Shorter communication

Short-term Cognitive-Behavioral Therapy for Binge Eating Disorder: Long-term efficacy and predictors of long-term treatment success

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A B S T R A C T

The present study evaluates the long-term efficacy (four years after treatment) of a short-term Cognitive-Behavioral Treatment (CBT) of Binge Eating Disorder (BED). We examined patient characteristics, mostly measured at the end of treatment, for their predictive value of long-term success. Forty-one BED-patients between 18 and 70 years took part in a randomized controlled trial (RCT) for a short-term treatment and were evaluated until 4 years after treatment. Assessments comprised structured interviews on comorbid mental disorder/eating disorder pathology and questionnaires on eating disorder pathology/general psychopathology. BED core symptoms and associated psychopathology improved substantially during treatment phase and further improved or at least remained stable during the follow-up period. End of treatment predictors for long term success were elevated weight and eating concern and higher frequency of objective binges. Tailoring additional interventions to patients’ individual needs could further improve treatment efficacy.

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Introduction

Binge Eating Disorder (BED), characterized as recurrent binge eating accompanied by the feeling of loss of control over eating without regular compensatory behavior, is introduced in the DSM-V as a new eating disorder category with minor adaptations of the research criteria of DSM-IV-R (lower required frequency and duration of binge eating episodes; American Psychiatric Association, 2013). BED represents the most common eating disorder, with prevalences in population-based studies ranging from 0.7 to 6.6% and is usually accompanied by elevated body weight and comorbid mental disorders (Gruzza, Przybeck, & Cloninger, 2007; Westenhofer, 2001; Yager, 2008). Cognitive-Behavioral Therapy (CBT) seems to be one of the most efficacious treatments for BED regarding binge eating and general eating disorder pathology (Vocks et al., 2010; Wilson, Wilfley, Agras, & Bryson, 2010). Given the high prevalences, especially in obese populations, and considerable long-term morbidity, facilitated accessibility of efficacious treatment options is indispensable. For this reason, shorter cost-effective versions of CBT or self-help treatments have recently been developed (Beintner, Jacobi, & Schmidt, 2014; Masheb & Grilo, 2008a; Perkins, Murphy, Schmidt, & Williams, 2009; Peterson et al., 2000; Schlup, Munsch, Meyer, Margraf, & Wilhelm, 2009). In a prior non-randomized study of our group short-term CBT revealed a comparable treatment effect to a 16-sessions CBT at 1-year follow-up (Schlup, Meyer, & Munsch, 2010). However, to our knowledge, up to now no data is available on long-term efficacy beyond two years for either self-help or treatments with a frequency of beyond 10 to 20 active treatment sessions.

Another important issue in treatment research on BED is the identification of predictors of treatment efficacy in order to adapt interventions to patients’ individual needs or the needs of subgroups of patients (Kraemer, Wilson, Fairburn, & Agras, 2002). Recent research revealed that higher frequency of binge eating and elevated eating disorder pathology at baseline had a negative influence on treatment efficacy (Castellini et al., 2012; Hilbert,
Saelens, et al., 2007; Masheb & Grilo, 2008a; Munsch, Meyer, & Biedert, 2012; Peterson et al., 2000; Wilson et al., 2010). Additionally, rapid response defined as early symptom improvement during treatment turned out to be a robust within-treatment predictor of therapy outcome immediately after treatment and during follow up (Grilo, White, Wilson, Gueorguieva, & Masheb, 2012; Munsch et al., 2012; Schlup et al., 2010). However, up to now post-treatment predictors of long-term outcome have not been identified. The identification of post-treatment predictors of long-term outcome will help to identify persons who are at risk to relapse and are in need of tailored interventions after initial treatment.

Our study aim was first to evaluate the long-term efficacy of a short-term treatment of BED during a 4-year follow-up period in terms of binge eating, eating disorder pathology, BMI and general psychopathology. Second, we attempted to identify post-treatment predictors (number of objective binge episodes, eating disorder pathology, negative-affect subtype, BMI, general life satisfaction, self-efficacy) of treatment success (abstainer rate and number of objective binge episodes) during the 4-year follow-up course. As rapid response measured during early treatment phase was of high negative predictive value for treatment success in several studies (Grilo et al. 2012; Munsch et al., 2012; Schlup et al., 2010), we additionally included this predictor, which was measured before the end of treatment.

**Methods**

**Participants**

Forty-one patients met the research criteria for BED according to DSM-IV (American Psychiatric Association, 2000) and took part in a randomized controlled trial conducted at the University of Basel (description see below). Participants were recruited through newspaper advertisements and flyers, they had to be aged between 18 and 70 years and to meet full diagnostic criteria for BED. Exclusion criteria were severe mental disorders, pregnancy, and participation in other psychotherapy/weight loss programs. The local ethics committee approved the treatment trial, and all participants provided written informed consent. In the present study, 26 participants still participated at 4-year follow up (see participant flow chart, Fig. 1). In the initial study of Schlup et al. (2009) only

Fig. 1. Participant flow chart, according Consort guidelines, www.consort-statement.org.
female participants \((n = 36)\) were included in the analyses. In this current study the few male patients were also included in order to increase statistical power, resulting in a total sample of 41 participants. Analyses of the primary outcomes remission from binge eating and number of objective binge eating episodes revealed that there were no significant differences in the temporal trajectories between males and females, neither during active treatment nor during follow-up (interaction “time during treatment \(\times\) sex” and “time during follow-up \(\times\) sex”, p-values > 0.33 in both cases).

**Study design and treatment protocol**

The study design was a randomized controlled trial, which aimed at investigating the efficacy of a shortened version of a 16-sessions group CBT that had previously demonstrated efficacy for BED (Munsch et al., 2007; Schlup et al., 2009). Participants were randomly assigned to either immediate treatment or the waitlist control group (permutated block design). After completion of the active treatment phase, the waitlist group also entered treatment. The active treatment phase comprised eight weekly 90-min group active treatment phase, the waitlist group also entered treatment. The active treatment phase comprised eight weekly 90-min group sessions, followed by five 90-min booster sessions over 12 months (1, 2, 3, 6 and 12 months after active treatment) led by trained CBT psychotherapists and co-therapists (master students). Content of treatment encompasses the identification of triggers of binge eating and the development of individual strategies in order to cope with the urge to binge eat. Please refer to the initial paper of Schlup et al. (2009) regarding the assessment and findings of treatment integrity, therapeutic competence and suitability of treatment.

**Assessments**

**BED-diagnoses and comorbid mental disorders**

Current and lifetime mental disorders were assessed face to face at baseline and by telephone at 4-year follow-up in order to reduce subject burden, using the structured interview “Diagnostisches Interview für psychische Störungen, DIPS” according to the DSM-IV-TR (Margraf, Ehlers, & Schneider, 1994; Wittchen, Zaudig, & Fydrich, 1997). BED diagnosis was assessed similarly based on the Eating Disorder Examination Interview with established reliability and sensitivity to track changes in eating disorder psychopathology (EDE; German version by Hilbert, Tuschen-Caffier, & Ohms, 2004), and on a self-developed short structured interview according to DSM-IV TR criteria, as at that time the DIPS did not include a BED-section.

**Eating disorder pathology**

The self-report version of the EDE (EDE-Q; German version by Hilbert & Tuschen-Caffier, 2006), with well-established psychometric properties (Hilbert, Tuschen-Caffier, Karwautz, Niederhofer, & Munsch, 2007; Reas, Grilo, & Masheb, 2006), was subsequently administered repeatedly until 4-year follow-up (end of treatment, 3-, 6-, 12-months and 4-year follow-up). The EDE-Q (and the EDE) assesses the number of objective binge episodes (OBEs; i.e., binge eating defined as consuming objective unusually large quantities of food during the last 28 days with a subjective sense of loss of control), from which abstainer rates have been inferred (proportion of patients not experiencing any OBEs). In addition, they provide four subscales, reflecting the severity of eating disorder pathology (dietary restraint, eating concern, weight concern, and shape concern), the scores ranging from 0 to 6, with higher scores reflecting greater severity of eating disorder psychopathology. According to Masheb and Grilo, overvaluation of shape and weight was built from the two subscales weight and shape concern of the EDE-Q as this composite scale has been shown to differentiate well between two important clusters of eating disorder pathology (Masheb & Grilo, 2008b).

In addition, we used a self-developed questionnaire to record ‘self-reported weekly binges’ at different measurement points (i.e., weekly during the active treatment phase, and at 3-, 6-, 12-month, and 4-year follow-up), where participants indicated ‘episodes of overeating during which you felt out of control during the past week” (Munsch et al., 2012). The assessment of weekly binges with a self-report questionnaire has been shown to have high convergent validity relative to ecological momentary assessment (Munsch et al., 2009).

**Body Mass Index**

Weight and height were measured on an electronic balance scale (Seca, Vogel & Halke, Germany) and by a stadiometer, except at 4-year follow-up, where participants self-reported weight and height. Body Mass Index (BMI) was calculated as weight in kilograms divided by the square of height in meters \((\text{kg/m}^2)\).

**Depression and anxiety symptoms**

Participants completed the German versions of the Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI), two well-established self-report measures of the symptoms of depression, negative affect and anxiety, with good psychometric properties (Hautzinger, Bailer, Worall, & Keller, 1994; Margraf & Ehlers, 2007). The BDI encompasses 20 items, the BAI 21 items on typical depressive/anxiety symptoms with a 4-point Likert-scale.

**General life satisfaction**

The questionnaire on life satisfaction, “Fragebogen zur Lebenszufriedenheit” (FLZ; Henrich & Herschbach, 1998) assesses general life satisfaction within a wide range of different aspects (friends, hobbies, health, revenues, work, family, sexuality) and has been shown to have good psychometric properties (Henrich & Herschbach, 2000).

**General self-efficacy**

The General Self-Efficacy Scale, “Allgemeine Selbstwirksamkeitsskala” (SWE; Jerusalem & Schwarzer, 1999), a self-report measure with 10 items, was used to assess participants’ belief about their capabilities to solve difficult problems and face critical situations. High reliability, stability as well as construct validity have been shown in different cultural contexts (Luszczynska, Scholz, & Schwarzer, 2005).

**Subcategorization**

Two predictor variables (rapid response and negative affect-subtype) were based on a subcategorization. Participants with a decline of at least 65% in number of self-reported weekly binges within the first four weeks of treatment were classified as rapid responders (according to Grilo, Masheb, & Wilson, 2006). Participants exceeding the BDI-cutoff of 18 at the end of treatment were classified within the negative affect subtype (according to Wilson et al., 2010). In this sample, 17 patients (41%) were classified as rapid responders and 11 (26%) were classified within the negative affect-subtype.

**Statistical analysis**

To analyze the data we used linear mixed models (Fitzmaurice, Laird, & Ware, 2004) for continuous or ordinal outcomes and logistic-normal models (Agresti, 2002) for dichotomous outcomes. To analyze the temporal course of outcomes across the 4-year follow-up period we used a discontinuous model (Singer &
Willett, 2003). Our model included two linear polynomials for the predictor time (ln[weeks]), one for the active treatment and one for the follow-up period which were estimated independently of each other with respect to the slope parameter. Thus this model predicts a shift in slope but no shift in level, with a turning point at the end of treatment. Primary outcomes included remission from binge eating and the number of OBEs. Secondary outcomes were the number of self-reported weekly binges, the four EDE-Q-scales dietary restraint, eating concern, shape concern, weight concern, and overvaluation of shape and weight, BMI, general life satisfaction, general self-efficacy, BDI, and BAI.

Predictors of follow-up were assessed for primary outcomes only and for the period end-of-treatment to 4-year follow-up. The model included time (ln[weeks]) (linear and quadratic polynomial) and the corresponding predictor measured at the end of treatment. We did not include pretreatment variables of the corresponding outcomes in order to avoid spurious correlations, since adjusting for pretreatment variables could remove part of the predictor effect, leading to biased results (Miller & Chapman, 2001).

Altogether we performed a total of 22 analyses (11 predictors × 2 outcomes). Due to the explorative nature of the study we did not correct error probabilities for multiple testing (Bender & Lange, 2001).

Results

Participants’ characteristics

Participants’ mean age was 45.6 (SD = 11.2). Altogether 33% of the patients suffered from at least one additional mental disorder at baseline, and 24% at 4-year follow-up (Table 1).

Temporal course

The probability of a diagnose for BED according to DSM-IV significantly declined from 100% at pretreatment to 4.6% at the end-of-treatment and remained constant (4.2%) at 4-year follow-up.

Primary outcomes (Tables 2 and 3)

The abstainer rate according to EDE-Q strongly increased during active treatment from less than 1% at pretreatment to c. 30% at the end of treatment and further improved, reaching four-year follow-up values of c. 67%. The number of OBEs significantly declined from 7.4 at pretreatment to 2.1 at the end of active treatment. During follow-up there was again a significant decline leading to c. 0.7 OBEs at 4-year follow-up. Thus abstainer rates increased by c. 66 percentage points and the number of OBEs decreased by more than 90% between pretreatment and 4-year follow-up.

Secondary outcomes (Tables 2 and 3)

Self-reported weekly binges, EDEQ-scales eating concern, shape concern and weight concern, and BDI-values all significantly decreased during active treatment whereas BMI, BAI-values, overvaluation of weight and shape (according to EDE-Q), life satisfaction, and self-efficacy all exhibited no temporal trend in that period. In contrast, the EDE-Q-scale dietary restraint significantly increased during active treatment. During follow-up EDEQ-scales eating concern, shape concern, weight concern, and overvaluation of weight and shape (according to EDE-Q), and BMI all decreased whereas for the remaining secondary outcomes no significant trend was found. Thus there was no indication of deterioration during follow-up for any of the investigated outcomes.

Discussion

The aim of the present study was for the first time to shed light on the following two research questions: The long-term efficacy of a short-term CBT followed by booster sessions in patients suffering from BED and the predictive role of end of treatment patient characteristics (number of OBEs, BMI, eating disorder pathology, general life satisfaction, self-efficacy, belongingness to the negative affect-subtype) regarding long-term treatment success. Our results have revealed a strong improvement of BED core symptoms during the treatment phase, followed by a further though less strong improvement during the follow-up period. Thus the probability of a BED diagnosis as well as the number of OBEs both significantly decreased and the abstainer rate significantly
### Table 2

Parameter estimates from linear and generalized linear mixed models for each outcome.

<table>
<thead>
<tr>
<th></th>
<th>Primary outcomes</th>
<th>Secondary outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EDEQ—abstainer rate</td>
<td>Number of OBEs (ln)</td>
</tr>
<tr>
<td></td>
<td>(ln)</td>
<td></td>
</tr>
<tr>
<td>Fixed coefficients</td>
<td>Slope —</td>
<td>1.990***</td>
</tr>
<tr>
<td></td>
<td>active treatment</td>
<td>0.472*</td>
</tr>
<tr>
<td>Random coefficients</td>
<td>Level 1 $\sigma_0^2$</td>
<td>1.789***</td>
</tr>
<tr>
<td></td>
<td>Level 2 Slope —</td>
<td>-0.077</td>
</tr>
<tr>
<td></td>
<td>active treatment</td>
<td>-0.085*</td>
</tr>
<tr>
<td></td>
<td>Level 2 Slope —</td>
<td>0.665</td>
</tr>
<tr>
<td></td>
<td>follow-up $\sigma_0^2$</td>
<td>0.031**</td>
</tr>
<tr>
<td></td>
<td>Level 2 correlation $\rho_{11}$</td>
<td>-0.556</td>
</tr>
<tr>
<td></td>
<td>Level 2 correlation $\rho_{12}$</td>
<td>-0.337</td>
</tr>
<tr>
<td>Pseudo $R^2$ statistics</td>
<td>$R^2_Y$</td>
<td>0.211*</td>
</tr>
<tr>
<td></td>
<td>$\hat{R}^2_Y$</td>
<td>-0.337</td>
</tr>
<tr>
<td>Goodness—of fit</td>
<td>AIC unconditional means model</td>
<td>220.8</td>
</tr>
<tr>
<td></td>
<td>AIC fitted model</td>
<td>179.0</td>
</tr>
</tbody>
</table>

$R^2_Y$: Correlation between observed and predicted values, $\hat{R}^2_Y$: Change in $\sigma_0^2$ between unconditional means model and unconditional growth model relative to unconditional means model.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

$1 - (\text{deviance of fitted model}/\text{deviance of unconditional means model})$.

b Based on the logit function of the probability of remission.
increased during active treatment. The values obtained at the end of treatment did not deteriorate during the 4-year follow-up but further improved slightly.

Self-reported weekly binges, eating disorder pathology (shape, weight and eating concern) and depressive symptoms, all significantly decreased during the treatment phase, but only eating concern, shape concern, weight concern, and overvaluation of weight and shape further improved during the follow-up period. Similar results were reported in the study of Fichter, Quadflieg, and Hedlund (2008) over a 12-years course, where significant symptom reductions in eating disorder pathology, general psychopathology and depressive symptoms were found. The lack of a decrease of depressive symptoms during follow-up in our study was also found in a previous study of Hilbert et al. (2012), examining the long-term treatment-success in patients suffering from BED. Interestingly, dietary restraint (measured by the EDE-Q) increased during active treatment. Some of the corresponding subscale items reflect potentially adaptive behaviors in the context of healthy weight loss goals, while others are more exclusively associated with eating disorder pathology. Thus, increasing dietary restraint does not necessarily represent a worsening of symptoms in this sample. Regarding BMI, as in other studies there was no significant change during the treatment phase (Vocks et al., 2010). However, there was a significant though small decline of BMI of 5% during the follow-up period. This is in line with previous studies that administered longer and more intensive treatments and that revealed a significant decline in BMI between three to six years after BED-treatment of approximately 5% (Munsch et al. 2012; Ricca et al. 2010). It should be kept in mind, that a decrease of BMI of 5% is associated with clinically relevant improvement of risk factors even though individual weight goals are probably unachievable (Tuomilehto et al., 2001).

Characteristics that are not explicitly targeted by a disorder-specific BED treatment such as anxiety, general life-satisfaction and self-efficacy did not improve during active treatment or follow-up. As such, levels of general life satisfaction were already high at baseline and measures of self-efficacy were low at baseline and remained comparable to values of persons suffering from coronary-heart diseases or cancer during follow-up (Tuszyńska et al., 2005). Anxiety scores at follow-up were still comparable in their degree of severity to those obtained by a treatment-seeking sample with subclinical anxiety disorder (Leyfer, Ruberg, & Woodruff-Borden, 2006). Thus, it seems noteworthy to further evaluate the role of anxiety regarding the maintenance of disordered eating behavior and decreased psychological well-being in BED patients (Keel, 2013). Future studies should further focus on the evaluation of additive modules after BED treatments such as training of emotion regulation (e.g. affect tolerance) as these can improve general psychopathology and self-efficacy (Tuszyńska et al., 2005).

Patients with higher frequency of OBES or elevated weight or eating concern at the end of treatment showed less favorable treatment success in terms of number of OBES and, for subjects with weight concern only, lowered remission rate during follow-up. This is contradictory to the results of Safer, Lively, Telch, and Agars (2002), where mainly dietary restraint at the end of treatment was predictive of relapse at 6-month follow-up. The comparison of the results of the two studies is hindered by methodological differences, since Safer and colleagues administered another treatment protocol (DBT vs. CBT), averaged weight and shape concern, indicated solely effect sizes and applied statistical analyses for dichotomous outcomes. Rapid response has shown to be a reliable predictor of treatment outcome (Grilo et al., 2012; Munsch et al., 2012; Schlip et al., 2010) but we didn’t find a corresponding effect in our short-term CBT at 4-year follow-up. In line with Grilo et al. (2012) we suggest that circumstances under which rapid response exerts its predictive effect should be further investigated.

Limitations of the current study are the small sample size limiting the validity of the findings. Further limitations refer to the generalizability of the findings, since our sample consisted mostly of women due to recruiting difficulties in the male population. We also cannot rule out that adding booster sessions to a short-term CBT influenced the effect of the initial treatment. When interpreting the long-term efficacy in this study it has to be taken into account that additional health care utilizations as well as the experience of adverse life events encountered by a substantial part of our participants may well have had an impact on the course of the symptomatology during subsequent 4-year follow-up. Reversely, persisting eating disorder or associated symptoms such as comorbid conditions may have led to additional treatment seeking. In order to lower subject burden at 4-year follow-up, solely self-report measures were applied and interviews were administered by telephone. Whereas the validity of self-report measures as well as telephone-based interviews seem to be comparable to face-to-face interviews when screening for diagnoses (Lee et al., 2010; Mond, Hay, Rodgers, Owen, & Beumont, 2004; Sysko et al., 2012), self-reporting height and weight is more critical.

**Conclusions**

In conclusion, short-term treatment followed by booster sessions for BED showed preliminary long-term efficacy in this study. Binge eating symptomatology as well as eating disorder pathology

**Table 3**

<table>
<thead>
<tr>
<th>Primary outcome</th>
<th>Baseline</th>
<th>End-of-treatment</th>
<th>12-month follow-up</th>
<th>4-years follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDEQ-abstainer rate (%)</td>
<td>0.67 (±0.48/1.62)</td>
<td>29.7 (±9.2/11.1)</td>
<td>51.8 (±10.2/10.1)</td>
<td>66.8 (±14.2/11.5)</td>
</tr>
<tr>
<td>Number of OBES</td>
<td>7.41 (±1.17/1.03)</td>
<td>2.06 (±0.50/0.43)</td>
<td>1.16 (±0.32/0.28)</td>
<td>0.72 (±0.40/0.33)</td>
</tr>
</tbody>
</table>

**Secondary outcome**

<table>
<thead>
<tr>
<th>Secondary outcome</th>
<th>Baseline</th>
<th>End-of-treatment</th>
<th>12-month follow-up</th>
<th>4-years follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of self-reported weekly binges (0 range to 20)</td>
<td>2.97 (±0.48/0.43)</td>
<td>0.87 (±0.19/0.17)</td>
<td>0.55 (±0.14/0.13)</td>
<td>0.36 (±0.21/0.18)</td>
</tr>
<tr>
<td>EDEQ-restraint eating (range 0–6)</td>
<td>1.76 (0.18)</td>
<td>2.17 (0.17)</td>
<td>1.93 (0.17)</td>
<td>1.77 (0.27)</td>
</tr>
<tr>
<td>EDEQ-eating concern (range 0–6)</td>
<td>2.43 (0.18)</td>
<td>1.65 (0.17)</td>
<td>1.25 (0.18)</td>
<td>0.98 (0.23)</td>
</tr>
<tr>
<td>EDEQ-shape concern (range 0–6)</td>
<td>4.05 (0.20)</td>
<td>3.68 (0.20)</td>
<td>3.12 (0.22)</td>
<td>2.75 (0.28)</td>
</tr>
<tr>
<td>EDEQ-weight concern (range 0–6)</td>
<td>3.49 (0.18)</td>
<td>3.15 (0.17)</td>
<td>2.62 (0.16)</td>
<td>2.27 (0.23)</td>
</tr>
<tr>
<td>EDEQ-Overvaluation of weight and shape (range 0–6)</td>
<td>4.23 (0.29)</td>
<td>4.02 (0.28)</td>
<td>3.19 (0.27)</td>
<td>2.63 (0.39)</td>
</tr>
<tr>
<td>BMI</td>
<td>34.4 (1.2)</td>
<td>34.3 (1.2)</td>
<td>33.2 (1.2)</td>
<td>32.4 (1.2)</td>
</tr>
<tr>
<td>Self efficacy (range 10–40)</td>
<td>28.2 (0.7)</td>
<td>28.7 (0.7)</td>
<td>29.5 (0.8)</td>
<td>30.1 (1.1)</td>
</tr>
<tr>
<td>Life satisfaction (range −3 to +5)</td>
<td>1.77 (0.27)</td>
<td>2.10 (0.27)</td>
<td>2.25 (0.24)</td>
<td>2.36 (0.31)</td>
</tr>
<tr>
<td>BDI (range 0–63)</td>
<td>9.06 (±1.50/1.31)</td>
<td>5.97 (±1.01/0.89)</td>
<td>6.16 (±1.08/0.93)</td>
<td>6.29 (±1.43/1.19)</td>
</tr>
<tr>
<td>BAI (range 0–63)</td>
<td>6.55 (±1.26/1.08)</td>
<td>4.77 (±1.05/0.89)</td>
<td>4.89 (±0.91/0.78)</td>
<td>4.97 (±1.12/0.94)</td>
</tr>
</tbody>
</table>

* Values back-transformed from logt, resulting in unequal confidence ranges.
* Values back-transformed from log, resulting in unequal confidence ranges.
and depressive symptoms improved markedly during the 8-week treatment and either slightly further improved or remained stable during the 4-year follow-up period. Future studies should encompass larger samples and evaluate whether addressing symptoms such as anxiety and self-efficacy during active treatment may further improve psychological health and support weight loss in BED. It should further be investigated, whether tailoring booster sessions to persons with elevated weight and eating concern at the end of treatment, lead to an increase of the long-term success in this subpopulation.

References


