American Psychological Association

Journal of Consulting and Clinical Psychology

0022-006X/18/$12.00

2018, Vol. 86, No. 8, 688–701
http://dx.doi.org/10.1037/ccp0000313

Brief Strategic Therapy and Cognitive Behavioral Therapy for Women with Binge Eating Disorder and Comorbid Obesity: A Randomized Clinical Trial One-Year Follow-Up

Jeffrey B. Jackson
Virginia Tech

Giada Pietrabissa
Istituto Auxologico Italiano, Istituto di Ricovero e Cura a Carattere Scientifico, San Giuseppe Hospital, Verbania, Italy and Catholic University of Milan

Alessandro Rossi
Istituto Auxologico Italiano, Istituto di Ricovero e Cura a Carattere Scientifico, San Giuseppe Hospital, Verbania, Italy and University of Padova

Gian Mauro Manzoni
Istituto Auxologico Italiano, Istituto di Ricovero e Cura a Carattere Scientifico, San Giuseppe Hospital, Verbania, Italy and eCampus University

Gianluca Castelnuovo
Istituto Auxologico Italiano, Istituto di Ricovero e Cura a Carattere Scientifico, San Giuseppe Hospital, Verbania, Italy and Catholic University of Milan

Objective: Binge eating disorder (BED) is frequently linked with obesity and related health risks like cardiovascular disease and diabetes. The purpose of this randomized clinical trial (RCT) was to determine the effectiveness of brief strategic therapy (BST) compared with cognitive-behavioral therapy (CBT) 1 year after a two-phase inpatient and outpatient-telemedicine treatment for BED. ***Method:*** Italian women with BED and comorbid obesity were recruited from a self-referred inpatient treatment program for weight loss ($N = 60$) and randomly assigned to either the BST treatment condition ($n = 30$) or CBT treatment condition ($n = 30$). Inpatient psychotherapy sessions were conducted in person and outpatient telemedicine psychotherapy sessions were conducted over the telephone. Multilevel growth curve modeling was used to estimate average growth trajectories from baseline to 1 year after treatment for the following outcomes: binge eating frequency, weight, and global functioning. ***Results:*** One year after treatment, women in the BST condition decreased in binge eating frequency and women in the CBT condition did not, whereas women in both conditions improved in weight and global functioning. BST was statistically and clinically superior to CBT in improving binge eating frequency, weight, and global functioning. ***Conclusions:*** Examining BED, given the current obesity epidemic, is an important area of study. Findings suggest that BST is statistically and clinically more effective than CBT in treating BED, promoting weight loss, and improving global functioning among women with BED and comorbid obesity 1 year after treatment. Telemedicine may be instrumental in reducing attrition.

Jeffrey B. Jackson, Department of Human Development and Family Science, Virginia Tech; Giada Pietrabissa, Istituto Auxologico Italiano, Istituto di Ricovero e Cura a Carattere Scientifico, San Giuseppe Hospital, Verbania, Italy and Department of Psychology, Catholic University of Milan; Alessandro Rossi, Istituto Auxologico Italiano, Istituto di Ricovero e Cura a Carattere Scientifico, San Giuseppe Hospital, Verbania, Italy and Department of Philosophy, Sociology, Education, and Applied Psychology, University of Padova; Gian Mauro Manzoni, Istituto Auxologico Italiano, Istituto di Ricovero e Cura a Carattere Scientifico, San Giuseppe Hospital, Verbania, Italy and Faculty of Psychology, eCampus University; Gianluca Castelnuovo, Istituto Auxologico Italiano, Istituto di Ricovero e Cura a Carattere Scientifico, San Giuseppe Hospital, Verbania, Italy and Department of Psychology, Catholic University of Milan.

This study was part of a large comprehensive technology-based project supported by the Compagnia di San Paolo Foundation. Two articles related to this publication were previously published: the study design and procedures used to collect the sample data (i.e., Castelnuovo, Manzoni, Villa, Cesa, Pietrabissa, & Molinari, 2011) and the posttreatment results for the sample data (i.e., Castelnuovo, Manzoni, Villa, Cesa, & Molinari, 2011). We express thanks to Jeremy B. Yorgason for consulting on the analyses.

Correspondence concerning this article should be addressed to Giada Pietrabissa, Psychology Research Laboratory, San Giuseppe Hospital, Istituto di Ricovero e Cura a Carattere Scientifico Istituto Auxologico Italiano, Via Cadorna, 90, 28824 Piancavallo (VB), Italy. E-mail: Giada.Pietrabissa@unicatt.it

What is the public health significance of this article?
The current obesity epidemic is a major health concern because of the implications for health problems, quality of life, and mortality rate. Brief strategic therapy was more effective than cognitive-behavioral therapy (the most researched treatment for binge eating disorder) in reducing binge episode frequency, increasing weight loss, and improving global functioning among women with binge eating disorder and comorbid obesity seeking treatment for weight loss one year after treatment. Telemedicine for people with binge eating disorder and obesity may increase treatment retention.

Keywords: binge eating disorder, obesity, brief strategic therapy, cognitive-behavioral therapy, telemedicine

Obesity is increasingly a worldwide problem of epidemic proportions (Roberto et al., 2015). Over the last 35 years, obesity rates have doubled in more than 70 countries and continue to increase in the majority of other countries, with current global estimates indicating 12% of adults (approximately 604 million) and 5% of children (approximately 108 million) are obese (Global Burden of Disease 2015 Obesity Collaborators, 2017). The global obesity epidemic is particularly concerning given the host of health risks, compromised quality of life, and mortality rate associated with obesity (Gregg, & Shaw, 2017). Common health risks associated with obesity include chronic conditions such as cardiovascular disease (e.g., high blood pressure, high cholesterol, coronary heart disease, stroke), Type 2 diabetes, kidney disease, gallbladder disease, musculoskeletal disorders, cancers (e.g., breast, colon, kidney, liver), respiratory problems, physical pain, and mental illness (e.g., anxiety, depression; Centers for Disease Control and Prevention [CDC], 2015a).

The mental health disorder most associated with obesity comorbidity is BED, with the majority of people suffering from BED also suffering from obesity (Bulik & Reichborn-Kjennerud, 2003; Wonderlich, Gordon, Mitchell, Crosby, & Engel, 2009). BED is the most common eating disorder in adults (Iacovino, Gredysa, Altman, & Wilfley, 2012), with a population prevalence ranging from 1% to 3.5% worldwide (Mustelin, Bulik, Kaprio, & Keski-Rahkonen, 2017). Individuals with BED experience severe distress and dysfunction due to binge eating (i.e., uncontrolled consumption of abnormally large amounts of food in a discrete period of time), but do not regularly engage in inappropriate compensatory weight control methods, such as purging, fasting, or excessive exercise (*Diagnostic and Statistical Manual of Mental Disorders*; 5th ed.; *DSM–5*; American Psychiatric Association [APA], 2013). Compared with obese individuals without BED, those with BED report greater functional impairment and lower quality of life, as well as significantly greater levels of eating disorder psychopathology (e.g., eating, weight concerns, body image issues) and psychiatric comorbidity (Wilson, 2011). Moreover, obese individuals with BED are more likely to experience higher levels of depression, dropout of weight loss treatment, regain lost weight more rapidly, and demonstrate lower behavior change self-efficacy than obese individuals without BED (Cargill, Clark, Pera, Niaura, & Abrams, 1999; Rieger, Wilfley, Stein, Marino, & Crow, 2005). BED has been identified as a challenging public health issue for which fewer than half of people receive treatment (Kessler et al., 2013).

The impact and increasing prevalence rates of obesity highlight the need to evaluate psychotherapy interventions for BED and comorbid obesity (Palavras, Hay, Filho, & Claudino, 2017). Telemedicine (i.e., providing clinical services through information and communication technology such as computers and telephones) offers advantages in terms of cost and accessibility and has proven effective in promoting weight loss, treatment adherence, and treatment retention among people who are overweight or obese (Aguilar-Martínez et al., 2014; Castelnuovo et al., 2014; Sorgente et al., 2017). Thus, telemedicine may be a method of service delivery that could be utilized to improve the rate of people with BED who receive treatment.

CBT is the most established and researched psychotherapy treatment for BED and obesity (Castelnuovo et al., 2017; Grilo, 2017). Overall, research has shown that individual and group formats of CBT produce larger improvements in binging compared with no treatment (Palavras et al., 2017). However, a review of RCTs comparing CBT with active (i.e., non-waitlist) alternative psychotherapies (i.e., non-CBT approaches such as behavioral weight loss therapy and interpersonal therapy) for the treatment of BED and comorbid overweight or obesity ($k = 8$) indicated the following: (a) CBT was more effective than alternative treatments in reducing binge eating at posttreatment in approximately one third of the studies (i.e., Grilo & Masheb, 2005; Munsch et al., 2007; Nauta, Hospers, Kok, & Jansen, 2000) and was either equally effective or less effective in the remaining approximate two thirds of the studies (i.e., Grilo, Masheb, Wilson, Gueorguieva, & White, 2011; Grilo, White, Gueorguieva, Barnes, & Masheb, 2013; Kristeller, Wolever, & Sheets, 2014; Wilfley et al., 2002; Wilson, Wilfley, Agras, & Bryson, 2010); (b) similarly, CBT was more effective than alternative treatments in reducing binge eating at follow-up (typically 1 year) in only one third of the studies; and (c) CBT was never more effective than alternative treatments in promoting weight loss at posttreatment or at follow-up. Even after broadening the parameters to include studies that compare variations of CBT and studies that compare CBT to nontreatment conditions, CBT has only shown modest success in long-term reduction of BED symptomatology (Hilbert et al., 2012) and limited efficacy in promoting weight loss (Vocks et al., 2010). Therefore, it is important to examine alternative treatments to CBT for increased effectiveness in improving BED symptomology, weight loss, and weight loss maintenance (Castelnuovo et al., 2015; Palavras et al., 2017; Wilson et al., 2010).

Empirical studies have shown BST to be clinically effective in treating several psychological disorders, including BED (Nardone & Watzlawick, 2005). An iterative processes of intervention, outcome assessment, and intervention modification was used to develop a BST protocol for the treatment of BED (Nardone, Milanese, & Verbitz, 2005). The protocol was designed to alter the perceptive-reactive system maintaining binging eating behavior through indirect intervention that circumvents resistance and creates corrective emotional experiences (Nardone & Portelli, 2005). Results of initial research on the efficacy of the protocol for BED ($n = 10$) and the similar clinical presentation of bulimia with restricting behavior and without purging behavior ($n = 45$) indicated that 1 year after treatment 84% of cases were resolved, 4% were highly improved, 12% were slightly improved, 0% were unchanged, and 0% were worsened (Nardone et al., 2005). Given these promising results, additional research seemed merited to better determine the effectiveness of the BST protocol for the treatment of BED. Therefore, the purpose of the present RCT was to determine the effectiveness of the BST protocol for BED compared with the gold standard CBT through 1 year after a two-phase inpatient and outpatient telemedicine treatment for women with BED and comorbid obesity participating in an inpatient weight loss program.

In an effort to improve the quality and generalizability of clinical treatment outcome findings, researchers have been encouraged to (a) conduct more effectiveness research in nonresearch settings where clients are the most likely to receive services, (b) include physical health and global functioning as treatment outcomes in addition to symptom alleviation, (c) evaluate long-term treatment effectiveness by collecting follow-up data, and (d) determine clinical significance (Tolin, McKay, Forman, Klonsky, & Thombs, 2015). Accordingly, the present study used an RCT design to evaluate the long-term effectiveness of BST and CBT for the treatment of BED and comorbid obesity (a) with Phase 1 at a nonresearch inpatient clinic for people seeking weight loss treatment and Phase 2 via outpatient telemedicine; (b) by assessing binge eating frequency (primary outcome), weight (secondary outcome), and global functioning (secondary outcome); (c) through 1 year posttreatment; and (d) by evaluating clinical significance in addition to statistical significance. Based on the substantial body of research that CBT treatment for BED is moderately effective and limited research suggesting that BST treatment for BED may be effective, we hypothesized that 1 year after treatment (a) both BST and CBT participants would demonstrate statistically and clinically reduced binge eating frequency, decreased weight, and improved global functioning; and (b) BST would be as effective as CBT in statistically and clinically improving binge eating frequency, weight, and global functioning.

Method

Participants

Participants ($N = 60$) were recruited from a self-referred weight loss program at an inpatient clinic in Northern Italy specializing in eating disorder treatment. Women were eligible for participation if they met the following inclusion criteria: (a) were between 18 and 70 years old, (b) were obese based on body mass index (BMI = weight in kilograms divided by height in meters squared; obesity = BMI $\geq$30 kg/m^2; CDC, 2015b), (c) met criteria for BED (*Diagnostic and Statistical Manual of Mental Disorders*; 4th ed., text rev.; *DSM–IV–TR;* APA, 2000), (d) adequate skills in written and spoken Italian, and (e) provided written informed consent. Exclusion criteria were as follows: (a) comorbid diagnosis of a chronic or acute medical condition unrelated to obesity, (b) comorbid severe psychiatric disorder as assessed by a clinical psychologist not associated with the study using the Structured Clinical Interview for the *DSM–IV–TR* (First, Williams, Spitzer, & Gibbon, 2007), (c) visual impairments impeding written questionnaire completion, and (d) auditory, cognitive, or communicative problems impeding the comprehension of treatment interventions. Participants were not excluded for receiving other forms of treatment (psychological or psychopharmacological) concurrently.

All participants were Caucasian Italian women ranging from 29 to 67 years in age ($M = 46.05$, $SD = 10.55$; Table 1). Retrospective self-report of the previous 6 months at pretreatment indicated an average weekly binge episode frequency ranging from two to four and a mean of 2.82 ($SD = 0.77$). Pretreatment participant weight ranged from 96 kg to 122 kg (212 lb – 269 lb) and averaged 106.95 kg (235.78 lb; $SD = 6.95$ kg); pretreatment participant BMI ranged from 35.56 to 45.19 and averaged 39.61 ($SD = 2.57$). At pretreatment, participant Outcome Questionnaire (OQ-45.2) scores ranged from 72 to 113 and averaged 94.42 ($SD = 10.74$); given that scores of 67 and higher indicate psychological distress on the Italian version of the OQ-45.2 (Chiappelli, Lo Coco, Gullo, Bensi, & Prestano, 2008), all participants were in the psychological distress range. There were no meaningful differences between treatment conditions in terms of receiving additional concurrent psychological treatment (BST: $n = 0$; CBT: $n = 1$) or psychopharmacological treatment (BST: $n = 2$; CBT: $n = 3$); given the small frequencies, secondary analysis to determine the effects of such treatments was not indicated.

Procedures

The RCT was approved by an internal review board and registered at clinicaltrials.gov (identifier: NCT01096251). Figure 1 presents the participant flow through each stage of the study. Sequential screening for inclusion was conducted for 100 consecutive women at admission to the voluntary inpatient weight loss program by clinic staff who were not otherwise affiliated with the study and blinded regarding treatment participation and condition allocation. Women who were eligible to participate were subsequently informed about the study and invited to participate in the study as adjunctive treatment to the inpatient weight loss program. After completing the pretreatment assessments (baseline), women who elected to participate were randomly assigned to either the BST condition or the CBT condition by an independent statistician using a randomization scheme. Participants were blinded regarding treatment allocation. Outcomes were assessed at pretreatment (Time 1 [T1]), inpatient discharge (Time 2 [T2]; approximately 1 month after the pretreatment measure), posttreatment (Time 3 [T3]; approximately 7 months after the pretreatment measure), 6-month follow-up (Time 4 [T4]), and 1-year follow-up (Time 5 [T5]). Assessments were conducted by inpatient clinic staff and graduate psychology trainees who were blinded to participant treatment condition assignment. The inpatient phase assessments (T1 and T2) were conducted in person and the outpatient telemedi-

Table 1
Means (Standard Deviations) and Mean Differences Between Conditions

Variables	Total ($N = 60$)	BST ($n = 30$)	CBT ($n = 30$)	Mean difference (*SE*)	*t* value (*p* value)
Weekly binge episodes					
T1	2.82 (.77)	2.80 (.81)	2.83 (.75)	.03 (.20)	.17 (.869)
T2					
T3	1.42 (1.00)	.97 (.67)	1.87 (1.07)	.90 (.23)	3.90***
T4	1.70 (1.17)	.93 (.83)	2.47 (.94)	1.53 (.23)	6.72***
T5	1.85 (1.02)	1.10 (.71)	2.60 (.68)	1.50 (.18)	8.38***
Weight (in kilograms)					
T1	106.95 (6.95)	106.53 (7.15)	107.37 (6.84)	.83 (1.81)	.46 (.646)
T2	99.73 (6.27)	98.90 (6.24)	100.57 (6.29)	1.67 (1.62)	1.03 (.307)
T3	93.07 (9.00)	88.40 (7.22)	97.73 (8.23)	9.33 (2.00)	4.67***
T4	93.27 (8.91)	87.83 (6.35)	98.70 (7.75)	10.87 (1.83)	5.94***
T5	94.88 (10.21)	87.93 (6.62)	101.83 (8.27)	13.90 (1.93)	7.19***
Psychological distress					
T1	94.42 (10.74)	96.47 (10.22)	92.37 (11.02)	−4.10 (2.74)	−1.49 (.141)
T2	86.73 (10.37)	87.07 (9.40)	86.40 (11.41)	−.67 (2.70)	−.25 (.806)
T3	73.58 (12.55)	69.27 (10.55)	77.90 (13.06)	8.63 (3.07)	2.82** (.007)
T4	74.28 (13.92)	67.03 (11.97)	81.53 (11.92)	14.50 (3.08)	4.70***
T5	74.07 (15.84)	63.70 (10.48)	84.43 (13.36)	20.73 (3.10)	6.69***
Age at treatment	46.05 (10.55)	45.90 (10.77)	46.20 (10.50)	.30 (2.75)	.11 (.913)

Note. BST = brief strategic therapy; CBT = cognitive behavioral therapy; *SE* = standard error; Time 1 [T1] = pretreatment (baseline); Time 2 [T2] = inpatient treatment discharge (approximately 1 month after beginning treatment); Time 3 [T3] = posttreatment (approximately 7 months after beginning treatment); Time 4 [T4] = 6 months posttreatment; Time 5 [T5] = 1-year follow-up. Unless otherwise noted, columns provide means with standard deviations in parentheses. Mean difference scores were calculated by subtracting the BST condition mean from the CBT condition mean (positive values favor BST and negative values favor CBT).
** $p \leq .01$. *** $p < .001$; for parsimony, p values less than .001 are only indicated by ***.

cine phase assessment (T3) and follow-up assessments (T4 and T5) were conducted over the telephone; reminder text messages were sent the day before telemedicine sessions. The attrition rate from randomization to 1-year follow-up was 0% (i.e., no participant dropout). Participants did not receive remuneration. All psychotherapy sessions were provided by four licensed psychologists with substantial training and experience in the treatment condition to which they were assigned (two assigned to BST and two assigned to CBT). To ensure treatment fidelity, senior licensed psychotherapists with expertise in the treatment condition they supervised provided monthly supervision to the four licensed psychologists and randomly audited audio recordings of the therapy sessions; although no formal rating system was employed, audit results indicated no deviations from either of the two treatment protocols.

Treatment Conditions

Treatment duration for both conditions was 7 months. As part of the 1-month inpatient phase, participants in both conditions were part of the inpatient weight loss treatment program in which they (a) were assessed by a staff dietitian and then placed on an individualized hypocaloric nutritionally balanced Mediterranean-style diet (80% of the Harris-Benedict estimated individual basal metabolic rate of daily caloric requirements with a composition of 59% carbohydrates, 25% fat, and 16% protein); (b) attended a nutrition education program aimed at promoting change in eating habits consisting of individual sessions and group sessions (45 min each twice a week) providing information on obesity and related health risks, nutrient intake recommendations, setting realistic weight loss goals, and behavior change strategies for weight management and preventing relapse; (c) engaged in physical activity once each week day that consisted of group classes on physical therapy and aerobic activity (alternative activities were provided for participants with orthopedic complications) by staff exercise physiologists; and (d) received eight face-to-face 45-min psychotherapy sessions (2 per week). As part of the 6-month outpatient telemedicine phase, participants received eight telephone psychotherapy sessions (2 sessions per month the first two months after discharge and one session per month for the subsequent four months) focused on monitoring treatment progress, consolidating skills (i.e., dietary, exercise, and psychological) acquired during the inpatient phase, promoting self-efficacy and problem solving, managing any crises, supporting motivation, and preventing relapse.

CBT. CBT sessions were based on the incremental three-stage BED treatment approach described by Fairburn, Marcus, and Wilson (1993). CBT is a problem-focused and action-oriented approach based on the premise that an individual's cognitions, emotions, and behaviors are interconnected such that clinical problems and psychological distress can be reduced by changing mutually reinforcing distorted cognitions and associated behavioral patterns. People with BED are conceptualized as coping with the negative cognitions and emotions that usually accompany binge eating by restricting, thus reinforcing a vicious *diet-binge cycle*.

The first stage focused on thorough assessment, explaining the cognitive framework for understanding the development and maintenance of BED, and behavioral interventions for substituting binge eating patterns with more moderate and routine eating pat-

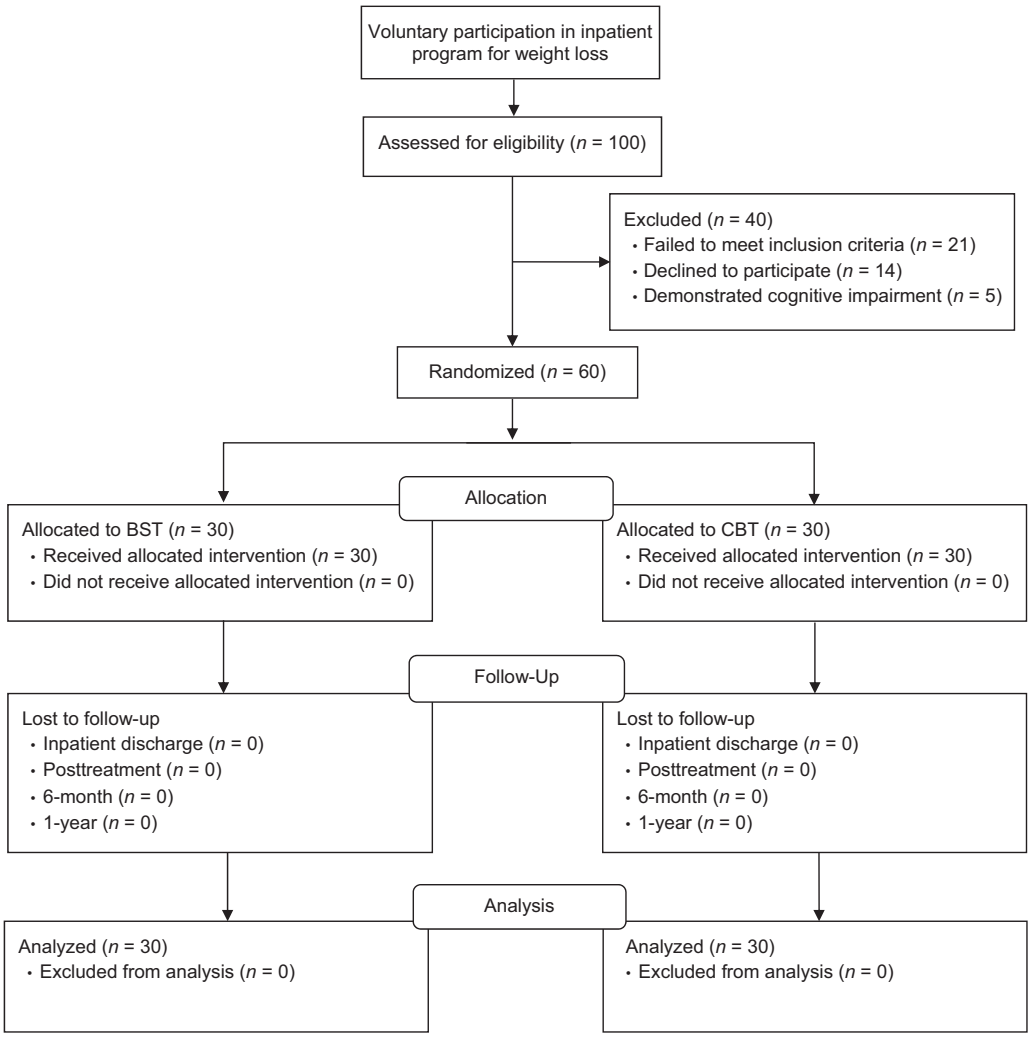

Figure 1. Consolidated Standards of Reporting Trials (CONSORT) participant flowchart. BST = brief strategic therapy; CBT = cognitive-behavioral therapy.

terns. The second stage focused on dieting cessation, developing healthier eating patterns, and restructuring of relevant cognitive distortions. The third stage focused on consolidation and maintenance of progress after termination. Psychotherapists identified the cognitive and behavioral patterns reinforcing BED and then accordingly encouraged participants to improve eating patterns and body image by setting goals, self-monitoring, restructuring distorted cognitions and self-perceptions, problem solving, preventing relapse, and managing stress in ways that do not involve food.

BST. The BST sessions were based on the four-stage treatment approach for BED described by Nardone et al. (2005). BST is a solution-focused approach aimed at subverting an individual's reiterated ineffective attempts to solve a problem that actually maintain or exacerbate the problem by implementing specific heuristic maneuvers. Similar to most psychotherapy approaches, CBT operates on the assumption that knowledge leads to change (*changing through knowing*); in sharp contrast, BST operates on the assumption that change precedes insight (*knowing through changing*). Whereas CBT emphasizes the primacy of cognitive distortions in the development and perpetuation of psychological disorders, BST assumes that psychological disorders are the outgrowth of misaligned attempted solutions for problems. Therefore, unlike CBT, the focus is not on identifying the cause of BED, but on identifying the attempted solutions that perpetuate BED. The typical BED attempted solution is trying to control the compulsion to eat by way of limitations (e.g., abstinence, resisting food cravings, restrictive diets); however, instead of increasing control over the compulsion to eat, these limitations tend to magnify the desire for food, causing the loss of control and giving in to the pleasure of binging.

The first stage focused on establishing the therapeutic alliance, defining the problem, and assessing the perceptive-reactive system maintaining the diet-binge cycle. The BED perceptive-reactive system is a self-sustaining cycle of binging and restricting in which participants *perceived* dieting as the solution to losing control and binging, and the *reaction* (i.e., attempted solution) to binging was compensatory hyperrestrictive dieting that increased vulnerability for subsequent binging due to increased hunger and deprivation

thinking. The second stage (which typically began during the first session) focused on facilitating corrective emotional experiences by disrupting the perceptive-reactive system maintaining the diet-binge cycle through direct, indirect, and paradoxical interventions. The primary intervention for this stage was the *fear of restricting* paradoxical reframe (i.e., even though dieting and fasting seem like the best strategies for losing weight, they actually precipitate the next binge and loss of control over food, which results in gaining even more weight). Strategic dialogue (Nardone & Salvini, 2007) and analogical language (e.g., metaphors, anecdotes, aphorisms) were used to help reframe the attempted solution of restricting as dangerous as opposed to an accomplishment (i.e., fearing restricting rather than binging), subverting the perception of the problem and the diet-binge cycle. The third stage focused on consolidating gains made over the course of treatment by reviewing effective strategies and improving the relationship with food by adopting more balanced, flexible, and healthy eating behaviors through reframes and behavioral prescriptions. The fourth and final stage focused on underscoring the importance of balance and increasing self-confidence and self-efficacy through reviewing treatment progress and highlighting personal responsibility for changes and successes in and out of treatment.

Assessments

Binge eating frequency. The primary outcome for the study, binge eating frequency, was assessed by participant retrospective self-report of the average weekly binge episode frequency over the previous 6 months (*DSM–IV–TR*). Binging behavior (i.e., consuming an unusually large amount of food characterized by a perceived loss of control) is the central defining clinical feature associated with the diagnostic criteria for BED and is the primary criterion used for determining BED severity (*DSM–5*). A person with BED is considered in partial remission when "binge eating occurs at an average frequency of less than one episode per week for a sustained period of time" and in full remission when "none of the criteria [e.g., binge-related distress, post-binge guilt, binging in isolation because of embarrassment] have been met for a sustained period of time" (*DSM–5*; APA, 2013, p. 350). Therefore, by assessing the average weekly binge episode frequency, it was possible to determine whether or not participants were in partial remission. Perceived loss of control during binge episodes was not assessed, significantly limiting the measurement of binge eating frequency. Participants were not directed to differentiate between objective binge episodes (i.e., consuming an atypically large amount of food) and subjective binge episodes (i.e., consuming a small or moderate amount of food that is perceived as being atypically large). The lack of discrimination between objective binge episodes and subjective binge episodes is not a concern for two primary reasons: complexities related to operationalization and most research indicates no difference in eating disorder symptomology, comorbid symptomology (e.g., anxiety, depression), and global functioning based on this binge eating typology, including a study of participants similarly seeking treatment for BED and comorbid obesity (Palavras, Morgan, Borges, Claudino, & Hay, 2013). Average weekly binge episode frequency was assessed at every time point except T2 (inpatient discharge) to prevent assessment period overlap, as the assessment period at each time point was the previous 6 months and T2 occurred only 1 month after T1 (pretreatment).

Weight. Weight was measured in kilograms using a scale with participants in lightweight clothing and shoes removed. Participants were weighed by staff during the inpatient phase (T1 and T2); participants weighed themselves and then self-reported their weight during the outpatient telemedicine phase and follow-up period (T3–T5). Self-report is a common research method for assessing weight due to the efficiency and ease of data collection compared with objective weight measures like medical examinations (Stommel & Schoenborn, 2009). However, self-reported weight tends to be underreported by varying degrees across individuals (i.e., large standard deviations), weight classifications (e.g., underweight, normal weight, overweight, obese), and sociodemographic characteristics such as gender, age, and nationality (Gorber, Tremblay, Moher, & Gorber, 2007). Although it was not possible to determine the degree of weight self-report bias in the current study, because weight self-report bias has been shown to be significant among Italian women at an average underreporting of −1.05 kg (Krul, Daanen, & Choi, 2011), analyses were conducted with and without a 1.05 kg adjustment to self-reported weight (T3–T5) to assess potential effects of weight self-report bias on study results.

Global functioning. Global functioning was evaluated using the OQ-45.2, a 45-item self-report measure that assesses psychological distress (i.e., common psychiatric symptoms and problems) and psychotherapy treatment progress (i.e., improvement, no change, and deterioration; Lambert et al., 2013). The Italian language version of the OQ-45.2—previously translated into Italian and validated with an Italian sample (Chiappelli et al., 2008; Lo Coco et al., 2008)—was used in the present study. The OQ-45.2 has three subscales (i.e., Symptom Distress, Social Role Functioning, and Interpersonal Relationships) that can be combined to provide a global index of overall functioning. Items are rated using a five-point Likert scale (0 = *never*, 1 = *rarely*, 2 = *sometimes*, 3 = *frequently*, 4 = *always*). The responses from all items were summed to obtain the global index score (possible scores ranging from 0 to 180), with lower scores indicating lower levels of psychological distress and higher levels of global functioning. The OQ-45.2 global index has a test–retest reliability of .84 and internal consistency of .93 (Lambert et al., 2013); the Italian version internal consistency for clinical samples is .90 (Lo Coco et al., 2008). The global index internal consistency for the current sample was .78.

Data Analysis

No data were missing for any of the participants on any of the outcome measures at any of the measurement points. In terms of preliminary analyses, we explored mean differences between treatment conditions and within treatment conditions across time from pretreatment to 1-year follow-up by calculating the means, standard deviations, mean differences, and two-tail mean tests for the three outcome variables (i.e., binge eating frequency, weight, and global functioning). We also calculated sample estimate standardized mean difference effect sizes to compare the change between conditions from pretreatment to 1-year follow-up for each outcome variable. We calculated unbiased sample estimate standardized mean difference effect sizes (Hedges' *g*) to correct for the potential

overestimated bias that can occur as a result of smaller samples (Hedges, 1981). The following established ranges guide interpreting standardized mean difference magnitude: $0.20 \leq g \leq 0.49$ = small, $0.50 \leq g \leq 0.79$ = medium, and $0.80 \leq g$ = large (Cohen, 1988). We then conducted two-tail *t* test post hoc analyses (α error probability = .05) for the outcome variable *g* values to determine achieved statistical power ($1 - \beta$ error probability).

For the main analysis, we used multilevel growth curve models to estimate the average pretreatment levels (i.e., intercepts) and growth trajectories (i.e., slopes) of binge episode frequency, weight, and psychological distress across time. Models also estimated variability in pretreatment levels and variability in change across time, as represented in random coefficients. Models were estimated using an unstructured residual matrix, allowing all variances and covariances to be freely estimated. We used the mixed command in IBM Statistical Package for the Social Sciences (SPSS) Version 24 to calculate the parameters in each of the models with maximum likelihood estimation. Models were estimated separately for each of the outcome variables.

First, we estimated an empty or unconditional model (no predictors) for the combined sample (all participants in both treatment conditions) to provide a baseline comparison and to calculate the intraclass correlation coefficient (i.e., the ratio of between-person variability to within-person variability). Second, we estimated a linear model with time as a predictor to calculate the intercept and slope for the combined sample. Third, we estimated models with higher order polynomials to explore any nonlinear change across time. Fourth, we used relative fit indices such as Akaike's information criterion and Schwarz's Bayesian information criterion to determine which model had the best fit. We repeated the first four steps for the CBT and BST conditions separately. Next, we estimated the best-fit models with treatment condition as a covariate to compare intercepts and slopes across treatment conditions. Then we added age (grand mean centered) as a control variable to the final models. Using covariance parameters, we calculated a pseudo R^2 to explore the amount of variance accounted for by predictors (Singer & Willett, 2003).

Clinical significance was calculated for each outcome by identifying the proportion of participants who demonstrated meaningful change from pretreatment to posttreatment (Kendall, 1999). We selected the 12-month posttreatment measurement point for the comparison point for calculating clinical significance to maximize measuring treatment effect duration. Participants were designated as *improved* (achieved clinically significant improvement), *deteriorated* (achieved clinically significant deterioration), or *unchanged* (no clinically significant change; Lambert, Hansen, & Bauer, 2007). Participants designated as improved whose scores changed from the dysfunctional side of the clinical cutoff score at pretreatment to the functional side of the clinical cutoff score at 1-year follow-up (Jacobson, Follette, & Revenstorf, 1984) were further designated as *recovered*, the ideal level of clinical significance (Lambert et al., 2007).

Results

Preliminary analyses for between-condition differences indicated there were no significant baseline differences on outcome variables (i.e., average weekly binge episode frequency, weight, and global functioning) or demographic characteristics between BST participants and CBT participants (see Table 1). Post hoc analysis of achieved statistical power for treatment group differences (Hedges' *g*) was 1.00 for all three outcome variables (noncentrality parameter δ ranged from 6.66 to 8.09, critical $t = 2.00$, $df = 58$). Multilevel growth curve modeling results indicated the quadratic model was the best fit for the total sample (Model 1), the BST condition (Model 2), the CBT condition (Model 3), and the total sample with treatment condition as a predictor (Model 4) for all three outcome variables (Table 2). Age did not predict the intercept, linear slope, or quadratic slope within any of the models for any of the outcomes.

Binge Eating Frequency

Preliminary analyses indicated BST average weekly binge episode frequency was lower than that of CBT at posttreatment, 6-month follow-up, and 1-year follow-up (see Table 1). The Hedges' *g* comparing BST and CBT for binge eating frequency change between pretreatment and 1-year follow-up was 2.09 ($SE = 0.32$, 95% CI [1.46, 2.71], $p < .001$) in favor of BST. The intraclass correlation coefficient indicated 28% of the variance in average weekly binge episode frequency occurred between participants across time and the remaining 72% occurred within participants across time.

Multilevel growth curve modeling results (see Table 2) indicated that on average, BST participant average weekly binge episode frequency decreased by 2.01 ($SE = .17$, $p < .001$) per measurement point, attenuated by an increase of 0.50 ($SE = .05$, $p < .001$) over time (Model 2); on average, CBT participant average weekly binge episode frequency decreased by 0.84 ($SE = .21$, $p < .001$) per measurement point attenuated by an increase of 0.28 ($SE = .07$, $p < .001$) over time (Model 3). The results of the quadratic model with treatment condition as a predictor (Model 4) indicated a significant difference between the linear slopes for each treatment condition ($B = 1.18$, $SE = 0.28$, $p < .001$); specifically, the downward linear trend was approximately 1 point less steep for the CBT condition across time, suggesting that participant weekly binge episode frequency, on average, decreased approximately one time less per linear measurement point in the CBT condition compared with the BST condition. The quadratic slope also differed significantly between treatment conditions ($B = -0.23$, $SE = 0.09$, $p = .013$): the upward quadratic trend was approximately a quarter point steeper for the CBT condition across time, indicating that upward change in the linear slope was steeper for the CBT condition. Pseudo R^2 values indicated 53% of the intercept variance and 88% of the linear slope variance were accounted for by treatment condition. Figure 2A shows a sharper decrease in average weekly binge episode frequency for BST participants that was essentially maintained after posttreatment, whereas the average weekly binge episode frequency for CBT participants decreased more gradually from pretreatment to posttreatment and then noticeably increased from posttreatment to 1-year follow-up, ultimately returning to pretreatment levels (mean difference = -0.23, $SE = 0.15$, $t(29) = -1.56$, $p = .129$). The estimated average weekly binge episode frequency at 1-year follow-up was 1.18 for the BST condition and 2.70 for the CBT condition; thus, on average, at 1-year follow-up, CBT participants binged more than twice as often as BST participants.

Binge eating frequency clinical significance was determined by identifying the proportion of participants who demonstrated a

Table 2
Multilevel Growth Curve Models of Treatment Outcomes

Predictors	Model 1: total sample ($N = 60$)		Model 2: BST ($n = 30$)		Model 3: CBT ($n = 30$)		Model 4: BST vs CBT ($N = 60$)	
	B	CI	*B*	CI	*B*	CI	*B*	CI
Weekly binge episodes								
Intercept	2.73***	[2.52, 2.93]	2.72***	[2.45, 2.98]	2.73***	[2.41, 3.05]	2.72***	[2.43, 3.01]
Time	−1.42***	[−1.71, −1.14]	−2.01***	[−2.35, −1.67]	−.84***	[−1.26,−.41]	−2.01***	[−2.40, −1.62]
Time^2	.39***	[.30, .48]	.50***	[.39, .61]	.28***	[.14, .41]	.50***	[.38, .62]
Treatment condition covariate								
Intercept							.01	[−.39, .42]
Linear slope							1.18***	[.63, 1.73]
Quadratic slope							−.23*	[−.40, −.05]
Covariance parameters								
Intercept variance	.16***	[.05, .57]	.18	[.05, .64]	.26	[.11, .58]	.17	[.05, .56]
Slope variance	.07***	[.03, .18]	.05	[.01, .18]	.00		.01	[.00, 1.90]
Residual variance	.49***	[.38, .64]	.34***	[.23, .48]	.55***	[.41, .74]	.47***	[.37, .61]
Weight								
Intercept	107.20***	[105.43, 108.98]	107.20***	[104.53, 109.87]	107.21***	[104.71, 109.71]	107.20***	[104.65, 109.76]
Time	−10.07***	[−11.14, −9.00]	−12.08***	[−13.49, −10.67]	−8.06***	[−9.41, −6.70]	−12.08***	[−13.46, −10.70]
Time^2	1.75***	[1.54, 1.96]	1.81***	[1.51, 2.12]	1.69***	[1.40, 1.98]	1.81***	[1.51, 2.11]
Treatment condition covariate								
Intercept							.01	[−3.61, 3.62]
Linear slope							4.03***	[2.07, 5.98]
Quadratic slope							−.12	[−.55, .30]
Covariance parameters								
Intercept variance	39.03***	[25.77, 59.11]	42.48**	[23.57, 76.56]	37.06**	[20.49, 67.04]	39.77***	[26.61, 61.73]
Slope variance	5.80***	[3.81, 8.85]	2.76**	[1.36, 5.62]	2.61**	[1.29, 5.27]	2.69***	[1.66, 4.52]
Residual variance	9.57***	[7.78, 11.77]	10.03***	[7.48, 13.46]	9.18***	[6.84, 12.31]	9.60***	[7.84, 11.90]
Psychological distress								
Intercept	95.36***	[92.58, 98.13]	97.78***	[94.07, 101.48]	92.94***	[88.84, 97.04]	97.78***	[93.94, 101.62]
Time	−13.54***	[−15.54, −11.53]	−16.47***	[−19.31, −13.64]	−10.61***	[−12.95, −8.26]	−16.47***	[−19.06, −13.88]
Time^2	2.06***	[1.64, 2.47]	1.98***	[1.32, 2.64]	2.13***	[1.61, 2.65]	1.98***	[1.39, 2.57]
Treatment condition covariate								
Intercept							−4.84	[−10.27, .60]
Linear slope							5.86**	[2.20, 9.52]
Quadratic slope							.15	[−.68, .99]
Covariance parameters								
Intercept variance	83.16***	[52.42, 131.95]	59.50*	[27.60, 128.28]	96.55**	[52.53, 177.46]	78.02***	[48.62, 125.20]
Slope variance	15.64***	[9.97, 24.52]	3.67	[1.08, 12.48]	6.50**	[3.06, 13.80]	5.09**	[2.65, 9.75]
Residual variance	37.38***	[30.39, 45.99]	46.44***	[34.62, 62.30]	28.69***	[21.38, 38.48]	37.56***	[30.52, 46.23]

Note. All models are quadratic growth curves. All parameter estimates are unstandardized (*B*). BST = brief strategic therapy; CBT = cognitive behavioral therapy; CI = 95% confidence interval; intercept variance = between-participant variability; residual variance = within-participant variability. Participant age was controlled for in each model. Lower psychological distress is associated with higher global functioning.
* $p \leq .05$. ** $p \leq .01$. *** $p < .001$.

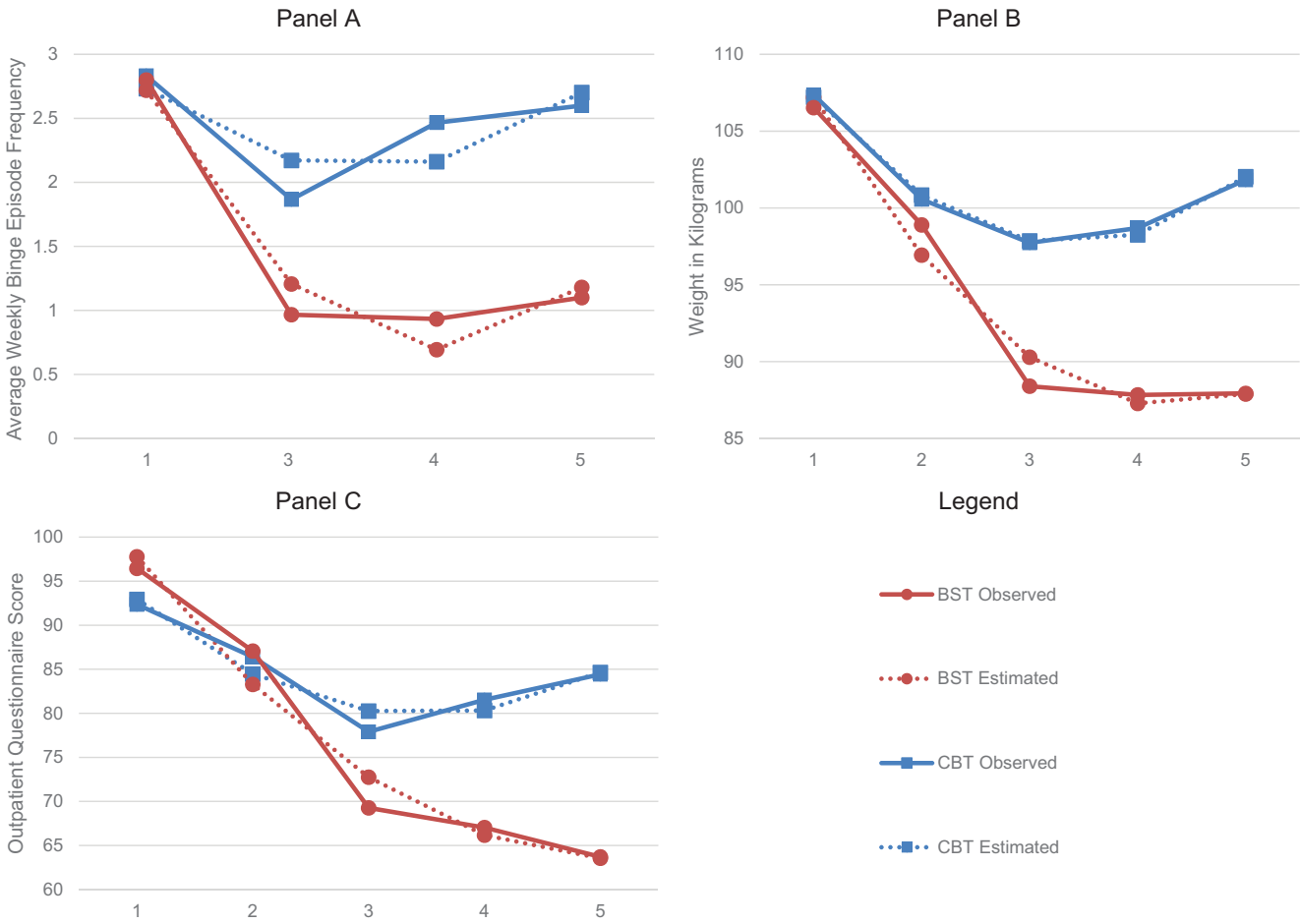

Figure 2. Observed and estimated mean outcome scores (*y* axis) of women with binge eating disorder (BED) and comorbid obesity by treatment condition from pretreatment until 1-year follow-up (*x* axis). Time 1 = pretreatment (baseline); Time 2 = inpatient treatment discharge (approximately 1 month after beginning treatment); Time 3 = posttreatment; Time 4 = 6-month follow-up; Time 5 = 1-year follow-up. The measure of binge episode frequency per week at Time 2 was excluded from the analyses because participants were not able to binge while receiving inpatient treatment. Lower Outcome Questionnaire-45.2 scores are associated with higher global functioning (lower psychological distress). BST = brief strategic therapy; CBT = cognitive behavioral therapy. See the online article for the color version of this figure.

change in average weekly binge episode frequency of two or more from pretreatment to 1-year follow-up. Participants were designated as improved if average weekly binge episode frequency decreased by two or more, unchanged if average weekly binge episode frequency increased or decreased by fewer than two, or deteriorated if average weekly binge episode frequency increased by two or more. The clinical cutoff score for determining if improved participants were also recovered from BED at 1-year follow-up was based on the *DSM–5* partial remission criterion of discontinued binging behavior (i.e., fewer than 1 weekly binge episode). Results indicated BST was clinically superior to CBT because the majority of BST participants achieved clinically significant improvement, with one out of six BST participants also achieving BED recovery, compared with only one CBT participant achieving clinically significant improvement, with none of the CBT participants also achieving recovery (Table 3).

Weight

Preliminary analyses for weight self-report bias were conducted by adjusting self-reported weight values (T3–T5) by +1.05 kg (Krul et al., 2011). Adjustments for weight self-report bias did not significantly alter study results for weight, suggesting the absence of appreciable weight self-report bias; therefore, the nonadjusted values for self-reported weight (T3–T5) were used in subsequent analyses. Preliminary analyses for between-condition differences indicated BST average participant weight was lower than that of CBT at posttreatment, 6-month follow-up, and 1-year follow-up (see Table 1). The Hedges' *g* comparing BST and CBT for weight loss between pretreatment and 1-year follow-up was 1.72 (*SE* = 0.30; 95% CI [1.13, 2.31], $p < .001$) in favor of BST. The intraclass correlation coefficient indicated 41% of the variance in weight

Table 3
Clinical Significance for Treatment Outcomes by Treatment Condition

	Treatment condition			
	BST (n = 30)		CBT (n = 30)	
Treatment outcome	n	%	n	%
Binge episode frequency				
Deteriorated	0	.0	1	3.3
Unchanged	14	46.7	28	93.3
Improved	16	53.3	1	3.3
Recovered	5	16.6	0	.0
Not recovered	11	36.7	1	3.3
Weight loss				
Deteriorated	0	.0	1	3.3
Unchanged	3	10.0	20	66.7
Improved	27	90.0	9	30.0
Recovered	10	33.3	0	.0
Not recovered	17	56.7	9	30.0
Global functioning				
Deteriorated	0	.0	1	3.3
Unchanged	2	6.7	19	63.3
Improved	28	93.3	10	33.3
Recovered	19	63.3	1	3.3
Not recovered	9	30.0	9	30.0

Note. BST = brief strategic therapy; CBT = cognitive behavioral therapy. The participants who deteriorated in the CBT condition were different for each treatment outcome.

occurred between participants across time and the remaining 59% occurred within participants across time.

Multilevel growth curve modeling results (see Table 2) indicated that, on average, BST participant weight decreased by 12.08 kg (26.63 lb; $SE = 0.71$, $p < .001$) per measurement point attenuated by an increase of 1.81 kg (3.99 lb; $SE = 0.15$, $p < .001$) over time (Model 2); on average, CBT participant weight decreased by 8.06 kg (17.77 lb; $SE = 0.68$, $p < .001$) per measurement point attenuated by an increase of 1.69 kg (3.73 lb; $SE = 0.15$, $p < .001$) over time (Model 3). The results of the quadratic model with treatment condition as a predictor (Model 4) indicated a significant difference between the linear slopes for each treatment condition ($B = 4.03$, $SE = 0.99$, $p < .001$); specifically, the downward linear trend was approximately 4 points less steep for the CBT condition across time, indicating that participant weight, on average, decreased approximately 4 kg (9 lb) less per linear measurement point in the CBT condition compared with the BST condition. The quadratic slope did not differ between treatment conditions ($B = -0.12$, $SE = 0.21$, $p = .565$). Pseudo R^2 values indicated 0% of the intercept variance and 39% of the linear slope variance were accounted for by treatment condition. Figure 2B shows a sharper decrease in average weight for BST participants that is essentially maintained after posttreatment, whereas the average weight for CBT participants decreased more gradually from pretreatment to posttreatment and then noticeably increased from posttreatment to 1-year follow-up, with BST participants weighing, on average, approximately 14 kg (31 lb) less than CBT participants at 1-year follow-up. The estimated average participant weight at 1-year follow-up was 87.90 kg (193.79 lb) for BST and 102.03 kg (224.94 lb) for CBT.

Weight loss clinical significance was determined by identifying the proportion of participants whose weight decreased 10% or more from pretreatment to 1-year follow-up. The selection of a 10% decrease in total body weight as the benchmark for clinically significant weight loss was based on evidence that modest weight loss (5%–10% of totally body weight) is associated with decreased related health risks such as high cholesterol, high blood pressure, and high blood sugar levels, even though people who lose 10% of their body weight may still be in the obese or overweight range (CDC, 2015c). Participants were designated as improved (a decrease of 10% or more in total body weight from pretreatment to 1-year follow-up), unchanged (total body weight from pretreatment to 1-year follow-up decreased by less than 10%, did not change, or increased by less than 10%), or deteriorated (an increase of 10% or more in total body weight from pretreatment to 1-year follow-up). The clinical cutoff for obesity (obesity = BMI $\geq$ 30 kg/m^2; CDC, 2015b) was used as the score for determining if improved weight participants were also recovered. BST was clinically superior to CBT in facilitating clinically significant weight loss among participants receiving treatment for BED, as almost all of the BST participants achieved clinically significant weight loss and one out of three BST participants also achieved obesity recovery, compared with one out of three CBT participants achieving clinically significant weight loss and none of the CBT participants also achieving obesity recovery (see Table 3).

Global Functioning

Global functioning assessed by the OQ-45 was measured such that lower scores indicated higher global functioning. Preliminary analyses for between-condition differences indicated BST average participant global functioning was better than that of CBT at posttreatment, 6-month follow-up, and 1-year follow-up (see Table 1). The Hedges' g comparing BST and CBT for global functioning improvement between pretreatment and 1-year follow-up was 2.04 ($SE = 0.32$, 95% CI [1.42, 2.66], $p < .001$) in favor of BST. The intraclass correlation coefficient indicated 32% of the variance in global functioning occurred between participants across time and the remaining 68% occurred within participants across time.

Multilevel growth curve modeling results (see Table 2) indicated that, on average, BST participant global functioning improved by 16.47 points ($SE = 1.43$, $p < .001$) per measurement point attenuated by a decline of 1.98 points ($SE = 0.33$, $p < .001$) over time (Model 2); on average, CBT participant global functioning improved by 10.61 points ($SE = 1.19$, $p < .001$) per measurement point attenuated by a decline of 2.13 points ($SE = 0.26$, $p < .001$) over time (Model 3). The results of the quadratic model with treatment condition as a predictor (Model 4) indicated a significant difference between the linear slopes for each treatment condition ($B = 5.86$, $SE = 1.86$, $p = .002$), suggesting that participant global functioning, on average, improved approximately 6 points less per linear measurement point in the CBT condition compared with the BST condition. The quadratic slope did not differ between treatment conditions ($B = 0.15$, $SE = 0.42$, $p = .715$). Pseudo R^2 values indicated 0% of the intercept variance and 57% of the linear slope variance were accounted for by treatment condition. Figure 2C shows a sharper improvement in average global functioning for BST participants that continues after posttreatment, whereas the average global functioning for CBT participants improved more

gradually from pretreatment to posttreatment and then declined slightly from posttreatment to 1-year follow-up. The estimated average global functioning score was approximately 21 points better for BST participants than CBT participants at 1-year follow-up.

Global functioning clinical significance was determined by identifying the proportion of participants who demonstrated statistically reliable observed change in total OQ-45.2 scores from pretreatment to 1-year follow-up. The established reliable change index—the amount a participant's global index must change from pretreatment to posttreatment to be considered clinically significant (Jacobson & Truax, 1991)—for the OQ-45.2 of 14 was used to designate participants as improved (scores that decreased by 14 or more indicate clinically significant improvement), unchanged (scores that increased or decreased by less than 14 indicate no clinically significant change), or deteriorated (scores that increased by 14 or more indicate clinically significant deterioration; Chiappelli et al., 2008; Lambert et al., 2013). The clinical cutoff score for determining if improved global functioning participants were also recovered was 66 for the Italian version of the OQ-45.2 (i.e., global index >66 = psychological distress; global index ≤ 66 = normative psychological functioning; Chiappelli et al., 2008). Results indicated that BST was clinically superior to CBT in improving global functioning as almost all of the BST participants demonstrated clinically significant improvement and approximately two out of three BST participants also achieved recovery, compared with one out of three CBT participants demonstrating clinically significant improvement and only one CBT participant also achieving recovery (see Table 3).

Discussion

The growing obesity epidemic is a worldwide public health issue, given the associated health complications and negative impacts on quality of life. BED is the most frequent co-occurring mental health disorder with obesity. The purpose of the present RCT was to determine the effectiveness and comparative effectiveness of BST and CBT for the treatment of BED in people with comorbid obesity 1 year after treatment. The results confirmed our hypothesis that 1 year after treatment participants in the BST condition would demonstrate statistical and clinical improvement in all three outcomes. Results only partially confirmed our hypothesis that 1 year after treatment participants in the CBT condition would demonstrate statistical and clinical improvement in all three outcomes, as CBT participants did not improve statistically or clinically in binge eating frequency. Finally, results disconfirmed our hypothesis that BST would be as effective as CBT in statistically and clinically improving all three outcomes, as BST was statistically and clinically superior to CBT in improving all three outcomes. The risk of Type I and Type II errors was small, given the large differences between conditions for each of the outcomes and the corresponding high statistical power. Age was not predictive for any of the models, regardless of treatment condition or outcome.

The most likely reason for the markedly disparate results for BST and CBT may be the differing BED symptom conceptualization and mechanisms of change behind the interventions. CBT provides problem-focused treatment aimed at helping clients control binge eating (the problem) by restructuring associated cognitive distortions (e.g., overevaluation of weight and shape, negative body image, negative core beliefs about self-worth, perfectionism) and replacing maladaptive behavioral patterns (e.g., binging, overeating, undereating) with more adaptive eating behavioral patterns. BST, on the contrary, provides solution-focused treatment aimed at helping clients shift the dysfunctional perceptive-reactive system around restricting (i.e., the attempted solution for binging that tends to maintain or exacerbate binging) by replacing dysfunctional attempted solutions with more functional solutions (e.g., following a nonrestrictive diet, engaging in various forms of self-care), often through paradoxical intervention (Nardone & Portelli, 2005).

The absence of missing data and the complete retention of all participants for both treatment conditions in the present study may be partially attributable to the modes of treatment delivery used in the two different phases of treatment: inpatient and outpatient telemedicine. Inpatient data collection and telephone calls for outpatient data collection were remarkably successful. Furthermore, telemedicine sessions and progress monitoring as part of the stepped-care treatment model may explain the complete retention rate. Results from this study align with findings that suggest telemedicine may be an effective alternative to in-person sessions for improving treatment adherence and completion rates, as well as significantly reduce the number of binge episodes and other BED pathology (Castelnuovo et al., 2015; Lindenberg, Moessner, Harney, McLaughlin, & Bauer, 2011; Sorgente et al., 2017). Given mental health care is often not obtained due to barriers like cost, access, and stigma, alternative treatment delivery modes like telemedicine may help people overcome barriers to treatment (Schmidt, Norr, Allan, Raines, & Capron, 2017), particularly among clients with BED, due to their tendency to feel ashamed and avoid face-to-face therapy (Wagner et al., 2016).

The results of this study suggest that BST may be a promising treatment for comorbid BED and obesity; however, additional research including independent replication and study design variation are needed to determine if BST is an empirically supported treatment for BED and obesity (Tolin et al., 2015). Several limitations of the present study constrain the generalizability and clinical application of BST for the treatment of BED and obesity; these limitations should inform the design of future research on the effectiveness of BST for BED and obesity. Although session audio-recording audits suggested treatment delivery fidelity, using a rating system with high interrater reliability would have increased confidence in the reliability and validity of results (Borrelli et al., 2005). The design of the present study prohibited conclusions regarding the effectiveness of the treatment delivery modes (i.e., stepped care from inpatient to outpatient telemedicine). For example, perhaps BST is better suited for telemedicine delivery than CBT. Further research is therefore warranted to confirm the effectiveness of the stepped-care model by comparing BST treatment across various treatment delivery modes (e.g., inpatient only, traditional outpatient only, telemedicine only, stepped-care model, and nontreatment control condition). Relatedly, because the study design incorporated an inpatient weight loss program in addition to the BST and CBT treatment conditions, the absence of a nontreatment control condition prevented the investigation of the independent role of the inpatient weight loss program all participants received. Furthermore, because participants voluntarily enrolled in the inpatient-level weight loss program, they might have been

more motivated, determined, and committed to lose weight than clients who solely seek outpatient psychotherapy for weight loss. Additionally, the homogeneous sample of White Italian women with obesity and BED seeking inpatient treatment for weight reduction limits the generalizability of the findings. Research is needed to determine if BST is as effective in treating BED among people who are overweight as it is among people who are obese.

In addition to limitations related to study design and sample, there were also limitations related to the measurement of outcome variables. The single-item measure of average binge episode frequency per week limited the assessment of binge eating frequency and remission. Although perceived loss of control during binge episodes was assessed in determining the BED diagnosis as a part of the study inclusion criteria, it was not assessed as part of binge eating frequency, significantly impairing the measurement of this clinical outcome. Additionally, given the limited range of average weekly binge episode frequency across the sample at pretreatment (i.e., 2–4), there was likely a floor effect, as participants who reported binging twice a week at pretreatment had to report no binges at 1-year follow-up to have demonstrated clinically significant improvement, potentially limiting the proportion of participants designated as improved. Using a scale with sound established psychometric properties such as the Binge Eating Scale (Gormally, Black, Daston, & Rardin, 1982) or the Eating Disorder Examination Questionnaire (Fairburn & Beglin, 2008) would have allowed for improved assessment of (a) BED symptomology beyond binge frequency (e.g., lack of control while eating, dieting and restricting behaviors), (b) BED full remission, and (c) important aspects related to BED recovery (e.g., body image concerns, weight concerns, eating concerns, restricting behaviors). Social desirability and demand characteristics may have affected the self-reported measures of binge frequency and weight. Furthermore, weight was assessed by observed measurement during the inpatient phase and then by self-report at all subsequent data collection points; this midstudy change in weight assessment method likely resulted in measurement error. Although tests for weight self-report bias based on an identified underreport rate by Italian women (Krul et al., 2011) were nonsignificant, given we were not able to calculate the bias for the study sample, measurement error may have nonetheless affected the results.

Finally, because psychotropic medications, obesity co-occurring health conditions, socioeconomic status, and self-efficacy were not assessed in the present study, it would be important for researcher to assess for these variables across more diverse samples (e.g., gender, race, nationality) to more thoroughly evaluate BST effectiveness, potential confounding variables, and generalizability. Notwithstanding these limitations, this study is the first RCT to examine the effectiveness of BST for the treatment of BED and comorbid obesity. Outcomes suggest a stepped-care telemedicine BST approach may significantly and clinically improve binge eating frequency, weight, and global functioning.

References

Aguilar-Martínez, A., Solé-Sedeño, J. M., Mancebo-Moreno, G., Medina, F. X., Carreras-Collado, R., & Saigí-Rubió, F. (2014). Use of mobile phones as a tool for weight loss: A systematic review. *Journal of Telemedicine and Telecare, 20,* 339–349. http://dx.doi.org/10.1177/1357633X14537777

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Borrelli, B., Sepinwall, D., Ernst, D., Bellg, A. J., Czajkowski, S., Breger, R., . . . Orwig, D. (2005). A new tool to assess treatment fidelity and evaluation of treatment fidelity across 10 years of health behavior research. *Journal of Consulting and Clinical Psychology, 73,* 852–860. http://dx.doi.org/10.1037/0022-006X.73.5.852

Bulik, C. M., & Reichborn-Kjennerud, T. (2003). Medical morbidity in binge eating disorder. *International Journal of Eating Disorders, 34,* S39–S46. http://dx.doi.org/10.1002/eat.10204

Cargill, B. R., Clark, M. M., Pera, V., Niaura, R. S., & Abrams, D. B. (1999). Binge eating, body image, depression, and self-efficacy in an obese clinical population. *Obesity Research, 7,* 379–386. http://dx.doi.org/10.1002/j.1550-8528.1999.tb00421.x

Castelnuovo, G., Manzoni, G. M., Pietrabissa, G., Corti, S., Giusti, E. M., Molinari, E., & Simpson, S. (2014). Obesity and outpatient rehabilitation using mobile technologies: The potential mHealth approach. *Frontiers in Psychology, 5,* 559. http://dx.doi.org/10.3389/fpsyg.2014.00559

Castelnuovo, G., Manzoni, G. M., Villa, V., Cesa, G. L., & Molinari, E. (2011). Brief strategic therapy vs cognitive behavioral therapy for the inpatient and telephone-based outpatient treatment of binge eating disorder: The STRATOB randomized controlled clinical trial. *Clinical Practice and Epidemiology in Mental Health, 7,* 29–37. http://dx.doi.org/10.2174/1745017901107010029

Castelnuovo, G., Manzoni, G. M., Villa, V., Cesa, G. L., Pietrabissa, G., & Molinari, E. (2011). The STRATOB study: Design of a randomized controlled clinical trial of Cognitive Behavioral Therapy and Brief Strategic Therapy with telecare in patients with obesity and binge-eating disorder referred to residential nutritional rehabilitation. *Trials, 12,* 114–121. www.trialsjournal.com/content/12/1/114. http://dx.doi.org/10.1186/1745-6215-12-114

Castelnuovo, G., Pietrabissa, G., Manzoni, G. M., Cattivelli, R., Rossi, A., Novelli, M., . . . Molinari, E. (2017). Cognitive behavioral therapy to aid weight loss in obese patients: Current perspectives. *Psychology Research and Behavior Management, 10,* 165–173. http://dx.doi.org/10.2147/PRBM.S113278

Castelnuovo, G., Pietrabissa, G., Manzoni, G. M., Corti, S., Ceccarini, M., Borrello, M., . . . Molinari, E. (2015). Chronic care management of globesity: Promoting healthier lifestyles in traditional and mHealth based settings. *Frontiers in Psychology, 6,* 1557. http://dx.doi.org/10.3389/fpsyg.2015.01557

Centers for Disease Control and Prevention. (2015a). The health effects of overweight and obesity. Retrieved from https://www.cdc.gov/healthyweight/losing_weight/index.html

Centers for Disease Control and Prevention. (2015b). Assessing your weight. Retrieved from https://www.cdc.gov/healthyweight/index.html

Centers for Disease Control and Prevention. (2015c). Losing weight. Retrieved from https://www.cdc.gov/healthyweight/effects/index.html

Chiappelli, M., Lo Coco, G., Gullo, S., Bensi, L., & Prestano, C. (2008). L'Outcome questionnaire 45.2. Adattamento italiano di uno strumento per la valutazione dei trattamenti psicologici [The outcome questionnaire 45.2. Italian validation of an instrument for the assessment of psychological treatments]. *Epidemiologia e Psichiatria Sociale, 17,* 152–161.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Fairburn, C. G., & Beglin, S. J. (2008). Eating Disorder Examination Questionnaire (6.0). In C. G. Fairburn (Ed.), *Cognitive behavior therapy and eating disorders* (pp. 309–315). New York, NY: Guilford Press.

Fairburn, C. G., Marcus, M. D., & Wilson, G. T. (1993). Cognitive-behavioral therapy for binge eating and bulimia nervosa: A comprehen-

sive treatment manual. In C. G. Fairburn & G. T. Wilson (Eds.), *Binge eating: Nature, assessment, and treatment* (pp. 361–404). New York, NY: Guilford Press.

First, M. B., Williams, J. B. W., Spitzer, R. L., & Gibbon, M. (2007). *Structured Clinical Interview for DSM–IV–TR Axis I disorders, clinical trials version (SCID-CT)*. New York, NY: Biometrics Research.

Global Burden of Disease 2015 Obesity Collaborators. (2017). Health effects of overweight and obesity in 195 countries over 25 years. *New England Journal of Medicine, 377,* 13–27. http://dx.doi.org/10.1056/NEJMoa1614362

Gorber, S. C., Tremblay, M., Moher, D., & Gorber, B. (2007). A comparison of direct vs. self-report measures for assessing height, weight and body mass index: A systematic review. *Obesity Reviews, 8,* 307–326. http://dx.doi.org/10.1111/j.1467-789X.2007.00347.x

Gormally, J., Black, S., Daston, S., & Rardin, D. (1982). The assessment of binge eating severity among obese persons. *Addictive Behaviors, 7,* 47–55. http://dx.doi.org/10.1016/0306-4603(82)90024-7

Gregg, E. W., & Shaw, J. E. (2017). Global health effects of overweight and obesity. *The New England Journal of Medicine, 377,* 80–81. http://dx.doi.org/10.1056/NEJMe1706095

Grilo, C. M. (2017). Psychological and behavioral treatments for binge-eating disorder. *The Journal of Clinical Psychiatry, 78,* 20–24. http://dx.doi.org/10.4088/JCP.sh16003su1c.04

Grilo, C. M., & Masheb, R. M. (2005). A randomized controlled comparison of guided self-help cognitive behavioral therapy and behavioral weight loss for binge eating disorder. *Behaviour Research and Therapy, 43,* 1509–1525. http://dx.doi.org/10.1016/j.brat.2004.11.010

Grilo, C. M., Masheb, R. M., Wilson, G. T., Gueorguieva, R., & White, M. A. (2011). Cognitive-behavioral therapy, behavioral weight loss, and sequential treatment for obese patients with binge-eating disorder: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 79,* 675–685. http://dx.doi.org/10.1037/a0025049

Grilo, C. M., White, M. A., Gueorguieva, R., Barnes, R. D., & Masheb, R. M. (2013). Self-help for binge eating disorder in primary care: A randomized controlled trial with ethnically and racially diverse obese patients. *Behaviour Research and Therapy, 51,* 855–861. http://dx.doi.org/10.1016/j.brat.2013.10.002

Hedges, L. V. (1981). Distribution theory for Glass's estimator of effect size and related estimators. *Journal of Educational Statistics, 6,* 107–128. http://dx.doi.org/10.3102/10769986006002107

Hilbert, A., Bishop, M. E., Stein, R. I., Tanofsky-Kraff, M., Swenson, A. K., Welch, R. R., & Wilfley, D. E. (2012). Long-term efficacy of psychological treatments for binge eating disorder. *The British Journal of Psychiatry, 200,* 232–237. http://dx.doi.org/10.1192/bjp.bp.110.089664

Iacovino, J. M., Gredysa, D. M., Altman, M., & Wilfley, D. E. (2012). Psychological treatments for binge eating disorder. *Current Psychiatry Reports, 14,* 432–446. http://dx.doi.org/10.1007/s11920-012-0277-8

Jacobson, N. S., Follette, W. C., & Revenstorf, D. (1984). Psychotherapy outcome research: Methods for reporting variability and evaluating clinical significance. *Behavior Therapy, 15,* 336–352. http://dx.doi.org/10.1016/S0005-7894(84)80002-7

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology, 59,* 12–19. http://dx.doi.org/10.1037/0022-006X.59.1.12

Kendall, P. C. (1999). Clinical significance. *Journal of Consulting and Clinical Psychology, 67,* 283–284. http://dx.doi.org/10.1037/0022-006X.67.3.283

Kessler, R. C., Berglund, P. A., Chiu, W. T., Deitz, A. C., Hudson, J. I., Shahly, V., . . . Xavier, M. (2013). The prevalence and correlates of binge eating disorder in the World Health Organization World Mental Health Surveys. *Biological Psychiatry, 73,* 904–914. http://dx.doi.org/10.1016/j.biopsych.2012.11.020

Kristeller, J., Wolever, R. Q., & Sheets, V. (2014). Mindfulness-based eating awareness training (MB-EAT) for binge eating: A randomized clinical trial. *Mindfulness, 5,* 282–297. http://dx.doi.org/10.1007/s12671-012-0179-1

Krul, A. J., Daanen, H. A., & Choi, H. (2011). Self-reported and measured weight, height and body mass index (BMI) in Italy, the Netherlands and North America. *European Journal of Public Health, 21,* 414–419. http://dx.doi.org/10.1093/eurpub/ckp228

Lambert, M. J., Hansen, N. B., & Bauer, S. (2007). Assessing the clinical significance of outcome results. In A. M. Nezu & C. M. Nezu (Eds.), *Evidence-based outcome research: A practical guide to conducting randomized controlled trials for psychosocial interventions* (pp. 359–378). New York, NY: Oxford University Press. http://dx.doi.org/10.1093/med:psych/9780195304633.003.0017

Lambert, M. J., Morton, J. J., Hatfield, D., Harmon, C., Hamilton, S., Reid, R. C., & Burlingame, G. M. (2013). *Administration and scoring manual for the Outcome Questionnaire (OQ-45.2)*. Orem, UT: American Professional Credentialing Services.

Lindenberg, K., Moessner, M., Harney, J., McLaughlin, O., & Bauer, S. (2011). E-health for individualized prevention of eating disorders. *Clinical Practice and Epidemiology in Mental Health, 7,* 74–83. http://dx.doi.org/10.2174/1745017901107010074

Lo Coco, G., Chiappelli, M., Bensi, L., Gullo, S., Prestano, C., & Lambert, M. J. (2008). The factorial structure of the Outcome Questionnaire-45: A study with an Italian sample. *Clinical Psychology & Psychotherapy, 15,* 418–423. http://dx.doi.org/10.1002/cpp.601

Munsch, S., Biedert, E., Meyer, A., Michael, T., Schlup, B., Tuch, A., & Margraf, J. (2007). A randomized comparison of cognitive behavioral therapy and behavioral weight loss treatment for overweight individuals with binge eating disorder. *International Journal of Eating Disorders, 40,* 102–113. http://dx.doi.org/10.1002/eat.20350

Mustelin, L., Bulik, C. M., Kaprio, J., & Keski-Rahkonen, A. (2017). Prevalence and correlates of binge eating disorder related features in the community. *Appetite, 109,* 165–171. http://dx.doi.org/10.1016/j.appet.2016.11.032

Nardone, G., Milanese, R., & Verbitz, T. (2005). *Prison of food: Research and treatment of eating disorders*. London, UK: Karnac.

Nardone, G., & Portelli, C. (2005). *Knowing through changing: The evolution of brief strategic therapy*. Norwalk, CT: Crown House.

Nardone, G., & Salvini, A. (2007). *The strategic dialogue: Rendering the diagnostic interview a real therapeutic intervention*. London, UK: Karnac.

Nardone, G., & Watzlawick, P. (2005). *Brief strategic therapy: Philosophy, techniques, and research*. Lanham, MD: Aronson.

Nauta, H., Hospers, H., Kok, G., & Jansen, A. (2000). A comparison between a cognitive and a behavioral treatment for obese binge eaters and obese non-binge eaters. *Behavior Therapy, 31,* 441–461. http://dx.doi.org/10.1016/S0005-7894(00)80024-6

Palavras, M. A., Hay, P., Filho, C. A., & Claudino, A. (2017). The efficacy of psychological therapies in reducing weight and binge eating in people with bulimia nervosa and binge eating disorder who are overweight or obese—A critical synthesis and meta-analyses. *Nutrients, 9,* 299–317. http://dx.doi.org/10.3390/nu9030299

Palavras, M. A., Morgan, C. M., Borges, F. M. B., Claudino, A. M., & Hay, P. J. (2013). An investigation of objective and subjective types of binge eating episodes in a clinical sample of people with co-morbid obesity. *Journal of Eating Disorders, 1,* 26. http://dx.doi.org/10.1186/2050-2974-1-26

Rieger, E., Wilfley, D. E., Stein, R. I., Marino, V., & Crow, S. J. (2005). A comparison of quality of life in obese individuals with and without binge eating disorder. *International Journal of Eating Disorders, 37,* 234–240. http://dx.doi.org/10.1002/eat.20101

Roberto, C. A., Swinburn, B., Hawkes, C., Huang, T. T., Costa, S. A., Ashe, M., . . . Brownell, K. D. (2015). Patchy progress on obesity

prevention: Emerging examples, entrenched barriers, and new thinking. *The Lancet, 385,* 2400–2409. http://dx.doi.org/10.1016/S0140-6736(14)61744-X

Schmidt, N. B., Norr, A. M., Allan, N. P., Raines, A. M., & Capron, D. W. (2017). A randomized clinical trial targeting anxiety sensitivity for patients with suicidal ideation. *Journal of Consulting and Clinical Psychology, 85,* 596–610. http://dx.doi.org/10.1037/ccp0000195

Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. New York, NY: Oxford University Press. http://dx.doi.org/10.1093/acprof:oso/9780195152968.001.0001

Sorgente, A., Pietrabissa, G., Manzoni, G. M., Re, F., Simpson, S., Perona, S., . . . Castelnuovo, G. (2017). Web-based interventions for weight loss or weight loss maintenance in overweight and obese people: A systematic review of systematic reviews. *Journal of Medical Internet Research, 19,* e229. http://dx.doi.org/10.2196/jmir.6972

Stommel, M., & Schoenborn, C. A. (2009). Accuracy and usefulness of BMI measures based on self-reported weight and height: Findings from the NHANES & NHIS 2001–2006. *BioMed Central Public Health, 9,* 421–431. http://dx.doi.org/10.1186/1471-2458-9-421

Tolin, D. F., McKay, D., Forman, E. M., Klonsky, E. D., & Thombs, B. D. (2015). Empirically supported treatment: Recommendations for a new model. *Clinical Psychology: Science and Practice, 22,* 317–338. http://dx.doi.org/10.1111/cpsp.12122

Vocks, S., Tuschen-Caffier, B., Pietrowsky, R., Rustenbach, S. J., Kersting, A., & Herpertz, S. (2010). Meta-analysis of the effectiveness of psychological and pharmacological treatments for binge eating disorder. *International Journal of Eating Disorders, 43,* 205–217. http://dx.doi.org/10.1002/eat.20696

Wagner, B., Nagl, M., Dölemeyer, R., Klinitzke, G., Steinig, J., Hilbert, A., & Kersting, A. (2016). Randomized controlled trial of an internet-based cognitive-behavioral treatment program for binge-eating disorder. *Behavior Therapy, 47,* 500–514. http://dx.doi.org/10.1016/j.beth.2016.01.006

Wilfley, D. E., Welch, R. R., Stein, R. I., Spurrell, E. B., Cohen, L. R., Saelens, B. E., . . . Matt, G. E. (2002). A randomized comparison of group cognitive-behavioral therapy and group interpersonal psychotherapy for the treatment of overweight individuals with binge-eating disorder. *Archives of General Psychiatry, 59,* 713–721. http://dx.doi.org/10.1001/archpsyc.59.8.713

Wilson, G. T. (2011). Treatment of binge eating disorder. *Psychiatric Clinics of North America, 34,* 773–783.

Wilson, G. T., Wilfley, D. E., Agras, W. S., & Bryson, S. W. (2010). Psychological treatments of binge eating disorder. *Archives of General Psychiatry, 67,* 94–101. http://dx.doi.org/10.1001/archgenpsychiatry.2009.170

Wonderlich, S. A., Gordon, K. H., Mitchell, J. E., Crosby, R. D., & Engel, S. G. (2009). The validity and clinical utility of binge eating disorder. *International Journal of Eating Disorders, 42,* 687–705.

Received November 27, 2017
Revision received April 9, 2018
Accepted April 12, 2018 ■