

Pilot Investigation of 2 Nondiet Approaches to Improve Weight and Health

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ABSTRACT

Context • Weight loss and maintenance are associated with many health benefits, but long-term maintenance of weight loss remains elusive for many people. Overweight individuals are at higher risk than normal-weight individuals for stress-induced overeating. The use of stress-management tools in a weight loss program might decrease the physiological stress that fuels overeating and improve posttreatment maintenance of weight loss

Objective • The study intended to compare the differences in outcomes between 2 approaches to achieving weight loss and changes in health—stress reduction and intuitive eating (IE)—during a 14-wk period.

Design • The research team designed a small, randomized, controlled pilot study.

Setting • The study took place at the University of Kentucky (Lexington, KY, USA).

Participants • Men and women, aged 25 to 65 y, with a body mass index ≥ 30 but ≤ 40 kg/m², were recruited through various outlets on a large college campus, and 33 enrolled in the study.

Intervention • Participants were randomly assigned either to an IE or to a stress-reduction program (EBT) for a 7 wk intervention and a 7-wk follow-up period.

Outcome Measures • Weight, blood pressure, stress, depression, and eating behaviors were measured at baseline, postintervention at week 7, and postintervention at week 14.

Results • Participants were 69.7% female and 93.9% Caucasian. An intent-to-treat analysis was conducted on the main outcome of weight. At 14 wk, the EBT group had lost 4.4 ± 6.7 lb (1.99 ± 3.04 kg), and the IE group had lost 1.03 ± 6.10 lb (0.48 ± 2.77 kg). A repeated measures analysis of variance did not find any significant difference between groups for weight change ($P = .36$). Completers in the EBT group significantly improved blood pressure, perceived stress, and food addiction symptoms from baseline to 7 wk ($P < .05$). Only the changes in weight were maintained at 14 wk.

Conclusions • The study suggested that the stress reduction approach may be viable as an approach to weight loss and improvements in health-related outcomes in the short term. A longer investigation of the program is warranted. (*Altern Ther Health Med.* 2018;24(1):16-20.)

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Recent data indicate that 69% of adults in the United States are either overweight or obese.¹ Excess weight is related to an increased risk of chronic disease. However, a 5% to 10% decrease from initial body weight in overweight and obese individuals has been shown to reduce the development of risk factors for chronic disease.² Unfortunately, numerous studies have found that long-term maintenance of weight loss remains elusive for many.³⁻⁵ In fact, current research suggests that continued support and encouragement from a counselor using behavioral techniques remains the best solution for long-term weight loss.⁶ That model is not sustainable for an already strapped health care system.

Traditional, behaviorally based approaches to weight loss have focused on modifying diet and exercise via caloric restriction and self-monitoring of weight-related behaviors.

Although initial weight loss with such programs is possible, they have shown limited success in preventing weight regain.⁷ That result may be due to the fact that traditional cognitive and behavioral programs focus on changing behavior rather than on the physiological drives that fuel it.⁸ During stress, the limbic triangle of neuroendocrinal mechanisms within the emotional brain that (1) prevent starvation, the hypothalamus; (2) heighten reward, the ventral tegmental area; and (3) attenuate stress, the amygdala, can promote overeating and inactivity.⁹

Stress has been shown to be positively associated with weight, likely because both chronic and acute stress increase food intake, especially intake of calorie-dense foods.^{10,11} Stress-induced overeating results from poor awareness of one's psychological state and the inability to differentiate between hunger cues and emotional arousal.¹⁰ Overweight individuals are at higher risk than normal-weight individuals for stress-induced overeating.¹² Therefore, the use of stress management tools in a weight loss program might decrease the physiological stress that fuels overeating and improve posttreatment maintenance of weight loss.¹⁰

One stress reduction program applied to overweight individuals had shown positive weight loss outcomes in 2 previous studies.^{13,14} Further development of that program led to the creation of emotional brain training (EBT), which teaches participants about tools that are calibrated to decrease stress and promote positive affect. The EBT program defines 5 levels of stress and 5 corresponding specific tools that are designed for optimal processing of emotions to decrease stress arousal and improve affect.

Another approach, intuitive eating (IE), employs mindfulness strategies to improve responsiveness based on physiological mindful awareness of signs of hunger and satiety rather than of emotional or environmental cues.¹⁵ Mindfulness, the primary component of IE, involves giving full attention to the process of eating and has been shown to reduce binge-eating episodes and to provide an increased sense of control over food intake.^{16,17} Although investigations on the success of mindfulness are limited, data suggest that the approach can provide a long-term solution to weight maintenance.

Both the EBT and the IE interventions are part of the third wave of behaviorism⁸ that does not focus directly on behavioral change but rather addresses either (1) the physiological underpinnings of maladaptive behavior (ie, the EBT program, which aims to decrease stress); or (2) mindful attunement to the physiological state to control the initiation and termination of eating episodes (ie, the IE program, which teaches awareness of physiological cues).

Given the known association between stress and obesity, the current research team has hypothesized that the stress reduction intervention, EBT, would be more effective than the mindfulness intervention, IE. The objective of the current study was to compare the effects of the 2 programs on the primary outcome of weight loss and on the secondary outcomes of controlling blood pressure, reducing perceived stress, decreasing depression, and regulating eating behaviors in a 14-week period.

METHODS

Participants

The study was conducted at the University of Kentucky (Lexington, KY, USA). Men and women, aged 25 to 65 years, who had a body mass index (BMI) ≥ 30 but ≤ 40 kg/m², were recruited in the course of 3 weeks through various outlets on a large college campus.

Participants were screened and excluded if they (1) had orthopedic or joint problems that prohibited regular physical activity; (2) had heart problems, chest pain, faintness, or dizzy spells; (3) had been hospitalized within the year prior to the study for psychiatric disorders; (4) had a history of anorexia or bulimia nervosa; (5) had ever had a medical diagnosis of cancer, HIV, or a major psychiatric disorder; (6) were pregnant, nursing, or planned to become pregnant; (7) were fewer than 9 months postpartum; or (8) had had a weight loss of ≥ 10 pounds (4.54 kg) in the 6 months prior to the study.

Eligible participants were invited to an information session about the study in which interested participants provided informed consent. Participants were told they would receive one of 2 weight loss interventions. All procedures were approved by the University of Kentucky Institutional Review Board.

Participants were then randomly assigned either to the EBT intervention or to the IE intervention, using SPSS (Armonk, NY, USA) to draw a random 50% sample. The study's personnel were not blinded to group assignment.

Procedures

Both interventions were delivered based upon previously developed and published programs.^{18,19} EBT is a 1-year program, which includes an optional 7-week weight loss intervention, *Wired for Freedom*. The EBT group's lessons were from a workbook created in conjunction with the book *EBT Basics: Wired for Freedom* by Laurel Mellin.¹⁸ The IE group's lessons were based on the book *Intuitive Eating: A Revolutionary Program That Works* by Evelyn Tribole and Elyse Resch.¹⁹ The groups were facilitated by health professionals with relevant training.

Baseline height, weight, blood pressure, and demographic data were collected at the first meeting. In addition, participants completed 3 surveys at baseline: (1) the Perceived Stress Scale (PSS),²⁰ (2) the Center for Epidemiologic Studies Depression Scale (CES-D),²¹ and Yale Food Addiction Scale (YFAS).²² Weight, blood pressure, and the survey data were collected again postintervention at week 7 and at follow-up at week 14. Weight was measured using a Tanita digital scale (Arlington Heights, IL, USA), and height was measured with a portable stadiometer (Seca, Hamburg, Germany), without shoes. Blood pressure was measured once on each date.

Intervention

The 5 levels of stress in the EBT program are (1) feeling great, (2) feeling good, (3) a little stressed, (4) definitely stressed, and (5) stressed out. The corresponding stress tools

used in the EBT program are (1) the sanctuary tool: compassion statements for self and others, (2) the feelings check tool: identification of feelings and needs, (3) the emotional housekeeping tool: expression of negative and positive feelings, (4) the cycle tool: emotional expression and revision of expectations, and (5) the damage control tool: stress-reducing statements.

The key principles of the IE program are (1) reject the diet mentality, (2) honor your hunger, (3) make peace with food, (4) challenge the food police, (5) feel your fullness, (6) discover the satisfaction factor, (7) cope with your emotions without using food, (8) respect your body, (9) exercise—feel the difference, and (10) honor your health.¹⁹

Each group met for 75-minute sessions, twice per week for 7 weeks. After the 7-week intervention, a 7-week, low-contact follow-up period occurred where participants did not meet as a group. During weeks 8 through 14, the participants were emailed weekly newsletters that contained summaries of the first 7 weeks of in-person meetings.

Outcome Measures

Outcome measures included weight, blood pressure, and the 3 surveys indicated previously, measuring (1) stress, depression, and eating behaviors.

Weight. Weight was measured with participants in light street clothing.

Blood Pressure. Blood pressure was measured in a seated position after a 5-minute rest period, with the participant's arm resting on a table at the height of the heart.²³

Perceived Stress Scale. The PSS is a measure of physiological stress and has been validated for use with adults.²⁴ Scores on the PSS can range from 0 to 40, with norms of approximately 13 points.²⁰

Center for Epidemiologic Studies Depression Scale. The CES-D is a self-report questionnaire for use in the general population. Scores can range from 1 to 60, with a score of 16 or greater considered to indicate depression.²¹

Yale Food Addiction Scale. Food dependence was measured by the YFAS, which uses diagnostic criteria for substance abuse as it relates to dependence on food. The scale has demonstrated good reliability (Cronbach's $\alpha = .93$) and internal validity ($\alpha = .86$).²²

Statistical Analyses

All analyses were performed using Windows version 20.0 of the Statistical Package for the Social Sciences (SPSS, Armonk, NY, USA). Descriptive statistics were used to characterize both groups at baseline. Continuous variables were compared between groups using 2-sample *t* tests if the normality assumption held or a Wilcoxon rank-sum test otherwise. The normality of the variables was checked using Kolmogorov-Smirnov.

A repeated measures analysis of variance (ANOVA) was conducted on the main outcome of weight change at 14 weeks. For completers only, within-group changes in outcome variables over time were examined using paired

t tests, and between-group changes were calculated using a standard *t* test. The correlation between the process variable—group attendance—and weight loss was examined using the Pearson *R* coefficient.

RESULTS

Baseline

Table 1 shows the baseline data by group for all participants. Of the 33 original participants, 7 participants withdrew from the study because they were no longer interested in participating. The final sample consisted of 26 participants. Of those participants—12 in the EBT group and 14 in the IE group—69% were female, and 92% were Caucasian. The mean age of participants was 53.8 ± 9.8 years, and the mean BMI at baseline was 35.8 ± 4.1 kg/m². The only significant difference between groups at baseline was the measurement for systolic blood pressure ($P = .03$).

Table 1. Baseline Demographic and Anthropometric Characteristics for All Participants in the 2 Interventions: Emotional Brain Training and Intuitive Eating Interventions (N = 33)

Characteristic	EBT group n = 16 Mean \pm SD	IE group n = 17 Mean \pm SD	P Value
Age, y	53.6 \pm 11.1	51.8 \pm 10.3	.63
Gender, female, %	62.5	76.5	.38
Race, Caucasian, %	100	88	.16
Education, graduate or professional degree, %	43.8	35.3	.36
BMI, kg/m ²	37.6 \pm 3.9	35.1 \pm 3.6	.06
Systolic blood pressure, mm Hg	145.3 \pm 16.7	132.8 \pm 13.9	.03 ^a
Diastolic blood pressure, mm Hg	90.7 \pm 9.5	84.7 \pm 7.9	.06
PSS ^b	16.0 \pm 6.3	16.8 \pm 6.6	.74
Depression (CES-D) ^c	8.1 \pm 7.5	10.7 \pm 9.3	.39
Food addiction symptoms (YFAS) ^d	3.31 \pm 1.5	3.35 \pm 2.2	.95

^a $P \leq .05$, showing a significant difference between groups, using an independent *t* test for continuous variables and χ^2 for categorical variables.

^bPerceived stress was measured using Cohen's PSS. No standard cut-off is recommended. Higher scores are associated with higher stress. Scores range from 0 to 40.

^cDepressive symptoms were measured using the CES-D. The cut-off above which professional care is recommended is 16. Scores range from 0 to 60.

^dThe symptom-count range for the YFAS is 0 to 7.

Abbreviations: EBT, stress reduction program; IE, intuitive eating; SD, standard deviation; BMI, body mass index; PSS, Perceived Stress Scale; CES-D, Center for Epidemiologic Studies Depression Scale; YFAS, Yale Food Addiction Scale.

Table 2. Mean Changes in Outcome Measures for Completers of the EBT and IE Interventions (n = 26)

Outcome Measure	Group	Changes From Baseline			
		To 7 wk Mean ± SD	P Value	To 14 wk Mean ± SD	P Value
Weight loss, lb	EBT	-2.9 ± 4.6	.05 ^a	-4.4 ± 6.7	.05 ^a
	IE	-1.5 ± 3.3	.12	-1.03 ± 6.10	.54
P value, group difference			.41		.20
Systolic blood pressure, mm Hg	EBT	-18.8 ± 18.6	.005 ^a	-11.1 ± 19.1	.07
	IE	-6.5 ± 15.6	.16	-3.7 ± 14.0	.34
P value, group difference			.08		.27
Diastolic blood pressure, mm Hg	EBT	-7.0 ± 10.9	.05 ^a	-4.9 ± 11.8	.18
	IE	+0.2 ± 9.9	.95	2.4 ± 11.6	.45
P value, group difference			.10		.12
PSS ^b	EBT	-6.2 ± 8.9	.04 ^a	-1.3 ± 7.6	.58
	IE	-1.7 ± 4.8	.22	-1.7 ± 8.3	.45
P value, group difference			.14		.88
Depression (CES-D) ^c	EBT	0.6 ± 8.8	.82	3.8 ± 11.5	.27
	IE	-1.5 ± 5.5	.33	-0.5 ± 0.6	.86
P value, group difference			.48		.32
Food Addiction symptoms (YFAS) ^d	EBT	-1.25 ± 1.55	.02 ^a	-0.75 ± 1.66	.15
	IE	-1.15 ± 2.34	.10	-0.43 ± 2.10	.46
P value, group difference			.91		.67

^aP value shows a significant difference between baseline and postintervention for a group.

^bPerceived stress was measured using Cohen’s PSS. No standard cut-off is recommended. Higher scores are associated with higher stress. Scores range from 0 to 40.

^cDepressive symptoms were measured using the CES-D. The cut-off above which professional care is recommended is 16. Scores range from 0 to 60.

^dThe symptom-count range for the Yale Food Addiction Scale is 0 to 7.

Abbreviations: EBT, emotional brain training; IE, intuitive eating; SD, standard deviation; PSS, perceived stress scale; CES-D, Center for Epidemiologic Studies Depression Scale; YFAS, Yale Food Addiction Scale.

Postintervention: 7 Weeks

Postintervention at week 7 (Table 2), an analysis of completers found that the EBT group had a mean weight loss of 2.9 ± 4.6 pounds (1.32 ± 2.09 kg; *P* = .05), whereas the IE group had a mean weight loss of 1.5 ± 3.9 pounds (0.68 ± 1.77 kg; *P* = .12). The difference in weight loss between the 2 groups was not significant (*P* = .41) nor was the difference between them significant for the percentage weight loss, 0.6% for the IE group and 1.2% for the EBT group (*P* = .37).

At week 7, only the EBT group had significantly decreased their systolic blood pressure (*P* = .005), diastolic blood pressure (*P* = .05), perceived stress (*P* = .04), and symptoms of food addiction (*P* = .02), as measured on the YFAS. The IE group did

not show any significant changes in those measures at 7 weeks.

Postintervention: 14 Weeks

For the primary outcome of change in weight at 14 weeks, a repeated measures ANOVA indicated that no significant differences existed between the groups (*P* = .36).

After the 7-week follow-up period at week 14, only the weight loss in the EBT group was still significant. In fact, the participants in the EBT group lost an average of an additional 1.5 ± 2.1 pounds (0.68 ± 0.95 kg), for a total loss of 4.4 ± 6.7 pounds (1.99 ± 3.04 kg; *P* = .05). That loss amounted to an average total decrease of 1.7% in body weight.

However, the decreases in perceived stress, systolic blood pressure, diastolic blood pressure, and food addiction symptoms were all lost by the follow-up, *P* = .58, *P* = .07, *P* = .18, and *P* = .15, respectively (Table 2). As for the measurements postintervention at 7 weeks, the IE intervention had no significant effects on any of the measured parameters at the follow-up at 14 weeks.

The EBT group’s members attended an average of 11.7 ± 2.9 sessions out of 14 biweekly meetings, and the IE group’s participants attended an average of 10.1 ± 2.6 sessions (*P* = .17). No correlation was found between the number of sessions attended and the change in weight within either group at 7 or 14 weeks.

DISCUSSION

The EBT program produced significant weight loss and changes in stress markers during the 7-week active intervention. In comparing the EBT to the IE intervention, the current research team found, however, that the differences between the 2 groups were not statistically significant. That finding may be due to the fact that the study used a small sample and was underpowered. Because the EBT participants had lost weight postintervention at 7 weeks and continued to lose weight until the follow-up at 14 weeks, the current study provides preliminary support that stress reduction approaches may be helpful in preventing weight regain.

The EBT group in the current study also showed significant 7-week changes in stress-related variables: diastolic and systolic blood pressure, perceived stress, and stress-induced food addiction symptoms, suggesting that stress management programs may have a beneficial effect on the physiology and obesity-related behavior in the studied population. At 14 weeks, the EBT group showed significant improvements in weight, and other stress-related variables remained lower than at baseline—systolic and diastolic blood pressure, perceived stress, and food addiction—but the changes were not statistically significant, perhaps due to the small sample size.

No significant changes were found in the IE group in weight or any other measure. That finding is consistent with previous studies with IE that have found no weight

change but improvements in other health markers in the course of an intervention.²⁵

The limitations of the current study include the study's short timeframe and a small sample size. More research is needed to strengthen confidence in the validity of the current findings, particularly by studying treatment with EBT and IE in the course of a longer duration. The significant short-term outcomes of the EBT program suggest that the program might hold promise as a long-term treatment for obesity with weekly face-to-face meetings with a counselor.

CONCLUSIONS

The study suggested that the stress reduction approach may be viable as an approach to weight loss and improvements in health-related outcomes in the short-term. A longer investigation of the program is warranted.

AUTHOR DISCLOSURE STATEMENT

The authors received no outside funding for the study. Laurel Mellin is the founder of the Emotional Brain Training Program.

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