

Running head: DBT FOR BINGE EATING

TWO BRIEF TREATMENTS BASED ON DIALECTICAL BEHAVIOR THERAPY
FOR BINGE EATING ACROSS DIAGNOSES AND DIAGNOSTIC THRESHOLDS:
RESULTS FROM A PRELIMINARY RANDOMIZED DISMANTLING STUDY

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“A dream you dream alone is only a dream. A dream you dream together is reality.”

-John Lennon.

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TABLE OF CONTENTS

ACKNOWLEDGMENTS.....	ii
LIST OF TABLES.....	vi
LIST OF ILLUSTRATIONS.....	viii
ABSTRACT.....	x
Chapter	
1. INTRODUCTION.....	1
Dialectical Behavior Therapy.....	1
Rationale for Applying DBT with Disordered Eating.....	3
Focus on emotions	3
Focus on awareness	3
Focus on reducing extremes.....	4
Focus on generalization	5
Refinements and Revisions to DBT for Disordered Eating.....	5
Limitations of Existing Research.....	7
Limited generalization.....	7
Potentially limited portability.....	10
Focus on wait list controls.....	11
The Current Study.....	11
Addressing the Limitations of Existing Research.....	11
Generalization.....	11
Portability.....	11
Comparison treatment.....	12
Primary Aims and Hypotheses.....	14
Primary Aim 1.....	14
Primary hypothesis.....	14
Secondary hypothesis.....	15
Exploratory analysis.....	15
Primary Aim 2.....	15
Primary hypothesis.....	15
Secondary hypothesis.....	15
Exploratory analysis.....	15
Primary Aim 3.....	15
Primary hypothesis.....	15
Secondary hypothesis.....	16
Exploratory analysis.....	16
2. METHOD.....	17

Feasibility Study	17
Design.....	17
Participants.....	19
Intervention.....	19
Measures.....	21
Eating disorder diagnoses.....	21
Disordered eating cognition and behavior.....	22
Co-occurring psychopathology.....	23
Results.....	23
Discussion.....	24
The Current Study.....	25
Design.....	25
Participants.....	29
Intervention.....	36
Measures.....	37
Eating disorder diagnoses.....	37
Disordered eating cognition and behavior.....	38
Auxiliary concerns.....	40
Co-occurring psychopathology.....	40
Body mass index.....	41
3. RESULTS.....	42
Analyses.....	42
Success of randomization.....	42
Hypothesis testing.....	42
Primary Outcome: Binge Eating.....	44
Secondary and Auxiliary Outcomes.....	48
4. DISCUSSION.....	82
Generalization and Portability Considerations.....	87
Limitations and Future Directions.....	89
Conclusion.....	92
REFERENCES.....	93
APPENDICES	
A: Mindfulness Foods.....	106
B: Consent Form.....	108
C: Diary Card Self-Monitoring Individual Session Guide.....	112
VITA.....	117

LIST OF TABLES

Table	Page
1. Length of Disordered Eating for Feasibility Study Participants.....	20
2. Reasons for Ineligibility ($n = 26$).....	30
3. Reasons for Withdrawal.....	32
4. Demographics and Disordered Eating Length of Randomized Study Participants	33
5. Distribution of Pre-Treatment Eating Disorder Diagnoses for Current Study Participants.....	34
6. Distribution of Pre-Treatment Co-Morbid Diagnoses for Current Study Participants.....	35
7. Frequency of Diagnostic Threshold Binge Eating.....	46
8. Multivariate Analyses of Variance Results.....	47
9. Effect Sizes for Secondary and Auxiliary Outcomes.....	50
10. Independent Samples T-Test Results for Auxiliary Outcomes.....	51
11. Eating Disorders Inventory Bulimia across Randomized Treatment.....	55
12. Regression Results for Eating Disorders Inventory Bulimia.....	56
13. Eating Disorders Inventory Interoceptive Awareness across Randomized Treatment.....	58
14. Regression Results for Eating Disorders Inventory Interoceptive Awareness.....	59
15. Bulimic Automatic Thoughts Test across Randomized Treatment.....	61
16. Regression Results for the Bulimic Automatic Thoughts Test.....	62
17. Forbidden vs. Unforbidden Foods Scale across Randomized Treatment.....	64

18. Regression Results for the Forbidden vs. Unforbidden Foods Scale.....	65
19. Eating Disorders Inventory Drive for Thinness across Randomized Treatment....	67
20. Regression Results for Eating Disorders Inventory Drive for Thinness.....	68
21. Eating Disorders Inventory Body Dissatisfaction across Randomized Treatment	70
22. Regression Results for Eating Disorders Inventory Body Dissatisfaction.....	71
23. Eating Disorders Inventory Ineffectiveness across Randomized Treatment.....	73
24. Regression Results for Eating Disorders Inventory Ineffectiveness.....	74
25. Eating Disorders Inventory Perfectionism across Randomized Treatment.....	76
26. Regression Results for Eating Disorders Inventory Perfectionism.....	77
27. Eating Disorders Inventory Interpersonal Distrust across Randomized Treatment	79
28. Regression Results for Eating Disorders Inventory Interpersonal Distrust.....	80

LIST OF ILLUSTRATIONS

Figure	Page
1. Study design and associated attrition.....	26
2. Weekly binge frequency across randomized treatment and feasibility study....	45
3. Weekly self-induced vomiting frequency across randomized treatment.....	52
4. Weekly mindless eating frequency across randomized treatment and feasibility study.....	53
5. Weekly apparently irrelevant behavior frequency across randomized treatment and feasibility study.....	54
6. Eating Disorder Inventory Bulimia across randomized treatment and feasibility study.....	57
7. Eating Disorders Inventory Interoceptive awareness across randomized treatment and feasibility study.....	60
8. Eating Disorders Inventory Bulimic Automatic Thoughts Test across randomized treatment.....	63
9. Eating Disorders Inventory Forbidden vs. Unforbidden Foods Scale across randomized treatment.....	66
10. Eating Disorders Inventory Drive for Thinness across randomized treatment and feasibility study.....	69
11. Eating Disorders Inventory Body Dissatisfaction across randomized treatment and feasibility study.....	72
12. Eating Disorders Inventory Ineffectiveness across randomized treatment and feasibility study.....	75

13.	Eating Disorders Inventory Perfectionism across randomized treatment and feasibility study.....	78
14.	Eating Disorders Inventory Interpersonal Distrust across randomized treatment and feasibility study.....	81

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ABSTRACT

How can disordered eating be effectively treated? The answer is not yet clear. Although cognitive behavioral therapy (CBT) is generally considered the treatment of choice, disordered eating has been shown to persist and re-emerge following CBT. Furthermore, little research exists regarding treatment efficacy for eating disorder presentations that fall outside of the current diagnoses of anorexia nervosa, bulimia nervosa, and binge eating disorder. The current study bolsters this area by examining the efficacy of two brief treatments based on dialectical behavior therapy (DBT) for binge eating, be it in the context of full- or sub-threshold BN or full- or sub-threshold BED. Participants were randomly assigned to either group DBT with coaching calls (DBT) or diary card self-monitoring with brief individual sessions (DC). Fifteen treatment sessions were provided over 16 weeks. Both treatments were associated with significant change (in the desired direction) in bulimic symptoms, dichotomous thinking, food labeling, drive for thinness, body dissatisfaction, ineffectiveness, perfectionism, and interpersonal distrust over the course of treatment. While DBT outperformed DC on symptom measures, DC outperformed DBT on retention. The results point to possibilities for stepped care and avenues for future research, including replication with a larger sample, further dismantling (e.g., DBT vs. behavior chain analysis; DBT vs. mindful eating), and comparison with other available treatments (e.g., treatment as usual; CBT; IPT).

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When it comes to treating disordered eating, there is still much to learn. Although cognitive behavioral therapy (CBT) is generally considered the treatment of choice [see Mitchell, Agras, & Wonderlich, 2007 and Shapiro et al., 2007 for reviews comparing CBT and other interventions for bulimia nervosa (BN); Brownley, Berkman, Sedway, Lohr, & Bulik, 2007 for a review comparing CBT and other interventions for binge eating disorder (BED)], disordered eating often persists or re-emerges following CBT (e.g., Mitchell et al., 2002; Mitchell et al., 2004). For example, the rates for abstinence from bulimic symptoms following CBT are inconsistent, with reports ranging from as low as 8% to as high as 80% (Mitchell et al., 2002), and even when individuals achieve abstinence by the end of CBT, symptoms have been found to re-occur (e.g., for 44%; Halmi et al., 2002). In addition, there is substantial attrition from CBT, with average drop-out rates around 28% (Mitchell et al., 2002). This suggests that CBT is not amenable to all. In particular, individuals with elevated impulsivity may be at increased risk of dropping out of CBT (Agras et al., 2000). Consequently, a treatment developed for individuals high in impulsivity may be well suited for individuals who do not remain in CBT. Dialectical behavior therapy (DBT) is such a treatment.

Dialectical Behavior Therapy

DBT was originally developed by Marsha Linehan for the treatment of borderline personality disorder (BPD)—in particular, its high-risk impulsive suicidal and self-harm

behaviors (BPD; Linehan, 1993). Research supports its efficacy in reducing these risky behaviors (see Robins & Chapman, 2004, for a review). Indeed, it is the only empirically supported outpatient psychotherapy for BPD (Robins & Chapman, 2004).

Conceptualizing suicidal and self-harm behavior as specific manifestations of broader problems in impulse control and emotion regulation raises the question of whether DBT may also be efficacious for other specific manifestations, such as disordered eating.

Accordingly, DBT has been adapted for individuals with disordered eating behavior, first for BED (Safer, Agras, & Robinson, 2007; Telch, 1997a; Telch, Agras, & Linehan, 2000; Telch, Agras, & Linehan, 2001; Wiser & Telch, 1999), then for BN (Safer, Telch, & Agras, 2001a; Safer, Telch, & Agras, 2001b), and most recently, for anorexia nervosa (AN; Limbrunner, Ben-Porath, & Wisniewski, 2005; Wisniewski & Ben-Porath, 2005; Wisniewski & Kelly, 2003) and eating disorders co-occurring with BPD (Chen, Matthews, Allen, Kuo, & Linehan, 2008; Palmer et al., 2003).

Overall, existing research suggests that DBT may be a viable treatment approach for individuals with disordered eating who do not pursue, persist in, or benefit from CBT. In a study by Telch and colleagues (2001), DBT for BED showed binge eating abstinence rates of 90% by treatment termination (compared to 12.5% among individuals in the wait-list condition). Full abstinence was maintained by 56% of a large subsample of the DBT group through a six month follow-up (Telch et al., 2001). Safer and colleagues (2007) have also demonstrated that DBT for BED results in superior reductions in dietary restraint, eating concerns, and weight concerns compared to supportive group therapy (Safer et al., 2007). DBT results for BN are more modest, with rates of abstinence from binge eating and purging achieved by 28.6% at treatment termination (compared to 0%

among individuals in the wait-list condition; Safer et al., 2001b).

Rationale for Applying DBT to Disordered Eating

The rationale for applying DBT to disordered eating is firmly based in theory and research. DBT combines many components of CBT (in particular, skills training and behavior chain analysis, an in-depth detailing of affect, cognitions, behaviors, and urges leading up to undesired behavior) with acceptance and mindfulness.

Focus on emotions. According to several theories (e.g., the Affect Regulation Model of eating disorders, Wiser & Telch, 1999; escape theory, Heatherton & Baumeister, 1991; expectancy theory, Hohlstein, Smith, & Atlas, 1998), disordered eating behaviors, such as binge eating and purging, are attempts at emotion regulation. Studies have consistently linked binge eating to negative affect (e.g., Arnow, Kenardy, & Agras, 1992; Cohen & Petrie, 2005; Elmore & de Castro, 1990; Jansen, van den Hout, & Griez, 1990; Lynch, Everingham, Dubitzky, Hartman, & Kasser, 2000; Mizes & Arbitell, 1991; Powell & Thelen, 1996; Stein et al., 2007) and individuals who binge eat frequently identify the function of binge eating as an escape from negative cognitions and emotions (Stickney, Miltenberger, & Wolff, 1999). Binge eating as a coping strategy is limited in effectiveness, with some negative emotions reduced only temporarily (e.g., anxiety; Elmore & de Castro, 1990) and other negative emotions produced (e.g., depression, guilt, hostility; Arnow et al., 1992; Elmore & de Castro, 1990; Jansen et al., 1990; Powell & Thelen, 1996). DBT aims to help individuals with eating disorders enhance their coping repertoire and replace their disordered eating behavior with healthier coping strategies.

Focus on awareness. Individuals with eating disorders frequently experience

difficulties with interoceptive awareness (see Lilenfeld, Wonderlich, Riso, Crosby, & Mitchell, 2006, for a review). In this context, interoceptive awareness is defined as competence and confidence in recognizing and identifying emotions versus sensations of hunger or satiety (Garner, Olmsted, & Polivy, 1983). Low interoceptive awareness could trigger binge eating and purging by causing individuals to feel frustrated or to mislabel negative emotions as physical sensations of hunger or fullness. Through mindfulness, DBT may increase interoceptive awareness. Consequently, clients could more accurately identify their emotions related to binge eating and purging and more accurately distinguish physical sensations from emotions.

Focus on reducing extremes. The cognitions of individuals with eating disorders are often extreme and dichotomous (Franko & Omori, 1999; Franko & Zuroff, 1992; Lingswiler, Crowther, & Stephens, 1988; Zotter & Crowther, 1991). This includes cognitions about food, with foods divided into forbidden food (food to be avoided because of high caloric content and/or nutritional content, such as fat or carbohydrates) and unforbidden food (food that need not be avoided because of its low caloric content and/or nutritional content; Arnow et al., 1992; Kales, 1990; Knight & Boland, 1989; Ruggiero, Williamson, Davis, & Schlundt, 1988). This can perpetuate binge eating through the abstinence violation effect (i.e., one bite of a forbidden food can precipitate a binge; Arnow et al., 1992; Gleaves, Williamson, & Barker, 1993). DBT could reduce the impact of the abstinence violation effect. Through mindfulness training, clients learn how to describe and approach food without judgment and categorization. Furthermore, they obtain extensive practice in eating without judgment and categorization through mindful eating exercises. This practice provides valuable exposure to a range of foods, including

forbidden foods, without permitting binge eating following consumption. Thus, the association between food—in particular, forbidden foods—and binge eating is uncoupled through exposure with response prevention, promoting the reduction of anxiety related to food and eating.

Focus on generalization. Clients must battle their eating disorders throughout each day. This contrasts with the one hour per week typically spent in outpatient therapy. DBT's coaching calls provide a bridge between sessions—an opportunity for enhancing change outside of therapy (Wisniewski & Ben-Porath, 2005).

Refinements and Revisions to DBT for Disordered Eating

DBT divides treatment targets into four levels, beginning with (a) suicidal behavior and self-harm, then moving to (b) therapy-interfering behaviors (e.g., not completing therapy homework), (c) quality of life-interfering behaviors¹, and (d) skills teaching. In the original form of DBT, this treatment hierarchy generally categorizes disordered eating behavior as a quality of life-interfering behavior—a tertiary priority. Retaining all suicidal and self-harm behavior as primary treatment targets may be necessary to convey to clients that no suicidal or self-harm behavior is condoned. However, several disordered eating behaviors are life-threatening or can lead to serious medical emergencies (e.g., syrup of ipecac use has been linked to heart damage and mortality, Wisniewski & Kelly, 2003; bradycardia, or low heart rate; orthostatic hypotension, or low blood pressure producing dizziness, faintness, or lightheadedness on standing; electrolyte imbalances; electrocardiogram abnormalities; Wisniewski & Kelly,

¹(1) substance abuse, (2) high-risk or unprotected sexual behavior, (3) extreme financial difficulties, (4) criminal behaviors that may lead to jail, (5) serious dysfunctional interpersonal behaviors, (6) employment- or school-related dysfunctional behaviors, (7) illness-related dysfunctional behaviors, (8) housing-related dysfunctional behaviors, (9) mental-health-related dysfunctional behaviors, and (10) mental-disorder-related dysfunctional patterns, e.g., Axis I disorders.

2003). Placing less severe suicidal and self-harm behavior (e.g., scratching or skin picking) above potentially more life-threatening disordered eating behavior seems to send an inaccurate message about the lethality of disordered eating behavior. Indeed, for individuals with eating disorders, medical complications stemming from disordered eating behaviors are as likely—if not more likely—than suicide to cause mortality (see Neumarker, 2000; Nielsen et al., 1998 for reviews). Linehan (1993) does acknowledge that fasting in individuals with AN may be an imminent threat and thus elevated to a primary target (p. 124). However, this issue warrants much more elaboration, with specific guidelines for treatment of disordered eating, including binge eating and purging.

As such, DBT has been revised for the treatment of eating disorders. Skills and monitoring are specifically linked to disordered eating behavior. With chronic eating disorder cases and AN, medical monitoring is used to determine when clients are in a state of medical emergency; disordered eating behaviors then become primary treatment targets (Wisniewski & Ben-Porath, 2005). With other adaptations for BN and BED, disordered eating is targeted but still placed below therapy-interfering behavior (Safer et al., 2001a; Safer et al., 2001b; Telch, 1997a; Telch et al., 2000; Telch et al., 2001; Wiser & Telch, 1999).

DBT in its original form may also warrant a reduction in length. DBT for BPD is an intensive intervention designed to last at least one year, with weekly individual sessions, weekly group skills training sessions covering mindfulness, interpersonal effectiveness, emotion regulation, and distress tolerance, and 24-hour on-call access to therapists for in-the-moment coaching. Such a lengthy and intensive intervention is clearly indicated for BPD—a personality disorder considered highly resistant to change.

However, several non-DBT trials have found success with 16-week individual or group interventions for BED and BN (e.g., Davis & Olmsted, 1992; Fairburn, 1995; Fairburn et al., 1991; Fairburn, Marcus, & Wilson, 1993; Telch, Agras, & Rossiter, 1990; Wilfley et al., 1993). Similarly, DBT has been shortened to 20 weeks for BN and BED (without BPD), excluding interpersonal effectiveness skills training, individual or group sessions, and coaching calls, and retaining mindfulness, emotion regulation, and distress tolerance skills training.

Limitations of Existing Research

Limited generalization. Given that all of the randomized trials of abbreviated DBT (focusing on mindfulness, emotion regulation, and distress tolerance skills training) for individuals with BN or BED (but not BPD) have been conducted at Stanford, independent replication is necessary. More specifically, participants in the studies at Stanford have been community members, typically older women with long-standing illness (mean age = 34, sd = 11; mean length of illness = 12.2. years, sd = 8.6, range: 0.5 to 29.5, for individuals with BN, Safer et al., 2001b; mean age = 50, sd = 9.1; mean length of illness = 29.2 years, sd = 11.7, range not reported, for individuals with BED, Telch et al., 2001). In contrast, the typical age of onset is between ages 19 and 20 for BN (e.g., range: 10 to 29; Wade, Bergin, Tiggemann, Bulik, & Fairburn, 2006) and ages 20 and 26 for BED (e.g., range: 6 to 29; Mussell et al., 1995; Wade et al., 2006). Consequently, the efficacy of DBT for disordered eating for younger women with more recent onset of disordered eating remains to be seen. In addition, most treatment research on BN and BED has focused on the disorders as defined by current diagnostic criteria (American Psychiatric Association, 2000a). This includes the research on DBT for BED

(Telch, 1997; Telch et al., 2000; Telch et al., 2001). However, the thresholds for diagnosis have been questioned and alternatives have been suggested that encompass symptom presentations outside of current criteria (e.g., Andersen, Bowers, & Watson, 2001; Fairburn & Bohn, 2001; Garfinkel, Kennedy, & Kaplan, 1995; Nielsen & Palmer, 2003; Williamson, Gleaves, & Salvin, 1992). Research provides support for reconceptualizing the diagnostic criteria. For example, individuals with sub-threshold BN and individuals with full-syndrome BN are statistically indistinguishable on most variables (e.g., age of eating disorder onset; length of illness; dietary restraint; purging; drive for thinness; eating, weight, and shape concerns; fear of fatness; avoidance of forbidden foods; body mass index (BMI); co-occurring psychopathology; perfectionism; impulsivity; and therapy participation; Anderson et al., 2001; Crow, Agras, Halmi, Mitchell, & Kraemer, 2002; Garfinkel et al., 1995; Hay & Fairburn, 1998; le Grange et al., 2006; Martin, Williamson, & Thaw, 2000; Ricca et al., 2001; Turner & Bryant-Waugh, 2004; Wilson & Eldridge, 1991). Parallel results have been found for individuals with sub-threshold versus full-syndrome BED (e.g., for dietary restraint; purging; eating, weight, and shape concerns; fear of fatness; avoidance of forbidden foods; BMI; co-occurring psychopathology; recognition of having an eating problem; desire for treatment; and treatment receipt; Crow et al., 2002; Hay & Fairburn, 1998; Martin et al., 2000; Striegel-Moore et al., 2000).²

² Some studies have found distinctions between sub-threshold and full-syndrome BN in adolescents (e.g., higher rates of co-occurring depression, obsessive compulsive symptoms, interpersonal sensitivity, paranoia, and psychoticism with full-syndrome BN (Bunnell, Shenker, Nussbaum, Jacobson, & Cooper, 1990) and adults (e.g., compared to individuals with sub-threshold BN, full-syndrome BN have reported more purging, le Grange et al., 2006; lower BMI, Andersen et al., 2001; Ricca et al., 2001; more eating concerns, le Grange et al., 2006; a greater likelihood of having a history of AN, le Grange et al., 2006; and greater likelihood of having received pharmacological intervention, le Grange et al., 2006). One study also found greater elevations of shape concern for individuals full-syndrome BED versus sub-threshold BED (Striegel-Moore et al., 2000).

Despite their subordinate status, sub-threshold BN and sub-threshold BED are prevalent among individuals who engage in disordered eating. Results from non-clinical samples suggest that sub-threshold BN and sub-threshold BED are at least as prevalent as full-syndrome BN and full-syndrome BED (Cotrufo, Barretta, Monteleone, & Maj, 1998; Garfinkel et al., 1995). Sub-threshold variants, typically grouped together in eating disorder not otherwise specified (EDNOS), are also common in clinical samples, in which they comprise 42 to 70.5% of adult outpatient eating cases (see Fairburn & Bohn, 2001, for a review). Moreover, the crude mortality rate for such “sub-threshold” behavior is 16.7% (22 individuals out of 132, compared to an expected 3; standardized mortality ratio = 7.15; Jorgensen, 1992). Other negative outcomes include depression and negative affect, cognitive distortions, weight gain, and serious medical complications, such as amenorrhea, reduced bone mineral density, and cardiac conditions (Bulik, Sullivan, & Kendler, 2002; McGuire, Wing, Klem, Lang, & Hill, 1999; Powell & Thelen, 1996; Stice, Cameron, Killen, Hayward, & Taylor, 1999; Warren et al., 1999).

Unfortunately, the research literature offers little guidance on the appropriate treatment of sub-threshold eating disorders (Nielsen & Palmer, 2003). Exceptions are primarily self-help approaches (e.g., Dunn, Neighbors, & Larimer, 2006) and brief prevention programs (e.g., one to two sessions; Coughlin & Kalodner, 2006; Franko et al., 2005; Green, Scott, Diyanova, Gasser, & Pederson, 2005; Stice, Orjada, & Tristan, 2006). Given the distress and interference experienced by individuals with sub-threshold BN and sub-threshold BED, treatment efficacy may be enhanced by longer, therapist-guided approaches that provide specific skills aimed at particular disordered eating behavior, such as binge eating. DBT offers such an approach, with some research support

for sub-threshold application with BN. The support comes from Safer and colleagues' (2001b) trial, which included sub-threshold BN characterized by binge eating and purging at least once a week for the previous three months (versus the DSM-IV stipulation that binge eating and purging occur at least twice a week for the previous three months, American Psychiatric Association, 2000a).

Potentially limited portability. Two issues may limit the ease with which DBT for BN or BED can be implemented in certain treatment settings. With the typical ages of onset for BN and BED noted above corresponding to the traditional college years and college attendance being a potential catalyst for escalated disordered eating behavior (Bowen-Woodward & Levitz, 1989; Dickstein, 1989; Sharp, Terling-Watt, Atkins, & Gilliam, 2001), many college counseling centers and psychological services clinics are charged with treating students with disordered eating. Although the treatment length of 20 sessions is shorter than the full DBT approach, it is still longer than a typical college semester. Given the typical rhythm of college campuses, being able to intervene within the constraints of the academic calendar is essential. An even shorter treatment would thus be necessary to permit adoption by campus health providers.

Secondly, thus far the research on DBT for BN or BED has focused on one diagnosis or the other. Delivering the treatment according to its empirical support consequently calls upon providers to limit groups to one diagnosis or the other. This may be prohibitive in general practice settings that do not encounter large volumes of clients with any one particular diagnosis. In contrast, general practice settings may be able to gather enough clients with one diagnosis or the other for a combined group. Determining that the treatment delivered to such heterogeneous groups remains efficacious would

therefore enhance the portability of the treatment.

Focus on wait-list controls. Only one of the randomized controlled trials of DBT for disordered eating thus far has compared DBT to more than a wait-list control (Safer et al., 2007). Thus, it largely remains to be seen how well outcomes from DBT compare to those produced when participants engage in more than wait-list assessment. Given the many components of DBT (e.g., diary card self-monitoring, mindfulness practice, behavior chain analysis), comparisons could focus on a specific component (e.g., diary card self-monitoring). This dismantling design would help begin to decipher the efficacy of each of the pieces of DBT, compared to the more complex treatment. To our knowledge, a dismantling study of DBT (for BPD, eating disorders, or otherwise) has not yet been conducted.

The Current Study

Addressing the Limitations of Existing Research

The current study addressed the limitations of existing research as follows:

Generalization. The current study was conducted at the University of Missouri Psychological Services Clinic in Columbia, Missouri. It is thus the first study of abbreviated DBT for individuals with BN or BED (but not BPD) outside of Stanford. In addition, in an effort to target younger women, college students were recruited from the local campuses. To broaden the applicability beyond current diagnostic criteria, participants with clinically significant symptoms of BN or BED were eligible, regardless of whether these symptoms reached criteria for full-threshold diagnosis.

Portability. To increase the potential portability to college campuses, the current study shortened the 20-session program to 15 sessions. In addition, groups included

heterogeneity in diagnosis (BN and BED).

Comparison treatment. The current study compared DBT to one component of DBT: diary card self-monitoring. Diary cards are integral to both standard and adapted DBT protocols (Linehan, 1993; D. L. Safer, personal communication, August 11, 2006). Diary card self-monitoring was facilitated by brief weekly individual sessions to review diary cards and troubleshoot card completion. These sessions were scheduled for 15 minutes each. Diary card self-monitoring involves keeping a record of behavior (e.g., binge eating, purging), as well as urges, emotions, and other outcomes of interest. The process of self-monitoring heightens self-awareness, provides the information necessary for establishing realistic goals, permits evaluation of progress, facilitates insight into potential causes of difficulty, and promotes behavior changes consistent with goals (Burke & Dunbar-Jacob, 1995; Febraro & Clum, 1998; Foreyt & Poston, 1998; Kirschenbaum & Wittrock, 1984). When self-monitoring documents progress, it can be reinforcing (Burke & Dunbar-Jacob, 1995) and boost self-efficacy, instilling confidence for achieving goals.

Research suggests that this process can lead to desired changes. The support for this approach spans several decades, from the 1970's (Jeffrey, Vender, & Wing, 1978; Maletzky, 1974; Perri & Richards, 1977) to today (Aittasalo, Miilunpalo, Kukkonen-Karjula, & Pasanen, 2006; Conn, Valentine, & Cooper, 2002; Diabetes Prevention Program Research Group, 2004; Glesson-Kreig, 2006; Krummel et al., 2001; Mossavar-Harmani et al., 2004; O'Brien & LeBow, 2007; Speck & Looney, 2001). This research shows that self-monitoring can be helpful for a wide range of individuals with various problems and concerns. Results have included decreased eating problems (O'Brien &

LeBow, 2007), greater weight loss (Baker & Kirschenbaum, 1993; Boutelle, Kirschenbaum, Baker, & Mitchell, 1999; Diabetes Prevention Program Research Group, 2004; Gormally & Rardin, 1981; Jeffrey et al., 1978; Leermakers, Auglin, & Wing, 1998; Madsen et al., 1993; Sperduto, Thompson, & O'Brien, 1986), increased physical activity (Aittasalo et al., 2006; Conn et al., 2002; Diabetes Prevention Program Research Group, 2004; Speck & Looney, 2001), reduced blood pressure (Eisenberg et al., 1993; Madsen et al., 1993; Weber, & Wertheim, 1989), better medication compliance (Burke & Dunbar-Jacob, 1995), improved studying (Perri & Richards, 1977), decreased self-harm (Maletzky, 1974), and fewer motor tics (Maletzky, 1974). These findings support recommendations to employ self-monitoring when trying to manage eating behavior (Foreyt & Goodrick, 1991; Foreyt & Post, 1998).

In addition to offering the benefits of self-monitoring, diary card self-monitoring also provides an opportunity for daily practice of non-judgmental self-observation: noticing what is happening without judging it as good or bad. Being non-judgmental can help break a cycle of negative emotions that can fuel problematic eating behaviors as a way of coping with the negative emotions. Extending this non-judgmental stance to foods can also help reduce individuals' likelihood of binge eating and purging. As noted above, judging foods as good or bad, forbidden or unforbidden, can trigger binge eating and purging. In contrast, non-judgmentally eating a balanced variety of foods can satisfy cravings and decrease the frequency of cravings without inevitably leading to binge eating or purging.

Completing the diary card can also increase awareness of emotions. Again, as noted above, according to several theories (Wiser & Telch, 1999; Heatherton &

Baumeister, 1991; Hohlstein et al., 1998), problem eating behaviors, like binge eating and purging, are attempts at regulating or controlling emotions. Individuals who binge eat often report that binge eating serves as an escape from negative thoughts and feelings (Stickney et al., 1999). Research has also linked binge eating with negative emotions like sadness, irritability, anger, frustration and anxiety (e.g., Arnow et al., 1992; Cohen & Petrie, 2005; Elmore & de Castro, 1990; Jansen et al., 1990; Lynch et al., 2000; Mizes & Arbitell, 1991; Powell & Thelen, 1996; Stein et al., 2007). At the same time, individuals with eating disorders frequently experience difficulties with interoceptive awareness (see Lilenfeld et al., 2006, for a review). Low interoceptive awareness can trigger binge eating and purging by causing individuals to feel frustrated or to mislabel negative emotions as physical sensations of hunger or fullness. By individuals taking a moment each day to observe their emotions, their interoceptive awareness may increase, leading to more accurate identification of emotions related to binge eating and purging and more accurate discernment of physical sensations from emotions. This can help foster an increased sense of control related to deciding whether to eat because of hunger or to cope in other ways because of triggering emotions.

In short, diary card self-monitoring is a potentially powerful piece of DBT. The degree to which this accounts for the efficacy of DBT is not currently known. The current study begins to explore this question.

Primary Aims and Hypotheses

Primary Aim 1: To examine the efficacy of abbreviated group DBT with coaching calls.

Primary hypothesis: Substantial reductions will be found for DBT participants from pre-treatment to the end of treatment for binge eating.

Secondary hypotheses: Substantial reductions will be found for DBT participants from pre-treatment to the end of treatment for bulimic symptoms as measured by the Eating Disorders Inventory Bulimia subscale (EDI-B), interoceptive awareness, dichotomous thinking, and food labeling (forbidden vs. unforbidden).

Exploratory analysis: Change in auxiliary concerns was also examined, namely, in drive for thinness, body dissatisfaction, ineffectiveness, perfectionism, interpersonal distrust, self-induced vomiting, mindless eating, and apparently irrelevant behavior (AIB; behavior that is rationalized but nonetheless play a role in eating patterns).

Primary Aim 2: To examine the efficacy of diary card self-monitoring with brief individual sessions (DC).

Primary hypothesis: Substantial reductions will be found for DC participants from pre-treatment to the end of treatment for binge eating.

Secondary hypotheses: Substantial reductions will be found for DC participants from pre-treatment to the end of treatment for bulimic symptoms as measured by the EDI-B, interoceptive awareness, dichotomous thinking, and food labeling (forbidden vs. unforbidden).

Exploratory analysis: Change in auxiliary concerns was also examined, namely, in drive for thinness, body dissatisfaction, ineffectiveness, perfectionism, interpersonal distrust, self-induced vomiting, mindless eating, and AIB.

Primary Aim 3: To compare the efficacy of DBT to DC.

Primary hypothesis: Outcomes will be more favorable for DBT participants than DC participants for binge eating. More specifically, greater reductions were hypothesized for binge eating.

Secondary hypotheses: Greater reductions were also hypothesized for DBT vs. DC for bulimic symptoms as measured by the EDI-B, interoceptive awareness, dichotomous thinking, and food labeling (forbidden vs. unforbidden).

Exploratory analysis: Differential change in auxiliary concerns was also examined, namely, in drive for thinness, body dissatisfaction, ineffectiveness, perfectionism, self-induced vomiting, mindless eating, and AIB.

METHOD

Feasibility Study

Design

In preparation for the proposed study, a non-randomized feasibility study was conducted. Given that eating pathology is stable over relatively short periods of time, such as the current adapted DBT protocol, with either no change or an increase in disordered eating behavior (Cooley & Toray, 1996; Cooley & Toray, 2001; Dolan, Evans, & Lavy, 1992), spontaneous decreases in eating pathology that a control group might detect have a low probability of occurring. This makes a one-group design a reasonable preliminary step for investigating the influence of DBT for binge eating (Shadish, Cook, & Campbell, 2002, p. 109).

Recruitment occurred from December 2006 to January 2007. Participants for the feasibility study were recruited from two sources: (1) an announcement through a local university e-mail distributed to all students, staff and faculty and (2) direct mail to eating disorder specialists and other professionals likely to encounter eating disorders in their work (e.g., physicians, dieticians, psychologists, psychiatrists, health promotion counselors, and academic advisors). Recruitment yielded 48 interested individuals. Twenty-six were reached for screening; 15 individuals completed screening and treatment orientation (58% of those reached for screening); 10 attended the first group (38% of those reached for screening; 67% of those who completed treatment orientation); and five completed treatment (19% of those reached for screening; 33% of those who completed treatment orientation). Reasons reported for not beginning group included

scheduling conflict (for 60%), cost (\$10/session; for 40%), and preference for more focus on weight loss (for 40%). Reasons reported for not continuing in group included scheduling conflict (for 60%), feeling uncomfortable due to perceived difference from group members (for one participant, 20%), and knowing a group leader from a previous setting (for one participant, 20%). Overall, the feasibility study retained more participants from phone screening to treatment completion than previous studies of DBT for BED. However, overall retention was lower than in Safer and colleagues' (2001b) study of DBT for BN, and retention from first to last session was lower than in previous studies.³

Assessment occurred at pre-treatment, twice during treatment, and post-treatment. Assessment during treatment occurred at the end of each skills module (mindfulness, emotion regulation, and distress tolerance). Following phone screening, assessments occurred in person. The assessments at each five-week interval took 15 to 30 minutes. Due to a lack of funding, no compensation was provided for completing the assessments.

³The results for the previous uncontrolled trial of DBT for BED were 113 interested individuals, 93 phone screenings, 19 treatment orientation session completers (20% of those reached for screening), 11 treatment starters (12% of those reached for screening; 58% of those who completed treatment orientation), and 11 treatment completers (Telch et al., 2000). Interested individuals were excluded if they did not meet full criteria for BED (44% of those reached for screening); if they were involved in psychotherapy, weight loss treatment, or psychiatry (24% of those reached for screening); if they met criteria for current substance abuse or dependence; if they were currently suicidal; if they had current psychosis; or if they were unavailable for the study duration (12% of those reached for screening). The results for the previous randomized controlled trial of DBT for BED were 465 phone screenings, 77 treatment orientation completers (17% of those reached for screening), 20 DBT treatment starters (only 4% of those reached for screening; 30% of those who completed treatment orientation; 91% of those randomly assigned to DBT rather than wait-list), and 18 treatment completers (4% of those reached for screening; 23% of those who completed treatment orientation; 82% of those randomly assigned to DBT rather than wait-list; Telch et al., 2001). Eighty-one percent of individuals were excluded from the latter study due to not meeting full diagnostic criteria for BED. The results for the previous randomized controlled trial of DBT for BN were 31 screenings, 16 DBT treatment starters (52% of those reached for screening; 100% of those randomly assigned to DBT versus wait-list), and 14 treatment completers (45% of those reached for screening; 87.5% of those randomly assigned to DBT versus wait-list; Safer et al., 2001b). In the latter study, participants withdrew due to pregnancy (50%) and new-onset psychosis (50%).

Participants

The mean age of participants who completed orientation was 39.15 (sd = 15.02; range: 17 to 56); the mean age of participants beginning group was 35.44 (sd = 13.72; range: 17 to 56); the mean age of treatment completers was 39.60 (sd = 9.53; range: 24 to 49). Consistent with previous work (Telch et al., 2001), attrition tended to occur early in treatment (40% after one session; 20% after two sessions; 20% after three sessions; 20% after five sessions), and attrition tended to occur among (relatively) younger participants (mean age = 30.25, sd = 17.78).

According to the Questionnaire for Eating Disorder Diagnosis (Q-EDD; Mintz, O'Halloran, Mulholland, & Schneider, 1997), the most prevalent presenting diagnosis was BED (diagnosed in 80% of treatment completers, with the remainder diagnosed with BN). Major depressive disorder in partial remission (present in 60% of treatment completers) and obsessive compulsive personality disorder (present in 20% of participants) constituted the co-occurring disorders. Histories of post-traumatic stress disorder and obsessive compulsive disorder were also indicated (each present in 20% of participants). For most participants, disordered eating was long-standing (see Table 1). For example, when asked how long they had been binge eating, responses included “forever,” “my whole adult life,” and “as far as I can remember.” All treatment completers were female and Caucasian.

Intervention

DBT was delivered based on the model developed by Agras, Safer, and colleagues (D. L. Safer, personal communication, August 11, 2006; Safer et al., 2001a; Safer et al., 2001b; Telch, 1997; Telch, et al., 2000; Telch, et al., 2001; Wiser & Telch,

Table 1

Length of Disordered Eating in Years for Feasibility Study Participants

	<u>Length of Binge Eating</u>	
	Mean (sd)	Range
Treatment Completers	13.60 (5.59)	5-20
Treatment Non-Completers who Started Group	7.67 (2.52)	5-10
Orientation Completers who Did Not Start Group	10.58 (13.62)	.33-30

Note. sd = standard deviation.

1999). The material covered in 20 weeks by Safer and colleagues was covered in 16 sessions over 18 weeks (no group meeting one week due to inclement weather; no group meeting over spring break). The groups met once a week. Each session lasted approximately two to 2 ½ hours: an hour and 20 minutes for mindfulness practice, diary card and homework review, and behavior chain analysis; a 10-minute break; and an hour for skills teaching and homework assignment. Coaching calls were also provided to assist participants in implementing skills between sessions. Participants were asked to pay \$10 for each group session to simulate “real-world” nominal fees for services in similar settings (sliding scale fee training clinics). This particular fee was chosen because it is the rate paid for each skills training group by regular clients in the full DBT program for BPD at the clinic where the study was conducted.

Prior to each treatment, participants met for orientation sessions with the author. Participants also completed an assessment feedback session covering their SCID (First, Spitzer, Gibbon, & Williams, 2002) and SIDP (Pfohl, Blum, & Zimmerman, 1997) results. If clients reported full-threshold co-morbidity, individual therapy was recommended and provided. Two participants engaged in the individual therapy option with the author. Another participant continued her ongoing individual therapy with another provider.

Measures

Eating disorder diagnoses. The Q-EDD (Mintz et al., 1997) was completed during initial phone screening to determine severity and diagnosis of disordered eating. The Q-EDD yields not only the diagnoses of AN, BN, and BED but also variants of EDNOS (non-bingeing BN, chewers/spitters) and symptomatic categories (e.g., sub-

threshold non-bingeing BN; sub-threshold BED; BN without reported loss of control and undue influence of weight or shape on self-evaluation, termed “behavioral BN;” sub-threshold behavioral BN; chronic dieting). The accuracy of the Q-EDD in distinguishing between eating disorder and non-eating disorder is quite high (98%), with a false negative rate of .03, false positive rate of .02, sensitivity of .97, specificity of .98, positive predictive power of .94, and negative predictive power of .99 (Mintz et al., 1997). Similarly, the accuracy of the Q-EDD in distinguishing between BN and non-BN is 97%, with a false negative rate of .22, a false positive rate of .02, sensitivity of .78, specificity of .98, positive predictive power of .78, and negative predictive power of .98 (Mintz et al., 1997). The latter rates are similar to those found for the Bulimia Test-Revised (BULIT-R, Thelen, Farmer, Wonderlich, & Smith, 1991). However, the positive predictive power of the Q-EDD is superior (78% compared to 54% for the BULIT-R). Reliability and validity of the Q-EDD have also been firmly established (see Mintz et al., 1997).

Disordered eating behavior and cognition. The primary outcome of binge eating was obtained from daily diary cards completed by participants and turned in weekly during treatment.

For the secondary outcomes of bulimic symptoms per the EDI-B and interoceptive awareness, participants were asked to complete Eating Disorders Inventory (EDI; Garner et al., 1983) subscales of Bulimia and Interoceptive Awareness before treatment and at the end of each skills module. The EDI subscales have demonstrated reliability and validity in clinical populations (e.g., Eberenz & Gleaves, 1994; Espelage et al., 2003).

The auxiliary concerns of Drive for Thinness, Body Dissatisfaction, Ineffectiveness, Perfectionism, and Interpersonal Distrust were also measured via the EDI, with the corresponding subscales completed before treatment and after each skills module.

Co-occurring psychopathology. The Structured Interview for DSM-IV Personality Borderline Module (SIDP-IV-BOR, Pfohl et al., 1997) was completed during phone screening to assess for BPD and self-harm. The SIDP-IV is a semi-structured interview that yields current personality disorder diagnoses. It has demonstrated validity and convergence with four other semi-structured personality disorder interviews (Huprich et al., 2006; Saylor, 2003). The SIDP-IV-BOR is the module for BPD. In support of the construct validity of this specific section of the SIDP-IV, the items comprising this module have demonstrated the most consistent clustering of the SIDP-IV personality disorder modules (Huprich, Zimmerman, & Chelminski, 2006).

The Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Patient Edition (SCID-I/P; First et al., 2002) and remaining SIDP-IV modules (Pfohl et al., 1997) provided diagnosis of co-occurring Axis I and II disorders before random assignment. The SCID-I/P is commonly considered the gold standard for Axis I diagnoses (e.g., see Freitas, Lopes, Appolinario, & Coutinho, 2006; Shear et al., 2000; Stice, Telch, & Rizvi, 2000).

Results

Paired samples t-tests were conducted to examine change in the primary outcome of weekly binge frequency; the secondary outcomes of EDI-Bulimia and Interoceptive Awareness; and the auxiliary concerns of Drive for Thinness, Body Dissatisfaction,

Ineffectiveness, Perfectionism, and Interpersonal Distrust. Results evidenced significant reductions in the primary outcome of weekly binge frequency from pre-treatment (per the Q-EDD; Mintz et al., 1997) to post-treatment (per final diary card; $t(3) = 4.90, p < .05$; see Figure 2), significant reductions from pre-treatment to post-treatment in the secondary outcome of EDI-Bulimia ($t(4) = 4.36, p < .05$; see Figure 6), and significant increases from pre-treatment to post-treatment in the secondary outcome of Interoceptive Awareness ($t(4) = 4.74, p < .01$; see Figure 7; the EDI Interoceptive Awareness subscale is scored such that lower scores reflect higher Interoceptive Awareness). Significant reductions were also found for the auxiliary outcomes of Ineffectiveness ($t(4) = 3.47, p < .05$; see Figure 12), Perfectionism ($t(4) = 3.67, p < .05$; see Figure 13), and Interpersonal Distrust ($t(4) = 3.30, p < .05$; see Figure 14). Results were not statistically significant for the auxiliary outcomes of Drive for Thinness ($t(4) = 2.30, p = .08$; see Figure 10) and Body Dissatisfaction ($t(4) = 1.01, p = .37$; see Figure 11).

Discussion

In summary, the feasibility study produced promising results warranting further investigation. Specifically, the feasibility study was able to recruit participants for and complete the adapted DBT program in the current setting. This treatment was associated with significantly reduced bulimic symptoms and significantly increased interoceptive awareness. Auxiliary findings linked DBT to reduced ineffectiveness, perfectionism, and interpersonal distrust. The relatively high level of attrition (50% of those who started DBT), low level of younger participants with less chronic pathology, and low diversity representation pointed to these areas as issues for improvement.

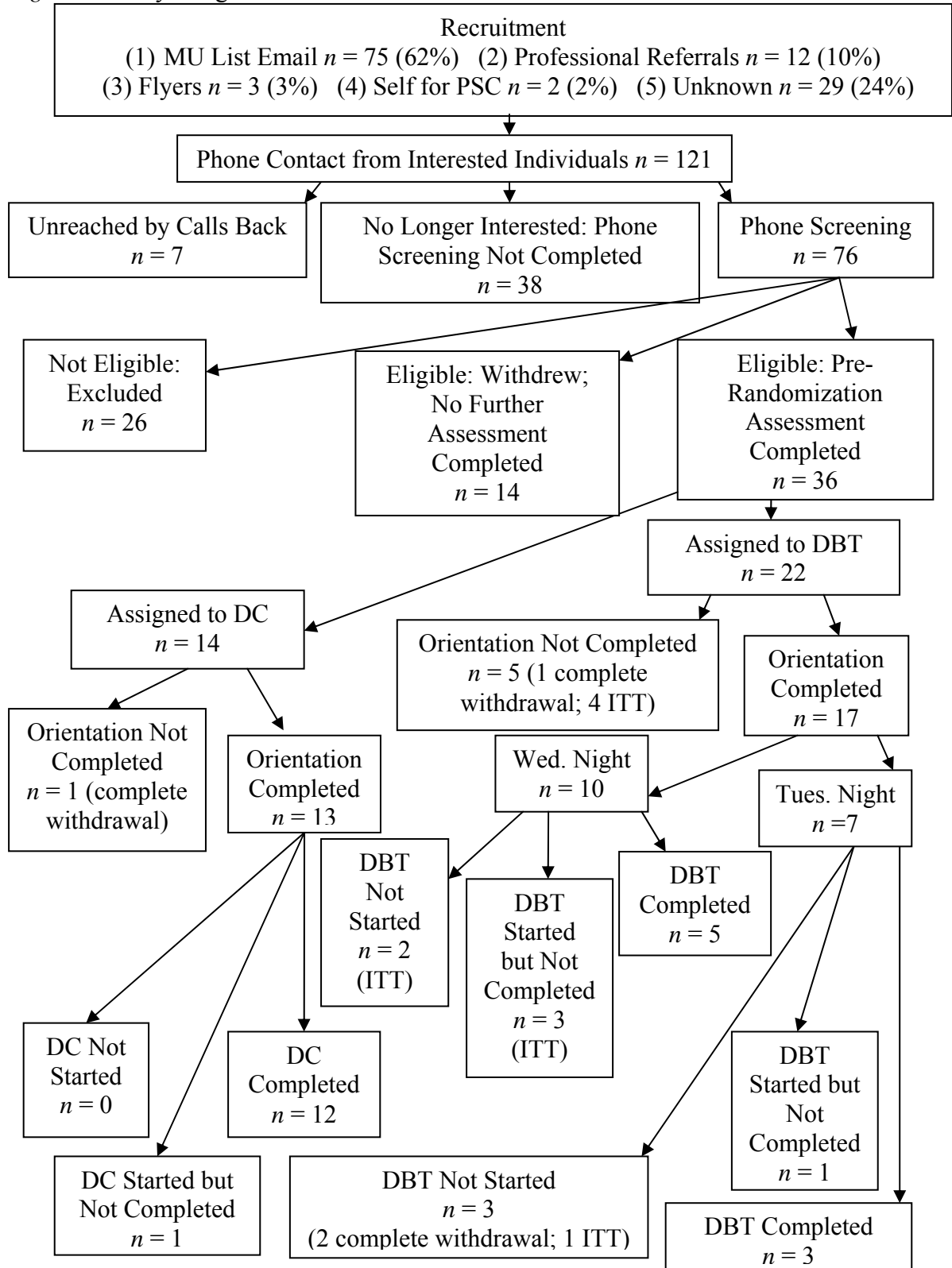
The Current Study

Design

The current study employed an alternative-treatments design (Shadish et al., 2002, p.258). This design is particularly useful when a control condition is ethically questionable (Shadish et al., 2002, p.262), as is suggested for eating disorders by their potential for severe health and functioning impact (e.g., Johnson, Spitzer, & Williams, 2001; Masheb & Grilo, 2004; Wilfley, Wilson, & Agras, 2003). For an illustration of the study design, including recruitment, random assignment, and assessment with corresponding *n*'s, see Figure 1.

The goal of between 48 and 64 treatment completers (which was not reached) was set based on power analyses. To estimate the necessary sample size, power analyses were conducted using the effect sizes found in previous studies (.61 to 1.51) and the design effect (Snijders & Bosker, 1999). Design effect is the ratio of the variance obtained (with a given sampling design) to the variance obtained for a simple random sample from the same population, supposing that the total sample size is the same (Snijders & Bosker, 1999, p.23). It is calculated by $1 + (n-1)\rho^1$ where n = group size and ρ^1 = the intraclass correlation (ICC, i.e., within group variation). Using this “effective” sample size to calculate power thus reflects a more conservative estimate. The power to detect these effect sizes approached 1 (e.g., estimates of .981 for binge eating and .998 for purging) when power was calculated based on design effect (Snijders & Bosker, 1999; e.g., for average binge eating and purging values of 0 (sd = 0.5 for binge eating and purging) for DBT at outcome, and average binge eating and purging values of 3 (sd = 2.75 for binge eating; sd = 2.25 for purging) for DC at outcome).

Figure 1. Study design and associated attrition.



Note. MU = University of Missouri. PSC = Psychological Services Clinic. ITT = Intent to Treat.

Recruitment was ended in March 2008 before reaching the sample size goal due to logistics. With the treatment being 16 weeks, this was necessary in order to start the second DBT group in time to finish by the end June, the month preceding this author's move to South Carolina for her predoctoral internship. Additional time and funding would have been required to reach the sample size goal.

Recruitment occurred from December 2006 to March 2008, with most recruitment between November 2007 and March 2008. Participants were recruited from several sources: (1) announcements through university e-mail distributed to all students, staff and faculty; (2) direct mail to eating disorder specialists and other professionals likely to encounter eating disorders in their work (e.g., physicians, dieticians, psychologists, psychiatrists, and health promotion counselors); (3) flyer posting and distribution on campus; (4) self referrals to the Psychological Services Clinic for eating concerns. In addition, individuals who called about the program during the feasibility study but were not reached for screening or were unable to join the feasibility group (e.g., due to a scheduling conflict) were re-contacted.

Participants were assigned via simple randomization to either abbreviated group DBT with coaching calls (referred to as DBT hereafter) or diary card self-monitoring with brief individual sessions (referred to as DC hereafter). Randomization was based on an online random number generator (<http://www.randomizer.org/form.htm>). Assignment sets were generated at periodic intervals during recruitment corresponding to enrollment numbers (e.g., after 10 enrolled participants). This author generated the allocation sequences, enrolled participants, and assigned participants to their conditions. To minimize participant knowledge of the condition to which they were not assigned, the

oral and written consent provided limited detail about the two treatments (see Appendix B). This effort at blinding was compromised by participants' questions about the conditions. To permit fully informed consent, some detail was given to participants when requested.

Several strategies were employed in an effort to retain participants in the group. First, 1.5 hour orientation sessions fully described the intervention, processed ambivalence and problem-solved potential barriers to completing treatment. This differed from the feasibility study in which orientation sessions were typically brief if participants identified no questions or concerns. Second, it was ensured the participants received the orientation session materials for review prior to the orientation session. For example, orientation sessions were typically scheduled no sooner than a week after randomization to permit participants to receive and review mailed materials covered in the orientation sessions. If this was not possible, participants were required to stop by the clinic to pick up their materials for review prior to their orientation session. When scheduling the orientation session, participants were also reminded to review the materials and come to session with any questions or concerns. Third, participants' urge to quit therapy before and after each group session was monitored on the weekly diary card. If participants reported high urges (between 3 and 6 on the 0 to 6 scale), group leaders called participants within 24 hours to identify causes and problem solve solutions. Fifth, participants' reasons for not planning to attend group were problem solved when participants notified group leaders of upcoming absences. Finally, following each absence, group leaders assessed participants' reasons for not attending and problem solved with participants ways to encourage future attendance.

Assessment occurred at pre-treatment prior to randomization, at several points during treatment, and post-treatment. The primary assessment intervals during treatment were five weeks, to correspond with, on average, the end of each skills module (mindfulness, emotion regulation, and distress tolerance). Following phone screening, assessments occurred in person. The assessments at each five-week interval took 15 to 30 minutes. For each assessment at the five-week intervals, participants received \$10 or a \$10 credit for their research treatment. Upon completion of treatment and all assessments, participants were thanked with a small gift of their choosing (e.g., a package of self-care products). Along with the gift presentation, qualitative feedback on the program was solicited.

Participants

Individuals were eligible for the study if they met full or partial criteria for BN or BED according to the Q-EDD (described further below; Mintz et al., 1997). Individuals with (1) BPD (according to the SIDP-IV-BOR; Pfohl et al., 1997) or (2) a BMI 18.5 or lower (consistent with the DSM-IV-TR diagnostic criteria for AN BMI, American Psychiatric Association, 2000a) were excluded given that these presentations tend to require more intensive interventions (American Psychiatric Association, 2000b; Grave, Ricca, & Todesco, 2001; Linehan et al., 2006; Wilson et al., 2000). Individuals with BPD ($n = 3$) were referred to the Psychological Services Clinic DBT program for BPD; individuals with AN BMI ($n = 1$) were referred to other treatment providers. For ineligibility details see Table 2.

One noteworthy deviation in screening occurred with a participant randomized to DBT. This participant did not report current binge eating during her initial phone

Table 2

Reasons for Ineligibility (n = 26)

Reason	Frequency
Asymptomatic	54% (<i>n</i> = 14)
Less than three criteria met on QEWP-R item 13	19% (<i>n</i> = 5)
BPD	12% (<i>n</i> = 3)
No objectively large binges reported	8% (<i>n</i> = 2)
No loss of control with binges	4% (<i>n</i> = 1)
Lack of self-perception of binge eating	4% (<i>n</i> = 1)
AN, BMI < 18.5	4% (<i>n</i> = 1)

Note. QEWP-R = Questionnaire on Eating and Weight Patterns-Revised (Spitzer et al., 1993). BPD = borderline personality disorder per the Structured Interview for DSM-IV Personality (Pfohl, Blum, & Zimmerman, 1997). AN = anorexia nervosa. BMI = body mass index. Reasons are listed in order of frequency. Of those screened who were not eligible due to being asymptomatic, 57% were moderately obese (*n* = 8), 14% were grossly obese (*n* = 2), and 14% were overweight (*n* = 2). Of those screened who were not eligible due to meeting less than three criteria on the QEWP-R, 100% otherwise met criteria for BED. Percentages total more than 100% due to one participant screened out for both no objectively large binges reported and less than three criteria on the QEWP-R.

screening. Following her notification of ineligibility, her mother appealed this decision and requested further consideration. This appeal included potential explanations for this participant not reporting binges to the level necessary for eligibility (e.g., her mother's presence during the phone screening). This resulted in a second screening, in which the participant reported a recent history of binge eating meeting eligibility criteria. She was then permitted to enter the study.

Twenty participants completed treatment (DBT: $n = 8$; DC: $n = 12$). For attrition details, see Figure 9 and Table 3. For the primary outcomes (bulimic symptoms, interoceptive awareness, dichotomous thinking, and food labeling), this resulted in low power (12 to 43%). Attrition was higher for DBT (33% attrition of participants who started group (37% for DBT group 1; 25% for DBT group 2) than DC (8% attrition of participants who started DC). DBT attrition in the current study also remained higher than in previous studies of DBT for binge eating, which had from 0 to 12% attrition among treatment starters (see Footnote 3, page 18, Safer et al., 2001b; Telch et al., 2000; Telch et al., 2001) but was lower than in the feasibility study (50% attrition). Consistent with previous work (Telch et al., 2001), DBT attrition tended to occur early in treatment (two left after one session; two left after two sessions). In comparison, the single DC withdrawal occurred after four sessions.

For demographic information and length of disordered eating, see Table 4; for diagnoses, Tables 5 and 6. The minimum age was 18; the lowest average age was 25.80 (for DBT group 1). Diagnoses were primarily sub- or full-threshold binge eating disorder

Table 3. *Reasons for Withdrawal.*

Reason	Pre-Scr (n = 38)	Post-Scr, Pre-BA (n = 14)		RA, Orientation Not Completed (n = 6)		Orientation Completed, Tx Not Started (n = 4)		Tx Started (n = 5)	
				Tx & A (n = 2)	Tx Only (n = 4)	Tx & A (n = 1)	Tx only (n = 3)	Tx & A (n = 1)	Tx Only (n = 4)
Time Commitment	53%	36%		50%	50%		33%		50%
Financial Commitment	11%								
No perceived binge eating	11%								
Distance	11%								
Desire for dietary intervention	8%								
Timing (e.g., evenings)	3%						67%		25%
Randomization	3%								
Independent Improvement	3%	14%							
Other Issues Prioritized		14%			25%	100%			25%
Interest in Other Tx Provider		9%							
Treatment Components		9%			25%				
Unknown	12.5%	50%	50%					100%	

Note. BA = Baseline Assessment. RA = random assignment. Scr = Screening. Unk = Unknown. Tx = Treatment. A = Assessment. In some columns, percentages total to greater than 100% due to participants reporting more than one reason for withdrawal.

Table 4. *Demographics and Disordered Eating Length of Current Study Participants.*

	Age	Caucasian	Asian	Native American	Biracial/ Bi-Ethnic	Other Ethnicity	Length of Binge Eating
DBT							
ITT: All ($n = 22$)	36.67 (14.95) Range: 18-62	91%		5% ($n = 1$)			16.02 (16.18)
ITT: Tx Starters ($n = 12$)	37.50 (15.97) Range: 18-62	100%					17.24 (13.81)
Group 1 ($n = 8$)	34.88 (16.43) Range: 18-60	100%					15.49 (15.18)
Group 2 ($n = 4$)	42.75 (15.84) Range: 27-62	100%					20.75 (11.73)
Tx Completers ($n = 8$)	33.38 (16.83) Range: 18-62	100%					13.86 (15.41)
Group 1 ($n = 5$)	25.80 (12.15) Range: 18-47	100%					9.78 (16.03)
Group 2 ($n = 3$)	46.00 (17.69) Range: 27-62	100%					20.67 (14.36)
DC							
ITT: All ($n = 14$)	32.14 (11.34) Range: 19-52	64%	7%		7%	7%	14.65 (13.95)
ITT: Tx Starters ($n = 13$)	32.77 (11.55) Range: 19-52	69%	8%		8%	8%	14.39 (14.48)
Tx Completers ($n = 12$)	32.83 (12.06) Range: 19-52	75%	8%			8%	14.09 (15.08)

Note. ITT = Intent to Treat. Tx = Treatment. AN = anorexia nervosa. BN = bulimia nervosa. BED = Binge eating disorder.

DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions.

Table 5

Distribution of Pre-Treatment Eating Disorder Diagnoses for Current Study Participants

	BN	BED	Sub- BN	Sub- BED	Sub-: Any
DBT					
ITT: All ($n = 22$)	27% ($n = 6$)	45% ($n = 10$)	5% ($n = 1$)	23% ($n = 5$)	27% ($n = 6$)
ITT: Tx Starters ($n = 12$)	33% ($n = 4$)	42% ($n = 5$)		25% ($n = 3$)	17% ($n = 2$)
Group 1 ($n = 8$)	50% ($n = 4$)	38% ($n = 3$)		13% ($n = 1$)	13% ($n = 1$)
Group 2 ($n = 4$)		50% ($n = 2$)		50% ($n = 2$)	
Tx Completers ($n = 8$)	50% ($n = 4$)	38% ($n = 3$)		13% ($n = 1$)	13% ($n = 1$)
Group 1 ($n = 5$)	80% ($n = 4$)	20% ($n = 1$)			
Group 2 ($n = 3$)		67% ($n = 2$)		33% ($n = 1$)	33% ($n = 1$)
DC					
ITT: All ($n = 14$)	29% ($n = 4$)	64% ($n = 9$)		7% ($n = 1$)	7% ($n = 1$)
ITT: Tx Starters ($n = 13$)	23% ($n = 3$)	69% ($n = 9$)		8% ($n = 1$)	8% ($n = 1$)
Tx Completers ($n = 12$)	17% ($n = 2$)	75% ($n = 9$)		8% ($n = 1$)	8% ($n = 1$)

Note. ITT = Intent to Treat. Tx = Treatment. AN = anorexia nervosa. BN = bulimia nervosa. BED = Binge eating disorder.

DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions.

Table 6. *Distribution of Pre-Treatment Co-Morbid Diagnoses for Current Study Participants.*

	None	Mood-C	Mood-H	Anxiety	GAD	OCD	PTSD	BDD	Alc/S-C	Alc/S-H	PD
DBT											
ITT: All	27%	55%	14%	36%	5%	9%	9%	14%	5%	9%	14%
	(n=6)	(n=12)	(n=3)	(n=8)	(n=1)	(n=2)	(n=2)	(n=3)	(n=1)	(n=2)	(n=3)
ITT: Tx Starters	25%	67%	8%	58%	8%	17%	17%	8%	8%	17%	33%
	(n=3)	(n=8)	(n=1)	(n=7)	(n=1)	(n=2)	(n=2)	(n=1)	(n=1)	(n=2)	(n=4)
Group 1	25%	42%	13%	63%	13%	25%	25%	13%	13%	13%	25%
	(n=2)	(n=5)	(n=1)	(n=5)	(n=1)	(n=2)	(n=2)	(n=1)	(n=1)	(n=1)	(n=2)
Group 2	25%	33%		50%					25%	25%	50%
	(n=1)	(n=3)		(n=2)					(n=1)		(n=2)
Tx Completers	13%	80%	13%	63%	13%	25%	25%	13%	13%		25%
	(n=1)	(n=6)	(n=1)	(n=5)	(n=1)	(n=2)	(n=2)	(n=1)	(n=1)		(n=2)
Group 1		80%	20%	80%	20%	40%	40%	20%	20%		20%
		(n=4)	(n=1)	(n=4)	(n=1)	(n=2)	(n=2)	(n=1)	(n=1)		(n=1)
Group 2	33%	67%		33%							33%
	(n=1)	(n=2)		(n=1)							(n=1)
DC											
ITT: All	7%	57%	21%	36%	21%	7%	7%		7%	21%	7%
	(n=1)	(n=8)	(n=3)	(n=5)	(n=3)	(n=1)	(n=1)		(n=1)	(n=3)	(n=1)
ITT: Tx Starters	8%	62%	15%	38%	23%	8%	8%		8%	23%	8%
	(n=1)	(n=8)	(n=2)	(n=5)	(n=3)	(n=1)	(n=1)		(n=1)	(n=3)	(n=1)
Tx Completers	8%	67%	8%	42%	25%	8%	8%		8%	25%	8%
	(n=1)	(n=8)	(n=1)	(n=5)	(n=3)	(n=1)	(n=1)		(n=1)	(n=3)	(n=1)

Note. ITT = Intent to Treat. Tx = Treatment. Group = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions. None = no current full-threshold co-morbidity. Mood-C = current mood disorder. Mood-H = mood disorder, full remission. Anxiety = any anxiety disorder (GAD, OCD, panic disorder, social phobia, or OCPD). GAD = generalized anxiety disorder. OCD = obsessive compulsive disorder. PTSD = posttraumatic stress disorder. BDD = body dysmorphic disorder. Alc/S-C = current alcohol or substance disorder, abuse or dependence. Alc/S-H = alcohol or substance disorder, abuse or dependence, sustained, full remission. PD = personality disorder.

(see Table 5 for diagnoses based on the SCID⁴). Co-morbidity was highest among DBT completers. Across participants, mood disorders co-occurred most often. These disorders were primarily variants of major depression (e.g., overall prevalence in intent to treat sample: 72%; major depressive disorder = 47%; mood disorder not otherwise specified = 17%; bipolar disorder = 6%). The most common personality disorders were obsessive compulsive personality disorder and avoidant personality disorder (each 6% of the intent to treat sample; avoidant personality disorder, 10% of treatment completers).

Intervention

DBT was delivered based on the model developed by Agras, Safer, and colleagues (D. L. Safer, personal communication, August 11, 2006; Safer et al., 2001a; Safer et al., 2001b; Telch, 1997; Telch, et al., 2000; Telch, et al., 2001; Wiser & Telch, 1999). The material covered in 20 weeks by Safer and colleagues was covered in 15 sessions over 16 weeks (no group meeting over spring break) to accommodate the college semester calendar. This design aimed to (a) promote increased retention of college student participants not residing in town between semesters and (b) permit use of this treatment model as an intervention approach for secondary and post-secondary schools as well as clinical and community settings. The groups met once a week. Each session lasted approximately 2 ½ hours: an hour and 20 minutes for mindfulness practice, diary card and homework review, and behavior chain analysis; a 10-minute break; and an hour for skills teaching and homework assignment. For a list of the foods used for mindfulness,

⁴ Agreement between the SCID and QEDD diagnoses was 67% ($n = 24$) for the intent to treat sample. When disagreement occurred, the same diagnostic category was typically implicated by both the SCID and QEDD (in 83% of the discrepant occurrences, $n = 10$). However, the frequency of behavior reported tended to fall short of full-threshold criteria with the QEDD but rise to the threshold with the SCID ($n = 9$). The diagnostic discrepancies arose due to a likely language barrier ($n = 1$) and a slight definition difference for excessive exercise within the criterion of compensatory behavior ($n = 1$).

see Appendix A. Coaching calls were also provided to assist participants in implementing skills between sessions. Participants were asked to pay \$10 for each group session to simulate “real-world” nominal fees for services in similar settings (sliding scale fee training clinics). This particular fee was chosen because it is the rate paid for each skills training group by regular clients in the full DBT program for BPD at the clinic where the study was conducted.

For DC, participants were asked to complete the front of the weekly DBT diary card on a daily basis over 16 weeks, with 15 brief individual sessions (no session scheduled over spring break; scheduled time of 15 minutes per session). When participants turned in their diary cards, they met with a first-year clinical psychology graduate student who problem solved difficulties in completing the diary card, praised diary card completion, and otherwise provided support (see Appendix C for DC individual session guide). Participants paid \$1 for each individual session. This rate was based on the corresponding rate for the group sessions according to time (\$1 per 15 minutes = \$4 per hour; \$4 per hour x 2.5 hours = \$10 per group session).

Prior to each treatment, participants met for orientation sessions with the author.

Measures

Eating disorder diagnoses. As in the feasibility study, the Q-EDD (Mintz et al., 1997) was completed during initial phone screening to determine severity and diagnosis of disordered eating. For details on the Q-EDD, see above. In addition to the Q-EDD, question 13 of the Questionnaire on Eating and Weight Patterns-Revised (QEWP-R; Spitzer et al., 1993) was asked to determine the presence of binge eating (Did you *usually* have any of the following experiences during these occasions [of eating within any two

hour period what most people will regard as an unusually large amount of food and, during that two hour period, feeling a loss of control or inability to stop eating]? (a) eating much more rapidly than usual? (b) eating until you felt uncomfortably full? (c) eating large amounts of food when you didn't feel physically hungry? (d) eating alone because you were embarrassed by how much you were eating? (e) feeling disgusted with yourself, depressed, or feeling very guilty after overeating? response options: yes; no). Positive endorsement of the binge eating items on the Q-EDD and at least three of the sub-questions composing question 13 were required to deem binge eating present. This is consistent with the SCID (First et al., 2002) requirements for binge eating in the context of BED (i.e., the criteria for determining whether or not an eating incident is binge eating⁵) and the recommendation that the QEWP-R be used as an adjunct for screening (Celio, Wilfley, Crow, Mitchell, & Walsh, 2004). The guidelines for the Eating Disorder Examination (Fairburn & Cooper, 1993) were also used to determine whether amounts of food during a binge were objectively large (e.g., the consumption of three main courses). This was the third and final requirement to conclude that binge eating was present.

Disordered eating behavior and cognition. The primary outcome of binge eating was obtained from daily diary cards completed by participants and turned in weekly during treatment. For each binge, participants were also asked to complete a Binge Record Sheet detailing the contents of their binge. Current results focus on the binge eating data from the diary cards.

Before random assignment and approximately every five weeks, all participants were asked to complete the following secondary measures.

⁵This is not the frequency criterion that distinguishes full-threshold BED from sub-threshold. Rather, it is the criterion used to determine whether or not individuals are binge eating, without consideration of frequency.

(1) *Bulimia and Interoceptive Awareness EDI subscales* (Garner et al., 1983). For details on these subscales, see Feasibility Study section above. Cronbach's alphas for this study were generally greater than .80 (Bulimia: .71-.84; Interoceptive Awareness: .77-.86), indicating adequate to high internal consistency.

(2) *The Bulimic Automatic Thoughts Test* (BATT, Franko & Zurroff, 1992). Dichotomous thinking was measured using the BATT, a measure of cognitive distortions often associated with BN. The BATT assesses dichotomous thinking, selective abstraction, magnification, personalization, superstitious thinking and overgeneralization (Franko & Zurroff, 1992). Items were drawn from two sources: ten items from client reports of their most frequent thoughts before and after eating and purging as noted in food diaries during CBT treatment for BN; ten additional items from nominations by eating disorder experts (Garner & Bemis, 1982). Significant positive correlations with the BULIT, EDI, binge eating frequency, and vomiting frequency support the construct validity of the BATT (Franko & Zurroff, 1992), as does the finding that BATT scores are higher among individuals reporting bulimic behaviors versus individuals reporting intensive dieting, casual dieting, or no dieting (Franko & Omori, 1999). For the current study, Cronbach's alpha for the BATT ranged from .94 to .96, indicating high internal consistency.

(3) *Forbidden vs. Unforbidden Foods Scale*. One hundred items based on the Food Evaluation Questionnaire (FEQ, Guertin & Conger, 1999) were used to assess labeling of foods from Knight and Boland's (1989) list of forbidden and unforbidden foods. Specifically, the items were based on the FEQ item assessing how unforbidden versus forbidden foods are on a 1 to 7 scale. The FEQ phrasing of "How forbidden was

the food that you ate?” was changed to “How forbidden is [insert food]?” An example food from the Knight and Boland list (1989) is chocolate ice cream. FEQ ratings are higher for foods clients identify as forbidden (e.g., donuts) and lower for foods clients identify as unforbidden (e.g., grilled chicken breast, Guertin & Conger, 1999), indicating that the FEQ item is a valid measure of food labeling. Cronbach’s alpha for this Forbidden vs. Unforbidden Foods Scale ranged from .94 to .96, indicating high internal consistency.

Auxiliary concerns. The auxiliary concerns of drive for thinness, body dissatisfaction, ineffectiveness, perfectionism, and interpersonal distrust were measured by the corresponding EDI subscales before random assignment and approximately every five weeks. Cronbach’s alphas for this study were generally greater than .80 (Drive for Thinness: .87-.89; Body Dissatisfaction: .91-.94; Ineffectiveness: .88-.92; Perfectionism: .85-.89; Interpersonal Distrust: .62-.84), indicating adequate to high internal consistency. During treatment, participants also reported on their daily self-induced vomiting, mindless eating, and AIB on their diary cards turned in weekly.

Co-occurring psychopathology. As in the feasibility study, the SIDP-IV-BOR (Pfohl et al., 1997) was completed during phone screening to assess for BPD and self-harm; the SCID-I/P (First et al., 2002) and SIDP-IV (Pfohl et al., 1997) provided diagnosis of co-occurring Axis I and II disorders before random assignment. To reduce participant burden, the SIDP-IV optional diagnoses were not assessed (i.e., only borderline, histrionic, narcissistic, antisocial, obsessive compulsive, avoidant, dependent, schizoid, schizotypal, and paranoid personality disorders were assessed).

The General Psychopathology subscale of the Structured Interview on Anorexic

and Bulimic Disorders Self-Rating (SIAB-S; Fichter & Quadflieg, 2000) provided a summary measure of severity of co-occurring psychopathology prior to randomization. This subscale is a broad 14-item measure covering self-confidence, self-esteem, self-efficacy, depression, anxiety, obsessive compulsive symptoms, self-harm, suicidal ideation, and suicidal behavior. Significant positive correlations between the General Psychopathology subscale and the Symptom Checklist-90 (SCL 90, Derogatis, Rickels, & Rock, 1976) indices (e.g., .30 with the general symptomatic index, Fichter & Quadflieg, 2001) provide support for the construct validity of the subscale. Cronbach's alpha for this study was .88, indicating adequate internal consistency.

Body mass index. Before random assignment, participants' height was obtained using the Psychological Services Clinic medical scale. In addition, before random assignment and approximately every five weeks during treatment, when participants completed their periodic assessments, their weight was obtained using the Psychological Services Clinic medical scale. These values were used to calculate BMI by dividing weight in kilograms by height in meters squared. This calculation controls for variations in weight due to height and can be considered a measure of relative weight. These assessments monitored whether BMI remained >18.5 , which it did for all participants, maintaining BMI within the eligibility range.

RESULTS

Analyses

Success of randomization. To determine whether random assignment appropriately distributed heterogeneity in DBT and DC participants, a series of independent samples t-tests were conducted comparing participants randomly assigned to DBT and participants randomly assigned to DC on pre-treatment demographics (age), co-morbidity (BPD features per the SIDP-BOR; general psychopathology), and the outcome measures. No statistically significant differences emerged (all $p > .15$ except for general psychopathology, $p = .071$). Although firm conclusions based on the overall lack of differences are precluded based on the small sample size and resulting low power, these results tentatively suggest that pre-treatment differences did not exist between DBT and DC conditions. In other words, randomization appeared to be successful in distributing participants to the conditions without bias.

Hypothesis testing. To test the study hypotheses, a series of analyses were conducted, including independent sample t-tests, chi square tests, hierarchical multiple regressions, and multivariate analyses of variance (MANOVAs). Results reported will focus on treatment completers. Within group pre-post effect sizes were also calculated correcting for the dependence between means using Morris and DeShon's (2002) equation. Between subjects effect sizes (ESs) were calculated as described by Cohen (1988; difference in the post-test DBT and DC means divided by the pooled post-treatment standard deviation).

Independent samples t-tests were conducted to compare DBT and DC on the average number of total incidents participants reported for the primary outcome of binge eating and the auxiliary outcomes of self-induced vomiting, mindless eating, and apparently irrelevant behavior (AIB) across treatment. Chi square tests compared DBT and DC frequencies of the diagnostic threshold level of the primary outcome of binge eating over the last three months of treatment, corresponding to the time frame currently stipulated by the DSM-IV-TR for diagnosis (American Psychiatric Association, 2001a), and abstinence from binge eating over the final four weeks of treatment, consistent with previous trials' timeframe stipulations for defining abstinence.

Two series of MANOVAs were conducted. For one series, the outcomes were obtained from the diary cards. For the other series, the outcomes were obtained from the measures collected at four times. For each of the diary card variables, the fifteen average weekly frequencies were entered into a model as outcomes (e.g., for binge eating, all fifteen average weekly frequencies were entered in one model as outcomes). For the other series, each of the variables collected at four times (e.g., EDI-Bulimia at pre-treatment, approximately five weeks into treatment, approximately 10 weeks into treatment, and at the end of treatment) were entered into a model as outcomes. For both series, the predictor variable was treatment condition (DBT and DC). These analyses permitted examination of whether there was an overall change across time or condition.

For the EDI variables, hierarchical multiple regression analyses were also conducted according to the guidelines of Cohen, Cohen, West, and Aiken (2003). For all regressions, pre-treatment levels were entered in step 1, followed by treatment condition (DBT=1 or DC=0) in step 2, to predict levels at the outcome point of interest (i.e.,

approximately five weeks into treatment, approximately 10 weeks into treatment, or post-treatment).

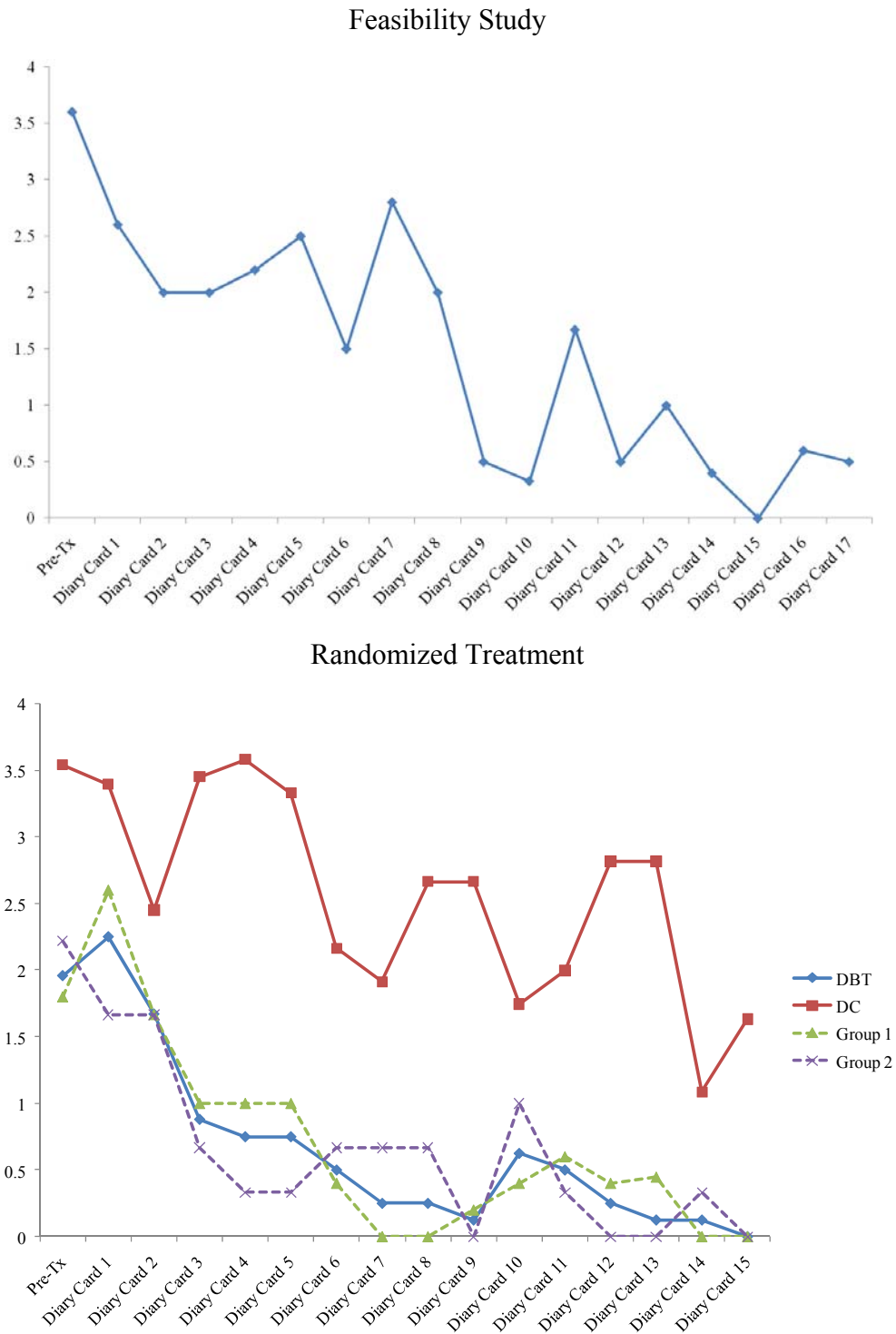
Primary Outcome: Binge Eating

Consistent with prediction, both DBT and DC completers showed decreases in binge eating over treatment (see Figure 2). Also consistent with prediction, the 15 weeks of diary card data showed that DBT completers reported fewer binges over the course of treatment ($M = 9.00$, $SD=9.23$, Range = 0-24) than Diary Card completers ($M = 36.92$, $SD=25.43$, Range = 5-85; $t = -2.96$, $df = 18$, $p < .01$). The DBT versus DC effect size for binge eating throughout treatment was also quite large at 1.61.

Table 7 presents the frequency of diagnostic threshold binge eating at pre-treatment and post-treatment for DBT and DC. As illustrated, all DBT participants improved on this criterion, with no DBT participants reporting full threshold binge eating at diagnostic levels after treatment and 25% showing complete abstinence from binge eating for the final three months of treatment. In contrast, 54% of DC treatment completers moved from sub-threshold to full-threshold levels and none showed complete abstinence. Consistent with prediction, the chi-square test confirmed that more DC completers than DBT completers met the diagnostic threshold for binge eating the final three months of treatment (chi square (1, $N=20$) = 7.18, $p = .015$).

However, as detailed in Table 8, MANOVA results indicated that change over treatment did not statistically differ depending on treatment condition. In addition, the 50% of DBT completers who achieved abstinence from binge eating compared to 27% of DC completers was not statistically significant (chi square (1, $N = 20$) = 1.03, $p = .311$).

Figure 2. Weekly binge frequency across randomized treatment and feasibility study.



Note. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions. Tx = Treatment.

Frequency of Diagnostic Threshold Binge Eating

Note. Threshold = 2 or more binges/week on average for three months. Tx = treatment DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions.

Table 8

Multivariate Analyses of Variance Results

Outcome	Effect	Value	<i>F</i>	df	Significance
Primary Outcome					
Binge Eating	Intercept	.008	8.029	16, 1	.271
	Tx Condition	.016	3.737	16, 1	.388
Secondary Outcomes					
EDI-Bulimia	Intercept	.154	19.271	4, 14	.000***
	Tx Condition	.581	2.528	4, 14	.088
Interoceptive Awareness	Intercept	.196	14.362	4, 14	.000***
	Tx Condition	.876	.494	4, 14	.741
Bulimic Automatic Thoughts Test	Intercept	.084	41.027	4, 15	.000***
	Tx Condition	.821	.820	4, 15	.532
Forbidden vs. Unforbidden Foods	Intercept	.035	90.838	4, 13	.000***
	Tx Condition	.786	.887	4, 13	.499
Auxiliary Outcomes					
EDI-Drive for Thinness	Intercept	.126	24.362	4, 14	.000***
	Tx Condition	.810	.822	4, 14	.533
EDI-Body Dissatisfaction	Intercept	.059	56.153	4, 14	.000***
	Tx Condition	.825	.745	4, 14	.577
EDI-Ineffectiveness	Intercept	.255	10.245	4, 14	.000***
	Tx Condition	.771	1.039	4, 14	.422
EDI-Perfectionism	Intercept	.212	13.021	4, 14	.000***
	Tx Condition	.828	.728	4, 14	.587
EDI-Interpersonal Distrust	Intercept	.357	6.758	4, 15	.003
	Tx Condition	.728	1.399	4, 15	.282
Mindless Eating Incidents	Intercept	.090	1.349	15, 2	.507
	Tx Condition	.069	1.787	15, 2	.417
Apparently Irrelevant Behavior	Intercept	.028	2.630	13, 1	.452
	Tx Condition	.024	3.166	13, 1	.416

Note. Tx = Treatment. EDI = Eating Disorders Inventory.

Secondary and Auxiliary Outcomes

The secondary and auxiliary pre-post effect sizes (ESs) for the DBT and DC completers, as well as the between-groups ESs for DBT versus DC completers, are shown in Tables 9 and 10. All pre versus post ESs were computed such that positive values indicate improvement during treatment. All DBT versus DC ESs were computed such that positive values indicate that, on average, subjects who completed DBT showed better post-treatment functioning than subjects who completed DC.

Overall, consistent with prediction, both treatments led to significant change over the course of treatment in secondary and auxiliary outcomes. Within subjects effect sizes for DBT were consistently large (Cohen, 1988), with the exception of a moderate effect size for Perfectionism. In contrast, the within subjects effect sizes for DC ranged from small (BATT) to large (e.g., Bulimia, Interoceptive Awareness, and Forbidden vs. Unforbidden Foods), with most effect sizes in the moderate range.

All but one post-treatment between-group effect size favored DBT over DC, with effect sizes ranging from -0.07 (favoring DC over DBT on Perfectionism) to 0.85 (favoring DBT over DC on forbidden vs. unforbidden food labeling; see Table 9). However, contrary to prediction, DC completers reported fewer incidents of self-induced vomiting and mindless eating during the course of treatment than DBT completers (see Figures 3 and 4). The between subjects effect size was moderate for self-induced vomiting ($ES = -.75$) and small for mindless eating ($ES = -.17$; see Table 10). The effect size for apparently irrelevant behavior incidents was moderate and favored the DBT condition ($ES = .45$; see Figure 5 and Table 10).

Results for each secondary and auxiliary measure are further detailed in a series of tables and figures presenting its means and standard deviations at the different assessment time points (e.g., Table 11 for EDI-Bulimia), then regression statistics (e.g., Table 12 for EDI-Bulimia), then trajectories of scores over the course of treatment (e.g., Figure 5 for EDI-Bulimia). For example, as seen in Table 11, DBT completers decreased on EDI-Bulimia scores from a pre-treatment mean of 7.63 (sd = 5.15) to a post-treatment mean of 1.63 (sd = 3.16), while DC completers began with a pre-treatment mean of 10.58 (sd = 4.19) and decreased to a post-treatment mean of 3.92 (sd = 4.62). As seen in Table 12, DBT versus DC treatment condition was not a significant predictor of EDI-Bulimia post-treatment scores after controlling for pre-treatment scores ($p = .409$). Figure 5 shows the trajectory of EDI-Bulimia scores for DBT and DC conditions in the randomized study, as well as for the DBT feasibility study.

Overall, in contrast to prediction, the hierarchical regression results for treatment condition did not reach statistical significance above and beyond the effect of pre-treatment levels (all $p > .05$, except for EDI-Bulimia approximately ten weeks into treatment; for details, see Tables 12, 14, 16, 18, 20, 22, 24, 26, 28). This pattern of non-significance was replicated in the MANOVAs (see Table 8).

Table 9

Effect Sizes for Secondary and Auxiliary Outcomes

Variable	Pre-Post Within Subjects		Post-Treatment Between Subjects
	DBT	DC	DBT vs. DC
Secondary Outcomes			
Bulimia	1.373	1.078	0.28
Interoceptive Awareness	1.122	1.210	0.36
BATT	0.864	0.259	0.45
Forbidden Foods vs. Unforbidden Foods	1.356	0.884	0.85
Auxiliary Outcomes			
Drive for Thinness	1.204	0.748	0.75
Body Dissatisfaction	1.167	0.734	0.46
Ineffectiveness	1.869	0.398	0.54
Perfectionism	0.670	0.387	-0.07
Interpersonal Distrust	1.225	0.410	0.13

Note. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions.

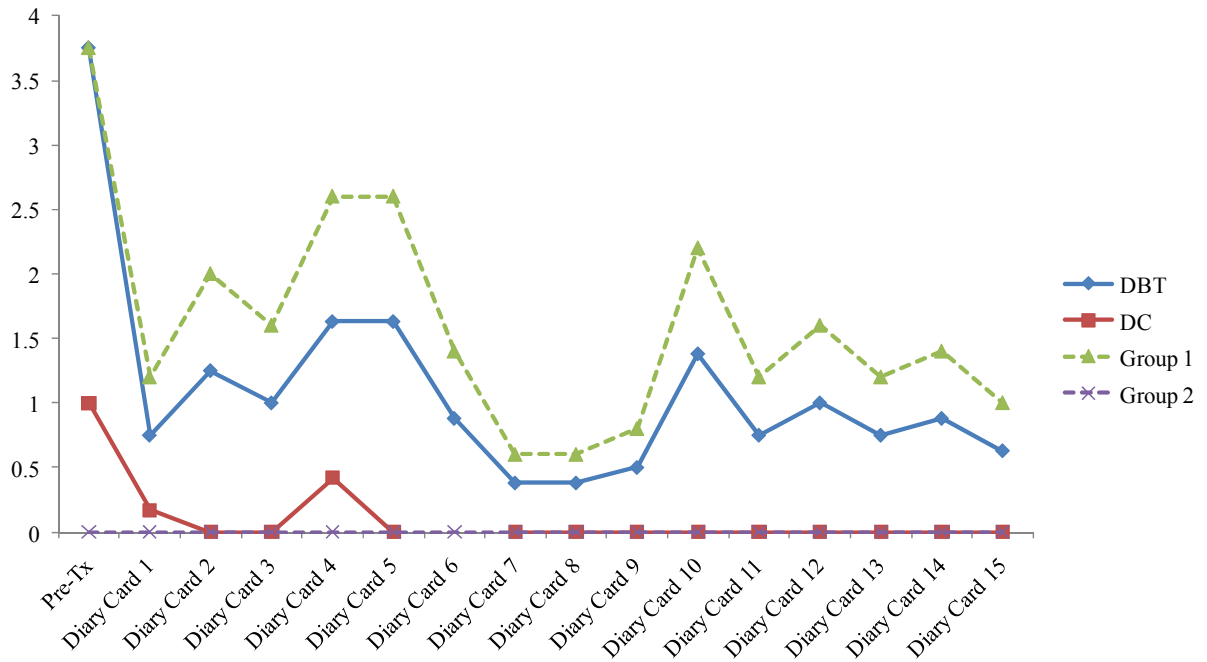
Table 10

Independent Samples T-Tests and Between-Groups Effect Sizes for Auxiliary Outcomes

Variable	<i>t</i>	df	Sig.	DBT M (sd) Range	DC M (sd) Range	ES (DBT vs. DC)
Auxiliary Outcomes						
SIV Incidents	1.40	18	.296	13.75 (32.74) 0-94	.67 (2.02) 0-7	-.75
Mindless Eating Incidents	.36	18	.720	102.38 (82.86) 12-274	88.21 (86.71) 3-309	-.17
AIB Incidents	-.99	18	.335	13.00 (13.288) 0-34	18.67 (12.04) 4-41	.45

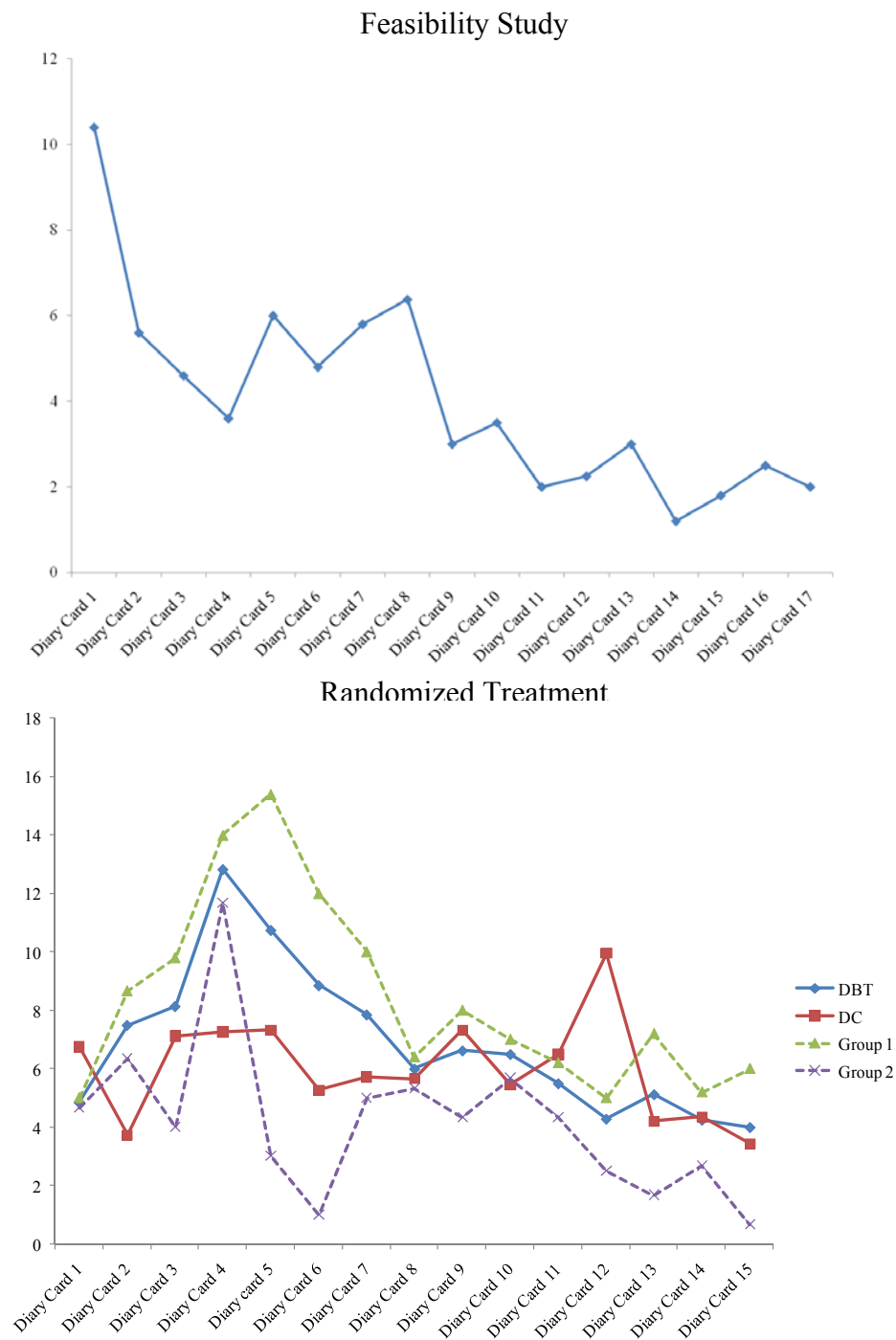
Note. df = degrees of freedom. Sig. = significance level. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions. M = mean. sd = standard deviation. SIV = self-induced vomiting. AIB = apparently irrelevant behavior.

Figure 3. Weekly self-induced vomiting frequency across randomized treatment.



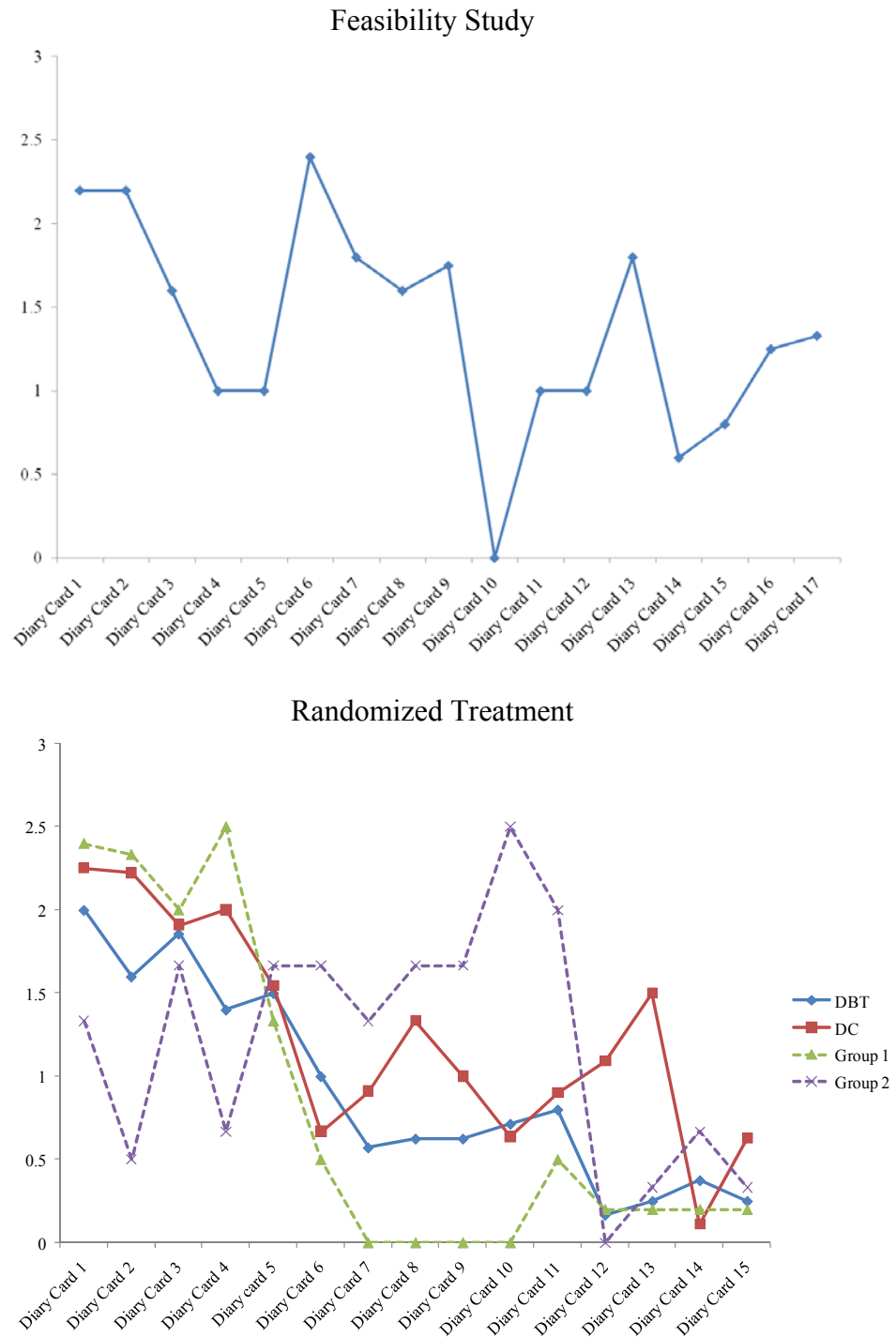
Note. Pre-Tx = Pre-treatment. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions. Figure not included for feasibility study due to only one participant reporting self-induced vomiting for the feasibility study.

Figure 4. Weekly mindless eating frequency across randomized treatment and feasibility study.



Note. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions.

Figure 5. Weekly apparently irrelevant behavior frequency across randomized treatment and feasibility study.



Note. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions.

Table 11

Eating Disorders Inventory Bulimia across Randomized Treatment

	Pre-Tx	~ Five Weeks into Tx	~10 Weeks into Tx	Post-Tx
	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)
DBT				
ITT: All	7.32 (4.64)	5.06 (4.23)	3.40 (2.90)	2.89 (3.91)
ITT: Tx Starters	6.75 (4.73)	6.00 (5.06)	2.80 (3.29)	2.00 (3.86)
Group 1	7.88 (4.82)	6.43 (4.96)	2.71 (2.69)	3.00 (4.47)
Group 2	4.50 (4.20)	5.00 (6.25)	3.00 (5.20)	0.00 (0.00)
Tx Completers	7.63 (5.15)	6.88 (5.17)	3.38 (3.46)	1.63 (3.16)
Group 1	9.60 (4.51)	8.00 (4.80)	3.60 (2.70)	2.60 (3.78)
Group 2	4.33 (5.13)	5.00 (6.25)	3.00 (5.20)	0.00 (0.00)
DC				
ITT: All	9.57 (4.64)	4.96 (4.75)	5.91 (5.20)	3.92 (4.62)
ITT: Tx Starters	10.08 (4.41)	4.96 (4.75)	5.91 (5.20)	3.92 (4.62)
Tx Completers	10.58 (4.19)	5.38 (4.71)	5.91 (5.20)	3.92 (4.62)

Note. Tx = Treatment. sd = standard deviation. ITT = Intent to Treat. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions.

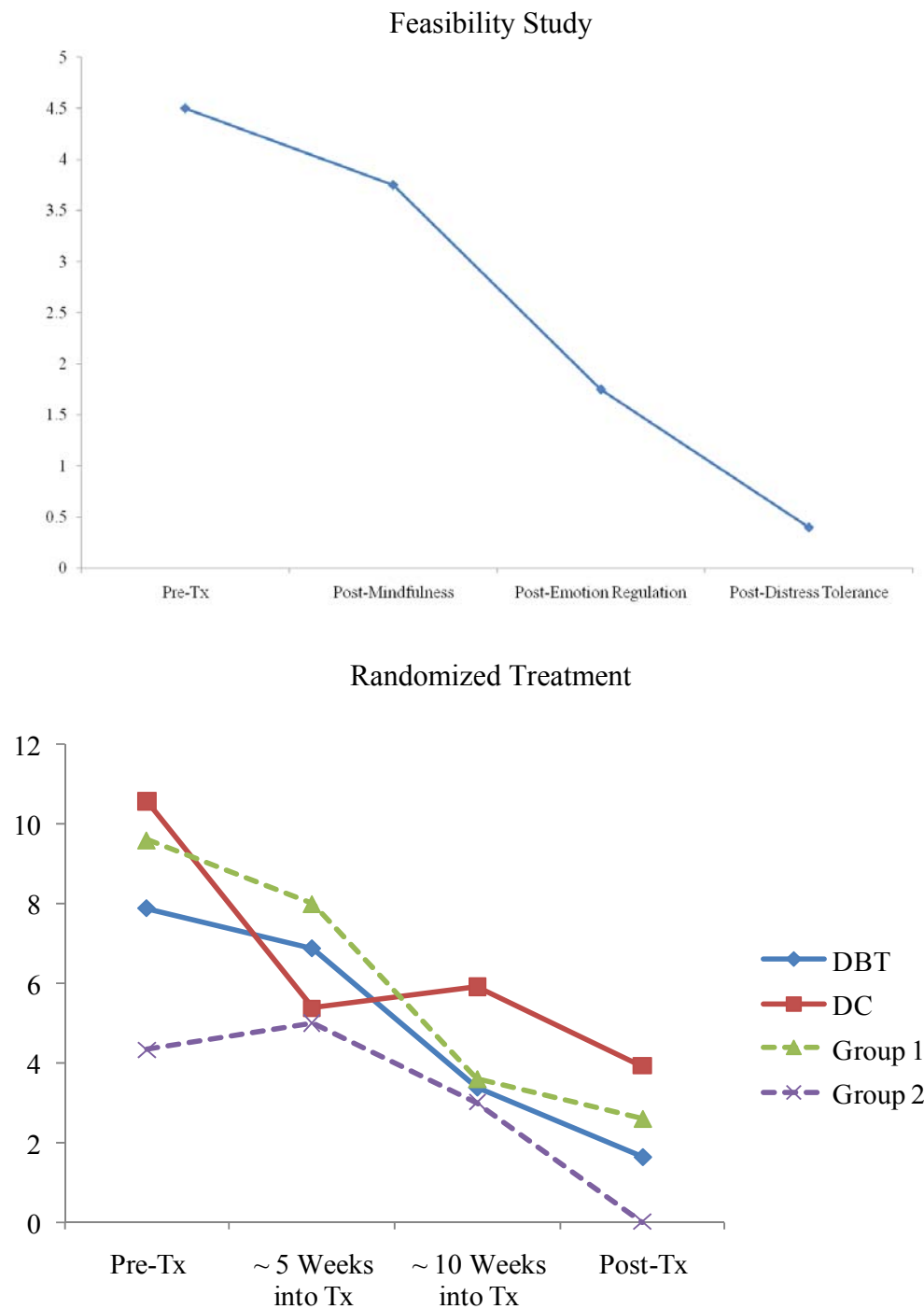
Table 12

Regression Results for Eating Disorders Inventory Bulimia

Outcome Variable	Predictor	β	Std Error	<i>t's</i>			<i>F's</i>			ΔR^2
				<i>t</i>	df	<i>p</i>	<i>F</i>	df	<i>p</i>	
~ 5 WIT	Constant	5.41	3.24	1.67	17	.113				
	Pre-Tx	.64	.21	3.06	17	.007**				
	TC	-3.38	1.95	-1.74	17	.100	5.00	2, 17	.020*	.11
~10 WIT	Constant	.66	3.78	.18	16	.863				
	Pre-Tx	.04	.24	.17	16	.871				
	TC	2.41	2.32	1.04	16	.315	.69	2, 16	.518	.06
Post-Tx	Constant	-1.63	3.30	.50	17	.627				
	Pre-Tx	.21	.21	.98	17	.342				
	TC	1.68	1.98	.85	17	.409	1.22	2, 17	.319	.04

Note. Std = Standard. df = degrees of freedom. *p* = significance level. ΔR^2 = change in R^2 between step 1 and 2. Tx = Treatment. WIT = Weeks into Treatment. TC = Treatment Condition. Statistics are from step 2. * = $p < .05$. ** = $p < .01$. For treatment condition, 0 = DC; 1 = DBT. Lower values reflect fewer bulimic symptoms.

Figure 6. Eating Disorders Inventory Bulimia across randomized treatment and feasibility study.



Note. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions. Tx = Treatment.

Table 13

Eating Disorders Inventory Interoceptive Awareness across Randomized Treatment

	Pre-Tx	~ Five Weeks into Tx	~10 Weeks into Tx	Post-Tx
	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)
DBT				
ITT: All	6.91 (5.04)	5.81 (5.49)	5.20 (4.63)	3.58 (4.43)
ITT: Tx Starters	6.92 (5.40)	6.60 (6.35)	5.70 (4.60)	2.17 (3.67)
Group 1	8.13 (5.39)	8.14 (6.69)	6.57 (4.96)	3.13 (4.22)
Group 2	4.50 (5.26)	3.00 (4.36)	3.67 (3.51)	0.25 (.50)
Tx Completers	9.00 (5.48)	7.88 (6.51)	6.38 (4.69)	2.63 (4.41)
Group 1	11.60 (3.05)	10.80 (6.02)	8.00 (4.85)	4.00 (5.24)
Group 2	4.67 (6.43)	3.00 (4.36)	3.67 (3.51)	.33 (.58)
DC				
ITT: All	9.21 (6.51)	6.31 (6.20)	5.91 (4.91)	4.17 (4.24)
ITT: Tx Starters	9.54 (6.65)	6.31 (6.20)	5.91 (4.91)	4.17 (4.24)
Tx Completers	10.33 (6.27)	6.83 (6.16)	5.91 (4.91)	4.17 (4.24)

Note. Tx = Treatment. sd = standard deviation. ITT = Intent to Treat. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions.

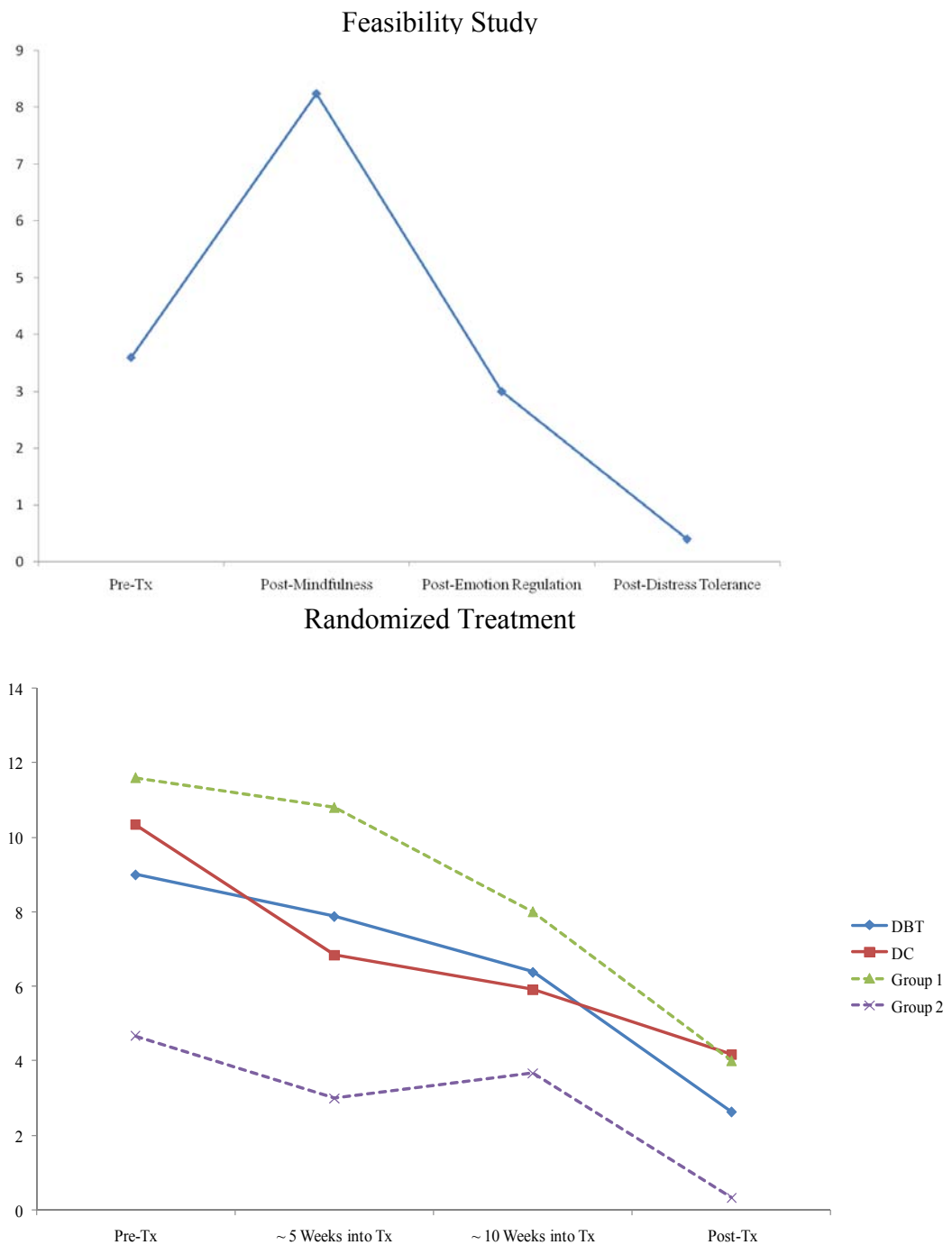
Table 14

Regression Results for Eating Disorders Interoceptive Awareness

Outcome Variable	Predictor	β	Std Error	<i>t's</i>			<i>F's</i>			ΔR^2
				<i>t</i>	df	<i>p</i>	<i>F</i>	df	<i>p</i>	
~ 5 WIT	Constant	3.58	4.00	.89	17	.384				
	Pre-Tx	.70	.19	3.63	17	.002**				
	TC	-1.97	2.23	-.88	17	.391	6.69	2, 17	.007**	.03
~10 WIT	Constant	4.17	3.62	1.15	16	.266				
	Pre-Tx	.39	.19	2.08	16	.054				
	TC	-1.32	2.09	-.63	16	.537	2.18	2, 16	.145	.02
Post-Tx	Constant	-1.75	3.12	-.56	17	.583				
	Pre-Tx	.37	.15	2.46	17	.025*				
	TC	1.05	1.75	.60	17	.556	3.42	2, 17	.056	.02

Note. Std = Standard. df = degrees of freedom. *p* = significance level. ΔR^2 = change in R^2 between step 1 and 2. Tx = Treatment. WIT = Weeks into Treatment. TC = Treatment Condition. Statistics are from step 2. * = $p < .05$. ** = $p < .01$. *** = $p < .001$. For treatment condition, 0 = DC; 1 = DBT. Lower values reflect greater interoceptive awareness.

Figure 7. Eating Disorders Inventory Interoceptive awareness across randomized treatment and feasibility study.



Note. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions. Tx = Treatment.

Table 15

Bulimic Automatic Thoughts Test across Randomized Treatment

	Pre-Tx	~ Five Weeks into Tx	~10 Weeks into Tx	Post-Tx
	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)
DBT				
ITT: All	55.55 (21.54)	49.50 (22.58)	47.20 (22.58)	43.61 (18.39)
ITT: Tx Starters	56.25 (24.13)	55.50 (25.45)	50.10 (22.78)	42.75 (19.35)
Group 1	58.75 (26.27)	62.00 (22.48)	54.43 (24.17)	48.13 (20.05)
Group 2	51.25 (21.78)	40.33 (30.09)	40.00 (19.08)	32.00 (14.28)
Tx Completers	63.63 (21.97)	60.50 (25.77)	55.50 (22.37)	45.50 (20.70)
Group 1	75.60 (13.54)	72.60 (14.88)	64.80 (20.14)	57.40 (15.66)
Group 2	43.67 (19.14)	40.33 (30.09)	40.00 (19.08)	25.67 (8.08)
DC				
ITT: All	60.07 (17.74)	55.15 (18.01)	60.25 (18.44)	55.50 (21.01)
ITT: Tx Starters	59.46 (18.31)	55.15 (18.01)	60.25 (18.44)	55.50 (21.02)
Tx Completers	59.75 (19.10)	56.17 (18.42)	60.25 (18.44)	55.50 (21.02)

Note. Tx = Treatment. sd = standard deviation. ITT = Intent to Treat. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions.

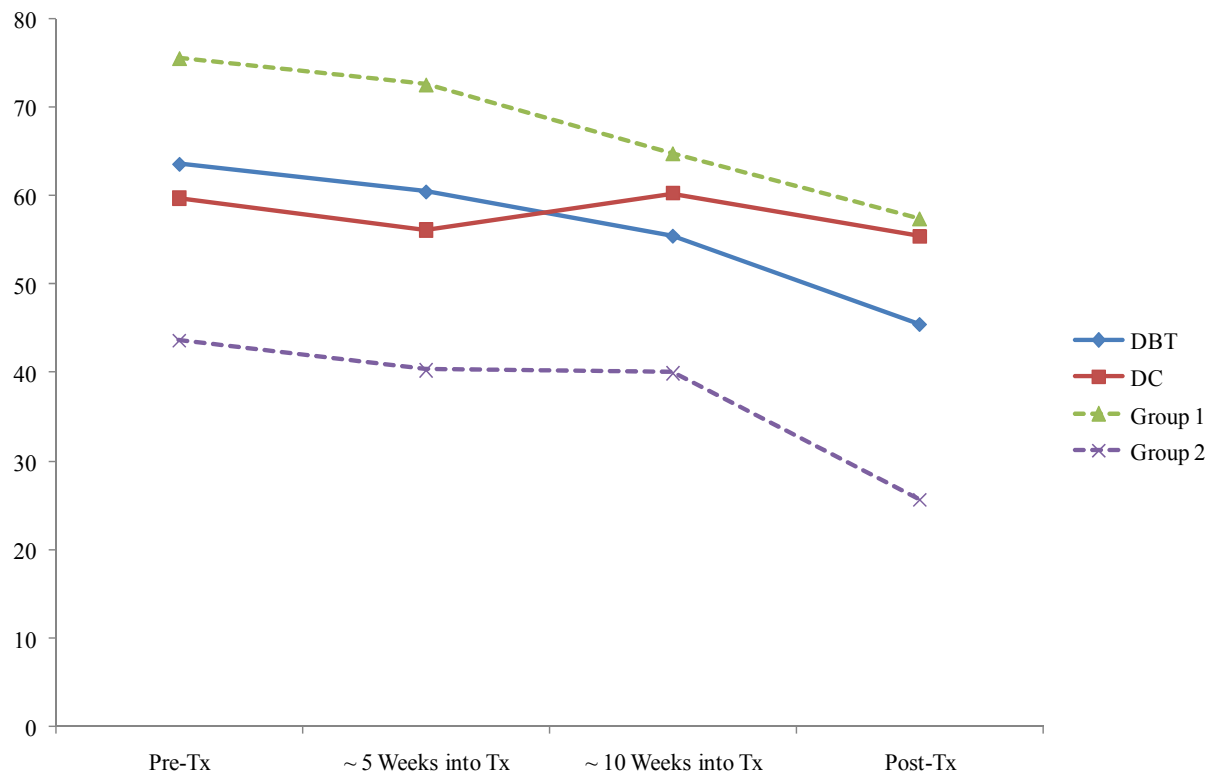
Table 16

Regression Results for the Bulimic Automatic Thoughts Test

Outcome Variable	Predictor	β	Std Error	<i>t</i> 's			<i>F</i> 's			ΔR^2
				<i>t</i>	df	<i>p</i>	<i>F</i>	df	<i>p</i>	
~ 5 WIT	Constant	3.46	12.67	.27	17	.788				
	Pre-Tx	.91	.14	6.76	17	.000***				
	TC	-.81	5.30	-.15	17	.880	23.18	2, 17	.000***	.00
~10 WIT	Constant	1.82	15.40	.12	17	.907				
	Pre-Tx	.73	.16	4.43	17	.000***				
	TC	7.56	6.45	1.17	17	.257	10.10	2, 17	.001**	.04
Post-Tx	Constant	-9.83	17.88	-.55	17	.589				
	Pre-Tx	.67	.19	3.54	17	.003**				
	TC	12.60	7.48	1.68	17	.110	7.16	2, 17	.006**	.09

Note. Std. = Standard. df = degrees of freedom. Sig. = significance level. ΔR^2 = change in R^2 between step 1 and 2. Tx = Treatment. WIT = Weeks into Treatment. Statistics are from step 2. ** = $p < .01$. *** = $p < .001$. For treatment condition, 0 = DC; 1 = DBT. Lower values reflect lower Bulimic Automatic Thoughts scores (the desired direction).

Figure 8. Bulimic Automatic Thoughts Test across randomized treatment.



Note. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions. Tx = Treatment.

Table 17

Forbidden vs. Unforbidden Foods Scale across Randomized Treatment

	Pre-Tx	~ Five Weeks into Tx	~10 Weeks into Tx	Post-Tx
	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)
DBT				
ITT: All	335.95 (116.72)	294.69 (137.27)	279.07 (153.90)	295.84 (154.57)
ITT: Tx Starters	341.08 (128.36)	302.00 (147.10)	281.80 (165.72)	271.67 (156.05)
Group 1	344.50 (149.25)	351.29 (124.27)	353.57 (144.76)	307.75 (138.17)
Group 2	334.25 (91.33)	187.00 (150.69)	114.33 (24.83)	199.50 (185.26)
Tx Completers	374.25 (106.68)	316.63 (157.46)	288.63 (182.43)	248.88 (162.25)
Group 1	418.80 (102.78)	394.40 (108.95)	393.20 (146.57)	334.00 (147.79)
Group 2	300.00 (73.98)	187.00 (150.69)	114.33 (24.83)	107.00 (12.12)
DC				
ITT: All	434.62 (77.22)	396.23 (115.46)	378.73 (12.87)	365.58 (107.77)
ITT: Tx Starters	435.08 (80.64)	396.23 (115.46)	378.73 (112.87)	365.58 (107.77)
Tx Completers	435.45 (84.56)	394.92 (120.49)	378.73 (112.87)	365.58 (107.77)

Note. Tx = Treatment. sd = standard deviation. ITT = Intent to Treat. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions.

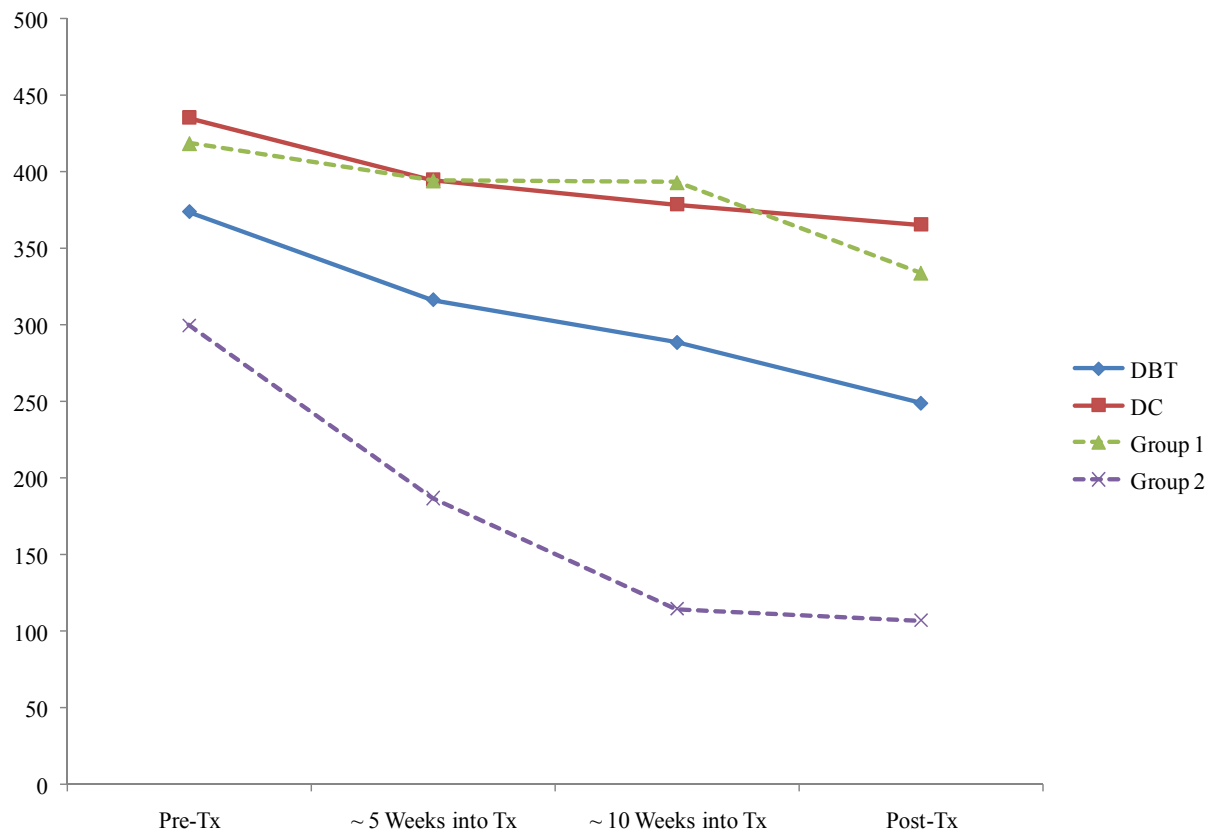
Table 18

Regression Results for Forbidden vs. Unforbidden Foods Scale

Outcome Variable	Predictor	β	Std Error	<i>t</i> 's			<i>F</i> 's			ΔR^2
				<i>t</i>	df	<i>p</i>	<i>F</i>	df	<i>p</i>	
~ 5 WIT	Constant	-156.12	83.37	-1.87	16	.080				
	Pre-Tx	1.27	.19	6.58	16	.000***				
	TC	-1.56	36.75	-.04	16	.967	24.03	2, 16	.000***	.00
~10 WIT	Constant	-186.58	105.53	-1.77	15	.097				
	Pre-Tx	1.22	.24	5.00	15	.000***				
	TC	20.44	47.29	.43	15	.672	14.75	2, 15	.000***	.00
Post-Tx	Constant	-222.75	96.30	-2.31	16	.034*				
	Pre-Tx	1.12	.22	5.02	16	.000***				
	TC	53.79	42.44	1.27	16	.223	17.20	2, 16	.000***	.03

Note. Std. = Standard. df = degrees of freedom. Sig. = significance level. ΔR^2 = change in R^2 between step 1 and 2. Tx = Treatment. WIT = Weeks into Treatment. Statistics are from step 2. * = $p < .05$. ** = $p < .01$. *** = $p < .001$. For treatment condition, 0 = DC; 1 = DBT. Lower values reflect less food labeling (the desired direction).

Figure 9. Forbidden vs. Unforbidden Foods Scale across randomized treatment.



Note. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions. Tx = treatment.

Table 19

Eating Disorders Inventory Drive for Thinness across Randomized Treatment

	Pre-Tx	~ Five Weeks into Tx	~10 Weeks into Tx	Post-Tx
	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)
DBT				
ITT: All	10.64 (5.92)	7.63 (6.21)	8.20 (6.10)	6.47 (5.35)
ITT: Tx Starters	10.50 (6.37)	8.00 (7.36)	8.20 (6.41)	5.67 (4.83)
Group 1	11.50 (6.48)	10.29 (7.34)	9.71 (6.24)	6.63 (4.69)
Group 2	8.50 (6.56)	2.67 (4.62)	4.67 (6.43)	3.75 (5.19)
Tx Completers	11.88 (6.85)	9.25 (7.72)	9.75 (6.25)	5.88 (4.55)
Group 1	15.00 (5.24)	13.20 (6.46)	12.80 (4.09)	8.60 (2.97)
Group 2	6.67 (6.66)	2.67 (4.62)	4.67 (6.43)	1.33 (2.31)
DC				
ITT: All	14.14 (5.30)	11.92 (5.84)	11.27 (5.71)	10.42 (6.33)
ITT: Tx Starters	14.15 (5.52)	11.92 (5.84)	11.27 (5.71)	10.42 (6.33)
Tx Completers	14.75 (5.31)	11.92 (6.10)	11.27 (5.71)	10.42 (6.33)

Note. Tx = Treatment. sd = standard deviation. ITT = Intent to Treat. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions.

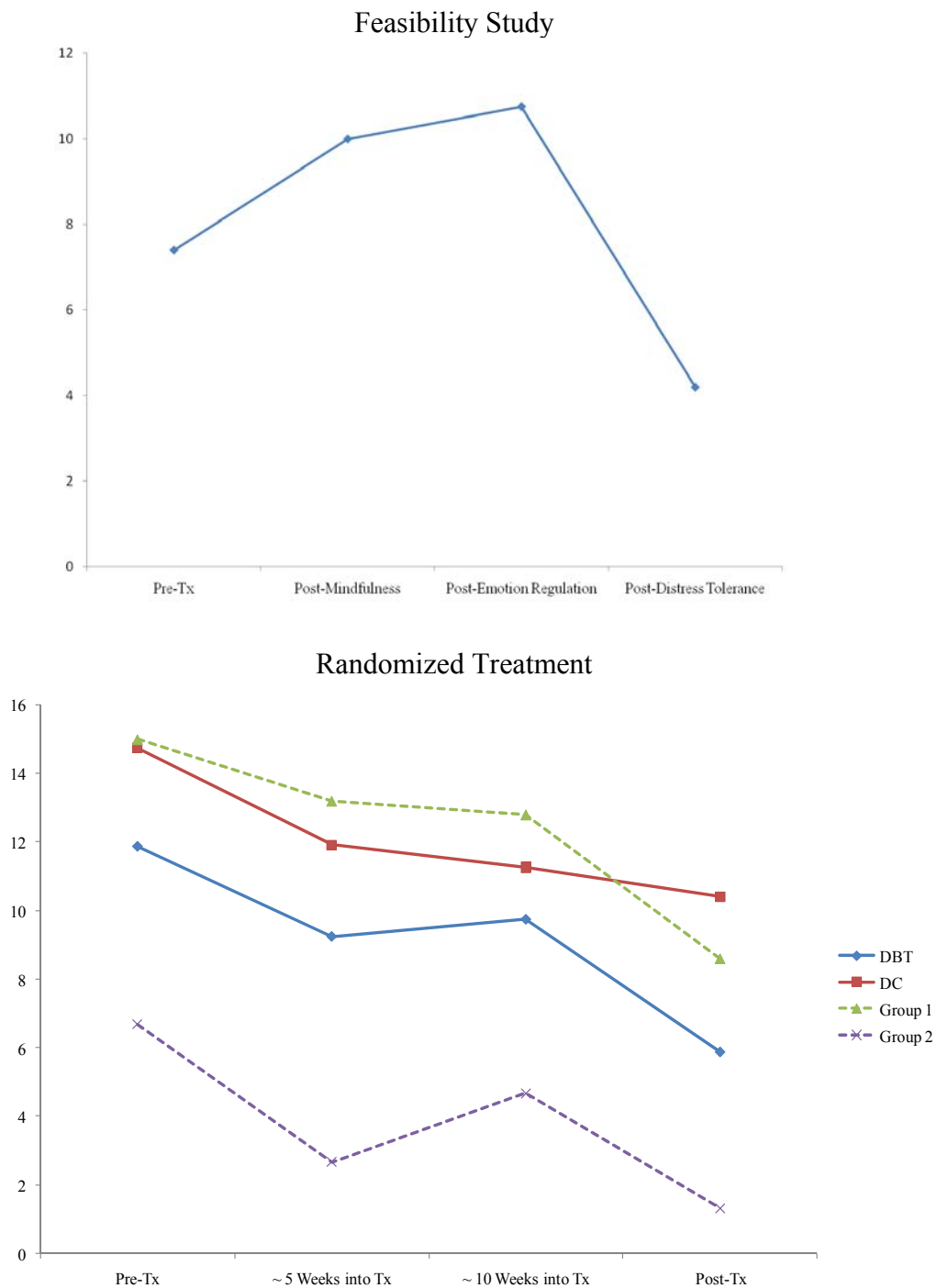
Table 20

Regression Results for Eating Disorders Drive for Thinness

Outcome Variable	Predictor	β	Std Error	<i>t</i> 's			<i>F</i> 's			ΔR^2
				<i>t</i>	df	<i>p</i>	<i>F</i>	df	<i>p</i>	
~ 5 WIT	Constant	-.87	4.03	-.22	17	.832				
	Pre-Tx	.83	.19	4.38	17	.000**				
	TC	.29	2.25	.13	17	.900	10.33	2, 17	.001**	.00
~10 WIT	Constant	3.85	4.42	.87	16	.396				
	Pre-Tx	.53	.22	2.41	16	.029*				
	TC	-.36	2.56	-.14	16	.889	3.09	2, 16	.073	.00
Post-Tx	Constant	-3.51	4.09	.86	17	.402				
	Pre-Tx	.54	.19	2.80	17	.012*				
	TC	2.99	2.28	1.31	17	.207	6.03	2, 17	.010*	.06

Note. Std. = Standard. df = degrees of freedom. Sig. = significance level. ΔR^2 = change in R^2 between step 1 and 2. Tx = Treatment. WIT = Weeks into Treatment. Statistics are from Step 2. * = $p < .05$. ** = $p < .01$. *** = $p < .001$. For treatment condition, 0 = DC; 1 = DBT. Lower values reflect less Drive for Thinness (the desired direction).

Figure 10. Eating Disorders Inventory Drive for Thinness across randomized treatment and feasibility study.



Note. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions. Tx = Treatment.

Table 21

Eating Disorders Inventory Body Dissatisfaction across Randomized Treatment

	Pre-Tx	~ Five Weeks into Tx	~10 Weeks into Tx	Post-Tx
	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)
DBT				
ITT: All	20.23 (7.45)	17.00 (8.87)	16.67 (8.55)	17.58 (8.49)
ITT: Tx Starters	20.08 (7.97)	16.10 (9.01)	15.70 (8.90)	14.75 (8.14)
Group 1	20.25 (8.14)	15.71 (8.94)	14.43 (8.06)	16.38 (8.75)
Group 2	19.75 (8.85)	17.00 (11.14)	18.67 (11.93)	11.50 (6.56)
Tx Completers	19.75 (8.38)	16.75 (9.27)	16.50 (9.61)	13.88 (6.60)
Group 1	20.00 (8.03)	16.60 (9.40)	15.20 (9.20)	14.60 (6.80)
Group 2	19.33 (10.79)	17.00 (11.14)	18.67 (11.93)	12.67 (7.51)
DC				
ITT: All	21.50 (5.76)	19.23 (7.69)	20.73 (6.97)	18.92 (7.97)
ITT: Tx Starters	22.15 (5.43)	19.23 (7.69)	20.73 (6.97)	18.92 (7.97)
Tx Completers	23.42 (3.09)	20.25 (7.06)	20.73 (6.97)	18.92 (7.97)

Note. Tx = Treatment. sd = standard deviation. ITT = Intent to Treat. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions.

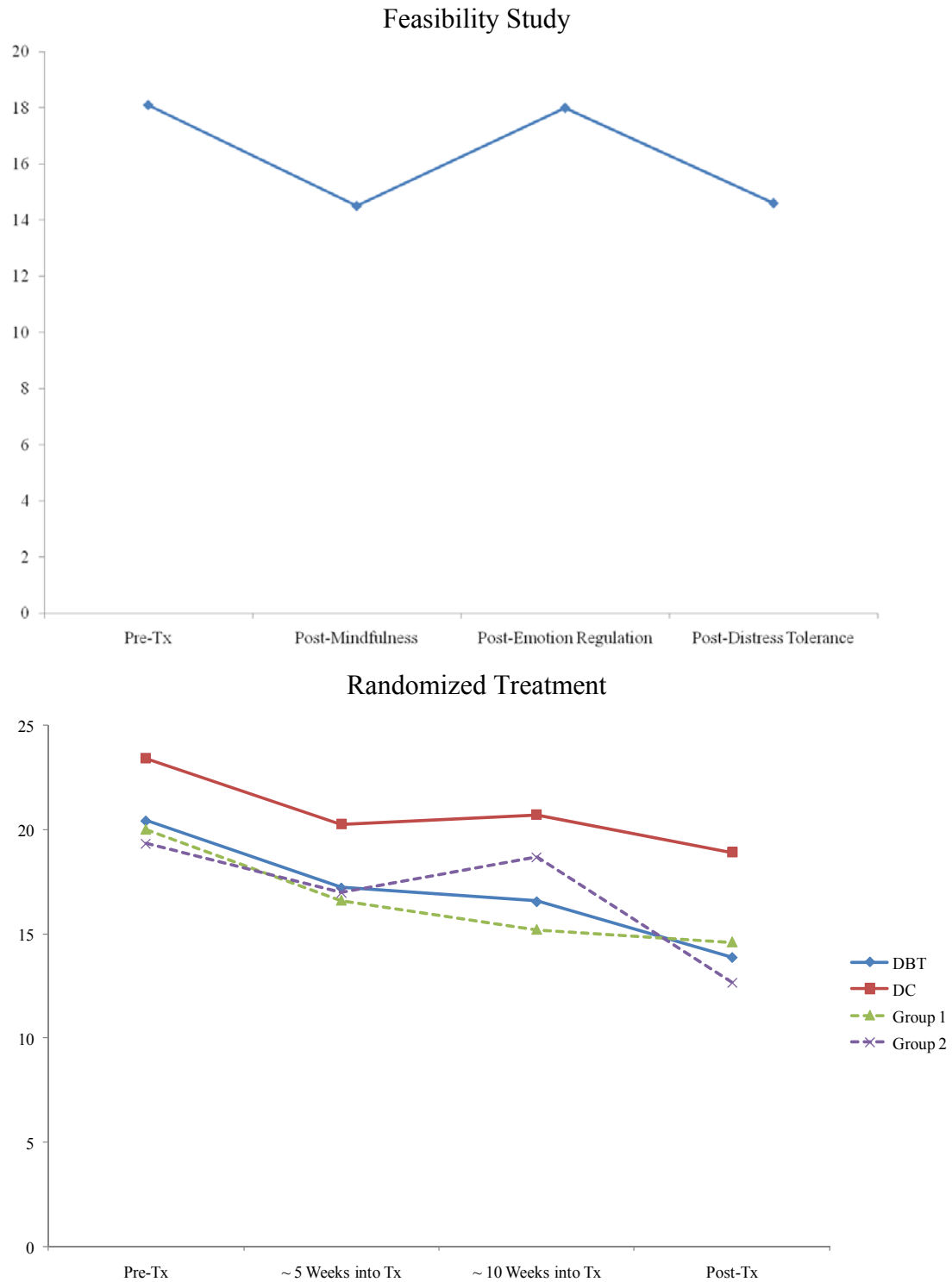
Table 22

Regression Results for Eating Disorders Body Dissatisfaction

Outcome Variable	Predictor	β	Std Error	<i>t</i> 's			<i>F</i> 's			ΔR^2
				<i>t</i>	df	<i>p</i>	<i>F</i>	df	<i>p</i>	
~ 5 WIT	Constant	-2.07	6.03	-.34	17	.735				
	Pre-Tx	.95	.25	3.89	17	.001**				
	TC	.01	2.87	.00	17	.998	8.39	2, 17	.003**	.00
~10 WIT	Constant	-3.41	5.94	-.57	16	.575				
	Pre-Tx	.99	.24	4.08	16	.001**				
	TC	.27	2.91	.09	16	.926	9.50	2, 16	.002**	.00
Post-Tx	Constant	-2.79	6.44	-.43	17	.670				
	Pre-Tx	.72	.26	2.77	17	.013*				
	TC	2.39	3.07	.78	17	.446	5.33	2, 17	.016*	.02

Note. Std. = Standard. df = degrees of freedom. Sig. = significance level. ΔR^2 = change in R^2 between step 1 and 2. Tx = Treatment. WIT = Weeks into Treatment. Statistics are from step 2. * = $p < .05$. ** = $p < .01$. *** = $p < .001$. For treatment condition, 0 = DC; 1 = DBT. Lower values reflect less body dissatisfaction (the desired direction).

Figure 11. Body Dissatisfaction across randomized treatment and feasibility study.



Note. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions. Tx = Treatment.

Table 23

Eating Disorders Inventory Ineffectiveness across Randomized Treatment

	Pre-Tx	~ Five Weeks into Tx	~10 Weeks into Tx	Post-Tx
	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)
DBT				
ITT: All	7.18 (6.38)	6.06 (6.88)	4.93 (6.69)	4.26 (4.51)
ITT: Tx Starters	7.33 (7.10)	7.30 (8.17)	6.50 (7.78)	3.00 (3.28)
Group 1	8.13 (8.37)	8.00 (9.45)	7.43 (9.09)	2.75 (3.62)
Group 2	5.75 (4.03)	5.67 (5.13)	4.33 (3.79)	3.50 (2.89)
Tx Completers	9.63 (7.65)	8.75 (8.58)	7.63 (8.33)	3.13 (3.56)
Group 1	12.00 (8.46)	10.60 (10.21)	9.60 (10.06)	3.60 (4.39)
Group 2	5.67 (4.93)	5.67 (5.13)	4.33 (3.79)	3.00 (2.08)
DC				
ITT: All	8.21 (6.22)	5.38 (4.68)	6.73 (6.18)	5.50 (5.27)
ITT: Tx Starters	8.54 (6.35)	5.38 (4.68)	6.73 (6.18)	5.50 (5.27)
Tx Completers	9.17 (6.19)	5.83 (4.59)	6.73 (6.18)	5.50 (5.27)

Note. Tx = Treatment. sd = standard deviation. ITT = Intent to Treat. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions.

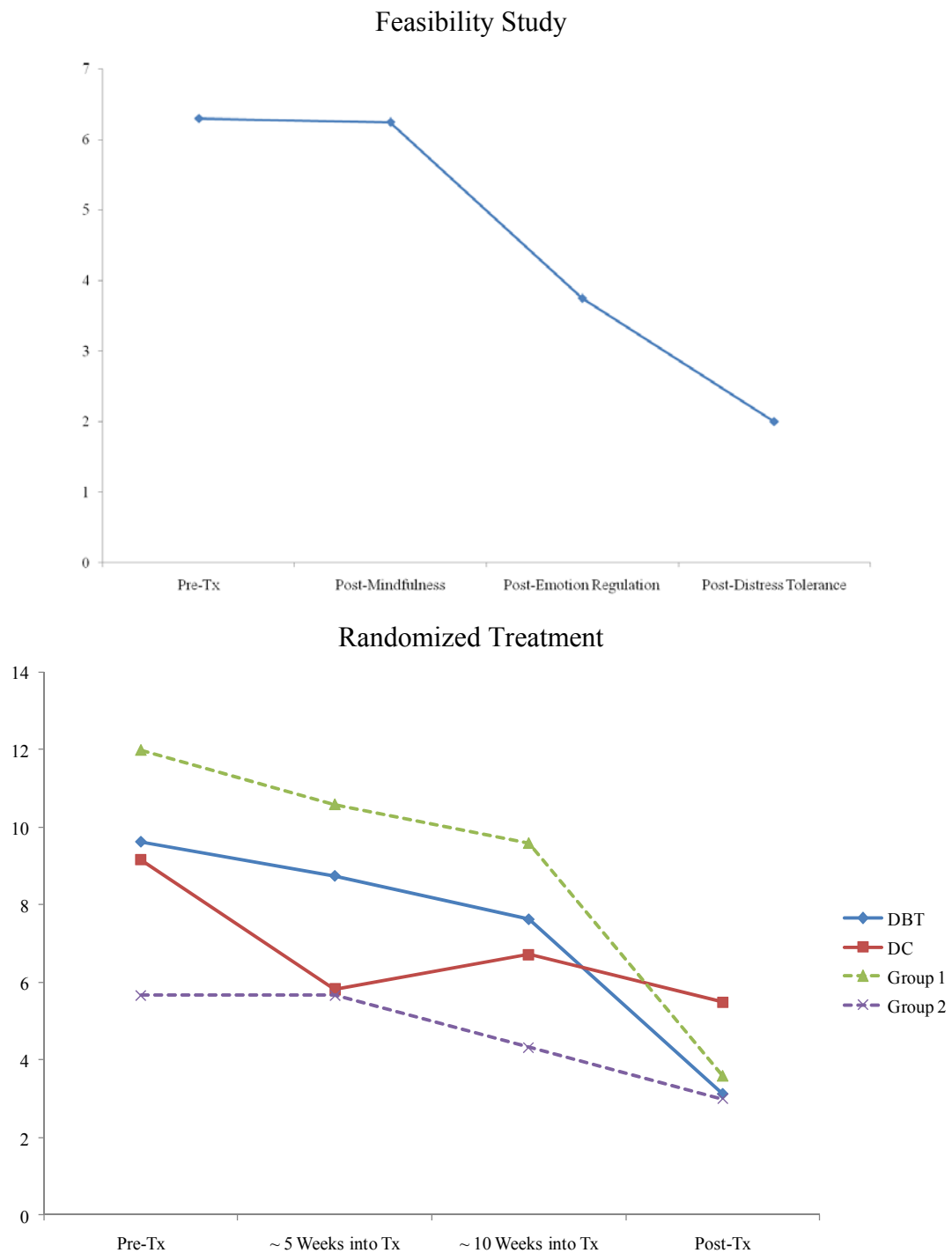
Table 24

Regression Results for Eating Disorders Ineffectiveness

Outcome Variable	Predictor	β	Std Error	<i>t</i> 's			<i>F</i> 's			ΔR^2
				<i>t</i>	df	<i>p</i>	<i>F</i>	df	<i>p</i>	
~ 5 WIT	Constant	4.61	3.76	1.23	17	.236				
	Pre-Tx	.70	.16	4.51	17	.000***				
	TC	-2.60	2.04	-1.27	17	.221	11.18	2, 17	.001**	.04
~10 WIT	Constant	1.51	4.45	.34	16	.738				
	Pre-Tx	.72	.19	3.88	16	.001**				
	TC	-.78	2.46	-.32	16	.756	7.57	2, 16	.005**	.00
Post-Tx	Constant	.09	4.03	.02	17	.982				
	Pre-Tx	.07	.17	.39	17	.699				
	TC	2.41	2.19	1.10	17	.287	.67	2, 17	.526	.07

Note. Std. = Standard. df = degrees of freedom. Sig. = significance level. ΔR^2 = change in R^2 between step 1 and 2. Tx = Treatment. WIT = Weeks into Treatment. Statistics are from step 2. * = $p < .05$. ** = $p < .01$. *** = $p < .001$. For treatment condition, 0 = DC; 1 = DBT. Lower values reflect less ineffectiveness (i.e., a greater sense of effectiveness; the desired direction).

Figure 12. Eating Disorders Inventory Ineffectiveness across randomized treatment and feasibility study.



Note. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions. Tx = Treatment.

Table 25

Eating Disorders Inventory Perfectionism across Randomized Treatment

	Pre-Tx	~ Five Weeks into Tx	~10 Weeks into Tx	Post-Tx
	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)
DBT				
ITT: All	7.91 (5.46)	6.69 (5.02)	6.47 (5.60)	6.68 (5.20)
ITT: Tx Starters	9.17 (5.24)	8.20 (5.31)	8.50 (5.56)	6.83 (4.63)
Group 1	10.63 (5.93)	10.43 (4.65)	11.00 (4.47)	8.25 (4.56)
Group 2	6.25 (1.26)	3.00 (2.00)	2.67 (2.52)	4.00 (3.74)
Tx Completers	10.63 (5.58)	8.38 (6.00)	8.88 (6.22)	7.25 (5.42)
Group 1	13.60 (4.98)	11.60 (5.13)	12.60 (4.28)	10.20 (4.49)
Group 2	5.67 (0.58)	3.00 (2.00)	2.67 (2.52)	2.33 (2.08)
DC				
ITT: All	6.86 (5.32)	6.92 (5.27)	7.64 (5.64)	6.75 (5.58)
ITT: Tx Starters	7.38 (5.14)	6.92 (5.27)	7.64 (5.64)	6.75 (5.58)
Tx Completers	7.67 (5.26)	6.67 (5.42)	7.64 (5.64)	6.75 (5.58)

Note. Tx = Treatment. sd = standard deviation. ITT = Intent to Treat. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions.

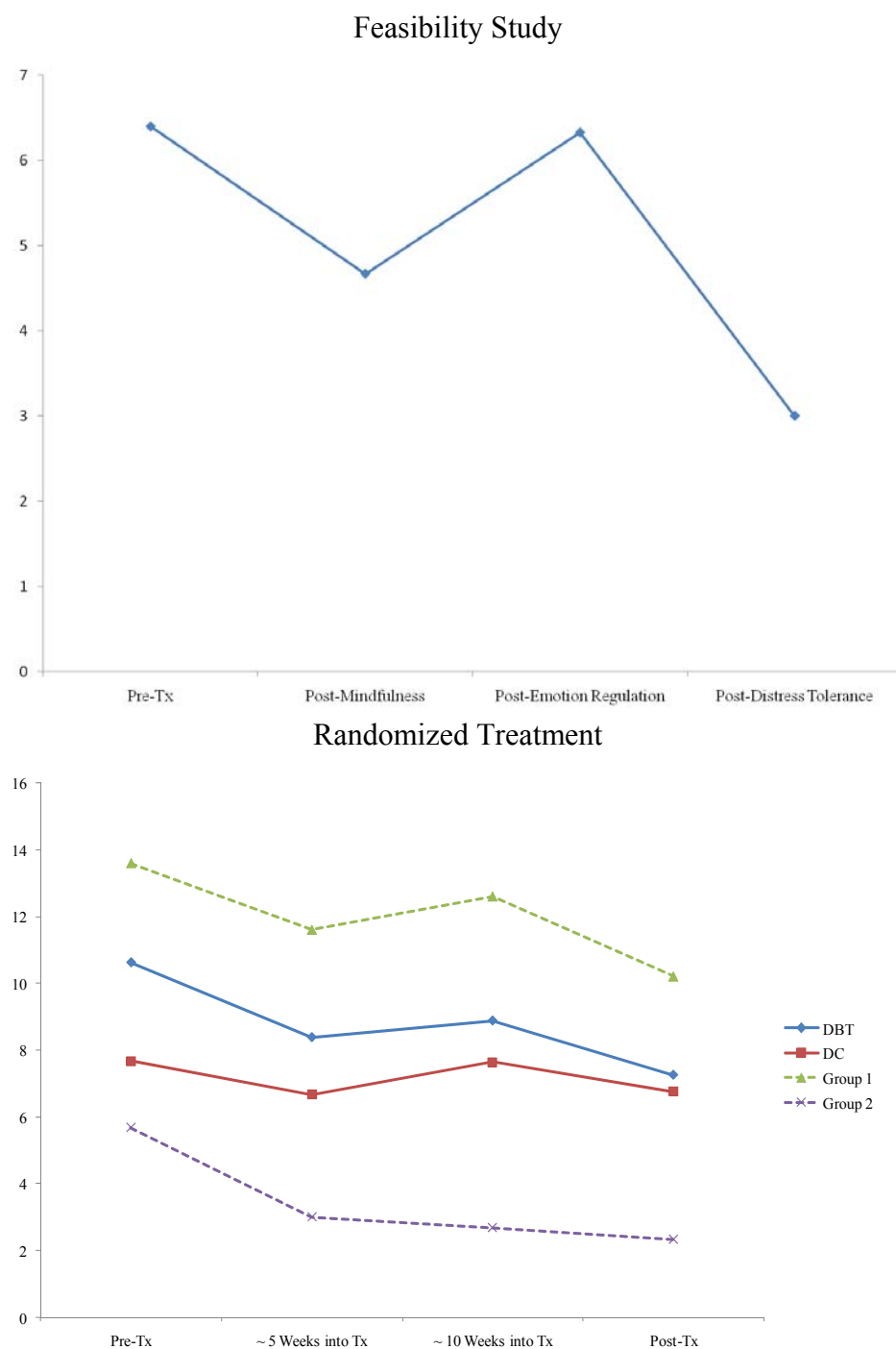
Table 26

Regression Results for Eating Disorders Perfectionism

Outcome Variable	Predictor	β	Std Error	<i>t</i> 's			<i>F</i> 's			ΔR^2
				<i>t</i>	df	<i>p</i>	<i>F</i>	df	<i>p</i>	
~ 5 WIT	Constant	-3.30	1.93	-1.71	17	.105				
	Pre-Tx	.99	.09	11.31	17	.000***				
	TC	1.21	.95	1.28	17	.219	65.74	2, 17	.000***	.01
~10 WIT	Constant	-2.70	2.59	-1.04	16	.314				
	Pre-Tx	.96	.12	8.13	16	.000***				
	TC	1.37	1.29	1.07	16	.303	33.55	2, 16	.000***	.01
Post-Tx	Constant	-3.71	3.11	-1.19	17	.250				
	Pre-Tx	.84	.14	5.99	17	.000***				
	TC	2.00	1.53	1.31	17	.209	18.01	2, 17	.000***	.03

Note. Std. = Standard. df = degrees of freedom. Sig. = significance level. ΔR^2 = change in R^2 between step 1 and 2. Tx = Treatment. WIT = Weeks into Treatment. Statistics are from step 2. ** = $p < .01$. *** = $p < .001$. For treatment condition, 0 = DC; 1 = DBT. Lower values reflect less perfectionism (the desired direction).

Figure 13. Eating Disorders Inventory Perfectionism across randomized treatment and feasibility study.



Note. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions. Tx = Treatment.

Table 27

Eating Disorders Inventory Interpersonal Distrust across Randomized Treatment

	Pre-Tx	~ Five Weeks into Tx	~10 Weeks into Tx	Post-Tx
	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)
DBT				
ITT: All	4.45 (3.25)	3.44 (2.76)	3.53 (2.88)	2.37 (2.43)
ITT: Tx Starters	4.83 (3.33)	3.60 (2.67)	3.80 (2.74)	1.75 (1.76)
Group 1	4.75 (3.45)	3.71 (2.75)	4.00 (2.83)	1.38 (1.41)
Group 2	5.00 (3.56)	3.33 (3.06)	3.33 (3.06)	2.50 (2.38)
Tx Completers	5.63 (3.50)	3.88 (2.85)	4.00 (2.62)	1.50 (1.69)
Group 1	6.40 (3.36)	4.20 (3.03)	4.40 (2.61)	1.20 (1.10)
Group 2	4.33 (4.04)	3.33 (3.06)	3.33 (3.06)	2.00 (2.65)
DC				
ITT: All	3.29 (4.08)	3.15 (3.44)	2.50 (3.21)	2.00 (1.65)
ITT: Tx Starters	3.31 (4.25)	3.15 (3.44)	2.50 (3.21)	2.00 (1.65)
Tx Completers	3.42 (4.42)	3.25 (3.57)	2.50 (3.21)	2.00 (1.65)

Note. Tx = Treatment. sd = standard deviation. ITT = Intent to Treat. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions.

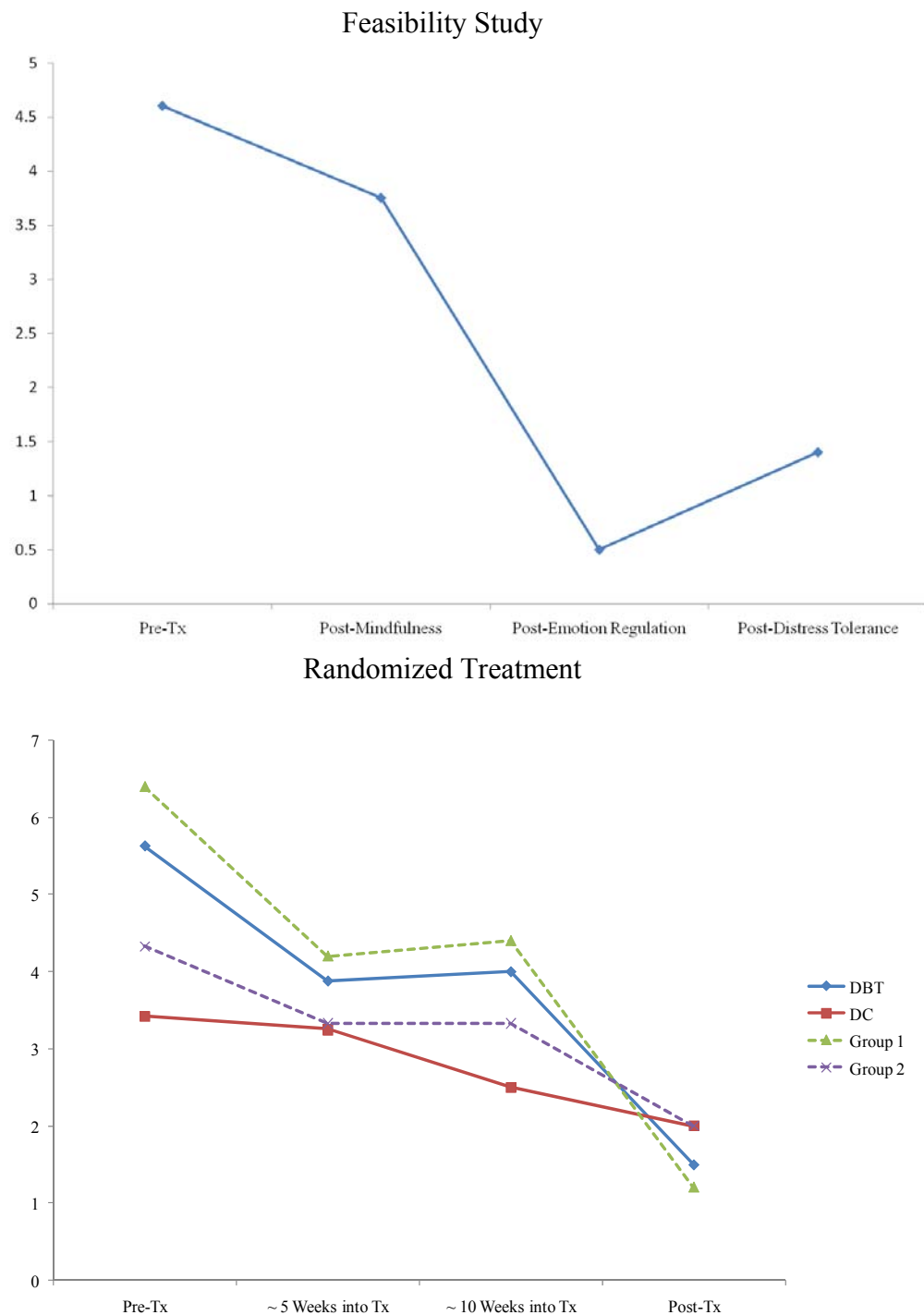
Table 28

Regression Results for Eating Disorders Interpersonal Distrust

Outcome Variable	Predictor	β	Std Error	<i>t</i> 's			<i>F</i> 's			ΔR^2
				<i>t</i>	df	<i>p</i>	<i>F</i>	df	<i>p</i>	
~ 5 WIT	Constant	-.87	1.60	-.55	17	.593				
	Pre-Tx	.69	.10	6.58	17	.000**				
	TC	.89	.86	1.04	17	.313	21.96	2, 17	.000***	.02
~10 WIT	Constant	1.11	1.76	.63	17	.535				
	Pre-Tx	.56	.11	4.91	17	.000***				
	TC	-.26	.94	-.28	17	.783	13.42	2, 17	.000***	.00
Post-Tx	Constant	-.26	1.40	-.19	17	.853				
	Pre-Tx	.16	.09	1.78	17	.094				
	TC	.86	.75	1.15	17	.267	1.82	2, 17	.193	.06

Note. Std. = Standard. df = degrees of freedom. Sig. = significance level. ΔR^2 = change in R^2 between step 1 and 2. Tx = Treatment. WIT = Weeks into Treatment. Statistics are from step 2. ** = $p < .01$. *** = $p < .001$. For treatment condition, 0 = DC; 1 = DBT. Lower scores reflect less interpersonal distrust (the desired direction).

Figure 14. Eating Disorders Inventory Interpersonal Distrust across feasibility study vs. randomized treatment.



Note. DBT = group dialectical behavior therapy with coaching calls. DC = Diary card self-monitoring with individual sessions. Tx = Treatment.

DISCUSSION

This study's results bolster support for the efficacy of DBT and suggest that the self-monitoring DC component may contribute substantially to its overall impact. Both DBT and DC treatments were associated with significant change (in the desired direction) in bulimic symptoms, dichotomous thinking, food labeling, drive for thinness, body dissatisfaction, ineffectiveness, perfectionism, and interpersonal distrust over the course of treatment. DBT's pre to post effect sizes were similar to those found previously for DBT (Safer et al., 2001b; Telch et al., 2000; Telch et al., 2001) and CBT (Thompson-Brenner, Glass, & Westen, 2003) indicating that this study was able to replicate the success of DBT found in previous studies, and provide an appropriate standard for comparison in the DC only condition. Comparing DBT with DC on within-subjects effect sizes, DBT demonstrated superior outcomes to DC on all measured variables except interoceptive awareness (1.122 for DBT vs. 1.210 for DC). Comparing DBT with DC on post-treatment scores, between-subjects effect sizes favored DBT for all measured variables except perfectionism ($d = -.07$). Statistically significant differences favoring DBT were also found for the average total number of binges reported during treatment, although it is possible that this reflected pre-existing binge eating trajectories rather than treatment condition (with DC participants reporting more binges both pre- and post-treatment than DBT participants, see Figure 2).

While effect sizes for both DBT and DC are comparably large for bulimic symptoms and interoceptive awareness, other patterns were more variable. In particular, for dichotomous thinking, ineffectiveness, and interpersonal distrust, within subjects

effect sizes were large for DBT but small for DC. Results also supported markedly greater efficacy for DBT compared to DC in reducing forbidden vs. unforbidden food labeling. This suggests that the diary card self-monitoring component of DBT may largely contribute to the impact of DBT on bulimic symptoms and interoceptive awareness but not necessarily account for other influences. Increased interoceptive awareness may thus largely be fostered by heightened awareness from daily self-monitoring of emotions and urges. In contrast, other components of DBT may be the primary agents of change for concerns such as dichotomous thinking, ineffectiveness, and interpersonal distrust. For example, DBT's dialectical stance may be key for reducing dichotomous thinking, and skills training may be crucial for reducing feelings of ineffectiveness. The differential findings for interpersonal distrust may stem from the greater extent of interpersonal interaction provided through group for DBT participants and/or the radical genuineness of DBT group leaders.

Moderate DBT outcomes and small DC outcomes for Perfectionism may reflect the lack of explicit attention to cognitive reframing in the treatments. For example, if a participant reported a perfectionistic thought during a behavior chain analysis in DBT, the thought would tend to simply be acknowledged as a thought and even validated rather than challenged and targeted for revision, as it would be in CBT. In addition, given that the treatment occurred in the context of a research study, the treatment may have inadvertently helped maintain perfectionistic tendencies. For example, in the interest of gathering complete data, diary cards and other paperwork completed were vigilantly monitored for complete data and participants were asked to fill in any oversights. Although this is consistent with DBT protocol, DBT allows for more room for shaping

(including accepting less complete diary cards at first, then gradually working up to requiring absolutely complete diary cards) when data is less of a priority. A more refined examination of perfectionism (e.g., adaptive vs. maladaptive) could inform the clinical significance of the relatively lower impact of DBT on Perfectionism. For example, it may be that although DBT does not reduce perfectionism as much as it reduces other concerns, the perfectionism retained is not necessarily harmful (i.e., it may be adaptive).

While DBT was associated with a significantly lower average number of total binges across treatment, the average number of mindless eating incidents across treatment was (non-significantly) higher for DBT compared to DC. This may reflect the more intensive focus on the distinction between mindful eating and mindless eating in group, including four weeks specifically teaching mindfulness, weekly mindful eating practice, and discussion of mindless eating in behavior chain and solution analysis. As a result, DBT participants likely had a heightened sensitivity to what is considered mindless eating according to the DBT diary card, which quite possibly increased the number of mindless eating incidents that they reported compared to DC participants. Indeed, when they shared their weekly summary in group, DBT participants commented on the distinction between the DBT definition of mindless eating and their lay perception.

In terms of attrition, DC outperformed DBT. For example, after participants began treatment, only one participant (7% of DC treatment starters) dropped out of DC treatment. In contrast, four participants (33% of DBT starters) dropped out of DBT. This discrepancy is worth consideration given that clients need to engage in treatment to benefit from treatment. Even if DBT were the most efficacious treatment for disordered eating, it may result in little public health impact if few clients are willing to complete

DBT treatment. Reasons for withdrawal implicate DC's comparatively less intensive, less time-consuming nature as one of the primary reasons that DC was able to retain more participants than DBT. Another potential explanation for the discrepancy is a preference for DC's individual format over DBT's group format. For example, despite the non-judgmental stance of DBT group, the individual sessions may have provoked less shame and social anxiety. In addition, DC's individual attention may have felt more explicitly and consistently relevant than the didactic DBT skills training and behavior chain and solution analysis, which was typically focused on only one participant per week. DC's individual format may also have helped form a stronger therapeutic alliance and a greater allegiance to remain in therapy.

Attrition was also higher for DBT than in previous treatment trials (e.g., 25% vs. 0 to 12%; Safer et al., 2001b; Telch et al., 2000; Telch et al., 2001). There are several possible explanations for this discrepancy. First, previous trials provided the treatment to participants at no cost, in line with traditional treatment research practice (D. L. Safer, personal communication, July 14, 2009). Furthermore, Stanford's prestige may have further bolstered participants' investment in completing treatment, compared to the current study's sliding scale training clinic.

Beyond differences related to money and status, the heterogeneity of the groups quite possibly played a role in increasing current attrition. For example, when problem solving their urges to quit DBT, participants included age differences in their concerns. Similarly, one of the participants who withdrew from the feasibility study indicated that she felt the group of primarily overweight women with BED was a poor match with her recent history of AN. At the same time, as the groups evolved, bonds were formed across

differences, and participants expressed appreciation for the diversity in experience and perspectives. Thus, ultimately, greater diversity may actually be helpful and, even, quite powerful. Given this, further efforts to determine effective strategies for participant retention appear warranted.

Given the efficacy demonstrated for the self-monitoring DC component of DBT, a stepped care approach might be warranted and may facilitate retention. For example, DC could serve as a first step in a DBT stepped care model for binge eating. Clients who are successful with DC alone would not require more intensive DBT intervention, while those who have remaining symptoms could progress to DBT intervention following DC, and perhaps those with more severe pathology (e.g., chronic bulimic symptoms) could bypass DC altogether for DBT. In this vein, a stepped care approach has been proposed with CBT (e.g., moving from self-help to guided self-help to group psychoeducation to individual therapy to more intensive levels of care; Wilson et al., 2000). DC could also serve as a low-cost option for settings that have limited training and staffing resources that preclude provision of DBT to all of those in need; in these settings, DC could serve as an interim treatment that builds a foundation for DBT while clients are on a waitlist for services. Such options appear warranted, given apparent barriers to establishing comprehensive care for disordered eating (Eating Disorders Association, 2000; Simmons, Milnes, & Anderson, 2008).

Stepping back from the numbers, participant feedback is of note. After all, for clinicians and clients, the impact of a treatment is measured not in aggregate but rather on a personal level. One example comes from an e-mail this author received from one of the DBT participants who had completed over four years of individual counseling and

participated in a highly recommended CBT program. This participant e-mailed to thank this author and her co-leader for the study, saying that it was more helpful than the CBT program. She said that this author could not begin to understand the impact the program had on her. Similarly, a DC participant had trouble finding words but expressed repeated gratitude for the benefit she received from her participation. Based on this and similar feedback from participants, the power of this study was markedly significant.

Generalization and Portability Considerations

Several design decisions were motivated by a desire to maximize clinical relevance and generalizability to other clinical, community and school settings. For example, the decision to include individuals with sub-threshold as well as diagnosed BN and BED was driven by the desire to examine the effects of intervention within the confines of a clinically realistic group modality. By necessity, many clinical, community and school settings include a range of symptom presentations in their intervention groups, but heretofore, only one other study has examined the efficacy of mixed groups of individuals with disordered eating (Chen et al., 2008). Also, as in typical clinic settings, treatment participants paid for sessions. This contrasts with the typical lab-based efficacy trial which provides free therapy for participants, and it further bolsters the generalizability of these findings to other service settings.

A caution should be raised regarding the heterogeneous group approach for purging. Although theory and clinical impressions suggest that abstinence from binge eating can result in abstinence from purging (Bulik, Sullivan, Joyce, Carter, & McIntosh, 1998), DBT participants in this study persisted in their purging (e.g., self-induced vomiting) despite substantial reductions and abstinence from binge eating. This is

consistent with research demonstrating that purging may more strongly drive binge eating rather than vice versa (Byrne & McLean, 2002) and suggests that further attention to purging may be necessary to reduce this behavior, particularly when purging is not solely triggered by binge eating (Fairburn & Cooper, 2008). Unfortunately, discussing purging in detail in a group with members who are not currently engaging in purging may trigger new instances of purging. To minimize this possibility and provide an appropriate level of care for the severity of this pathology, individual therapy may be needed as a supplement to group for those with purging behavior. Chen and colleagues (2008) investigated this combination for co-morbid BPD and BN or BED in six months of Linehan's DBT (individual sessions, group, and coaching calls) adapted for eating disorders. By the end of treatment, 67% of their participants who started treatment purging ($n = 2$ of 3) reported abstinence; this was sustained for one participant through six-month follow-up. Further research with larger samples is needed to confirm the efficacy of this combined approach for purging.

The reduction in DBT treatment to 15 sessions permitted its delivery within a college semester, potentially increasing its portability to college campus providers. At the same time, the (albeit small) treatment fee does not parallel typical practice at college counseling centers, which often provide students unlimited access to free groups (and an allotment of free individual sessions). In addition, the inclusion of coaching calls may be less readily transferrable to such settings for various reasons. For example, providers who do not regularly provide DBT may hesitate to adopt this intervention component due to different therapeutic philosophies or fear of client misuse. Systemic constraints on after-hours contact (e.g., at some counseling centers) may also make coaching calls

prohibitive. Given the support for Safer and colleagues' approach, which does not include coaching calls, and clients' hesitancy to utilize coaching calls (only 50% of DBT treatment completers placed a coaching call when it was not specifically assigned for homework; each participant who initiated a coaching call did so only once), providers who are not able or willing to provide coaching calls may still be able to deliver an efficacious treatment by implementing the DBT for binge eating without coaching calls. Research clarifying the importance of including coaching calls is needed, along with replication in a non-fee-for-service setting.

Limitations and Future Directions

Perhaps the greatest limitation of this research is its small sample size. Thus, significant differences may have been missed that a larger sample could have uncovered. Another limitation is this study's low level of diversity, with the intent to treat sample not including men (although men were considered in screening) and including few participants (3%, $n = 1$) of reported non-majority race. Similarly, few younger women with a recent onset of disordered eating were captured overall. Consequently, conclusions about the efficacy of these DBT adaptations for these populations either cannot be made (e.g., for men) or should be made with caution.

Methodologically, a limitation is this author's myriad roles throughout the study, from recruitment to assessment, random assignment, research assistant training, group treatment delivery, supervision (e.g., leading DBT consultation team and co-supervising the individual therapist), some data entry, and data analysis. This resulted from the nature of the project (i.e., it being this author's dissertation and thus a training experience) and limited funding and staff. Although this author did her best not to introduce bias, the

possibility of unintentional bias remains. A future goal is thus a larger study with more funding to permit greater role separation.

Although necessarily limited in its scope, this study provides the groundwork for several future research directions, including assessing outcomes at extended follow-up points, comparing the most efficacious interventions with each other (e.g., CBT versus DBT versus interpersonal psychotherapy (IPT)), using larger samples to permit greater exploration of key client characteristics that predict response to one intervention over another, and further examining treatment components (e.g., behavior chain analysis; mindful eating) in a dismantling approach to determine which components are essential for a cost-effective intervention. It would also be interesting to explore the impact of heterogeneity (e.g., in diagnosis; age) on DBT attrition. For example, participants could be randomly assigned to either a more homogenous group (e.g., female college students with bulimia nervosa) or a heterogeneous group such as the groups in the current study. Higher attrition in the heterogeneous groups, after accounting for other reasons for attrition, would suggest that more homogeneous groups may be preferable for retention, or that explicit therapeutic discussion of group diversity (as a part of protocol rather than when raised by participants, as was done in the current study) may be a warranted addition to the treatment when groups are heterogeneous.

Electronic diaries are another avenue for future research. Although using paper diary cards is a stipulation of DBT protocol, the accuracy of such monitoring methods has been questioned (Piasecki, Hufford, Solhan, & Trull, 2007). One of the major concerns is that individuals complete their entries not at the intervals requested but rather after time has elapsed, increasing the retrospective nature of their report and,

consequently, decreasing accuracy. Electronic diaries offer an alternative with the capability of tracking the exact time and date of entries. This can enhance adherence to requested monitoring schedules, reducing the retrospective nature of entries. Future studies may thus increase the accuracy of diary card data by utilizing electronic diaries. Whether this would have added clinical benefit is unclear. For example, le Grange and colleagues' (2002) found trends favoring CBT with ecological momentary assessment (EMA) compared to CBT without (with 37% vs. 59% of participants, respectively, meeting BED full-threshold diagnostic criteria at post-treatment; 77% vs. 47% reducing their binge eating frequency by half from pre- to post-treatment). However, no statistically significant differences in outcomes emerged, leading to the conclusion that EMA did not significantly enhance CBT.

Future research could also address the current mono-operation bias. For example, future research could include reports from additional informants (Sher & Trull, 1996). Alternatively, observational measures could be used. For example, participants' ability to resist binge eating could be measured by observing their behavior after consuming a small portion of forbidden food. Such data could currently be coded for DBT participants⁶ but are not available for DC participants. Extending such observation to DC participants would require rigorous ethical safeguards to protect participants from harm.

In closing, the current dataset provides opportunities to explore additional questions. For example, auxiliary analyses with other diary card variables could be worthwhile. In addition, a closer examination of the differences in trajectory shapes could

⁶During mindfulness practices, clients consumed forbidden foods. They then had access to snacks during the group break and after group. These snacks were a mixture of forbidden and unforbidden foods. Since all sessions were videotaped, participants' eating behavior during break and immediately after group was recorded.

be fruitful. Moving forward, the author plans to pursue such future directions.

Conclusion

In conclusion, the current study adds to the evidence for the efficacy of DBT adaptations for disordered eating. Specifically, support was found for group dialectical behavior therapy with coaching calls (DBT) and diary card self-monitoring with brief individual sessions (DC). While DBT outperformed DC on symptom measures, DC outperformed DBT on retention. The results point to possibilities for stepped care and avenues for future research, including replication with a larger sample, further dismantling (e.g., DBT vs. behavior chain analysis; DBT vs. mindful eating), and comparison with other available treatments (e.g., treatment as usual; CBT; IPT).

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Appendix A

Mindfulness Food for DBT Group 1

1. Tangelo juice
2. Graham crackers
3. Peaches
4. Buttered popcorn
5. Jelly beans
6. Pudding
7. Pasta
8. Pizza
9. Candy bars
10. Ice cream
11. Chocolate chip cookies
12. Chocolate cake

Mindfulness Food for DBT Group 2

1. Tangelo juice
2. Ham and cheese with crackers
3. Buttered popcorn
4. Pudding
5. Potato chips
6. Pasta night
7. Baked potatoes
8. Chocolate chip cookies
9. Candy bars
10. Ice cream
11. Donuts
12. Chocolate cake

Appendix B

Informed Consent

The current study is being conducted by Angela Cain, doctoral candidate in the Psychological Sciences Department at the University of Missouri-Columbia, under the supervision of Kristin Hawley, Ph.D., and Jeremy Skinner, Ph.D. The goal of the study is to determine the effectiveness of two interventions for binge eating and other problem eating behaviors. Both interventions have been shown to be helpful for a significant number of people. The current study will compare the two interventions to determine whether one of the therapies produces better outcomes, on average, for individuals who receive it.

In this study, you will be asked to complete several interviews and questionnaires. Your height and weight will also be measured using a medical scale while you stand backwards on the scale. The amount of time of these assessments varies and typically takes several hours. After completing these assessments, you will be randomly assigned to one of the two interventions being evaluated. You will be notified of the assignment via phone and email, if available. You will then be asked to attend a 1.5-hour orientation session. The interventions will last 15 weeks. During this time period, you will be asked to attend all sessions, which range from 15 minutes to 2.5 hours, depending on condition; to participate as fully as possible; and to complete daily self-monitoring sheets, turned in weekly. You will also be asked to complete three more assessments, spaced approximately five weeks apart, with the final assessment following your final intervention session. These assessments will consist of several of the questionnaires you completed during the first assessment. In addition, weighing will be repeated in the same manner as before. These assessments will each take approximately 30 minutes.

All assessment, orientation, and treatment sessions will be videotaped in order to permit clinical supervision and adherence monitoring. Videotapes will be viewed only by individuals related to this research study.

All identifiable data and information you provide, including videotapes, will be maintained in locked filing cabinets at the Psychological Services Clinic and accessible only by research project personnel. When your data are entered into an electronic database for analysis, they will be separated from your name through the assignment of an identification number. The list linking names to identification numbers will be stored separately from the database in a secure location. Copies of the database will be stored in a locked filing cabinet in the Psychological Services Clinic and Angela Cain's locked office. Data will be maintained indefinitely, for a minimum of three years after the completion of the study.

This study is being conducted with individuals who report engaging in binge eating and who are no longer living at home (mostly over age 18). Your participation in this study is completely voluntary. You may refuse or discontinue participation at any time. You will receive a small thank you package of personal care products (e.g., lotion, emery boards)

for completing this study. Further incentives, as approved by the Institutional Review Board, may also be provided.

The cost to receive services varies with the intervention. Cost will not exceed \$10/session.

As a participant in an intervention study, you will face potential risks. Although research conducted thus far indicates that the interventions being provided will produce symptom improvement, the course of that improvement is not yet clear. Thus, you may experience an increase in symptoms, followed by a decrease. Furthermore, the interventions may not produce symptom improvement in all participants and may not produce the same degree of symptom improvement. However, the interventions are not expected to produce long-term symptom worsening, given that this has not been evident in the randomized controlled trials thus far. Close clinical supervision will be provided by Dr. Jeremy Skinner, licensed clinical psychologist and expert in the interventions being provided, with additional clinical consultation provided by Dr. Anna Bardone-Cone, clinical psychologist specializing in eating disorder intervention and research, and Dr. Kristin Hawley, clinical psychologist and expert in interventions research. Although previous participants in our services have reported high levels of satisfaction, it is possible that you could find participation stressful. As noted above, your participation is completely voluntary and if you wish to end participation in the intervention or in the study as a whole (i.e., the intervention and assessments), you will be provided with referrals to other providers in the community upon request.

You may face the potential risk of other participants breaking confidentiality of your participation in the study and the information you share. To minimize this risk, the importance of confidentiality will be emphasized. Each participant and intervention provider will sign a contract agreeing to maintain confidentiality.

To help protect your privacy, a Certificate of Confidentiality from the National Institutes of Health has been obtained. With this certificate, this study's researchers cannot be forced to disclose information that may identify you, even by a court subpoena, in any federal, state, or local civil, criminal, administrative, legislative, or other proceedings. This study's researchers will use the Certificate to resist any demands for information that would identify you, except as explained below.

The Certificate cannot be used to resist a demand for information from personnel of the United States Government that is used for auditing or evaluation of federally funded projects or for information that must be disclosed in order to meet the requirements of the federal Food and Drug Administration (FDA).

A Certificate of Confidentiality does not prevent you or a member of your family from voluntarily releasing information about you or your involvement in this research. If an

insurer, employer, or other person obtains your written consent to receive research information, then the researchers may not use the Certificate to withhold that information.

Finally, understand that the investigator is not prevented from taking steps, including reporting to authorities, to prevent serious harm to yourself or others.

Findings from this study have the potential for great public health significance. They will inform the delivery of interventions for disordered eating and are expected to improve understanding of the what brings about change. The identification of a cost-effective intervention can prevent significant health consequences and potential mortality. To disseminate the findings of this study to other researchers and service providers, the overall results, averaged across participants and without identifiable information, will be submitted for presentation at professional conferences and submitted for publication in psychology or psychiatry research journals.

If you have any questions about this research, you may contact Angela Cain at 573-289-4651 or asg258@mizzou.edu. If you have any questions about your rights as a research participant, please contact the University of Missouri-Columbia Campus Institutional Review Board at 882-9585.

Participant Signature

Date

Experimenter Signature

Date

Appendix C

Session Guide for Diary Card Review Sessions

1. Greet participant; ask participant to see their diary card.
2. Check for full completion.
3. If participant does not have a diary card or has not fully completed the diary card:
 - a. Identify problem(s).
 - e.g., Missing diary card
 - e.g., Whole days of information missing
 - e.g., Whole week of a particular variable missing
 - e.g., Examples missing, e.g., for apparently irrelevant behavior
 - e.g., No initials
 - e.g., Incomplete dates
 - e.g., No dates
 - b. Reflect problem(s) to participant.
 - c. Identify what got in the way: Ask participant if she thought of doing the missing elements at any time.
 - If participant says she thought of doing the missing elements, elicit what got in the way each time she thought about it but did not follow through on completion.
 - d. Generate solutions collaboratively with client.
 - e. Summarize solutions.
4. If participant has an entirely complete diary card, praise completeness and ask if participant had any difficulty doing so.
 - a. If so, problem solve (go to 3a and work through 3e).
 - b. If not, proceed to #5.
5. Thank participant for coming to her session.
6. Schedule next session or remind participant of her next session if already scheduled.
 - a. Write next session date and time on clinic appointment card.
 - b. Give client appointment card.

What to do if a participant asks for help that does not appear to relate to the diary card?

1. **Listen to the participant's concerns.** Don't disregard them but also don't devote time to their discussion at the sacrifice of problem solving the diary card.
2. **If possible, link the concerns to diary card completion.** For example, if the participant is asking for help with excessive exercising and the participant identifies that she is so tired from exercising that when she is not exercising, the thought of even picking up a pen to complete the diary card is too exhausting, reflect this connection.
3. **Do not allow this to derail the focus on problem solving diary card completion.** The treatment hierarchy of DBT requires you to place problem solving diary card completion above the discussion of problem eating behaviors.
4. If the client is reporting potentially life-threatening concerns (e.g., syrup of ipecac use, continued purging despite serious medical contraindications, e.g., an esophageal hole), **provide appropriate medical referrals** (see Medical Referral List).
5. **Empathize** with not being able to more fully process concerns.
6. **Encourage the participant to apply the problem solving techniques used for diary card completion to her other concerns.**

Medical Referral List

Physicians

D. Paul Robinson, M.D.	Student Health Center	882-7481
	University Physician's Medical Building 1101 Hospital Drive Columbia, Missouri 65212	
	Pediatric and Adolescent Specialty Clinic	882-6921
	University Physician's Medical Building 1101 Hospital Drive Columbia, Missouri 65212	
Susan Even, M.D.	Family Practice Medicine	882-7481
Christy Tharenos, M.D.	Student Health Center	
Kenneth Ogawa, M.D.	University Physician's Medical Building	
Julaine Stiers, M.D.	1101 Hospital Drive	
Gary Upton, D.O.	Student Health Center	
Alph Wise, M.D.	Columbia, Missouri 65212	
Melissa Lawson, M.D.	Pediatric and Adolescent Specialty Clinic	882-6921
	University Physician's Medical Building 1101 Hospital Drive Columbia, Missouri 65212	

Inpatient Treatment in Missouri

Castlewood Treatment Center <i>Offers: inpatient/residential and intensive outpatient</i>	800 Holland Rd St. Louis, MO 63021 http://www.castlewoodtc.com	1-888-822-8938
McCallum in the Park <i>Offers: inpatient/residential, and outpatient/day programs</i>	100 S. Brentwood Blvd., Suite 350 St. Louis, MO 63105 1-800-828-8158 http://www.mccallumplace.com	1-800-828-8158
Baptist Lutheran Hospital <i>Offers: hospital care, inpatient</i>	6601 Rockhill Road Kansas City, MO 64131 http://www.baptist-lutheranmedicalcenter.com/	816-276-7818

Helpful Websites

Academy for Eating Disorders

<http://www.aedweb.org/>

Information on eating disorders, including prevalence, course, outcome, risk factors, treatment, and an eating disorder professional finder.

National Eating Disorders Association

http://www.edap.org/p.asp?WebPage_ID=337

Information on disordered eating and eating disorders, including diagnoses, dieting, causes, males, and a toll-free information and referral helpline.

Something Fishy Website on Eating Disorders

<http://www.something-fishy.org/>

Resources on anorexia nervosa, bulimia nervosa, and compulsive overeating, including signs and symptoms, recovery information, cultural issues, and treatment finder.

The Alliance for Eating Disorders Awareness

<http://www.eatingdisorderinfo.org/>

Educational information about the warning signs, dangers, and consequences of anorexia nervosa, bulimia nervosa, and other related disorders.

VITA

Angela Cain, daughter of John and Corrinne Gerber, was born June 24, 1981, in Canton, Ohio. She graduated from Strasburg-Franklin High School as valedictorian in 1999. She completed her senior year of coursework for Strasburg-Franklin at the Tuscarawas campus of Kent State University. She then continued her studies as a Founder's Scholar in the Honors College on the main campus in Kent, Ohio. She graduated summa cum laude as co-valedictorian with a B.A. in psychology and minor in women's studies in 2002. Angela then earned her M.A. in clinical psychology from the University of Missouri, Columbia in May 2004. Angela completed her pre-doctoral internship at the University of South Carolina Counseling and Human Development Center in Columbia, South Carolina from August 2008 to July 2009. Angela plans to continue to focus on eating disorder treatment research throughout her career.