



A cross sectional investigation of the relationship between mindfulness, emotion regulation and eating disorder symptoms amongst female university students

Lorna Grice

Supervised by: Paul Lattimore

April 2015

A cross sectional investigation of the relationship between mindfulness, emotion regulation and eating disorder symptoms amongst female university students

ABSTRACT

Recently it has been established that individuals with eating disorders have difficulties regulating their emotions and have low levels of mindfulness. The current study has employed undergraduate female participants ($N = 119$) with no prior diagnosis of an eating disorder in order to explore the relationship between mindfulness, emotion regulation and eating disorder symptoms in a non-clinical setting. The aim of this research is to increase the understanding of how these psychological constructs are possible risk factors for young female students in developing anorexia nervosa. Participants completed a cross sectional survey which included the Five Facet Mindfulness Questionnaire – Short form (FFMQ-SF), the Difficulties in Emotion Regulation Scale (DERS) and the Eating Disorder Inventory-3 (EDI-3). Results indicate how individuals with more symptoms typical of eating disorders had lower levels of mindfulness and greater difficulties regulating their emotions. The relationship between mindfulness and eating disorders was found to be mediated by emotion regulation. This research emphasises the importance of understanding the psychological aspects of eating disorders as it has been demonstrated that low mindfulness and poor emotion regulation could be possible risk factors in developing an eating disorder. Further research is warranted to explore this using a prospective design.

KEY WORDS:	EATING DISORDERS	ANOREXIA NERVOSA	EMOTION REGULATION	MINDFULNESS	UNDERGRADUATE FEMALES
-------------------	-----------------------------	-----------------------------	-------------------------------	--------------------	----------------------------------

“It’s an addiction and a compulsion, a brain disorder and a crutch, your best friend and your worst enemy, a fight between body and soul. Anorexia is an illness which takes on a life of its own, feeding itself as you starve. It’s a voice in your head which never, ever shuts up” – Emma Woolf.

Introduction

Anorexia Nervosa (AN) is a serious mental health disorder which is characterised by a significantly low body weight, the intense fear of gaining weight or becoming fat and a disturbance in the way an individual self-evaluates their body weight and shape (American Psychiatric Association, 2013). The characteristics outlined here are focused on the core, physical symptoms of AN. However, research suggests that even when weight is restored and these symptoms are alleviated there are psychological symptoms which continue to exist (Haynos et al., 2014). This highlights how important it is to consider these psychological symptoms when examining the development and maintenance of eating disorders.

Recently, emotion regulation difficulties have been increasingly examined amongst those with eating disorders, findings suggest that difficulties in regulating ones emotions can facilitate the maintenance of the disorder, and perhaps even be a factor which may have contributed to its development (Svaldi et al., 2011). Additionally, the introduction of mindfulness based interventions (MBIs) have been found to improve problems with emotion regulation which in turn has been found to facilitate the recovery from eating disorder symptoms (Prowse et al., 2013). Findings such as these indicate the importance of targeting the psychological aspects of eating disorders within intervention options. Therefore the current study further examines the influence mindfulness and emotion regulation have on both the physical and psychological symptoms of eating disorders, with the aim to understand the relationship between mindfulness, emotion regulation and AN.

Emotion regulation refers to the way in which emotional distress is managed and responded to (Gratz & Roemer, 2004) when an individual has difficulties in regulating their emotions they are unable to effectively influence the experience or expression of them (Fruzzetti et al., 2008). In terms of psychological disorders such as depression and anxiety there has been recent research to suggest that emotion regulation is a factor which underlies these disorders (Aldao et al., 2010; Pepping et al., 2014). Similar associations can be seen within the eating disorder

literature with research indicating the role emotion regulation plays in the development and maintenance of disordered eating. Haynos and Fruzzetti (2011) provide evidence which suggests that AN is a disorder of emotion dysregulation, their research highlights how eating disorder behaviours such as bingeing, purging and restricting may function as a distraction from emotion, and this escape from adverse emotions serves to negatively reinforce the use of eating disorder behaviours as a way to cope. Hofmann et al. (2012) propose a transdiagnostic model to explain anxiety and mood disorders in terms of emotion dysregulation, they suggest that a triggering event along with an existing diathesis influences whether positive or negative affect is experienced. This model is not limited to mood disorders or a clinical population, Hoffman et al. (2012) explain how emotion dysregulation can be predictor of various forms of psychopathology, and can also be seen as a risk factor in non-clinical populations. Exploring different types of psychopathology in terms of emotion regulation can open up new avenues in understanding the underlying mechanisms which may lead to various disorders; in particular eating disorders.

A qualitative study by Serpell et al. (1999) gained an in depth account of the way AN sufferers feel about their eating disorder, interestingly it was apparent that using eating disorder behaviours as a way to cope with emotions was viewed both positively and negatively by those with AN. The study required participants to write two letters to their anorexia, one as a friend the other as an enemy. Codes which referred to using their anorexia as an emotional coping tool were found in both letters, in the friend letter the participants considered the disorder in a positive light as a way to help them escape certain emotions or avoid distress. In contrast, within the enemy letter the disorder was portrayed as being negative as it dulled the individual's ability to properly express their emotions. Findings such as these indicate how important it is to those with AN that they can adequately control their emotions, however many studies have found that this is inherently difficult for AN sufferers.

A study by Brockmeyer et al. (2012a) reported increased emotion regulation difficulties amongst those with AN compared to healthy controls, this was apparent across all subscales of the Difficulties in Emotion Regulation Scale

(DERS). Developed by Gratz and Roemer (2004) the DERS is used to measure levels of emotion dysregulation and is made up of 6 dimensions. The first is Non-Acceptance of Emotional Responses and is made up of items which reflect a tendency to have negative secondary emotional responses and a lack of acceptance of ones emotions. Second is Goals which refers to items that measure goal directed behaviour and includes items reflecting how negative emotions may cause difficulties in concentration and ability to complete tasks when feeling distressed. Impulse control difficulties is the third dimension which consists of items relating to difficulties in controlling behaviour when faced with negative emotions. Lack of Emotional Awareness the fourth dimension and is comprised of items reflecting how much individuals attend to and acknowledge emotions. These items are reverse scored in order to reflect an inattention to and lack of awareness of emotional responses. The fifth factor is Limited Access to Emotion Regulation Strategies and includes items related to the belief that when feeling negative emotion there is little than can be done to regulate this. Finally, Lack of Emotional Clarity refers to the extent to which individuals completely understand the emotions they are experiencing.

Brockmeyer et al. (2012a) found in particular that the level of difficulties experienced was discovered to be higher for the subscale which measured emotion regulation strategies, showing how those with AN have limited access to strategies which effectively regulate their emotions. This may explain why AN sufferers turn to eating disorder behaviours such as restricting food intake, or excessively exercising in order to gain control over their emotions. Limited access to emotion regulation strategies (*strategies*) has continually been found to be one of the most significant subscales of the DERS amongst those with AN. Harrison et al. (2009) found *strategies* to be significantly negatively correlated with results from an emotion recognition task, demonstrating how individuals with AN have difficulty in both recognising and regulating their emotions. Additionally, Brockmeyer et al. (2012b) found that self-starvation serves as a behaviour which regulates negative emotions amongst individuals with AN.

A model proposed by Schmidt and Treasure (2006) emphasizes how the role of eating disorder behaviours can facilitate the avoidance of negative emotions, by

focusing on restriction of food, individuals with AN recognise that they can prevent their emotions from manifesting, and instead allowing a feeling of numbness to dominate. This echoes findings from qualitative research, which gives a deeper insight into how those with AN are motivated to consistently manage their emotions through the use of maladaptive strategies. For example, findings have demonstrated that AN patients restrict food intake as this is considered a way to gain control and to escape their emotions (Kyriacou, Easter & Thacnturia, 2009; Nordbø et al., 2006; Serpell et al., 1999). More recently, Espeset et al. (2012) examined how patients with AN managed the aversive emotions of sadness, anger, fear and disgust and how the management of these emotions can be linked to their eating disorder behaviours. Findings highlighted how different emotions triggered different eating disorder behaviours, for example when experiencing feelings of sadness patients would focus on food and their body weight, and would engage in behaviours such as food restriction and purging. Although those with AN show emotion regulation strategies that are effective in avoiding and controlling their emotions, these strategies involve suppression, inhibition and avoidance which all become maladaptive and serve to maintain their eating disorder. Danner et al. (2014) highlights how difficulties in emotion regulation can be related to a lack of adaptive strategies, the presence of maladaptive strategies or a combination of both.

Difficulties in emotion regulation are not limited to those who are in the full throws of the disorder, difficulties regulating emotions have also been found to be present in those that have recovered from AN (Brockmeyer et al., 2012b). This finding adds weight to the assertion that the psychological aspects of eating disorders are particularly important to consider (Prowse et al., 2013), and also provides evidence in support of the findings that recovery from the physical symptoms of AN may not necessarily mean recovery from the psychological issues faced. Haynos et al. (2014) demonstrate how there is little improvement in emotion regulation following weight restoration, this lack of improvement was seen for both AN restricting type (AN-R) and for AN binge/purge type (AN-BP). A longitudinal study by Racine and Wildes (2014) found converging evidence which

supports the notion that emotion regulation difficulties are involved in the maintenance of both AN-R and AN-BP.

To fully understand the role emotion regulation difficulties have in the development and maintenance of AN it is important to consider the different facets of emotion regulation. It is clear from previous research that *strategies* is a subscale of DERS that is particularly linked with AN (Brockmeyer et al., 2012a; Harrison et al., 2009; Pepping et al., 2014). Additionally, the non-acceptance of emotional responses (*non-acceptance*) subscale has also been investigated in relation to eating disorders; research by Merwin et al. (2010) found a link between dietary restraint and high scores on the *non-acceptance* subscale of the DERS. This suggests that individuals with eating disorders have difficulty accepting the expression of their emotions, they feel ashamed, guilty and weak for being upset. Merwin et al. (2010) propose that disordered eating functions as a way avoid this undesirable affective arousal. It is also demonstrated by Harrison et al. (2009) that individuals with AN produce high scores on the *non-acceptance* subscale. In addition to this, all subscales of the DERS were found to produce significantly high scores amongst those with AN. Although *strategies* and *non-acceptance* had the largest effect sizes, it can be seen that individuals with AN also have difficulties in engaging with goal directed behaviour, they have impulse control difficulties, a lack of emotional awareness and a lack of emotional clarity. These findings from Harrison et al. (2009) are in line with a number of other studies which examined scores on the DERS amongst individuals with AN (Brockmeyer et al., 2014; Harrison et al., 2010). In view of the previous literature a further aim of the current study is to examine scores on the DERS in relation to eating disorder symptoms, it is expected that high scores on the DERS will be associated with higher scores on the Eating Disorder Inventory-3 (EDI-3), particularly scores for *strategies* and *non-acceptance*, in line with previous literature.

Both, *strategies* and *non-acceptance* have been associated with the construct of mindfulness, which has also received burgeoning attention within the eating disorder literature in recent years. Mindfulness can be defined as 'paying attention in a particular way: on purpose, in the present moment, non-

judgementally' (Kabat-Zinn, 1994, p. 4.). Mindfulness is associated with being aware and accepting of thoughts and feelings in a non-judging way, however for AN sufferers this is immensely difficult (Prowse et al., 2013). Individuals with AN insist on maintaining control over thoughts, feelings and behaviours. Moreover, this disorder is consistently characterised with experiential avoidance; something which is challenged within the construct of mindfulness (Butryn et al., 2013; Cowdrey & Park, 2012). Evidence suggests that those with eating disorders have low levels of mindfulness (Pepping et al., 2014; Prowse et al., 2013). In addition to this, research regarding mindfulness interventions are consistently demonstrating how effective a mindfulness approach is for improving symptoms of eating disorders (Katterman et al., 2014).

Linehan (1993) proposes that mindfulness based interventions allow individuals to learn how to observe certain stimuli without feeling the need to evaluate how true or important they are. Moreover, individuals feel less inclined to escape or avoid the stimuli they would usually want to control. As can be seen within the literature, avoidance and non-acceptance are dominant features of AN (Espeset et al., 2012; Merwin et al., 2010) it can be understood that mindfulness could serve as a valuable approach in learning how to overcome the need to escape aversive stimuli and increase the awareness and acceptance of emotions, empowering individuals to respond more adaptively to aversive experiences by reducing reactivity to thoughts and emotions. In regard to the efficacy of this approach for the treatment of eating disorders, evidence suggests a promising improvement in eating disorder symptoms following a mindfulness based intervention. With the implementation of Dialectical Behaviour Therapy (DBT) - which involves four weeks of core mindfulness practice - Salbach-Andrae et al. (2008) found significant improvements in eating disorder symptoms in an adolescent AN sample. Additionally, Bankoff et al. (2012) reviewed 13 empirical studies examining the efficacy of DBT for the treatment of eating disorders and concluded that DBT treatments appear effective in treating both eating disorder behaviours and related psychopathology. In addition to targeting mindfulness, DBT also focuses on emotion regulation. Telch et al. (2001) noted improvements in adaptive affect regulation along with reduction of eating disorder behaviours

and symptoms following the implementation of DBT. Improvements in eating disorder symptoms, levels of mindfulness and levels of emotion regulation when targeted by DBT suggests a relationship between these constructs; understanding this further can facilitate advances in treatment options for eating disorders. The current study therefore examines the relationship between mindfulness, emotion regulation and eating disorder symptoms. Taking into account previous findings it is expected that those who display more symptoms related to eating disorders will have lower levels of mindfulness. It is also anticipated that lower levels of mindfulness will be associated with greater difficulties in emotion regulation.

Pepping et al. (2014) proposes that emotion regulation is the process underlying the relationship between low mindfulness and psychosocial distress. They examined the mediating role of emotion regulation for the relationship between mindfulness and interpersonal distress, symptom distress, depression, anxiety, stress and social role difficulties in a sample of participants seeking treatment for eating disorders. Findings indicated how higher levels of mindfulness are associated with less emotion dysregulation and lower scores for *non-acceptance* and *strategies*. Lack of access to *strategies* was consistently found to be a mediator for the relationship between mindfulness and psychosocial distress amongst those with eating disorders, it was concluded that individuals with high levels of psychosocial distress are low in mindfulness and this relationship can be almost fully explained by their lack of access to emotion regulation strategies. These findings provide evidence for the role of difficulties in emotion regulation, mindfulness and eating disorders. However, it is not clear if these difficulties occur because of the eating disorder or if emotion dysregulation was a predisposing factor. Although the current study cannot imply cause and effect, examining the relationship between these constructs in a sample with no prior diagnosis of an eating disorder can provide a basis for understanding the possible risk factors of developing an eating disorder.

In order to investigate this the current study has employed a non-clinical sample of undergraduate females as this population may be considered as at risk for developing an eating disorder. It has been highlighted numerous times that

undergraduate students display significant levels of eating disorder symptoms (Berg et al., 2009; Eisenberg et al., 2011). It has also been highlighted how emotion regulation varies over the life span, Gross (2013) explains how there are many inner and outer changes within adolescents which can lead to greater distress than has been previously experienced in childhood. These significant life changes can present more challenges in learning to effectively regulate emotions. Although it is understood that emotion regulation challenges can arise in adolescence there is a lack of evidence that links emotion regulation difficulties faced by undergraduate females to the possible development of eating disorders. The relationship between mindfulness and eating disorder risk in this sample is also lacking in research. Therefore in order to understand the factors which may predict the development of eating disorders in undergraduate females the final aim of this study is to explore the relationship between mindfulness and eating disorder symptoms in a non-clinical sample, it is expected that emotion regulation will be a significant mediator of this relationship.

Method

Design

In the current study a cross sectional correlational design was used to examine the relationship between mindfulness, facets of emotion regulation and eating disorder symptoms. All participants were required to complete a survey which contained three psychometric measures: the Five Facet Mindfulness Questionnaire (FFMQ); the Difficulties in Emotion Regulation Scale (DERS); and the Eating Disorder Inventory-3 (EDI-3).

Participants

119 female undergraduate students who had no prior diagnosis of an eating disorder were recruited opportunistically to take part in this study. Participants were required to complete an online survey, 65 of these participants done so in exchange for course credit, the remaining 54 were recruited through the use of social media. Participants ranged in age from 18-27 years ($M = 20$, $SD = 1.9$).

Materials

Mindfulness

Mindfulness was assessed using the Five Facet Mindfulness Questionnaire – Short Form (FFMQ-SF; Bohlmeijer et al., 2011). The FFMQ is a self-report measure of mindfulness that consists of 24 items and five subscales which can also be combined to produce a total score. These subscales are: observing, describing, acting with awareness, non-judgement of inner experience and non-reactivity to inner experience. Each item is scored on 5 point likert scale ranging from 1 = never or very rarely true, to 5 = very often or always true. Higher scores are indicative of higher dispositional mindfulness. In the current study it was not required to measure the observing and describing facets so they were subsequently omitted from the questionnaire, therefore the composite score is derived from the subscales: acting with awareness, non-judgement of inner experience and non-reactivity to inner experience. Good internal consistency was found for the composite score (Cronbach's $\alpha = .79$) and for each of the subscales which make up the composite score (Cronbach's $\alpha = .84, .79, \text{ and } .80$) respectively.

Emotion Regulation

Levels of emotion regulation were assessed using the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS is a 36-item self-report measure consisting of six subscales (non-acceptance, goals, impulse, awareness, strategies and clarity) the internal consistency of these scales were found to be in the acceptable range (Cronbach's $\alpha = .91, .91, .91, .93, .87$) respectively, with the exception of the awareness subscale (Cronbach's $\alpha = .53$). Although all subscales have been used in the current study, two of these are considered particularly important for what the study is investigating as they are more closely related to mindfulness. These two subscales are *non-acceptance* of emotion which is assessed with phrases such as '*when I'm upset I feel guilty for feeling this way*' and limited access to emotion regulation *strategies* which is assessed with items such as '*When I'm upset I believe that I'll end up feeling very depressed*'. The DERS uses a 5 point likert scale ranging from 1 = almost never

to 5 = almost always. Scores at the higher end of the scale indicate greater problems with emotion regulation, the highest possible score is 180 and the lowest is 36. It is worthwhile to note that when 'emotion regulation' is mentioned it is referring to emotion regulation as measured by the DERS and 'emotion dysregulation' is referring to the EDI-ED sub-scale included in the EDI-3.

Eating Disorder Symptoms

Symptoms of eating disorders were assessed using the Eating Disorder Inventory 3 (EDI-3; Garner, 2004). This is a 91-item self-report measure used to assess 12 different subscales of eating disorder symptoms, these consist of three eating-disorder specific scales and nine general psychological scales, these scales measure 6 various areas: Eating Disorder Risk, Ineffectiveness, Interpersonal Problems, Affective Problems, Over control and General Psychological Maladjustment. In the current study 5 out of the 12 subscales were used, these were: Drive for thinness (EDI-DT) which assesses the fear of gaining weight and the need to diet; Bulimia (EDI-B) which assesses any episodes of bingeing and purging; Body Dissatisfaction (EDI-BD) which measures how satisfied one is with their personal appearance; Interoceptive Deficits (EDI-ID) which assesses how well individuals can distinguish between certain feelings and sensations; and Emotion Dysregulation (EDI-ED) which measures the individuals tendency to be impulsive, reckless and angry. The items on this questionnaire are rated on a 4 point likert scale. Scores on the scale are rated to be low, typical or high clinical, with higher scores indicating higher clinical risk factors for an eating disorder to be present/develop. Internal consistency has already been well established for this measure.

Procedure

Participants completed an online survey via the survey tool Bristol Online Survey (BOS) which was delivered using the SONA systems software along with participants recruited from social media websites such as Facebook and Twitter. The questionnaire was comprised of the EDI-3, DERS and FFMQ and was timed

to take approximately 10 minutes to complete. Prior to participating it was required that participant information sheets were completed and consent was obtained. Once the questionnaire was complete participants were provided with a debrief sheet which outlined the purpose of the study in addition to the researchers details if participants wished to ask any questions. Out of a required 200 participants the response rate was 59.5%.

Data Analysis Strategies

Data was checked for normal distribution using skewness and kurtosis tests, followed by box and whisker plots being produced to highlight any outliers. Internal consistency was established using Cronbach's Alpha. Possible correlations between variables have been computed using a Pearson's r analysis using SPSS 20, multiple regression analysis using an established procedure (Preacher & Hayes, 2004) was carried out in order to highlight potential mediating variables and gain a deeper understanding of the relationship between variables.

Ethical Issues

Before the commencement of this study an application to gain ethical approval was submitted to PSYREP – the universities ethics committee and it was decided that there were no serious ethical issues regarding the nature of this study and therefore approval was granted. Each participant was provided with information regarding the nature of the study and asked to provide consent to take part, they were also made aware of their rights regarding anonymity and their right to withdraw. A debrief sheet was provided upon completion, with information about the study and the researchers contact details if the participants wished to get in touch. Participants were also provided with the details of the universities counselling team and also the contact details of a registered eating disorder charity.

Results

Prior to data analysis skewness and kurtosis checks were carried out to determine if the data was normally distributed, the majority of variables were found to be in the acceptable range of +/-1 (see table 1.). To further show how

well the data was distributed across variables, box and whisker plots have been produced which demonstrate that for each subscale of the FFMQ and DERS data was normally distributed with no outliers (see fig. 1-2). Skewness and kurtosis for the EDI-3 were not in the acceptable range, a box and whisker plot has been provided (Fig 3.) to show which items have been identified as outliers. It should be noted that when using a 0 value in the EDI-3 questionnaire data may not be within the acceptable ranges for skewness and kurtosis, despite data being outside conventional acceptable boundaries the hypotheses require parametric tests and multiple regression strategies to be used.

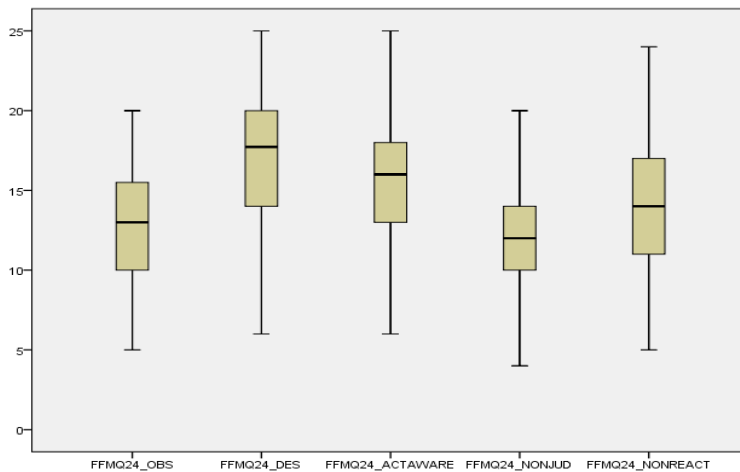


Figure 1: Box and whisker plot to show normal distribution of data for the FFMQ subscales

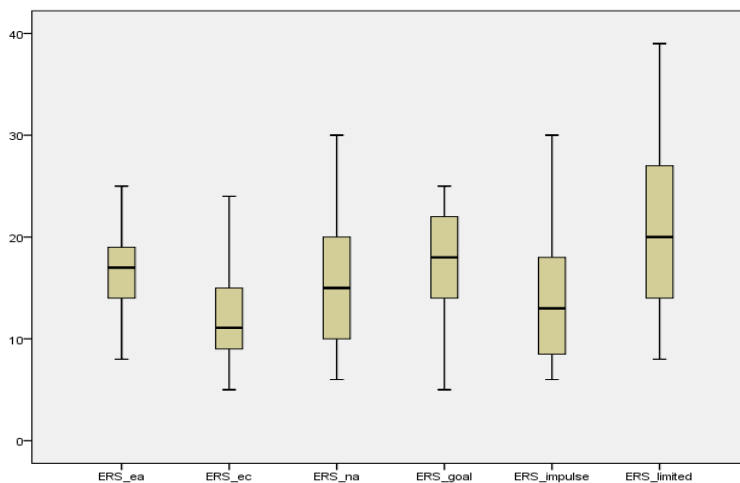


Figure 2: Box and whisker plot to show normal distribution for the DERS

Table 1

Skewness, kurtosis, mean and standard deviations for the EDI-3 subscales, FFMQ and DERS

	M	SD	SKEWNESS	KURTOSIS
FFMQ_COMPOSITE	41.3	8.7	-.2	.1
FFMQ_OBS	13.0	3.7	.1	-.7
FFMQ_DES	16.7	4.2	-.6	.1
FFMQ_ACTAWARE	15.4	4.0	.0	.0
FFMQ_NONJUDG	11.9	3.4	.2	-.3
FFMQ_NONREACT	14.0	3.9	.0	-.3
DERS_EA	16.9	3.6	.1	-.2
DERS_EC	12.3	4.4	.4	-.4
DERS_NA	15.4	6.3	.3	-.9
DERS_GOAL	17.4	5.4	-.4	-.6
DERS_IMPULSE	14.0	6.0	.5	-.6
DERS_STRATEGIES	21.2	8.6	.3	-.8
EDI_DT	12.1	8.3	.2	-1.3
EDI_BUL	8.4	7.3	1.1	.8
EDI_BD	17.4	7.9	-.5	-.7
EDI_ID	10.1	8.2	.9	.1
EDI_ED	7.3	6.9	1.0	.2

Note: FFMQ_Composite: Singular composite score of the Five Facet Mindfulness Questionnaire (FFMQ), FFMQ_OBS: Observe facet of the FFMQ, FFMQ_DES: Describe facet of the FFMQ, FFMQ_ACTAWARE: Acting with Awareness facet of the FFMQ, FFMQ_NONJUDG: Non-judgement of Inner Experience facet of the FFMQ, FFMQ_NONREACT: Non-reactivity to Inner Experience facet of the FFMQ, DERS_EA: Lack of Emotional Awareness subscale of the Difficulties in Emotion Regulation Scale (DERS), DERS_EC: Lack of Emotional Clarity subscale of DERS, DERS_NA: Non-acceptance of Emotional Responses subscale of DERS, DERS_GOAL: Difficulties Engaging in Goal-directed Behaviour subscale of DERS, DERS_IMPULSE: Impulse Control Difficulties subscale of DERS, DERS_STRATEGIES: Limited Access to Emotion Regulation Strategies subscale of the DERS, EDI_DT: Drive for Thinness subscale of the Eating Disorder Inventory-3 (EDI-3), EDI_BUL: Bulimia subscale of the EDI-3, EDI_BD: Body Dissatisfaction subscale of the EDI-3, EDI_ID: Interoceptive Deficits subscale of the EDI-3, EDI_ED: Emotion Dysregulation subscale of the EDI-3

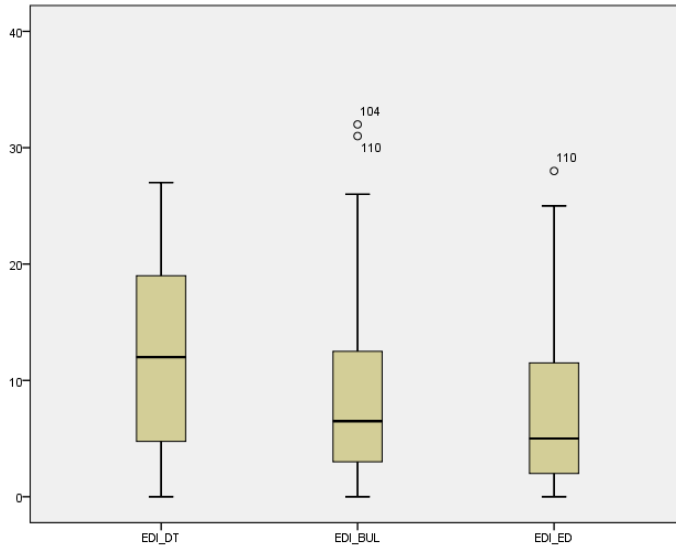


Figure 3: Box and whisker plot to show outliers for the EDI-3

To test the hypothesis that lower levels of mindfulness are associated with greater difficulties in emotion regulation a Pearson's r test was carried out; correlation coefficients can be found in table 2. Findings show that there is a significant negative correlation between FFMQ composite scores and each subscale of the DERS, with the exception of the EA subscale which was not found to have a significant correlation with the FFMQ. The significant correlations found indicate a relationship between low levels of mindfulness and the inability to adequately regulate ones emotions. Findings also indicate that some aspects of emotion regulation are more strongly correlated with mindfulness; a particularly strong correlation was found for the *strategies* subscale which indicates how limited access to emotion regulation strategies can be associated with lower levels of mindfulness. A scatterplot has been provided in Figure 4 to illustrate the strength of this relationship. Significant negative correlations can also be seen when looking at the separate facets of the FFMQ in relation to the DERS subscales. In line with the composite score there was the exception of the EA subscale which once again did not yield a significant correlation. Weak to moderate correlations ($r = -.394$ to $-.645$) can be seen for each facet of the FFMQ and DERS which further demonstrates the relationship between low levels of mindfulness and greater difficulties regulating emotions, the most established relationship can be

seen between the non-judgment and non-acceptance subscales which each produced a moderate correlation.

Table 2

Pearson's R correlation coefficients indicating association between FFMQ and DERS subscales

	EA	EC	NA	GOAL	IMPULSE	STRATEGIES
FFMQ_COMPOSITE	-.160	-.631**	-.671**	-.586**	-.686**	-.723**
FFMQ24_ACTAWARE	-.220*	-.556**	-.520**	-.432**	-.495**	-.491**
FFMQ24_NONJUDG	-.041	-.489**	-.645**	-.473**	-.609**	-.590**
FFMQ24_NONREG	-.092	-.401**	-.394**	-.443**	-.484**	-.586**

Note: See table 1 footnote for label descriptions.

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

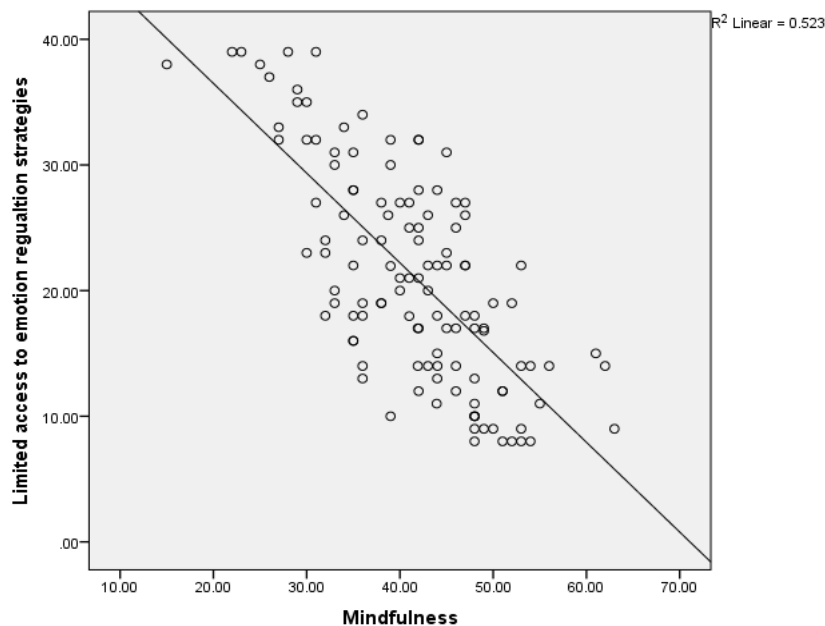


Figure 4: A Scatterplot to show the strong negative relationship between DERS-strategies and Mindfulness

Correlations between the variables mindfulness and eating disorder symptoms were also looked at in order to test the hypothesis that lower levels of mindfulness are associated with a greater risk of presenting with aspects of eating disorders. Correlation coefficients can be found in table 3 which highlight the significant negative relationship between scores on the FFMQ and the EDI-3. The composite score for mindfulness was displayed as being weakly to moderately correlated with the EDI measure of eating disorder symptoms ($r = -.250$ to $-.644$). Moreover it can be seen that for the two psychological scales the correlations were much stronger than for the physical subscales. This is also noted when looking at each facet of mindfulness in relation to eating disorder symptoms with the psychological subscales ID and ED having moderate correlations with mindfulness ($r = -.416$ to $-.644$) compared to the physical symptom subscales: DT, BUL and BD only producing weak relationships with mindfulness ($r = -.189$ to $-.294$) with findings also showing how BD does not significantly correlate with both the non-judgement and non-reacting facets of mindfulness.

Table 3

Pearson's r correlation coefficients indicating association between FFMQ and EDI-3 subscales

	EDI_DT	EDI_BUL	EDI_BD	EDI_ID	EDI_ED
FFMQ_COMPOSITE	-.334**	-.282**	-.250**	-.644**	-.595**
FFMQ_ACTAWARE	-.251**	-.211*	-.268**	-.525**	-.416**
FFMQ_NONJUD	-.215*	-.252**	-.127	-.543**	-.450**
FFMQ_NONREACT	-.294**	-.189*	-.168	-.416**	-.498**

Note: See table 1 footnote for label descriptions.

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

This is a pattern that also seems to emerge when examining the relationship between scores on the DERS and the EDI-3 (Table 4). Findings indicate how the psychological aspects of eating disorders are significantly positively correlated with difficulties regulating emotions, a particularly strong correlation can be found

between the DERS subscale *emotional clarity* and the EDI-3 subscale *interoceptive deficits* ($r = .742$). With the exception of the association between DERS_EA and EDI_ED all subscales of the DERS can be found to be significantly positively correlated with the psychological subscales of the EDI-3, with strong to moderate correlations being found for the majority of subscales with the exception of two weakly correlated ones: EA and ID, and *goal* and ED. This is considerably different to the scores for the physical aspects of eating disorders. Although the majority of subscales were found to be significantly positively correlated with one another - with the exception of DERS_EA - the scores for these correlations were weak, with only the relationship between *strategies* and DT yielding a moderate score ($r = .432$).

Table 4

Pearson's r correlation coefficients indicating association between DERS and EDI-3 subscales

	EDI_DT	EDI_BUL	EDI_BD	EDI_ID	EDI_ED
DERS_EA	.054	.054	.152	.245**	.101
DERS_EC	.233*	.271**	.211*	.742**	.525**
DERS_NA	.381**	.295**	.288**	.619**	.470**
DERS_GOAL	.392**	.207*	.306**	.402**	.330**
DERS_IMPULSE	.289**	.328**	.226*	.620**	.672**
DERS_STRATEGIES	.432**	.379**	.311**	.661**	.612**

Note: See table 1 footnote for label descriptions.

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Due to the significant relationships observed between the EDI sub-scales *Interoceptive Deficits* and *Emotion Dysregulation* in association with the FFMQ composite score and the DERS subscales, a multiple regression analysis using an established procedure (Preacher & Hayes, 2004) was carried out to explore the possibility of these variables being causally related. If the relationship between mindfulness and the eating disorder subscales are found to be significantly mediated by the subscales of the DERS, then it can be suggested

that the relationship between psychological eating disorder symptoms and mindfulness is explained by difficulties in emotion regulation, and therefore may provide an insight into how a mindfulness intervention which is focused on aspects of emotion regulation could improve eating disorder symptoms. The causal model for these relationships can be found in figure 5.

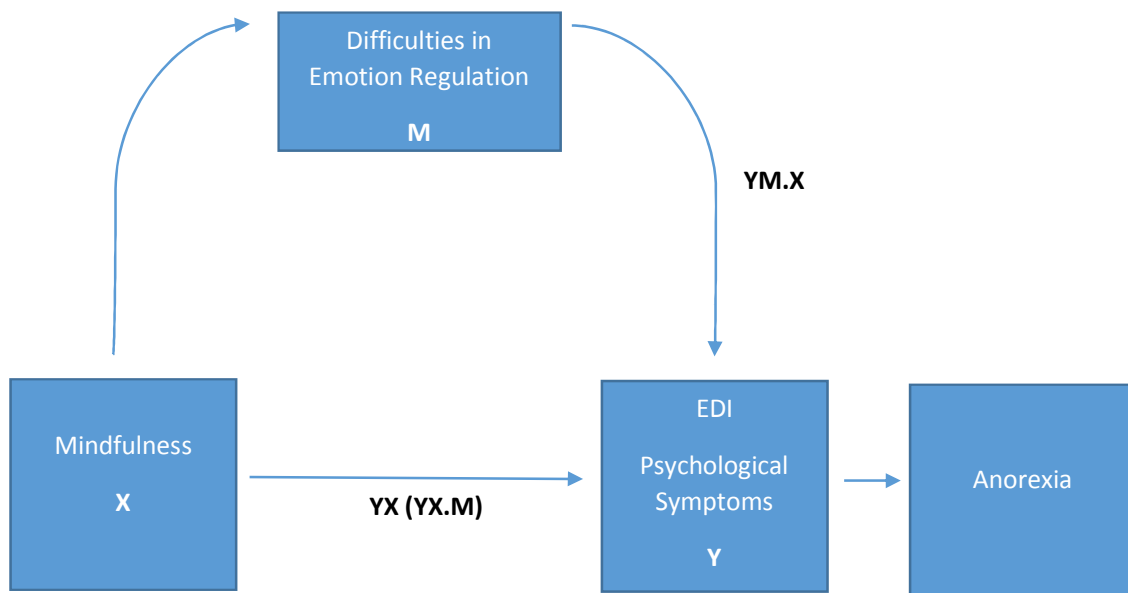


Figure 5: Proposed causal relationship between Mindfulness, Difficulties in Emotion Regulation and the psychological subscales of the EDI-3 (EDI-ID, EDI-ED)

Results from the regression analysis, which can be found in Table 5 show that 3 of the DERS subscales act as significant mediators of the relationship between mindfulness and the subscale EDI-ED. These 3 subscales; *strategies*, *impulse* and *emotional clarity* are also found to mediate the relationship between mindfulness and the subscale EDI-ID, with the addition of the *non-acceptance* subscale also being found to act as a mediator for EDI-ID. These findings suggest that the relationship between mindfulness and psychological eating disorder symptoms is mediated by difficulties in emotion regulation. Moreover, specific subscales of emotion regulation are found to influence this relationship. No significant mediation was found when the DERS subscales *goal* and *non-acceptance* were used as mediators for the outcome variable EDI-ED. For the outcome variable EDI-ID, it was only *goal* that was not established as a significant

mediator. The subscale *emotional awareness* was left out of mediation analysis due to not meeting the required assumptions.

Table 5

Regression summary for tests of mediation as illustrated in Figure 5. Showing results of significant mediators only

	DERS	Z	ρ	LL 95%	UL 95%
EDI-ED	Strategies	-3.53	<.01	-.33	-.11
	Impulse	-4.79	<.01	-.39	-.16
	Emotional clarity	-2.53	<.05	-.23	-.03
EDI-ID	Strategies	-3.99	<.01	-.40	-.14
	Impulse	-3.41	<.01	-.36	-.08
	Non-acceptance	-3.38	<.01	-.34	-.09
	Emotional clarity	-5.62	<.01	-.44	-.23

As well as the psychological subscales, two of the eating specific subscales EDI-DT and EDI-BUL were also tested to see if emotion regulation difficulties mediated their relationship with mindfulness. Results of this regression analysis can be found in Table 6 along with a causal model of these relationships, which can be found in figure 6. Findings indicate that 3 of the DERS subscales; *strategies*, *non-acceptance* and *goal* have been established as significant mediators of the relationship between mindfulness and EDI-DT. For the subscale EDI-BUL only *strategies* and *impulse* were found to act as mediators for this relationship. These findings demonstrate how the eating specific symptoms of eating disorders are associated with mindfulness through the mediation of particular difficulties in emotion regulation. The *strategies* subscale of the DERS was the only aspect of emotion regulation which was consistently found to be a mediator of the relationship between mindfulness and eating disorder symptoms,

both psychological and eating specific. For the subscale EDI-DT no significant mediation was found for *impulse* or *emotional clarity*, whereas with the EDI-BUL subscale mediation was found for *impulse* but not for *non-acceptance*, *emotional clarity* or *goal*. As with the previous regression, the DERS subscale *Emotional Awareness* was omitted from testing, along with the EDI-3 subscale *Body Dissatisfaction* as they did not meet the required assumptions.

Table 6

Regression summary for tests of mediation as illustrated in Figure 6. Showing results of significant mediators only

	DERS	Z	ρ	LL 95%	UL 95%
EDI-DT	Strategies	-3.15	<.05	-.45	-.10
	Non-acceptance	-2.39	<.05	-.32	-.03
EDI-BUL	Goal	-2.66	<.05	-.30	-.03
	Strategies	-2.84	<.05	-.36	-.08
	Impulse	-2.06	<.05	-.27	-.01

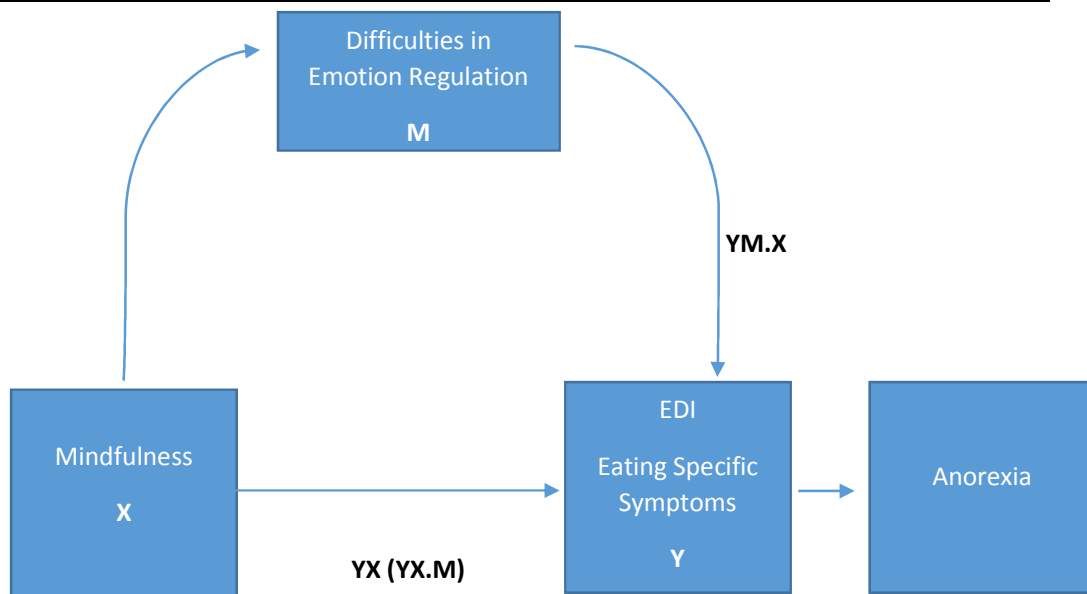


Figure 6: Proposed causal relationship between Mindfulness, Difficulties in Emotion Regulation and the eating specific subscales of the EDI-3 (EDI-DT, EDI-BUL).

Discussion

The present research was concerned with investigating the predictive factors of developing AN. Guided by previous literature it was expected that mindfulness and emotion regulation would be associated with eating disorder symptoms. Initially the relationship between mindfulness and emotion regulation was investigated, as predicted those with low levels of mindfulness displayed greater emotion regulation difficulties. This relationship was found to be strongest for the *strategies* and *non-acceptance* subscales of the DERS, which is in line with previous findings (Pepping et al., 2014).

The relationship between mindfulness and symptoms of eating disorders, as measured by the EDI-3 was also explored. Findings supported earlier predictions, highlighting significant associations between low levels of mindfulness and more symptoms related to eating disorders. Emotion regulation was similarly examined, it was found that those with greater difficulty regulating their emotions also exhibited more eating disorder symptoms. We can be confident in the significance of these results as there were no major issues regarding the distribution of data. These findings demonstrate how low levels of mindfulness and greater difficulties in regulating ones emotions can be associated with individuals displaying more characteristics that are related to eating disorders. Although significant relationships have been displayed between the DERS and FFMQ in relation to the eating specific aspects of eating disorders, an important pattern emerged showing how the psychological aspects produced stronger correlations.

Exploring possible causal relationships between mindfulness, emotion regulation and eating disorder symptoms allowed important findings to come to light. In line with the final hypothesis, evidence clearly indicates a mediating role of emotion regulation for the relationship between mindfulness and eating disorder symptoms. Moreover, the influence emotion regulation had on this relationship was found to be more established for the psychological EDI-3 scales than for the eating specific scales. This evidence illustrates once more the importance of the psychological aspects of eating disorders by highlighting how those low in

mindfulness are more likely to present with eating disorder symptoms such as interoceptive deficits and emotion dysregulation and this can be explained in terms of their inability to effectively regulate their emotions.

One dimension of emotion regulation which was consistently found to be a mediator of the relationship between low levels of mindfulness and all symptoms of eating disorders, which were included in the regression analyses was *strategies*. The evidence illustrates how individuals low in mindfulness may have difficulty dealing with their emotions and finding the right way to manage their distress; this can be assumed to be a risk factor for having symptoms related to eating disorders. These findings are in line with a number of studies which examined emotion regulation in those with AN. Both Harrison et al. (2009) and Brockmeyer et al. (2012a) found that scores for the *strategies* subscale were higher than other dimensions of emotion regulation amongst those with AN. The current research provides further insight into this relationship, suggesting how this may be an issue which was present before the onset of the disorder.

When exploring the other dimensions of emotion regulation the story is not as simple, both *impulse* and *emotional clarity* were found to mediate the relationship between low levels of mindfulness and the psychological symptoms of eating disorders, however no indirect effect was found for these dimensions when examining their influence on the eating specific symptoms. This finding could implicate the importance of targeting specific aspects of emotion regulation within treatment options for eating disorders, as a number of studies have demonstrated how those who have reached weight restoration following recovery from AN still struggle with the psychological symptoms of their disorder (Brockmeyer et al., 2012b; Haynos et al., 2014). Although emotion regulation has been found to have a direct and indirect effect on all eating disorder symptoms, it is important to draw attention to how the individual dimensions of emotion regulation can be considered to be predictive of different symptoms. Appreciating this can facilitate an enhanced understanding of how to effectively improve the psychological symptoms of AN which are often still existent despite treatment. In the context of previous research it can be seen that these findings add weight to the assertion that AN may be a disorder of emotion regulation (Haynos & Fruzzetti, 2011).

It is important to reiterate here that the emotional awareness dimension of emotion regulation was found to have little to no significant correlations with mindfulness or eating disorder symptoms. When conducting the Cronbach's Alpha for this subscale it became apparent that the internal consistency was poor, which may explain why no significant relationships could be established, this meant that emotional awareness was omitted from the mediation analyses. As previous research has found a link between emotional awareness and symptoms of AN (Racine & Wildes, 2013) it could be assumed that if the internal consistency was improved then similar findings may have been evident in the current research. Body dissatisfaction is an eating specific subscale of the EDI-3 which was also omitted from mediation analyses due to it being a non-significant or weakly correlated subscale with both mindfulness and emotion regulation.

The moderate to strong relationships revealed between low levels of mindfulness and the psychological symptoms of eating disorders extend previous findings (Pepping et al., 2014; Prowse et al., 2013). When mindfulness levels are low, individuals are more likely to over analyse, judge and be non-acceptant of their thoughts and feelings, for an anorexia sufferer this is particularly the case (Butryn et al., 2013). The findings of the current study show how low levels of mindfulness are present in those who do not have an eating disorder, yet these individuals are found to score high on the psychological eating disorder measures. As established in the regression analysis this relationship is mediated by poor emotion regulation, in light of this relationship and previous research highlighting how the psychological aspects of AN exist past weight restoration, it is imperative that both mindfulness and emotion regulation are given credence when treating eating disorders. If these issues are tackled from the beginning of a treatment plan for AN, it could serve to improve recovery outcomes.

Indeed, prior intervention research has confirmed the efficacy of treating eating disorders with therapies which focus on mindfulness and emotion regulation, for example Dialectical Behaviour Therapy (DBT) has been found to significantly improve eating disorder symptoms in those with AN in a number of studies (Bankoff et al., 2012; Salbach-Andrae et al., 2008; Telch et al., 2001). This is a positive outcome, however more understanding of the underlying mechanisms of

this successful intervention is needed to further improve treatment options. The current study provides this additional insight by highlighting how each dimension of emotion regulation influences the relationship between mindfulness and eating disorder symptoms. While the present findings can only determine a statistical causality, the evidence draws attention to how the potential risk factors of developing an eating disorder are also the factors believed to maintain the disorder (Racine & Wildes, 2013). This in itself indicates the magnitude of these issues and need the need for appropriate interventions.

To confirm that the mediating role of emotion regulation for the relationship between low mindfulness and eating disorder symptoms is causally related, a prospective design is required. Extending the findings of the current study, future research may measure mindfulness, emotion regulation and symptoms of eating disorders over a number of years in order to assess how the risk factors that are associated with undergraduate females developing an eating disorder, may actually be able to predict the development of AN. Another way of confirming causality would be to implement an intervention which served to improve mindfulness levels through targeting specific dimensions of emotion regulation in order to explore whether eating disorder symptoms were reduced. The use of an undergraduate female sample in an intervention study would allow risk factors to be causally determined. This level of understanding is not only important for the treatment of eating disorders, but is also essential for the development of preventative interventions. Significant levels of eating disorder symptoms have been noted within undergraduate students, not only in the current study but also within previous research (Berg et al., 2009; Eisenberg et al., 2011). It is therefore advisable that universities offer programmes which serve to improve mindfulness and emotion regulation. This would not only assist in targeting the potential risk factors for developing eating disorders, but would also serve to improve general psychological well-being as both of these constructs have been associated with general psychological distress (Pepping et al., 2014).

Overall the findings of the present study highlight how female undergraduate students are at risk for developing an eating disorder. A causal relationship was established between low levels of mindfulness and symptoms associated with

eating disorders, this relationship was mediated by difficulties in emotion regulation. Therefore it can be concluded that poor mindfulness and the inability to effectively regulate emotions are risk factors for having symptoms related to eating disorders. As previously mentioned a prospective design or intervention study is needed to confirm this causal relationship, however the present findings do add weight to prior research which has found a link between these constructs. Moreover, the significant findings noted here indicate the importance of the psychological aspects of eating disorders, something which needs to be targeted much more within eating disorder interventions in order to improve recovery outcomes.

References

- Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion regulation strategies across psychopathology: A meta-analysis. *Clinical Psychology Review, 30* (2), 217-237.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Bankoff, S. M., Karpel, M. G., Forbes, H. E., & Pantalone, D. W. (2012). A Systematic Review of Dialectical Behavior Therapy for the Treatment of Eating Disorders. *Eating Disorders, 20*, 196-215.
- Berg, K. C., Frazier, P., & Sherr, L. (2009). Change in eating disorder attitudes and behaviour in college women: Prevalence and Predictors. *Eating Behaviours, 10*, 137-142.
- Bohlmeijer, E., Klooster, P. M., Fledderus, M., Veehof, M., & Baer, R. (2011). Psychometric Properties of the Five Facet Mindfulness Questionnaire in Depressed Adults and Development of a Short Form. *Assessment, 18*(3), 308-320.
- Brockmeyer, T., Hinrich, B., Holtforth, M. G., Pfeiffer, N., Herzog, W., & Friederich, H. (2012a). Specific emotion regulation impairments in major depression and anorexia nervosa. *Psychiatry Research, 200*, 550-553.
- Brockmeyer, T., Holtforth, M. G., Bents, H., Kämmerer, A., Herzog, W., Friederich, H. (2012b). Starvation and emotion regulation in anorexia nervosa. *Comprehensive Psychiatry, 53*, 496-501.
- Brockmeyer, T., Skunde, M., Wu, M., Bresslein, E., Rudofsky, G., Friederich, H. (2014). Difficulties in emotion regulation across the spectrum of eating disorders. *Comprehensive Psychiatry, 55*, 565-571.

- Butryn, M. L., Juarascio, A., Shaw, J., Kerrigan, S. G., Clark, V.,... Forman, E. M. (2013). Mindfulness and its relationship with eating disorders symptomatology in women receiving residential treatment. *Eating Behaviours, 14*, 13-16.
- Cowdrey, F. A., & Park, R. J. (2012). The role of experiential avoidance, rumination and mindfulness in eating disorders. *Eating Behaviours, 13*, 100-105.
- Danner, U. N., Sternheim, L., & Evers, C. (2014). The importance of distinguishing between the different eating disorders (sub)types when assessing emotion regulation strategies. *Psychiatry Research, 215*, 727-732.
- Eisenberg, D., Nicklett, E. J., Roeder, K., & Kirz, N. E. (2011). Eating Disorders Symptoms among College students: Prevalence, Persistence, Correlates and Treatment-Seeking. *Journal of American College Health, 59*(8), 700-706.
- Espeset, E. S., Gullisken, K. S., Nordbø, R. S., Skårderud, F., & Holte, A. (2012). The Link between Negative Emotions and Eating Disorder Behaviour in Patients with Anorexia Nervosa. *Eating Disorders Review, 20*, 451-460.
- Fruzzetti, A. E., Crook, W., Erikson, K. M., Lee, J. E., & Worrall, J. M. (2008). Emotion Regulation. In W. T O'Donohue & J. E. Fisher (Eds.) *Cognitive behaviour therapy: Applying empirically supported techniques in your practice* (2nd ed., pp. 174-186). Hoboken, NJ: Wiley.
- Gratz, K. L., & Roemer, L. (2004). Multidimensional Assessment of Emotional Regulation and Dysregulation: Development, Factor Structure, and Initial Validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioural Assessment, 26* (1), 41-54.
- Gross, J. J. (2013). Emotion Regulation: Taking Stock and Moving Forward. *American Psychological Association, 13*(3), 359-365.
- Harrison, A., Sullivan, S., Tchanturia, K., & Treasure, J. (2009). Emotion Recognition and Regulation in Anorexia Nervosa. *Clinical Psychology and Psychiatry, 16*, 348-356.
- Harrison, A., Sullivan, S., Tchanturia, K., & Treasure, J. (2010). Emotional functioning in eating disorders: attentional bias, emotion recognition and emotion regulation. *Psychological Medicine, 27*, 1-11.
- Haynos, A. F., & Fruzzetti, A. E. (2011). Anorexia nervosa as a disorder of emotion dysregulation: Theory, evidence, and treatment implications. *Clinical Psychology: Science and Practice, 18* (3), 183-202.
- Haynos, A. F., Roberto, C. A., Martinez, M. A., Attia, E., & Fruzzetti, A. E. (2014). Emotion Regulation Difficulties in Anorexia Nervosa before and After Inpatient Weight Restoration. *International Journal of Eating Disorders* doi: 10.1002/eat.22265

- Hoffman, S. G., Sawyer, A. T., Fang, A., & Asnaani, A. (2012). Emotion Dysregulation Model of Mood and Anxiety Disorders. *Depression and Anxiety, 29*, 409-416.
- Kabat-Zinn, J. (1994). *Wherever you go, there you are: Mindfulness meditation in everyday life*. New York: Hyperion.
- Katterman, S. N., Kleinman, B. M., Hood, M. M., Nackers, L. M., & Corsica, J. A. (2014). Mindfulness mediation as an intervention for binge eating, emotional eating, and weight loss: A systematic review. *Eating Behaviours, 15*, 197-204.
- Kyriacou, O., Easter, A., & Tchanturia, K. (2009). Comparing views of patients, parents, and clinicians on emotions in anorexia a qualitative study. *Journal of Health Psychology, 14*(7), 843 - 854.
- Lafrance Robinson, A., Kosmerly, S., Mansfield-Green, S., & Lafrance, G. (2013). Disordered Eating Behaviours in an Undergraduate Sample: Associations Among Gender, Body Mass Index, and Difficulties in Emotion Regulation. *Canadian Journal of Behavioural Science*, doi: 10.1037/a0031123
- Linehan, M. M. (1993). *Cognitive-behavioural treatment of borderline personality disorder*. New York: Guilford Press.
- Merwin, R. M., Zucker, N. L., Lacy, J. L., & Elliot, C. A. (2010). Interoceptive awareness in eating disorders: Distinguishing lack of clarity from non-acceptance of internal experience. *Cognition and Emotion, 24*(5), 892-902.
- Nordbø, R. S., Espeset, E. S., Gulliksen, K. S., Skårderud, F., & Holte, A. (2006). The meaning of self-starvation: Qualitative study of patients' perception of anorexia nervosa. *International Journal of Eating Disorders, 39*(7), 556-564.
- Pepping, C. A., O'Donovan, A., Zimmer-Gembeck, M. J., & Hanisch, M. (2014). Is emotion regulation the process underlying the relationship between low mindfulness and psychosocial distress? *Australian Journal of Psychology, 66*, 130-138.
- Prowse, E., Bore, M., & Dyer, S. (2013). Eating disorder symptomatology, body image, and mindfulness: Finding in a non-clinical sample. *Clinical Psychologist, 17*, 77-87.
- Racine, S. E., & Wildes, J. E. (2014). Dynamic Longitudinal Relations between Emotion Regulation Difficulties and Anorexia Nervosa Symptoms over the Year Following Intensive Treatment. *Journal of Consultant Clinical Psychology*. doi:10.1037/ccp0000011.
- Salbach-Andrae, H., Bohnekamp, I., Pfeiffer, E., Lehmkuhl, U., & Miller, A. L. (2008). Dialectical Behaviour Therapy of Anorexia and Bulimia Nervosa among Adolescents: A Case Series. *Cognitive and Behavioural Practice, 15*, 415-425.

Schmidt, U., & Treasure, J. (2006). Anorexia nervosa: Valued and visible. A cognitive-interpersonal maintenance model and its implications for research and practice. *British Journal of Clinical Psychology, 45*, 343-366.

Serpell, L., Treasure, J., Teasdale, J., & Sullivan, V. (1999). Anorexia nervosa: Friend or foe? *International Journal of Eating Disorders, 25*, 177-186.

Svaldi, J., Griepenstroh, J., Tuschen-Caffier, B., & Ehring, T. (2011). Emotion regulation deficits in eating disorders: A marker of eating pathology or general psychopathology? *Psychiatry Research, 197*, 103-111.

Telch, C. F., Agras, W. S., & Linehan, M. M. (2001). Dialectical Behaviour Therapy for Binge Eating Disorder. *Journal of Consulting and Clinical Psychology, 69*(6), 1061-1065.

Wolf, E. (2012). *An Apple A Day: A memoir of love and recovery from anorexia*. West Sussex: Summersdale Publishers.

