

Adapted Motivational Interviewing for Women With Binge Eating Disorder: A Randomized Controlled Trial

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In this randomized controlled trial, 108 women with binge-eating disorder (BED) recruited from the community were assigned to either an adapted motivational interviewing (AMI) group (1 individual AMI session + self-help handbook) or control group (handbook only). They were phoned 4, 8, and 16 weeks following the initial session to assess binge eating and associated symptoms (depression, self-esteem, quality of life). Postintervention, the AMI group participants were more confident than those in the control group in their ability to change binge eating. Although both groups reported improved binge eating, mood, self-esteem, and general quality of life 16 weeks following the intervention, the AMI group improved to a greater extent. A greater proportion of women in the AMI group abstained from binge eating (27.8% vs. 11.1%) and no longer met the binge frequency criterion of the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; American Psychiatric Association, 2000) for BED (87.0% vs. 57.4%). AMI may constitute a brief, effective intervention for BED and associated symptoms.

Keywords: motivational interviewing, motivational enhancement therapy, binge-eating disorder, eating disorders, randomized controlled trial

The field of addictions has provided evidence that a clinician's behavior can significantly influence the client's motivation for change (Moyers & Martin, 2006). The notion that motivation arises from the client-clinician interaction rather than residing solely within the client led to the development of motivational interviewing (MI)—a client-centered, directive method for enhancing intrinsic motivation for change (Miller & Rollnick, 1991). A client's readiness for change is hypothesized to stem from both the perceived importance of the change and the confidence the client has about successfully making the change (i.e., self-efficacy;

Burke, Arkowitz, & Menchola, 2003). MI aims to increase the importance of change from the client's perspective and is tailored according to the client's stage of change (i.e., precontemplation, contemplation, preparation, action, or maintenance) (Prochaska & DiClemente, 1992) because attempts to prescribe change for individuals who are ambivalent about making serious lifestyle alterations are likely to be met with resistance (Treasure et al., 1999). MI has been combined with other intervention components, and this combined approach is known as adapted MI, or AMI (Burke et al., 2003). The term *AMI* refers to motivational interventions that provide personalized assessment feedback (traditional motivational enhancement therapy) as well as manualized forms of MI, which include intervention components but not personalized assessment feedback.

A meta-analysis examining the efficacy of AMI in randomized controlled trials found that, relative to no treatment and/or placebo comparison groups, AMI yielded medium effects in the areas of drug addiction ($d = 0.56$) and diet and exercise ($d = 0.53$) and small to medium effects in the area of alcohol problems ($d = 0.25$ to 0.53 ; Burke et al., 2003). AMI also yielded moderate effects ($d = 0.47$) on social impact measures such as social, occupational, and physical problems related to the target behavior (Burke et al., 2003).

Adapted Motivational Interviewing for Eating Disorders

The ambivalence about change and resistance to treatment of individuals with eating disorders have frequently been compared with those of individuals with substance abuse problems (Vitousek, Watson, & Wilson, 1998), yet few empirical studies have examined the efficacy of AMI in eating disorder samples. Feld, Woodside, Kaplan, Olmsted, and Carter (2001) evaluated four hourlong sessions of group AMI for individuals with anorexia and

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bulimia nervosa. AMI increased self-esteem and motivation for change and decreased depression symptoms, suggesting that AMI may exert positive effects that extend beyond the problem behavior, but the possibility of spontaneous improvement cannot be ruled out because a control group was not available for comparison.

Treasure et al. (1999) examined the role of readiness for change in determining treatment engagement and outcome for individuals with bulimia nervosa. Despite a focus on motivation rather than symptom reduction, AMI was as effective as cognitive-behavioral therapy (CBT) in reducing the frequency of binge eating, vomiting, and laxative abuse over the first 4 weeks of treatment—an impressive finding given that CBT has received the greatest empirical support for treatment of bulimia nervosa (National Institute for Clinical Excellence [NICE], 2004).

Adapted Motivational Interviewing for Binge-Eating Disorder

Binge-eating disorder (BED) is characterized by recurrent eating binges in the absence of regular compensatory behaviors to control weight (American Psychiatric Association [APA], 2000) and is often associated with depression, low self-esteem, and diminished quality of life (Marcus, 1997; Wilfley et al., 2000). CBT is currently considered the most effective treatment for BED, followed by interpersonal psychotherapy (IPT) (NICE, 2004); however, self-help programs are sufficient for many individuals with binge-eating problems, precluding the need for more intensive, long-term treatment (Fairburn & Carter, 1997). For those who do require more intensive professional treatment, CBT and IPT may not be viable options because they are costly and not universally available. Even if one is accepted into and has sufficient financial resources for treatment with CBT and IPT, a sizeable portion of individuals continue to binge-eat (38%–41%; Wilfley et al., 2002), suggesting that research into alternatives to or supplemental treatments for CBT and IPT is important.

One study found that a single AMI session was more effective than a self-help handbook control condition in increasing readiness for change among binge eaters ($N = 90$; Dunn, Neighbors, & Larimer, 2006). Although both groups decreased the frequency of their binge eating to a similar extent, the AMI group had higher binge abstinence rates at 4 months (24% vs. 9%). However, the sample consisted of college students with full or subthreshold bulimia nervosa or BED, as determined by a self-report instrument rather than diagnostic interview. To date, no published studies have examined the efficacy of AMI for women meeting the *Diagnostic and Statistical Manual of Mental Disorders—Text Revision* (DSM-IV-TR; APA, 2000) criterion for BED.

Study Rationale and Aims

Two research findings suggest that examining the efficacy of AMI in women with BED may be fruitful. First, there is a great deal of symptom overlap between BED and the addictive disorders for which AMI was originally developed, such as consuming larger amounts of food than intended, making repeated unsuccessful attempts to stop the behavior, and continuing the behavior despite knowledge of persistent adverse effects (Cassin & von Ranson, 2007; Wilson, 1991). Second, studies examining the ef-

ficacy of AMI on eating behaviors have yielded larger effect sizes, on average, than drug and alcohol studies have (Burke et al., 2003). The present randomized controlled trial examined whether a single AMI session would reduce binge eating in women with BED recruited from the community to a greater extent than would a self-help handbook.

Study Hypotheses

Primary Hypothesis

Receiving a single AMI session plus a self-help handbook will reduce binge-eating symptoms (binge frequency and size) to a greater extent than would a self-help handbook alone.

Secondary Hypotheses

1. AMI encourages individuals to reflect on the impact of binge eating and specifically aims to enhance self-efficacy; therefore, the AMI group was expected to report significantly greater self-efficacy, as well as importance, confidence, and readiness for change ratings, relative to the control group.

2. Cessation of binge eating is associated with improvement in comorbid psychological disturbances; therefore, the AMI group was expected to report greater improvement in depression, self-esteem, and quality of life relative to the control group.

Method

Participants

Women with a current DSM-IV-TR diagnosis of BED (APA, 2000) were recruited from the community (a large Canadian city) from October 2004 to July 2005. Participants were recruited through local television news (47.2%), newspapers/magazines (26.9%), radio interviews (4.6%), listservs/websites (4.6%), community events (4.6%), and word of mouth (2.8%). The remaining 9.3% had previously participated in research in our laboratory and agreed to have their name added to a database for possible participation in future studies. Women who regularly (more than once per month) engaged in compensatory behaviors characteristic of bulimia nervosa were excluded from the study. To increase the external validity of the findings, we did not exclude any other individuals from the study. On the basis of a priori power calculations, a minimum of 45 women were required per group ($N = 90$) to have an 80% chance of detecting a significant difference between groups ($p = .05$). Of 242 women who expressed interest in participating, 108 were randomized to the AMI or control group (to compensate for attrition) after determining that they met the inclusion criteria (see Figure 1).

The AMI and control groups did not differ on demographic variables. Participants had a mean age of 42.5 years ($SD = 12.7$), and most were Caucasian (88.9%). In terms of marital status, 45.4% were married or cohabiting, 32.4% had never been married, and 18.5% were separated or divorced. Participants were generally quite well educated: 56.5% had completed a college or university degree, and 25.9% completed some college or university courses. The AMI and control groups did not differ with respect to BED duration ($M = 15.1$ years, $SD = 11.6$) or body mass index (BMI; $M = 33.2$ kg/m², $SD = 7.8$).

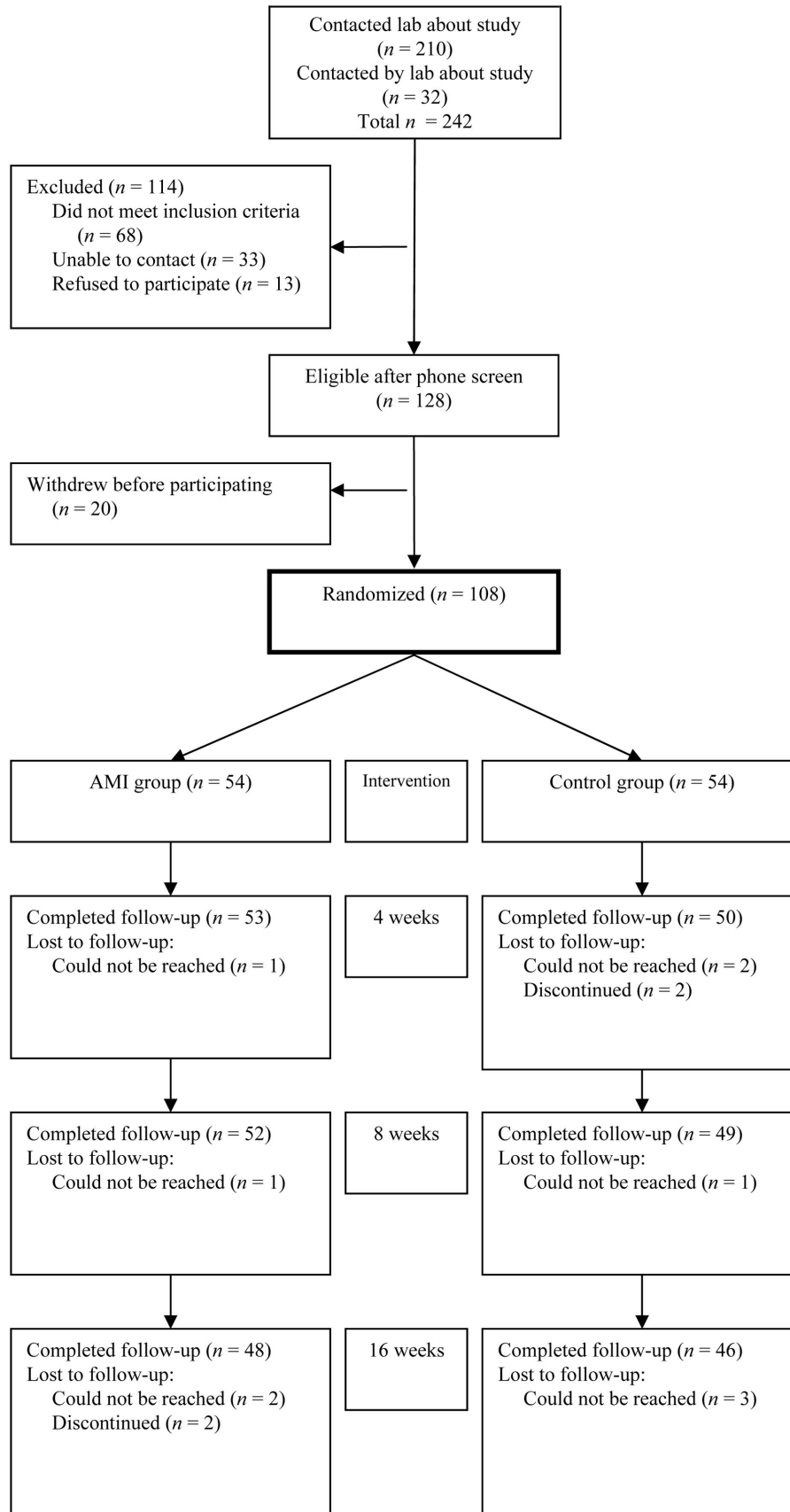


Figure 1. Summary of participant flow. AMI = adapted motivational interviewing.

Measures/Assessments

Participants were assessed at baseline, immediately following the intervention, and at three follow-up points (4, 8, and 16 weeks following the intervention).

Descriptive information. Participants provided demographic information regarding age, marital status, race/ethnicity, and education. Self-reported height and weight were also provided for BMI calculation ($BMI = kg/m^2$).

Baseline. The eating disorders module of the Structured Clinical Interview for *DSM-IV* (SCID-I; First, Spitzer, Gibbon, & Williams, 1996) was administered during the phone screen, to determine study eligibility and match groups on binge-eating frequency, and again at baseline, to ensure that participants continued to meet diagnostic criteria for BED at the time of study participation. Participants also completed measures of depression (Beck Depression Inventory—II [BDI-II]; Beck, Steer, & Brown, 1996), self-esteem (Rosenberg Self-Esteem Scale [RSE]; Rosenberg, 1965), and quality of life (Extended Satisfaction With Life Scale [ESWLS]; Alfonso, 1995). The quality of life scale assessed satisfaction with general life, social life, sex life, self, physical appearance, family, and relationships. Coefficient alpha for these measures in the present study were .92 (BDI-II), .87 (RSE), and .91 to .97 (ESWLS subscales).

Immediate postintervention. Participants provided change ratings by responding to the following three questions on an 11-point visual analogue scale ranging from *not at all* to *extremely*: “How important is it for you to change?” “How ready are you to change?” and “If you decide to change, how confident are you that you will succeed?” (Miller & Rollnick, 2002; italics added to emphasize the three change ratings that participants made). They also completed a measure of eating self-efficacy (Weight Efficacy Lifestyle Questionnaire [WEL]; Clark, Abrams, Niaura, Eaton, & Rossi, 1991). Respondents are asked to rate their confidence in resisting eating in tempting situations, which comprise five subscales: when appealing food is available, when experiencing negative emotions, when experiencing physical discomfort, when engaging in other activities (e.g., reading, watching TV), or when experiencing social pressure. Coefficient alpha for these subscales in the present study ranged from .77 to .88.

Follow-up. A Timeline Follow-Back Interview (TLFB; Sobell & Sobell, 1992) was used to assess the primary outcome measures of binge frequency and size for the period since the last study contact (at 4, 8, and 16 weeks following the intervention). Timeline interviews have demonstrated high test-retest reliability, interrater reliability, concurrent validity, and discriminant validity in the assessment of substance use (Fals-Stewart, O’Farrell, Freitas, McFarlin, & Rutigliano, 2000). This interview was modified in the current study to assess binge eating. Participants were asked to use a calendar or daily diary and to think of holidays, special occasions, or stressful periods to help them recall their eating binges. They were asked additional probing questions regarding the size, duration, and frequency of eating binges to increase the validity and reliability of the TLFB in the assessment of binge eating. Self-reported depression, self-esteem, and quality of life were reassessed 16 weeks following the intervention.

Procedure

After completing a phone screen to determine eligibility, participants were scheduled one face-to-face session in our university-based research laboratory. Participants completed informed consent prior to participating in the study, which specified that participation would entail completing an interview about eating behaviors and several questionnaires and answering three follow-up phone calls to assess binge eating. Participants were informed that the purpose of the study was to compare two different interviews for obtaining information about binge eating but were unaware of the differences between the interviews as well as their group assignment. Ethical approval for the study was obtained from the University Conjoint Faculties Research Ethics Board.

All participants completed the measures of depression, self-esteem, and quality of life (BDI-II, RSE, and ESWLS, respectively) in counterbalanced order, followed by the SCID-I eating disorders module. Using the computerized MINIM program (Evans, Royston, & Day, 2001), we randomly assigned participants to either the AMI or control group. The interviewers were unaware of group assignment until immediately prior to the appointment.

Control group: Self-help handbook only. A self-help handbook titled *Defeating Binge Eating*—which is based on a publication titled *Taming the Hungry Bear: Your Way to Recover From Chronic Overeating* (Trotter & Bromley, 2002)—was developed for the present study. The 21-page handbook included a combination of psychoeducation and cognitive-behavioral techniques. MI strategies were specifically excluded to prevent the control group from being exposed to AMI. The handbook contained the following sections:

1. What is binge eating?
2. Learning to take small steps
3. Understanding hunger and food cravings
4. Beginning the work
5. Working with hunger and appetite
6. Working with food and feelings
7. Preventing relapse
8. Local mental health and Internet resources

The handbook included worksheets on goal setting (i.e., goal, how it will be achieved, potential problems and solutions), daily food intake (i.e., monitoring food intake and identifying antecedents and consequences of eating binges), and automatic thoughts that may trigger eating binges. Participants were encouraged to read the entire handbook and complete the worksheets at the initial session, and no additional guidance was provided. The handbook is available upon request from Stephanie E. Cassin.

AMI group: AMI session + self-help handbook. In addition to receiving a copy of the self-help handbook, individuals in the AMI group received one individual AMI session. The AMI protocol developed for the present study was based on a book titled *Getting*

Better Bit(e) by Bit(e): A Survival Guide for Sufferers of Bulimia Nervosa and Binge Eating Disorders (Treasure & Schmidt, 1997). The intervention in the present study was modified for use with individuals with BED, such that information pertaining to compensatory behaviors was excluded and the intervention was adapted into a single-session intervention. This goal was achieved by reviewing the content of and modeling the protocol on two existing single-session AMIs (Diskin, 2006; Hodgins, Currie, & el-Guebaly, 2001).

The goals of the AMI protocol were to encourage the participant to reflect upon her binge-eating behavior, consider both the benefits and consequences of binge eating, resolve ambivalence, and then consider the possibility of change. The AMI protocol was semistructured, such that certain questions were asked of all participants but follow-up questions were tailored to the content of participants' answers. Throughout the intervention, consistent with MI principles (Miller & Rollnick, 2002), the therapist expressed acceptance and affirmation, reframed the client's thoughts so that motivational statements were amplified and nonmotivational statements were minimized, elicited the client's self-motivational statements (e.g., expressions of problem recognition, concern, desire, intention to change, and ability to change), and affirmed the client's freedom of choice and self-direction.

The AMI protocol included the following elements:

1. Eliciting concerns about binge eating (e.g., impact on physical health, mental health, finances, and relationships)
2. Exploration of ambivalence
3. Discussion of transtheoretical model of change and brief assessment of participant's stage of change
4. Written decisional balance (i.e., pros and cons of staying the same versus changing)
5. Bolster self-efficacy (e.g., encourage participant to recall past experiences in which she has shown mastery in the face of difficulties and challenges)
6. Values exploration (e.g., exploration of dissonance between actual life and ideal life, ponder the future with and without binge eating)
7. Assessment of readiness and confidence for change
8. Elicit ideas for possible behavioral alternatives to binge eating
9. Work collaboratively on devising a change plan consisting of small, manageable steps
10. Complete "Plans for Change" worksheet (Treasure & Schmidt, 1997)

The AMI protocol is available upon request from Stephanie E. Cassin.

The mean length of individual AMI sessions was 81.8 min ($SD = 12.9$). To avoid confounding due to interviewer effects, two clinical psychology doctoral students trained in the assessment of

eating disorders, including the SCID-I, conducted the interviews. Both interviewers read about the principles and strategies of MI and observed the MI professional training videotape series (Miller, Rollnick, & Moyers, 1998). Following the videotape series, the interviewers engaged in role-play exercises to gain practical experience and received feedback immediately following the interviews.

To evaluate therapist adherence to the AMI protocol, two trained undergraduate research assistants rated audiotaped AMI sessions on the basis of the MI guidelines of the Yale Adherence and Competence Scale—Second Edition (YACS-II; Nuro et al., 2005). The following nine items, which are explicitly defined in the YACS-II manual, were rated on a 7-point scale ranging from 1 (*Not at all present during the session*) to 7 (*Extensively present during the session*): "Motivational interviewing style"; "Open-ended questions"; "Affirmation of strengths and self-efficacy"; "Reflective statements"; "Fostering a collaborative atmosphere"; "Motivation to change"; "Heightening discrepancies"; "Pros, cons, and ambivalence"; and "Change plan discussion."

Following the eating disorder assessment and AMI intervention, all participants completed the measure of eating self-efficacy (WEL; Clark et al., 1991) and the importance, confidence, and readiness ratings in counterbalanced order.

Telephone follow-up. Three trained undergraduate research assistants blind to participants' group assignments conducted the follow-up telephone assessments from November 2004 to January 2006. The research assistants studied the *DSM-IV-TR* criteria for eating disorders (APA, 2000), read research articles on eating disorders with an emphasis on the assessment of eating binges, underwent didactic training on eating disorders and the SCID-I eating disorders module, and engaged in supervised role-play exercises to gain practical experience. The primary investigator observed and provided feedback to research assistants on their initial follow-up assessments and then met with them at least weekly to review their assessments. The same research assistant conducted all three follow-up assessments for each participant. Participants were contacted by phone at 4 weeks, 8 weeks, and 16 weeks postintervention and were asked to retrospectively recall the number of eating binges they had engaged in since the last follow-up contact using the TLFB interview. They were asked additional probing questions regarding the size, duration, and frequency of their eating binges. Participants were also asked if they had read the self-help manual. These phone contacts were kept as brief as possible to minimize the effects of monitoring on binge eating. At the 16 weeks follow-up, participants were asked if they were successful in achieving their goal and about their satisfaction with the study. In addition, the measures of depression, self-esteem, and quality of life were readministered over the telephone.

Statistical Analysis

Randomization and attrition. To examine whether there was differential attrition across groups, independent *t* tests were performed to compare completers with dropouts on demographic variables, baseline variables (e.g., BMI, binge-eating frequency), and variables assessed immediately following the intervention (e.g., eating self-efficacy). A chi-square analysis was also conducted to determine whether an equivalent proportion of partici-

pants dropped out of the AMI and control groups. To examine whether random assignment resulted in equivalency across groups, we performed independent *t* tests to compare the AMI and control groups on demographic variables and baseline variables (e.g., age, BMI, binge-eating frequency).

Treatment adherence. The minimal threshold for demonstrating MI adherence in the current study was set as 5 on a 7-point scale, indicating that each of the MI dimensions were present *quite a bit* during the AMI sessions (Nuro et al., 2005). Frequencies were computed to assess whether the audiotapes met or exceeded the cutoff of 5, and means and standard deviations were computed to assess how frequently the MI dimensions were present during the AMI sessions.

Immediate postintervention. To examine whether AMI increased participants' eating self-efficacy and change ratings (i.e., importance, readiness, and confidence), independent *t* tests were performed to compare the two groups on the WEL (Clark et al., 1991) and change ratings immediately following the intervention. Cohen's *d* effect sizes were computed (Thalheimer & Cook, 2002).

Primary effects of AMI. A 2 (group: AMI vs. control) \times 4 (time: baseline, 4 weeks, 8 weeks, 16 weeks) repeated-measures split-plot analysis of variance (ANOVA) was performed to examine group differences in binge-eating frequency (i.e., average number of binge episodes per month). Cohen's *d* effect size was computed (Thalheimer & Cook, 2002). Significant Group \times Time interactions were followed up with independent samples *t* tests. To assess whether the changes in binge-eating frequency were comparable across both interviewers, we performed a 2 (Interviewer 1 vs. Interviewer 2) \times 4 (time: baseline, 4 weeks, 8 weeks, 16 weeks) repeated-measures split-plot ANOVA. Changes in binge size were assessed (*much smaller, somewhat smaller, no change, somewhat larger, much larger*), and group differences were examined with a Pearson chi-square analysis.

Secondary effects of AMI. A 2 (group: AMI vs. control) \times 2 (time: baseline, 16 weeks) repeated-measures split-plot ANOVA

was performed to examine group differences in psychological functioning (i.e., BDI-II, RSE, ESWLS). Cohen's *d* effect sizes were computed (Thalheimer & Cook, 2002).

Process and satisfaction evaluation. The percentage of participants who read the handbook (*not at all, some sections, completely*) and who found it helpful (*not at all, somewhat, completely*) were computed, as were the percentage of participants who attained their goals (*not at all, partially, mostly, completely*). The percentage of participants who were satisfied with the research study (*not at all, somewhat, completely*) was also computed. Group differences were examined with a Pearson chi-square analysis.

Results

Randomization and Attrition

Fourteen participants (13.0%) did not complete the 16 week follow-up interview: 6 (11.1%) from the AMI group and 8 (14.8%) from the control group (see Figure 1), a nonsignificant difference, $\chi^2(1, N = 108) = 0.33, p = .58$. Ten participants could not be contacted; others discontinued their participation due to surgery ($n = 2$) or lack of time ($n = 2$). The completers did not differ from the dropouts on any demographic variables (i.e., age, marital status, ethnicity, education, occupational status), clinical variables, baseline level of outcome variables, or variables assessed immediately following the intervention, suggesting no differential attrition across groups. Results based on the intention-to-treat procedure (in which the last observed response of dropouts was carried forward) are presented below ($N = 108$). The results of the study were consistent regardless of whether completer or intention-to-treat analyses were performed.

Despite randomization of participants across groups, the AMI group reported lower self-esteem at baseline, $t(106) = 2.06, p = .04$. However, the groups did not differ with respect to baseline binge-eating frequency, depression, or quality of life subscales (see Table 1).

Table 1

Comparison of Control ($n = 54$) and Adapted Motivational Interviewing ($n = 54$) Groups at Baseline and 16 Weeks Following the Intervention

Variable	Baseline		16 weeks follow-up		<i>F</i> (1, 106) ^a	<i>d</i> ^b
	Control	AMI	Control	AMI		
Binge-eating frequency (days/month)	13.6 (6.9)	14.6 (8.0)	6.3 (6.0)	2.8 (3.5)	8.97**	0.58
BDI-II	20.6 (9.8)	25.2 (13.9)	16.2 (12.2)	14.2 (11.1)	10.9***	0.64
RSE ^c	24.1 (4.6)	26.3 (6.1)	22.9 (5.7)	22.5 (5.8)	9.44**	0.60
ESWLS						
General life	17.1 (8.0)	16.5 (7.8)	19.6 (8.4)	21.9 (8.4)	6.22*	0.48
Social life	15.8 (8.5)	14.1 (8.0)	18.5 (10.3)	18.5 (8.9)	1.70	0.25
Sex life	13.5 (8.7)	12.0 (8.0)	15.3 (9.1)	15.9 (9.3)	2.06	0.28
Self	16.0 (6.9)	14.1 (6.5)	19.4 (7.5)	20.4 (8.3)	5.95*	0.47
Physical appearance	8.7 (4.9)	7.1 (3.9)	10.2 (6.0)	10.6 (6.6)	3.05	0.34
Family	18.4 (10.1)	19.5 (8.8)	20.9 (9.3)	23.8 (8.6)	1.93	0.27
Relationships	19.2 (9.3)	17.5 (10.1)	20.6 (9.2)	22.1 (9.2)	3.61	0.37

Note. A 2 \times 2 repeated-measures split-plot analysis of variance was conducted to examine group differences at follow-up; data are given as means (*SD*). AMI = adapted motivational interviewing; BDI-II = Beck Depression Inventory—II (Beck, Steer, & Brown, 1996); RSE = Rosenberg Self-Esteem Scale (Rosenberg, 1965); ESWLS = Extended Satisfaction With Life Scale (Alfonso, 1995).

^a *F* is for the Group (control vs. AMI) \times Time (baseline vs. 16 weeks follow-up) interaction. ^b Effect sizes were computed from the *F* tests (0.2 = small effect, 0.5 = medium effect, 0.8 = large effect). ^c Lower score = higher self-esteem.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Treatment Adherence

Twenty (37.0%) AMI sessions (10 from each interviewer) were rated on nine MI adherence dimensions (Nuro et al., 2005) by two raters. All of the audiotapes exceeded the minimal threshold for MI adherence (all dimensions rated as 5 or higher on a 7-point scale). Averaging across raters, tapes, and MI adherence dimensions, we judged MI features to be present *extensively* (78.3%), *considerably* (21.3%), or *quite a bit* (1.4%) during the sessions. Intraclass correlation coefficients to assess interrater reliability were not computed due to restricted ranges on the 7-point scale.

Immediate Postintervention

The AMI group was significantly more confident in their ability to change, as well as their ability to resist overeating on all five subscales of the WEL (Clark et al., 1991), including when experiencing negative emotions, physical discomfort, social pressure, other activities (e.g., when reading or watching TV), or when appealing food is available (see Table 2).

Primary Effects of AMI

The TLFBI interview to assess changes in binge-eating frequency at 4, 8, and 16 weeks following the intervention indicated a significant Group \times Time interaction, $F(3, 318) = 8.08, p < .001$. Follow-up independent samples t tests indicated that the AMI group reduced their binge-eating frequency to a greater extent than did the control group at 4 weeks, $t(106) = 3.91, p < .001$ ($d = 0.76$), 8 weeks, $t(106) = 2.88, p = .005$ ($d = 0.56$), and 16 weeks, $t(106) = 4.11, p < .001$ ($d = 0.80$), following the intervention (see Figure 2). The reductions in binge eating did not differ across the two interviewers at any follow-up point for either the AMI group, $F(3, 156) = 1.79, p = .15$, or control group, $F(3, 156) = 0.67, p = .57$.

Although the AMI group reduced the frequency of their binge eating to a greater extent than did the control group, of those who continued to have eating binges, change in self-reported binge size

was consistent across groups, $\chi^2(4, N = 87) = 9.01, p = .06$. Of the participants in both groups who continued to have some eating binges at 16 weeks, 61.0% reported that their binges had become much smaller or somewhat smaller, 33.3% remained the same size, and 5.7% had become somewhat larger.

Clinical significance. Significantly more women in the AMI group ($N = 15, 27.8%$) abstained from binge eating (defined as no eating binges within the past 2 months) relative to those in the control group ($N = 6, 11.1%$), $\chi^2(1, N = 108) = 4.79, p = .03$. Women who abstained from binge eating did not differ from those who continued binge eating on demographic variables, clinical variables, or baseline levels of outcome variables. However, women in the AMI group who abstained from binge eating reported having greater self-efficacy immediately following the AMI intervention in their ability to resist binge eating when experiencing negative emotions, $t(52) = 3.03, p = .004$, or physical discomfort, $t(52) = 2.03, p = .05$, compared with women who did not abstain from binge eating. Significantly more women in the AMI group ($N = 47, 87.0%$) no longer met the *DSM-IV-TR* frequency criterion for BED (two or more binges/week) relative to those in the control group ($N = 31, 57.4%$), $\chi^2(1, N = 108) = 11.82, p = .001$.

Secondary Effects of AMI

Changes in depression, self-esteem, and quality of life were examined at the 16 weeks follow-up (see Table 1). The Group \times Time interaction was significant for depression and self-esteem. While depression and self-esteem improved in both groups, they improved to a greater extent in the AMI group. There was a significant Group \times Time interaction for general quality of life and self-related quality of life, such that the AMI group improved to a greater extent. Both groups improved to a similar extent on the remaining quality of life subscales over the 16-week follow-up (i.e., social life, sex life, physical appearance, family life, and relationship/marriage).

Process and Satisfaction Evaluation

Participants were asked about their use of the handbook at each follow-up period, and there were no significant differences between the AMI and control groups. By 16 weeks, 79.4% reported that they had read the handbook completely, and 3.9% had not read the handbook. The majority of participants found the handbook completely (40.4%) or somewhat (48.9%) helpful, whereas a minority (10.6%) found it not at all helpful. Upon completion of the study, participants were asked about their achievement of goals related to binge eating, and there were no significant differences between the AMI and control groups. Overall, 7.4% rated themselves as completely successful in achieving their goals, 37.2% as mostly successful, 42.6% as partially successful, and 12.8% as not at all successful. When asked about their overall satisfaction with the study, AMI participants were significantly more satisfied than were control participants, $\chi^2(2, N = 94) = 6.36, p = .04$. Follow-up tests indicated that a greater proportion of participants in the AMI group (75.0%) than the control group (52.2%) were completely satisfied with the study, $\chi^2(1, N = 94) = 5.30, p = .02$.

Discussion

The results of this study indicate that AMI, which was developed for addictions, may also be effective for the treatment of

Table 2

Comparison of Control ($n = 54$) and Adapted Motivational Interviewing ($n = 54$) Groups Immediately Following Intervention

Variable	Control	AMI	$t(106)$	d^a
WEL ^b				
Negative Emotions	16.6 (7.1)	22.8 (8.4)	4.16***	0.80
Food Availability	17.6 (8.1)	25.6 (8.2)	5.03***	0.99
Social Pressure	23.9 (8.4)	28.5 (7.9)	2.93**	0.57
Physical Discomfort	24.0 (7.5)	28.1 (7.2)	2.93**	0.56
Other Activities	22.7 (7.7)	29.8 (8.0)	4.72***	0.91
Change ratings				
Importance of change	9.4 (1.1)	9.5 (0.9)	0.84	0.10
Readiness for change	8.4 (1.6)	8.6 (1.3)	0.52	0.14
Confidence for change	5.5 (2.8)	7.6 (1.4)	4.91***	0.96

Note. Independent-samples t tests were conducted to compare groups; data are given as means (SD). WEL = Weight Efficacy Lifestyle Questionnaire (Clark et al., 1991); AMI = adapted motivational interviewing. ^a Effect sizes were computed from the t tests (0.2 = small effect, 0.5 = medium effect, 0.8 = large effect). ^b WEL scores indicate ability to resist overeating in tempting circumstances.

** $p < .01$. *** $p < .001$.

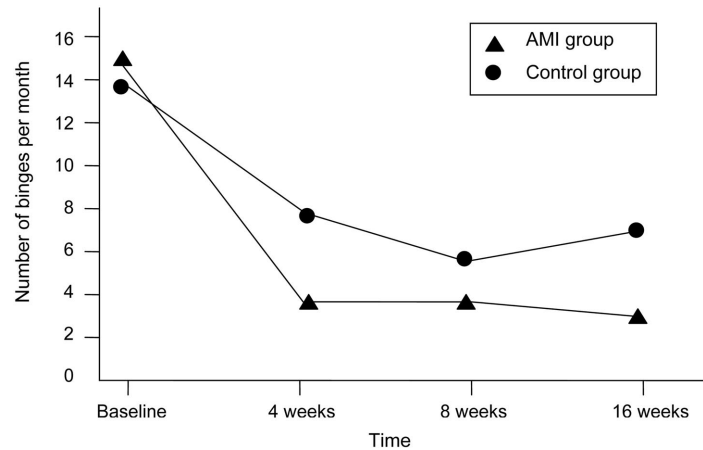


Figure 2. Reductions in binge-eating frequency over the 16-week follow-up period. AMI = adapted motivational interviewing. Group differences are significant ($p < .01$) at all three follow-up points.

BED. Although the self-help handbook alone helped women to improve their binge eating over a 16-week follow-up period, the addition of one AMI session significantly improved outcome. Furthermore, improvement was not limited to the domain of binge eating, but rather extended to other domains such as mood, self-esteem, and quality of life. AMI holds promise as a brief intervention for BED and associated symptoms.

It appears that the strength of AMI lies primarily in its ability to enhance confidence for change and self-efficacy—qualities that many women who binge-eat lack due to an extensive history of unsuccessful attempts to stop binge eating. As with the study by Dunn et al. (2006), both the AMI and control groups significantly reduced their binge-eating frequency over a 16-week period. However, the AMI group in the present study reduced their binge eating to a greater extent than did the control group at all three follow-up points. In contrast to a recent meta-analysis of AMI (Hettema, Steele, & Miller, 2005), which reported a rapid impact of AMI ($d = 0.77$ at 1 month) with a gradual decrease of effect size over time ($d = 0.39$ at 1 to 3 months and $d = 0.31$ at 3 to 6 months), the present study demonstrated the largest effect size 4 months following AMI ($d = 0.80$). However, it is important to extend the follow-up period to determine whether the effects of AMI are maintained over time.

The binge-eating abstinence rate of 27.8% for women in the AMI group was higher than the 24% reported by Dunn et al. (2006) but lower than the 33%–62% reported by other BED treatment studies (Carter & Fairburn, 1998; Wonderlich, de Zwaan, Mitchell, Peterson, & Crow, 2003). However, the present study examined a brief single-session intervention and used a more conservative definition of *abstinence* (no binges in the previous 2 months) than that used in other studies (no binges in the previous 28 days). Although many women continued to have eating binges, a great majority (87%) no longer met the *DSM-IV-TR* frequency criterion for BED of two or more binges per week (APA, 2000).

The present study demonstrated that AMI holds promise as an intervention for BED. The study recruited women from the community, excluded few potential participants, had a high retention rate, and used trained interviewers who were not “experts” in AMI—all factors that increase the external validity of the study.

However, a discussion of the study limitations is warranted. First, only women were recruited for participation. Second, the baseline assessments were conducted in person, whereas the follow-up assessments were conducted by phone in order to maximize retention rates, and responses may have varied by mode of administration. However, this bias would not be expected to differ across the AMI and control groups. Third, although significant dates and events were used to help participants recall their eating binges, the TLFB interview may have been subject to retrospective recall bias. However, this bias would not be expected to differ across the AMI and control groups. Accuracy could have been enhanced by having participants record each of their eating binges; however, the frequency of their binges would have likely been influenced by the use of self-monitoring.

The results of the present study provide an impetus to investigate additional questions regarding the value of AMI for the treatment of eating disorders in general and BED in particular. First, is AMI equally effective for men with BED? Second, are the long-term effects (particularly binge abstinence rates) enhanced by booster sessions or the provision of assessment feedback? Third, might a telephone-based intervention make AMI more accessible to binge eaters? Fourth, is AMI effective for individuals with BED who do not voluntarily present for treatment, such as those who are brought to the attention of medical professionals due to associated medical problems and/or obesity? Fifth, is AMI a useful adjunct to empirically supported treatments such as CBT or IPT, particularly as the first stage of intervention? A recent meta-analysis (Hettema et al., 2005) reported that large effect sizes are observed when AMI is used in this manner because it improves treatment retention and adherence—two issues that often emerge in the treatment of eating disorders.

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