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Eat Behav. 2016 August ; 22: 199–205. doi:10.1016/j.eatbeh.2016.06.014.**Development and Preliminary Effectiveness of an Innovative Treatment for Binge Eating in Racially Diverse Adolescent Girls****Suzanne E. Mazzeo^{a,b}, Janet Lydecker^c, Megan Harney^d, Allison A. Palmberg^a, Nichole R. Kelly^e, Rachel W. Gow^{a,b}, Melanie K. Bean^{a,b}, Laura M. Thornton^d, Marian Tanofsky-Kraff^e, Cynthia M. Bulik^{d,f,g}, Yael Latzer^h, and Marilyn Sternⁱ**^aDepartment of Psychology, Virginia Commonwealth University, Richmond, VA, USA^bDepartment of Pediatrics, Virginia Commonwealth University, Richmond, VA, USA^cYale School of Medicine, New Haven, CT, USA^dDepartment of Psychiatry, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA^eDepartment of Medical & Clinical Psychology, Uniformed Services University, Bethesda, MD, USA^fDepartment of Nutrition, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA^gDepartment of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden^hUniversity of Haifa, Haifa, IsraelⁱUniversity of South Florida, Department of Child and Family Studies, Tampa, FL, USA**Abstract**

Introduction—Binge and loss of control (LOC) eating are significant concerns among many adolescents and are associated with poor physical, social, and psychological functioning. Black girls appear to be particularly vulnerable to binge and LOC eating. Yet, empirically validated, culturally sensitive treatments for these disordered eating behaviors are not well established. This investigation examined satisfaction, feasibility, and preliminary outcomes of a binge eating intervention for ethnically diverse adolescent girls.

Methods—Participants were 45 girls (age 13–17 years; 44.4% white, 42.2% black) randomized into a Dialectical Behavior Therapy (DBT)-based intervention (**Linking Individuals Being**

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Author Disclosures Authors Mazzeo, Stern, Gow, and Bulik designed the study and wrote the protocol. Mazzeo and Palmberg, and Gow conducted literature searches and provided summaries of previous research studies. Tanofsky-Kraff and Latzer provided specific consultation and feedback on the intervention design and implementation. Mazzeo, Bulik, and Tanofsky-Kraff provided assistance with recruitment issues. Bean, Harney, Gow, Kelly, Lydecker, and Palmberg all assisted with data collection. Thornton conducted data analysis. Mazzeo wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

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Eemotionally **R**real, LIBER8) or a weight management group (2BFit). Following each meeting, participants completed satisfaction measures, and therapists assessed intervention feasibility. Participants also completed assessments of eating behavior and related psychological constructs at baseline, immediately following the intervention, and at 3-month follow-up.

Results—Descriptive statistics indicated that LIBER8 was feasible, and participants were highly satisfied with this intervention. Significant reductions in eating disorder cognitions, dietary restraint, and eating in response to negative affect were observed for participants in both groups, with no differences between LIBER8 and 2BFit.

Discussion—The acceptability and feasibility of LIBER8 and associated reductions in emotional eating show promise in ameliorating binge eating and provide insight into multiple options for treating this challenging eating concern.

Keywords

binge eating; adolescents; race; dialectical behavior therapy; intervention

1. Introduction

1.1 Binge Eating Disorder

Binge-eating disorder (BED) is characterized by the consumption of an objectively large amount of food in the absence of compensatory behaviors.¹ BED is the most common clinical eating disorder, and is associated with numerous comorbidities, including depression, anxiety, low self-esteem, and weight and shape concerns.^{2–5} These psychological correlates of BED are evident regardless of body weight, suggesting that binge eating and associated distress, not body weight (or Body Mass Index, BMI), are most relevant to the clinical impairment related to this disorder.⁵ In addition, binge eating (BE) behaviors are often chronic, and many adults with this condition report that their symptoms began in childhood.⁶ Many adolescents seeking obesity treatment report engaging in BE behavior, yet few treatments for this condition are designed for pediatric populations.^{7,8}

1.2 Binge Eating Diagnosis and Treatment in Adolescents

Adolescents who engage in BE appear particularly vulnerable to psychological distress, including anxiety and depressive symptomatology, and these negative mental health outcomes are not accounted for by weight status.^{8,9} BE can be challenging to treat in adolescents, because individuals in this age group are still developing their abilities to self-regulate emotions.¹⁰ Consequently, adolescents might be particularly vulnerable to maladaptive coping strategies, such as BE. In the formative work conducted for the development of the intervention evaluated in this study, (**L**inking **I**ndividuals **B**eing **E**emotionally **R**real, LIBER8), adolescents also noted that autonomy issues sometimes influenced their BE behavior.¹¹ For example, many described bingeing on “junk” foods as a way to “rebel” against their mothers.¹¹ Other qualitative research has identified links between LOC eating and a range of negative and positive emotions.¹² Thus, for developmental reasons, adolescents might be especially susceptible to BE.

Experts have recognized the unique presentation of BED in adolescents and have developed diagnostic criteria reflecting these developmental issues.^{13,14} These criteria assert that it is not the amount of food that is consumed during a binge, but rather loss of control (LOC) regarding eating that best indexes BED in adolescents.^{13,14} Within this age group, LOC regarding eating was the specific BED criterion most strongly associated with higher BMI, increased adiposity, and greater anxiety, depressive symptoms, disordered eating thoughts, weight and shape concerns, and behavior problems.¹⁵ LOC eating also appears to be a more appropriate indicator of BE than the amount of food consumed within this age group, as the ability to self-monitor is decreased during BE episodes.^{13,14} Further, adolescents who are growing rapidly require higher calorie consumption, making it difficult to quantify an “excessive amount of food.”^{13,14} Therefore, LOC is considered a better indicator of BE in adolescents than the amount of food involved.^{7,13–15}

Adolescent girls report engaging in more BE behavior than their male peers.^{7,16,17} BE also appears to have a greater negative impact on girls' quality of life, compared with that of their male peers.¹⁷ These sex differences in BE rates, and the distress associated with this behavior, suggest that it might be especially important to address in treatment for adolescent girls.

1.3 Binge Eating in Diverse Groups

In addition to the sex differences in BE noted above, some studies have identified racial and ethnic disparities in BED. In particular, BED appears to be at least as prevalent among black adolescent girls and women compared with other racial/ethnic groups.^{18,19} There are many cultural factors that might contribute to the higher prevalence of BED in black girls, including historical connections to food availability and selection, and differential body image pressures.²⁰ For example, within the black community, a fuller, curvier body type is generally preferable to the extremely thin ideal portrayed in media targeting primarily white women.²⁰ However, black women are less likely than their white peers to seek or receive appropriate referrals to eating disorder treatment.^{21,22} Moreover, when black women do pursue eating disorder treatment, they are more likely to drop out.^{21,22} These issues are likely to be exacerbated among adolescents with BE, as this age group is notoriously difficult to engage in treatment.²³

Thus, in the formative work for this study,^{11,24} we conducted focus groups with the targeted population, to enhance this intervention's (LIBER8's) relevance and acceptability for this specific age group. We included both black and white girls in this formative work, as this intervention was designed to be culturally sensitive, so that no group would be excluded, but sensitivity to the intersection of diversity issues and relevant topics including food selection and body ideals, would be optimized. (See previous papers^{11,24} for further details regarding the LIBER8 intervention).

1.4 Binge Eating Treatment

The LIBER8 intervention is based on the affect regulation model of BE, which proposes that this behavior functions as a coping strategy to manage distress.²⁵ Research supports this model, identifying associations among interpersonal problems, negative affect, and LOC

eating.^{9,26} Moreover, BE is associated with deficits in emotion regulation skills,^{9,27} suggesting that interventions emphasizing coping strategies might prove especially effective in treating this problematic eating behavior.^{9,28}

Three specific psychotherapeutic approaches are most often used to treat BE: cognitive behavioral therapy (CBT),²⁹ interpersonal psychotherapy (IPT),³⁰ and dialectical behavior therapy (DBT).^{28,31} CBT and IPT do not emphasize the emotional dysregulation and coping skill deficits common in individuals with BED. DBT, in contrast, directly targets these issues by teaching individuals to recognize, tolerate, and regulate their affective states.²⁸ DBT does not directly focus on BE, but rather, on the emotional states preceding and following a binge episode. This approach is generally effective in reducing BE.²⁸ However, DBT trials for BE have included older (typically middle-age), mostly white adults; samples are small, and little follow-up data are available.^{28,31} Thus, research is needed to determine if this approach can be used effectively to treat adolescents with BE.

1.5 Current Trial

Given the relative paucity of BE treatments for adolescent girls, this study examined the feasibility and preliminary effectiveness of LIBER8, a developmentally and culturally sensitive intervention.²⁴ We hypothesized that this intervention would be feasible and yield significant decreases in LOC eating and BE, eating disorder cognitions, and eating in the response to factors other than hunger. These exploratory analyses were intended to inform the design of a subsequent large-scale RCT.

2. Methods

Methods and recruitment strategy are described in detail elsewhere²⁴ and briefly reviewed here.

2.1 Recruitment

Inclusion Criteria—Eligible participants were females (ages 13–18 years), who met criteria for LOC-Eating Disorder or BED in children^{13,14} and spoke English. This study was approved by the local Institutional Review Board (IRB). Participants and their parents/caregivers provided verbal consent prior to completing the phone screening. Girls and their caregivers provided written assent/consent at baseline prior to completing assessments.

Exclusion Criteria—Exclusion criteria included alcohol or drug dependence in the prior three months, current significant suicidal ideation or self-harm behaviors (assessed in-person at each assessment), developmental disability or neurological impairment that would impair ability to participate in a group, or psychosis. Adolescents were not excluded if they were receiving psychotherapy for concerns other than BE.

Recruitment—Participants were recruited from local pediatric health providers and community organizations. Study flyers were posted in grocery stores and health clubs, and radio advertisements were aired on stations popular with young adults. All participants received gift cards for completing in-person assessments (baseline, post-assessment, and

three month follow-up). Adolescents who completed the program were given Certificates of Completion and participated in a graduation ceremony.

2.2 Procedures

Participants completed a phone screening to determine eligibility. Those meeting criteria were invited to complete baseline assessments. Participants remaining eligible following baseline were randomly assigned to the DBT-based intervention, LIBER8, or 2BFit, a weight management group. The LIBER8 and 2BFit manuals were developed by the authors. Details about each of these treatments are provided elsewhere.²⁴ Briefly, each intervention was delivered in face-to-face sessions, which occurred weekly. In Wave 1 of the trial, each intervention included 12 sessions. However, participants in that wave reported that they would prefer a smaller number of sessions. Subsequent waves were reduced to eight sessions (for both groups) based on this feedback.

Although considered the “control” group, the 2BFit program was an active, behaviorally-based weight management treatment that provided education on the importance of healthy nutrition and physical activity habits; similar interventions have been shown to reduce bulimic symptoms, including BE.³² Both immediately following the completion of the intervention, and three months later, assessments were re-administered. Intervention satisfaction and feasibility were evaluated weekly during the treatment phase. Also, weekly self-harm screenings were conducted with adolescents in both groups throughout the intervention.

2.3 Participants & Interventionists

Participants were 45 females between the ages of 13-17 years ($M_{age} = 15.42$, $SD = 1.73$). With respect to race, 44.4% were white, 42.2% were black, 4.4% were biracial, and 8.9% choose not to answer. Five waves of participants completed the intervention. In Waves 1-3, participants were randomized to either LIBER8 or 2BFit using a random number generator. Due to difficulties recruiting for two concurrent groups, and because our primary aim was to establish feasibility of LIBER8, Wave 4 was not randomized; all participants were placed in LIBER8. In addition, all participants in Wave 5 completed LIBER8 in an individual session format, as we did not want to keep potential participants on a waiting list until a large enough group could be formed that met each participant's scheduling needs. See Table 1 for more information regarding each wave.

Group Leaders—Group leaders were trained in their respective manualized interventions (LIBER8 or 2BFit) by the study coordinator. Leaders were doctoral students in psychology or PhD level psychologists.

2.4 Measures

Initial Phone Screen—During the initial call, a trained research assistant or the study coordinator conducted the phone screen interview with caregivers, who answered questions about their demographic characteristics, ability to attend groups and whether their adolescent daughter displayed specific eating behaviors (overeating, erratic eating). If

responses suggested daughters might be eligible for the study, caregivers were asked to provide verbal consent for them to participate in a separate phone screening.

Loss of Control Eating Disorder Screening Questionnaire (LOC-ED)—

Adolescents completed the LOC-ED¹⁴ during the initial phone screen. The LOC-ED assessed BE and LOC eating frequency and episode features such as hunger and satiety levels, affect and mood before, during, and after episodes, and compensatory behaviors.¹⁴

M.I.N.I International Neuropsychiatric Interview version 6.0 (M.I.N.I.)—

The M.I.N.I.³³ is a brief clinical interview that assesses DSM-IV-TR Axis I disorders. Select modules (anorexia nervosa, bulimia nervosa, alcohol or substance abuse, and suicidality) were conducted with each adolescent to screen for each of these diagnoses; (the suicidality module was administered in-person at baseline and weekly to ensure participants' safety). The M.I.N.I. yields reliable and valid scores.³³

Eating Disorder Examination (EDE)—The overeating portion of the EDE³⁴ assessed both objective and subjective binge episodes, and objective overeating. The EDE interview was used to ascertain additional diagnostic information, rather than for formal analyses. The EDE yields reliable and valid scores in adolescent samples.³⁵

Eating Disorder Examination-Questionnaire (EDE-Q)—The EDE-Q³⁶ assessed disordered eating cognitions and behaviors. It includes four subscales (Restraint, Shape Concern, Weight Concern, and Eating Concern), and an index of Global disordered eating attitudes. The EDE-Q yields reliable and valid scores.³⁷

Emotional Eating Scale – Adapted for Children (EES-C)—The EES-C is a 25-item self-report measure assessing desire to eat as a means of coping with: anxiety, anger, and frustration (AAF), depressive symptoms (DEP), and feeling unsettled (UNS).³⁸ It yields internally consistent and stable scores, and demonstrates convergent and discriminant validity.³⁸

Eating in the Absence of Hunger Questionnaire for Children and Adolescents (EAH-C)—The EAH-C measures eating in response to three categories of “triggers”: Negative Affect, External Eating cues, and Fatigue/Boredom.³⁹ It yields internally consistent and stable scores, and evidences convergent validity with measures of emotional eating.³⁹

Height and Weight—Weight was assessed using a digital scale and height was assessed with a stadiometer. BMI percentile was calculated for each individual.

Demographic Questionnaire—This questionnaire assessed participants' date of birth, year in school, comfort with texting, and texting use.

Self-Monitoring—Participants in LIBER8 engaged in self-monitoring of BE and LOC eating (as well as urges to engage in this behavior) via text messaging. Participants were initially asked to complete daily self-monitoring by recording the number of times they engaged in four symptoms (i.e., number of BE episodes; strength of urges to binge; number

of LOC episodes; and strength of urges to engage in LOC eating). After the message was received, the participant was sent an automatic feedback message based on three categories: status quo, improved, and deteriorated. Participants were sent reminders if they did not send their daily message. Following the first wave of the intervention, monitoring was reduced to once per week, as participants indicated that once per day was not feasible. (See Section 4.2 for more details regarding texting feasibility).

Participant Satisfaction Questionnaire—At the end of each session, participants completed a satisfaction questionnaire consisting of seven questions rated on a three-point scale: 1=*Not at all helpful*, 2=*A little bit helpful*, 3=*Yes, very helpful*. Participants were also asked how satisfied they were with the group so far (1=*Not satisfied at all*, 2=*Somewhat satisfied*, 3=*Very satisfied*). Additionally, participants were asked to provide open-ended feedback regarding their satisfaction.

Therapist Feasibility Questionnaire—At the end of each session, leaders completed a feasibility questionnaire including four questions rated on a four-point scale: 1=*Strongly Disagree*, 2=*Disagree*, 3=*Agree*, 4=*Strongly Agree*. Leaders were also offered the opportunity to provide open-ended feedback.

3. Analysis

For satisfaction and feasibility, percent endorsement of each item was calculated. Repeated measures ANOVAs were completed for Waves 1-3 from baseline to post-testing to evaluate differences in outcomes between LIBER8 and 2BFit among participants who completed both baseline and post-test. Paired sample T-tests evaluated changes from baseline to post-test on all measures. For LIBER8, participants in Waves 1–5 who completed both baseline and post-testing were included in the paired sample T-tests. For 2BFit, data from participants in Waves 1-3 who completed baseline and post-test were included in analyses.

4. Results

4.1 Feasibility of Recruitment

Recruitment yielded 164 calls from families interested in a BE program. Participants came from direct mail (48.8%), provider referrals (15.1%) community programs (16.2%), radio (1.8%), and other sources (18.1%; e.g., word of mouth, flyers in the community). Based on the phone screen, 41.5% ($n=68$) were eligible, 40.2% ($n=66$) were not eligible, and 18.3% ($n=30$) provided insufficient information to determine eligibility (or daughter did not call to complete screen).

Reasons for ineligibility at phone screen included not meeting LOC eating criteria (71.2%), above 18 years (10.6%), compensatory behaviors (7.6%), suicidality (1.5%), younger than 13 years (3%), self-harm (1.5%), dietary restriction (1.5%), and other (3%). Among those who attended baseline assessments, 9.1% ($n=5$) were not eligible and 90.9% ($n=50$) were eligible.

4.2 Participants' Demographics, Attrition and Attendance

A total of 28 participants were assigned to the LIBER8 intervention across 5 waves (see Table 1). Of these, 18 (64.3%) completed post-test and 12 (42.9%) completed follow-up. For 2BFit, 13 of 17 participants (76.5%) completed post-test and 11 (64.7%) completed follow-up. The mean age of participants assigned to LIBER8 and 2BFit was, respectively $M_{\text{age}} = 15.50$ years, $SD = 1.64$, and $M_{\text{age}} = 15.29$ years, $SD = 1.90$; 12 white and 12 black participants were randomly assigned to LIBER8; 8 white and 7 black participants were randomly assigned to 2BFit.

There were no significant attrition differences between groups at post-test ($\chi^2=0.73$, $p<.40$) or follow-up ($\chi^2= 2.02$, $p<.16$). Across all five waves of LIBER8, participants attended an average of 64.9% of sessions. The mean proportion of 2Bfit sessions attended was 68.5%.

4.3 Participants' Ratings of Satisfaction and Texting Feasibility

Participants reported high satisfaction with LIBER8: 76% indicated the topics were helpful; 59% believed the homework was helpful, and 72% reported having fun. In addition, 99% and 84% were comfortable with their leaders and other members, respectively. Lastly, 81% endorsed being “very satisfied” with the sessions overall. Qualitative feedback included, “everyone was nice, I felt like I could talk;” “...I learn new helpful stuff and that I don't feel judged,” and “it gave me good ways to cope with my emotions.” Similar levels of satisfaction were reported for 2BFit: 86% indicated the topics were helpful; 83% believed the homework was helpful, and 81% reported having fun. In addition, 99% and 98% indicated comfort with leaders and other members, respectively. Lastly, 86% endorsed being “very satisfied” with the sessions overall. No participants developed any significant suicidal intention, clinically significant self-harming behaviors, bulimia nervosa, or anorexia nervosa during the study.

Although adolescents generally reported positive perceptions of LIBER8 as a whole, the texting component was not well received. Very few participants texted as scheduled, if at all. Specifically, LIBER8 participants participated in texting for self-monitoring at the following rates: 44% in week 1, 48% in week 2, 12% in week 3, 24% in week 4, 44% in week 5, 16% in week 6, 32% in week 7 and 16% in week 8. Participants reported several barriers to adherence to the texting schedule, including forgetting to respond (despite reminders), losing their phones as punishment, and not wanting to text adults. This resistance to texting remained even after the texting component was reduced from daily to once per week.

4.4 Therapists' Ratings of Feasibility

Among LIBER8 therapists, 61% reported they were able to cover all content, 65% believed topics were appropriate, and 69% believed group members understood the content. Therapists identified areas that could be improved, including, “cover loss of control/emotional eating more often in earlier sessions.” Therapists from 2BFit also reported that their intervention was feasible: 72% noted that they were able to cover all content; 73% believed topics were appropriate, and 80% believed group members understood the content.

4.5 Between Group Analyses

Repeated measures ANOVAs indicated no significant differences between groups, or time by group interactions (all p -values $>.05$). However, time differences (from baseline to post-test) were observed for the EDE-Q subscales of Eating Concern, Shape Concern, Restraint, and Global score, EES subscales of AAF and DEP, and EAH subscale of Negative Affect (discussed below).

4.6 Within Group Analyses

LIBER8 participants manifested improvements from baseline to post-testing on four EDEQ subscales: Eating Concern ($t=2.49$, $p<.031$), Shape Concern ($t=2.32$, $p<.034$), Restraint ($t=2.38$, $p<.030$), and Global Score ($t=2.72$, $p<.020$). Paired samples T-tests also indicated a significant reduction on the EAH Negative Affect Scale ($t=3.15$, $p<.007$). See Table 2 for detailed results.

Similarly, 2BFit participants demonstrated improvements on all EDEQ subscales: Eating Concern ($t=3.13$, $p<.014$), Shape Concern ($t=4.27$, $p<.002$), Weight Concern ($t=3.26$, $p<.007$), Restraint ($t=2.40$, $p<.034$), and Global Score ($t=3.72$, $p<.006$). Also, significant reductions in scores on two subscales of the EES-C measure: AAF ($t=2.80$, $p<.018$) and DEP ($t=3.49$, $p<.006$) were identified. See Table 3.

5. Discussion

5.1 Overview

This study evaluated the feasibility, acceptability, and preliminary outcomes of an innovative intervention (LIBER8) targeting BE and LOC eating in a racially diverse sample of adolescent girls. LIBER8 participants manifested reductions in eating concern, shape concern, global disordered eating attitudes, restraint and negative affect from baseline to post-testing. Participants in the active control group (2BFit) also manifested reductions in several outcomes (eating concern, shape concern, weight concern, global disordered eating attitudes, and emotional eating). Thus, both approaches appear to reduce several maladaptive eating symptoms. These findings make sense in light of research indicating that weight-management interventions focusing on nutrition and exercise habits are useful in reducing disordered eating cognitions and behaviors.⁴⁰ Results also suggest that LIBER8, the DBT-based intervention developed in this study, holds promise for reducing disordered eating in adolescents.

The focus on emotion regulation and interpersonal skills in LIBER8 appears to have reduced eating in response to negative affect. This is consistent with research indicating that negative affect is associated with LOC eating.^{9,26} The coping, self-evaluation, and mindfulness skills taught in LIBER8, as well as the attention to examples involving food-related situations, might have made participants more aware of their eating habits and provided tools to improve these behaviors. For the 2BFit group, the structure and focus on nutrition and physical activity seems to have also made participants more aware of their maladaptive eating habits.

It was somewhat surprising initially that 2BFit yielded roughly comparable results to those of LIBER8; however, other recent research with adolescents engaging in LOC eating found no differences in initial outcomes in IPT versus a Health Education comparison group.⁴¹ This suggests that a “stepped-care” model of treatment might be beneficial for adolescents with LOC eating. The 2BFit intervention is based on standard behavioral weight loss principles, and could be implemented by a trained health educator with no specific mental health expertise. Thus, 2BFit is easier and less expensive to disseminate widely, compared with LIBER8. However, 2BFit might not be sufficient for everyone. In particular, individuals with lingering emotional eating difficulties might benefit from LIBER8's focus on emotion regulation skills. Because LIBER8 involves more advanced therapeutic skills and concepts, it is important that experienced clinicians conduct this intervention. Therefore, the “stepped-care” model might be more cost effective and more accessible to many populations.

5.2 Lessons Learned

Adolescents' lack of enthusiasm for the texting component of LIBER8 was surprising given the positive results of other studies that have used texting as an element of treatment for various health concerns.^{42,43} The current outcomes suggest the role of texting might be evolving in adolescents' lives. Because this way of communicating is no longer novel, adolescents might be less interested in using it, especially to communicate with adults, as some noted in this trial.

An additional challenge in the current study was recruitment. Although many caregivers contacted the researchers expressing concern about their daughters' eating habits, girls themselves often were not troubled by their behavior. Many also experienced too few episodes of BE and LOC eating to meet criteria, rendering them ineligible. Qualitative research provides evidence for the relative lack of concern many girls expressed about their eating behaviors in the current study;¹¹ many adolescents do not view BE/LOC eating as a problem. Rather, they view it as a means of asserting their independence from their parents, and appear to believe that they can simply stop this behavior at any time, and thus do not need treatment.¹¹ Perhaps participants' self-awareness was not high enough to identify their behavior as problematic; this awareness could develop over time, through the process of maturation.

5.3 Limitations and Strengths

Results should be interpreted within the context of a few limitations. Most notably, we experienced difficulty recruiting individuals with sufficient awareness of and concern about their eating behaviors. Commonly, parents recognized the maladaptive nature of their daughters' eating habits, but the adolescents did not. Thus, several girls were excluded during the phone screening due to lack of endorsement of LOC. Because of these recruiting challenges, we did not randomize the fourth and fifth group waves. Second, LIBER8 therapists noted that some individuals appeared to have difficulty with some of the more abstract concepts involved in that intervention. This might be due to differences in the relative cognitive complexity of the adolescents. Future trials could also consider matching girls to treatment based on their level of cognitive development. Also, perhaps the LIBER8 intervention might be more effective with older adolescents or emerging adults (e.g.,

college-age women). Third, because of the small sample size, this study was not sufficiently powered to detect potential racial differences in the effectiveness of the interventions. Future studies should examine this moderator.

Despite these limitations, this study has two key strengths. First, given the increased risk for BE in black adolescent girls, and the dearth of research on this population, this investigation provides important information on this group. Moreover, LIBER8 extended traditional CBT using DBT concepts that had not been previously studied in BE/LOC eating for adolescent girls. In sum, current results suggest both groups show promise in treating BE using a “stepped-care” model, and provide insight into treating this problematic eating behavior.

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Highlights

- This binge eating intervention was feasible in a sample of adolescent girls.
- Treatment yielded reductions in eating disordered cognitions and restraint.
- This investigation included both black and white adolescents.
- Binge eating in adolescents might be best treated using a “stepped-care” approach.

Table 1

Number of participants in each wave by intervention group.

Wave Number	Total Number	LIBER8	2BFIT
1	11	6	5
2	12	5	7
3	11	6	5
4	6	6	N/A
5	5	5	N/A

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Table 2

Means for the baseline and post-test scores from the EDE-Q, EES-C and EAH and results from the paired samples t-tests for the Liber8 group.

Variable	Baseline Mean	Post-Test Mean	n	t-value (p-value)
EDE-Q				
Eating Concern	1.92	1.05	12	2.49 (.031)
Shape Concern	3.32	2.44	17	2.32 (.034)
Weight Concern	3.33	2.72	16	1.29 (.216)
Restraint	1.54	1.00	18	2.38 (.030)
Total	2.53	1.74	12	2.72 (.020)
EES-C				
Anxiety, Anger, and Frustration	0.91	0.82	17	0.88 (.391)
Depressive Symptoms	1.71	1.38	15	1.25 (.234)
Feeling Unsettled	1.28	0.87	16	2.10 (.053)
EAH				
Negative Affect	1.07	0.87	17	3.15 (.007)
External	2.15	2.10	17	0.53 (.602)
Fatigue	1.65	1.54	17	1.04 (.313)

Table 3

Means for the baseline and post-test scores from the EDE-Q, EES-C and EAH and results from the paired samples t-tests for the 2Bfit group.

Variable	Baseline Mean	Post-Test Mean	n	t-value (p-value)
EDE-Q				
Eating Concern	1.90	0.70	9	3.13 (.014)
Shape Concern	2.88	1.76	13	4.27 (.002)
Weight Concern	2.96	2.13	13	3.26 (.007)
Restraint	1.65	1.20	13	2.40 (.034)
Total	2.24	1.37	9	3.72 (.006)
EES-C				
Anxiety, Anger, and Frustration	1.14	0.68	12	2.80 (.018)
Depressive Symptoms	2.10	1.62	12	3.49 (.006)
Feeling Unsettled	1.32	1.04	11	0.87 (.406)
EAH				
Negative Affect	1.24	0.90	13	1.42 (.182)
External	2.15	2.04	13	0.62 (.549)
Fatigue	1.87	1.46	13	2.11 (.057)