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**Eating Disorder Symptomatology, Body Image and Mindfulness: Findings from a
Non-Clinical Sample**

Emma Prowse, B Science (Hons), D Clin Psych Candidate
University of Newcastle, Australia

Dr. Miles Bore, PhD
University of Newcastle, Australia

Stella Dyer, M.A (Psych) Clin,
Clinical Psychologist, Centre for Psychotherapy, Hunter New England Health

Correspondence:

Emma Prowse
Emma.Prowse@uon.edu.au

Miles Bore:
Miles.Bore@newcastle.edu.au

School of Psychology
University of Newcastle, Australia
University Drive
Callaghan NSW 2308
Australia
Ph: (02) 4921 6585
Fax: (02) 4921 6980

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Abstract

Background: There has been increasing interest in the use of mindfulness based interventions in treating various disorders and conditions; however evidence to support the application of mindfulness-based treatments for eating disorders is limited. The current study was designed as a preliminary investigation of the relationship between mindfulness and eating disordered symptoms to provide an avenue for further research and to inform treatment. Underlying factors including; body image, sense of self, identity and quality of life, were also investigated in order to increase understanding about eating disorders. *Method:* A battery of self-report questionnaires was administered online to first year psychology students from an Australian University (N=411). *Results:* “Observing” as a mindfulness skill was related to higher reported eating disorder symptoms; however the mindfulness skills “acceptance without judgment” and “action with awareness” were associated with lower eating disorder symptoms. *Conclusions:* These findings are consistent with theoretical support for a possible role of mindfulness based interventions in treating eating disorders.

Keywords

Body Image

Eating Disorders

Identity

Mindfulness

Key Points

Despite increasing interest in the use of mindfulness based therapies in treating eating disorders, existing evidence is limited indicating a need for further investigation.

This research provides evidence for a relationship between eating disorder symptoms and mindfulness, supporting the use of Mindfulness-based therapies for treating eating disorders.

This study also found a possible role of sense of self, depression, anxiety, distress and quality of life in eating disorder pathology, supporting a holistic approach to treatment of eating disorders.

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Eating Disorders are a serious concern due to the severity of potential health risks and rising prevalence. Eating Disorders are classified under Axis I of the Diagnostic and Statistical Manual of Mental Disorders (APA, 2000) consisting of Anorexia Nervosa, Bulimia Nervosa and Eating Disorders not Otherwise Specified. The serious nature of eating disorders is highlighted by numerous physiological consequences including kidney, bowel and cardiovascular damage, organ failure and electrolyte imbalances that can lead to death (Hales & Yudofsky, 2003; Heffner, Sperry, Eifert, & Detweiler, 2002). Individuals with eating disorders are excessively concerned about their body image and weight, and even subthreshold cases (common in university students, e.g. Kurth, Krahn, Nairn, & Drewnowski, 1995) cause significant distress and reduced quality of life (Kristeller, et al., 2006).

While Cognitive Behaviour Therapy (CBT) has been the dominant clinical treatment for some time and has the most empirical evidence for treating eating disorders, there has been increasing interest in the use of mindfulness and acceptance based therapies in treating various disorders and conditions (e.g. Baer, Fischer, & Huss, 2005; Kabat-Zinn, 2003). Although current evidence to support the application of mindfulness-based treatments for eating disorders is limited, the existing evidence has been promising (Baer, et al., 2005). Due to reports of the limited but promising empirical evidence for mindfulness based interventions for treating eating disorders in the context of the serious nature and possible health consequences associated with eating disorders, the relationship between mindfulness and eating disorders warrants further investigation.

Mindfulness is an “awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding experience moment by moment”

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(Kabat-Zinn, 2003). Mindfulness based therapies are thought to result in improvements in eating disorder symptoms through allowing people to choose to respond differently to distress, rather than eating or restricting eating as an “impulsive, maladaptive behavioural response” (Baer, et al., 2005, p. 288).

The desire for control over one’s life is a factor that has been suggested to be associated with the development and perpetuation of eating disorder symptoms (Kristeller, et al., 2006). Individuals with eating disorders often develop eating disorders as a means of regaining a sense of control over their body and emotions. However, in reality these individuals do not have control over their destructive thoughts and emotions that maintain disordered eating (Stewart, 2004). Accordingly, mindfulness is highly appropriate for these clients as it “enables individuals to increase perceived control in context of healthy and adaptive thoughts and behaviours” (Stewart, 2004, p. 792).

Mindfulness offers an alternative approach to perceiving body image that does not actively challenge the unrealistic expectations that today’s society places on both women and men. Mindfulness promotes a different relationship to body image, through neutrally observing the body non judgmentally and distancing from the belief that the body should be changed. (Stewart, 2004). It is important to note that while Stewart (2004) outlines the theory behind the application of mindfulness to body image, this concept has yet to be investigated empirically.

Eating disordered individuals with a distorted body image usually define their entire self-concept or sense of self by their appearance. Increasing mindfulness, through mindfulness-based interventions, is thought to provide acceptance of the self as an individual, a more complete or holistic self-definition and improvements in self-worth and self compassion (Stewart, 2004). It is suggested that this occurs through encouraging the

individual to investigate their values and strive to lead a more meaningful life. This in turn improves quality of life (Stewart, 2004).

Similarly, previous studies have indicated that eating disorders arise from disturbances in the development of identity (Stein & Corte, 2007; 2008). Identity, according to Erikson (1950, 1968), is a definition of the individuals' self, values and direction or purpose in life. However, confusion is caused by a lack of clarity around the definition of identity within the literature, with definitions also encompassing self-definition and self-concept (Stein & Corte, 2007; 2008). Research is needed to clarify identity as a construct and its relationship with eating disorders.

Aims and Hypotheses

The aim of this study was to investigate the relationship between mindfulness and eating disordered symptoms given the increasing use of mindfulness-based interventions in treating eating disorders. It was expected that individuals with higher levels of mindfulness would report lower levels of eating disordered symptoms. The relationship between mindfulness and body image was also investigated, with the hypothesis that individuals scoring higher on mindfulness measures will be more accepting of their body image.

Additionally, the relationships between mindfulness and eating disorder symptoms with self-concept and self-identity were investigated. It was hypothesised that individuals with more severe eating disordered symptoms would not have formed identities. It was also expected that lower scores on sense of self and self compassion would be related to more severe eating disordered symptoms.

The relationship between self control and eating disorder symptoms was also examined, with the hypothesis that those scoring higher in measures of eating disordered symptoms would score lower in perceived self control. Finally, relationships between mindfulness, stress, anxiety, depression and quality of life were considered. It was expected

that individuals who have a greater capacity for mindfulness would have lower levels of distress, anxiety and depression, and report higher quality of life.

Method

Participants

The sample consisted of 411 first year psychology students from an Australian university. Three hundred and nine females and 98 males participated (4 unidentified), with an age range of 17 to 57 years, a mean age of 22.5 years and a median age of 19 years. One point seven percent of participants reported fulltime employment, 24% reported part time employment and 2% reported being unemployed; 68% of participants were fulltime students, 4.1% were part time students. Eighty-six percent of participants were of Anglo-Saxon, 2% identified as being of Aboriginal or Torres Strait Islander origin and 12% identified as being from another cultural background.

The students participated voluntarily in exchange for course credit and were recruited online via a website used by the university to recruit participants for research projects. They selected the current study from series of research projects operating concurrently.

Instruments

Behavioural Measure of Eating Disorder Symptoms. The Eating Disorders Examination Questionnaire (EDE-Q, Fairburn & Beglin, 1994) was administered in order to measure eating disorder symptomatology. The EDE-Q is an adapted version of the Eating Disorders Examination (Fairburn & Cooper, 1993) a structured clinical interview providing diagnostic information (Luce & Crowther, 1999). The EDE-Q is composed of 31 self report items, including a combination of items rated on a 7 point likert scale (0-6) and free form short answer questions.

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The EDE-Q consists of 4 subscales: restraint, shape concern, weight concern and eating concern, and can be used to make tentative diagnoses of Anorexia Nervosa and Bulimia Nervosa (Luce & Crowther, 1999). For example, the question “have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?” investigates Restricted Eating.

The EDE-Q has good internal consistency ($\alpha=.78-.92$) and test- retest reliability ($r=.81-.94$, Luce & Crowther, 1999). The measure also has adequate construct validity, good concurrent validity and divergent validity and acceptable criterion validity (Mond, Hay, Rodgers, Owen, & Beumont, 2004).

Mindfulness Measure. The Kentucky Inventory of Mindfulness Skills (KIMS, Baer, Smith, & Allen, 2004) was administered to measure the participants’ self-reported capacity to be mindful. The questionnaire is composed of 39 self report items assessed on a 5 point likert scale (1–5). The questionnaire measures mindfulness across 4 scales: “Observe”, “Describe”, “Accept without Judgement” and “Act with Awareness” (e.g. “When I’m doing something, I’m only focused on what I’m doing, nothing else”). The KIMS has adequate internal consistency ($\alpha=.76-.91$) and good test-retest validity and adequate construct validity (Baer, et al., 2004).

Body Image. The Body Image Acceptance and Action Questionnaire (BI-AAQ, Sandoz & Wilson, 2006) was utilised to assess body image. This 12 item self report scale measure acceptance of body image on a 7 item likert scale (1-7) producing a total acceptance of body image score. The questionnaire assesses the individual’s relationship with their body image through questions such as “worrying about my weight makes it difficult for me to live a life that I value.” The BI-AQQ has good internal consistency ($r=.92$) and good construct validity (Sandoz, 2010; Sandoz & Wilson, 2006).

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Stress, Anxiety and Depression. The 21-item version of the Depression, Anxiety and Stress Scale (DASS-21, Lovibond & Lovibond, 1995) was administered in order to assess levels of distress and mood. The DASS-21 consists of 3 scales: Depression, Anxiety and Stress, measured on a 4 item likert scale (0-3). The DASS-21 has high overall reliability ($r = .93$) and adequate convergent and divergent validity (Henry & Crawford, 2005).

Identity, self-concept and self-compassion. The Ego Identity Processes Questionnaire (EIPQ, Balistreri, Busch-Rossnagel, & Geisinger, 1995) is a 32 item questionnaire which was utilised to assess the identity formation reached by the participants. The EIPQ consists of 2 scales: a *Commitment* scale and an *Exploration* scale measured using a 6 point likert scale (1–6). The internal consistency and reliability of this measure is adequate (Commitment, $\alpha = .80$, $r = .90$; Exploration, $\alpha = .86$, $r = .76$) and the measure also has adequate construct validity (Balistreri, et al., 1995).

Self-concept was assessed with the Sense of Self Inventory (SOSI, Basten, 2007). The SOSI is a 21 item questionnaire, using a 4 point likert scale (1-4). The SOSI produces a single total score. The validity and reliability of this measure are currently being investigated.

The Self Compassion Scale (Neff, 2003) was also administered in order to measure the individuals' compassion towards themselves. The Self Compassion Scale is a 26 item questionnaire producing 6 subscales; Self Kindness, Self Judgment, Common Humanity, Isolation, Mindfulness and Over Identification, as well as a total score. The self compassion scale possesses high test-retest reliability ($r = .93$) as well as acceptable convergent and divergent validity (Neff, 2003).

Control. Self-control was assessed with the Self-Control Scale (Tangeny, Baumeister, & Boone, 2004). The Self-Control scale is a 36 item questionnaire measured on a 5 point likert scale (1–5), producing a total Self-Control score. The self control scale has high

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internal consistency ($\alpha=.89$) and test-retest reliability ($r=.89$). This measure also possesses adequate convergent and divergent validity (Tangeny, et al., 2004).

Quality of Life. The Personal Wellbeing Index (PWI 4th Ed) was utilised to assess personal well-being or quality of life (International Wellbeing Group, 2006). The PWI is measured on a 10 point likert scale (0–10) and includes a single item and a multi-item (8 item) questionnaire. The multi-item scale produces a total score and has adequate convergent and divergent validity, alpha reliably ranging from .70-.85 and good test-retest reliability ($r=.84$).

Demographics. Demographic information was collected, including age, gender, employment status, occupation and culture. Additional questions, about whether the participants have ever had counselling and their ideal weight, in order to compare this to reported weight and to assess weight dissatisfaction, were also included.

Procedure

Ethics approval was acquired from the university human research ethics committee. First year psychology students completed the battery of 9 self-report questionnaires, ranging from 9-36 items, designed to take approximately 1 hour to complete. The questionnaires were completed online via the research participation website used. Students were able to participate at any time of the day and were not timed. Data was saved to the university server.

Data Analysis

Descriptive statistics, correlations, regressions and ANOVAs were performed on the data. ANOVAs were performed in order to determine the differences between the student sample and the norm. Correlations and regressions were performed to assess the hypothesised relationships. Data analysis was conducted using Minitab version 16.

Results

Descriptive Statistics

Prior to statistical analysis, data was scored as per authors' instructions and examined for omissions. Initially, the participants' weight, BMI, satisfaction with their current weight, exercise behaviours, and past treatment for an eating disorder or other mental illness were examined.

Forty percent of females reported being happy with their current weight. This was reversed for males, with 59% reporting being happy with their current weight. The ideal weight reported by females was significantly lower ($M=57.57$) than their actual weight ($M=65.66$, $t=12.56$, $p<.01$). The ideal weight reported by males was also significantly lower ($M=76.33$) than their actual weight ($M=79.81$, $t=2.84$, $p<.01$). Females reported a significantly larger difference between their reported actual and ideal weight ($M=-8.15$) than males ($M=-3.43$, $t=3.36$, $p<.01$). The mean BMI calculated for female participants ($M=23.41$) and male ($M=24.77$) participants were in the healthy weight range. Sixteen percent of female participants were in the underweight range, 59% in the healthy weight range, 16% in the overweight range and 8% in the obese range. Four percent of male participants were in the underweight range, 54% in the healthy weight range, 33% in the overweight range and 9% in the obese range.

Twenty three female participants (6%) reported having ever been treated for an eating disorder, with a mean age of 19 at the time of receiving treatment (range 12-25 years old). No male participants reported past treatment for an eating disorder. Eighteen percent of participants (20% of females and 12% of males), reported having past treatment for a mental illness with a mean age of 19.5 at the time of receiving treatment (range 4-51 years old).

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The internal consistencies were assessed via Cronbach's alpha coefficients.

Acceptable Cronbach's alpha coefficients were obtained for all measures included in analysis (Tables 1 and 2).

Comparisons to norms.

To determine whether the sample was equivalent to the normal population, comparisons between sample means and norm means were conducted. The means obtained from the sample were compared to the norm means for eating disorder symptoms (Table 1). Only female norms have been published for the EDE-Q. Only total norms were published for the BI-AAQ.

Female participants scored significantly higher on all measures of eating disorder symptoms than the norm. Thirty two percent of female participants scored over one standard deviation from the norm means indicating the existence of a subclinical group in the sample of university students. This is demonstrated in the distribution of total EDE-Q scores for females in Figure 1.

Males scored significantly lower than females on all measures of eating disorder symptoms: EDE-Q [$t(183) = 4.75, p < .01$], Restraint [$t(175) = -2.57, p < .05$], Eating Concern [$t(230) = -5.00, p < .01$], Shape Concern [$t(158) = -4.00, p < .01$] and Weight Concern [$t(186) = 5.26, p < .01$], indicating less eating disorder pathology in males compared to females.

The distribution of total EDE-Q scores, a measure of eating disorder symptoms, for male participants is shown in Figure 2.

The sample mean in acceptance of body image scores was significantly lower than the norm mean, with lower scores indicating the participants were less accepting of their body image. Females scored significantly lower than males in acceptance of body image [$t(179) = 3.70, p < .01$].

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Means obtained for mindfulness were also compared to the norms (Table 2), with higher scores reflecting higher levels of mindfulness skills. No significant differences were identified between the sample means and the norm mean for mindfulness measures of observe and describe. However, obtained means for the mindfulness measures, acting with awareness and acceptance without judgment, were significantly lower than the norm, meaning that the student sample were less inclined to act with awareness and accept without judgment than the norm. No norms differentiating between genders were available. No significant gender differences were identified on measures of mindfulness.

The reliability of all other measures administered ranged from $\alpha=.69-.95$. While some differences between obtained means and norm means were found, they were not meaningful in terms of the current research.

Relationships between variables

Correlations were performed to examine the relationships between eating disorder symptoms, acceptance of body image and mindfulness with all other measures. The correlation matrix representing the Pearson's r values is presented in Table 3.

The pattern of significant relationships indicated that individuals with higher levels of eating disorder symptoms were less accepting of their body image, reported higher pathology (or disturbance) of sense of self, depression, stress and anxiety scores. Those with higher eating disorder symptoms also scored lower in self compassion, self control and personal wellbeing or quality of life. The reverse relationships were found for acceptance of body image, with those reporting higher acceptance of their body image reporting higher self compassion, self control and personal wellbeing, and lower pathology of sense of self, depression, stress and anxiety scores.

People with high levels of eating disorder symptoms were more likely to observe their surroundings. However, those with more eating disorder symptoms were less likely to “act

with awareness” and “accept without judgement”. The reverse relationship was found between acceptance of body image and mindfulness skills, with those who accepted their body image reporting lower levels of “observing” and “describing” skills, as well as being more likely to “act with awareness” and “accept without judgment”.

Similar relationships were found between mindfulness and other measures. Those with higher levels of pathology of sense of self, anxiety, stress and depression rated themselves more able to “observe” but less able to “describe”, “act with awareness” and “accept without judgment”. The reverse relationship was found between mindfulness skills and personal wellbeing, with those with higher levels of personal well-being reporting being more able to “describe”, “act with awareness” and “accept without judgment”.

Predictors of eating disorder symptoms and acceptance of body image

In order to determine the strongest predictors of eating disorder symptoms, a linear regression analysis was conducted for EDE-Q scores (Table 4). First, all predictors, including body image, were entered into a regression equation against EDE-Q scores as a measure of eating disorder symptoms. Four significant predictors were identified, accounting for 72.1% of the variance. Given the strong correlation between body image and eating disorder symptoms, a second regression model was conducted excluding body image as a predictor. Four significant predictors were identified in this model, accounting for 42.5% of the variance.

A linear regression analysis was also conducted for Body Image (Table 5). In the first model, all predictors, including body image, were entered into a regression equation against BIAAQ scores as a measure of acceptance of body image. Seven significant predictors were identified, accounting for 75.2% of the variance. Given the strong correlation between body image and eating disorder symptoms, a second regression model was run excluding eating

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disorder symptoms as predictors. Six significant predictors were identified in this model, accounting for 46.8% of the variance.

Discussion

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It was expected that individuals with higher levels of mindfulness (or self awareness) would report lower levels of eating disordered symptoms. Results indicated that the mindfulness skill “observing” was linked to higher reported eating disorder symptoms, however, the mindfulness skills “acceptance without judgment” (taking a neutral approach) and “acting with awareness” (focussing the mind on the present) were linked to lower eating disorder symptoms. This reveals that those with more eating disorder symptoms were less likely to “act with awareness” and “accept without judgement”. The reverse relationship was also found between mindfulness skills and acceptance of body image. Those who were more accepting of their body image performed better on all mindfulness skills, except “observing”. While this is consistent with theoretical literature asserting that certain aspects of mindfulness play a role in reducing distress and dysfunctional beliefs (e.g. Baer, et al., 2005; Kabat-Zinn, 2003), the relationship found in this study was more complicated than expected.

However, results were consistent with Baer and colleagues’ (2006) finding that those with higher scores in psychopathology reported lower levels of mindfulness skills with the exception of “observing” skills. The authors attributed this pattern to the items included in the observe subscale assessing internal (e.g. cognitive and emotional) and external (e.g. perceptual) experiences, whereas other subscales only investigate internal experiences. It would also seem that being good at frequently observing both your internal experiences and your external environment would not be helpful if you are prone to misjudge the experience, and likely to lead to increased levels of distress. Further, higher scores in “observing” could

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be a reflection of increased attention to and hyper-vigilance associated with weight, shape and diet, which are defining features of eating disorder presentations.

The results suggest that the skills of “acting with awareness” and “acceptance without judgement” are associated with greater resilience against eating disorder pathology. As such, it may be wise for mindfulness-based teaching to provide more of a focus on these skills. It may also be that people score lower on acting with awareness and acceptance without judgment because they are difficult skills to learn and may require more time to practice. They are also not skills that are routinely taught or value highly in our culture. Future studies could explore the most effective methods for teaching these specific mindfulness skills and whether these skills require more time to practice.

Sense of Self, Identity and Self Compassion

A relationship existed between mindfulness skills and sense of self, as hypothesised. Those higher in mindfulness skills (except observing) had a more complete sense of self or less pathology of sense of self, providing some evidence for Basten’s (2007) theoretical assertion that sense of self requires the capacity for 'self reflective awareness' or mindfulness. Further, those who reported higher levels of eating disorder symptoms also reported higher levels of pathology of sense of self, and those who were more accepting of their body image had lower levels of pathology in sense of self.

While sense of self was identified as a predictor of eating disorder symptoms, identity was not. This was inconsistent with literature providing a link between eating disorder pathology and impaired identity (e.g. Stein & Corte, 2007; 2008). It may be that having a stronger sense of self is more of a resilience factor than having a strong self identity. As such, this study provides support for the distinction between sense of self as an awareness of self and identity. This is an interesting area for further research to ensure that these relationships are not an artefact of the instruments utilised to measure the constructs.

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The expected relationships between self compassion and eating disorders, mindfulness and sense of self were found, providing some experimental evidence for theoretical relationships that are associated with enhanced resilience.

Mental Health and Personal Well-being

Relationships between mindfulness (describing, acceptance without judgement and acting with awareness), personal well-being and overall psychopathology including stress, anxiety and depression, were found in the expected directions. This provides further empirical support for the notion that mindfulness skills are linked to personal wellbeing and positive mental health status, highlighting the overall benefits of mindfulness (e.g. Brown & Ryan, 2003).

The sample reflected elevated levels of stress, anxiety and depression and lower levels of personal well being or quality of life when compared to the norm. These finding replicate existing studies on mental health in university students, indicating that students experience higher levels of distress and mental illness in comparison to census data of the Australian population (Stallman, 2010).

Clinical Implications

The identification of a relationship between mindfulness skills and eating disorder symptoms provides additional evidence for the use of Mindfulness based therapies such as Acceptance and Commitment Therapy (ACT, Hayes, Strosahl, & Wilson, 1999), Dialectical Behaviour Therapy (DBT, Linehan, 1993a, 1993b) and Mindfulness-based Cognitive Therapy (MCBT, Segal, Williams, & Teasdale, 2002). As “acting with awareness” and “acceptance without judgment” are most strongly related to eating disorder symptoms, it is important that more of a focus is given to teaching these skills in interventions targeting eating disorder pathology.

Additionally, the variety of factors relating to eating disorder pathology provides evidence for therapeutic intervention, treating the whole person, as opposed to focussing on eating behaviours and related thoughts. Mindfulness based treatments are therefore appropriate as they focus on underlying emotional and cognitive processes which in turn should have positive benefits in influencing eating behaviours as well as depressive symptoms, anxiety and quality of life.

The identification of body image, sense of self and self compassion, as significant predictors of eating disorder symptoms, support existing research indicating that body image disturbance and excessive investment of appearance in definition of sense of self are involved in the development and maintenance of eating disorders (e.g. Stice & Shaw, 2002). Evidence exists for preventative interventions, such as social literacy presented to targeted groups such as high schools, aimed at building resilience to sociocultural pressures associated with weight and shape (e.g. Levine & Piran, 2004; Stice & Shaw, 2002). Future research could investigate the efficacy of screening for sense of self and self compassion in addition to body image concerns and incorporating these into early intervention to determine whether treating these symptoms can prevent eating disorder pathology.

Limitations and areas for further research

We note that this study was based on self report questionnaires. This is of interest as denial of some, if not all symptoms, is often characteristic of eating disorders pathology (e.g. Hales & Yudofsky, 2003). Additionally, the current results provide some evidence for a relationship between mindfulness and eating disorder symptoms but this study cannot determine causality. Findings from the current cross sectional research provide good reason to consider investigating longitudinal study in the future to determine causality and whether there are specific elements of mindfulness that may play a key role in change.

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The current study was conducted on a subclinical sample of Australian university students. It would be interesting to investigate whether similar results are found in a clinical sample of individuals diagnosed with an eating disorder.

Conclusions

While interest in the use of mindfulness based therapies is increasing in clinical practice, limited empirical evidence for mindfulness based interventions for treating eating disorders exists (Baer, et al., 2005). In order to employ mindfulness based interventions to improve eating disorder symptoms, initially a relationship between eating disorder symptoms and mindfulness skills needs to be identified. The current study has provided evidence for a relationship between eating disorder symptoms and mindfulness skills. This provides some support for a possible role of mindfulness based interventions in treating eating disorders. However, further research is required in order to provide evidence for a causal relationship and the effectiveness of mindfulness based therapies.

This study also provided evidence for a possible role of sense of self, self compassion and perceived level of self control, as well as levels of co-morbid symptoms of depression, anxiety, levels of distress and quality of life with eating disorder pathology and mindfulness skills. This supports a holistic approach to the treatment of eating disorders, such as mindfulness based interventions, which aim to treat the whole person, not simply focussing on the eating disorder symptoms.

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Eating Disorders Symptomatology and Mindfulness

Table 1.
Sample Means, Norm Means and Cronbach's Alpha Coefficients for Eating Disorder Measures.

	Sample mean total (SD)	Female sample mean (SD)	Male sample mean (SD)	Norm mean (SD)	Female norm mean (SD)	Male norm mean (SD)	Alpha
Restraint	1.50** (1.39)	1.60** (0.08)	1.20 (1.31)	-	1.21 (1.33)	-	.81
Eating Concern	1.12** (1.25)	1.26** (1.31)	0.66 (0.92)	-	0.62 (0.86)	-	.78
Weight Concern	2.19** (1.69)	2.41** (1.70)	1.48 (1.46)	-	1.59 (1.37)	-	.88
Shape Concern	2.60**	2.79** (1.64)	2.01 (1.71)	-	2.15 (1.60)	-	.91
EDE-Q total	1.86** (1.34)	2.02** (1.35)	1.34 (1.19)	-	1.55 (1.21)	-	.89
BI-AAQ	59.30** (17.63)	57.69 (17.86)	64.71 (15.78)	63.99 (16.10)	-	-	.94

Note: *P<.05 **P<.01

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Table 2.

Sample Means, Norm Means and Cronbach's Alpha Coefficients for Mindfulness Scale.

	Sample mean total (SD)	Female sample mean (SD)	Male sample mean (SD)	Norm mean (SD)	Alpha
Mindfulness- observe	37.23 (8.34)	37.67 (8.51)	35.97 (7.77)	37.62 (7.36)	.86
Mindfulness- describe	27.89 (6.03)	27.90 (6.10)	27.95 (5.87)	27.91 (5.63)	.87
Mindfulness- Acting with awareness	28.36* (5.56)	28.41 (10.00)	28.09 (14.00)	29.06 (5.39)	.74
Mindfulness- Acceptance without judgment	27.98** (7.85)	27.92 (7.88)	28.07 (7.86)	29.86 (6.26)	.90

Note: *P<.05 **P<.01

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Table 3.
Correlation matrix.

	Restraint	Eating Concern	Shape Concern	Weight Concern	EDEQ Total	BIAAQ	Observing	Describing	Acting	Accepting
Eating Concern	.59**									
Shape Concern	.64**	.73**								
Weight Concern	.65**	.76**	.92**							
EDEQ Total	.80**	.86**	.94**	.95**						
BIAAQ	-.55**	-.74**	-.80**	-.79**	-.81**					
Observing	.22**	.17**	.21**	.18**	.23**	-.25**				
Describing	-.00	-.10*	-.12*	-.09	-.09	.17**	.34**			
Acting	-.06	-.22**	-.24**	-.21**	-.21**	.21**	-.05	.20**		
Accepting	-.24**	-.33**	-.36**	-.33**	-.35**	.46**	-.45**	.14**	.35**	
Identity Commitment	.01	-.04	-.02	.02	-.01	.06	.11*	.26**	.19**	.14**
Identity Exploration	.03	.06	.09	.10	.08	-.11*	.40**	.21**	-.09	-.32**
Personal Wellbeing	-.13*	-.28**	-.27**	-.25**	-.26**	.31**	.03	.24**	.25**	.31**
Depression	.19**	.37**	.35**	.31**	.34**	-.42**	.07	-.24**	-.39**	-.51**
Anxiety	.23**	.36**	.29**	.27**	.32**	-.38**	.21**	-.11*	-.33**	-.47**
Stress	.21**	.37**	.32**	.32**	.34**	-.42**	.21**	-.12*	-.38**	-.53**
DASS total	.23**	.42**	.36**	.34**	.38**	-.48**	.18**	-.18**	-.41**	-.57**
Self Control	-.04	-.26**	-.24**	-.20**	-.21**	.24**	-.01	.16**	.51**	.34**
Sense of Self	.17**	.35**	.32**	.30**	.38**	-.43**	.14**	-.25**	-.32**	-.58**
Self Compassion	-.20**	-.41**	-.41**	-.38**	-.40**	.48**	-.09	.19**	.36**	.55**
Gender	.12*	.20**	.20**	.24**	.22**	-.17**	.09	-.00	.03	-.01
Age	.05	-.06	.03	.04	.02	.08	.15**	.11*	.17**	.02

Note. ** $p < .01$; * $p < .05$.

Eating Disorders Symptoms and Mindfulness

Table 4.

Regression Model for Eating Disorder Symptoms (EDE-Q).

Model	Predictors	β	p	R ² (%)
1	Body Image	-.75	<.001	72.1
	BMI	.16	<.001	
	Sense of Self	-.13	.014	
	Gender	.10	.002	
2	BMI	.42	<.001	42.5
	Gender	.27	<.001	
	Self compassion	-.27	<.001	
	Mindfulness - observe	.17	.002	

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Table 5.
Regression Model for Body Image (BI-AAQ).

Model	Predictors	β	p	R ² (%)
1	Shape concern	-.35	<.001	
	Eating concern	-.20	<.001	
	Weight concern	-.19	.009	
	Sense of Self	-.12	.014	
	Mindfulness - accepting	.09	.026	
	Age	.08	.007	
	Mindfulness - describing	-.07	.033	75.2
2	BMI	-.34	<.001	
	Self compassion	.25	<.001	
	Gender	-.23	<.001	
	Mindfulness - observe	-.17	<.001	
	Age	.16	<.001	
	Mindfulness - describing	.09	.046	46.8

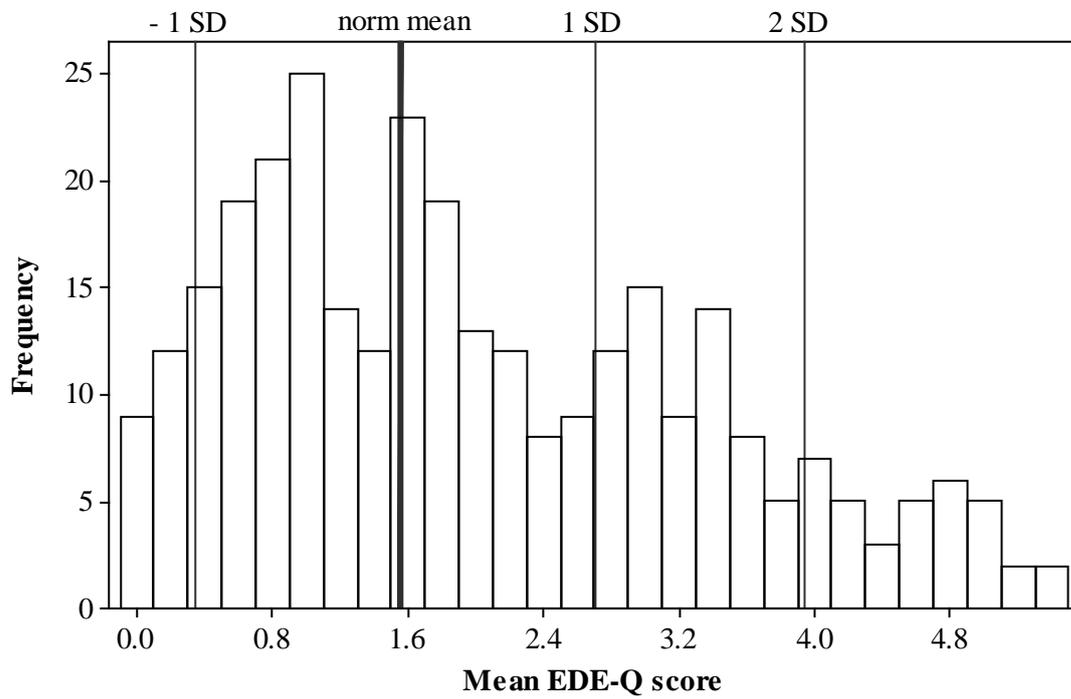


Figure 1. Histogram of EDE-Q scores of female participants.

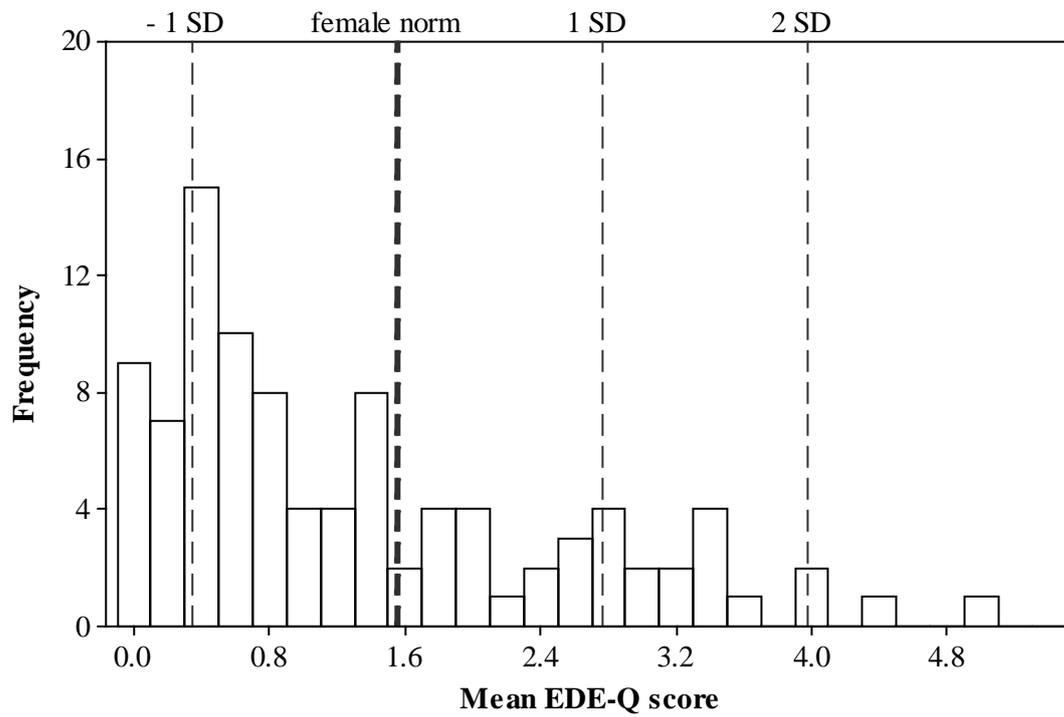


Figure 2. Histogram of EDE-Q scores of male participants.