COMPARING A NOVEL, GROUP-BASED GUIDED SELF-HELP TO UNGUIDED SELF-HELP FOR THE TREATMENT OF BINGE-EATING DISORDER IN ADULTS: A RANDOMIZED CONTROLLED TRIAL

by

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Dalhousie University is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq. We are all Treaty people.

DEDICATION PAGE

This thesis is dedicated to my Mum and Dad – Leslie and Peter Harris – who, despite a lack of familial academic roots, taught me the value of education and instilled in me a love of life-long learning.

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ABSTRACT

This thesis assessed the efficacy of a 3-session, group-based, guided self-help treatment for binge-eating disorder (BED) called Binge Focused Therapy (BFT). In a parallel-group randomized controlled trial (RCT), adults with mild–severe BED were randomized to virtual BFT or a traditional unguided self-help approach for binge eating (*Overcoming Binge Eating*; Fairburn, 2013). Outcomes were collected via self-report questionnaires at Baseline, Week 6, Week 10 (posttreatment), 6-, and 12-month follow-up. We hypothesized that BFT (n = 82) would lead to better outcomes and lower treatment attrition than unguided self-help (n = 82). Our intention-to-treat analysis demonstrated a significant effect of treatment group on BED symptomatology (primary outcome; β = -5.04, $p < .001$, 95% CI [-7.57, -2.52]), binge frequency (β = -3.24, $p = .001$, 95% CI [-5.22, -1.26]), general ED symptomatology (β = -0.91, $p < .001$, 95% CI [-1.17, -0.65]), clinical impairment (β = -6.27, $p < .001$, 95% CI [-8.78, -3.77]), confidence to change binge eating (β = 1.22, $p < .001$, 95% CI [0.56, 1.89]), BED remission (OR = 4.98, $p = .003$, 95% CI [1.72, 14.40]), and treatment attrition (β = 0.456, $p < .001$), with the BFT group reporting greater improvements and lower dropout. We did not find evidence of a significant effect of group on binge-eating abstinence (OR = 2.01, $p = .103$, 95% CI [0.87, 4.64]). Findings provide initial support for the use of BFT to treat BED. BFT may be particularly useful for overcoming common treatment implementation and accessibility barriers.

LIST OF ABBREVIATIONS USED

ACT	Acceptance and commitment therapy
AN	Anorexia nervosa
ANOVA	Analysis of variance
APA	American Psychiatric Association
BED	Binge-eating disorder
BES	Binge Eating Scale
BFT	Binge focused therapy
BMI	Body Mass Index
BN	Bulimia nervosa
CBT	Cognitive behavior therapy
CIA	Clinical Impairment Assessment
DBT	Dialectical behavior therapy
DSM-5	Diagnostic and Statistical Manual of Mental Disorders 5th Edition
ED	Eating disorder
EDDS	Eating Disorder Diagnostic Scale
EDE	Eating Disorder Examination
EDE-Q	Eating Disorder Examination Questionnaire
IPT	Interpersonal psychotherapy
ITT	Intention-to-treat
LDX	Lisdexamfetamine dimesylate
MET	Motivational enhancement therapy
ML	Maximum likelihood
NICE	National Institute for Health and Care Excellence
QIDS-SR	Quick Inventory of Depressive Symptomatology (Self-Report)
RCT	Randomized controlled trial
REDCap	Research Electronic Data Capture
REML	Restricted maximum likelihood
USH	Unguided self-help
WHO	World Health Organization

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CHAPTER 1 – INTRODUCTION

1.1 Overview of Binge-Eating Disorder

Binge-eating disorder (BED) is characterized by recurrent episodes of binge eating, which is defined as consuming a larger amount of food than most people would eat in a similar amount of time while having a sense of loss of control over the eating, and which are not followed by compensatory behaviors such as self-induced vomiting or fasting (American Psychiatric Association [APA], 2013). According to the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5) diagnostic criteria for BED is met if an individual experiences at least one binge-eating episode per week for three months and has marked distress related to the episodes (APA, 2013). Additionally, the binge-eating episodes must be associated with three or more of five behavioral symptoms: eating much more rapidly; eating until uncomfortably full; eating when not physically hungry; eating alone due to embarrassment by the amount of food consumed; and feeling disgusted with oneself, depressed, or very guilty following the episodes.

BED is the most common eating disorder (ED) in adults with an estimated lifetime prevalence of 1.17% for males and 2.42% for females (1.53% across the sexes; Qian et al., 2022). BED is highly comorbid with other psychiatric disorders, particularly mood disorders (including depression), substance use disorders, and anxiety disorders (Udo & Grilo, 2019). Chronic health problems including diabetes, hypertension, heart conditions, and gastrointestinal symptoms are also commonly comorbid with BED, even when analyses are adjusted for co-occurring psychiatric disorders (Olguin et al., 2017; Udo & Grilo, 2019). Individuals with BED are also more likely to have a high Body Mass Index (BMI; Udo & Grilo, 2018).

BED is associated with a high disease burden globally (Santomauro et al., 2021), and has substantial economic costs at both the individual and societal levels (Streatfeild et al., 2021; Tannous et al., 2022). Health service utilization and associated costs are considerably higher for individuals with BED than those without (Ágh et al., 2015; Watson et al., 2018). Individuals with BED also have poorer health-related quality of life (Ágh et al., 2015; Singleton et al., 2019) and marked impairments in daily functioning (Appolinario et al., 2022; Pawaskar et al, 2017).

1.2 Treatment of Binge-Eating Disorder

Several interventions have been found to be efficacious for the treatment of BED. While a diverse range of interventions for BED have been studied over the previous two decades, the literature has remained relatively consistent with a focus on psychotherapeutic approaches and a general consensus in support of cognitive behavior therapy (CBT), which has become the leading approach for treating BED (Grilo & Juarascio, 2023). CBT for BED focuses on identifying dysfunctional thoughts (e.g., about eating and food, or weight and shape) and maladaptive behaviors (e.g., binge eating), as well as learning strategies to regulate eating patterns and cope with stress (Fairburn, 2008). A meta-analysis of data from randomized-controlled trials (RCTs) on BED treatments found that from pre- to posttreatment CBT significantly reduces binge-eating episodes (with a large-size effect; Hedge's $g = 0.87$ [0.42, 1.33]), significantly reduces ED psychopathology (with a medium-size effect; $g = 0.65$, [0.37, 0.93]), and significantly increases the odds of binge-eating abstinence (with a large odds ratio; $OR = 10.0$, [5.3, 18.6]) when compared to inactive controls (Hilbert et al., 2019). After CBT, interpersonal psychotherapy (IPT) is often

considered the next most well-supported psychotherapy for BED (Grilo & Juarascio, 2023). IPT, which was developed for the treatment of depression and then adapted for BED, focuses on identifying interpersonal challenges that play a role in the creation and maintenance of binge eating and learning strategies to overcome these challenges (Wilfley et al., 1998). IPT may be comparable to CBT for reducing binge-eating frequency and ED psychopathology (Wilfley et al., 2002; Wilson et al., 2010). A meta-analysis of studies on psychotherapies for BED found that IPT led to the highest rates of abstinence from binge eating (Linardon, 2018).

There is also some evidence to support the use of what are referred to as "third-wave" cognitive and behavior therapies for the treatment of BED, including dialectical behavior therapy (DBT) and acceptance and commitment therapy (ACT; Linardon, Fairburn, et al., 2017). In contrast to traditional CBT, third-wave therapies center on strategies related to mindfulness, acceptance, and psychological flexibility (Hayes & Hofmann, 2021). DBT was developed from traditional CBT principles and while both approaches involve learning strategies to cope with stress, DBT primarily focuses on developing emotion regulation skills (Wiser & Telch, 1999). DBT has demonstrated efficacy for improving BED outcomes (Carter et al., 2020; Safer et al., 2010) and DBT may be comparable to CBT for reducing binge-eating frequency (Chen et al., 2017). ACT, which was designed to address mental health more broadly than attempting to treat one specific disorder, focuses on reducing experiential avoidance (or avoidance of thoughts, feelings, and sensations) and increasing psychological flexibility (Hayes et al., 1999). Experiential avoidance, in particular, may mediate binge eating (Lillis et al., 2011) and research suggests that ACT may be efficacious for reducing binge eating frequency and

ED psychopathology in individuals with BED (Onnink et al., 2022). While CBT is generally considered superior to other psychotherapies for BED (Linardon, Wade, et al., 2017), studies directly comparing CBT to other psychotherapies for BED are sparse and it remains unclear which, if any, approach is superior across outcomes (Hilbert et al., 2019; Peat et al., 2017).

There are also gaps in the BED literature on the use of pharmacotherapy (Samara et al., 2024). Only one medication, lisdexamfetamine dimesylate (LDX), has been approved for the treatment of BED by regulatory boards in a small number of countries including the United States, Canada, and Australia (Australian Government Therapeutic Goods Administration, 2018; Government of Canada, n.d.; United States Food and Drug Administration, 2015). The meta-analysis of BED treatments by Hilbert et al., (2019) reported that LDX significantly reduces binge-eating episodes (with a medium-size effect; $g = 0.65$ [0.39, 0.92]) and significantly increases the odds of binge-eating abstinence (with a medium odds ratio; $OR = 3.1$, [2.0, 5.0]) when compared to inactive controls. Studies directly comparing pharmacotherapy and psychotherapy for BED are limited and those that do exist examined only short-term effects of fluoxetine, sibutramine, or methylphenidate (Samara et al., 2024). In a recent meta-analysis, CBT was found to be superior to fluoxetine, but not sibutramine or methylphenidate, for improving binge-eating frequency, remission, and ED psychopathology (Samara et al., 2024). Further, there is no available research comparing CBT and LDX. In consideration of the limitations and gaps in the current literature, some argue that the presumption that CBT is superior to pharmacotherapy for BED may yet be premature (Samara et al., 2024). Nonetheless, meta-analyses of the available literature support the current clinical guidelines that recommend

CBT-based approaches as the first-line treatment for BED (Linardon, Wade, et al., 2017; National Institute for Health and Care Excellence [NICE], 2017). Further, these guidelines classify pharmacotherapy as the second-line option and advise against the use of medication *alone* for BED (Crone et al., 2023; NICE, 2017). Therefore, psychotherapy is a fundamental component of evidence-based treatment for BED.

1.3 Barriers to Treatment

Many individuals with BED never receive treatment or are left untreated for years. In the United States, it has been estimated that less than half of adults with BED ever access care for binge eating (Coffino et al., 2019). Similar findings have been reported in countries with universal healthcare; in a community sample of Finnish young adults diagnosed with BED, less than half had received treatment (Silén et al., 2021). Individuals with BED may avoid accessing care due to shame and stigmatization (Hamilton et al., 2022). Those who do seek help often wait longer than individuals with any other ED diagnosis; one study out of the United Kingdom found the average length of time without treatment for BED to be nearly six years, which was approximately two years longer than the average for bulimia nervosa (BN) and four years longer than the average for anorexia nervosa (AN; Austin et al., 2021).

Wait times and disparities in treatment availability across geographic regions were identified as key barriers to treatment access in Canada a decade ago (Standing Committee on the Status of Women, 2014). The median wait time for Canadian ED treatment programs is increasing, now reported at 22.9 weeks in 2021—up from 12.1 weeks in 2005 (Esmail & Walker, 2005; Moir & Barua, 2022). Thus, while there are several interventions with

demonstrated efficacy for treating BED (CBT being the leading approach) they are often inaccessible, particularly due to a lack of specialists with training in these higher-intensity therapies (Grilo & Juarascio, 2023).

1.4 Structured Self-Help

Structured self-help may be a viable option for improving access to BED treatment, as it is less resource-intensive than individual psychotherapy. Self-help is often categorized as guided, when it includes support from a health professional, or unguided, when no additional support is provided. Both approaches have demonstrated efficacy for improving BED symptoms and are generally superior to inactive controls (Linardon, Wade, et al., 2017; Traviss-Turner et al., 2017). From pre- to posttreatment, self-help for BED significantly reduces binge-eating episodes (with a medium-size effect; g = 0.68 [0.25, 1.12]), significantly reduces ED psychopathology (with a medium-size effect; g = 0.57, [0.15, 0.99]), and significantly increases the odds of binge-eating abstinence (with a large odds ratio; OR = 8.53, [3.14, 23.15]) when compared to inactive controls (Hilbert et al., 2019). Self-help for BED may be equivalent to psychotherapy on some posttreatment outcomes, particularly improvements in general ED psychopathology (Hilbert et al., 2019). Improvements made with self-help may be sustained at posttreatment follow-up, although follow-up data beyond 12 months is sparse (Hilbert et al., 2020).

The literature comparing guided and unguided self-help for BED directly is mixed (Davey, Bennett, et al., 2023). A previous systematic review and metaregression of studies on self-help for BED and BN found that guided self-help led to greater posttreatment reductions in binge eating and ED psychopathology compared to unguided self-help

(Beintner et al., 2014). Further, guided self-help led to binge-eating abstinence rates more than two times higher than unguided (Beintner et al., 2014). A meta-analysis by Linardon (2018) suggests that follow-up abstinence rates for guided self-help may be equivalent to more resource-intensive clinician-led group treatment, as between-group differences in posttreatment abstinence were not maintained at follow-up. Studies on unguided self-help were not included in that meta-analysis. The meta-analysis by Hilbert et al. (2019), with updated review (Hilbert, 2023), did not find evidence of significant differences in improvements on binge-eating frequency and abstinence between guided and unguided self-help.

Despite mixed findings and the scarcity of longer-term follow-up data, guided self-help is generally regarded as having advantages over unguided self-help (Kenny et al., 2020; Melisse et al., 2023). Beintner et al. (2014) found a significantly higher proportion of individuals in unguided self-help interventions completed less than half of the intervention, suggesting that guidance may reduce the likelihood of dropout particularly during the first half of treatment. While there remain gaps in the literature regarding type and extent of guidance needed for best outcomes (Wilson & Zandberg, 2012), clinical guidelines recommend guided self-help as the first-line intervention for BED, particularly when standard psychotherapy is unacceptable or inaccessible (NICE, 2017).

Despite demonstrated efficacy in research settings, evidence-based BED interventions are often not disseminated beyond research trials into health systems (Peat et al., 2017) leading to a lack of literature on the real-world implementation of guided self-help for BED. Literature on the implementation of guided self-help for other EDs and psychiatric disorders is also limited, and predominantly focuses on treatment for

depression. For example, in the United Kingdom guided self-help is the most common first-line therapy approach used to treat anxiety and depression in adults within the National Health Service (NHS England, 2024). Similarly, a digital guided self-help approach for depression is now available nationally in Lebanon (World Health Organization [WHO], 2024). The successful implementation of guided self-help programs in these countries, as well as the accompanying data on the effectiveness of such programs for improving patient outcomes within real-world health systems (see Clark, 2018, for more detail), indicates that the implementation of guided self-help for other disorders (i.e., BED) may be feasible.

The gap between research and health systems is likely due to infrastructure inadequacies (e.g., sparsity of specialists) and there is a need for innovative means to close this gap (Peat et al., 2017). Guided self-help approaches that are designed to be led by non-specialist providers may facilitate the broader use and implementation of such approaches. A recent manual published by the WHO on the implementation of psychological interventions within existing systems pays particular attention to the need to increase access to evidence-based psychotherapies through the use of non-specialist providers and less resource-intensive approaches such as guided self-help (WHO, 2024). While this manual does not include specific reference to ED interventions, there have been similar calls in the BED literature. The development of brief (or 'focused'), low-intensity (or 'programme-led') interventions is critical to improving ED intervention accessibility, as they are less resource-intensive, can be facilitated by non-specialists, and have the potential for broader dissemination (Davey, Allen, et al., 2023).

1.5 BINGE-FOCUSED THERAPY

Binge focused therapy (BFT) is a brief, group-based guided self-help intervention for BED based on the unguided self-help approach *The Brain Over Binge Recovery Guide* (Hansen, 2016). BFT incorporates aspects of ACT, DBT, motivational enhancement therapy (MET), and neuroscience-based principles of habit formation, focusing on enhancing confidence and self-efficacy (see Appendix A for an overview of the theoretical principles of BFT). MET was originally developed to treat substance use disorder and focuses on addressing the ambivalence individuals with such disorders often have about behavior change (Rollnick et al., 1992). While the literature on MET for BED is limited, studies in which MET principles were incorporated into BED treatment have demonstrated that increasing readiness and motivation to change binge-eating behaviors is associated with improved binge-eating outcomes (Cassin et al., 2008; Dunn et al., 2006). There is also some indication that motivation to change plays a role in ED treatment engagement and dropout (Vall & Wade, 2015). The impact of motivation to change on treatment outcomes is likely mediated by self-efficacy (or confidence in oneself to change; Keshen et al., 2017; Vall & Wade, 2015), and self-efficacy is often lower in individuals with BED than those without BED (Chao et al., 2022). Interventions that increase both motivation to change and self-efficacy may improve ED outcomes (Sansfaçon et al., 2020; Vall & Wade, 2015).

BFT was developed to optimize real-world implementation and efficiency. While traditional guided self-help on average requires 11.1 +/- 5.5 (Hilbert et al., 2019) individual sessions with a specialized clinician, BFT is delivered in three sessions and is facilitated by non-specialists (e.g., registered nurses), as session content is scripted. Additionally, BFT is conducted in a group-format, which allows up to 10 patients to receive treatment at

once. To further increase accessibility, BFT can be administered online via a videoconference platform. Previous research supports the use of interventions delivered in shorter time frames, by providers with less experience and credentials than specialists, in group formats, and via the internet (Davey, Bennett, et al., 2023; de Zwaan et al., 2017; Wilson & Zandberg, 2012).

In 2018, our team conducted a pilot study of BFT that included 40 individuals with BED. In-person group sessions were administered by undergraduate honors psychology students. Unpublished results indicate that the intention-to-treat sample (i.e., all participants who started the intervention were included in the data analysis whether they completed the intervention or not) experienced significant reductions in binge-eating frequency and severity, and general ED symptomology. The sample also reported improved confidence to change binge eating. At 6-month follow up, 42.85% of participants who completed the intervention were abstinent from binge eating (i.e., no binge-eating episodes within the past 28 days). Data from the pilot study, including qualitative feedback from participants, was used to guide modifications to BFT to improve the high treatment attrition rate. Dropout after the first session, which was heavily focused on psychoeducation, was particularly high. Therefore, a key modification was the addition of interactive activities in the first session, including goal setting and beginning the homework as a group, to increase group interaction and treatment engagement.

1.6 Study Aims, Objectives, and Hypotheses

The primary aim of this thesis was to assess the efficacy of virtual BFT by comparing BFT to an active comparator—a traditional CBT-based unguided self-help

approach for treating binge eating. The primary objective of this project was to compare the effect of BFT, relative to unguided self-help, on changes in binge-eating symptomatology. The secondary objectives were to compare the effect of BFT, relative to unguided self-help, on changes in binge-eating frequency, general ED symptomatology, clinical impairment, confidence to change binge eating, binge-eating abstinence, and BED remission. Additionally, differences in treatment attrition between groups were compared. The primary hypothesis was that there would be a statistically significant main effect of treatment group on binge-eating symptomatology, with the BFT group reporting lower binge-eating symptomatology than the comparator. The secondary hypotheses were: there would be a statistically significant main effect of treatment group on binge-eating frequency, general ED symptomatology, clinical impairment, confidence to change binge eating, abstinence, and remission, with greater improvements for the BFT group versus the comparator; and that treatment group would predict attrition rates, with lower dropout in the BFT group than the comparator group.

CHAPTER 2 – METHODS

2.1 Study Design

The data analyzed in this thesis were collected as part of a single-site, parallel-group, unblinded RCT with two arms: the intervention of interest (BFT) and the active comparator (unguided self-help). The trial was conducted out of the Nova Scotia Health Eating Disorder Clinic (Abbie J Lane Building; QEII Health Sciences Centre) in Halifax, Nova Scotia. Ethics approval for this trial was obtained from the Nova Scotia Health Research Ethics Board (ROMEO file 1025887).

2.2 Participants

Participants included 164 adults who met DSM-5 criteria for mild to severe BED (APA, 2013), with the criteria for mild severity modified from a minimum of one objective binge-eating episode per week to two objective binge-eating episodes per week. This criteria modification was intended to increase the likelihood that changes in binge-eating frequency from pre- to post-intervention would be discernable. Eligible participants were at least 18 years old with access to a computer with internet connection and a webcam that could be used in a private location. Individuals with a BMI < 20 kg/m^2, currently pregnant, receiving BED treatment, experiencing serious physical illness, severe depression (deemed by the trial's principal investigator [a psychiatrist] to be potentially treatment interfering), severe substance use issues, or engaging in significant self-harm behaviors were excluded. These criteria were intended to exclude individuals who likely required more specialized care than that provided by either intervention offered in the study. Participants from the BFT pilot study or individuals who had previously read and implemented strategies from

Overcoming Binge Eating (Fairburn, 2013) were also not eligible to participate. Participants on psychotropic medication used to treat BED or that could affect appetite or binging were included providing they had not had a dose change within 4 weeks of study inclusion. Participants were not required to maintain constant medication dosages after inclusion, nor were they restricted from starting new medications.

A convenience sampling method was used to recruit participants through social media advertisements directed at individuals in the Canadian Atlantic provinces and Ontario. The advertisements included a link to an electronic version of the consent form. Potential participants provided written informed consent virtually prior to beginning prescreening questionnaires. Written informed consent and prescreening questionnaire responses were collected using Research Electronic Data Capture (REDCap) tools hosted at Nova Scotia Health (Harris et al., 2019; Harris et al., 2009).

Prescreening questionnaires included the Eating Disorder Diagnostic Scale (EDDS; Stice et al., 2000) and the Quick Inventory of Depressive Symptomatology (Self-Report; QIDS-SR; Rush et al., 2003). The EDDS is a 22-item self-report measure of disordered eating behaviors and attitudes over the past 3 months that aligns with DSM diagnostic criteria for BED, BN, and AN. The EDDS was used to screen out individuals who did not appear to meet study inclusion criteria regarding BED diagnosis. Individuals who reported fewer than eight binge episodes per month were excluded. Those who reported at least one episode per month of self-induced vomiting, fasting (≥ 8 hours), driven intense exercise, laxatives use, or diuretics use were also excluded, as this is a strong indication that an individual would meet diagnostic criteria for BN which, unlike BED, is characterized by such compensatory behaviors. Individuals were also asked to self-report current height and

weight, which were used to calculate BMI. Those with a BMI < 20 kg/m^2 were excluded, as this range is typically indicative of AN. The QIDS is a 16-item self-report measure of depression related symptoms severity with scores ranging from 0–27. Individuals who scored > 20 on the QIDS, which is considered to be indicative of very severe depression, but who appeared otherwise eligible based on their other prescreening responses, were further assessed via telephone call by the principal investigator (a psychiatrist) to determine whether their depression symptoms may be treatment interfering.

The remaining questions in the prescreening questionnaire package were written by the research team and were related to study inclusion criteria not covered by the EDDS and QIDS (see Appendix B for an overview of these prescreening questions). Potential participants were contacted by a research assistant via telephone or email with follow-up questions regarding prescreening responses if further information was needed to determine eligibility to proceed to the final screening phase. Those who appeared eligible following prescreening then attended a video-call with a trained research assistant to confirm that they met DSM-5 BED criteria with a semistructured interview using the Eating Disorder Examination (EDE; Cooper & Fairburn, 1987). All participants who were excluded in the prescreening or screening phase were provided information on alternative options for accessing supports for disordered eating symptoms and/or mental health concerns.

2.3 Randomization

Randomization occurred in a cyclical fashion, with groups of approximately 20 participants being randomized at once over 1-week periods. After approximately 20 participants were found to be eligible, those individuals were randomized to create two

groups (i.e., a BFT group and an active control group) with approximately 10 participants per group. This method was used to ensure that enough participants required to form a BFT group were randomized within the same window of time.

Prior to study start, an individual unaffiliated with the research team generated a randomization sequence using permuted blocks of four and six, and sealed treatment assignment codes in numbered opaque envelopes that were opened sequentially by a research assistant after each participant completed baseline measures. Eligible participants were randomly assigned to 10 weeks of BFT (n = 82) or CBT unguided self-help (n = 82).

2.4 Intervention and Active Control

2.4.1 Binge Focused Therapy (BFT)

Nine BFT groups with 7–11 participants per group were created over the study period. Participants randomized to BFT attended three online group sessions over 6 weeks, with sessions during Weeks 1, 2, and 6, followed by 4 weeks of weekly unguided check-ins to self-monitor for signs of relapse and initiate a relapse prevention plan if needed (see Appendix C for an overview of session content). Sessions were facilitated by psychiatric nurses supervised by a psychiatrist who met with facilitators after each Session 2 (and as needed for ongoing support) to discuss progress and resolve issues. Participants received a standardized email at the beginning of Weeks 3–5 (i.e., weeks without a session), reminding them to complete homework assigned during sessions, and at the beginning of Weeks 7–10, reminding them to remain engaged and complete self-guided check-ins.

Sessions were audio recorded. At study end, 25% of sessions (numbered sequentially) were selected using a random number generator and recordings of those

sessions were reviewed using an adherence checklist to confirm intervention fidelity. There was a 99.6% adherence rate.

2.4.2 Unguided Self-Help

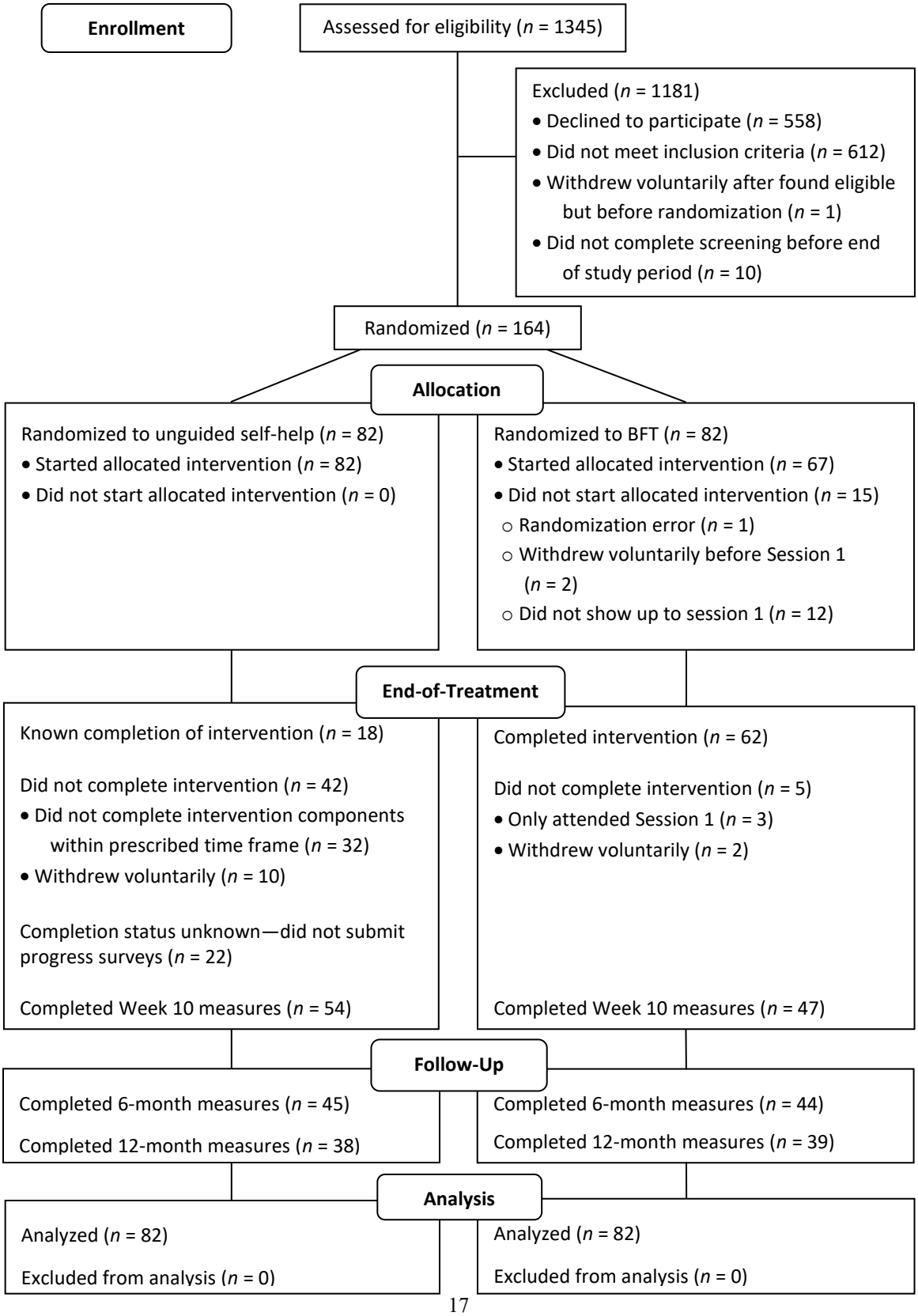
Participants randomized to unguided self-help were provided a copy of *Overcoming Binge Eating* (Fairburn, 2013), which is the most frequently studied self-help book for binge eating, with research supporting its use in the treatment of BED (Wilson & Zandberg, 2012). *Overcoming Binge Eating* (Fairburn, 2013) is intended to help individuals understand binge eating and control binge-eating behaviors. Participants were asked to complete the book over 10 weeks while working through exercises outlined in the book. A standardized reminder email encouraging participants to remain on track was sent at the beginning of Weeks 2–10.

2.5 Data Collection

Participants were asked to complete questionnaire packages online via REDCap at five timepoints: before being randomized (Baseline), 6 weeks after intervention start (Week 6), posttreatment (Week 10), 26 weeks after intervention completion (6-month follow-up), and 52 weeks after intervention completion (12-month follow-up). One participant assigned to BFT was withdrawn in Week 1 due to a randomization error. The participant was provided a copy of *Overcoming Binge Eating* (Fairburn, 2013) but outcomes were not collected from them. See Figure 1 for a flowchart of participants through the study.

Figure 1

CONSORT Flowchart of Participants



2.5 Measures and Outcomes

2.5.1 Demographics

Participants were asked to complete a self-report demographics questionnaires to obtain information regarding age, gender/sex, ethnicity, duration of time with binge eating, number of attempts seeking help for binge eating, education level, employment status, and marital status.

2.5.2 Binge Eating Scale

The Binge Eating Scale (BES; Gormally et al., 1982) is a 16-item self-report measure of behavioral and cognitive symptoms associated with binge eating. The BES has been shown to have good psychometric properties and has been validated for use as a measure of binge-eating severity in samples of adults with binge-eating behaviors (Burton et al., 2016; Timmerman, 1999). BES scores range from 0–46 with a score < 17 considered to be indicative of minimal binge eating, scores between 18–26 considered to be indicative of moderate binge eating, and scores > 27 considered to be indicative of severe binge eating. The BES was our primary outcome measure. Cronbach's alpha values for BES scores from our sample were calculated for each timepoint to assess the internal consistency of the scale. Values ranged from 0.69–0.94 (see Appendix D).

2.5.3 Eating Disorder Examination Questionnaire

The Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994) is a 28-item self-report measure of disordered eating behaviors and attitudes over the past 28 days. The EDE-Q has been shown to have good psychometric properties and has

been validated for use in samples of adults with EDs (Aardoom et al., 2012; Reas et al., 2006). The EDE-Q includes four subscales (restraint, eating concerns, weight concerns, and shape concerns), which are comprised of 22 of the 28 total items. The remaining items not included in the subscales are questions regarding frequency of ED behaviors (e.g., binge eating). A global score is obtained by calculating a score for each of these four subscales and dividing the total sum of the subscales by four. Global scores range from 0–6, with higher scores indicating increased severity of ED psychopathology. A global score ≤ 2.77 (< 1 standard deviation above the community mean; see Mond et al., 2006) is frequently used as a measure of ED recovery (de Jong et al., 2020; Wade et al., 2017). It should be noted that much of the research on the psychometric properties of the EDE-Q has involved female samples and while there is some support for the utility of the EDE-Q in identifying EDs in males, further evaluation is required to determine the appropriateness of standard clinical cut-off scores, as well as the division of items into subscales and their weights, for measuring ED symptomatology in male samples (Schaefer et al., 2018).

It should also be noted that subsequent studies have yet to provide support for the original four subscale structure (Aardoom et al., 2012) and factor analysis has identified alternative subgroupings that may fit the original items better (Rand-Giovannetti et al., 2020). Nonetheless, our analysis did not include hypotheses regarding the individual subscales. While our calculation of global scores still involved using the original item weights, previous comparisons of global scores calculated with the original weights versus equal weights were comparable (Aardoom et al., 2012).

We used the EDE-Q to measure: binge-eating frequency (Item 15); binge-eating abstinence, which we defined as a 100% reduction in binge episodes in the past 28 days

(i.e., Item 15 = 0); general ED symptomatology (EDE-Q global score); and remission from BED, which we defined as meeting our criteria for abstinence in addition to an EDE-Q global score ≤ 2.77. Cronbach's alpha values for EDE-Q scores from our sample were calculated at each timepoint to assess the internal consistency of the scale and subscales. Values ranged from 0.85–0.93 for the global score, 0.77–0.81 for the restraint subscale, 0.65–0.83 for the eating concerns subscale, 0.58–0.76 for the weight concerns subscale, and 0.75–0.89 for the shape concerns subscale (see Appendix D).

2.5.4 Clinical Impairment Assessment

The Clinical Impairment Assessment (CIA; Bohn & Fairburn, 2008) is a 16-item self-report measure of psychosocial functioning impairment. The CIA has been shown to have good psychometric properties and has been validated for use as a measure of impairment secondary to ED symptoms in samples of adults diagnosed with an ED (Bohn et al., 2008; Maraldo et al., 2021), although psychometric assessment with samples of adults with BED specifically is minimal. Scores range from 0–48 with higher scores indicating increased impairment and a score of 16 representing the clinical cut-off point. The CIA includes three subscales (personal, social, and cognitive impairment), although our analyses did not include hypotheses regarding the subscales. All questions in the CIA are weighted equally. CIA global score served as our measure of clinical impairment. Cronbach's alpha values for CIA scores from our sample were calculated for each timepoint to assess the internal consistency of the scale and subscales. Values ranged between 0.91–0.96 for the global score, 0.91–0.96 for the personal impairment subscale,

0.82–0.91 for the social impairment subscale, and 0.85–0.92 for the cognitive impairment subscale (see Appendix D).

2.5.5 Confidence to Change Binge Eating

Participants' confidence to change binge eating was measured using a single-item question developed by the research team: "On a scale from 1 to 10, how confident are you that you can change your binge eating if you wanted to?". Participants were asked to select a response from a visual scale with anchors at 1 (*not at all confident*), 5 (*somewhat confident*), and 10 (*extremely confident*).

2.5.6 Treatment Attrition

Attrition was defined as not completing treatment as prescribed. Completion of BFT as prescribed was defined as attending Session 1 and one other session (Session 2 *or* 3), as determined by facilitators' attendance records. Completion of unguided self-help as prescribed was defined as reading Chapters 1, 4, 5, and the 'Getting Ready' section, as well as completing Steps 1–3 of *Overcoming Binge Eating* (Fairburn, 2013), as determined by self-report progress questionnaires completed at Weeks 6 and 10.

2.6 Sample Size and Power Analysis

An a priori sample size was computed by simulation with R software for the following linear mixed-effects model of our primary outcome in the lme4 package syntax (Bates et al., 2015): BES ~ Group*Time + (Time + 1|Participant). With a significance criterion of $\alpha = .05$, we aimed to achieve 80% power to detect a medium-size effect, which

is considered clinically significant (Jacobi et al., 2012). The smallest sample to achieve 80% power was 115 participants per group. To account for 10% attrition, we aimed to recruit 254 participants in total.

Due to recruitment challenges, the actual sample size achieved during the study period was 164 participants (82 per arm). Prior to data analysis we conducted a power analysis with the same BES values from the a priori sample size analysis to determine how the originally proposed model could be modified to obtain sufficient power with the actual sample size. The updated model, BES ~ Baseline_BES + Group + Time + (1|Participant), offered 86% power to detect a main effect of group.

2.7 Statistical Analysis

Statistical analyses followed an intention-to-treat approach (i.e., all randomized participants were included whether they completed their assigned intervention or not) and were performed with R software version 4.3.0. Demographics were compared between-groups with randomization chi-square and two-sample permutation tests for categorical and continuous variables, respectively. For all analyses, statistical significance was evaluated against an a priori one-sided significance threshold of $\alpha = 0.05$.

2.7.1 Primary Analysis

Our primary analysis used a repeated-measures, mixed-effects linear regression model to estimate the between treatment group difference in BES scores (binge-eating symptomatology) over the course of the study (Weeks 0, 6, 10, 26, and 52). The primary multivariate model included Baseline (Week 0) scores as a covariate, time and treatment

group as fixed effects, and participant as a random effect. A random intercept was used to allow the mean value to vary by participant. An unstructured covariance matrix was used. The model is specified as follows: BES ~ Baseline_BES + Group + Time + (1|Participant). The model was estimated with restricted maximum likelihood (REML) and parameter *p* values were obtained with Satterthwaite approximation for degrees of freedom using the lmerTest package in R (Kuznetsova et al., 2017). REML with Satterthwaite approximation has been shown to produce robust significance tests even with smaller sample sizes (Luke, 2017).

2.7.2 Secondary Analyses

For secondary analyses estimating between treatment group differences in EDE-Q Item 15 (binge-eating frequency), EDE-Q global scores (general ED symptomatology), CIA scores (clinical impairment), and confidence to change binge eating over the course of the study we used the same mixed-effects linear regression equation and method as the primary analysis with relevant baseline scores substituted for each model.

Secondary analyses also included estimating between treatment group differences in abstinence and remission at Week 10 and follow-ups, which involved generalized linear mixed-effects models following the same equation as the primary analysis (with relevant baseline scores substituted) but with a logit link function (due to the binary nature of the data). Generalized linear mixed-effects models were estimated using lme4.

The final secondary analysis assessed between treatment group differences in attrition rates by end-of-treatment using a logistic regression model.

2.7.3 Linear Mixed-Effects Models Comparisons

For all linear and generalized linear models we completed comparisons between a "null" model (i.e., group predictor omitted) and a "full" model (i.e., group predictor included) to confirm whether treatment group improved model fit. The best fitting model for each dependent variable was identified with a likelihood ratio test via analysis of variance (ANOVA). During the model comparison stage, models were fit with maximum likelihood (ML) even though the final models were fit with REML; ML is required for likelihood ratio tests in which models with different fixed effects are compared but REML is preferable to ML for significance testing (Luke, 2017). Model assumptions for linearity, normality of residuals, homoscedasticity, multicollinearity, and outliers were checked using graphical and diagnostic measures in R.

CHAPTER 3 – RESULTS

3.1 Sample Demographics

Treatment groups did not differ significantly with regards to age, ethnicity, duration of time with binge eating, number of attempts seeking help for binge eating, education level, or employment status (see Table 1). The average age was 39.30 years (*SD* = 8.85) in the unguided self-help group and 39.04 years (*SD* = 10.54) in the BFT group. Average duration with binge eating was 19.03 years (*SD* = 10.87) in the unguided self-help group and 19.91 years (*SD* = 13.11) in the BFT group. Groups did, however, differ significantly in terms of gender/sex and marital status. Six participants in the total sample (3.7%) identified as male and all were randomized to BFT. The proportion of participants that selected the marital status options 'married' and 'common law' differed between groups. However, when the data was recoded to collapse these marital status categories into one, there was no significant between-group difference in marital status.

Table 1

Sociodemographic Characteristics of Participants at Baseline

Baseline characteristic	Unguided self-help		BFT		Full sample	
	n	%	*n*	%	*n*	%
Gender						
Female	79	96.3	76	92.7	155	94.5
Male	0	0	6	7.3	6	3.7
Other	2	2.4	0	0	2	1.2
No response	1	1.2	0	0	1	0.6
Ethnic origin						
Aboriginal / Indigenous	1	1.2	2	2.4	2	1.2
Asian / Pacific Islander	1	1.2	0	0	1	0.6
Hispanic or Latino	0	0	1	1.2	1	0.6
White	78	95.1	78	95.1	156	95.1
Other	2	2.4	1	1.2	4	2.4
Education						
High school diploma or equivalent	2	2.4	3	3.7	5	3.0
Some college, no degree	5	6.1	6	7.3	11	6.7
Trade / technical / vocational training	19	23.2	10	12.2	29	17.7
Some university, no degree	6	7.3	11	13.4	17	10.4
Bachelor's degree	25	30.5	27	32.9	52	31.7
Master's degree	15	18.3	15	18.3	30	18.3
Professional degree	5	6.1	5	6.1	10	6.1
Doctorate degree	1	1.2	0	0	1	0.6
Other	4	4.9	5	6.1	9	5.5
Marital Status						
Single	29	35.4	30	36.6	59	35.9
Married	37	45.1	21	25.6	58	35.4
Common law	10	12.2	17	20.7	27	16.5
Divorced	3	3.7	6	7.3	9	5.5
Other	2	2.4	8	9.8	10	6.1
No response	1	1.2	0	0	1	0.6
Employment						
Unemployed	4	4.9	3	3.7	7	4.3
Part-time or casual	8	9.8	11	13.4	19	11.6

Baseline characteristic	Unguided self-help		BFT		Full sample	
	n	%	*n*	%	*n*	%
Employed full-time	55	67.1	53	64.6	108	65.9
Student	7	8.5	13	15.9	20	12.2
Unable to work / on disability leave	9	11.0	8	9.8	17	10.4
Other	4	4.9	2	2.4	6	3.7
Previously sought help for binge eating						
Yes	26	31.7	20	24.4	46	28.1
No	55	67.1	62	75.6	117	71.3
No response	1	1.2	0	0	1	0.6
Type of help						
Individual therapy	13	15.9	13	15.9	26	15.9
Peer support program / group	6	7.3	5	6.1	11	6.7
Professionally-led group treatment	4	4.9	4	4.9	8	4.9
Family doctor	15	18.3	11	13.4	26	15.9
Psychiatrist	4	4.9	3	3.7	7	4.3
Other	8	9.8	3	3.7	11	6.7

Note. $N = 164$ ($n = 82$ for each condition).

3.2 Linear Mixed-Effects Models Selection

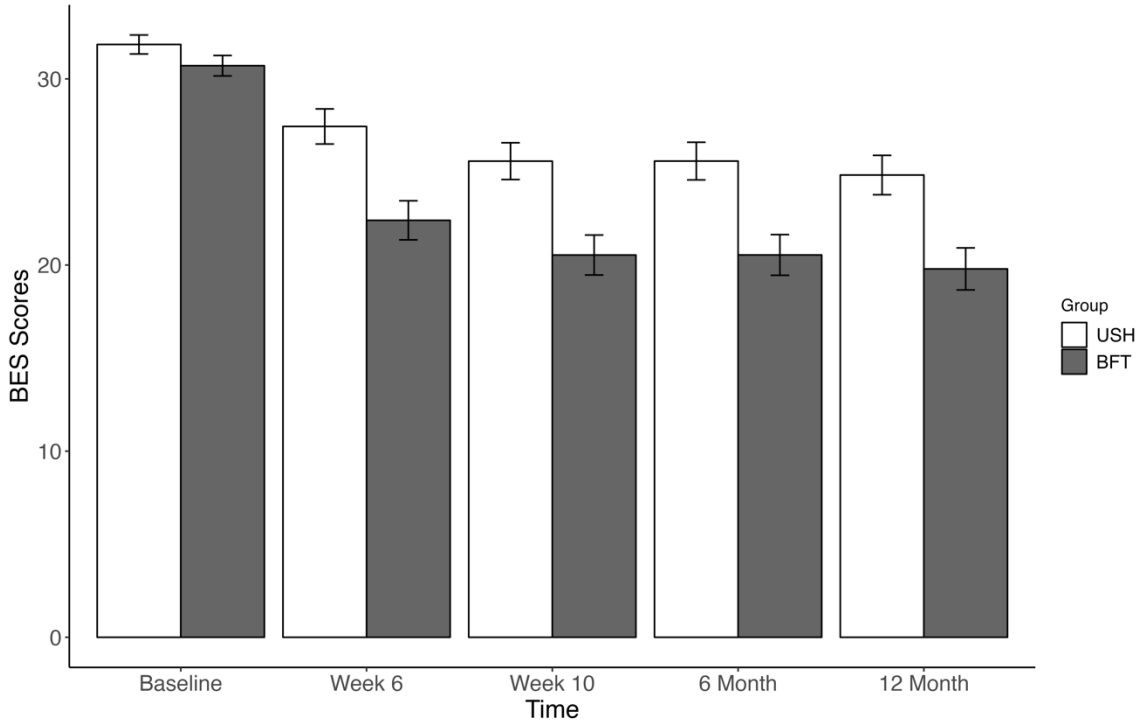
Baseline values were omitted from the final remission model, as we identified high multicollinearity among predictor variables when Baseline was included as a covariate. For all primary and secondary outcomes *except* for abstinence, the "full" model was a better fit than the "null" model, indicating that treatment group contributes significantly to variability in outcomes (see Appendix E for results of model comparisons).

3.3 Primary Analysis Results: Binge-Eating Symptomatology

In the primary analysis, we found a significant main effect of treatment group on binge-eating symptomatology, $\beta = -5.04$, $p < .001$, 95% CI [-7.57, -2.52], indicating that BFT had BES scores that were on average 5.04 points lower than unguided self-help.

Figure 2

Change in BES Scores (Binge-Eating Symptomatology) Over Time By Treatment Group



Note. BES = Binge Eating Scale; USH = unguided self-help; BFT = binge focused therapy.

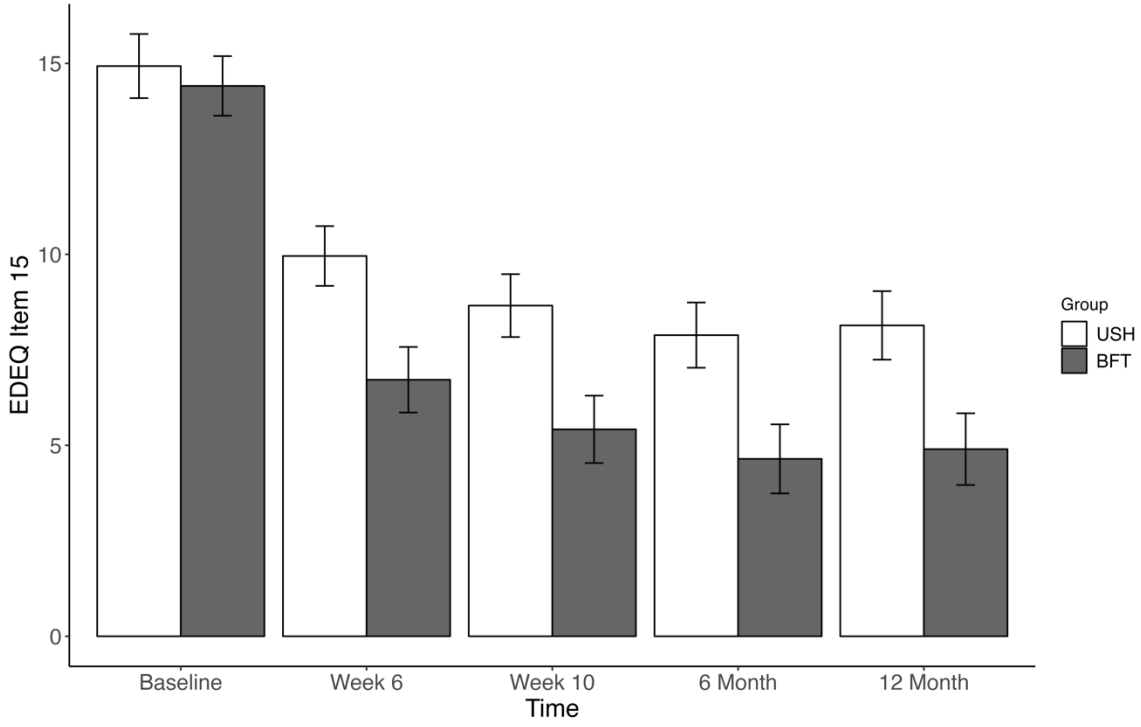
3.4 Secondary Analyses Results

3.4.1 Binge-Eating Frequency

In the secondary analyses, we found a significant main effect of treatment group on binge-eating frequency (EDE-Q Item 15), β = -3.24, p = .001, 95% CI [-5.22, -1.26], indicating that BFT had an average of 3.24 fewer binge days per month than unguided self-help (see Figure 3).

Figure 3

Change in EDE-Q Item 15 (Binge-Eating Frequency) Over Time By Treatment Group



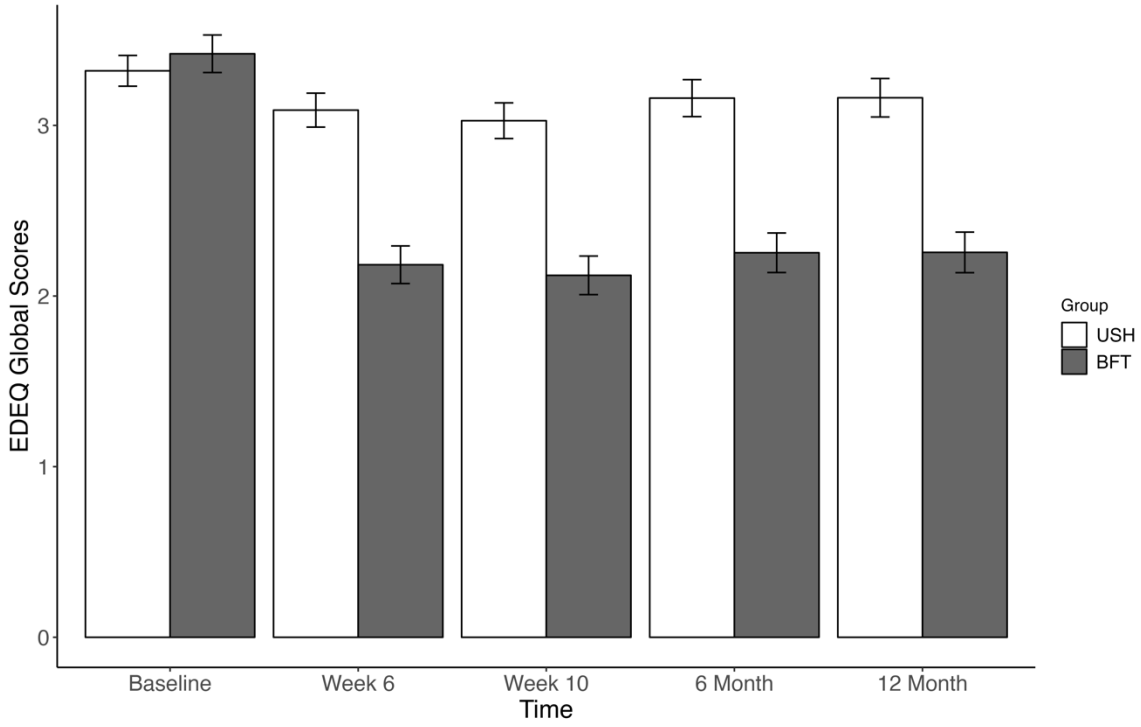
Note. EDEQ = Eating Disorder Examination Questionnaire; USH = unguided self-help; BFT = binge focused therapy.

3.4.2 General Eating Disorder Symptomatology

We also found a significant main effect of treatment group on general ED symptomatology, $\beta = -0.91$, $p < .001$, 95% CI [-1.17, -0.65], indicating that BFT had EDE-Q global scores that were on average 0.91 points lower than unguided self-help (see Figure 4).

Figure 4

Change in EDE-Q global scores *(ED Symptomatology) Over Time By Treatment Group*



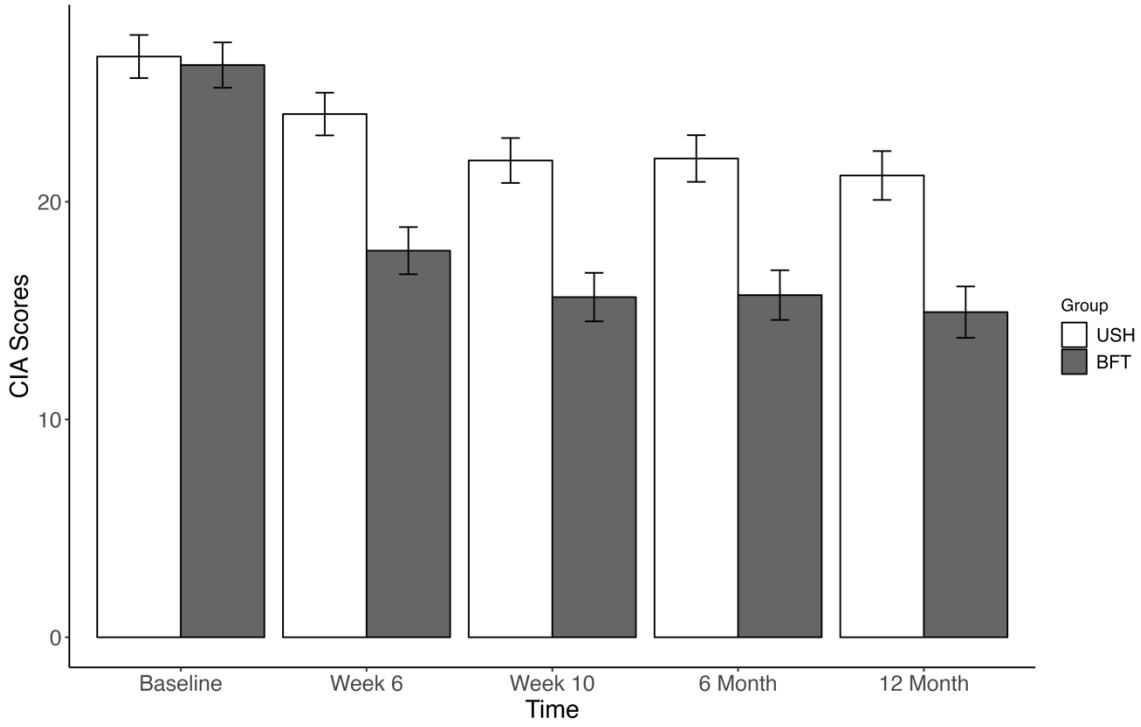
Note. EDEQ = Eating Disorder Examination Questionnaire; USH = unguided self-help; BFT = binge focused therapy.

3.4.3 Clinical Impairment

There was a significant main effect of treatment group on clinical impairment, β = -6.27, $p < .001$, 95% CI [-8.78, -3.77], indicating that BFT had CIA scores that were on average 6.27 points lower than unguided self-help (see Figure 5).

Figure 5

Change in CIA scores *(Clinical Impairment) Over Time By Treatment Group*



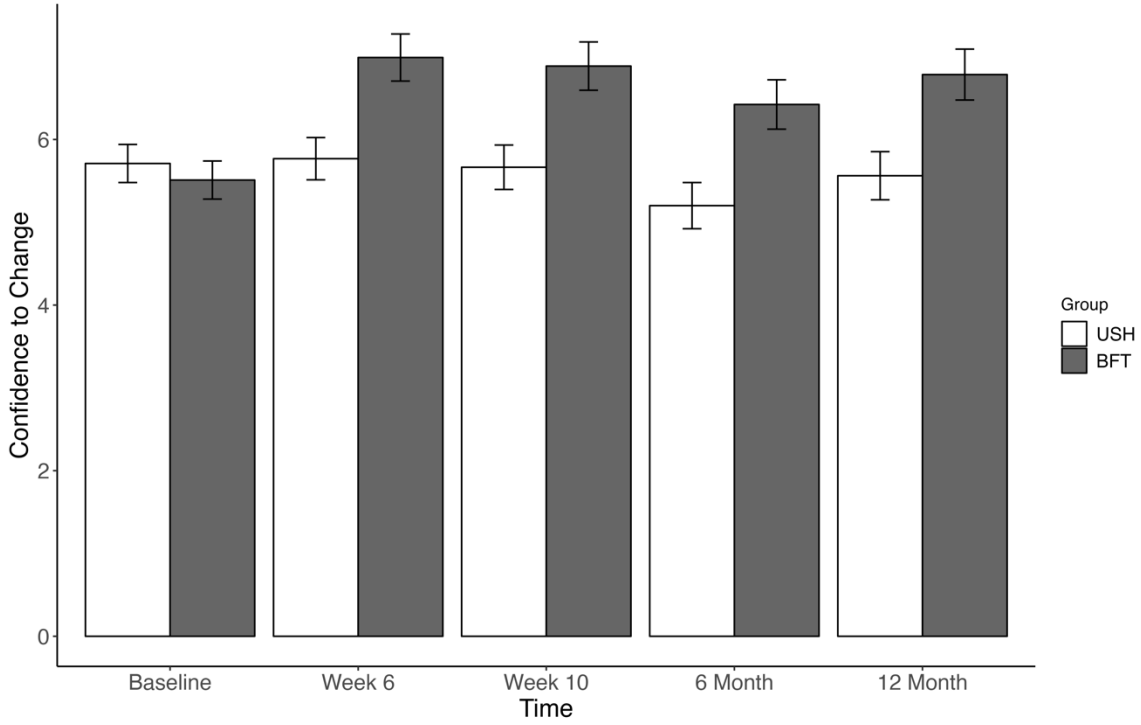
Note. CIA = Clinical Impairment Assessment; USH = unguided self-help; BFT = binge focused therapy.

3.4.4 Confidence to Change Binge Eating

We also found a significant main effect of treatment group on confidence to change binge eating, $\beta = 1.22$, $p < .001$, 95% CI [0.56, 1.89], indicating that BFT had confidence to change binge eating ratings that were on average 1.22 points higher than unguided self-help (see Figure 6).

Figure 6

Change in Confidence to Change Binge Eating Over Time By Treatment Group



Note. USH = unguided self-help; BFT = binge focused therapy.

3.4.5 Binge-Eating Abstinence and Remission

Our analysis did not find evidence of a significant effect of treatment group on abstinence rates, *OR* = 2.01, *p* = .103, 95% CI [0.87, 4.64]. At posttreatment, 4 (4.88%) participants in unguided self-help and 10 (12.2%) participants in BFT met abstinence criteria. At 6-month follow-up, 13 (15.85%) participants from unguided self-help and 14 (17.07%) participants from BFT were abstinent. This dropped to 9 (10.97%) participants from unguided self-help and 10 (12.19%) participants from BFT at 12-month follow-up.

There was, however, a significant main effect of treatment group on remission rates, *OR* = 4.98, *p* = .003, 95% CI [1.72, 14.40], indicating that the odds of remission were approximately 4.98 times higher for BFT than unguided self-help. At posttreatment, 2 (2.44%) participants in unguided self-help and 10 (12.2%) participants in BFT met remission criteria. At 6-month follow-up, 8 (9.76%) participants from unguided self-help and 13 (15.85%) participants from BFT were in remission. This dropped to 4 (4.88%) participants from unguided self-help and 9 (10.97%) participants from BFT at 12-month follow-up.

3.4.6 Treatment Attrition

The attrition model was statistically significant, $\chi^2(1) = 7.21$, $p = .007$. Treatment group was a significant predictor of treatment attrition, $\beta = 0.456$, $SE = 0.076$, $t(141) = 6.03$, $p < .001$, with higher attrition from unguided self-help than BFT. Only 18 (21.95%) participants in unguided self-help completed treatment as prescribed, while 62 (75.61%) participants in BFT completed treatment as prescribed.

CHAPTER 4 - DISCUSSION

The primary aim of this RCT was to examine the efficacy of BFT—a novel, group-based guided self-help treatment for BED that was developed to optimize real-world implementation and efficiency. Specifically, we compared virtual BFT to a traditional CBT-based unguided self-help approach for binge eating. Findings support our primary hypothesis; compared to unguided self-help, the BFT group reported lower binge-eating symptomatology over the course of the study. Secondary hypotheses that the BFT group would report lower binge-eating frequency, general ED symptomatology, clinical impairment, and treatment attrition, as well as higher confidence to change binge eating, were also supported. While our results support our secondary hypothesis that BFT would have higher remission rates than unguided self-help, we did not find evidence to support our hypothesis that binge-eating abstinence rates would be higher for BFT.

The results of the present study are similar to previous findings that guided self-help is associated with greater improvements in binge eating and related psychopathology compared with unguided self-help (Beintner et al., 2014). However, the literature directly comparing guided and unguided self-help is mixed (Davey, Bennett, et al., 2023) and more recent reports found no significant differences between the two on reduction of binge-eating frequency (Hilbert, 2023; Hilbert et al., 2019). In the present study, while both groups demonstrated improved binge-eating symptomatology and decreased binge frequency, which were maintained at follow-ups, improvements were greater for the BFT group with BES scores reduced to the lower end of the range for moderate binge eating behaviors and related cognitions. BES scores for the unguided self-help group remained within the range of severe binge eating behaviors and related cognitions throughout the

intervention and follow-ups. Similarly, both groups demonstrated improvement in general ED symptomatology, but those made with BFT were greater with EDE-Q global scores below the clinical cutoff (i.e., within the range of ED recovery) maintained through follow-ups. For the unguided self-help group, EDE-Q global scores remained above the clinical cutoff throughout, indicating a clinically significant level of ongoing disordered eating behaviors and attitudes. Clinical impairment also improved in both groups, with gains in overall psychosocial functioning maintained at follow-ups; however, improvements were again greater for the BFT group with CIA scores reduced below the clinical cutoff, while scores for the unguided self-help group remained within the high impairment range.

As expected, we found that remission rates were significantly higher for BFT than unguided self-help. While the majority of participants in both groups did not meet criteria for remission, previous systematic reviews similarly found that up to half of individuals with BED continued to experience symptoms following treatment (Brownley et al., 2007; Linardon, 2018). Conversely, the present findings on binge-eating abstinence differ from previous reports of higher abstinence rates for guided self-help (Beintner et al., 2014). Although the BFT group appeared to have higher binge-eating abstinence rates posttreatment (12.2%) compared to the unguided self-help group (4.88%), our abstinence model was not significant and abstinence rates were more similar between-groups at follow-ups. For both groups, our abstinence rates were lower than would be expected for BED self-help approaches (~46%; Hilbert et al., 2019). One explanation for this finding is that the present study used an intention-to-treat method, which assumes that any participant who does not complete follow-up measures is not abstinent. As over 50% of participants did not submit questionnaires at 12-month follow-up, it is possible that our abstinence rates

are underestimations. It is also possible that our rates were lower than expected due to our inclusion criteria requiring at least two binge episodes per week, which is higher than the one binge episode per week needed to meet DSM-5 diagnostic criteria; therefore, our sample was already experiencing higher rates of binge eating to begin with. An alternative explanation is that although BFT mediated symptom and functional improvement comparably to previous reports (Hilbert et al. 2019), BFT may, in fact, be less effective than other guided self-help interventions at helping patients achieve abstinence from binge eating. While this finding may indicate a limitation of BFT and research aimed at improving the effectiveness of BED treatments should be a priority (Linardon, 2018), abstinence may not be a strong indicator of the success of an intervention for improving overall outcomes. There is a lack of research demonstrating that abstinence (or remission) should be considered a necessary component of a favorable treatment outcome. There is some indication from research on alcohol-use disorder (which, similarly, has posttreatment abstinence rates around 50%) that interventions that focus on complete symptom reduction may not be more effective in the long-term than those that do not (van Amsterdam & van den Brink, 2013).

While both guided and unguided self-help have demonstrated efficacy for improving BED symptoms (Linardon, Wade, et al., 2017; Traviss-Turner et al., 2017) and it remains unclear whether the addition of guidance in self-help approaches is absolutely necessary for improving outcomes, there is a general consensus that guidance may be particularly useful as a means of reducing the high likelihood of dropout common to self-help treatments (Hilbert et al., 2019; Beintner et al., 2014). Findings of the present study support this notion, as a higher proportion of individuals in BFT (75.61%) completed

treatment as prescribed compared with unguided self-help (21.95%). Indeed, our rate of treatment non-completion for BFT (24.39%) is in line with the average self-help dropout rate (24%) found by Hilbert et al. (2019). Additionally, the BFT group reported an increase in confidence to change binge eating from Baseline to Week 6 (after completion of the guided portion of the intervention) that was maintained at follow-ups. As there is some indication that motivation to change may increase treatment engagement and decrease dropout (Vall & Wade, 2015), BFT's focus on improving confidence and self-efficacy (mediators of motivation to change) may also decrease the likelihood of dropout. Participants may also feel accountable to continue with treatment that includes guidance in the form of scheduled 'face-to-face' sessions (Beintner et al., 2014). However, from the present study, it is not possible to state definitively which mechanisms of change led to the greater BED outcome improvements and lower dropout in the BFT group.

4.1 Strengths and Limitations

There are several limitations of the present study that should be taken into account when considering these findings. In particular, the sample was quite homogenous, with the majority of participants being White and female, making the generalizability of the results to other groups difficult. While one third of individuals with BED in the general population are male, they are significantly less likely to ever seek help for BED and often make up a much smaller portion of research samples (Carrino et al., 2023; Qian et al., 2022). Historically marginalized ethnic and racial groups also tend to seek treatment for BED less often (Carrino et al., 2023; Coffino et al., 2019). Recruitment via social media advertisements may contribute to sampling biases, possibly due to the advertisement

parameters selected by researchers (e.g., geographic range; Arigo et al., 2018), as well as the influence of ED stereotypes on an individual's decision to self-identify for screening (Grillot & Keel, 2018). Efforts to engage underrepresented groups in treatment and research are needed (Carrino et al., 2023; Coffino et al., 2019).

Additionally, we were unable to reach our initial sample size goal and, therefore, were unable to directly compare BFT to the active control using linear models with interaction terms, which would allow for more definitive statements of between-group differences at specific timepoints for our sample. Nonetheless, our findings that treatment group predicted improvement on all outcomes *except* for abstinence rates, with greater improvements for the BFT group, are clinically meaningful. Further, the use of an active control group is also a strength of this study; the use of wait-list controls may inflate treatment effects in trials of psychological interventions (Cuijpers et al., 2021; Cunningham et al., 2013; Furukawa et al., 2014) and there have been calls in the BED literature for more studies directly comparing active BED interventions (Peat et al., 2017). However, at present it is unclear whether BED outcome improvement was greater for the BFT group due to the addition of guidance, differences in intervention content between BFT and the book, or a combination of factors. The mechanisms responsible for the between-group differences in treatment attrition rates are also unclear and may be due to differences in intervention content or the addition of guidance, or even the differences between the treatment completion definitions we used for each group (i.e., session attendance records versus self-reported reading progress).

Another limitation was the use of self-report data for outcome measurement. Conversely, a strength of this study was the inclusion of clinical interviews with the EDE

to establish BED diagnoses. Future studies might consider repeating clinical interviews at end-of-treatment to examine changes in symptomatology. Another strength was the collection of measurements at 12-months posttreatment, as follow-up data on BED self-help treatments, even at the one-year timepoint, is sparse (Hilbert, 2023). However, collection of longer-term follow-up data beyond the first year should be a goal for future research.

4.2 Conclusion

While there remain gaps in the literature, particularly with regard to longer-term follow-up data, as well as the type and extent of guidance needed for best outcomes, guided self-help is the recommended first-line intervention for BED, particularly when standard psychotherapy is unacceptable or inaccessible (Hilbert et al., 2019; NICE, 2017). This study provides further support for the use and recommendation of guided self-help approaches for BED.

As with many evidence-based interventions for BED, guided self-help approaches are often not available (Grilo & Juarascio, 2023) and have yet to be widely implemented in health systems. As a virtual and less resource-intensive approach, BFT may be able to reduce the gap between research and health system implementation identified in Peat et al. (2017). As BFT can be facilitated in a group format by non-specialists it has the potential for broader dissemination that could improve BED intervention accessibility (in line with the recommendations outlined in Davey, Allen, et al., 2023).

In addition to the use of guided self-help as the first-line treatment for BED, the NICE (2017) guidelines also recommend a stepped care approach in which individuals who

do not respond to guided self-help are offered therapist-led CBT. Future studies should directly assess stepped care approaches for BED (Peat et al., 2017; Tasca et al., 2019). A next step may be to replicate these findings on BFT in a trial that also includes the option to escalate participants who do not respond to or dropout from guided self-help on to individual therapist-led treatment. Alternatively, a modified replication study could trial BFT as one option within a stratified care approach. A stratified care approach involves assessing patients' illness severity and complexity on a continuum and then matching them to the most appropriate level of care (Sawrikar et al., 2021), with BFT as the brief / focused intervention option for individuals with less severe and complex BED.

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APPENDIX A – THEORETICAL PRINCIPLES OF BFT

The participant is taught the basic theoretical concepts of BFT, which borrow elements from Acceptance and Commitment Therapy, Dialectical Behavior Therapy, motivational enhancement, and neurobiology principles of habit formation and addiction:

1. Traditional therapy for BED may overcomplicate the recovery process, and bestow too much power to the therapy or therapist, thereby unintentionally undermining the patient's self-efficacy.
2. Binge eating can be conceptualized within a neurobiological framework, in which the disordered behavior is understood as a response to restrictive eating, and the subsequent entrenchment of the behavior through conditioning (i.e., habit formation).
3. Rather than focusing on the underlying cognitions and emotions associated with the urges to binge, BFT provides simple skills for detaching from urges and engaging in alterative actions. Over time, this process allows the habitual urges to diminish (through extinction).

After learning this theory, the patient is taught The 4 Steps of BFT:

1. View Urges as Neurological Junk	Viewing urges as Neurological Junk, or faulty messages, from the "lower brain" diminishes their significance and power. This is the first step in creating a dissonant and detached view of urges, which frames them as Meaningless, Powerless and Harmless.
2. Separate the Higher Brain (Authentic Self) from Urges to Binge	Separation of the highest brain (prefrontal cortex) from urges is the separation of one's Authentic Self (values and desires outside of the eating disorder) from the conditioned signals of the "lower brain" (subcortex). This perspective enhances an individual's motivation to take responsibility for making the choice to not act on urges. The prefrontal cortex retains the ability to override the conditioned urges from the subcortex when the belief that "I ultimately have control over what I do" is adopted.
3. Stop Reacting to Urges to Binge	Any reaction to an urge (e.g., "what is the hidden emotional meaning of this urge?", "what is the trigger?", "I am angry with this urge") maintains its strength and frequency. On the other hand, detaching from the urge allows for deconditioning and positive changes to occur with neuroplasticity. The essence of this step is allowing urges to come and go, rather than devoting attention towards them (accomplished through the use of Defusion skills). Step 1 can facilitate this process by engendering a dismissive attitude towards the urge (e.g., "that's just Neurological Junk from my lower brain").
4. Stop Acting on Urges to Binge	Not acting on urges is made possible by the prior steps, and can be enhanced by engaging in Alternative Action. Initially, the brain responds with tempting thoughts and justifications for following urges (e.g., "just have one more binge", or "this behavior will help you cope"). However, over time and with abstinence from behaviors, these urges will eventually stop (or significantly diminish).

APPENDIX B – PRESCREENING QUESTIONS

1. Please indicate your age:
2. Are you pregnant or hoping to become pregnant in the next year?
3. Are you currently receiving any form of therapy (group or individual talk therapy) or participating in a support group (peer support or professionally led)?
4. Has a doctor ever diagnosed you with anorexia or bulimia nervosa?
5. Have you been diagnosed with any medical problems? If "Yes", please specify the condition:
6. Have you previously participated in a research study testing Binge Focused Therapy (BFT)? *Note: This study occurred at the NSHA Eating Disorder Clinic in 2018.*
7. Have you previously read any part of the book "*Overcoming Binge Eating*" by Christopher Fairburn?
8. Are you able to read, write, speak, and understand English?
9. Do you have access to a computer with an internet connection and webcam that can be used in a private area?
10. Are you currently taking any medications? If "Yes", please specify which medication(s) and the dosage:
11. Did any of the doses of your medications change during the past 4 weeks or did you start any new medications in the past 4 weeks?
12. Have you used any illicit/illegal substances for recreational purposes within the past two months?

13. Have you felt you wanted or needed to cut down on your drinking or drug use in the last year? If "Yes", please specify which substance and how frequently this happens:
14. In the last year, have you ever drank or used drugs more than you meant to? If "Yes", please specify which substance and how frequently this happens:
15. Over the past 3 months, have you engaged in self-harm behaviors (e.g., cutting, burning, etc.)?

APPENDIX C – OVERVIEW OF BFT SESSIONS

Week 1 Session 1	• PowerPoint presentation – Theory and Principles of BFT (4-steps) • Basic nutrition psychoeducation (Canada's Food Guide, importance of non-restrictive eating, eating any food in moderation). • Introduction to Defusion and Alternative Action Skills & Tracking Sheet Homework: • Practice Defusion skills • Practice using Alternative Actions • Clarify values and vision of Authentic Self (Vision Board App) • Complete food records

Week 2
Session 2
	• PowerPoint presentation – Review principles of BFT
	• Review homework:
	  o Alternative actions, Defusion skills and vision of Authentic Self
	  o Review food records and provide nutritional feedback
	• Introduce Strategies for Success (i.e., relapse prevention)

Week 3–5 (No sessions)	• Homework – Use tracking sheet and food record to monitor application of BFT principles for 4 weeks.
Week 6 Session 3	• Check in – review homework and problem solve as needed

APPENDIX D – INTERNAL CONSISTENCY OF OUTCOME MEASURES

Measure/Subscale	Baseline *n* = 164	Week 6 *n* = 118	Week 10 *n* = 101	6-Month *n* = 89	12-Month *n* = 77
	Cronbach's Alpha				
Binge Eating Scale	0.69	0.91	0.93	0.93	0.94
EDE-Q					
Global Score	0.85	0.91	0.92	0.93	0.92
Restraint	0.77	0.81	0.77	0.81	0.77
Eating Concerns	0.65	0.75	0.80	0.83	0.83
Weight Concerns	0.58	0.70	0.75	0.74	0.76
Shape Concerns	0.75	0.86	0.87	0.89	0.88
Clinical Impairment Assessment					
Global Score	0.91	0.94	0.95	0.96	0.95
Personal Impairment	0.91	0.94	0.96	0.96	0.95
Social Impairment	0.82	0.86	0.90	0.91	0.89
Cognitive Impairment	0.85	0.87	0.88	0.92	0.88

Note. EDE-Q = Eating Disorder Examination Questionnaire.

APPENDIX E – RESULTS OF MODEL COMPARISONS

LME Models for BES Scores (BED Symptomatology) With and Without Treatment Group Included as a Fixed Effect

Predictors	Null model			Group model		
	Estimates	95% CI	*p*	Estimates	95% CI	*p*
(Intercept)	0.46	[-8.23, 9.15]	0.917	3.88	[-4.53, 12.30]	0.365
Baseline BES	0.80	[0.53, 1.07]	<0.001	0.76	[0.50, 1.02]	<0.001
Week 10	-1.91	[-3.43, -0.38]	0.014	-1.86	[-3.38, -0.35]	0.016
6-month	-1.89	[-3.48, -0.30]	0.020	-1.86	[-3.45, -0.27]	0.022
12-month	-2.67	[-4.36, -0.98]	0.002	-2.61	[-4.29, -0.93]	0.002
Group				-5.04	[-7.57, -2.52]	<0.001
Random effects						
σ^2	30.67			30.56		
τ_{00}	43.20 $_{ID}$			37.67 $_{ID}$		
ICC	0.58			0.55		
N	121 $_{ID}$			121 $_{ID}$		
Observations	379			379		
Marginal R^2 / Conditional R^2	0.179 / 0.659			0.247 / 0.663		
AIC	2577.182			2562.154		

Note. LME = linear mixed-effects; BES = Binge Eating Scale; BED = binge-eating disorder; CI = confidence interval; ICC = intraclass correlation coefficient; AIC = Akaike information criterion.

LME Models for EDE-Q Item 15 (Binge-Eating Frequency) With and Without Treatment Group Included as a Fixed Effect

Predictors	Null model			Group model		
	Estimates	95% CI	*p*	Estimates	95% CI	*p*
(Intercept)	3.25	[0.78, 5.73]	0.010	4.92	[2.32, 7.53]	<0.001
Baseline Item 15	0.37	[0.22, 0.51]	<0.001	0.35	[0.21, 0.49]	<0.001
Week 10	-1.33	[-2.81, 0.15]	0.078	-1.30	[-2.78, 0.18]	0.084
6-month	-2.10	[-3.65, -0.56]	0.008	-2.07	[-3.61, -0.53]	0.009
12-month	-1.87	[-3.50, -0.25]	0.024	-1.82	[-3.44, -0.20]	0.028
Group				-3.24	[-5.22, -1.26]	0.001
Random effects						
σ^2	29.35			29.21		
τ_{00}	21.73 $_{ID}$			19.70 $_{ID}$		
ICC	0.43			0.40		
N	121 $_{ID}$			121 $_{ID}$		
Observations	381			381		
Marginal R^2 / Conditional R^2	0.127 / 0.498			0.170 / 0.505		
AIC	2518.228			2508.255		

Note. LME = linear mixed-effects; EDE-Q = Eating Disorder Examination Questionnaire; CI = confidence interval; ICC = intraclass correlation coefficient; AIC = Akaike information criterion.

LME Models for EDE-Q Global Scores (General ED Symptomatology) With and Without Treatment Group Included as a Fixed Effect

Predictors	Null model			Group model		
	Estimates	95% CI	*p*	Estimates	95% CI	*p*
(Intercept)	0.63	[0.02, 1.23]	0.042	0.94	[0.41, 1.46]	<0.001
Baseline EDE-Q	0.62	[0.45, 0.79]	<0.001	0.64	[0.50, 0.79]	<0.001
Week 10	-0.07	[-0.24, 0.11]	0.459	-0.06	[-0.24, 0.11]	0.488
6-month	0.07	[-0.12, 0.25]	0.489	0.07	[-0.11, 0.25]	0.454
12-month	0.06	[-0.13, 0.25]	0.539	0.07	[-0.12, 0.26]	0.459
Group				-0.91	[-1.17, -0.65]	<0.001
Random effects						
σ^2	0.42			0.41		
τ_{00}	0.56_{ID}			0.37_{ID}		
ICC	0.58			0.47		
N	121_{ID}			121_{ID}		
Observations	382			382		
Marginal R^2 / Conditional R^2	0.231 / 0.673			0.390 / 0.677		
AIC	968.785			932.508		

Note. LME = linear mixed-effects; EDE-Q = Eating Disorder Examination Questionnaire; ED = eating disorder; CI = confidence interval; ICC = intraclass correlation coefficient; AIC = Akaike information criterion.

LME Models for CIA Scores (Clinical Impairment) With and Without Treatment Group Included as a Fixed Effect

Predictors	Null model			Group model		
	Estimates	95% CI	*p*	Estimates	95% CI	*p*
(Intercept)	3.75	[-0.54, 8.05]	0.087	6.78	[2.64, 10.91]	0.001
Baseline CIA	0.69	[0.54, 0.84]	<0.001	0.68	[0.54, 0.82]	<0.001
Week 10	-2.18	[-4.01, -0.36]	0.019	-2.13	[-3.95, -0.31]	0.022
6-month	-2.08	[-3.99, -0.16]	0.034	-2.04	[-3.95, -0.13]	0.036
12-month	-2.94	[-4.95, -0.94]	0.004	-2.82	[-4.82, -0.83]	0.006
Group				-6.27	[-8.78, -3.77]	<0.001
Random effects						
σ^2	45.12			44.98		
τ_{00}	41.79 $_{ID}$			32.67 $_{ID}$		
ICC	0.48			0.42		
N	122 $_{ID}$			122 $_{ID}$		
Observations	385			385		
Marginal R^2 / Conditional R^2	0.314 / 0.644			0.393 / 0.649		
AIC	2727.121			2704.323		

Note. LME = linear mixed-effects; CIA = Clinical Impairment Assessment; CI = confidence interval; ICC = intraclass correlation coefficient; AIC = Akaike information criterion.

LME Models for Confidence to Change Binge Eating Ratings With and Without Treatment Group Included as a Fixed Effect

Predictors	Null model			Group model		
	Estimates	95% CI	*p*	Estimates	95% CI	*p*
(Intercept)	4.53	[3.51, 5.55]	<0.001	3.90	[2.86, 4.93]	<0.001
Baseline confidence	0.31	[0.15, 0.47]	<0.001	0.33	[0.17, 0.49]	<0.001
Week 10	-0.10	[-0.55, 0.36]	0.683	-0.10	[-0.56, 0.35]	0.656
6-month	-0.56	[-1.04, -0.07]	0.024	-0.57	[-1.05, -0.09]	0.021
12-month	-0.19	[-0.69, 0.32]	0.469	-0.21	[-0.71, 0.30]	0.420
Group				1.22	[0.56, 1.89]	<0.001
Random effects						
σ^2	2.84			2.83		
τ_{00}	2.72 $_{ID}$			2.40 $_{ID}$		
ICC	0.49			0.46		
N	122 $_{ID}$			122 $_{ID}$		
Observations	385			385		
Marginal R^2 / Conditional R^2	0.078 / 0.529			0.135 / 0.532		
AIC	1675.978			1665.740		

Note. LME = linear mixed-effects; CI = confidence interval; ICC = intraclass correlation coefficient; AIC = Akaike information criterion.

GLMM Models for Binge Eating Abstinence Rates With and Without Treatment Group Included as a Fixed Effect

Predictors	Null model			Group model		
	Odds ratios	95% CI	*p*	Odds ratios	95% CI	*p*
(Intercept)	0.05	[0.02, 0.11]	<0.001	0.03	[0.01, 0.09]	<0.001
Baseline abstinence	1.34	[0.04, 42.85]	0.870	1.88	[0.06, 59.09]	0.719
Week 10	1.93	[0.75, 4.98]	0.175	1.92	[0.74, 4.97]	0.181
6-month	6.79	[2.66, 17.33]	<0.001	6.70	[2.63, 17.11]	<0.001
12-month	4.97	[1.88, 13.12]	0.001	4.88	[1.85, 12.90]	0.001
Group				2.01	[0.87, 4.64]	0.103
Random effects						
σ^2	3.29			3.29		
τ_{00}	1.98 $_{ID}$			1.86 $_{ID}$		
ICC	0.38			0.36		
N	121 $_{ID}$			121 $_{ID}$		
Observations	382			382		
Marginal R^2 / Conditional R^2	0.103 / 0.439			0.125 / 0.441		
AIC	340.170			339.468		

Note. GLMM = generalized linear mixed-effects; CI = confidence interval; ICC = intraclass correlation coefficient; AIC = Akaike information criterion.

GLMM Models for BED Remission Rates With and Without Treatment Group Included as a Fixed Effect

Predictors	Null model			Group model		
	Odds ratios	95% CI	*p*	Odds ratios	95% CI	*p*
(Intercept)	0.02	[0.01, 0.06]	<0.001	0.01	[0.00, 0.04]	<0.001
Week 10	2.27	[0.69, 7.39]	0.175	2.20	[0.69, 7.01]	0.183
6-month	6.63	[2.17, 20.29]	0.001	6.63	[2.22, 19.83]	0.001
12-month	4.41	[1.34, 14.47]	0.014	4.05	[1.26, 13.03]	0.019
Group				4.98	[1.72, 14.40]	0.003
Random effects						
σ^2	3.29			3.29		
τ_{00}	3.80 $_{ID}$			2.77 $_{ID}$		
ICC	0.54			0.46		
N	122 $_{ID}$			122 $_{ID}$		
Observations	383			383		
Marginal R^2 / Conditional R^2	0.071 / 0.569			0.168 / 0.548		
AIC	286.530			278.736		

Note. GLMM = generalized linear mixed-effects; BED = binge-eating disorder; CI = confidence interval; ICC = intraclass correlation coefficient; AIC = Akaike information criterion.