are compatible with evidence showing that cognitive-behavioral approaches can improve body-image-related outcomes and reduce maladaptive eating processes in women (Sartipi et al., 2021; Yousefi et al., 2021). They are also consistent with cognitive-behavioral models emphasizing that modification of dysfunctional appearance-related cognitions can produce clinically meaningful changes in body-related psychological functioning (Fang et al., 2020). Thus, the reduction observed following cognitive therapy may reflect not only direct changes in eating behavior but also changes in the cognitive interpretations that previously maintained ineffective attempts to regulate weight and food intake.

Another possible explanation for the effect of cognitive therapy concerns the structured behavioral and self-regulatory components incorporated into the intervention. Participants were taught to identify the relationships among thoughts, emotions, and behaviors; challenge negative cognitions; use positive and adaptive self-statements; develop assertiveness; apply relaxation strategies; and use

systematic problem-solving skills. These techniques may have enhanced participants' capacity to manage situations that previously triggered emotional eating or binge episodes. Cognitive-behavioral treatment principles emphasize that changing eating-related behavior requires more than increasing knowledge about diet; individuals must also develop alternative responses to distress, interpersonal pressure, self-criticism, and perceived failure (Zarb, 2019). This interpretation is supported by research emphasizing the complex relationship between binge-eating behavior and weight control. Attempts to control weight through rigid or maladaptive strategies can perpetuate binge eating, whereas interventions that simultaneously target cognitive and behavioral mechanisms may produce more sustainable outcomes (Cooper et al., 2020). The significant maintenance of change from pretest to follow-up in the cognitive therapy condition is therefore clinically meaningful, because it suggests that participants may have continued to apply acquired cognitive and behavioral strategies after the intervention ended rather than depending exclusively on therapist contact.

The cognitive therapy findings can also be interpreted in relation to body image and self-evaluation. Body dissatisfaction is highly relevant to bulimic psychopathology because negative perceptions of body shape can trigger dietary restriction, emotional distress, compensatory behavior, and repeated efforts at weight control. Research has demonstrated that body-related self-concept and weight-control behaviors are connected to broader aspects of self-esteem and sociocultural expectations (Bani Fatemeh et al., 2020). Likewise, physical self-concept is associated with broader psychological and quality-of-life outcomes among women (Ghaffari & Ozabli, 2021). If cognitive therapy reduced distorted interpretations of appearance and helped participants evaluate their bodies in a less rigid and self-critical manner, this may have weakened the cycle connecting negative body evaluation with overeating and ineffective weight-control attempts. Previous studies showing beneficial effects of cognitive-behavioral interventions on body image and binge eating provide additional support for this explanation (Sartipi et al., 2021; Yousefi et al., 2021). Accordingly, cognitive therapy may facilitate weight-related improvement not by intensifying concerns about body size, but by promoting more realistic cognition, greater self-regulation, and less emotionally reactive eating behavior.

The significant longitudinal effect observed for schema therapy is also consistent with previous research indicating

that early maladaptive schemas represent important psychological vulnerabilities in eating disorders. Schema therapy conceptualizes persistent behavioral problems as expressions of deeply rooted cognitive-emotional structures formed through interactions among temperament, early experiences, and unmet emotional needs. A systematic review has shown that maladaptive schemas are meaningfully implicated across eating-disorder presentations, supporting the relevance of schema-level processes to the persistence of dysfunctional eating behavior (Maher et al., 2022). Research on positive schemas in eating-disorder populations likewise suggests that both maladaptive and adaptive schema structures may be relevant to psychological functioning in individuals with eating disorders (Huckstepp et al., 2023). In the present study, schema therapy included cognitive restructuring, evaluation of evidence for and against schemas, emotional processing, imagery, role playing, modification of coping styles, strengthening of the Healthy Adult mode, and practice of healthier behaviors. These techniques may have reduced the tendency to use eating as a response to schema activation and may have enabled participants to regulate emotional distress through more adaptive mechanisms.

The present schema therapy findings are supported by several previous studies specifically involving women with bulimia nervosa. Schema therapy has been reported to improve self-worth and cognitive flexibility in women with bulimia nervosa (Khamarniya et al., 2024). These variables may be particularly important for reducing problematic eating because rigid thinking and negative self-evaluation can intensify reactions to perceived dietary failure or dissatisfaction with appearance. Schema therapy has also been shown to reduce rumination and depression and improve personality functioning among women with bulimia nervosa (Bagheri Sheikhangafsheh et al., 2024). Rumination may be especially relevant because repeated negative thinking can prolong emotional distress and increase vulnerability to maladaptive coping behaviors. Recent evidence has also demonstrated an association between negative perfectionism and bulimia nervosa through the mediating role of rumination (Rakhshan Haghighifard & Azad Yekta, 2026). Consequently, schema therapy may influence weight-related behavior partly by weakening rigid perfectionistic beliefs, reducing repetitive negative thinking, and developing more adaptive responses to perceived personal shortcomings. Earlier findings demonstrating beneficial effects of schema therapy on bulimia nervosa and stress among women with obesity are

also consistent with this interpretation (Narimani & Nemati, 2021).

Emotion regulation constitutes another plausible mechanism through which schema therapy may have produced the observed changes. Women with bulimic symptoms frequently experience difficulties tolerating and regulating negative affect, and overeating may function as an immediate but maladaptive strategy for reducing emotional discomfort. Research comparing overweight women with bulimia nervosa and other overweight women has indicated clinically meaningful differences in self-compassion, emotion-regulation difficulties, and mindfulness (Almasi, 2022). Other therapeutic research has demonstrated that improving emotional processing can reduce body-image dissatisfaction, maladaptive cognitive emotion regulation, and impulsivity in women with bulimia nervosa (Vatankhah et al., 2025). Similarly, adaptive coping and self-compassion appear to vary alongside bulimic symptoms in women's daily experiences (Katan & Kelly, 2023). Schema therapy directly addresses unmet emotional needs, blocked affect, maladaptive coping responses, and emotional modes. Consequently, the intervention may have helped participants recognize emotional triggers for overeating and replace avoidance or self-soothing through food with healthier emotion-regulation strategies. This mechanism could contribute to the progressive reduction observed across posttest and follow-up.

The present findings are also consistent with studies examining schema therapy in obesity and emotional eating. Schema therapy has demonstrated beneficial effects on emotion regulation and attitudes toward eating among women with obesity (Mohammadian Amiri et al., 2024). Furthermore, schema therapy has been associated with changes in avoidance coping and body mass index among obese individuals with emotional eating (Najjar Kakhaki et al., 2024). Irani and colleagues likewise found schema therapy to be useful for emotional adjustment, body image, and weight loss among individuals with obesity and problematic eating patterns (Irani et al., 2021). These findings provide a plausible context for understanding the current results: when eating behavior is maintained by emotional avoidance, maladaptive schemas, or negative body-related self-perceptions, addressing these underlying processes may indirectly facilitate healthier eating patterns and weight change. Schema-focused treatment may therefore be particularly valuable when weight-management difficulties are embedded in broader personality, emotional,

and interpersonal patterns rather than being limited to isolated dietary behavior.

Importantly, the present study did not demonstrate clear superiority of one intervention over the other. This finding is consistent with research suggesting that schema therapy and cognitive-behavioral approaches may both improve body image and broader psychological functioning among women with obesity (Pakandish et al., 2020). Although these therapeutic models differ conceptually, they also contain overlapping mechanisms. Both encourage individuals to identify maladaptive thoughts, reconsider dysfunctional beliefs, increase awareness of triggers, develop healthier coping responses, and practice adaptive behavior. Cognitive therapy may exert its effects primarily through present-focused modification of automatic thoughts, beliefs, and behavioral patterns, whereas schema therapy extends these processes by addressing longstanding cognitive-emotional structures and developmental patterns. When the principal outcome is weight-related change over a relatively short period, these distinct pathways may ultimately produce similar behavioral consequences. The lack of a significant overall difference between the treatments therefore does not imply that they operate identically; rather, it may indicate that both are capable of influencing different mechanisms that converge on healthier eating and improved regulation of weight-related behavior.

The absence of clear superiority can also be understood in light of the multifactorial nature of bulimia nervosa. Recovery does not depend on a single psychological variable. Motivation for recovery, perceived control, coping style, self-compassion, body image, emotion regulation, interpersonal functioning, perfectionistic beliefs, and repetitive negative thinking may all influence therapeutic response (Katan & Kelly, 2023; Rakhshan Haghighifard & Azad Yekta, 2026; Van Huyssteen, 2025). Similarly, neurobiological research indicates that body-image processing in bulimia nervosa involves complex neural systems rather than merely consciously endorsed beliefs about appearance (Norrlin & Baumann, 2025). It is therefore plausible that different patients benefit through different therapeutic pathways. Participants dominated by distorted automatic thoughts and maladaptive eating rules may respond particularly well to cognitive therapy, whereas those with more enduring interpersonal difficulties, emotional deprivation, perfectionism, or entrenched negative self-schemas may obtain greater benefit from schema therapy. Group-level comparisons may obscure such individual differences, especially in relatively small samples.

The maintenance of treatment-related changes at follow-up is another important finding. Eating and weight-related problems often involve chronic or recurrent patterns, and short-term improvement does not necessarily indicate lasting therapeutic benefit. The lack of significant deterioration between posttest and follow-up in the cognitive therapy group and the continued favorable descriptive pattern in schema therapy suggest that participants may have retained and continued using the skills learned during treatment. Schema therapy may support maintenance through increased awareness of recurrent schemas and coping styles, while cognitive therapy may support it through continued identification and restructuring of dysfunctional thoughts and application of problem-solving strategies. The importance of maintaining adaptive coping is especially relevant in bulimia nervosa because daily fluctuations in emotional states and self-evaluation can increase vulnerability to relapse (Katan & Kelly, 2023). Similarly, intervention effects on body-image and cognitive-emotional functioning may help reduce the likelihood that future episodes of distress automatically lead to maladaptive eating behavior.

5. Conclusion

Taken together, the findings indicate that both cognitive therapy and schema therapy represent potentially useful psychological approaches for overweight women with bulimia nervosa. The significant Time $\times$ Group effects are particularly important because they demonstrate that the course of change over time differed according to treatment condition, even though the overall between-group main effect was not statistically significant. This distinction suggests that assessment of therapeutic effectiveness should consider trajectories of change rather than relying solely on averaged group differences. Cognitive therapy may facilitate improvement through modification of dysfunctional automatic thoughts, enhancement of problem solving and assertiveness, and development of more adaptive cognitive responses to food, weight, and body image. Schema therapy may achieve similar behavioral outcomes by modifying deeper maladaptive schemas, reducing schema-driven emotional distress, strengthening adaptive modes, and changing dysfunctional coping strategies. The convergence of these pathways may explain why both interventions were associated with favorable outcomes without one demonstrating unequivocal superiority. Clinically, the findings support a psychologically informed approach to

weight-related difficulties in bulimia nervosa in which interventions address the cognitive and emotional mechanisms surrounding eating behavior rather than treating excessive weight as an isolated physical problem.

6. Limitations and Suggestions

Several limitations should be considered when interpreting the findings. First, the sample was relatively small and consisted of women attending psychological and nutritional counseling centers in one district of Tehran, which restricts the generalizability of the findings to women in other geographical, socioeconomic, cultural, or clinical settings. Second, convenience sampling may have produced selection bias because women who voluntarily attended treatment centers and agreed to participate may differ from individuals with bulimia nervosa who do not seek psychological services. Third, participant attrition occurred before completion of the study, and six initially selected individuals were excluded because of repeated absences or insufficient cooperation. Fourth, the study focused primarily on a weight-related outcome and did not simultaneously evaluate a broader set of clinically important variables such as binge-eating frequency, compensatory behaviors, body dissatisfaction, emotion regulation, maladaptive schemas, self-esteem, or quality of life. Fifth, the two-month follow-up period was relatively brief and therefore cannot establish whether the observed treatment gains persist over longer periods. Finally, although both interventions were delivered in a structured group format, therapist-related variables, adherence to therapeutic techniques, treatment fidelity, concurrent lifestyle changes, and participants' dietary or physical-activity behaviors were not comprehensively controlled.

Future research should replicate the study with larger samples recruited from multiple clinical centers and different geographical areas to improve statistical power and external validity. Randomized controlled trials with longer follow-up periods, such as six months or one year, would provide stronger evidence concerning the stability of treatment effects and the likelihood of relapse. Future studies should assess not only body weight or BMI but also the core symptoms of bulimia nervosa, including binge-eating episodes, compensatory behavior, body dissatisfaction, eating attitudes, and preoccupation with weight and shape. Researchers should additionally examine potential mediating mechanisms such as cognitive flexibility, early maladaptive schemas, rumination, perfectionism, self-

compassion, emotion regulation, and coping strategies to determine how each treatment produces change. Moderator analyses could identify whether specific patient characteristics predict better response to cognitive therapy or schema therapy, thereby contributing to personalized treatment selection. Comparative research involving additional evidence-based interventions and combined treatment protocols would also help determine whether integrating cognitive and schema-focused techniques produces greater or more durable effects than either approach alone.

Mental health professionals working with women who experience both bulimic eating patterns and overweight should consider incorporating structured psychological interventions alongside appropriate nutritional and medical care. Cognitive therapy may be particularly useful when maladaptive automatic thoughts, rigid dietary beliefs, negative self-talk, and ineffective problem-solving strategies are prominent, whereas schema therapy may be considered when eating difficulties appear closely connected to longstanding emotional patterns, persistent negative self-beliefs, maladaptive coping styles, or recurrent interpersonal difficulties. Clinicians should assess the individual psychological mechanisms associated with binge eating and weight-control behavior before selecting an intervention rather than relying exclusively on body weight as a treatment indicator. Treatment programs should also include relapse-prevention planning and follow-up contact to support maintenance of therapeutic gains. Counseling and nutritional centers can benefit from multidisciplinary cooperation among psychologists, psychiatrists, physicians, and nutrition professionals so that weight management does not inadvertently intensify restrictive eating, body dissatisfaction, or compensatory behavior. Finally, psychoeducational programs for women with bulimic symptoms should emphasize adaptive emotion regulation, realistic body-related beliefs, flexible eating-related thinking, healthy coping, and sustainable behavioral change rather than rigid or punitive approaches to weight control.

Authors' Contributions

Authors equally contributed to this article.

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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