

EVIDENCE AND POTENTIAL MECHANISMS FOR MINDFULNESS PRACTICES AND ENERGY PSYCHOLOGY FOR OBESITY AND BINGE-EATING DISORDER

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Obesity is a growing epidemic. Chronic stress produces endocrine and immune factors that are contributors to obesity's etiology. These biochemicals also can affect appetite and eating behaviors that can lead to binge-eating disorder. The inadequacies of standard care and the problem of patient noncompliance have inspired a search for alternative treatments. Proposals in the literature have called for combination therapies involving behavioral or new biological therapies. This manuscript suggests that mind–body interventions would be ideal for such combinations. Two mind–body modalities, energy psychology and mindfulness meditation, are

reviewed for their potential in treating weight loss, stress, and behavior modification related to binge-eating disorder. Whereas mindfulness meditation and practices show more compelling evidence, energy psychology, in the infancy stages of elucidation, exhibits initially promising outcomes but requires further evidence-based trials.

Key words: Obesity, binge eating disorder, emotional freedom technique, mindfulness, mindful eating

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INTRODUCTION

Obesity has become an increasing global epidemic.¹ Despite the fact that its incidence has stabilized after decades of rapid increases,² the occurrence of a body mass index (BMI) score greater than 40 (equivalent to approximately 100 pounds overweight) increased by 50%, and the occurrence of a BMI score greater than 50 increased by 75% from 2000 to 2005.³ The inadequacies of standard care, combined with the challenges of patient noncompliance, have exacerbated this significant public health issue. Given the many determinants of obesity, including genes, behavior, environment, culture, and socioeconomic status, which contribute to the multifaceted nature of this chronic illness,⁴ there is a need to look to alternative approaches for treatment and prevention. We propose that mind–body therapies, and specifically the approaches of energy psychology and mindfulness, may substantially improve our success in the prevention and treatment of obesity by addressing three of the psychological and behavioral contributors to obesity: stress, anxiety, and binge-eating disorder (BED).

CONVENTIONAL APPROACHES TO OBESITY

The National Institutes of Health clinical guidelines for obesity recommend the modification of diet, physical exercise, and drug

therapies, often combined with cognitive behavioral therapy (CBT), to bring behavioral change.⁵ With the federal government's publication of the 2010 Dietary Guidelines for Americans⁶ comes the advice to “enjoy your food but eat less,” along with improved dietary recommendations, such as the advice to limit intake of foods high in solid fats, added sugars, and salts. Despite these recommendations, the ubiquitous presence of fast foods and packaged convenience foods, which are filled with those components, makes compliance a challenge.

“Diets Don't Work” has been a mantra repeated over and over in the media. In fact, in a 2006 study⁷ in which investigators compared several popular diets comprising either high carbohydrates, high protein, or high fat, they found a rapid regression of compliance after six months, to the extent that it did not matter which diet had initially been more effective. In another study, authors⁸ examined a combination of diet and exercise compared with diet alone and observed that 50% of their subjects in both groups regained the weight that they lost after one year, despite their having lost more weight with the combination therapy.

Despite the failure of diet alone in most studies, strategies incorporating both diet and exercise can be effective: a Cochrane review on exercise for overweight or obesity⁹ concluded that exercise had a positive effect on body weight and cardiovascular risk factors and that this effect was enhanced by a combination of exercise with dietary interventions. Interestingly, the authors of a more recent study¹⁰ found that the benefits of exercise in inducing weight loss may come through psychological pathways rather than through actual energy expenditure. These factors include self-regulation and self-efficacy, which may mediate the relationship between exercise and weight change.

Psychological interventions, particularly behavioral therapy and CBT, have been shown to be effective, especially when combined with diet and exercise.¹¹ However, these interventions are costly and require extensive clinical contact for long

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durations to achieve efficacy.¹¹ The authors of a recent randomized controlled trial (RCT)¹² with a three-year follow-up period looked at a new form of CBT that addresses patients' overeating and low level of activity, as well as factors that impede weight maintenance, and found that this form of therapy did not result in improved weight maintenance. These authors concluded that CBT is not sufficiently effective in helping patients maintain their weight loss in the long term.

Bariatric surgery has succeeded in producing significant weight loss,¹³ but the procedure is costly and associated with risks¹⁴ that may not be justifiable. One recent study of high-risk older men, for example, found that the surgery was not associated with reduced mortality compared with usual care during a mean 6.7 years of follow-up.¹⁵ Furthermore, in an earlier study investigators found that up to 30% of patients start to regain the weight within 18 months to two years,¹⁶ and in another qualitative study¹⁷ investigators found that patients who initially had emotional eating difficulties before surgery would eventually revert to those behaviors.

Pharmacotherapy has not demonstrated dramatic efficacy¹⁴ and produces limited results, often at the expense of cardiometabolic health risks.¹⁸ For example, orlistat and sibutramine, two antiobesity drugs that have been approved for use in durations up to two years, show only limited weight loss success (< 5 kg per 1- to 4-year average), can cost \$120 to 140 a month, and have produced adverse events.¹⁹ Gadde and Allison¹⁴ have recently reviewed research on combination therapy, involving pairs of pharmacological agents. In a comment on that paper, Mechanick and Apovian²⁰ argue that "multiple pathways to weight gain certainly require multiple targets to block this eons-old survival instinct to eat when food is plentiful." They propose that non-pharmacological interventions, such as behavior therapies or new biological therapies that target neuroendocrine pathways, can serve to optimize and individualize treatment.²⁰

FOUNDATIONS OF OVEREATING AND EMOTIONAL EATING

Recent research related to eating behavior reflects newly developed thoughts regarding the processes that lead to overeating. In a progression from the simplistic theory that overweight and obesity is merely caused by an imbalance in the homeostatic processes controlling food intake, it is now understood that more complex psychosocial mechanisms are at play. One theory is that this imbalance is caused by the struggle between the evolutionary trait of hedonic feeding, the tendency of humans to eat in the absence of energy deficit, and inhibitory control, the tendency to inhibit food intake in response to a variety of reasons such as food scarcity or social pressures,²¹ with the presence of stress tipping the scales towards increased feeding and decreased inhibition.²² Another perspective is that people participate in "mindless eating" as a way of becoming disconnected from their internal experience.²³

There is mounting evidence that overweight and obesity come about both through direct physiological pathways, as well as through changes in health-related behaviors such as food choice and intake quantity.²⁴ Many people adjust their eating habits in response to perceived stress as well as to persistent external stres-

sors. Although 20% of people will not change their eating behaviors under stress, most do; approximately 40% will increase and 40% will decrease their eating.²⁵ The emotional eaters, who tend to increase food intake, are more likely to crave high-fat/sweet and rewarding comfort foods. The basis for this behavior is becoming understood to entail brain pathways that involve learning and memory of reward and pleasure. Habit formation and decreased cognitive control are also involved.²⁵ These habits form the basis of BED. Binge eating occurs when a person eats larger amounts of food than normal in a short amount of time.²⁶ It therefore involves a loss of control and is often precipitated by a range of negative emotions, such as anxiety, depression, anger, and loneliness. Overweight subjects may or may not be characterized as binge eaters.²⁷

THE BIOCHEMICAL MECHANISM OF THE STRESS CONNECTION

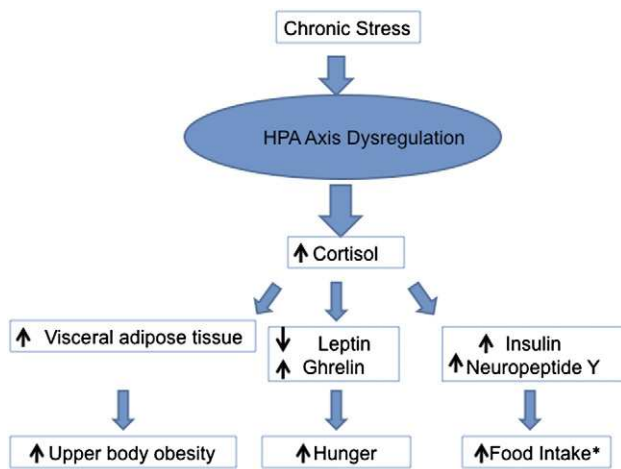
The stress response, also known as the "fight or flight response," involves the interaction of the autonomic nervous system, which includes the sympathetic and the parasympathetic nervous systems, the hypothalamic-pituitary-adrenal axis and endocrine secretion. Together, these systems comprise neuroendocrine pathways that collaborate to maintain the body's regulation of homeostasis. This mechanism is very effective when stress is acute, but in the case of chronic stress, the effect can be injurious to one's physiological state.^{28,29} Over time, chronic exposure to stress hormones contributes to "allostatic load."³⁰ The stress hormones released by the body, mostly cortisol, can alter the body's fuel metabolism, especially by adipose tissue, leading to an increase in upper-body obesity.³¹ Furthermore, hormones such as leptin, ghrelin, and neuropeptide Y can affect appetite and cause changes in fat mass storage.^{32,33} This results in the linking of stress and obesity²⁰ (Figure 1).

The Role of Mind-Body Therapies

Given the limited success of conventional approaches and the new information about the psychological and physiological mechanisms underlying obesity, we propose that a specific subgroup of mind-body therapies, including energy psychology and mindfulness-based approaches, could add an important new dimension to the integrative treatment of eating disorders.

Energy Psychology

Energy psychology refers to a family of therapies that are used for treating physical disorders and psychological symptoms,³⁴ which includes Thought Field Therapy, Emotional Freedom Techniques (EFT), Eye Movement Desensitization and Reprocessing, and Tapas Acupressure Technique (TAT). These therapies incorporate concepts originating from non-Western healing and spiritual systems, including acupuncture, acupressure, yoga, meditation, and qigong, and they combine physical activity with mental activation on the basis of the premise that the body is composed of electrical signals or energy fields.³⁵ Energy psychology has been quite controversial among psychotherapists and has been the subject of much heated debate in the literature.³⁵⁻³⁷ Nonetheless, the clinical application of these practices is growing and is beginning to be investigated for efficacy. The safety of



*Particularly high fat and/or sugar "comfort foods".

Figure 1. Link between stress and obesity. Chronic stress leads to dysregulation of the hypothalamic–pituitary–adrenal axis,^{29–31} which ultimately leads to an increase in the body’s production of cortisol.³² Cortisol, in turn can (1) increase the body’s production of visceral adipose tissue, leading to increased upper body obesity³²; (2) decrease the production of leptin and increase the production of ghrelin, thereby increasing the body’s hunger signals^{33,34}; and (3) increase production of insulin and neuropeptide Y, which can increase food intake, especially of high fat and/or sugar comfort foods.^{25,28,34}

energy psychology treatment has also not been clearly established.³⁸

There are two main elements of EFT. The first is that of exposure therapy,³⁷ which is defined as remembering a trauma of a memory or a fear, or an issue that is causing extensive rumination. This is done by expressing a memory or fear in a brief sentence and then immediately coupling it with a statement of self-acceptance that serves as a form of cognitive restructuring. The second element involves stimulation of acupressure points during the aforementioned statement. This “noninvasive somatic intervention”³⁹ is believed to produce results that are significantly more rapid and powerful than other exposure-based treatments such as relaxation and diaphragmatic breathing. According to Gary Craig, who developed EFT, a disruption in the body’s energy system is the root cause of all negative emotions.⁴⁰ EFT works by bringing about a “reversal of polarity,” which is believed to address the self-defeating negative thinking that can often take place outside of one’s awareness in the subconscious mind.⁴⁰ EFT may also bring about physiological changes such as alterations in brain waves⁴¹ and changes in salivary cortisol levels (discussed below).

The effects of EFT have also been studied in reference to various psychological factors, with a specific emphasis on food cravings. A within-subject study involving 102 participants attending a three-day EFT workshop reported the technique to be effective in reducing psychological symptoms such as anxiety, depression, and obsessive compulsive behaviors ($P < .005$) both at one month and six months after intervention.⁴² An additional study⁴³ addressed the effects of EFT on anxiety, depression, food

cravings, and pain in health care workers. Using a within-study design on 216 subjects who attended 2-hour EFT workshops at five different professional conferences, the authors found significant ($P < .001$) posttest improvements in psychological distress and food cravings. These improvements were maintained at a 90-day follow-up, although these findings may have been biased by the low response rate at follow up ($n = 42$). In another recent RCT⁴⁴ of a four-week EFT intervention for food cravings ($n = 96$), it was found that subjects in the treatment group showed a greater reduction in food cravings and the subjective power of food from pre- to post-test compared with a wait list control. These variables were maintained at a six-month follow-up across collapsed groups, and a delayed effect was seen for craving restraint. A similar study⁴⁵ by the same authors has also observed a reduction in BMI across collapsed groups at 12-month follow-up.

In addition, a recent 3-arm RCT has been conducted on the effects of a 50-minute EFT group session on stress biochemistry⁴⁶ and shows significant decreases in pre- and post-intervention salivary cortisol levels ($P < .05$) along with decreases in psychological symptoms for the EFT treatment group one hour after intervention as compared with a no-treatment group and a psychotherapy group receiving a supportive interview.

TAT, a related energy psychology approach, has also been studied for weight loss and maintenance. In a 2007 RCT, investigators compared the efficacy of TAT against Qigong and a self-directed support group as a possible intervention for weight-loss maintenance and showed that although the participants in the TAT group lost about the same amount of weight as the other two groups, they were able to better maintain weight loss at 24 weeks after intervention ($P = .09$) as compared with the qigong and self-directed support group groups.⁴⁷

MINDFULNESS MEDITATION

Mindfulness meditation is defined as a state in which one becomes highly aware and focused on the reality of the present moment, accepting and acknowledging it, without involvement in thoughts or emotional reaction.⁴⁸ In healthcare, the two main forms of mindfulness used are Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT).⁴⁹ MBSR was developed by Jon Kabat-Zinn, and is an eight-week group intervention program with weekly two-hour sessions, and one full-day retreat combining mindfulness-based meditation, body scanning exercises, group discussions, and Hatha yoga.⁵⁰

In the past decade, mindfulness has increasingly been embraced in the field of obesity and eating disorder treatment with the advent of an assortment of variations on the original MBSR therapy specifically geared to address issues involving food intake. Mindfulness combined with Acceptance and Commitment Theory (ACT) targets *experiential avoidance*, a strategy which may be helpful in preventing negative emotions from leading to unhealthy actions.⁵¹ Experiential avoidance is involved with emotional eating and external eating behaviors, which occur in response to external stimuli, such as the taste, sight, or smell of food. In ACT, one learns to experience a craving and let the feeling pass without acting on it.⁵² Mindful-

ness-Based Cognitive Behavioral Therapy (MBCT) combines elements of mindfulness with mindful eating, psychoeducation, physical activity, and a focus on strengths.⁵³ Mindfulness-Based Eating Awareness Training (ie, MB-EAT) involves the cultivation of mindfulness, mindful eating, emotional balance, and self-acceptance.⁵⁴ A pilot trial⁵⁵ of a six-week group curriculum for providing mindfulness training to obese individuals, called Mindful Eating and Living (ie, MEAL), showed significant increases in measures of mindfulness and cognitive restraint around eating and significant decreases in weight, eating disinhibition, binge eating, depression, perceived stress, physical symptoms, negative affect, and C-reactive protein.

In a recent systematic review of eight studies,⁵⁶ authors examined a variety of mindfulness techniques in treating eating disorders, including anorexia, bulimia, and BED. Because trial quality varied and sample sizes were small, the researchers concluded that mindfulness may be effective in treating eating disorders but that further research was needed. The authors noted, however, that all of the articles that met the study's criterion reported positive outcomes for the mindfulness intervention.

Two additional studies recently addressed the treatment of obesity with a combination of mindfulness strategies and ACT. Lillis et al⁵⁷ conducted a RCT on 87 subjects who had all completed at least a six-month weight loss program. Using a wait list control against treatment of the experimental group through a one-day workshop, the authors found that, compared with the control group, the experimental group showed greater improvements in obesity-related stigma, quality of life, psychological distress, and reduction of body mass at a three-month follow-up. Alberts et al⁵⁸ conducted an RCT on 19 participants in a 10-week dietary group treatment that examined the effect of mindfulness plus ACT on food cravings. Experimental subjects underwent an additional seven-week, manual-based mindfulness/acceptance training. The control group received information on healthy food choices. The experimental group showed significantly lower food cravings, a lower preoccupation with food in four subscales, less loss of control, and better positive outcome expectancy, as compared with the control group. There was no significant effect observed for emotional craving. The authors of both of these studies conclude that mindfulness strategies combined with acceptance are effective in reducing the behaviors that lead many obese patients to overeat.

With regards to stress, mindfulness can reduce psychological factors that have been shown to contribute to obesity. In a recent well conducted systematic review, Mars and Abbey⁴⁹ examined 22 studies with conditions ranging from participants with Axis I disorders, various diagnosed medical disorders, and healthy subjects. Axis I disorders include a range of psychopathologies such as childhood developmental and adjustment abnormalities, adult anxiety, and mood, sleep, and sexual disorders. Subjects with BED are known to have greater comorbidity for Axis I disorders.²⁷ The authors report that five studies examining Axis I disorders showed statistically significant results for an eight-week, two hours per week MBCT program in reducing psychological stress, recurring bouts of depression, and pain. They conclude that, despite some methodological difficulties in the trials,

mindfulness therapy may have a positive impact on reducing stress and depression.

CONCLUSIONS

Despite increasing public awareness of obesity's detrimental effects on health, the conventional approaches to managing this condition have not been effective. The recommended standard care for overweight and obesity, namely diet and exercise, are for the most part ineffective in the long term. Behavioral therapy and CBT may have some effect but are costly and difficult to implement. Issues with bariatric surgery and pharmacological therapies attributable to cost and the potential for harm, as well as lack of long-term efficacy, have limited their utility. In many studies, the combination of these therapies seems to work better than when each is attempted alone, but the challenge of overweight and obesity seems to be long-term weight maintenance.

Many sufferers of obesity are also plagued with BED. Binge eating is tied in with dysfunctional beliefs surrounding emotions, weight, and shape concerns. Binge eaters show a lack of coping skills and tend to use food to escape from negative emotions. It is for these reasons that treatment of BED must address the emotional components involved in overeating.²⁷

This article has provided a brief review of energy psychology and mindfulness meditation and interventions involving mindfulness practices, which show great potential in treatment of patients with obesity and/or BED. The principles behind these therapies make them ideal for addressing the behavioral components of overeating.

Research on energy psychology is still in its infancy; with few randomized controlled trials and insufficient studies available for systematic review of its safety and efficacy. Many of the published trials have been uncontrolled and the majority of those studies that do have controls have not accounted for patient expectation of efficacy. Further research of greater quality must be conducted for energy psychology to gain acceptance as an effective treatment modality for obesity and eating disorders. However, the published literature indicates a potential for positive application of these methods to obesity and the related psychological issues. This family of "Noninvasive Somatic Interventions"⁴⁰ should be further tested for its role in the treatment of obesity.

There is evidence that MBSR and MBCT are effective in reducing stress, anxiety, depression, and other psychological factors associated with obesity and binge eating. Mindfulness, combined with other therapies and interventions, such as ACT, CBT, MEAL, and EAT, also shows promise in being a useful therapy for the behavioral component of obesity. Because mindfulness therapy can be performed in a group setting and can be practiced by the individual following training, it can also be cost-effective.

There are additional mind-body interventions that should be examined as well for efficacy in treating obesity and BED. Research also exists for yoga,⁵⁹⁻⁶¹ acupuncture,⁶²⁻⁶⁶ relaxation therapy,⁶⁷ guided imagery,⁶⁸ tai chi,⁶⁹ art therapy,⁷⁰ dance movement therapy,⁷¹ and intuitive eating.⁷² Further elucidation of the efficacy and mechanisms of the therapies reviewed and the ones listed above will provide great insight into possible ways to optimize obesity and BED treatment in the future.

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