Appetite 103 (2016) 265–274

Contents lists available at ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

Emotion regulation training to reduce problematic dietary restriction: An experimental analysis

Ann F. Haynos [a, b, *], Bailey Hill [b], Alan E. Fruzzetti [b]

[a] Department of Psychiatry, University of Minnesota Medical Center, Minneapolis, MN, United States
[b] Department of Psychology, University of Nevada, Reno, Reno, NV, United States

ARTICLE INFO

Article history:
Received 1 March 2016
Received in revised form
11 April 2016
Accepted 16 April 2016
Available online 20 April 2016

Keywords:
Dietary restriction
Eating disorder anorexia nervosa
Emotion regulation

ABSTRACT

Evidence suggests that emotion regulation may be a process relevant to problematic dietary restriction. However, emotion regulation has not been evaluated as an intervention target across a range of restriction severity. This study utilized an experimental design to examine whether targeting emotion regulation reduced problematic dietary restriction. Within a self-identified restrictive sample ($n = 72$), the effects of an emotion regulation condition (i.e., emotion regulation training) were compared to those of a control condition (i.e., nutrition information training) on dietary restriction indices (i.e., effort to reduce intake on a progressive ratio task, work towards an alternate reinforcer on a progressive ratio task, intake by dietary recall) following a stressor. Exploratory analyses of potential moderators (i.e., restraint, BMI, binge eating and purging status, emotion regulation difficulties) were conducted to examine whether these factors affected the impact of training on dietary restriction. No significant main effects of condition were detected on any outcome measure. However, results were moderated by BMI status. Participants with lower BMIs exerted less effort towards dietary restriction following the emotion regulation condition versus the control condition ($p = 0.02$). Results suggest that targeting emotion regulation may help to reduce problematic dietary restriction among lower weight individuals.

Problematic dietary restriction, or limiting caloric and/or nutrient consumption in a disordered manner that is inadequate for the long-term maintenance of appropriate weight and/or health (Haynos & Fruzzetti, 2015), is a surprisingly common practice that is associated with serious consequences. Although many who cut back on intake do so in a less severe and harmful manner (e.g., healthy portion control), evidence suggests that a substantial number of individuals engage in the more extreme practices characterized by problematic dietary restriction, such as skipping meals or fasting, to control weight (Mitchison, Hay, Slewa-Younan, & Mond, 2012). Individuals engaging in problematic dietary restriction can experience a range of serious physical and psychological consequences (Daee et al., 2002; Forman-Hoffman, 2004), are at elevated risk of developing an eating disorder (Liechty & Lee, 2013) or obesity (Neumark-Sztainer et al., 2006), and have suicide rates ten times higher than those who do not engage in dietary restriction (Daee et al., 2002).

Despite the negative physical and psychological effects of problematic dietary restriction, treatment for this set of behaviors is lacking. No clearly efficacious treatments have been identified for adults with anorexia nervosa (Berkman et al., 2006), which could be considered the prototype of extreme dietary restriction, or for other subthreshold eating disorders primarily characterized by problematic dietary restriction (Ricca et al., 2010). Additionally, there are no established interventions for problematic dietary restriction that does not yet meet eating disorder criteria (Jacobi, Völker, Trockel, & Taylor, 2012). Thus, there is a need for more effective treatment of problematic dietary restriction across clinical severity.

Progress in treatment development for problematic dietary restriction may be limited by a lack of knowledge regarding the risk and maintenance mechanisms of such behavior. However, recently there has been increasing interest in examining emotion regulation as a psychological process relevant to problematic dietary restriction (Haynos & Fruzzetti, 2011). It has been proposed that individuals who engage in disordered dietary restriction have deficits in the ability to effectively modulate emotion and, therefore, rely on restriction to produce desired affective changes. There is research

* Corresponding author. Department of Psychiatry, University of Minnesota Medical Center, 2450 Riverside Ave., F279, Minneapolis, MN 55454, United States.
E-mail address: afhaynos@umn.edu (A.F. Haynos).

http://dx.doi.org/10.1016/j.appet.2016.04.018
0195-6663/

beginning to support this hypothesis, the majority of which has been conducted in samples with anorexia nervosa. Studies have found that individuals with anorexia nervosa display elevated difficulties with emotion regulation (Harrison, Sullivan, Tchanturia, & Treasure, 2010; Svaldi, Griepenstroh, Tuschen-Caffier, & Ehring, 2012), which do not remit with weight restoration (Haynos, Roberto, Martinez, Attia, & Fruzzetti, 2014), and predict long-term persistence of disordered eating (Racine & Wildes, 2014). There is also initial evidence suggesting a functional link between dietary restriction and affect, such that affective changes serve as precipitants and consequences of dietary restriction behavior among individuals with anorexia nervosa (Engel et al., 2013). There has been less research examining emotion regulation processes among individuals who engage in problematic dietary restriction at lower severity levels. However, there is evidence that such individuals have poorer emotion regulation abilities than those who do not restrict eating (Ackard, Croll, & Kearney-Cooke, 2002).

These studies suggest the utility of targeting emotion regulation difficulties in the treatment of problematic dietary restriction across a range of clinical presentations. Some interventions have begun targeting aspects of emotion regulation in anorexia nervosa (Chen et al., 2015; Lynch et al., 2013; Wildes, Marcus, Cheng, McCabe, & Gaskill, 2014). However, there has been no examination of emotion regulation as a specific intervention target across a range of restriction severity. There is growing interest in examining problem behaviors cross-diagnostically in order to identify common mechanisms across a range of severity and presentation (Morris & Cuthbert, 2012). Problematic dietary restriction has not often been examined dimensionally, due to uncertainty regarding whether such behaviors are disordered at the subthreshold level (Lowe & Timko, 2004). However, evidence suggests that problematic dietary restriction frequently predates the development of a full-threshold eating disorder (Affenito, Dohm, Crawford, Daniels, & Striegel-Moore, 2002), and can lead to negative consequences even in the absence of a diagnosed eating disorder (Daee et al., 2002; Forman-Hoffman, 2004; Neumark-Sztainer et al., 2006). Thus, there is compelling reason to investigate problematic dietary restriction across severity levels, ranging from subclinical to clinical severity.

The primary objective of this study was to conduct a randomized experiment to test whether targeting emotion regulation reduces problematic dietary restriction behavior across a range of clinical severity. Other studies have begun using single-session experiments to test potential treatment targets for eating disorders (e.g., Cardi, Esposito, Clarke, Schifano, & Treasure, 2015), as this approach offers minimized resource burden and more rapid dissemination of results compared to a clinical trial. Therefore, we conducted a randomized, controlled experimental study comparing the impact of an emotion regulation condition (i.e., emotion regulation training) to an active control condition (i.e., nutrition information training) on dietary restriction behavior following a stressor. The primary hypothesis was that the emotion regulation training would have a greater impact on dietary restriction behavior compared to the control condition. Our secondary, exploratory objective was to examine potential moderators of outcome following emotion regulation versus nutrition information training. Because this objective was exploratory, we had no a priori hypotheses about which clinical characteristics would moderate training effects.

1. Methods

1.1. Participants

The sample size of 72 participants was determined through a power analysis conducted using G-Power software (Faul, Erdfelder, Buchner, & Lang, 2009), assuming an alpha level of 0.05 and sufficient power (80%) to detect a large effect size ($f = 0.40$) for fixed effects, main effects, and interactions in an experiment with two conditions and up to three covariates.

Inclusion criteria included: 1) Age >18 years old; 2) Female; 3) Endorsement of engaging in problematic dietary restriction ≥1 day within the last month on the Dietary Restriction Screener (DRS; Haynos & Fruzzetti, 2015). Exclusion criteria included: 1) Meeting DSM-IV criteria for bulimia nervosa or binge eating disorder by the Eating Disorder Examination- Questionnaire (EDE-Q) (Fairburn & Beglin, 1994), using the method described by Berg et al. (2012); and 2) BMI ≥ 25 kg/m^2. These criteria were selected in order to recruit participants engaging in clinically relevant dietary restriction across a range of severity (sub-clinical to meeting criteria for anorexia nervosa) and for whom dietary restriction, rather than binge eating or overeating, was the primary clinical concern. Males were excluded due to differing metabolic needs, potentially leading to extraneous variability on dietary restriction-related outcome measures. Fig. 1 highlights the participant flow for this study. Of note, the 349 invited participants who declined to participate either failed to respond to the invitation email or to show for a scheduled appointment.

1.2. Study procedures

1.2.1. Study overview

Fig. 2 outlines the flow of study procedures. Individuals participated in screening for eligibility and those who were eligible were invited to participate in the laboratory portion of the study. During the laboratory portion of the study, participants first signed informed consent and completed baseline measures (including a twenty-four dietary recall). Participants were then exposed to the mood manipulation, which consisted of receiving the information that they would be expected to consume some amount of a high-calorie milkshake as a part of the study. This information was designed to increase negative and decrease positive affect. Participants were then randomly assigned to the emotion regulation condition (i.e., emotion regulation training) or active control condition (i.e., nutrition information training) and participated in the training to which they were assigned. Following the training, participants completed a progressive ratio (PR) computer task, which allowed them to work (through space bar presses) towards: 1) decreasing the amount of milkshake that they would be expected to consume, and/or 2) increasing the amount of money that would be awarded to them. The primary outcome variable in this study was the number of bar presses towards decreased food intake. The day after experimental procedures, a 24 h dietary recall was conducted to determine whether interventions impacted consumption for the remainder of the day. All study procedures were conducted at a mid-size university in the Western U.S. and approved by the local Institutional Review Board.

1.2.2. Recruitment and screening

Participants were primarily recruited through an online psychology department recruitment site, flyers hung throughout the campus and community, and online and print advertisements. Participants were offered compensation either in the form of extra credit in psychology courses or two movie tickets. Interested individuals participated in an initial screening for eligibility either through the online recruitment site or over the phone.

1.2.3. Consent and baseline procedures

Individuals who were interested and eligible were invited to participate in the laboratory portion of the study. Study procedures