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An exploratory study of Mindfulness Based Stress Reduction for emotional eating

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ABSTRACT

Emotional eating is an important predictor of weight loss and weight regain after weight loss. This two part study's primary aim was to explore changes in emotional eating in a general population of individuals taking the Mindfulness Based Stress Reduction (MBSR) program, with a secondary aim to explore whether changes in mindfulness predicted changes in emotional eating. Self-reported survey data exploring these questions were collected before and after the intervention for two sequential studies (Study 1 and Study 2). While there were no control groups for either study, in both studies emotional eating scores following the MBSR were significantly lower than scores prior to taking the MBSR ($p < 0.001$; $p < 0.001$) In Study 2, changes in mindfulness were correlated with changes in emotional eating ($r = 0.317$, $p = 0.004$). These results suggest that MBSR may be an effective intervention for emotional eating, and that further research is warranted to examine effects on weight loss and maintenance.

1. Introduction

A 2008 epidemiologic study in *Obesity* predicted that by 2048, all American adults will be overweight or obese, posing significant social, economic, and health concerns for the future (Wang, Beydoun, Liang, Caballero, & Kumanyika, 2008). Weight loss interventions have improved in their success rates, but weight maintenance following weight loss remains an under-researched and important problem (Anderson, Konz, Frederich, & Wood, 2001; Jeffery et al., 2000). Based on the disinhibition subscale of the Three Factor Eating Questionnaire, Neimeier et al. examined two potential predictors of weight loss and regain: internal disinhibition and external disinhibition (Niemeier, Phelan, Fava, & Wing, 2007). Internal disinhibition, or emotional eating, results from an inability to inhibit the drive to eat in response to internal processes, such as emotional distress. External disinhibition results from an inability to inhibit the drive to eat in response to external processes, such as seeing food in a social situation. Neimeier found that internal disinhibition is a much stronger predictor of weight loss and regain than external disinhibition (Niemeier et al., 2007). Other studies have since explored the role of emotional eating in initial weight change, finding that internal disinhibition during weight loss interventions were predictive of later weight loss maintenance (Butryn, Thomas, & Lowe, 2009). In addition, higher levels of emotional eating predict weight gain, while lower levels of emotional eating predict weight loss (Koenders & van Strien, 2011; Silva et al., 2008).

Mechanistically, in individuals with chronically high stress levels, consumption of "comfort" foods may dampen the HPA axis, becoming a form of self-medication (Tomiyama, Dallman, & Epel, 2011). As the drive to emotionally eat becomes habitual, an inability to suppress this drive, or a lack of internal inhibition, will lead to increased intake of "comfort" foods in response to stressors. Successful interventions for long-term weight management must then have a two-pronged approach: to decrease chronic stress levels, but also to alter the individual's response to stress and the negative emotions that are triggered by it.

Mindfulness training, or the cultivation of non-judgmental awareness of the present moment, has been shown to improve emotional reactivity and decrease stress, as well as improve other health behaviors (Brewer et al., 2011; Goyal et al., 2014; Miller, Kristeller, Headings, & Nagaraja, 2014; O'Reilly, Cook, Spruijt-Metz, & Black, 2014). The Mindfulness-Based Stress Reduction

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(MBSR) program is an 8 week, highly accessible course currently offered in over 500 sites across the US. If mindfulness training is an effective intervention for decreasing emotional eating, the MBSR could present a low-cost strategy for addressing stress-and emotion-related eating, and potentially weight loss and weight loss maintenance.

To date, studies exploring the effects of mindfulness based interventions on emotional eating have had mixed results. A 2014 review concluded that mindfulness based interventions showed a significant reduction in binge eating behaviors with medium to large effect sizes. However, the effect on emotional eating was not consistent across studies, with two out of five showing improvements in emotional eating (Alberts, Thewissen, & Raes, 2012; Daubenmier et al., 2011; Katterman, Kleinman, Hood, Nackers, & Corsica, 2014). Of the three negative studies, two included participants with low levels of emotional eating at baseline, and the third was underpowered with a sample size of 7 (Kearney et al., 2012; Leahey, Crowther, & Irwin, 2008; Timmerman & Brown, 2012). One of these negative studies involved participants in a MBSR program for veterans, and found a correlation between increases in mindfulness skills and decreases in emotional eating (Kearney et al., 2012). Further research is required to determine the effectiveness of mindfulness based interventions, and MBSR in particular, at reducing emotional eating, as the effectiveness of MBSR in a robust general community sample has not been studied. In addition, it is important to investigate the relationship between changes in mindfulness and changes in emotional eating to determine if mindfulness is the key ingredient in the intervention.

The current study aimed to explore changes in emotional eating following MBSR in a community sample, and potential associations with changes in mindfulness.

2. Study 1

To explore whether participation in the MBSR program would reduce emotional eating, we first conducted a pilot study with a robust sample size using a limited number of questions about emotional eating incorporated into pre-post questionnaires completed by all participants.

3. Methods

3.1. Participants and data collection

Participants were drawn from individuals enrolled in the MBSR program at the Center for Mindfulness in Medicine, Health Care and Society at UMASS Medical School from January through August 2013. Each participant was provided a paper survey to fill out before and after the course. All participants were formally asked for permission to use their de-identified survey data for research, and were given the option to opt out of survey completion. There were no exclusion criteria, though individuals with significant mental health or addiction issues are routinely excluded from participation in the course. This study was approved by the Institutional Review Boards of the University of Massachusetts Medical School.

3.2. Intervention

Mindfulness-Based Stress Reduction (MBSR) is an 8 week long course with one 2.5–3 h long class per week with one 7 h silent retreat between weeks 6 and 7. The course was taught by certified instructors who receive supervision by senior teachers to ensure fidelity. Formal mindfulness practices taught in class include the body scan, seated and walking meditation, and gentle yoga. Participants are asked to complete formal mindfulness practices for 45 min per day, 6 days per week, using guidance provided on audio CDs, as well as other exercises and informal mindfulness practices (such as eating one meal per day mindfully). Though there is no explicit discussion of weight, mindful eating is taught through a mindful eating exercise in the first class, and the theme of self-care is repeated throughout the program, including instruction for healthy nutrition, physical activity, and adequate sleep.

3.3. Measures

Self-reported height, weight, and demographics were collected. Our primary outcome was assessed using a shortened modification of the Internal Disinhibition Scale (IDS), derived by Niemeier et al (Niemeier et al., 2007). from the Three Factor Eating Questionnaire (also known as the Eating Inventory), a widely used measure of disordered eating in obesity research (Stunkard & Messick, 1985). According to the factor structure identified by these authors, 8 items correspond to internal cues that disinhibit eating control. The full scale has documented reliability (alpha = 0.78) and validity with U.S. adults (Niemeier et al., 2007). Higher scores (greater degree of emotional eating) predict less weight loss during weight loss treatment and weight regain post-treatment and during weight loss maintenance (Koenders & van Strien, 2011; Teixeira et al., 2010). Study 1 used three items from the scale to reduce participant burden: “When I feel anxious, I find myself eating”, “When I feel blue, I often overeat”, “When I feel lonely, I console myself by eating.” Participants answered these three items on a scale involving the options “Routinely,” “Often,” “Sometimes,” or “Never.” The total IDS score was computed by summing across all three items, with each answer of “Routinely” worth 3 points, “Often” worth 2 points, “Sometimes” worth 1 point, and “Never” worth 0 points.

3.4. Data analysis

SPSS was used for all data analyses. Paired *t*-test (2-tailed, alpha = 0.05) were used to compare baseline and post intervention on dependent variables. Correlational analysis (Pearson) was used to determine relationships between variables.

4. Results

4.1. Participants

348 individuals completed baseline surveys and agreed to have their data used for research. Of those, 332 also completed post-MBSR surveys (Fig. 1). Mean age was 48.3 ± 14.2 S.D. Participants were 29.1% male and 70.9% female, which is a typical distribution for the MBSR program (Carmody, Baer, L B Lykins, & Olendzki, 2009). The average BMI was 25.3 ± 5 S.D. 185 participants were <25, 96 were >25 and 41 participants were >30 (11 did not provide their weight). There was no significant difference in emotional eating answers or BMI at baseline between individuals who did not provide post-treatment data (n = 16) and the rest of the sample (n = 332).

4.2. Effects of intervention

Analysis of the primary outcome, emotional eating, revealed a significant decrease in emotional eating scores following MBSR based on emotional eating questions derived from the Internal Disinhibition Scale (IDS) (n = 327, pre mean = 2.9 + 2.6 SD, post mean = 2.1 + 2.1 SD, $p < 0.001$, 95% CI [0.56, 0.95]). In addition, higher emotional eating scores at baseline were correlated with greater change in emotional eating following MBSR (r = 0.594,