Psychological and Dietary Treatments of Binge Eating Disorder: Conceptual Implications

Stephen A. Wonderlich,[1,2]* Martina de Zwaan,[2] James E. Mitchell,[1,2] Carol Peterson,[3] and Scott Crow[3]

[1] Department of Neuroscience, University of North Dakota School of Medicine & Health Sciences, Fargo, North Dakota
[2] Neuropsychiatric Research Institute, Fargo, North Dakota
[3] Department of Psychiatry, Eating Disorders Research Program, University of Minnesota, Minneapolis, Minnesota

Accepted 28 March 2003

Abstract: **Objective:** *The authors review the available literature on psychological and dietary treatment approaches for binge eating disorder (BED).* **Methods:** *Studies were grouped according to psychological versus dietary approaches to BED. Studies were reviewed in terms of general implications, but particular emphasis was placed on drop-out rates, abstinence from binge eating, and weight loss.* **Results:** *Drop-out rates from psychological or dietary approaches to treatment averaged 20% and the presence of binge eating did not confer a greater risk of drop-out among obese individuals. Both psychological and dietary approaches to treatment produced abstinence rates from binge eating of approximately 50% at the 12-month follow-up. Both psychological and dietary approaches show modest efficacy of short-term weight loss, but these effects are generally not sustained in long-term follow-up assessments.* **Discussion:** *Psychological and dietary approaches to BED treatment show reasonable efficacy in binge eating reduction, but limited efficacy in weight loss. These findings are discussed in terms of the validity of the BED construct and the need for more psychopathology studies of BED.* © *2003 by Wiley Periodicals, Inc.* Int J Eat Disord 34: S58–S73, 2003.

Key words: *binge eating disorder; treatment; psychological approach; dietary approach*

INTRODUCTION

In the last decade, there has been an increase in the number of empirical studies of psychological and dietary approaches for the treatment of binge eating disorder (BED). It is noteworthy that the BED literature has been influenced heavily by the bulimia nervosa

Correspondence to: Stephen A. Wonderlich, Ph.D., Department of Neuroscience, University of North Dakota School of Medicine and Health Sciences, 1919 Elm Street North, Fargo, ND 58103. E-mail: stephenw@medicine.nodak.edu

Published online in Wiley InterScience (www.interscience.wiley.com). DOI: 10.1002/eat.10206

(BN) treatment literature, probably due to the fact that both disorders share the common symptom of binge eating as well as other psychological and behavioral characteristics (Marcus & Wing, 1987; Smith, Marcus, & Kaye, 1992). Consequently, treatments that were efficacious for BN patients (e.g., cognitive behavior therapy [CBT], interpersonal therapy [IPT], and dialectical behavior therapy [DBT]) were modified and used in the treatment of BED patients. Each of these treatments is characterized primarily by reducing binge eating and, secondarily, by addressing issues of obesity treatment and weight management. Alternatively, some studies have evaluated structured dieting approaches to the treatment of BED, which directly target weight loss and do not specifically address binge eating reduction (de Zwaan & Mitchell, 2001). These disparate approaches, which differ in their hypothesized mechanisms of action, are somewhat efficacious in the treatment of BED and raise interesting questions about the nature of this construct.

We review the empirical studies of psychological, behavioral, and dieting approaches to BED. After reviewing this literature, we examine how these treatment studies may inform us about the diagnostic validity of BED and show how further psychopathology research on BED may enhance treatment strategies.

PSYCHOLOGICAL AND BEHAVIORAL TREATMENTS OF BED

We review three psychological approaches to BED: CBT, IPT, and DBT. Each of these approaches is a short-term, structured intervention that directly targets a reduction in binge eating (e.g., CBT) or associated mechanisms (e.g., relationships in IPT, affect in DBT) believed to underlie BED. Each of these treatment approaches was based previously on a conceptual model of BN, which was later extrapolated to BED. Early studies of BED were conducted on individuals with BN-nonpurging type. Until the advent of the 4th ed. of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 1994), many individuals with the contemporary diagnosis of BED were most appropriately assigned to the BN-nonpurging type diagnostic category.

CBT

Early CBT for the nonpurging bulimic patient was conducted in a group therapy format (e.g., Telch, Agras, Rossiter, Wilfley, & Kennardy, 1990). The treatment emphasized establishing healthy eating patterns, self-monitoring food intake, developing problem solving skills, and preventing recurrence. A series of empirical trials revealed several significant findings. First, by the end of short-term treatment, CBT consistently reduced binge eating more than no treatment control conditions, but percentage reductions in binge eating episodes ranged dramatically from less than 50% to greater than 90% (Telch et al., 1990; Wilfley et al., 1993). Second, in spite of substantial reductions in binge eating, the percentage of subjects who were abstinent from binge eating at the end of treatment was considerably less and ranged from 41% to 66% (Agras et al., 1995; Agras, Telch, Arnow, Eldredge, & Marnell, 1997; Eldredge et al., 1997). However, some studies demonstrated higher abstinence rates (Wilfley et al., 2002). Third, the significant reductions in binge eating and moderate abstinence rates in CBT subjects waned over time, but generally remained improved over baseline levels (Agras et al., 1997; Telch et al., 1990; Wilfley et al., 2002).

In a series of studies of BED individuals who failed to respond to CBT, Eldredge et al. (1997) found that extending CBT treatment for an additional 12 weeks resulted in a

significant decrease in binge eating, whereas Agras et al. (1995) found that the provision of IPT to CBT nonresponders did not produce significant reductions in binge frequency or abstinence rates. Although CBT is relatively ineffective in promoting weight loss in obese binge eaters, individuals who do reach binge abstinence are most likely to maintain weight loss at the 12–18-month follow-up (Agras et al., 1995, 1997).

In a recent study comparing cognitive therapy (CT) with behavioral therapy (BT) in the reduction of binge eating and weight loss in BED and non-BED obese subjects, Nauta, Hospers, Kok, and Janssen (2000) found differential results of these treatments for binge reduction versus weight reduction. CT was more effective than BT in terms of abstinence from binge eating at the 6-month follow up (86% vs. 44%), but BT resulted in greater weight loss than CT at the 6-month follow-up (−2.4 kg vs. +0.1 kg). Subjects diagnosed with BED at pretreatment were more likely to show weight gain at follow-up than non-BED individuals.

Self-Help Treatment of BED

Several studies have found that cognitive-behavioral techniques, including self-monitoring, stimulus control, nutritional rehabilitation, problem solving, and cognitive restructuring, can be delivered to individuals with BED using self-help formats. Self-help approaches provide a number of advantages over traditional treatment because they are cost-effective and easily disseminated. Using a self-help manual (Fairburn, 1995), Carter and Fairburn (1998) compared a self-help condition with a guided self-help condition that included several sessions with a paraprofessional. At the end of treatment, abstinence rates were 50% and 43% for the guided self-help and self-help conditions, respectively, both of which were significantly better than the wait-list control group. Improvements were maintained at the 6-month follow-up. Similar abstinence rates were found in an uncontrolled study using the same manual with biweekly telephone guidance for 3 months (Wells, Garvin, Dohm, & Striegel-Moore, 1997).

Self-help strategies also have been utilized in a group format. Using the cognitive-behavioral approach of Peterson and Mitchell (1996), Peterson et al. (1998) evaluated four types of groups: therapist-led, in which the therapist provided psychoeducational material for the first half of the session and led a discussion and homework review for the second half; therapist-assisted, in which group members observed a videotape of the psychoeducational lecture, followed by a discussion led by a clinician; structured self-help, in which participants watched the psychoeducational videotape and then led their own discussion; and a wait-list control group. No differences were found in improvements in binge eating or abstinence rates for the three treatment groups. All were significantly better than the wait-list control group and improvements in binge eating were maintained at the 6-month and 12-month follow-up assessments (Peterson et al., 2001). In summary, self-help investigations are efficacious for a subgroup of individuals with BED. Preliminary findings indicate that self-help interventions can be delivered individually using treatment manuals, as well as in group formats. Further studies will need to determine which individuals with BED can benefit from minimal treatment approaches that utilize self-help approaches.

IPT

IPT (Fairburn et al., 1991) is a well-known psychotherapeutic treatment in the BN treatment literature that has been studied recently in the treatment of BED. Wilfley and colleagues have conducted the two most substantial studies of the comparative efficacy

of CBT and IPT for BED. In the first study, Wilfley et al. (1993) randomized 56 nonpurging bulimic individuals to either CBT or IPT. Both treatments were more effective than a wait-list control condition in reducing the number of binge days at the end of treatment, although both treatments were associated with significant increases in binge eating at the 1-year follow-up. The rates of abstinence for at least 1 week at the 12-month follow-up were comparable between the two conditions (CBT = 46%, IPT = 40%), but neither resulted in significant weight loss.

In a larger replication of this earlier study, Wilfley et al. (2002) found that binge eating rates were reduced significantly after 20 weeks of either CBT or IPT and that the treatments were comparable in efficacy. Although binge eating rates increased at the 1-year follow up, 59% of CBT subjects and 62% of IPT subjects remained abstinent. Similar to the earlier findings, abstinence from binge eating in either treatment condition enhanced long-term weight loss, which did not differ between CBT or IPT at the 1-year follow-up. Many questions about treatment specificity were raised in this study. IPT was equal to CBT in reductions in dietary restraint at long-term follow up, even though dietary restraint is not targeted in IPT. Similarly, CBT was equal to IPT in enhancing interpersonal functioning, although CBT did not explicitly target interpersonal behavior. Wilfley and colleagues concluded that further studies are needed to examine the specificity of the effects of both IPT and CBT and that the inclusion of a nonspecific treatment condition should be considered in future treatment studies of BED.

DBT

Recent studies reported that negative emotional states may have a significant role in precipitating binge eating in individuals with BED (Agras & Telch, 1998; Telch & Agras, 1996). Because binge eating may serve as a way to cope with underlying affective conditions, researchers considered the efficacy of DBT (Linehan, 1993) to treat individuals with BED. DBT targets emotion regulation and has been used with some degree of efficacy in the treatment of borderline personality disorder (Linehan, Armstrong, Suarez, Allmond, & Heard, 1991). Two studies examined the efficacy of DBT for BED females. In an uncontrolled study, Telch, Agras, and Linehan (2000) found that a 20-week trial of DBT resulted in a substantial reduction in binge eating and an 82% binge eating abstinence rate at posttreatment. The abstinence rate decreased to 70% at the 6-month follow-up and the average weight loss for subjects at the 6-month follow-up was 3.9 kg. In a controlled replication of this trial, Telch, Agras, and Linehan (2001) found that DBT was more effective than a wait-list control condition in the reduction of binge eating and produced an abstinence rate of 89% at the end of treatment, which decreased to 56% at the 6-month follow-up. DBT showed at least modest weight loss (2.5 kg) at the end of treatment, but the authors did not include follow-up data on weight regain.

DBT is a promising treatment for BED individuals. It has reasonable efficacy in reducing binge eating, but its long-term effectiveness is uncertain. The two studies by Telch et al. raised an important issue regarding mediational mechanisms. DBT is designed to modify emotional behavior, but modifications in affective variables were minimal (Telch et al., 2001). The only mood variable that decreased in the context of DBT was an anger scale, but other measures of negative affect showed less evidence of change, even though binge eating decreased. Future studies of the effectiveness of DBT on BED should carefully examine mood-related mediational mechanisms to determine if DBT has the expected effect on these intervening variables.

DIETING TREATMENTS FOR BED

Whereas CBT for BED places a primary emphasis on binge eating reduction and a secondary emphasis on weight loss, diet approaches to BED treatment have focused on primary efforts to promote weight loss with secondary emphasis on binge eating reduction. Although many of these dieting treatments retain the behavioral characteristics seen in CBT for BED, the behavioral interventions do not include strategies to reduce or prevent binge eating. They only limit calorie intake and increase exercise.

Very Low Calorie Diets (VLCD)

At least seven studies have examined the effect of VLCDs on BED individuals. Typically, VLCDs are conducted under medical supervision and are accompanied by comprehensive weight management programs that include behavioral interventions and nutritional education (Wadden & Bartlett, 1992). The caloric intake in VLCD is usually around 800 kcal a day plus recommended allowances of vitamins and minerals. After subjects emerge from the fasting portion of the VLCD, they enter a weight stabilization phase of approximately 6 weeks during which they eat a balanced diet of approximately 1,200 kcal a day. Early studies examined whether the presence of binge eating had a negative impact on VLCDs for obese individuals. These studies demonstrated that the presence of binge eating does not reduce the effectiveness of VLCD programs for weight loss and that obese individuals lose approximately 20 kg during the dieting program, regardless of binge eating status (LaPorte, 1992), which is maintained at the 6-month follow up (Wadden, Foster, & Letizia, 1992; Yanovski, Gormally, Leser, Gwirtsman, & Yanovski, 1994). There is no evidence to suggest that the BED subjects lose less weight than non-BED subjects in VLCD programs. However, Gladis et al. (1998) reported that BED subjects maintain greater weight loss at the 12-month follow-up than do non-BED obese subjects.

Two recent reports demonstrated that individuals with BED do as well in the VLCD programs as non-BED subjects (de Zwaan et al., 2003; Raymond, de Zwaan, Mitchell, Ackard, & Thuras, 2002), but these studies also examined the effect of VLCDs on binge eating. The results demonstrated that individuals with BED were able to lose a significant amount of weight on the VLCD (17.5 kg at the end of treatment; Raymond et al., 2002). However, similar to non-BED subjects, BED subjects regained approximately three fourths of that weight at the 1-year follow-up. Both reports indicated that VLCDs had a significant impact on binge eating. For example, 57% and 33% of BED subjects no longer met diagnostic criteria at the 6-month (Raymond et al., 2002) and 12-month follow-ups (de Zwaan et al., 2003), respectively. These studies showed that BED individuals do as well as non-BED obese individuals in VLCD treatment. This treatment approach also has a significant impact on binge eating behavior, in spite of the absence of any specific intervention targeting binge eating. de Zwaan et al. (2003) included a structured CBT phase for BED after the weight loss component of their VLCD program. Their conclusion was that the CBT for BED conferred no additional benefit on binge eating or weight loss.

Finally, there has also been interest in whether or not BED individuals would adhere to a VLCD program. Although one study found that BED subjects were less likely to adhere to the fasting phase of the diet plan and drop out of VLCD treatment (Yanovski et al., 1994), most studies have failed to find any significant differences between BED and non-BED subjects in drop-out rates (de Zwaan et al., 2003; LaPorte, 1992; Wadden et al., 1992).

Behavioral Self-Management Strategies for Weight Control

Several studies have compared the LEARN weight management program (Brownell, 1989) with no treatment conditions or alternative weight loss treatments in studies of BED subjects. The LEARN program emphasizes self-control methods to regulate eating and exercise patterns, including self-monitoring, stimulus control, social support, problem solving, and goal setting. Porzelius, Houston, Smith, Arfken, and Fisher (1995) compared the LEARN program with another weight loss program designed specifically for the treatment of the obese binge eating individual (OBET). The OBET program is similar to a DBT type intervention. For example, participants are assisted to cope with emotions that may contribute to binge eating and are encouraged to seek supportive social relationships. They also learn to reduce restrictive dieting patterns that may contribute to binge eating behavior. Both treatments had equivalent drop-out rates (15%). The results indicated that participants with the most severe binge eating problems responded better to the OBET program than to the LEARN program, with an average weight loss of 8.17 kg. Similarly, Reeves et al. (2001) compared the LEARN program to a wait-list control condition with 98 obese binge eating women. They found that although there was no difference between the groups in weight loss at 6 months, the LEARN program significantly reduced binge eating. However, the LEARN program failed to result in a marked improvement in macronutrient choice at the 6-month follow up, which may explain its relative ineffectiveness in achieving weight loss.

Finally, Goodrick et al. (1998) compared a dieting program that included the LEARN program with a nondieting treatment condition and a wait-list control with 219 binge eating obese individuals. The nondieting program focused on reducing restrictive eating, enhancing self and body acceptance, and implementing changes in exercise patterns. Both the LEARN program and the nondiet approach were equally effective in reducing binge eating at the 6 and 12-month follow-ups and both were more effective than the wait-list control. However, the diet program was slightly more effective than the nondiet program in achieving weight loss at the 6-month follow-up, but this difference was minimal at the 18-month follow-up, at which time both groups were approximately 1 kg over baseline weight.

SUMMARY: DROP-OUT RATES, ABSTINENCE RATES FROM BINGE EATING, AND WEIGHT LOSS

Table 1 presents outcomes for published studies that either compared BED treatments or compared the efficacy of a treatment for BED and non-BED obese participants on three variables: drop-out rates from treatment, abstinence rates from binge eating, and weight loss. All of the studies were conducted in a group setting as opposed to individual treatment. Drop-out rates from psychotherapy studies of BED are usually less than 20%. Among obese individuals, the presence of BED does not indicate a greater risk of drop-out from treatment. Although differences between psychotherapeutic treatments in drop-out rates have not been tested comprehensively, there does not appear to be a significant difference in drop-out likelihood across different approaches. Conversely, early studies of VLCDs revealed slightly higher drop-out rates among BED subjects (e.g., 32% in Laporte, 1992; 47% in Wadden et al., 1992), but other studies of VLCDs reported lower drop-out rates (13% in de Zwaan et al., 2003; 24% in Yanovski et al., 1994).

Table 1. Effect of psychotherapeutic and dietary BED treatments on rates of drop-out, abstinence from binge eating, and weight loss

Study	Sample Size	Percent Drop-Out of Active Treatment	Percent of BED Subjects Abstinent or Fail to Meet Criteria for BED after Treatment			Weight Loss		
			Posttreatment	6 Months	12–18 Months	Posttreatment	6 Months	12–18 Months
Psychotherapy studies								
Wilfley et al. (2002)								
IPT	81 BED	11.1%	73% abstinent		62% abstinent			No CBT-IPT treatment difference
CBT	81 BED	8.6%	79% abstinent		59% abstinent			Abstainers (−2.4 kg) Nonabstainers (−4.6 kg)
Marchesini et al. (2002)								
CBT for BED + Learn	46 BED 46 NBED	38% (CBT) —					−7.7 kg (BED) −11.1 kg (NBED)	
WLC	76 Obese	—					—	
Telch, Agras, & Linehan (2001)								
DBT	22 BED	22%	89% abstinent (4 weeks)	56% abstinent (4 weeks)		−2.5 kg		
WLC	22 BED	27%	13% abstinent (4 weeks)	—		+0.18 kg		
Nauta, Hospers, Kok, & Jansen (2000)								
CT	37 BED	16% BED	67% abstinent in CT	86% abstinent in CT		−0.8 kg (CT)	+0.1 kg (CT)	
BT	37 NBED	11% NBED	44% abstinent in BT	44% abstinent in BT		−5.5 kg (BT)	−2.4 kg (BT)	
Eldredge et al. (1997)								
Combination of CBT/Learn (12–24 weeks)	36 BED	19%	66% abstinent (2 weeks)					
WLC	10 BED	20%	—					
Agras, Telch, Arnow, Eldredge, & Marnell (1997)								
CBT + Learn	75 BED (1-year follow-up)	N/A	41% abstinent (2 weeks)		33% abstinent (2 weeks)	−1.8 kg		+.05 kg Abstainers (−4.0 kg) Nonabstainers (+3.6 kg)

Agras et al. (1995)								
CBT ± Learn or IPT	39 BED	13%	55% (2 weeks) after CBT				−4.8 kg (CBT + LEARN)	
WLC	11 BED	9%					+4.7 kg (CBT + IPT)	
Wilfley et al. (1993)								
CBT	18 BN-nonpurge	33%	28% abstinent (1 week)		46% abstinent (1 week)			−0.0 kg
IPT	18 BN-nonpurge	11%	44% abstinent (1 week)		40% abstinent (1 week)			−3.0 kg
WLC	20 BN-nonpurge	0%	0% abstinent (1 week)					—
Telch, Agras, Rossiter, Wilfley, & Kenardy (1990)								
CBT	23 BN-nonpurge	17%	79% abstinent (1 week)	46% abstinent (1 week)		+.31 kg		
WLC	21 BN-nonpurge	0%	0% abstinent (1 week)	—		+.92 kg		
Dietary studies								
de Zwaan et al. (2002)								
VLCD ± CBT	71 BED	13%			33% abstinent			−5.6% baseline
	83 NBED	22%						−5.6% baseline
Raymond, de Zwaan, Mitchell, Ackard, & Thuras (2002)								
VLCD ± CBT	63 BED			57% no longer BED		−17.5 kg		−5.25 kg
	36 Sub-BED					−19.1 kg		−5.4 kg
	29 NBED					−13.8 kg		−4.3 kg
Gladis et al. (1998)								
Diet + BT + exercise	14 BED	14.5%					−23.1 kg	−22.7 kg
	23 Sub-BED	21.7%					−17.2 kg	−14.6 kg
	22 Episodic overeat	22.7%					−14.6 kg	−12.8 kg
	50 No overeat	13.5%					−16.4 kg	−13.8 kg
Reeves et al. (2001)								
Behavioral self-management	59 BE	22%					−0.9 kg	
WLC	39 BE	7.6%					0 kg	

(*Continued*)

Table 1. Continued

Study	Sample Size	Percent Drop-Out of Active Treatment	Percent of BED Subjects Abstinent or Fail to Meet Criteria for BED after Treatment			Weight Loss		
			Posttreatment	6 Months	12–18 Months	Posttreatment	6 Months	12–18 Months
Goodrick et al. (1998)								
Diet treatment	79 BE	15%					−.57 kg	+1.0 kg
Nondiet treatment	78 BE	17%					+1.35 kg	+1.0 kg
WLC	62 BE	6%					+0.64 kg	
Porzelius, Houston, Smith, Arfken, & Fisher (1995)								
Standard behavioral weight loss	No binge—8 Moderate—8 Severe—9	16%—Standard treatment				Severe BE Standard treatment (−6.1 kg)		Severe BE Standard treatment (+3.0 kg)
OBET	No binge—8 Moderate—10 Severe—11	14% OBET				OBET (−4.7 kg)		OBET (−8.17 kg)
Yanovski, Gormally, Leser, Gwirtsman, & Yanovski (1994)								
VLCD + BT	21 BED	24%—1 year					−19.6 kg	
	17 NBED	0%—1 year					−21.3 kg	
Telch & Agras (1993)								
VLCD + BT	20 BED	—			39% no longer BED			−10 kg
	71 NBED							−10 kg
LaPorte (1992)								
VLCD + BT	27 BED	32%				−18.7 kg		
	24 NBED	17%				−20.23 kg		
Wadden, Foster, & Letizia (1992)								
VLCD + BT	29 BED	47%					−21.5 kg	
	180 NBED	37%					−21.7 kg	

Note: BED = binge eating disorder; IPT = interpersonal therapy; CBT = cognitive-behavioral therapy; DBT = dialectical behavior therapy; WLC = weight loss control; CT = cognitive therapy; BT = behavior therapy; NBED = non-BED; VLCD = very low calorie diet; OBET = obese binge eating treatment; BE = binge eating.

Overall, the drop-out rate from psychological or dietary approaches to treatment is about 20% and the presence of binge eating does not confer a greater risk of drop-out.

Psychotherapeutic approaches to BED treatment have produced a binge eating abstinence rate of about 50% at the 12-month follow-up (range = 33%–62%). VLCD approaches to treatment, which do not target binge eating, have resulted in nearly equivalent rates of abstinence from binge eating at the 12-month follow-up (i.e., 33% in de Zwaan et al., 2003; 56% in Raymond et al., 2002). About one half of BED subjects who receive treatment will reach abstinence from binge eating within 1 year. However, definitions and measurements of abstinence vary substantially across studies. Longer-term follow-up studies are needed and would clarify the stability of the abstinence from binge eating outcome.

As Table 1 indicates, the psychological approaches to BED treatment yielded relatively minimal effects on weight loss at the 12-month follow-up. There were no substantial differences between treatment approaches, with the possible exception that BT may be better than CT for weight loss (Nauta et al., 2000). The most consistent finding is that regardless of the treatment approach, long-term weight loss is predicted significantly by a long-term abstinence from binge eating. It is likely that a subset of individuals will maintain a modest (i.e., 5%) weight loss after behavioral treatment for BED, which may confer significant health-related benefits (Wilfley et al., 2002). The dietary approaches to treatment have been somewhat more effective in terms of short-term weight loss than psychotherapeutic approaches, with 6 month follow-up revealing weight loss of nearly 20 kg and 12 month follow-ups of VLCDs averaging about 10 kg lost. The Gladis et al. (1998) study is remarkable in its 12-month weight loss findings for BED patients (i.e., 22.7 kg lost), but these authors note that on average, their subjects regained 46% of the weight lost. Although various approaches to BED treatment produce fairly high rates of binge eating abstinence, particularly in the short term, the efficacy for long-term weight loss is less substantial.

DOES PHARMACOTHERAPY ADD TO THE EFFECTIVENESS OF PSYCHOTHERAPY OR DIET TREATMENTS FOR BED?

Studies of combined psychotherapy and medication approaches to the treatment of BED are increasing. Many have added antidepressants, in dosages that are effective in the treatment of BN, to CBT with or without behavioral weight loss treatment (e.g., 60 mg fluoxetine, 300 mg fluvoxamine: Devlin, 2002; Grilo, Masheb, Heninger, & Wilson, 2002; Ricca et al., 2001; desipramine: Agras et al., 1994; imipramine: Laederach-Hofmann et al., 1999). Three of these studies were placebo controlled. In the remaining two studies (Agras et al., 1994; Ricca et al., 2001), the medication was added openly but in a randomized manner. In the three studies that allowed a comparison, CBT was consistently superior to drug treatment alone (Devlin, 2002; Grilo et al., 2002; Ricca et al., 2001). The most striking result was that in four of the five studies, medication did not add to the efficacy of CBT in reducing binge eating frequency (Agras et al., 1994; Devlin, 2002; Grilo et al., 2002; Ricca et al., 2001). Only one study (Laederach-Hofmann et al., 1999) found that medication (i.e., 75 mg imipramine) decreased binge eating episodes when added to psychological treatment during acute treatment and that the result was maintained 6 months after withdrawal of the drug. This study should be viewed cautiously because the dosage of imipramine was low and no other study in BN or BED has supported the finding that an 8-week course of medication has a persistent effect on binge eating.

Antidepressant medication may enhance weight loss beyond the effects of CBT and behavioral weight loss treatment. Agras et al. (1994) reported that of patients who had completed 3 months of group CBT and who had received either open-label desipramine plus weight loss treatment or weight loss treatment alone, the desipramine-treated group lost significantly more weight during treatment and follow-up. In addition, they demonstrated that patients who stopped binge eating entirely lost significantly more weight than those who were not abstinent, irrespective of the treatment they received. This finding was later replicated by Grilo et al. (2002) and Devlin (2002).

The two most rigorously controlled conbination treatment studies are still ongoing and only preliminary results are available (Devlin, 2002; Grilo et al., 2002). Both studies used a four-cell design: individual CBT plus 60 mg fluoxetine or placebo, fluoxetine alone, and placebo alone over a 16-week period. In the Devlin study, all patients also received behavioral weight loss treatment in addition to CBT and fluoxetine. The results were consistent with earlier findings. The author reported significantly higher remission rates for CBT compared with either fluoxetine or placebo alone and fluoxetine did not add to the effects of CBT on remission rates. In both studies, fluoxetine alone did not differ from placebo. This is surprising given the drug's effectiveness in patients with BN and given the superiority of a wide range of drugs (including SSRIs) in controlled pharmacologic treatment trials in BED. Unfortunately, long-term follow-up results of these two studies are not available yet.

CONCEPTUAL ISSUES FOR FUTURE BED TREATMENT RESEARCH

Collectively, the prospective longitudinal studies of BED (Cachelin et al., 1999; Fairburn, Cooper, Doll, Norman, & O'Connor, 2000) and treatment outcome studies reviewed in this article suggest that BED is an unstable and remitting state. It is associated with an increased risk of later obesity and negative health-related outcomes and responds, in the short term, to a variety of treatment interventions. BED may be viewed as a complex condition with multiple pathophysiologic pathways or maintenance mechanisms that are targeted differentially by a variety of treatments, all of which result in some reduction of symptoms. Conversely, the improvement in BED treatment studies may reflect a nonspecific effect found in interventions ranging from self-help CBT to relatively complex DBT interventions. For example, IPT resulted in changes in cognitive disturbance related to weight, shape, and eating, whereas CBT produced improvements in interpersonal functioning (Wilfley et al., 2002). The results obtained, which were not specifically predicted or targeted by these treatments, are consistent with a nonspecific treatment effect. Similarly, Nauta et al. (2000) found that a behavioral treatment intending to reduce dietary restraint slightly increased dietary restraint in BED subjects, but that in spite of this increase, binge eating rates were still decreased. In addition, treatments that promote dietary restraint, yet reduce binge eating (i.e., VLCDs), raise significant questions about the specificity of mechanisms of action and change. Research in this field would benefit from a careful consideration of the construct of dietary restraint. This construct is operationalized somewhat differently with different measures, which could account for some of the contradictory findings.

Although more treatment studies with nonspecific treatment control conditions are needed (Wilfley et al., 2002), it may be reasonable to reconsider the conceptual origins of BED treatments. It is noteworthy that the first wave of treatments for BED were derived from the BN treatment literature because both conditions involved binge eating.

At the same time, however, researchers were demonstrating the discriminant validity of BED from BN (Brody, Walsh, & Devlin, 1994), a finding that has been replicated (Wilfley, Schwartz, Spurrell, & Fairburn, 2000). Thus, because of basic differences in underlying psychopathology, it may be that the continued application of BN treatments to BED ultimately will be limited. For example, CBT approaches to BED based on BN treatments have targeted dietary restraint, a construct that is identified more with BN than with BED (Brody et al., 1994; Wilfley et al., 2000) and is unlikely to have mediational significance in CBT treatments for BED (Nauta et al., 2000). The significance of dietary restraint in the psychopathology of BED is challenged also by the recent findings that VLCDs do not seem to produce significant binge eating in obese binge eaters. Similar conceptual issues arise from treatment studies of DBT. DBT is somewhat effective in the treatment of BED, even though the treatment had a relatively minimal effect on the DBT target of mood-related functioning (Telch et al., 2001). It may be appropriate to reconsider conceptual models for etiology and maintenance of BED in light of current psychopathology research and base future treatments on carefully developed models of specific BED psychopathology.

Another issue to consider in future BED treatment studies is the measurement system currently employed to assess BED. First, there are questions of convergent validity regarding various approaches to measuring binge eating over time. For example, several studies have now examined the concurrent validity of the Eating Disorder Examination (EDE; Fairburn & Cooper, 1993) and the Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994) in BED. Although one study with BED subjects found relatively poor convergence between these two measures on frequency of days with objective bulimic episodes (Wilfley, Schwartz, Spurrell, & Fairburn, 1997), others have found varying degrees of convergence for different eating-related variables. For example, Grilo, Masheb, and Wilson (2001a, 2001b) found reasonable convergence between the EDE and the EDE-Q in objective binge eating, but a general lack of convergence for subjective bulimic episodes and objective overeating assessments.

The conclusion from these data is that the EDE-Q should not be used in isolation to assess eating behavior. It may miss aspects of these constructs, which are believed to be better identified through carefully conducted interviews with considerable probing and detailed questioning (Carter, Aime, & Mills, 2001). However, as Grilo et al. (2001a, 2001b) argued, even with careful questioning, both the EDE and EDE-Q ultimately rely heavily on retrospective recall of information that may be influenced by numerous memory problems and cognitive biases (Shiffman et al., 1997). Therefore, it is necessary to compare the EDE and the EDE-Q with measures with less risk of retrospective recall bias, such as self-monitoring. Grilo et al. (2001a, 2001b) evaluated this issue in subjects with BED by studying the convergence between daily self-monitoring of binge eating and self-reported retrospective recall of binge eating. Both studies found points of convergence and divergence between these assessment procedures with BED subjects. Self-monitoring of objective binge eating coincided reasonably well with EDE-Q recall of binge eating rates over the previous 7 days. Conversely, self-monitoring and the EDE-Q diverged in assessments of subjective bulimic episodes and objective overeating. Given the lack of a consistent pattern of convergent validity across these three methods of measurement (i.e., interview, self-report, self-monitoring) of relevant binge eating-related behaviors, it is important in future treatment studies to consider carefully the degree of method convergence for different eating-related variables, as well as the advantages and disadvantages of each measurement approach (Wilson,

1987). Whereas interviews and self-report rely on memory processes that may be contaminated by distortion, self-monitoring may carry a reactivity that changes the behavior of interest.

Two other measurement studies (Greeno, Wing, & Shiffman, 2000; Le Grange, Gorin, Catley, & Stone, 2001), although not directly relevant to BED treatment, raise concerns about the construct validity of the BED diagnosis. In both studies, obese individuals were categorized as either obese BED or non-BED obese, based on structured interviewing (i.e., Structured Clinical Interview for DSM-IV (SCID; First, Spitzer, Gibbon, & Williams, 1995) or EDE). Both BED and non-BED subjects completed daily monitoring of well-defined eating behaviors using ecologic momentary assessment (EMA) strategies. To the surprise of investigators in both studies, EMA strategies showed that the non-BED subjects reported high levels of binge eating that were nearly equal in frequency to the BED subjects in one study (Greeno et al., 2000) and equal to the BED subjects in the other study (Le Grange et al., 2001). The Greeno et al. study reported that there were no differences between the BED and non-BED groups in the size of their binge eating episodes (792 vs. 800 kcal, respectively). These authors also found that both BED and non-BED subjects reported a sense of loss of control during binge eating episodes, but it was more pronounced in the BED sample. However, as these authors noted, it is a departure from other eating disorder diagnostic categories to assume that BED is differentiated primarily from non-BED on the basis of a subjective loss of control, but not eating disorder behavior. Granted, these are only two studies and further research is needed. If the diagnosis of BED, as assessed by semistructured interviews, does not predict daily behavior, it is a serious challenge to the diagnostic validity of BED. These EMA studies must be integrated with laboratory findings that suggest that obese BED patients consume more calories during a binge than obese non-BED subjects (Yanovski et al., 1992), although laboratory findings have been contradictory in discriminations between BED and non-BED subjects (Alger, Seagle, & Ravussin, 1995; Goldfein, Walsh, LaChaussee, Kissileff, & Devlin, 1993).

SUMMARY AND CONCLUSIONS

Psychological and dietary approaches to BED treatment reduce binge eating in the short term, but long-term weight loss continues to be a problem. Certain individuals will attain abstinence from binge eating, which predicts a modest but stable degree of weight loss. However, BED is an unstable condition that responds to a variety of treatments. Additional psychopathology studies of BED that utilize a prospective design and control groups to clarify discriminant validity (e.g., both BN and obese non-BED) are needed. Intensive assessment procedures that measure variables of interest multiple times per day (e.g., EMA; Smyth et al., 2001) may provide additional information on the construct validity of diagnostic constructs. Finally, taxometric analyses (Williamson et al., 2002) may provide another approach to clarify distinctions between BED and related conditions. Multiple methods of assessments may be better integrated in a manner that clarifies the diagnostic validity of BED and generate appropriate treatment interventions.

Supported by grants from the National Institute of Health awarded to Dr. Wonderlich (RO1 MH59674), Dr. Mitchell (RO1 MHDK58820, RO1 MH5910, RO1 DK61973, RO1 MH66287), and Dr. Crow (RO1 DK61912, RO1 DK60432, P30 DK50456, RO1 MH59234).

REFERENCES

Agras, W.S., & Telch, C.F. (1998). The effects of caloric deprivation and negative affect on binge eating in obese binge-eating disordered women. Behavior Therapy, 29, 491–503.

Agras, W.S., Telch, C.F., Arnow, B., Eldredge, K., Detzer, M.J., Henderson, J., & Marnell, M. (1995). Does interpersonal therapy help patients with binge eating disorder who fail to respond to cognitive-behavioral therapy? Journal of Consulting and Clinical Psychology, 63, 356–360.

Agras, W.S., Telch, C.F., Arnow, B., Eldredge, K., & Marnell, M. (1997). One-year follow-up of cognitive-behavioral therapy for obese individuals with binge eating disorder. Journal of Consulting and Clinical Psychology, 65, 343–347.

Agras W.S., Telch C.F., Arnow B., Eldredge K., Wilfley D.E., Reaburn S.D., Henderson J., & Marnell M. (1994) Weight loss, cognitive-behavioral, and desipramine treatments in binge eating disorder. An additive design. Behavior Therapy, 25, 225–238.

Alger, S., Seagle, H., & Ravussin, E. (1995). Food intake and energy expenditure in obese female bingers and non-bingers. International Journal of Obesity and Related Metabolic Disorders, 19, 11–16.

American Psychiatric Association. (1994). Diagnostic and statistical manual of mental disorders (4th ed.). Washington, DC: Author.

Brody, M.L., Walsh, B.T., & Devlin, M.J. (1994). Binge eating disorder: Reliability and validity of a new diagnostic category. Journal of Consulting and Clinical Psychology, 62, 381–386.

Brownell, K.D. (1989). The learn program for weight control. Philadelphia: University of Pennsylvania School of Medicine Press.

Cachelin, F.M., Striegel-Moore, R.H., Elder, K.A., Pike, K.M., Wilfley, D.E., & Fairburn, C.G. (1999). Natural course of a community sample of women with binge eating disorder. International Journal of Eating Disorders, 25, 45–54.

Carter, J.C., Aime, A.A., & Mills, J.S. (2001). Assessment of bulimia nervosa: A comparison of interview and self-report questionnaire methods. International Journal of Eating Disorders, 30, 187–192.

Carter, J.C., & Fairburn, C.G. (1998). Cognitive-behavioral self-help for binge eating disorder: A controlled effectiveness study. Journal of Consulting and Clinical Psychology, 66, 616–623.

Devlin, M. (2002, April). Psychotherapy and medication for binge eating disorder. Paper presented at the International Conference on Eating Disorders, Boston, MA.

de Zwaan, M., & Mitchell, J.E. (2001). Binge eating disorder. In J.E. Mitchell (Ed.), The outpatient treatment of eating disorders: A guide for therapists, dietitians, and physicians (pp. 59–96). Minneapolis: University of Minnesota Press.

de Zwaan, M., Mitchell, J.E., Mussell, M.P., Raymond, N.C., Seim, H.C., Specker, S.M., & Crosby, R.D. (2003). Short-term cognitive behavioral treatment does not improve outcome on a comprehensive very-low-calorie diet program in obese women with binge eating disorder (in press).

Eldredge, K.L., Agras, W.S., Arnow, B., Telch, C.F., Bell, S., Castonguay, L., & Marnell, M. (1997). The effects of extending cognitive-behavioral therapy for binge eating disorder among initial treatment nonresponders. International Journal of Eating Disorders, 21, 347–352.

Fairburn, C. (1995). Overcoming binge eating. New York: Guilford Press.

Fairburn, C.G., & Beglin, S.J. (1994). Assessment of eating disorders: Interview or self-report questionnaire? International Journal of Eating Disorders, 16, 363–370.

Fairburn, C.G., & Cooper, Z. (1993). The Eating Disorder Examination (12th ed.). In C.G. Fairburn & G.T. Wilson (Eds.), Binge eating: Nature, assessment and treatment (pp. 317–360). New York: Guilford Press.

Fairburn, C.G., Cooper, Z., Doll, H.A., Norman, P., & O'Connor, M. (2000). The natural course of bulimia nervosa and binge eating disorder in young women. Archives of General Psychiatry, 57, 659–665.

Fairburn, C.G., Jones, R., Peveler, R.C., Carr, S.J., Solomon, R.A., O'Connor, M.E., Burton, J., & Hope, R.A. (1991). Three psychological treatments for bulimia nervosa. Archives of General Psychiatry, 48, 463–469.

First, M.B., Spitzer, R.L., Gibbon, M., & Williams, J.B. (1995). Structured Clinical Interview for the DSM-IV Axis I Disorders – Patient Edition (SCID-I/P, Version 2). New York State Psychiatric Institute, Biometrics Research Department: New York.

Gladis, M.M., Wadden, T.A., Vogt, R., Foster, G., Kuehnel, R.H., & Bartlett, S.J. (1998). Behavioral treatment of obese binge eaters: Do they need different care? Journal of Psychosomatic Research, 44, 375–384.

Goldfein, J.A., Walsh, B.T., LaChaussee, J.L., Kissileff, H.R., & Devlin, M.J. (1993). Eating behavior in binge eating disorder. International Journal of Eating Disorders, 14, 427–431.

Goodrick, G.K., Wadden, T.A., Poston, W.S.C., Kimball, K.T., Reeves, R.S., & Foreyt, J.P. (1998). Nondieting versus dieting treatment for overweight binge-eating women. Journal of Consulting and Clinical Psychology, 66, 363–368.

Greeno, C.G., Wing, R.R., & Shiffman, S. (2000). Binge antecedents in obese women with and without binge eating disorder. Journal of Consulting and Clinical Psychology, 68, 95–102.

Grilo, C.M., Masheb, R.M., Heninger, G., & Wilson, G.T. (2002, April). Psychotherapy and medication for binge eating disorder. Paper presented at the International Conference on Eating Disorders, Boston, MA.

Grilo, C.M., Masheb, R.M., & Wilson, G.T. (2001a). Different methods for assessing the features of eating disorders in patients with binge eating disorder: A replication. Obesity Research, 9, 418–422.

Grilo, C.M., Masheb, R.M., & Wilson, G.T. (2001b). A comparison of different methods for assessing the features of eating disorders in patients with binge eating disorder. Journal of Consulting and Clinical Psychology, 69, 317–322.
Laederach-Hofman, K., Graf, C., Horber, F., Lippuner, K., Lederer, S., Michel, R., & Schneider, M. (1999). Imipramine and diet counseling with psychological support in the treatment of obese binge eaters: A randomized, placebo-controlled double-blind study. International Journal of Eating Disorders, 26, 231–244.
LaPorte, D.J. (1992). Treatment response in obese binge eaters: Preliminary results using a very low calorie diet (VLCD) and behavior therapy. Addictive Behavior, 17, 247–257.
Le Grange, D., Gorin, A., Catley, D., & Stone, A.A. (2001). Does momentary assessment detect binge eating in overweight women that is denied at interview? European Eating Disorders Review, 9, 309–324.
Linehan, M.M. (1993). Cognitive behavioral therapy of borderline personality disorder. New York: Guilford Press.
Linehan, M.M., Armstrong, H.E., Suarez, A., Allmond, D., & Heard, H.L. (1991). Cognitive-behavioral treatment of chronically parasuicidal borderline patients. Archives of General Psychiatry, 48, 1060–1064.
Marchesini, G., Natale, S., Chierici, S., Manini, R., Besteghi, L., Di Domizio, S., Sartini, A., Pasqui, F., Baraldi, L., Forlani, G., & Melchionda, N. (2002). Effects of cognitive-behavioural therapy on health-related quality of life in obese subjects with and without binge eating disorder. International Journal of Obesity, 26, 1261–1267.
Marcus, M.D., & Wing, R.R. (1987). Binge eating among the obese. Annals of Behavioral Medicine, 9, 23–27.
Nauta, H., Hospers, H., Kok, G., & Jansen, A. (2000). A comparison between a cognitive and a behavioral treatment for obese binge eaters and obese non-binge eaters. Behavior Therapy, 31, 441–461.
Peterson, C.B., & Mitchell, J.E. (1996). Treatment of binge-eating disorder in group cognitive-behavioral therapy. In J. Werne (Ed.), Treating eating disorders (pp. 143–186). San Francisco: Jossey-Bass.
Peterson, C.B., Mitchell, J.E., Engbloom, S., Nugent, S., Mussell, M.P., Crow, S.J., & Thuras, P. (2001). Self-help versus therapist-led group cognitive-behavioral treatment of binge eating disorder at follow-up. International Journal of Eating Disorders, 30, 363–374.
Peterson, C.B., Mitchell, J.E., Engbloom, S., Nugent, S., Mussell, M.P., & Miller, J.P. (1998). Group cognitive-behavioral treatment of binge eating disorder: A comparison of therapist-led versus self help formats. International Journal of Eating Disorders, 24, 125–136.
Porzelius, L.K., Houston, C., Smith, M., Arfken, C., & Fisher, E. (1995). Comparison of a standard behavioral weight loss treatment and a binge eating weight loss treatment. Behavioral Therapy, 26, 119–134.
Raymond, N.C., de Zwaan, M., Mitchell, J.E., Ackard, D., & Thuras, P. (2002). Effect of a very low calorie diet on the diagnostic category of individuals with binge eating disorder. International Journal of Eating Disorders, 31, 49–56.
Reeves, R.S., McPherson, R.S., Nichaman, M.Z., Harrist, R.B., Foreyt, J.P., & Goodrick, G.K. (2001). Nutrient intake of obese female binge eaters. Journal of the American Dietetic Association, 101, 209–215.
Ricca, V., Mannucci, E., Mezzani, B., Moretti, S., Di Bernardo, M., Bertelli, M., Rotella, C.M., & Faravelli, C. (2001). Fluoxetine and fluvoxamine combined with individual cognitive-behaviour therapy in binge eating disorder: A one-year follow-up study. Psychotherapy and Psychosomatics, 70, 298–306.
Shiffman, S., Hufford, M., Hickcox, M., Paty, J.A., Gnys, M., & Kassel, J.D. (1997). Remember that? A comparison of real-time versus retrospective recall of smoking lapses. Journal of Consulting and Clinical Psychology, 65, 292–300.
Smith, D.E., Marcus, M.D., & Kaye, W. (1992). Cognitive-behavorial treatment of obese binge eaters. International Journal of Eating Disorders, 12, 257–262.
Smyth, J., Wonderlich, S., Crosby, R., Miltenberger, R., Mitchell, J., & Rorty, M. (2001). The use of ecological momentary assessment approaches in eating disorder research. International Journal of Eating Disorders, 30, 83–95.
Telch, C.F., & Agras, S.W. (1993). The effects of a very low calorie diet on binge eating. Behavior Therapy, 24, 177–193.
Telch, C.F., & Agras, W.S. (1996). Do emotional states influence binge eating in the obese? International Journal of Eating Disorders, 20, 271–279.
Telch, C.F., Agras, W.S., & Linehan, M.M. (2000). Group dialectical behavior therapy for binge-eating disorder: A preliminary, uncontrolled trial. Behavior Therapy, 31, 569–582.
Telch, C.F., Agras, W.S., & Linehan, M.M. (2001). Dialectical behavior therapy for binge eating disorder. Journal of Consulting and Clinical Psychology, 69, 1061–1065.
Telch, C.F., Agras, W.S., Rossiter, E.M., Wilfley, D., & Kenardy, J. (1990). Group cognitive-behavioral treatment for the nonpurging bulimic: An initial evaluation. Journal of Consulting and Clinical Psychology, 58, 629–635.
Wadden, T.A., & Bartlett, S.J. (1992). Very low calorie diets: An overview and appraisal. In: T.A. Wadden & T.B. VanItallie (Eds.), Treatment of the seriously obese patients (pp. 44079). New York: Guilford Press.
Wadden, T.A., Foster, G.D., & Letizia, K.A. (1992). Response of obese binge eaters to treatment by behavior therapy combined with very low calorie diet. Journal of Consulting and Clinical Psychology, 60, 808–811.
Wells, A.M., Garvin, V., Dohm, F., & Striegel-Moore, R.H. (1997). Telephone-based guided self-help for binge eating disorder: A feasibility study. International Journal of Eating Disorders, 21, 341–346.
Wilfley, D.E., Agras, S.W., Telch, C.F., Rossiter, E.M., Schneider, J.A., Cole, A.G., Sifford, L., & Raeburn, S.D. (1993). Group cognitive-behavioral therapy and group interpersonal psychotherapy for the nonpurging bulimic individual: A controlled comparison. Journal of Consulting and Clinical Psychology, 61, 296–305.

Wilfley, D.E., Schwartz, M.B., Spurrell, E.B., & Fairburn, C.G. (1997). Assessing the specific psychopathology of binge eating disordered patients: Interview or self-report? Behavior Research Therapy, 12, 1151–1159.
Wilfley, D.E., Schwartz, M.B., Spurell, E.B., & Fairburn, C.G. (2000). Using the Eating Disorder Examination to identify the specific psychopathology of binge eating disorder. International Journal of Eating Disorders, 27, 259–269.
Wilfley, D.E., Welch, R.R., Stein, R.I., Spurrell, E.B., Cohen, L.R., Saelens, B.E., Dounchis, J.Z., Frank, M.A., Wiseman, C.V., & Matt, G.E. (2002). A randomized comparison of group cognitive-behavioral therapy and group interpersonal psychotherapy for the treatment of overweight individuals with binge-eating disorder. Archives of General Psychiatry, 59, 713–721.
Williamson, D.A., Womble, L.G., Smeets, M.A.M., Netemeyer, R.G., Thaw, J.M., Kutlesic, V., & Gleaves, D.H. (2002). Latent structure of eating disorder symptoms: A factor analytic and taxometric investigation. The American Journal of Psychiatry, 159, 412–418.
Wilson, G.T. (1987). Assessing treatment outcome in bulimia nervosa: A methodological note. International Journal of Eating Disorders, 6, 339–348.
Yanovski, S.Z., Gormally, J.F., Leser, M.S., Gwirtsman, H.E., & Yanovski, J.A. (1994). Binge eating disorder affects outcome of comprehensive very-low-calorie diet treatment. Obesity Research, 2, 205–212.
Yanovski, S.Z., Leet, M., Yanovski, J.A., Flood, M., Gold, P.W., Kissileff, H.R., & Walsh, B.T. (1992). Food selection and intake of obese women with binge-eating disorder. American Journal of Clinical Nutrition, 56, 975–980.