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# Mindfulness and its relationship with eating disorders symptomatology in women receiving residential treatment

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ABSTRACT

*Objective:* Mindfulness and its related constructs (e.g., awareness and acceptance) are increasingly being recognized as relevant to understanding eating disorders and improving treatment. The purpose of this study was to (1) examine the relationship between mindfulness and ED symptomatology at baseline and (2) examine how changes in mindfulness relate to change in ED symptomatology.
*Method:* Measures of mindfulness and ED symptomatology were administered to 88 patients upon admission to residential ED treatment and at discharge.
*Results:* Baseline ED symptomatology was associated with lower awareness, acceptance, and cognitive defusion, and higher emotional avoidance. Improvements in these variables were related to improvement in ED symptomatology.
*Discussion:* Interventions targeting mindfulness could be beneficial for patients with EDs.


## 1. Introduction

There is a growing body of research suggesting that mindfulness (i.e., non-judgmental, present-moment awareness) and its related constructs are relevant to understanding the development and maintenance of eating disorders. Anorexia nervosa and bulimia nervosa are both characterized by experiential avoidance and a strong desire to maintain control over eating-related behaviors, urges, thoughts, and feelings (Corstorphine, Mountford, Tomlinson, Waller, & Meyer, 2007; Merwin & Wilson, 2009; Merwin, Zucker, Lacy, & Elliot, 2010; Orsillo & Batten, 2002). Eating disorder behaviors may be reinforced in part because they allow individuals to temporarily avoid other distressing internal experiences by focusing instead on one's weight or eating behavior (Hayes & Pankey, 2002; Heffner, Sperry, Eifert, & Detweiler, 2002; Paxton & Diggens, 1997; Schmidt & Treasure, 2006). Many individuals with eating disorders also have deficits in emotion recognition and emotional awareness (Harrison, Sullivan, Tchanturia, & Treasure, 2009; Sim & Zeman, 2004). Recognition and awareness of internal experience may be a precondition to cognitive defusion, which is the ability to have distance and perspective from the literal meaning of cognitive activity (Merwin et al., 2010).

A small number of case studies and pilot studies have suggested that mindfulness and acceptance might be effective foci of treatment for eating disorders (Anderson & Simmons, 2008; Baer, Fischer, & Huss, 2005; Juarascio, Forman, & Herbert, 2010; Kristeller, Baer, & QuillianWolever, 2006; Safer, Telch, & Chen, 2009). However, very little data have been collected to determine whether improvements in mindfulness and related constructs (i.e., awareness, acceptance, cognitive defusion) are related to symptom severity and symptom improvement. The purpose of this study was to measure mindfulness in individuals at a residential treatment facility for eating disorders and (1) examine the relationship between mindfulness and eating disorder symptomatology at baseline and (2) examine how changes in mindfulness during the course of treatment related to change in eating disorder symptomatology. It was hypothesized that low levels of awareness, acceptance, and cognitive defusion, and high levels of emotional avoidance would be associated with greater eating disorder symptomatology at admission. It was also hypothesized that improvements in these variables during treatment would be associated with improvement in eating disorder symptomatology.

## 2. Methods

### 2.1. Participants

Participants were women admitted to two residential treatment facilities for eating disorders. Study measures were added to the standard battery of measures patients are asked to complete upon admission, and completion rates were consistent with the typical rates of participation at those facilities. Of the 105 patients admitted to

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treatment during the period of recruitment, 88 patients completed the admission assessment (response rate 83.8%), which included a diagnostic interview conducted by a psychiatrist. All patients met DSM-IV (American Psychiatric Association, 1994) criteria at admission for anorexia nervosa ($n = 35$), bulimia nervosa ($n = 29$), or eating disorder not otherwise specified (EDNOS; $n = 24$). Most participants (88.6%) were Caucasian and average age was 25.8 ± 11.2 years. Mean length of stay in the program was 26.5 days (SD = 12.2). Two-thirds of the sample ($n = 59$) also completed a discharge assessment. Most cases of attrition at discharge resulted from a patient being unexpectedly discharged before the research team could contact them to complete the discharge assessment.

### 2.2. Procedure

The study was conducted according to the ethical principles regarding research with human participants and was approved by an institutional review board. All participants provided informed consent prior to completing the intake assessment. Assessment questionnaires at admission and discharge were administered via computer at the treatment facility on the second day of treatment and within the final 2 days of treatment, respectively. Treatment was based on a comprehensive system designed to normalize eating patterns, stabilize or increase weight, and eliminate compensatory behaviors. Patients received an intensive and comprehensive program of individual, group, and family therapy provided by a multi-disciplinary team. The theoretical orientation at both facilities was eclectic and was largely based on psychodynamic and feminist-based theories.

### 2.3. Measures

The Eating Disorders Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 1994) is a 36-item self-report questionnaire that evaluates eating disorder symptoms over the past 28 days. It was adapted from the EDE (Fairburn & Cooper, 1993) semi-structured interview. The Global score, which is the average of the Shape Concern, Weight Concern, Eating Concern, and Restraint subscales, was examined for this study. Fairburn and Beglin (1994) have reported data on the concurrent validity of the EDE-Q in community and clinical populations. Acceptable levels of internal consistency have been observed for the EDE-Global and subscale scores (Cronbach α coefficients above .70; Peterson et al., 2007). Good 2-week test–retest reliability also has been demonstrated (*r*s ranging from .81 to .94; Luce & Crowther, 1999) .

The Eating Disorders Inventory-3rd Edition (EDI-3; Garner, 2004) is a 96-item self-report inventory that measures eating disorder symptoms. The EDI-3 is organized into 12 primary scales; however, the current study included only the Drive for Thinness, Body Dissatisfaction, and Bulimia subscales (Garner, 2004). The scale has adequate psychometric properties (Garner, Olmsted, & Polivy, 1983). The test–retest reliability of these subscales among women diagnosed with eating disorders has been excellent (Cumella, 2006). All EDI items are able to discriminate between eating disorder and non-patient samples (Garner et al., 1983).

The Body Image Acceptance and Awareness Questionnaire (BI-AAQ; Sandoz, 2010) is a 12-item self-report measure designed to assess body image flexibility. The BI-AAQ has shown good psychometric properties including internal consistency (Cronbach's alpha = .93; Sandoz, 2010), as well as concurrent, criterion-related, and incremental validity amongst both clinical and non-clinical samples (Ferreira, Pinto-Gouveia, & Duarte, 2011).

The Philadelphia Mindfulness Scale (PHLMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008) is a 20-item self-report measure that assesses two constructs: present-moment awareness and nonjudgmental acceptance. Exploratory and confirmatory factor analyses support the two-factor structure. Good internal consistency and reliability were demonstrated in both clinical and non-clinical samples (Cardaciotto et al., 2008).

The Emotional Avoidance Questionnaire (EAQ; Taylor, Laposa, & Alden, 2004) is a 20-item self-report measure designed to assess the extent to which one behaviorally and cognitively avoids emotion. The EAQ has four subscales: avoidance of positive emotion, negative beliefs about emotions, social concerns about displaying emotions, and avoidance of positive emotion. The EAQ subscales have demonstrated fair to good internal consistency (.66–.83; Taylor et al., 2004).

The Eating Attitudes Thoughts and Defusion Scale (EATDS; Shaw, Butryn, Juarascio, Kerrigan, & Matteucci, Unpublished) is a recently developed 13-item self-report measure of the extent to which a person is able to distance oneself from negative thoughts about food, weight, and body image. Psychometric data from three pooled samples ($n = 367$) have documented adequate internal consistency (Cronbach's alpha = .93) and convergent and divergent validity (Shaw et al., Unpublished).

### 2.4. Statistical analysis

Correlations were conducted to examine the relationship between mindfulness and eating disorder symptomatology at pre-treatment, and significant relationships were reexamined using linear regression analyses that controlled for comorbidity. A series of independent sample *t*-tests was utilized to compare pre-treatment measures for participants with and without comorbid mood or anxiety disorders. To examine how change in mindfulness was associated with change in symptomatology at post-treatment, post-treatment scores were regressed on baseline scores and standardized residuals of change were created. The residuals of change were then correlated for mindfulness-related measures and eating disorder symptom measures.

## 3. Results

### 3.1. Relationship at baseline between mindfulness-related processes and eating disorder symptoms

The first aim of this study was to examine how mindfulness-related processes were related to eating disorder symptoms at admission to treatment (see Table 1). Lower levels of body image acceptance (measured by BI-AAQ) were significantly associated with greater eating disorder symptomatology, as measured by the EDE-Q and EDI. Participants with lower levels of awareness (measured by the PHLMS) also had significantly greater eating disorder symptomatology, as measured by EDI subscale scores. Lower levels of acceptance (also measured by the PHLMS) were associated with more severe symptoms on the EDE-Q, EDI-Drive for Thinness, and EDI-Body Dissatisfaction. Greater emotional avoidance, as measured by EAQ subscales, was significantly associated with greater eating disorder symptoms on all measures. Less cognitive defusion, as measured by the EATDS, was associated with greater severity on the EDE-Q and the EDI-Bulimia and EDI-Body Dissatisfaction measures. When these significant relationships were reexamined controlling for presence or absence of mood disorder and presence or absence of anxiety disorder, all remained significant except for the relationship between cognitive defusion and EDI-Bulimia, for which the *p*-value decreased to .06. In addition, scores on the PHLMS, BI-AAQ, EATDS, and EAQ at pre-treatment were compared in those with and without co-morbid mood or anxiety disorders. No appreciable ($\eta_p^2 =$ .000–.035) or significant ($p$-values = .08–.97) differences were observed between groups, with the exception that participants with anxiety disorders reported significantly greater avoidance on the EAQ-Beliefs subscale ($\eta_p^2 = .07$, $p = .01$).

**Table 1**
Correlations at admission between eating disorder symptom measures and body image acceptance (BI-AAQ), awareness and acceptance (PHLMS), emotional avoidance (EAQ) and cognitive defusion (EATDS) ($n = 88$).

| | EDE-Q | EDI-Drive for Thinness | EDI-Bulimia | EDI-Body Dissatisfaction |
|---|---|---|---|---|
| Body image acceptance | −.46** | −.76** | −.42** | −.61** |
| PHLMS awareness | −.25 | −.26* | −.30** | −.26* |
| PHLMS acceptance | −.33** | −.40** | −.19 | −.32* |
| EAQ avoidance of positive emotions | .39** | .42** | .28** | .47** |
| EAQ negative beliefs about emotion | .30** | .57** | .43** | .58** |
| EAQ social concerns about displaying emotion | .37** | .55** | .31** | .50** |
| EAQ avoidance of negative emotions | .27* | .30** | .28** | .31** |
| EATDS defusion | −.53** | −.50** | −.19 | −.50** |

*$p < .05$, **$p < .01$.

### 3.2. Relationship between change in mindfulness-related processes and eating disorder symptoms

The second aim of the study was to examine how change in mindfulness-related variables was associated with change in symptomatology during treatment. As shown in Table 2, increases from pre- to post-treatment in body image acceptance (as measured by the BI-AAQ) and awareness (as measured by the PHLMS-Awareness subscale) were significantly associated with decreases in all eating disorder symptom measures. Participants with the greatest improvement in body image acceptance had the greatest decreases in eating disorder symptoms. There were statistical trends ($p$-values between .05 and .10) for the association between increases in global acceptance, as measured by the PHLMS-Acceptance subscale, and improvement during treatment in all eating disorder symptom measures. Decreases in the avoidance of positive emotions, negative beliefs about emotion, and social concerns about displaying emotion (all measured by the EAQ) were significantly associated with improvements in all eating disorder symptom measures. Decreases in avoidance of negative emotion, also measured by the EAQ, were associated with significant improvements during treatment in EDI-Drive for Thinness and EDI-Bulimia scores. Change in cognitive defusion (EATDS) was not significantly related to change in symptomatology.

## 4. Discussion

The results of this study highlight mindfulness as an appropriate target for experimental treatment of eating disorders. At admission to treatment, higher scores on eating disorder symptomatology were significantly correlated with lower awareness, acceptance, and cognitive defusion, and higher emotional avoidance. Participants with and without comorbid mood and anxiety disorders had similar scores on mindfulness measures at admission, and the significant relationships between eating disorder symptomatology and mindfulness-related variables at admission could not be accounted for by the presence of comorbid mood or anxiety disorders. Participants who experienced the greatest improvements in awareness, acceptance, and emotional avoidance also showed the most improvement in eating disorder symptoms from pre- to post-treatment. Treatment gains were shown to be associated with improvements in these areas despite the fact that the treatment model used at these facilities did not focus on addressing these deficits directly. This might suggest that interventions such as ACT, which specifically promotes increases in emotional awareness and acceptance, could be beneficial for patients with eating disorders, and might even produce gains beyond those of standard behavioral treatments. Further research is needed to examine the effectiveness of ACT and other mindfulness- and acceptance-based approaches for the treatment of eating disorders.

Results of this study should be interpreted with caution given that formal mediational analyses could not be conducted because process measures and outcomes were collected contemporaneously. In addition, the attrition rate was relatively high. In contrast to tightly controlled clinical trials, few selection criteria were used for participation in this study and patients presented with significant comorbid conditions and prior treatment histories. This may indicate that these findings are generally representative of patients who seek treatment in residential programs for eating disorders.

In summary, this study makes a contribution to the literature by documenting the relationship between eating disorder symptoms and emotional avoidance, deficits in emotional awareness, and a lack of ability to defuse from eating-related thoughts. Additional research should prospectively examine how these deficits develop and relate to symptomatology and determine the extent to which treatment that targets mindfulness can enhance outcomes.

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**Contributors**

Butryn and Forman designed the study and wrote the protocol. Juarascio and Shaw conducted literature searches and provided summaries of previous research studies. Butryn, Juarascio, and Shaw conducted the statistical analysis. All authors wrote sections of the manuscript. All authors have approved the final manuscript.

**Table 2**
Pre- to post-treatment change in eating disorder symptoms and change in body image acceptance (BI-AAQ), change in awareness and acceptance (PHLMS), change in emotional avoidance (EAQ), and change in cognitive defusion (EATDS) ($n = 59$).

| | EDE-Q | EDI-Drive for Thinness | EDI-Bulimia | EDI-Body Dissatisfaction |
|---|---|---|---|---|
| Body image acceptance | −.53** | −.54** | −.32* | −.36** |
| PHLMS awareness | −.30** | −.34** | −.21 | −.26* |
| PHLMS acceptance | −.25 | −.23 | −.21 | −.19 |
| EAQ avoidance of positive emotions | .27* | .36** | .26* | .29* |
| EAQ negative beliefs about emotion | .33** | .44** | .43* | .28* |
| EAQ social concerns about displaying emotion | .35** | .41** | .33* | .35** |
| EAQ avoidance of negative emotions | .20 | .26* | .37** | .21 |
| EATDS defusion | −.20 | −.19 | −.02 | −.14 |

*$p < .05$, **$p < .01$.

**Conflict of interest**

All authors declare no conflict of interest for this study.

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