

**A Multiple Single Case Design Study
of Dialectical Behaviour Therapy Skills Groups for
Bulimia Nervosa: Are they associated with an
increase in Mindfulness and Acceptance?**

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Thesis declaration form

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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Overview

The overall focus of this thesis is on Eating Disorders (EDs). This thesis consists of three parts.

Part 1 of the thesis is a systematic literature review on the relationship between childhood emotional abuse and emotional neglect and EDs. Kent and Waller (2000) conducted a non-systematic literature review which suggested a probable relationship between childhood emotional abuse and EDs, and proposed that there was a need for further research to understand this relationship. It was considered useful to review the literature from this time to the present day to summarise the research that has taken place since. The literature review also aimed to highlight factors that may be associated with this relationship. In addition it aimed to evaluate whether people diagnosed with an ED and who have a history of childhood emotional abuse show more severe symptoms and comorbidity.

Part 2 of the thesis is an empirical study investigating whether a 12 week Dialectical Behaviour Therapy (DBT) skills group is associated with improvements in mindfulness and acceptance. It also examined whether improvements in mindfulness and acceptance were associated with improvements in binge eating, and eating pathology in general. The study utilised a multiple single case design to analyse the data. This paper forms part of a joint research study conducted with Hall (2015; Trainee Clinical Psychologist, University College London) who will report quantitative outcomes for the feasibility of the DBT group intervention.

Part 3 is a critical appraisal and discussed methodological and conceptual issues encountered during the research process. Furthermore, it reflected on the researcher's experience of delivering a clinical intervention in the context of research. It also reflected on the impact of a participant suicide. The hope was that the critical appraisal would be useful for future researchers.

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**Part 1: Literature Review - A Systematic
Literature Review into the Relationship between
Childhood Emotional Abuse and Emotional Neglect
and Eating Disorders**

Abstract

Aims: This review aimed to evaluate literature investigating the relationship between emotional abuse, emotional neglect and eating disorders (EDs). It also aimed to highlight factors that may be associated with this relationship. Lastly, it aimed to evaluate whether people diagnosed with an ED and who have a history of childhood emotional abuse show more severe symptoms and comorbidity.

Method: A systematic literature search was conducted using the databases PsychINFO, CINAHL, MEDLINE and Web of Science. Once exclusion criteria were applied, 22 studies were identified as appropriate for the review.

Results: Overall results showed higher levels of emotional abuse and emotional neglect for bulimia nervosa (BN) when compared to healthy controls, but this was not the case for anorexia nervosa (AN). ED samples report a similar level of emotional abuse and emotional neglect compared to other Axis I disorders. Studies highlighted possible psychological processes that may account for the relationship between emotional abuse, emotional neglect and ED. However, the research investigating severity and comorbidity is scarce and mixed. This review highlights the possibility that multiple experiences of abuse may be associated with comorbidity in ED presentation. The evidence suggests that anxiety, depression, and dysthymia are probable comorbid mental disorders.

Conclusions: There is some evidence for the link between emotional abuse, emotional neglect and EDs. However, there is a lack of specificity to this relationship, with other Axis I disorders reporting similar levels of abuse. Further research is needed to improve our understanding of the factors involved.

1.0 Introduction

There have been a number of studies investigating the link between negative experiences in childhood and the development of Eating Disorders (EDs) in adolescence and/or adulthood. The majority of this research has focused on the relationship between sexual abuse and physical abuse and EDs. Burns, Fischer, Jackson and Harding (2012) suggested that the lack of research into childhood emotional abuse (hereinafter referred to as emotional abuse) is most likely due to historical practice in the study of child maltreatment of focusing almost exclusively on sexual and/or physical abuse. Furthermore, it may have been assumed that the consequences of emotional abuse were not as severe as those of more obvious forms of maltreatment which leave physical signs (Egeland, 2007). Another issue regarding emotional abuse has been the difficulty in defining it in a meaningful way. It is defined differently depending on country, jurisdictions and in the literature (Glaser, 2011). Furthermore, emotional abuse may not be clearly marked by any specific behaviour on the behalf of a perpetrator, and the act tends to depend on the victim's perception of the perpetrator's intent and thought processes (Waller, Corstorphine & Mountford, 2007). This creates uncertainty around the definition and largely explains inconsistencies that have been observed in measurement (Kent & Waller, 2000). In recent years, studies have begun to include emotional abuse and childhood emotional neglect (hereinafter referred to as emotional neglect) alongside other types of abuse when investigating the link between childhood abuse and the development of EDs, but only a small number of studies have focused exclusively on emotional abuse. However, to date there has not been a systematic review in this area. The current systematic review aims to summarise the research to date on the relationship between emotional abuse and emotional neglect and the development of EDs.

1.1 Definition of Emotional Abuse and Emotional Neglect

In England, HM Government (2013) defines emotional abuse as “the persistent emotional maltreatment of a child such as to cause severe and persistent adverse effects on the child’s emotional development” (p. 85). They state that it may involve conveying to a child that they are worthless, unloved or inadequate, deliberately silencing or ridiculing them. Neglect can be defined as the persistent failure to meet a child’s basic physical and/or psychological needs and a lack of responsiveness to a child’s emotional needs (HM Government, 2013). Another definition of emotional abuse and emotional neglect was provided by Glasser (2002) who proposed that it could be characterised as being emotionally unavailable or unresponsive to the child. This included failing to recognise the child’s boundaries and individuality and failing to promote social adaptation. A national survey of 2869 18-24 year olds reported that 6% of individuals’ experienced frequent and severe emotional abuse, including humiliation, psychological control, terrorizing or threatening attacks. Furthermore, 12% reported experiencing three or more forms of emotional abuse (Cawson, Wattam, Brooker & Kelly, 2000). It is likely that many cases of emotional abuse go undetected given the difficulties in conceptualising and measuring the concept. Furthermore, it could be suggested that only the cases that are more obvious or severe in nature are reported. Consequently, it could be argued that the rate of emotional abuse is much higher than studies have indicated.

1.2 Definition of Eating Disorders

EDs are comprised of a range of syndromes encompassing physical, psychological and social features. One in 250 females and 1 in 2000 males will experience anorexia nervosa (AN) in adolescence or young adulthood whereas, approximately five times that number will suffer from bulimia nervosa (BN; NICE, 2004). The Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-V; American Psychiatric Association, 2013) provides a classification system for the EDs;

AN is characterised by excessive dieting that leads to severe weight loss with a pathological fear of becoming fat, including distorted body image. BN is characterised by recurring episodes of eating significantly more food in a short period of time than most people would eat under similar circumstances, with episodes accompanied with a loss of control. This is then followed by a compensatory behaviour to avoid gaining weight such as, self-induced vomiting, laxatives, fasting or over-exercise. Binge Eating Disorder (BED) was approved in DSM 5 (2013) as its own category of ED. Similar to BN, individuals with BED have episodes of binge eating but unlike individuals' with BN they do not present with any compensatory behaviours. Levitt and Sansone (2007) suggest that ED symptoms are complex and are caused by a variety of factors. They also state that despite the heterogeneity in symptom organisation, and individuals' past experiences, trauma and/or abuse appear to be a commonly reported experience in the presentation of many ED patients.

1.3 Child Abuse and Eating Disorders

As previously stated, the majority of the research into the link between childhood abuse and EDs has focused on sexual and physical abuse and research findings on this relationship have been mixed. Welch and Fairburn (1996) found no specific relationship between sexual and physical abuse and the later development of an ED. Whereas, Rorty, Yager and Rossotto (1994) found no relationship between sexual abuse and EDs but found that women with BN reported higher rates of physical abuse, psychological and multiple forms of abuse when compared to women without BN. Furthermore, a meta-analysis of 53 studies found a small but significant relationship between sexual abuse and EDs (Smolak & Murnen, 2002). Studies indicate that EDs are not inevitably associated with sexual or physical abuse, but instead it is likely to be a risk factor for the development of some cases of EDs, with other variables undoubtedly playing an important role for example, parent-child attachment and emotional distress unrelated to trauma (Briere & Scott, 2007).

Briere and Scott (2007) hypothesise three possible relationships between childhood maltreatment and EDs. Firstly, they hypothesise that child maltreatment may occur independently of a co-existent ED. Secondly, they suggest that it may not be related to the cause of the ED but nevertheless intensify or complicate eating pathology. A third possibility is that experiences of childhood maltreatment may directly cause the development of the ED. Sansone and Sansone (2007) believed that repetitive exposure to abusive experiences in childhood was likely to intensify the risk for developing general psychopathology in adulthood, including an ED. They suggested that other contextual factors may moderate psychopathology outcomes such as, the age of onset of abuse, relationship of the perpetrator to the individual and number of perpetrators or incidents. Researchers used The Schedule for Affective Disorders and Schizophrenia Diagnostic Interview (K-SADS; Endicott & Spitzer, 1978) to assess for mental health difficulties in maltreated children and found that the majority of these children received at least one mental health diagnosis. Interestingly, the children in the emotionally neglected category received the highest number of diagnoses and 73% of the group were co-morbid for two or more diagnoses (Egeland, 1997). This illustrates the negative impact that child maltreatment has on mental health functioning. Furthermore, it demonstrates that child maltreatment can lead to a variety of clinical outcomes and the norm tends to be a comorbid presentation. The lack of specificity between child maltreatment and later psychopathology has been supported by previous research into the relationship between childhood maltreatment and obesity (Hemmingsson, Johansson & Reynisdottir, 2014), depression and anxiety (Gibb, Butler & Beck 2003; Spertus, Yehuda, Wong, Halligan & Seremetis 2003), post-traumatic stress disorder (Spertus et al., 2003), substance use disorders (Kendler et al., 2000) and schizophrenia (Read, Van Os, Morrison & Ross, 2005). This highlights the fact that complex processes are involved and suggests a need to consider a variety of variables impacting on the

relationship between childhood maltreatment and later psychopathology, in particular the development of an ED.

1.4 Emotional Abuse, Emotional Neglect and Eating Disorders

In the past 15 years theorists and researchers have emphasised the importance of emotional abuse and emotional neglect in the development of EDs. There is some evidence to suggest that psychological/emotional maltreatment is more predictive of eating disordered behaviours in non-clinical samples compared to physical and sexual abuse and physical neglect (Kent, Waller & Dagnan, 1999; Witkiewitz & Dodge-Reyome, 2001). It is important to note that emotional abuse has been found to co-exist with other forms of maltreatment (Claussen & Crittenden, 1991; Higgins & McCabe, 2000) therefore, it could be hypothesised that it was the predictive variable in the previous relationship found between physical and sexual abuse and EDs.

1.5 Previous Literature Review Focusing on Emotional Abuse and Eating Disorders

Kent and Waller (2000) conducted a non-systematic literature review exploring the relationship between emotional abuse and eating psychopathology. At the time of carrying out their review they identified only two studies specifically investigating the relationship between emotional abuse and eating psychopathology, with one of those studies being a non-clinical sample. They found that there was little coherence in the definitions of emotional abuse used, and that most of the literature focused on the broader construct of family function. In addition, they observed inconsistencies in measurements and populations studied. Nevertheless, they concluded that there was some evidence for a link between emotional abuse and eating psychopathology and put forward a tentative model for empirical testing. They suggested that cognitive-affective processes might mediate the relationship between childhood emotional abuse and the later development of eating psychopathology. They suggested a range

of possible mediators may include dissociation, self-denigrating beliefs, shame, poor self-esteem, body dissatisfaction and/or anxiety. They hypothesised that the impact of emotional abuse would vary as a consequence of other abuse related variables that would act as moderators. Probable moderators suggested were the gender of the perpetrator and the developmental level at the onset of the abuse. Furthermore, they proposed that clinical experience suggests that when there is a history of emotional abuse there is likely to be an increased severity of specific ED symptoms, in particular vomiting, and greater co-morbidity, such as obsessive compulsive features and impulsive behaviours.

1.6 Aims

The review by Kent and Waller (2000) concluded that there was a probable relationship between emotional abuse and later eating psychopathology. They suggested that there was a need for further research in order to understand the nature of this relationship. It was considered useful to review the literature from this time to the present day to summarise the research that has taken place since. The current systematic review will further build on the previous review by including the BED category.

The current review aimed to systematically identify and appraise studies which focus on the impact of emotional abuse and emotional neglect on EDs. It also aimed to bring together variables that may be associated with this relationship.

1. Is there a relationship between emotional abuse and/or emotional neglect and EDs?
2. If so, what factors may be associated with this relationship?
3. Do people with EDs and a history of emotional abuse show more severe symptoms or more comorbidity than those with EDs but no history of emotional abuse?

2.0 Method

2.1 Systematic Literature Search

Studies published between January 2000 and January 2015 were identified by electronic searches of the following databases: PsycINFO, Ovid MEDLINE, CINAHL and Web of Science. PsycINFO focuses primarily on psychological literature and related disciplines. MEDLINE covers medicine, nursing, dentistry and health care. CINAHL covers nursing, biomedicine and health sciences. Web of Science covers scientific literature from a range of disciplines including, psychiatry. Search terms used were ('eating disorder*' OR 'anorexi*' OR 'bulimi*') AND (('emotion*' OR 'psychological') NEAR/2 ('abus*' OR neglect*'OR maltreatment)). In addition the subject headings 'emotional abuse' and 'eating disorders', were used where possible. The initial search resulted in 332 studies, which was reduced to 209 once duplicates were removed. A breakdown of the stages is listed in Table 1.

Table 1

Number of papers retrieved from each database

Database	Number of papers
Web of Science	124
PsycINFO	116
Ovid MEDLINE	66
CINAHL	26

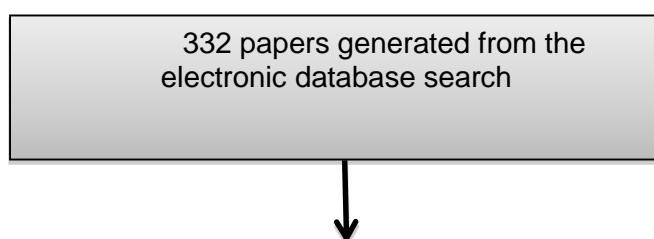
Inclusion criteria were (i) a measure of ED, (ii) a measure of emotional abuse and/or emotional neglect, (iii) published in the English language.

Exclusion criteria were (i) clearly irrelevant (the study was not on topic i.e. not about ED or abuse, the study was the wrong study type e.g. single case study, or the

wrong publication type e.g. dissertation), (ii) review or theoretical papers, which were retained for the introduction, (iii) studies which focused solely on physical or sexual abuse, (iv) articles focusing specifically on negative comments about shape or weight, (v) articles focusing solely on bullying by peers, (vi) articles that did not use a full measure of ED for example, only recording scores from subscales of the Eating Disorder Examination Questionnaire (EDE-Q).

The inclusion and exclusion criteria could not reliably be determined from the abstracts alone therefore, a two-step approach was applied to the inclusion and exclusion process to ensure that no suitable articles were excluded from the review before the full text review (the diagram in Figure 1 gives a summary of this procedure). This meant that clearly ineligible articles that did not meet the inclusion criteria were discarded, and the full texts were obtained from articles that were potentially eligible. Then the full texts for 62 articles were reviewed using the above inclusion and exclusion criteria. Following this, a further 40 articles were excluded, and the remaining 22 articles were included in the current review.

Relevant information was extracted from the 22 included articles (see Appendix I), including study design, the nature of the participants sample sizes and measures used for identifying emotional abuse and emotional neglect. The frequency and severity of emotional abuse and emotional neglect in EDs within the sample and any other relevant information regarding the relationship between emotional abuse and emotional neglect and EDs was also recorded.



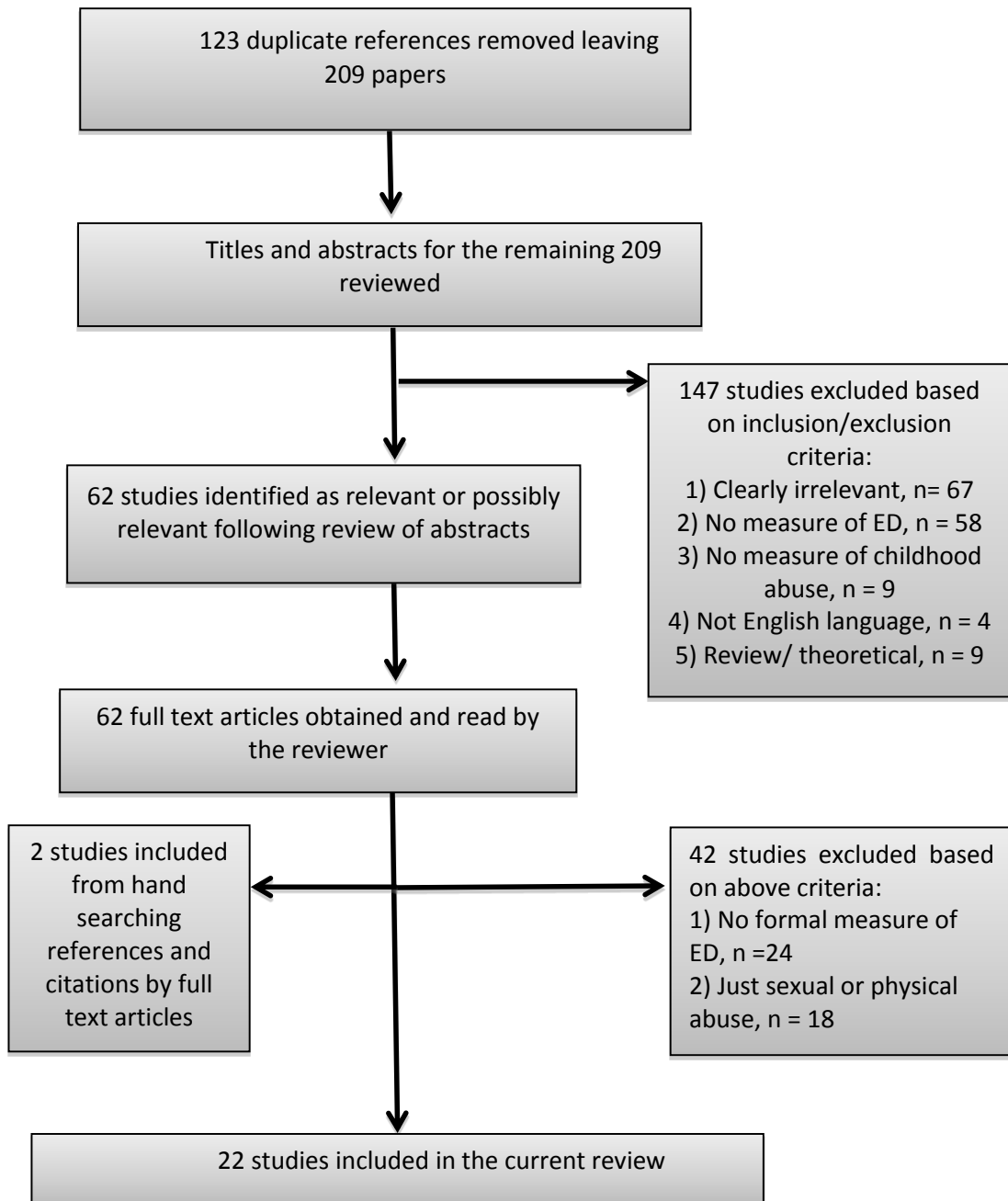


Figure 1. Diagram of Search Procedure.

3.0 Results

3.1 Study Characteristics

Design, sample and participants. The characteristics of the 22 reviewed studies are presented in a table in appendix I. This includes a detailed breakdown of the number of participants used in each study, the nature of the comparison group

(where applicable), and information about the level of emotional abuse and emotional neglect within each sample.

The mean age of participants with EDs ranged from 16.0 to 44.9, which was comparable to the mean age range for the control participants (15.7 to 44.8). Two studies did not provide the mean age of participants (Schoemaker, Smit, Bijl, Wilma & Vollebergh, 2002; Webster & Palmer, 2000). Fourteen studies included only female participants and one study did not provide any demographic details about participants (Schoemaker et al., 2002). Of the studies that included men, the percentage of men that made up the study sample ranged from 50.8% (Johnson, Cohen, Kasen & Brook, 2002) to 4.3% (Racine & Wildes, 2015). Ten studies did not specify the ethnicity of the participants. Most participants were Caucasian and of the studies that included other ethnicities, the percentage of Caucasians ranged from 85% to 96.7%. Two studies included a full ethnic breakdown of the sample (Allison, Grilo, Masheb & Stunkard, 2007; Groleau et al., 2012). For cross sectional studies, the ED group sample size range was 21 (Fosse & Holen, 2006; Kuga, Akyuz, Dogan, Ersan & Izgic, 2006) to 230 (Wildes, Kalarchian, Marcus, Levine & Courcoulas, 2008), with a mean sample size of 112.

Recruitment of participants with ED varied across the 22 studies. Seven studies recruited participants from the community (31.8%), 13 from outpatient clinics (59%), three from inpatient clinics (13.6%), and two from university settings (9%). One study did not specify where participants were recruited from (Vaja & Lang, 2014) making it difficult to generalise their findings. Four studies recruited participants from more than one setting (Bardone-Cone et al., 2008; Webster & Palmer, 2000; Wonderlich et al., 2007; Racine & Wildes, 2015). For the purpose of this review it was assumed that studies that had recruited participants from more than one setting would include participants with a range of severity of ED. Regarding the type of sample used, studies predominantly included an adult sample (n = 17), two studies included

adolescents, two studies included university students and one was a cohort study in which participants were recruited from the community and followed over time. When deconstructing the ED group further, five studies focused on participants with BED, five studies focused on participants with BN or bulimia spectrum disorders (includes threshold and subthreshold forms of BN), three studies focused on AN, two studies used a population sample, one study used an obese sample seeking bariatric surgery, and six studies included participants with a mixture of ED diagnoses. Many of the studies specified subtypes of ED for example, AN – binge and purge (AN-B/P) and AN – restricting (AN-R), BN purging and non-purging. Eleven of the included studies also recruited a comparison group, with four of these studies including more than one comparison group. See Table 2 for information on comparison groups used.

Table 2

Comparison groups included

Comparison group	Number of studies using group
Healthy Control	8
Night Eating Syndrome	1
Overweight/obese	1
Major Depression	1
Borderline Personality Disorder	1
Substance Use Disorder	1
Dual Diagnosis	1

Measures The two most common measures used to assess for ED were the Structured Clinical Interview for DSM-IV-TR –Axis-I, (SCID-I; First, Spitzer, Robert, Gibbon & Williams, 2002) ,the Eating Disorder Examination Interview (EDE; Cooper & Fairburn, 1993) and the Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994). The SCID-I is a frequently used and much researched semi-structured clinical interview that is commonly used as a diagnostic tool. The EDE is

regarded as the “gold standard” interview to assess ED symptoms. Recent research supports the reliability and validity of the EDE in assessing ED symptoms (Berg, Peterson, Frazier & Crow, 2012).

Table 3

Measures used to assess for Eating Disorder (symptoms)

Measure of ED (and ED symptomology)	Number of studies
Structured Clinical Interview for DSM-IV –Axis-I (SCID-I)	17
Eating Disorder Examination	7
Eating Attitudes Test	3
Eating Disorder Examination Questionnaire	3
International Classification of Diseases (ICD-10)	2
Diagnostic Interview Schedule for Children –IV (NIMH-DISC-IV)	1
Inventory based on criteria of DSM-IV	1
Questionnaire on Eating and Weight Patterns – Revised	1
Bulimic Investigatory Test Edinburgh (BITE)	1
Structured Inventory for Anorexic and Bulimic Syndromes (SIAB-EX)	1
Composite International Diagnostic Interview (CIDI)	1

All studies apart from one assessed emotional abuse and emotional neglect retrospectively. The difficulties in assessing the exposure retrospectively are discussed in the “Quality of Studies” section below. There does not appear to be a gold standard instrument for measuring emotional abuse and emotional neglect. The most common measure used to assess for emotional abuse and emotional neglect was the Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998). This measure screens for five types of childhood maltreatment (sexual abuse, physical abuse, emotional abuse, emotional neglect and physical neglect). The CTQ has been

found to have test-retest reliability coefficients of 0.80 to 0.83, internal consistency of Cronbach's alpha 0.79 to 0.94 and good construct validity (Bernstein et al., 1994; Fink, Bernstein, Handelsman, Foote & Lovejoy, 1995; Roy & Perry, 2004). Three studies used the Childhood Trauma Interview (CTI; Bernstein et al., 1994) to assess for emotional abuse. The CTI is a semi-structured interview with good psychometric properties including, inter-rater reliability and construct validity (Bernstein et al., 1994). In a review of instruments assessing childhood maltreatment the Childhood Experiences of Care and Abuse Interview and the Child Abuse and Trauma Scale were deemed to have acceptable psychometric properties (Roy & Perry, 2004). Table 4 gives a breakdown of the measures used to assess for emotional abuse and emotional neglect in the included studies.

3.2 Assessing Methodological Quality

The quality of the studies was assessed using Young and Solomon's (2009) criteria for systematically assessing the methodological quality of studies. Each study was analysed against criteria appropriate for the type of design used (cross sectional = 21 or cohort = 1). The results of this analysis are provided in Appendix II and when necessary more detailed information is provided about the limitations of the studies. Overall the quality of the studies was considered 'adequate' to 'good'. All of the studies posed a clear research question and used the appropriate design to answer the research question.

Table 4

Measures used to assess Childhood Emotional Abuse and Emotional Neglect

Measures of childhood abuse	Number of studies
Childhood Trauma Questionnaire (CTQ)	10
Childhood Trauma Interview (CTI)	3

Clinical Interview	2
Parental Bonding Inventory	1
The Child Abuse and Trauma Scale (CATS)	2
Disorganized Poverty Interview	1
Childhood Abuse and Neglect Questionnaire Form (CANQF)	1
Childhood Experiences of Care and Abuse Interview (CECA)	1
Linköping Youth Life Experience Scale (LYLES)	1
Family Interview for Protectiveness and Empathy	1
Family Assessment Device	1

None of the studies appeared to deviate from the original protocol outlined in the method. In accordance with Young and Solomon (2009) half of the studies were marked down due to not stating a hypothesis. However, research investigating emotional abuse and emotional neglect and its relationship to the development of ED is still in its infancy, therefore it could be argued that stating research questions in an open ended manner allows for an exploratory approach. This is viewed as the most helpful approach if there is a lack of research in the area and the researcher does not wish to constrain the investigation early on (Barker, Pistrang & Elliot, 2002). Twelve studies were marked down for not providing relevant information to assess for conflicts of interest. Nevertheless, just because the authors did not make reference to this issue does not necessarily indicate that conflicts of interests were present.

Most of the studies were written to a high standard; with a thorough method section and statistical plan and an in-depth results section. However, methodological concerns in relation to six studies meant that there was uncertainty over the validity of the conclusions as detailed in Appendix II (Becker & Gilo, 2011; Carretero-Garcia et al., 2012; Grilo & Masheb, 2002; Jaite et al., 2011; Lejonclou et al., 2014; Vaja & Lang, 2014).

The majority of the studies used validated and well researched measures. Although two studies used unvalidated questionnaires to measure abuse (Carretero-Garcia et al., 2002) and ED (Fosse & Holen, 2006). Fosse and Holen (2006) used a short inventory based on DSM-IV to assess for ED however, modifying or omitting certain questions may impact on the construct validity of the measure, and consequently the study's findings. Carretero-Garcia et al. (2002) refer to an 'ad hoc' questionnaire that they utilised to measure abuse in their non-clinical group. They do not provide any further information on this, nor do they use the same tool to measure abuse in their ED group, and this is likely to bias their research findings. With regards to the reporting on level of abuse, some studies used percentages whilst others gave mean scores making it difficult to make comparisons between studies. Of the studies that provided mean scores, there was heterogeneity in measurement further adding to the difficulties in comparing studies.

Only one study made reference to conducting a power analysis to determine the sample size that was required (Hart & Waller, 2002). Studies occasionally separated the ED group into sub-groups to perform their statistical analyses. This reduced the size of the groups, and in turn the statistical power, thus increasing the risk of making a Type 2 error.

The majority of studies did not state their response or refusal rate, and this creates uncertainty about the representativeness of the sample. For example, if potential participants knew that the study was examining the links between EDs and maltreatment, this may have led individuals who had experienced emotional abuse to be more (or less) likely to participate, thus biasing the findings. For the purpose of this review, studies that had not included this information but had recruited an acceptable sample size (of at least 112 participants) were deemed to be a representative sample.

Eight of the studies did not provide the mean Body Mass Index (BMI) for the ED group. This could be useful information as it may indicate the severity of ED. Furthermore, only two studies gave information on social economic status (SES; Kuga et al., 2006; Lejonclou et al., 2014). It would have been informative to provide information on SES as it has been found to be related to EDs, with individuals with EDs having higher SES compared to controls (Nevonen & Norring, 2004). Approximately half of the studies did not state any exclusion criteria. Four studies excluded participants who were currently engaged in an ED treatment programme (Alison, Grilo, Masheb & Stunkard, 2007; Becker & Grilo, 2011; Dunkley, Masheb & Grilo, 2010; Grilo & Masheb, 2002). As a result, these studies may not be generalisable to individuals who present to services.

Studies were almost exclusively cross-sectional (n=21) with one longitudinal study. The main limitation of cross-sectional research is that it is not able to provide information about cause and effect relationships. Nine of the 21 studies did not include a control group. Only three of the studies that used a control group matched 'controls' to the ED group. Controls were matched on sex (Kuga et al., 2006), age range (Webster & Palmer, 2000) and age range and previous psychiatric treatment (Fosse & Holen, 2006). Kuga et al. (2006) used an undergraduate control group and this may have biased the results of the study because students may not be typical of the normal population. With regards to sampling, all of the cross-sectional studies measured abuse retrospectively. Research has extensively documented how retrospective memory recall can be biased (Gary, Manning, Loftus & Sherman, 1996; Patihis et al., 2013; Roemer, Litz, Orsillo, Ehlich & Freidman, 1998; Sato & Kawahara, 2011). Furthermore, individuals suffering from AN have been shown to have cognitive deficits that can affect autobiographical memory recall (Nandrino, Doba, Lesne, Christophe & Pezard, 2006). Laporte and Guttman (2001) obtained evidence from parents to corroborate participant reports. They found that there were more inconsistencies

between parental and participant reports of abuse in the AN group compared to both the healthy control group and the Borderline Personality Disorder (BPD) group. However, it is important to note that only participants whose parent agreed to participate in the study were included. Individuals who were no longer in contact with parents or whose parent(s) were not willing to talk about past negative experiences were not represented in this study. These may be the very individuals who are most likely to have suffered abuse. As a result the actual frequency of emotional abuse in AN may be higher than found in this study. With regards to BN, Somerville, Cooper and Hackman (2007) investigated the presence and characteristics of spontaneous imagery in BN. The images described how the individual felt she would look if she became fat. They found that BN participants reported a higher frequency of images compared to 'non-dieting controls' but not 'dieting control'. There was no difference found between the groups in how often they experienced the images. Interestingly, the BN participants experienced the images as more negative and reported higher levels of anxiety compared to the other two groups. The authors suggested that the difference found in the reported emotional quality of the images may be due to the different meaning attributed to the images, for example fearing if they became fat others would reject them. These findings could be applied to BN individuals' self-reports about childhood maltreatment. It could be hypothesised that the frequency of emotional abuse in AN and BN may be comparable and that differences found in self-reports of severity of emotional abuse and emotional neglect may be due to differences in cognition (i.e. memory function and/or the meaning attributed to the maltreatment) and not a reflection of objective experiences.

Many of the studies recruited participants from the community and thus are likely to be more representative of the overall population with ED compared to solely clinic samples, this is because most individuals who suffer from ED do not enter into treatment (e.g. Welch & Fairburn, 1994). However, the use of advertisements to

recruit participants is likely to result in a selection bias as a participant's decision to participate may be correlated with traits that affect the study, making the group a non-representative sample. For example, individuals who are high in self-blame or who experience severe depression may be less likely to be motivated to participate in research. A handful of the studies recruited participants from community and mental health settings. However, they did not specify whether the two groups differed on variables of importance i.e. severity of ED, age of onset of ED symptoms etc.

The Johnson et al. (2002) cohort study was well designed and measured a range of variables that may be related to ED for example, child temperament, parental psychiatric symptoms and a range of parental maladaptive behaviours. The analyses were conducted with data from 782 families for whom information was available on childhood adversities and problems with eating or weight during adolescence or early adulthood. The young person and their mother were interviewed separately and both interviewers were blind to the responses of the other informant. The assessment was multi-modal, incorporating interviews with parents, self-report and official government information. This adds to the validity and reliability of the results. Unfortunately the authors do not comment on whether there were any losses to follow up, therefore making it difficult to determine the representativeness of the sample. Longitudinal studies are helpful in investigating the potential causes of a condition. Measuring levels of the predictor before the outcome occurs establishes the time sequences of the variables allowing us to establish cause and effect relationships (Hulley, Cummings, Browner, Grady & Newman, 2007) enabling us to take a lifespan perspective to understanding how EDs develop. However, interviews were conducted over nearly a 20 year span. In that timeframe it is likely that there was a shift in how abuse and ED was conceptualised, in addition to improved methods for investigating exposures and outcomes. This may have led to greater misclassification and impacted on the research findings.

3.3 Results of Studies

This section considers the evidence relating to EDs, emotional abuse and emotional neglect. The studies have been grouped by the nature of the comparison group used. It will then go on to summarise findings on whether emotional abuse is related to severity of symptoms and a co-morbid presentation in ED. Finally it will summarise the factors that are associated with emotional abuse and EDs.

EDs compared to healthy controls. Nine studies compared levels of maltreatment between those with EDs and healthy controls. Table 5 summarises ED diagnosis, the type of maltreatment assessed and the findings of each study.

Table 5

Studies comparing levels of emotional abuse and neglect in EDs and healthy controls

Reference	Type of maltreatment	Results
Carretero-Garcia et al. (2012)	Emotional abuse	HC < EDG (AN-P, BN-P, AN-R)
Groleau et al. (2012)	Emotional abuse	HC < BSD
Jaite et al. (2011)	Emotional abuse and emotional neglect	HC < AN-BP, HG ~ AN-R AN-BP > AN-R
Kugu et al. (2006)	Emotional abuse Emotional and physical neglect	HC < EDG (BN & BED) HC ~ EDG (BN & BED)

Laporte et al. (2001)	Verbal abuse	HC ~ AN
Lejonclou et al. (2014)	Emotional abuse	HC < EDG
Schoemaker et al. (2002)	Psychological abuse & emotional neglect	HC < BN
Vaja & Lang (2014)	Emotional abuse & negative home environment/neglect	HC < EDG (BN & AN)
Webster & Palmer (2000)	Parental indifference	HC < BN, HG < MIXED HC ~ AN
	Parental antipathy	HG ~ BN, HG ~ AN HC < MIXED
	Parental control	HC ~ BN, HG ~ AN HC~ MIXED

Note. HC = Healthy Group, EDG = Eating Disorder Group, BN = Bulimia Nervosa, AN = Anorexia Nervosa, BSD = Bulimia Spectrum Disorders

As can be seen in Table 5, four studies combined all ED diagnoses into a combined ED group (EDG) to perform statistical analysis (Carretero et al., 2012; Kuga et al., 2006; Lejonclou et al., 2014; Vaja & Lang, 2014). All of those studies found significantly higher levels of emotional abuse in the EDG. As previously discussed, Carretero's et al. (2012) findings may be susceptible to bias. Furthermore, they used a psychology undergraduate control group which may not be representative of the normal population. In addition, Lejonclou et al. (2014) used the Linkoping Youth Life Experiences Scale (LYLES; Nilsson, Gustafsson, Larsson, & Svedin, 2010a) to measure emotional abuse. This measure is about adverse childhood circumstances and trauma in general, with one question pertaining to emotional abuse, and consequently may not be sensitive enough to capture all types of emotionally abusive experiences. In addition, the study only had a 56.9% response rate and the authors did not adjust for the number of statistical tests performed. All of these issues increase the likelihood of making a Type 1 error. Two of those studies also compared levels of

emotional neglect and found significantly higher levels in the EDG compared to HG (Kuga et al., 2006; Vaja & Lang, 2014). However, Kuga et al. (2006) combined emotional and physical neglect. Not distinguishing between the two types of neglect means they were unable to investigate which one was the predictive variable. Two studies found significantly higher levels of emotional/psychological abuse in the BN/BSD group compared to the HC (Groleau et al., 2012 & Schoemaker et al., 2002). One study did not find a difference in the level of emotional abuse between AN and HC (Laporte et al., 2001). Although when the AN group was separated into sub-types, Jaite et al. (2011) found that emotional abuse and emotional neglect was significantly higher in the AN-BP group compared to the AN-R. There was no significant difference between AN-R and HC regarding maltreatment. Webster and Palmer (2000) found that the BN and MIXED group (which includes participants who fulfilled the criteria for BN and AN) reported significantly higher levels of parental indifference (this includes emotional and physical neglect) compared to the HC. With regards to parental antipathy (akin to emotional abuse), the only significant difference was between the MIXED and HC groups. No significant differences were found between AN and HC on parental indifference or antipathy. Furthermore, no significant differences were found between any of the ED groups and HC in relation to parental control (which refers to the amount of supervision, discipline and control).

EDs compared to other Axis I disorders. Three studies compared levels of emotional abuse and emotional neglect between ED and Axis I disorders. Table 6 summarises the findings.

Table 6

Studies comparing levels of emotional abuse and neglect in EDs and Axis I disorders

Reference	Type of maltreatment	Results
Fosse & Holen (2006)	Emotional neglect	PC ~ BN, PC ~ AN

		Emotional & physical abuse	PC < BN, PC ~ AN
		Father care	PC > BN, PC ~ AN
		Father overprotection	PC < BN, PC ~ AN
		Mother care	PC ~ BN, PC ~ AN
		Mother overprotection	PC ~ BN, PC ~ AN
Schoemaker et al. (2002)		Emotional neglect	BN ~ PC, BN ~ SC BN ~ DC
		Psychological abuse	BN > PC, BN > SC BN ~ DC
Webster & Palmer (2000)		Parental indifference	DEP ~ BN, DEP > AN, DEP ~ MIXED
		Parental antipathy	DEP > AN, DEP ~ BN, DEP ~ MIXED
		Parental control	DEP ~ BN, DEP > AN, DEP ~ MIXED

Note. PC = psychiatric control, DEP = depression, SC = substance use control group, DC = dual diagnosis control group

Studies did not find any significant differences between EDs and psychiatric control groups for emotional neglect, although depressed participants reported a higher level of parental indifference compared to those with AN (Webster & Palmer, 2000). Fosse et al. (2006) found that BN participants reported significantly higher levels of emotional and physical abuse. There were no significant differences between the AN group and the PC group on any of the scales. The BN group reported lower levels of paternal care and higher levels of paternal overprotection compared to the PC group. Similarly, Schoemaker et al. (2002) also found that BN reported more psychological abuse compared to psychiatric and substance use groups however, this was not true for the dual diagnosis group (which includes participants with a co-morbid substance use and a psychiatric disorder, not including BN). The depression, BN and MIXED group reported similar levels of parental antipathy however, the AN group reported significantly less parental antipathy. The depression group reported significantly more parental group in comparison to the BN, AN and MIXED group.

ED compared to Axis II disorders. One study compared levels of verbal abuse between AN and BPD (Laporte, 2001). There is no formal definition of verbal abuse, and it appears to be used interchangeably with emotional and/or psychological abuse in the literature. They found that the BPD group reported significantly more verbal abuse compared to the AN participants. Participants' parents were also interviewed to see whether reports of abuse could be confirmed. The level of agreement for verbal abuse was weakest in families of women with AN (37.5%). However there was not a significant statistical difference in reports of abuse by daughters, mothers or fathers. The AN sample only include AN-R, which means that the findings may not be generalisable to AN-B/P. The group sample sizes were small (34 in the AN group), which is not surprising as abusive parents may not agree to participate in the study and a number of individuals who were abused may no longer be on good terms with their parents. Of the 34 AN participants only 28% met full DSM criteria for AN, with the rest presenting with anorexic characteristics. Given these issues the results of this study may not be reliable.

Comparison between different EDs and EDs and other eating difficulties.

Allison et al. (2007) found no significant differences in the level of emotional abuse between BED, night-eating syndrome and an obese/overweight control group. Although they found that the BED group reported significantly more emotional neglect compared to the night-eating syndrome and the obese control group. Bardone-Cone et al. (2008) found that women with BN who had a history of AN compared to women with women with BN and no history of AN were significantly more likely to score higher on all abuse scales, including emotional abuse and emotional neglect. The former group of women also had higher levels of dietary restraint and purging and lower body mass indices.

Cohort Study. Johnson et al. (2002) investigated the relationship between childhood maltreatment and risk for developing an ED. They found that childhood

experiences of physical neglect and sexual abuse were risk factors for developing an ED during adolescence and adulthood. In addition, a number of eating and weight problems were associated with these two forms of maltreatment. Interestingly, the study highlighted the link between paternal emotional neglect and risk for developing eating pathology. They found that low paternal affection, lack of paternal communication with the child and lack of paternal time was associated with the use of medication to lose weight and fasting for a minimum of 24 hours. It is important to note that this does not necessarily indicate that these individuals have or will go on to have an ED. What's more, children who experienced three or more kinds of maladaptive paternal behaviour were three times more likely to have EDs in adolescence or adulthood. They found that many child adversities were associated with eating problems. Unfortunately, due to the small sample size the study did not have the statistical power to investigate the relationship between specific ED diagnoses and child adversities so had to focus on eating and weight problems more broadly.

Correlation Studies

Non- ED sample. Wildes, Kalarchian, Marcus, Levine and Courcoulas (2007) investigated the frequency of ED, emotional abuse and emotional neglect in bariatric surgery candidates with known psychiatric co-morbidity. The highest reported type of maltreatment was emotional abuse (50% of the sample) and 30% reported emotional neglect. They found that emotional abuse was associated with mood and anxiety disorders, whereas emotional neglect was only associated with mood disorders. Surprisingly, they did not find a specific relationship between emotional abuse, emotional neglect and ED. However it may be difficult to assess for an ED in a severely overweight sample.

Do people with EDs and a history of emotional abuse show more severe symptoms or more co-morbidity than those with EDs but no history of emotional abuse?

Only five studies examined whether emotional abuse was associated with severity of eating pathology or psychiatric co-morbidity. Hartt and Waller (2002) found no significant relationship between severity of reported abuse and severity of bulimic pathology. They found that severity of neglect (which they defined as experiences of feeling unwanted, unsupported, lonely or left to take care of oneself) and sexual abuse was significantly associated with severity of dissociation whereas, emotional abuse was not associated with dissociation. On the other hand, Wonderlich et al. (2007) found that emotional abuse was associated with more severe ED pathology as measured by the EDE global score even when controlling for the effects of the other types of abuse.

Two studies investigated co-morbidity in BED samples. Grilo and Masheb (2001) found that emotional abuse was significantly associated with higher scores on the Beck Depression Inventory (BDI) therefore, suggesting that participants with BED and a history of emotional abuse were more likely to have co-morbid depression. Becker and Grilo (2011) did not observe any associations between any of the maltreatment types and BDI scores in a BED sample but they did find that emotional abuse was associated with dysthymic disorder. Therefore, suggesting that participants with BED and a history of emotional abuse may be more likely to also be diagnosed with dysthymic disorder. Wonderlich et al. (2007) found that all types of maltreatment were significantly associated with a greater likelihood of a lifetime anxiety disorder in a BN sample. In this study no one form of maltreatment reached statistical significance independently. This suggests that experiencing any type of childhood maltreatment increased the risk of having a co-morbid anxiety presentation.

In relation to Axis II disorders, one study found that 30.2% of BED participants were co-morbid for a Personality Disorder. The co-morbid group were more likely to report clinically significant levels of emotional abuse compared to BED participants without a personality disorder. Similarly, they reported significantly higher CTQ dimensional emotional abuse scores (Grilo & Masheb, 2002). The most common category was Cluster C, with Avoidant PD being the most frequent diagnosis. Emotional, physical and sexual abuse was found to be associated with elevated BPD in participants with BN (Wonderlich et al., 2007). Research has found that individuals who experience emotional abuse and emotional neglect are significantly more likely to be diagnosed with a personality disorder in adulthood (Hengartner, Ajdacic-Gross, Rodgers, Muller & Rossler, 2013). Therefore, it could be suggested that the difference found between ED participants with and without a personality disorder could be due to the relationship between childhood maltreatment and personality disorders. More research is needed to shed light on the relationship between ED, personality disorder and maltreatment, and the factors that are linked to co-morbidity.

What are the factors associated with childhood emotional abuse and EDs?

Factors that may explain how emotional abuse causes ED. Research has been conducted to explore the cognitive profile of participants with ED. Research findings suggest that severity of emotional abuse is significantly associated with certain core beliefs; mistrust/abuse, defectiveness/shame, vulnerability to harm and emotional inhibition (Hart & Waller, 2002). The Defectiveness/Shame schema (the belief that one is inwardly defective, shameful or unlovable), is likely to develop if parents are critical and make their child feel unworthy (Young, 1994). Dunkley et al. (2010) found that the relationship between emotional abuse and both depressive symptoms and body dissatisfaction were fully mediated by the presence of a self-critical personality style in a BED sample. This was superior to a competing model

using low self-esteem as a mediating variable. On the other hand, emotional abuse and emotional neglect have been found to be significantly associated with low self-esteem in ED samples (Grilo & Masheb, 2001 & Becker & Grilo, 2011). Groleau et al. (2012) conducted a mediation analysis to investigate the relationship between emotional abuse and bulimic spectrum disorder. They found that overall severity of ED i.e. total EAT-26 scores, and EAT-26 dieting scores could be explained by ineffectiveness i.e. global self-esteem. Likewise, they found that EAT-26 oral control scores were mediated by affective instability. They did not find perfectionism to be correlated with emotional abuse. Racine and Wildes (2015) also found that emotional dysregulation mediated the relationship between emotional abuse and AN. Furthermore, they found that this relationship was significantly larger than the sexual abuse-emotion dysregulation relationship. This effect was found to be consistent across AN-R and AN-BP sub-types. Two other studies included in this review have stressed the importance of emotional regulation in the relationship between emotional abuse and the later development of an ED. Emotional abuse was significantly associated with higher variability in anger-hostility ratings and higher levels of negative affect (Wonderlich et al., 2007). Furthermore, in an ED sample the participants who scored higher on the Difficulties with Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) also reported a negative home environment and more emotional abuse (Vaja & Lang, 2014).

Factors that may affect the direction or strength of the relationship between emotional abuse and ED. Groleau et al. (2012) examined whether the presence of dopaminergic genes contribute to the risk of developing a bulimic spectrum disorder. They found that the presence of dopaminergic genes did not interact with the relationship between emotional abuse and bulimic spectrum disorders. In particular, there was no interaction found between dopaminergic genes and abuse for affect instability, impulsivity, compulsivity or average binge frequency.

Age of dieting onset has been found to have a negative relationship with emotional neglect in a BED sample. Therefore, individuals who started dieting at a younger age reported more emotional neglect. However, obesity onset did not have an effect on the relationship between ED and abuse (Becker & Grilo, 2011). Grilo and Masheb (2001) also found no significant differences in any form of maltreatment by gender or obesity. Therefore, gender and obesity were not found to influence the relationship between ED and emotional abuse or emotional neglect. Furthermore, no type of maltreatment was associated with age of initially becoming overweight, age of onset of binge eating or age of diagnosis in a BED sample (Grilo & Masheb, 2001). In BN, experiencing multiple abuse i.e. two or more forms of abuse, was related to a more complex bulimic presentation. The authors found that this relationship was mainly driven by psychological abuse (Schoemaker et al., 2002). This would suggest that psychological abuse had more of an effect on the complexity of the BN presentation compared to other types of abuse.

4.0 Discussion

The aim of this literature review was to establish the current evidence base for the relationship between emotional abuse and emotional neglect and the development of ED in adolescence and adulthood. The review considered whether emotional abuse impacted on the severity of ED and whether it contributed to co-morbidity. The review then considered which factors may account for the relationship and which may contribute to it. Research findings are mixed with regards to whether there is a relationship between emotional abuse, emotional neglect and the development of EDs. The findings of studies comparing ED to healthy controls suggest that emotional abuse and emotional neglect is related to the development of BN, BED and AN-BP but not AN-R. This could imply a specific relationship between emotional abuse and emotional neglect and problems with bingeing and/or purging.

However, the findings were mixed when comparing BN to psychiatric controls, and there were no significant differences found between AN and psychiatric controls in levels of emotional abuse and emotional neglect reported. Furthermore, in non-ED samples there was no direct relationship found between emotional abuse and ED. Although there is some evidence supporting the relationship between emotional abuse and the development of an ED there is a lack of specificity, with research findings suggesting that participants with BN are similar to participants with other Axis I disorders in terms of levels of emotional abuse and emotional neglect. These mixed findings indicate that childhood emotional abuse may be a risk factor for experiencing a range of psychiatric difficulties, including ED. This further supports Egeland's (1997) findings that early experiences of maltreatment can result in a number of clinical outcomes. Furthermore, it adds weight to Briere and Scott's (2007) claim that the relationship may not be a linear one and their emphasis on the importance of other variables. Thus, we need to illuminate the developmental pathway for ED following childhood emotional abuse.

Researchers have recently attempted to determine the pathway to the development of an ED when an individual is exposed to emotional abuse and/ or emotional neglect. There is some evidence to support the hypothesis of Kent and Waller (2000) about the mediating role of self-esteem and body dissatisfaction. On the other hand, self-esteem may be too global a construct, but rather a self-critical personality style or specific core beliefs related to low self-esteem may be more important. Research highlights the probable role of emotional dysregulation in mediating the relationship. The Dialectical Behaviour Therapy model (DBT; Linehan, 1993a and 1993b) can help us to understand this relationship. The theory states that emotional abuse and emotional neglect result in invalidating environments. A child's emotional responses may be ignored or ridiculed. This may result in a child not being able to regulate their own emotions and self soothe. Beliefs may form about negative

emotions being “bad” or “wrong” and the individual may experience self-critical thoughts and low self-esteem due to their inability to manage their emotions, in addition to developing emotionally avoidant coping strategies. It has been proposed that binge eating is a means of escaping from unpleasant thoughts and emotions (Heatherton & Baumeister, 1991). There is promising evidence for the effectiveness of DBT in the treatment of EDs (Chen, Matthews, Allen, Kuo & Linehan, 2008; Safer, Telch & Agras, 2001; Telch, Agras, Stewart & Linehan, 2001 & Telch, Agras & Linehan, 2000).

Most of the research into the development of eating psychopathology and parental relationships has focused on the importance of the mother-daughter relationship (Birch, Fisher & Davison, 2003; Francis & Birch, 2005; Likerian, 1997; Marsden, 1997). However, there is some evidence that maladaptive paternal behaviour is more closely linked to ED symptoms compared with maladaptive maternal behaviour (Johnson et al., 2002). This is an interesting finding, and will require further research to understand this association.

Overall there has been a lack of research into moderating variables i.e. factors that affect the strength and/or direction of the relationship. Schoemaker et al. (2002) emphasised the role of multiple abusive experiences in contributing to co-morbidity in BN. Participants with BN, an additional Axis I psychiatric disorder (i.e. a mood disorder, anxiety disorder or schizophrenia) and a substance use disorder had the highest rate of psychological abuse and multiple abuse. An individual may turn to substances as a means of coping with anxiety or depression (Kassel, 2010), with this behaviour in the short term being negatively reinforcing for instance, a reduction in negative emotions. It is not surprising that avoidant personality disorder was the most common personality disorder found in the BED sample. Avoidant personality disorder is characterised by longstanding feelings of inadequacy, hyper-sensitivity to rejection and avoidance of social situations (American Psychiatric Association, 2013). All of the

co-morbid disorders, including EDs can be seen as an individual's attempt to cope with or avoid the negative emotions associated with the emotional abuse and/or emotional neglect they experienced in childhood.

Given current pressures to treat patients quickly and the time constraints imposed on therapy, clinicians may not fully explore experiences of childhood abuse. However, the findings of this review would suggest that it is important that clinicians take a comprehensive childhood history, and assess for history of emotional abuse and emotional neglect to inform a psychological problem formulation. Helping patients' to understand how earlier life experiences have contributed to their self-concept and ways of managing difficulties in the present is likely to empower them to overcome their mental health difficulties.

In recent years the treatment of choice for BN has been Cognitive Behavioural Therapy (CBT; Health and Clinical Excellence, 2004 & Wilson, Grilo & Vitousek, 2007). However, only 30-50% of people with BN who receive CBT recover i.e. cease bingeing and purging (Wilson & Fairburn, 2007). This suggests that how we conceptualise and treat BN requires some refining. The CBT model has been extended to include additional maintaining processes that may interact with the ED and present additional obstacles to change (CBT-E; Fairburn, Cooper & Shafran 2008). The hypothesised maintaining processes include; clinical perfectionism, low self-esteem, mood intolerance and interpersonal difficulties (Fairburn et al., 2008). This supports the findings of the current review, and suggests that therapy should focus on the psychological processes that can be related to the underlying causes and maintaining factors for the ED, and not simply focus on reducing ED symptoms. The findings of this review propose that tackling a self-critical attitude and challenging negative core beliefs may also be a target for treatment. Furthermore, given the proposed role of emotion dysregulation in mediating the relationship, clinicians should assess patients' current repertoire of strategies to manage negative emotions and if

required consider a modified version of DBT (Safer, Telch & Chen, 2009) for the treatment of BN and BED.

4.1 Limitations of Current Evidence

As previously noted, research into emotional abuse and emotional neglect and EDs is still in its infancy, and although increasing, the current evidence base still remains scarce and with mixed findings. All but one of the studies used a cross-sectional design and retrospective self-report measures to investigate the relationship. The difficulties with this approach have been documented in the review. Longitudinal studies are needed to investigate more thoroughly the relationship between emotional abuse and the development of ED, and disentangle the processes involved. However longitudinal studies are very costly, and often suffer from significant attrition rates. The vast majority of the studies simply focused on initial analyses looking at the frequencies of abuse in their sample and did not attempt to shed light on possible mediating and/or moderating variables that may be implicated in the relationship. A few studies did attempt to explore variables that may be related to emotional abuse, emotional neglect and ED, although only three of the studies used mediation analysis (Dunkley et al, 2010; Groleau et al., 2012 & Racine & Wildes, 2012).

The studies mainly used Caucasian females which limits how generalisable the findings are to non-whites and men. Over the past few years, there has been increasing evidence of disordered eating amongst men and ethnic minorities and further research needs to be conducted to investigate whether the relationship between emotional abuse and emotional neglect is similar to that found in Caucasians and females, and whether the same proposed processes underpin this relationship.

Most studies that employed a psychiatric control group did not specify the actual diagnoses in the group making comparisons between the studies difficult. Given the

observed non-specificity between childhood maltreatment and clinical outcomes, it would be recommended that studies specify the mental health diagnoses included in their 'psychiatric control' group to enable comparisons to be made between Axis I disorders. This would help shed light on the individual pathways from emotional abuse and emotional neglect to the different mental health diagnoses. Additionally, further investigation into the relationship between various mental health diagnoses may help with classification and treatment models.

4.2 Limitations of the Review

This review focused on experiences of parental emotional abuse and emotional neglect and did not include studies of bullying. Research suggests that there is a relationship between bullying by peers about appearance and ED pathology (Sweetingham & Waller, 2007). Due to these restrictions this review may have missed out on some interesting findings.

A strength of the review was that a systematic approach was applied at every stage. Thorough assessment of identified articles against the inclusion and exclusion criteria was carried out, but by the primary author alone. This also applies to the quality rating assessment. An independent quality checker would have been desirable but was not feasible given the scope of this review. The reference lists were searched for the articles that passed the initial exclusion criteria ($n = 62$). However, it was not feasible to carry out an exhaustive search of the full text of excluded articles. These issues may have resulted in a small number of relevant studies being missed.

Solomon and Young's (2009) assessment tool was used to evaluate the methodological quality of the studies included in this review. Using a structured tool ensures that the evaluation is standardised however, the author alone rated the studies and made a judgement on how individual items were rated (e.g. what constituted a score of 0, 0.5 and 1 for whether the study methodology addressed the

most important potential sources of bias) and what score each study obtained. The lack of an independent quality rater is likely to reduce the reliability of the results. Giving studies a final composite score can be a useful way of categorising studies and aiding communication between researchers, however again the lack of an independent rater is likely to be problematic.

4.3 Suggestions for Future Research

It is clear that further research is needed in this area. Firstly, it will be important to replicate the research findings included in this review with different populations for example, ethnic minorities, men and the Lesbian, Gay, Bisexual and Transgendered community (LGBT) as these populations are underrepresented in ED research and research in general. The relationship between emotional abuse and emotional neglect is not a straightforward one, so future research should continue to focus on illuminating potential moderating and mediating variables. In particular, it would be informative for research to focus on neuro-circuitry and genetics and their interaction with childhood maltreatment. Neuroscience perspectives suggest that the overwhelming stress of childhood maltreatment is associated with changes in biological stress systems (Twardosz & Lutzker, 2010). This is interesting as these are the main systems implicated in anxiety, mood and impulse control disorders. These biological systems significantly influence cognitive and physical development, and emotional and behavioural regulation (De Bellis, 2001). Incorporating a developmental psychopathology perspective in EDs would allow for the development of theories about neuropsychological, social and psychological influences on the pathway linking emotional abuse and emotional neglect to EDs. Furthermore, additional research using community samples is needed to shed light on possible resilience factors to further our understanding of why some individuals who experience childhood maltreatment do not go on to develop mental health problems later in life. Collishaw et al. (2007) conducted a prospective population based study

spanning 30 years. They found that a substantial minority of abused individuals reported no mental health problems in adult life. They found that resilience was related to a number of factors, including perceived parental care, adolescent peer relationships, the quality of adult love relationships, and personality style. It would be informative to conduct similar studies focusing on EDs in particular to elucidate factors that protect from EDs. Some protective factors may be amenable to external manipulation and may possibly be a focus for psychosocial interventions for example, school based peer support groups. It is recommended that future research attempts to assess emotional abuse using a multi-method approach, incorporating self-report, official records (where possible), structured observation (more applicable to longitudinal studies) and informant reports. This would be particularly important given the tendency of individuals with AN to under report experiences of maltreatment.

5.0 Conclusions

The current systematic literature review provides some support for the relationship between the experience of emotional abuse and/or emotional neglect in childhood, and the development of ED in adolescence or adulthood. However, findings indicate that it is not a specific relationship but rather childhood maltreatment may be a risk factor for psychopathology in general, rather than being specific to ED. Research into mediating and moderating factors that may account for the reasons why individuals develop ED following emotional abuse is still in their infancy. However, there is some evidence for the role of specific psychological factors such as, self-esteem, a critical personality style, particular core beliefs and deficits in emotional regulation. These psychological processes may underlie the relationship and should also be a target in the treatment of EDs. Further research is required to add richness to the current evidence base with the aim of developing treatments and preventative initiatives for this client group.

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**Part 2: Empirical Paper - A Multiple Single Case
Design Study of Dialectical Behaviour Therapy Skills
Groups for Bulimia Nervosa: Are they associated with
an increase in Mindfulness and Acceptance?**

Abstract

Aims: Dialectical Behaviour Therapy (DBT) has proven to be a promising treatment for bulimia nervosa (BN). However, currently we have limited knowledge about the mechanisms of change. Previous research suggests that improvements in mindfulness and acceptance are related to improvements in BN symptoms. This study investigated whether DBT skills groups for BN were associated with an increase in mindfulness and acceptance in women with BN. It also examined whether changes in mindfulness and acceptance were associated with changes in bingeing and overall eating pathology. Furthermore, it also examined whether changes in mindfulness, acceptance and bingeing were associated with changes in the Emotional Eating Scale (EES).

Method: The study employed a multiple single case design reporting on 15 participants who attended a 12 week DBT skills group for BN. Participants completed outcome measures at assessment, session three, six, nine and 12. Data was also collected at one month follow up. The study employed a reliable and clinical change methodology to analyse the impact of the DBT intervention on mindfulness and acceptance.

Results: Attending the group was associated with improvements in mindfulness for all except one of the participants although the patterns of change were idiosyncratic. Furthermore, group attendance was associated with improvements in acceptance for over half of the participants. There was an association between changes in mindfulness, acceptance and eating pathology/bingeing although this was not consistent. On the whole, a decrease in emotional eating was associated with a reduction in bingeing and an increase in acceptance.

Conclusion: This study provides preliminary evidence that DBT skills groups for BN are associated with improvements in mindfulness and acceptance, although the latter

may be less responsive to change in a brief intervention. The findings suggest that there may be an association between changes in mindfulness and acceptance, and eating pathology: however, the relationship appears to be complex and requires further research.

1.0 Introduction

Bulimia nervosa (BN) is defined in the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-V; American Psychiatric Association, 2013) as being characterised by recurrent episodes of eating significantly more food in a short period of time than most people would eat under similar circumstances, with episodes accompanied with a loss of control. This is then followed by a compensatory behaviour to avoid gaining weight such as, self-induced vomiting, laxatives, fasting or over-exercise.

Cognitive Behavioural Therapy (CBT) is recommended as the treatment of choice (National Institute of Health and Clinical Excellence, 2004; Shapiro et al., 2007; Wilson, Grilo & Vitousek, 2007) with a suggested alternative to CBT being Interpersonal Psychotherapy (Agras et al., 2000; Fairburn, Jones, Peveler, Hope & O'Connor, 1993; NICE, 2004). Despite CBT being an effective treatment, only around 50% of patients cease binge eating and purging following treatment (Wilson, Fairburn & Agras, 1997). It has been suggested that current treatments have had limited success due to the lack of focus on learning how to change the individual's relationship to disordered eating thoughts and urges, in addition to learning to accept the presence of distressing thoughts and feelings (Jurascio et al., 2013).

1.1 Definition of Mindfulness

There are a number of different definitions of mindfulness however, the one that is most commonly cited is by Kabat-Zinn (1994) who proposed that it is "*paying attention in a particular way, on purpose, in the present moment, and non-judgementally*" (p.4). In Clinical Psychology current conceptualisations of mindfulness include two primary and essential elements of *being aware of one's moment to moment experience, and doing this non-judgementally with acceptance* (Keng, Smoski & Robins, 2011).

1.2 Definition of Experiential Avoidance, Acceptance and Psychological Flexibility

In Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, Wilson, 1999) 'experiential avoidance' has been defined as the unwillingness to remain in contact with aversive private experiences, in addition to taking action to avoid and/or change them (Hayes, Wilson, Gifford, Follette & Strosahl, 1996). In particular, 'emotional eating' has been defined as eating in response to negative emotions and can be viewed as a form of experiential avoidance. Acceptance can be understood as the willingness to experience aversive or unwanted private events in the service of pursuing one's values and goals (Hayes et al., 1999). Hayes et al. (2006) expanded on this, to incorporate the ability to fully contact the present moment, and the thoughts and feelings it contains without defence, and termed this 'psychological flexibility'.

1.3 Mindfulness, Acceptance and Disordered Eating

Levin, Dalrymple, Himes and Zimmerman (2014) examined differences in mindfulness facet scores between patients with and without a history of engaging in problematic eating patterns in an obese sample seeking bariatric surgery. They found that patients with a history of problematic eating behaviours tended to be lower on acting with awareness and non-judgemental facets. However, when controlling for all other facets of mindfulness, as well as depression, acting with awareness was the only consistent mindfulness facet related to binge and emotional eating (Levin et al., 2014). Lack of awareness may result in individuals eating mindlessly, and hence lead to episodes of overeating or bingeing.

It has been theorised that binge eating is motivated by a desire to escape from self-awareness (Heatherton & Baumeister, 1991). Heatherton and Baumeister (1991) proposed that individuals who binge eat have high standards and expectations for themselves, and are sensitive to the (perceived) demands of others. When they fall short of these standards, they develop an aversive pattern of high self-awareness.

They suggested that bingeing enables the individual to escape the unpleasant emotions and cognitions associated with this self-awareness. Research findings have demonstrated that individuals suffering from eating disorders (EDs) tend to score higher than clinical and non-clinical populations on measures of experiential avoidance and tend to struggle to accept negative emotional experiences (Wildes, Ringham & Marcus, 2010).

Lavender, Jardin and Anderson (2009) examined the relationship between BN symptoms, mindfulness and thought suppression in undergraduate men and women using regression analyses. They found that mindfulness and thought suppression (i.e. when an individual consciously attempts to stop thinking an unwanted thought) were able to significantly predict BN symptoms, although thought suppression was found to account for a greater percentage of the variance for men and women. This further adds to the evidence that non-acceptance and avoidance of internal experiences plays a substantial role in the development and/or maintenance of EDs.

Research findings suggest that individuals with EDs experience a deficit in interoceptive awareness i.e. uncertainty about what somatic and emotional states they are experiencing, and fear or guilt regarding their affective experience (Sim & Zeeman, 2004). Merwin, Zucker, Lacey and Elliot (2010) conducted a study with 50 participants with EDs to establish whether lack of emotional clarity and non-acceptance were differentially related to ED symptomology. They found that non-acceptance of affective responses, not lack of emotional clarity, predicted dietary restraint scores, above and beyond body mass index (BMI), age or illness duration. This would suggest that greater attention to and acceptance of internal experiences and the ability to maintain behavioural control and unattached to inner experiences during times of distress are associated with lower levels of eating pathology (Lavender, Gratz & Tull, 2011).

Juarscio et al. (2013) investigated whether treatment as usual (TAU) plus additional ACT group sessions could produce larger reductions in disordered eating compared to TAU alone in an inpatient eating disordered sample. They found that patients in the ACT condition experienced slightly greater improvements in eating pathology compared to patients in the TAU condition, although the authors stated that these results were only trended towards significance. There was also a trend towards a greater increase in psychological flexibility (as measured by the Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011) in the ACT group. Although the effect is relatively small, it is notable that the addition of a small number of ACT group sessions showed a consistent pattern of reduced eating pathology and greater willingness to eat food that causes distress. This illustrates that a relatively low dosage of ACT can create small but consistent improvements in eating pathology above and beyond the effects of a full inpatient treatment program suggesting the possibility of a full intervention focusing on increasing acceptance.

Mindfulness skills can be taught to counteract the tendency to use binge eating to avoid emotional awareness, as they emphasise non-judgemental and sustained awareness of emotional states as they occur in the present moment, without reacting to them behaviourally (Kristeller, Baer & Quillian-Wolever, 2006). Preliminary findings show that mindfulness-based CBT for disordered eating decreases the number of binge episodes and reduces emotional eating in patients with clinical and subclinical Binge Eating Disorder (BED) (Baer, Fischer & Huss, 2005). A second study showed that this treatment also reduced food cravings, dichotomous thinking, and bodily dissatisfaction compared to a wait list control in an eating disordered sample (Alberts, Thewissen & Raes, 2012). Furthermore, participants in both studies showed a moderate increase in mindfulness. This provides evidence that mindfulness interventions may lead to improvements in eating pathology and tentative evidence that these are linked to improving mindfulness skills.

Research findings would suggest that interventions focusing on acceptance and mindfulness, such as the 'third generation' of CBT interventions improve psychological flexibility i.e. diffusion from thoughts and emotions. One such approach is Dialectical Behaviour Therapy (DBT; Linehan, 1993a, 1993b). The current study will investigate changes in mindfulness following a DBT skills group for BN.

1.4 Dialectical Behaviour Therapy, Borderline Personality Disorder and Mindfulness

DBT teaches clients new, more functional ways to modulate their emotional experience (Linehan, 1993a, 1993b). It consists of four different modules; mindfulness, emotional regulation, distress tolerance and interpersonal effectiveness, with additional weekly mindfulness practice at the start of all sessions.

DBT is an empirically validated treatment for Borderline Personality Disorder (BPD; Linehan, 1993a, 1993b). It is based on an affect regulation model and conceptualises maladaptive behaviours, such as intentional self-harm and anger outbursts as dysfunctional attempts to reduce negative emotions. Mindfulness has been significantly negatively correlated with BPD features such as, self-harm, binge eating and drug use in a psychiatric sample (Wupperman, Fickling, Klemanski, Berking & Whitman, 2013). Therefore, lower levels of mindfulness are associated with elevated BPD behaviours. Furthermore, the relationship between BPD features and acts of self-injury and acts of harmful dysregulated behaviour were both mediated by deficits in mindfulness (Wupperman et al., 2013). If binge eating can be conceptualised as similar to dysregulated behaviour in BPD, it could be suggested that associations between affect dysregulation and bingeing might also be mediated by mindfulness.

Perroud, Nicastro, Jermann and Huguelet (2012) investigated changes in mindfulness using the five facet mindfulness questionnaire (FFMQ; Baer et al., 2006)

in a BPD sample receiving a one year DBT treatment which included four weeks of intensive-DBT (I-DBT) at the start. The study found no significant increase in awareness, however there was a significant increase in accepting without judgement, but this was mainly accounted for by the time spent in standard DBT and was not significant for I-DBT (Perroud et al., 2012). Therefore, DBT was shown to improve participants' ability to be open to their internal experience without judging it however, this study suggested that improvements in mindfulness were associated with a longer term DBT intervention.

1.5 Aims of the current study

It has been proposed that the binge eating pattern seen in BN delivers temporary relief from negative affect in the same way that impulsive behaviours act in BPD (Telch, 1997). The affect regulation model of EDs emphasises the relationship between emotional distress and disordered eating. This model states that behaviour such as, binge eating and purging are maladaptive strategies used to decrease or avoid unpleasant affective and/or cognitive experiences (Safer, Telch & Chen, 2009). DBT has proven to be a promising treatment for BN (Chen, Matthews, Allen, Kuo & Linehan, 2008 & Safer, Telch & Agras 2001) However, we have little knowledge of why or how it works. It could be proposed that an increase in mindfulness and acceptance is related to improvements in bulimic symptoms such as bingeing. The primary goal of this study was to conduct a series of case studies investigating whether a 12 week DBT skills group increased mindfulness and acceptance for adult women with BN. The research questions that this study aimed to answer were:

- 1) Are DBT skills groups associated with an increase in facets of mindfulness and acceptance in individuals with BN? If so, what is the pattern of change?
- 2) Are changes in mindfulness and acceptance associated with changes in bingeing behaviour and overall eating pathology?

- 3) Are changes in mindfulness, acceptance and bingeing behaviour associated with changes in emotional eating?

2.0 Method

2.1 A Joint Project

A joint study was conducted with Anna Hall, Trainee Clinical Psychologist at UCL. Hall (2015) evaluated whether a 12 week DBT skills group was a feasible intervention for individuals suffering from BN, focusing on a number of clinical, functional and cost outcomes. Hall (2015) also investigated participants' views in relation to the feasibility of the intervention. See Appendix III for details on joint working.

2.2 Design of the Current Study

A multiple-single case series design was used, with three separate phases. This included a baseline time point, intervention and a one month follow up (FU) phase. Data was collected at four time points during the intervention with each participant acting as their own control. Baseline data was collected from participants between one and four weeks before the intervention took place. Using too few time intervals would make it difficult to demonstrate the existence or lack of an effect. Therefore, participants were included in the analysis if a minimum of two time points were collected during the intervention in addition to FU data. Data for participants not included in the analysis is included in Appendix IV. Consequently, 15 individuals were included in the analysis.

2.3 Setting

Data collection took place on three separate sites. Two of the sites were located in a NHS Foundation Trust based in outer London. One of the sites was a

specialist Personality Disorder Service, whilst the other was a specialist ED service. Due to recruitment difficulties, four months into the study, a university site was included as a third research site. In total three DBT groups were conducted with two of those being run in NHS settings and one taking place at the university.

2.4 Inclusion and Exclusion Criteria

The inclusion criteria for the study were:

- 1) Female
- 2) Aged 18 years and older
- 3) Met DSM-5 (American Psychiatric Association, 2013) criteria for a diagnosis of BN (bingeing and purging at least once a week for a period of three months or more; self-evaluation unduly influenced by concerns about weight/shape; a sense of lack of control over eating)
- 4) A Body Mass Index (BMI) greater than 18

Exclusion criteria included individuals with current psychosis, a moderate or severe learning disability, or if there was a known organic cause of their ED (e.g. head injury). If an individual was unable to communicate in the English language to a conversational level they were excluded from the study.

2.5 Recruitment

NHS recruitment

The researchers screened patients on the ED Service and Personality Disorder Service treatment waiting lists and telephoned patients who were deemed eligible. Furthermore, clinicians based at the research sites identified suitable patients on their caseload and referred them to the study.

The researchers contacted all of the General Practices, IAPT and psychology services in the four boroughs covered by the NHS trust where the study took place. An email was sent detailing information about the study (including a therapist information sheet; see Appendix V), and requesting that they give a participant information sheet (PIS; see Appendix VI) to all of the patients on their caseloads whom they thought may be suitable for the study.

University Recruitment

Student Psychological Services and Disabilities Services, in addition to Student Minds (which ran an ED support group at the university) were sent an email notifying them of the study and requesting that they inform all suitable students. Students also self-referred after seeing a poster (see Appendix VII) on campus. Please see Figure 1 for a flow chart of the recruitment process.

2.6 Procedure

Once an individual had been identified as potentially suitable for the study by one of the primary researchers, a referring clinician or by the individual self-referring (as was the case for the university students), one of the researchers contacted them via telephone or email to provide them with information on the study and answer any questions. The potential participant was then sent the PIS which provided more comprehensive information about the study and given at least 24 hours to decide whether they wished to participate. Following this, a face to face assessment was arranged. At assessment, the study was again fully explained, along with confidentiality and risk. If the individual still wished to participate in the study they were given the study consent form to sign (see Appendix VIII). Following this, a clinical interview was conducted to confirm the individual's suitability for the study. Once the individual's eligibility had been confirmed they were asked to complete the study measures. Participants were then offered a place in a DBT group with NHS

participants attending a group on NHS premises and student participants attending a group at the university site.

Ethical Approval

Ethical approval was granted by NRES Committee London – Bloomsbury (ref: 14/LO/0672; Appendix VIII).

Outcome Measures

Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994). The EDE-Q is a 41-item measure based directly on the Eating Disorder Examination (EDE: Fairburn & Cooper, 1993) which assesses ED pathology over the last 28 days. It includes four sub-scales: restraint, weight concern, shape concern and eating concern. The findings from a systematic review into the psychometric properties of the EDE-Q suggest that its subscales have good internal consistency, with alphas ranging from 0.70 to 0.93. Furthermore, across studies the test-retest correlations ranged from 0.66 to 0.94 for scores on the four subscales and from 0.51 to 0.92 for the behaviour frequency items (Berg, Peterson, Frazier & Crow, 2012). The EDE-Q was used to measure the severity of ED pathology. This was completed at baseline and FU. Responses to two question from the EDE-Q were collected weekly during treatment (i.e. over the past week how many times have you eaten an unusually large amount of food and made yourself sick, taken laxatives or exercised in a driven way as a means of controlling your weight or

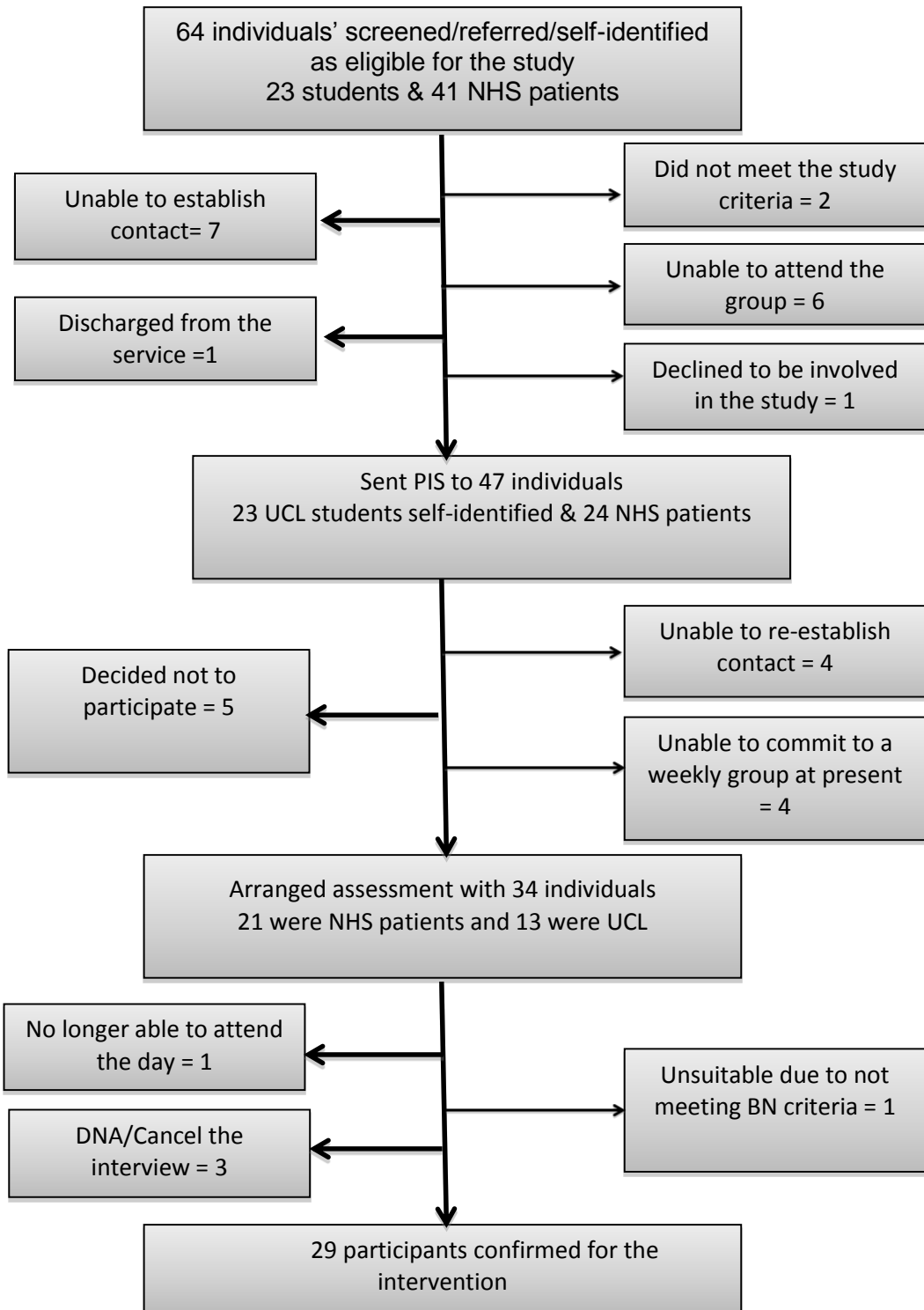


Figure 1. Flowchart of the recruitment process.

shape?). Only data from baseline, sessions three, six, nine and 12 and FU were used for this study.

The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006). Baer et al. (2006) found that the FFMQ demonstrated adequate to good internal consistency with alpha coefficients ranging from 0.75 to 0.91. There are 39 questions and items are rated on a five point Likert type scale ranging from 1 (never or rarely true) to 5 (very often or always true). The FFMQ is based on a factor analytic study of five independently developed mindfulness questionnaires. The analysis suggested that mindfulness was a multifactorial five factor construct and yielded five factors that appeared to represent elements of mindfulness as it is currently conceptualised. The five facets (factors) identified were observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience. Each facet has eight items apart from non-reactivity which has seven items. The FFMQ is considered to measure mindfulness skills through these subscales. Higher mindfulness scores indicate greater mindfulness skills, and lower scores indicate poorer mindfulness skills. This measure provided baseline comparison data and change over time data for the impact of DBT on mindfulness. This was completed at baseline, sessions three, six, nine and 12 and at one month FU. See table 1 for a detailed description of the FFMQ including example items.

The Acceptance and Action Questionnaire (AAQ-II; Bond et al., 2011). The AAQ-II is the second version of the Acceptance and Action questionnaire developed by Hayes et al. (2004) to assess experiential avoidance and psychological inflexibility. The AAQ-II is a Likert style scale, which contains 10 questions that runs from 1 (never true) to 7 (always true). Scores ranged from 0-70 with higher scores indicating greater levels of acceptance. Bond et al. (2011) tested its validity and reliability and found a good internal consistency with an alpha coefficient of 0.84 and good test-retest reliability at three months and 12 months with 0.81 and 0.79 respectively. They also investigated the construct validity of the AAQ-II and found that higher levels of

experiential avoidance were correlated with theoretical expected outcomes such as, greater depressive symptoms (Beck Depression Inventory-Second Edition; BDI-II; Beck, Steer & Brown, 1996), more anxiety related symptoms (Beck Anxiety Inventory; BAI; Beck & Steer, 1993), stress and overall psychological distress. The AAQ-II was completed at baseline, sessions three, six, nine and 12, and at one month FU.

Table 1

Description of the mindfulness facets in the Five Facet Mindfulness Questionnaire

Mindfulness Facet	Description	Example of an item question	Score range*
Observe	Noticing or attending to internal or external experiences e.g. sensations, emotions	When I am walking, I deliberately notice the sensations of my body moving	0-40
Describe	Labelling internal experiences with words	I'm good at finding the words to describe my feelings	0-40
Awareness	Attending to one's activities in the present moment	I am easily distracted	0-40
Non-judge	Taking a non-evaluative stance towards thoughts and feelings	I criticise myself for having irrational or inappropriate emotions	0-40
Non-react	Allowing thoughts and feelings to come and go, without getting caught up or carried away by them	I watch my feelings without getting lost in them	0-35

*Score range: higher scores indicate greater mindfulness

Emotional Eating Scale (EES; Arnow, Kenardy & Agras, 1995). The EES is a 25-item questionnaire that measures the extent to which negative emotional states trigger an urge to eat. The authors found that coefficient alpha was .81 indicating acceptable internal consistency, as a result the scale composite score was

used to analyse individual changes in emotional eating. Scores range from 0-100, with lower scores suggesting less emotional eating. This scale was completed at baseline, weekly during the intervention and at FU however, only data from baseline, sessions three, six, nine, 12 and FU were used for this study.

Treatment protocol

Practicalities

Three DBT skills groups were conducted for the study. Two groups were run in the evening (one at UCL and another one in NHS premises), with one being run in the afternoon.

The initial group was run by the external supervisor (the Clinical Lead at the Personality Disorder Service), with the researchers co-facilitating. The second group was run in the NHS with one of the researchers and a Counselling Psychologist (working at the ED site) co-facilitating. The second researcher ran the third group at UCL with another trainee clinical psychologist (UCL) co-facilitating. Both of the co-facilitators had experience working with BN and were familiar with DBT. Supervision was provided regularly throughout the study by the Clinical Lead at the Personality Disorder Service who is also a DBT trainer.

2.7 Intervention: DBT skills group for Bulimia Nervosa

The 12 week skills group was based on Safer, Telch and Chen's (2009) manual on DBT for BED and BN. The authors excluded the 'interpersonal effectiveness' module from the DBT manual due to its potential overlap with other treatments developed for BED and BN that specifically focus on treating interpersonal problems. In order to reduce the number of group sessions from the usual the manual was

reduced to include only those skills which were felt to be most beneficial for individuals with BN. At the beginning of each group session there was a short mindfulness exercise. The groups lasted for two hours with a 5-10 minute break. The first session included psychoeducation on BN and focused on orienting participants to the DBT model and treatment for example, chain analysis and dialectics.

Sessions two to four focused on teaching mindfulness skills (first module). This included teaching the 'what' skills of mindfulness; observing, describing and fully participating in the present moment. The 'how' skills of mindfulness; non-judgmentally, one-mindfully and focusing on doing what is effective in the present moment. In addition to learning how to recognise unhelpful states of mind such as, 'emotional' (thoughts based on our feelings), and 'rational' (thoughts based on logic) mind and learning how to synthesise these into 'wise mind'. Sessions five to seven focused on teaching emotional regulation (module two). The purpose of this module was to help participants understand the function of emotions, and to teach the skills needed to manage their emotions by reducing vulnerability to negative emotions, changing negative emotions, and building on positive emotional experiences. Sessions eight to 10 focused on teaching distress tolerance skills (module three). The main aim of the distress tolerance skills is to help the individual not make a difficult situation worse through risk behaviours. These skills are used when a person is in a crisis and is unable, unwilling or if it would be inappropriate to change the situation. They include skills such as distraction, self-soothe, and radical acceptance (i.e. the willingness to accept a situation how it really is rather than how we want it to be). Session 11 focused on helping participants to identify their personal values, who they wanted to be and whether they were behaving according to these values. Session 12 was the final session and focused on relapse prevention.

2.8 Planned Analysis

Analyses were conducted to investigate whether there were any differences in a number of variables recorded at baseline between completers and those who did not attend or dropped out of the intervention. The aim was to see whether particular variables related to completion or disengagement. Descriptive statistics were used to investigate differences in categorical variables; ethnicity, recruitment site, and whether participants were receiving additional support. T tests were conducted to analyse for differences in age, severity of eating pathology (as measured by the EDE-Q), mindfulness (FFMQ) and acceptance (AAQ-II) for those who completed versus those who did not attend or dropped out of the intervention.

The original plan was to use multivariate statistics including regression analyses to analyse the relationship between BN symptoms, mindfulness and acceptance. A power calculation was conducted to identify the number of participants needed to detect change in outcome measures. The power analysis estimated a required sample size of 34 participants to investigate pre and post mindfulness and acceptance scores. The estimated sample size to conduct a multiple linear regression was 68. Due to recruitment difficulties, the required sample size was not achieved, which therefore meant that the study would have lacked the necessary power impacting on the validity of the study.

It was decided that the study would instead use a single case design. Visual analysis, the reliable change index (RCI) and clinically significant change (CSC) methodology was employed to analysis the data.

Visual Analysis is the process of looking at a graph of the data points to determine whether the intervention is associated with a change in a particular measure, and assessing the pattern of change. Engel and Schutt (2012) state that three concepts that help guide visual inspection are: (a) level, (b) trend and (c)

variability. Level refers to the amount or magnitude of change in the target variable. Trend refers to the direction in the pattern of the data points e.g. increasing. Variability refers to the stability or variability of the data points.

The RCI is a statistic that is used to work out whether a change in an individual's pre to post scores is statistically significant or not, which is based on the reliability of the measure. Therefore, it refers to the extent to which the change shown by an individual falls beyond the range which could be attributed to the measurement variability of the instrument itself. It is defined as the change in an individual's score divided by the standard error of the difference for the test being used. Therefore, computation of the RCI requires knowledge of the standard deviation of the measure and an estimate of the reliability of the measure. Jacobson and Truax (1991) stated that a RCI of larger than 1.96 would be unlikely to occur ($p < 0.05$) without an actual change. Therefore, if a participant's score changed by ± 1.96 it was considered to be reliable at the $p = 0.05$ level (Jacobson & Truax, 1991). Furthermore, the Reliable Change Criterion of each measure was calculated to determine the amount of change required in the participant's pre to post score to be considered a reliable change. Participants are classified as "reliably improved" if their score changes reliably in a direction of functionality hence, an increase in scores for the FFMQ and AAQ-II and a reduction in scores for the EDE-Q and the EES.

Jacobson, Follette and Revenstorf (1984) defined Clinically Significant Change (CSC) as the extent to which therapy moves someone outside the range of the dysfunctional population or within the range of the functioning population. Jacobson and Truax (1991) proposed that there were three ways in which this process could be operationalised:

- (a) CSC is achieved when the FU score lies outside of the range of the dysfunctional population. Where the range is defined as extending 2

standard deviations (SD) beyond the mean for the clinical population in the direction of a functioning population.

(b) CSC is achieved when the FU score lies within the range of the functioning population, where the range is defined as within 2 SD of the mean of the functioning population

(c) CSC is defined as when the FU score is statistically more likely to be in the functioning population than the mean of the dysfunctional population.

The third definition of CSC is the least arbitrary as it is based on the likelihood of a particular score ending up in the functional as opposed to the dysfunctional population distributions, which may overlap to a greater or lesser extent. As a result, if distributional data is available from a suitable control (functional) sample criterion (c) was used, when there is no distributional data criterion (a) is the only available option for assessing CSC.

For the FFMQ, instead using the composite score, individual mindfulness facets were analysed independently because each facet represents a unique construct and underlies different mindfulness skills (see table 1 for a description of the FFMQ mindfulness facets). The FFMQ and AAQ-II were not designed as tools for diagnosing mental disorders. As such, these measures were not designed to have cut-off points for which people are likely to meet the criteria for a diagnosable mental health disorder.

Reliable Change Analysis

For the EDE-Q reliability data was obtained from Aardoom et al. (2012) who investigated the norms for the EDE-Q in clinical and non-clinical populations. They found that the mean global score for women with BN was 4.34 (SD 1.04) and the internal consistency (Cronbach's α coefficient) in their study was 0.95. Based on this study the reliable change criterion was 0.65. Therefore, the participant's pre to post

test score had to change by 0.65 to be defined as a reliable change (see appendix X for a worked example of RC for the EDE-Q for participant 1).

For the AAQ-II reliability data was obtained from a published study that used the measure to assess acceptance in an inpatient ED population (including BN, anorexia nervosa or EDNOS in the BN or anorexia nervosa spectrum) (Juarascio, Schumacher, Shaw, Forman & Herbet, 2015). The internal consistency reliability reported in the study was 0.92.

There was no prior published research reporting reliability data for the FFMQ in a BN sample. Consequently, reliability data was used from a number of studies using the FFMQ in a similar population, with the median Cronbach's alpha coefficient being used to calculate RC for the current study (see table 3). Reliability data was extracted from four studies (Baer, Smith, Hopkins, Krietemeyer & Toney, 2006; Lilja, Lundh, Joseffson & Falkenstrom, 2012; Richards & Martin, 2013; Williams, Dalgleish, Karl & Kuyken, 2014) with the reliability for mindfulness facets ranging from; observe: 75 to 83, describe: 77 to 92, awareness: 87 to 92, non-judge: 87-94 and non-react: 75 to 81 change (see appendix XI for a worked example of RC for the FFMQ and AAQ-II for participant 1).

For the EES reliability data was obtained from Arnow, Kennedy and Agras (1994) who used the measure to assess emotional eating in a BN sample. The internal consistency reliability reported in the study was 0.81 (see appendix XII for a worked example of RC change for Participant 1).

Aardoom et al. (2012) also investigated norms for the EDE-Q in a non-clinical group i.e. the general population. Therefore, criterion (c) was used to determine CSC for the EDE-Q. The mean global score for the general population was 0.93 (SD 0.86) (with the mean global score for the BN population cited above). The CSC calculation suggested a cut-off point of 2.47, which meant that a global score of 2.47 or lower was deemed no longer in the clinical range (see appendix X for the criterion (c) CSC worked example for participant 1).

As recommended by Jacobson and Truax (1991) criterion (a) was used to calculate CSC for the AAQ-II, FFMQ and EES. As proposed, if a participant's pre to post test score had changed by two SD it was deemed to have been a clinically significant change. For the purpose of this study, the current study sample was used as the population to inform CSC calculations for the AAQ-II, FFMQ and EES. The whole sample including completers and non-completers were included to ensure that the analysis was not biased as a result of attrition. See Table 2 for data informing RC and CSC calculations for the FFMQ, AAQ-II and EES (see appendix XI and XII for worked example for clinical change for the FFMQ, AAQ-II and the EES).

Table 2

Mean scores and standard deviation for the total sample's mindfulness and acceptance assessment scores.

FFMQ (mindfulness facets)	Mean score	Standard deviation (SD)	
		1 SD	2 SD
Observe	23.69	5.39	10.78
Describe	21.35	6.30	12.6
Awareness	18.13	5.70	11.4
Non-judge	18.03	6.53	13.06
Non-react	15.59	4.35	8.7
AAQ-II (acceptance)	26.93	10.39	20.78
EES (emotional eating)	52.79	20.80	41.6

Table 3

Reliability Coefficient to calculate Reliable Change for mindfulness and acceptance, and the suggested Reliable Change Criterion

FFMQ (mindfulness facets)	Cronbach's coefficient	Reliable Change Criterion
Observe	.80	6.68
Describe	.90	5.51
Awareness	.89	5.23
Non-judge	.91	5.43
Non-react	.78	5.64
AAQ-II (acceptance)	.92	8.15
EES (emotional eating)	.81	25.13

3.0 Results

3.1 Sample characteristics

Twenty-nine individuals' agreed to participate in the research study. Eighteen of those were NHS patients and 11 were university students. At initial assessment all of the participants experienced problems with bingeing and purging (on average) at least once a week and met DSM 5 (American Psychiatric Association, 2013) criteria for BN.

NHS participants were either under the care of the ED Service or the Personality Disorder Service.

The student participants were enrolled in undergraduate, masters or PHD programmes at the university site.

The total sample was comprised of 29 females, with 18 (62.1%) participants identifying as 'White British', six as White European (20.7%), three (10.3%) identifying as Asian and two as Mixed Race (6.9%). Eighteen of the participants were recruited from the Personality Disorder and ED service (62.1%) and 11 were recruited from UCL university (37.9%). The mean age of the sample was 25.10 (SD 8.1), and the ages ranged from 18 to 56. The mean score of the sample at baseline on the EDE-Q was 4.4 (SD 1.1). Five participants (17.2%) were receiving another form of support when they were assessed for the group, with three of those participants receiving standard DBT at the Personality Disorder Service.

Of the 29 participants who were assessed as suitable for the study and agreed to participate, 23 (79.3%) of those attended the group and six did not attend (20.7%). Of those who started the group, 17 participants (73.9%) completed the intervention, and six participants (26%) dropped out. See figure 2 for a breakdown of the study attrition. The mean number of group sessions attended by those who completed the intervention was 10.7, ranging from seven to 12.

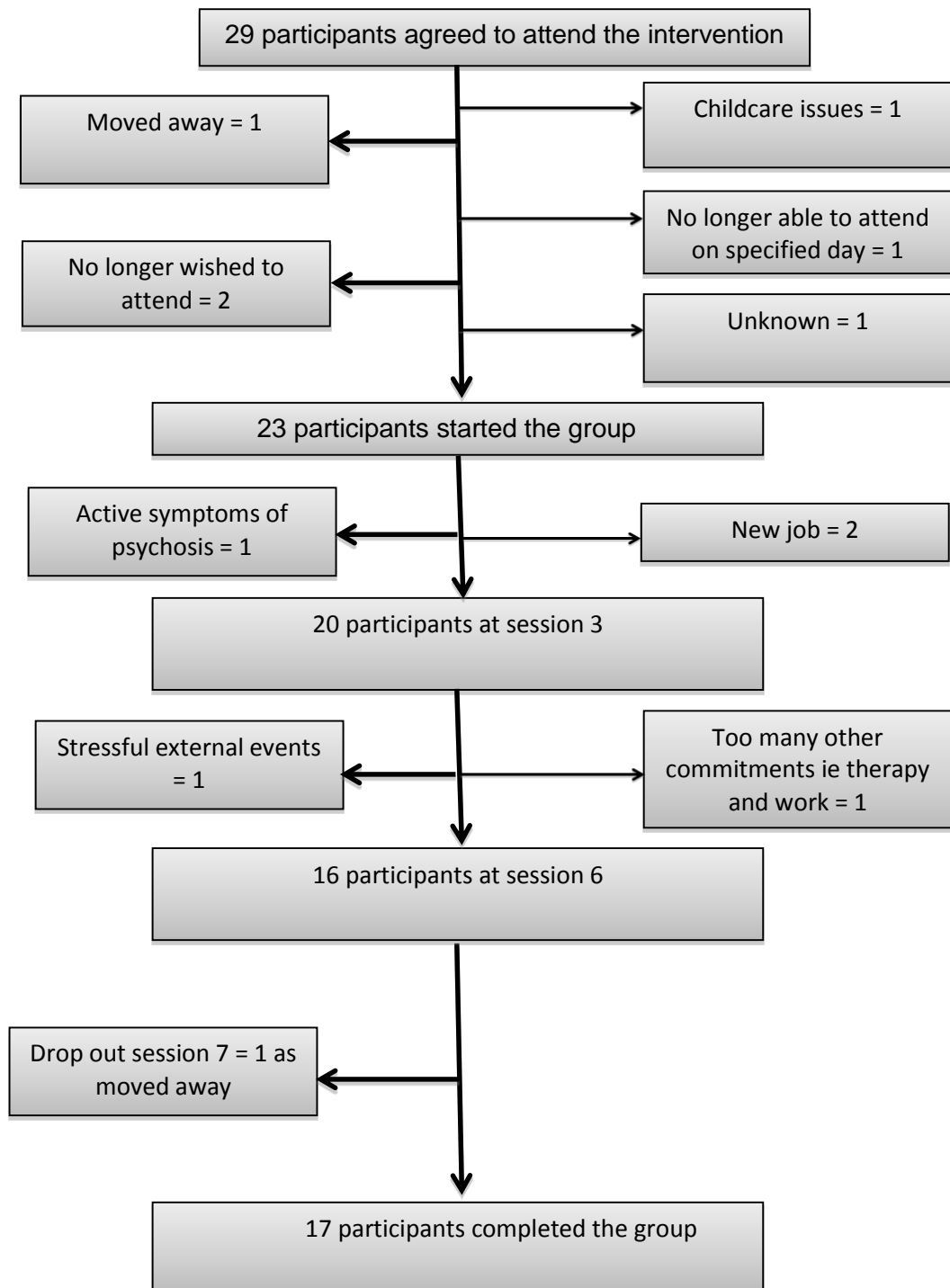


Figure 2. Flowchart of study attrition.

3.2 Analysis comparing those who completed the intervention to those who did not attend or dropped out of the intervention

The results show that there were no statistical differences on continuous variables between completers and those who were assessed and did not attend the intervention and those who dropped out of the intervention. The non-attenders and drop out group scored slightly higher than completers on mindfulness and acceptance at assessment but this difference was not significant. In terms of ethnicity, the number of White British participants was equal for completers and the non-attenders and drop out group. Asian women were more likely to complete the intervention. With regards to participants attending another treatment programme, there was not a substantial difference between completers and those who did not attend or dropped out in relation to this variable. Participants recruited from the university were more likely to complete the intervention whereas, participants recruited from the NHS were equally as likely to complete and not attend or drop out of the intervention. For a summary of the results see Tables 4 and 5.

Table 4

Results of analyses on continuous variables for those who completed and those who did not attend or dropped out of intervention.

Variable	Mean (SD)		T	Significance
	Completers	Non-attenders/drop outs		
Age	25.24 (SD 8.98)	24.92 (SD 7.15)	-.102 (27)	.902
EDE-Q	4.31 (SD .976)	4.59 (SD 1.23)	.684 (27)	.500
FFMQ	93.59 (SD 14.30)	101.75 (SD 22.56)	1.106 (17.17)	.284
AAQ2	25.35 (SD 9.82)	29.17 (SD 11.18)	.973 (27)	.339

Table 5

Results of analyses on categorical variables for those who completed and those who did not attend or dropped out of the intervention.

Variable	Number (%)	
	Completers	Non-attenders/drop outs
<i>Ethnicity</i>		
White British	9 (50%)	9 (50%)
Asian	5 (83.3%)	1 (16.7%)
White Other	1 (33.3%)	2 (66.7%)
Mixed	2 (100%)	-
<i>Other Treatment</i>		
Other treatment	3 (60%)	2 (40%)
No other treatment	14 (58.3%)	10 (41.7%)
<i>Referral Source</i>		
NHS	9 (50%)	9 (50%)
University	8 (72.7%)	3 (27.2%)

3.3 Results of Multiple Single Case Design

Participant 1

Participant 1 was a 30 year old woman who worked full time. She had suffered with BN for 11 years, and had a co-morbid diagnosis of Borderline Personality Disorder. She was recruited from the ED service and had attended the PD Service for treatment approximately 10 years ago. Whilst attending the group she was also receiving support from Overeaters Anonymous to help manage her difficulties around food. Participant 1 attended 10 group sessions. At assessment her global EDE-Q score was in the clinical range and it demonstrated a reliable change at FU (4.55 to 3.24). Describe, awareness and non-judge mindfulness facets reliably improved. Observe and non-react mindfulness facets clinically improved, in addition to acceptance and her EES score.

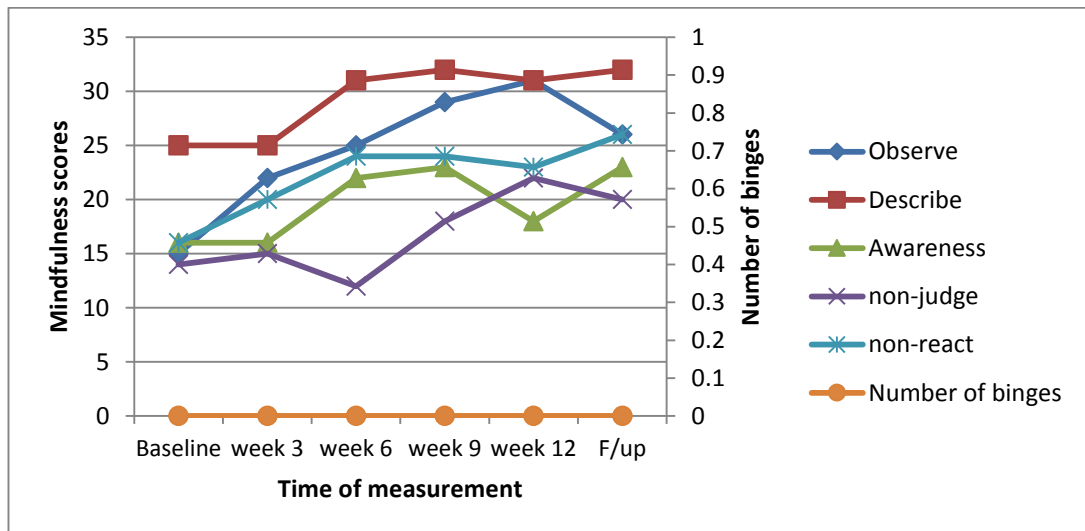


Figure 3. Participant 1 mindfulness scores and number of weekly binges.

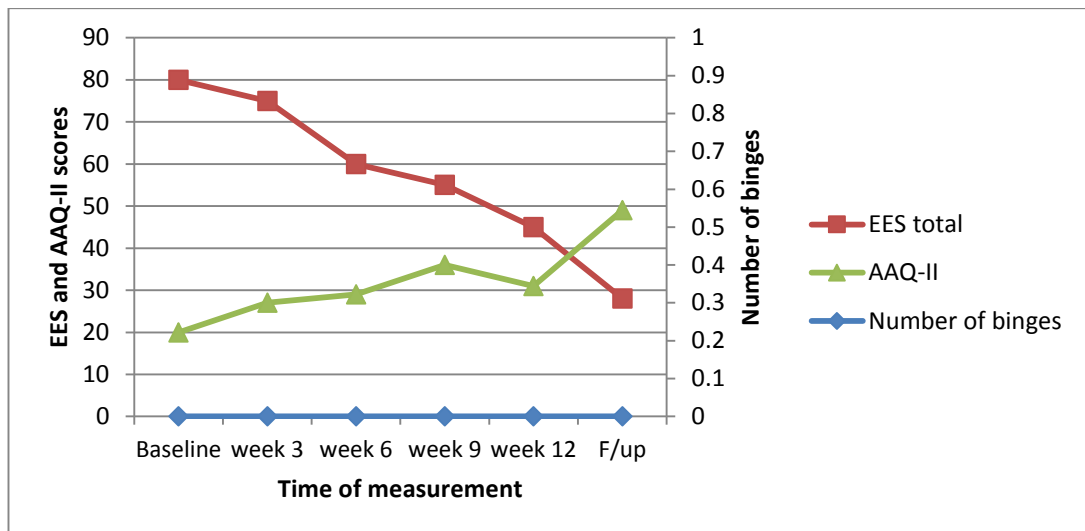


Figure 4. Participant 1 acceptance and emotional eating scores, and number of weekly binges

There was a marked increase in the observe and non-react mindfulness scores between baseline and session three, with the observe facet continuing to steadily increase until session 12, whereas the non-react levelled out at session 6. When all of the other facets had increased from session three to six, the non-judge facet slightly decreased. This suggests that although Participant 1 was generally more mindful this was not accompanied with a less judgemental stance. At FU the observe facet had reduced by one level and the awareness facet had increased by one level. For the other mindfulness facets, Participant 1 remained consistent at one month FU. The trend was for the AAQ-II to steadily increase from baseline to week 12, although it increased by two levels between week 12 and FU. Improvements in mindfulness and acceptance were associated with a marked reduction in the EES. Improvements in these measures are associated with a decrease in the EDE-Q. Her EDE-Q remained in the clinical range from pre to post intervention, however this does not appear to be associated with bingeing as no bingeing is reported throughout the intervention.

Participant 2

Participant 2 was a 21 year college student, who came from an Asian background. She was recruited from the ED service and had been experiencing BN for one and a half years. She also had a diagnosis of BPD and depression. She had previously had DBT therapy at the PD service, in addition to being an in-patient in a psychiatric hospital during adolescence. At assessment her global EDE-Q score was in the clinical range, but there was no change in ED severity at FU (4.27 to 3.91). Participant 2's non-judge and non-react mindfulness facets and her acceptance scores had reliably improved at FU, in addition to her EES score. Participant 2 attended 11 group sessions.

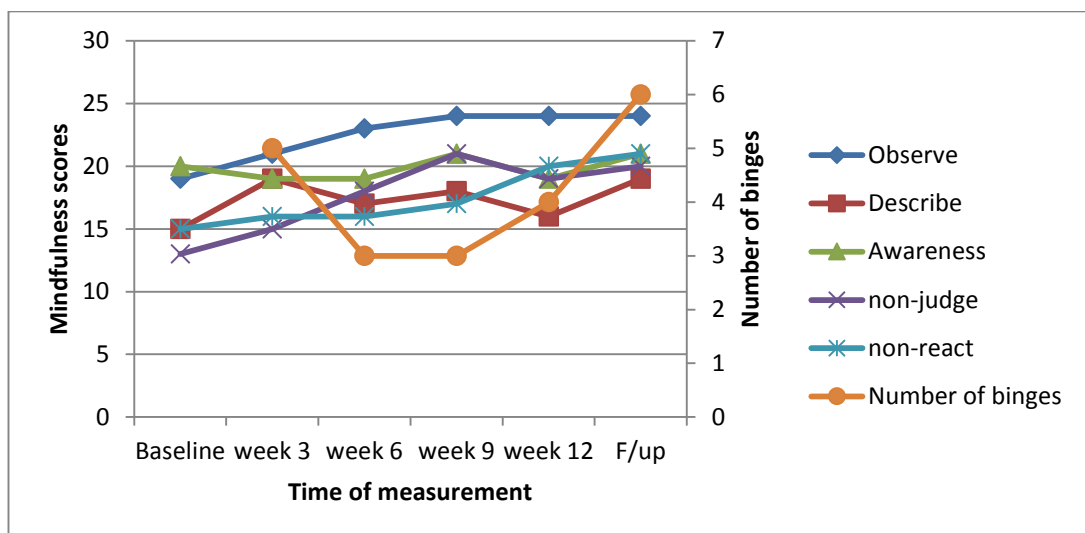


Figure 5. Participant 2 mindfulness scores and number of weekly binges.

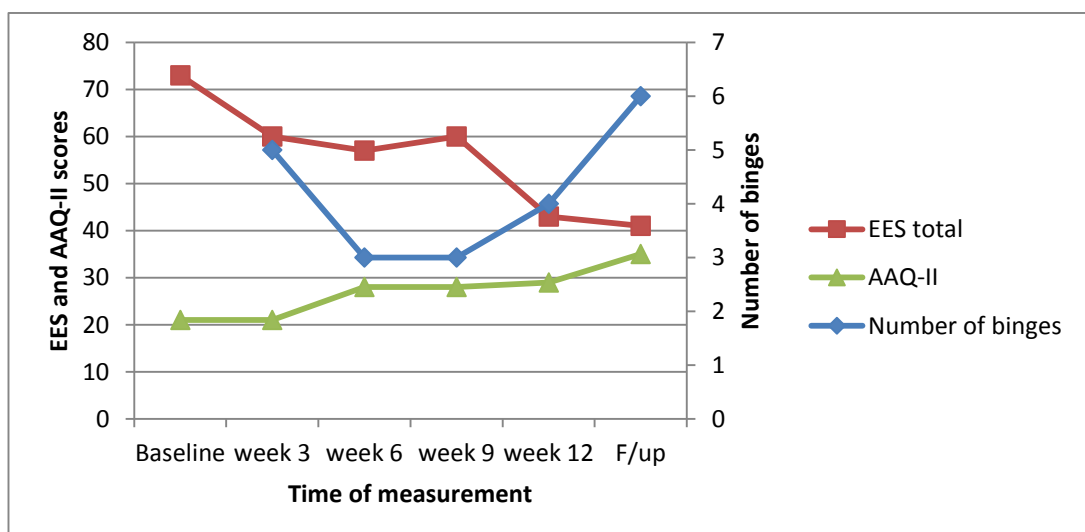


Figure 6. Participant 2 acceptance and emotional eating scores, and number of weekly binges.

With regards to mindfulness facets, there was not much variability in scores across the DBT intervention. The non-judge and non-react facets steadily increased by one level, although this improvement does not appear to be associated with a decrease in bingeing, with bingeing worsening from session nine. The other facets stayed relatively constant throughout the intervention. The AAQ-II increased in session six, but then there is no change until FU, where there is a small increase. The general trend of the EES score was to reduce over the course of the intervention, with a marked reduction occurring between week nine and 12. However, this was not associated with a decrease in bingeing, although it was associated with an increase in acceptance. There was little change in bingeing from pre to post measurement, which is also reflected in her EDE-Q scores.

Participant 3

Participant 3 was a 19 year old university student. She was recruited from the ED service and had been suffering from her ED for four years. During the group she received a diagnosis of BPD. She had never received any form of therapy in the past. She attended 10 group sessions, and data is missing for session nine. At assessment her EDE-Q was in the clinical range, and demonstrated a clinically significant improvement at FU (3.69 to 1.76). At FU participant 3's had a reliable deterioration in awareness, non-judge and non-react mindfulness facets. There was no change in acceptance. However, there was a reliable improvement in Participant 3's EES score.

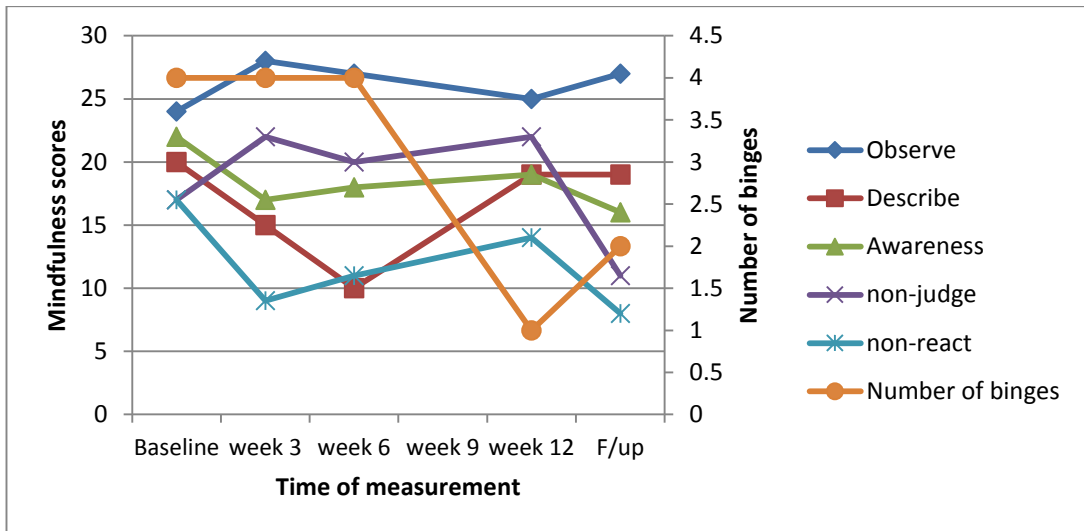


Figure 7. Participant 3 mindfulness scores and number of weekly binges.

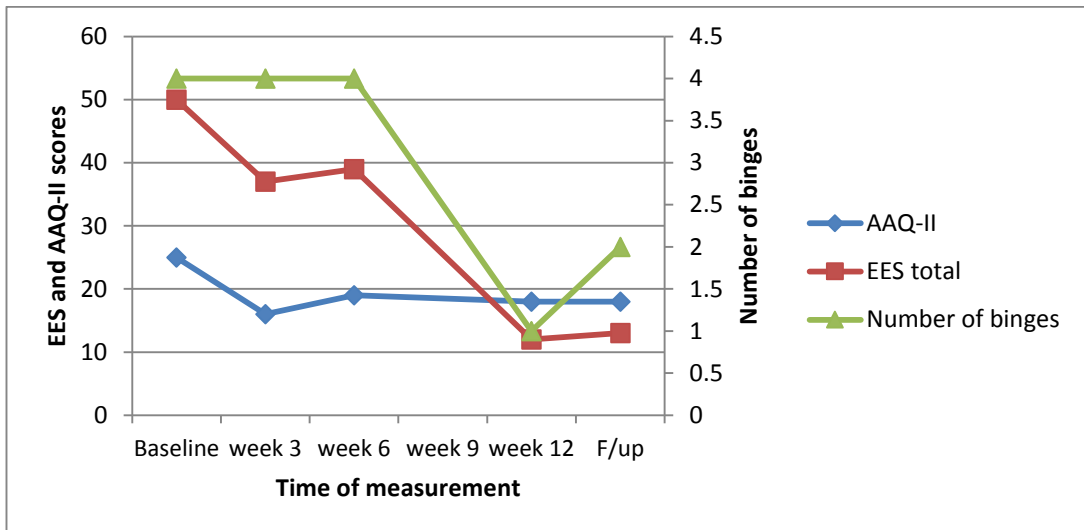


Figure 8. Participant 3 acceptance and emotional eating scores, and number of weekly binges

There was a deterioration in Participant 3 awareness, describe and act with awareness scores from baseline to week three, whilst the other facets improved. However, this was not associated with increased bingeing. The describe facet continued to deteriorate until week six, but in the second half of the intervention the score improved by nearly two levels. At week six, Participant 3 reported bingeing four times, whereas at week 12 she reported bingeing once. This positive change may be associated with the large improvement in the describe mindfulness facet and is

reflected by the very large reduction in the EES. Although observe and describe remained relatively consistent from week 12 to FU, there was a large drop in three of the mindfulness facets (awareness, non-judge and non-react). An improvement in her EDE-Q score is associated with a decrease in bingeing.

Participant 4

Participant 4 was a 25 year old Irish woman. She was working full time and was in the process of setting up her own business. She was recruited from the ED service and had suffered with an ED for 11 years. In terms of previous therapy, during adolescence she had received family therapy and was previously seen by a CBT therapist and psychotherapist when she was 19 years old. EDE-Q was in the clinical range at baseline (4.12) but data is missing for FU therefore, analysis was conducted from baseline to week 12. There was a reliable improvement in Participant 4's observe mindfulness and acceptance scores. There was no change in her EES score. She attended 10 group sessions, with data missing for session nine and FU.

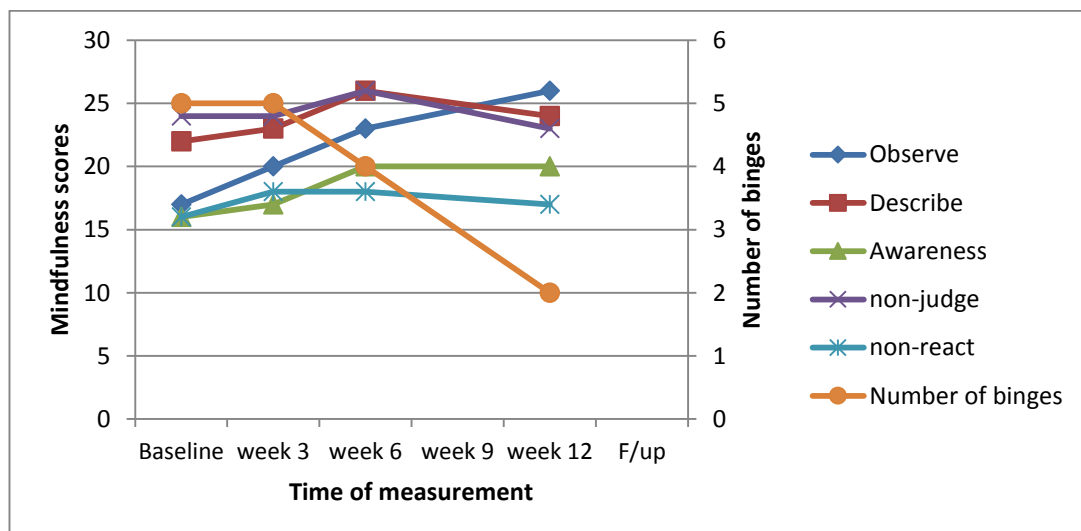


Figure 9. Participant 4 mindfulness scores and number of weekly binges.

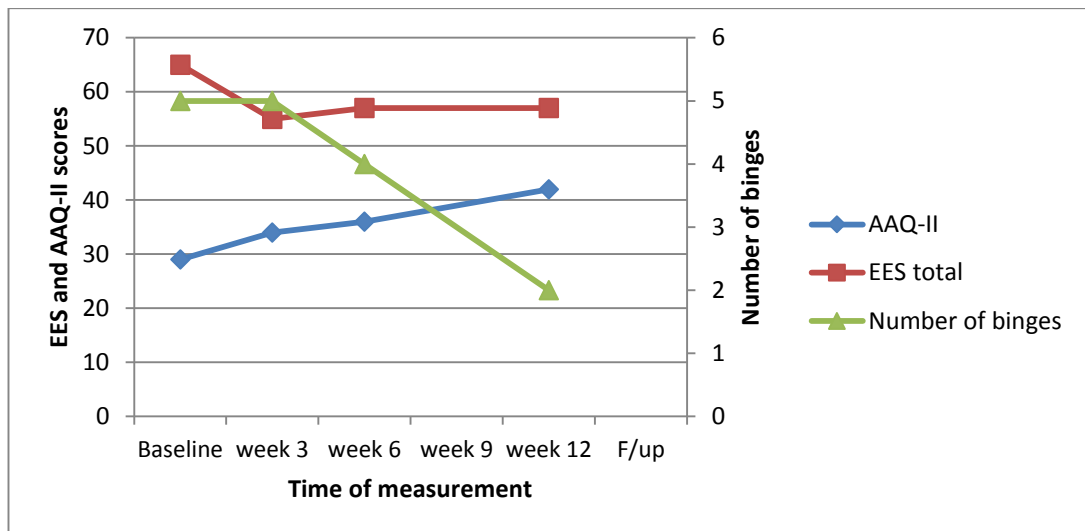


Figure 10. Participant 4 acceptance and emotional eating scores, and number of weekly binges.

The trends towards improvement in observe and acceptance started between baseline and week three, and continued steadily throughout the intervention. The other mindfulness facets remained relatively stable throughout the intervention. Interestingly, number of weekly binges started to decrease at week six, and was at its lowest point (2 binges) at week 12 when acceptance was at its highest point. Although the number of binges reduced throughout the intervention her EES score did not reduce.

Participant 5

Participant 5 was a 56 year old White British woman who was recruited from the ED service. She also had been diagnosed with BPD and Agoraphobia. Prior to the intervention she had completed a CBT group at the ED service. She attended 10 group sessions. At assessment her EDE-Q global score was in the clinical range and demonstrated a reliable worsening of ED symptoms at FU (4.48 to 5.29). At FU there was a reliable deterioration in the describe mindfulness facet. There was no change in Participant 5's acceptance or EES scores.

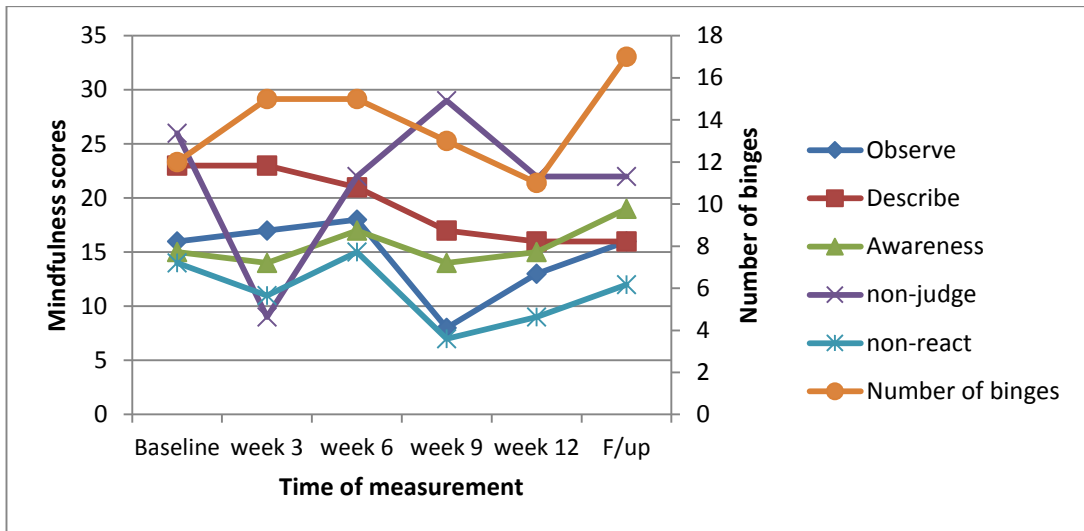


Figure 11. Participant 5 mindfulness scores, and number of weekly binges.

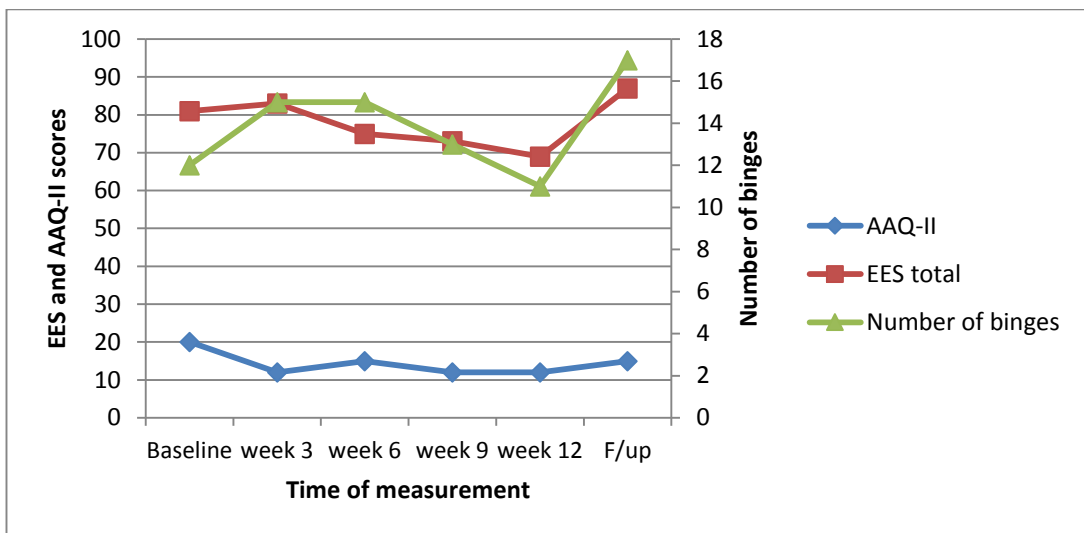


Figure 12. Participant 5 acceptance and emotional eating scores, and number of weekly binges.

Between baseline and week three there was a significant three level decrease in non-judge which coincided with an increase in bingeing. The other mindfulness scores did not change during this period. However, there is a large and steady increase in non-judge between week three and nine, which occurred simultaneously with a decrease in bingeing. Between week six and nine, the other mindfulness scores decreased, with non-react and observe decreasing by nearly two levels. There is little change in acceptance throughout the whole intervention, with a decrease in level between baseline and session 3. Worsening EDE-Q scores was associated with an increase in bingeing.

Participant 6

Participant 6 was a 33 year old White British woman recruited from the PD service where she was receiving treatment for BPD. She was also working full time. During the study intervention she concurrently attended individual and group DBT at the PD service. She had been experiencing ED symptoms for 19 years. At assessment her global EDE-Q was in the clinical range and at FU it demonstrated a reliable improvement in symptoms (4.31 to 3.53). Participant 6's describe and awareness mindfulness facets reliably improved and there was a clinically significant improvement in non-judge and non-react mindfulness facets. Furthermore, there was a clinically significant improvement in her acceptance scores. There was no change in her EES score. She attended nine group sessions, but data is missing for session six.

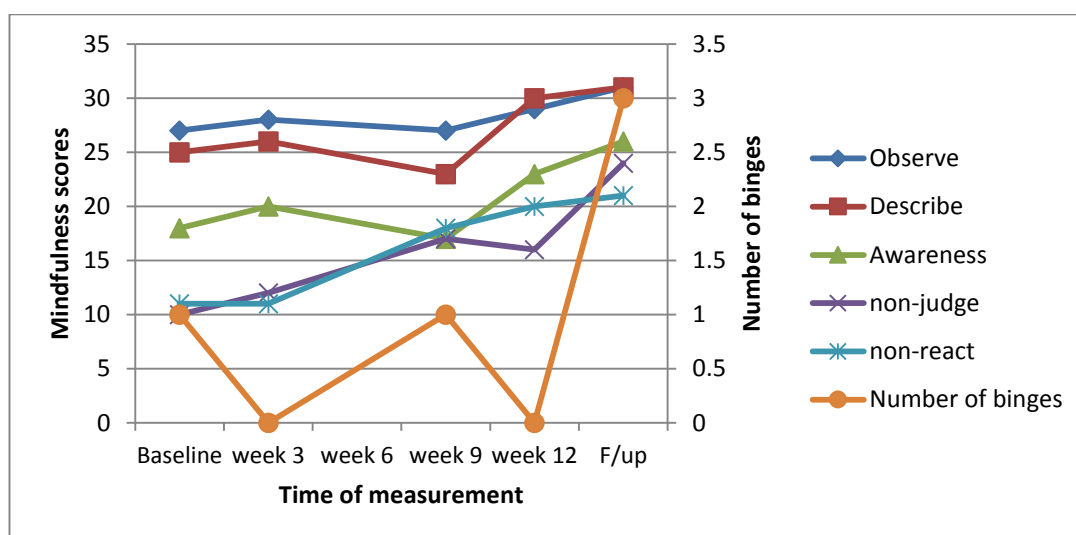


Figure 13. Participant 6 mindfulness score and number of weekly binges.

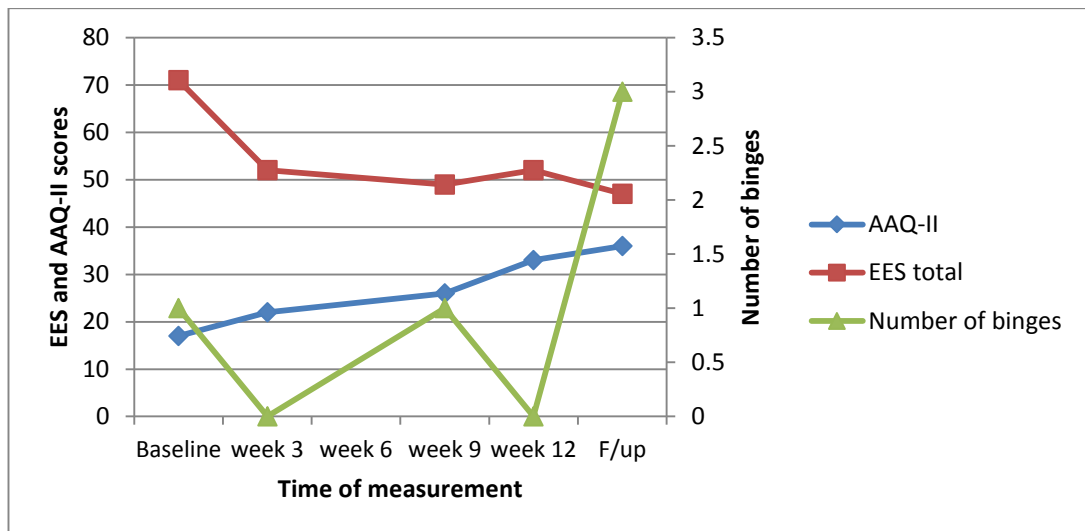


Figure 14. Participant 6 acceptance and emotional eating score, and number of weekly binges.

There was no change in mindfulness scores from baseline to the intervention stage. There was a trend towards improvements in mindfulness between week three and week nine for non-judge and non-react facets, with both increasing by nearly two levels. Other facets tended to slightly deteriorate or stay the same during the first part of the intervention. The change in level for observe, describe and awareness happened between week nine and 12. In addition, there was a trend towards increased acceptance, beginning at baseline and a more noticeable increase in level between week nine and 12. Although, there is a significant decrease in the EES (which is associated with number of binges at week three), there is no further change throughout the intervention whereas, number of binges is variable. A reliable improvement in the EDE-Q from pre to post intervention was associated with an increase in bingeing.

Participant 7

Participant 7 was a 24 year old White British woman. She was doing a Masters degree at UCL, where she was recruited from. She had never received psychological support

in the past, and said that she had previously resisted accessing help. She had been experiencing BN for two years. At assessment her global EDE-Q score was in the clinical range, but at FU it demonstrated no reliable change in ED severity (4.48 to 4.37). There was a reliable improvement in the awareness mindfulness facet and a clinically significant improvement in the observe facet. There was a reliable improvement in Participant 7's acceptance scores. There was no change in Participant 7's EES score. She attended all 12 group sessions.

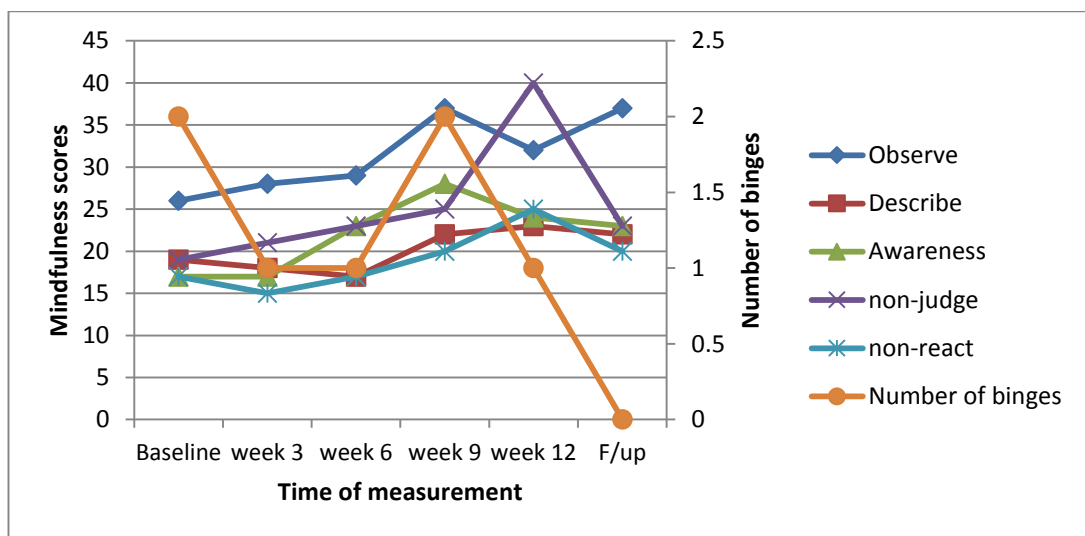


Figure 15. Participant 7 mindfulness scores and number of weekly binges.

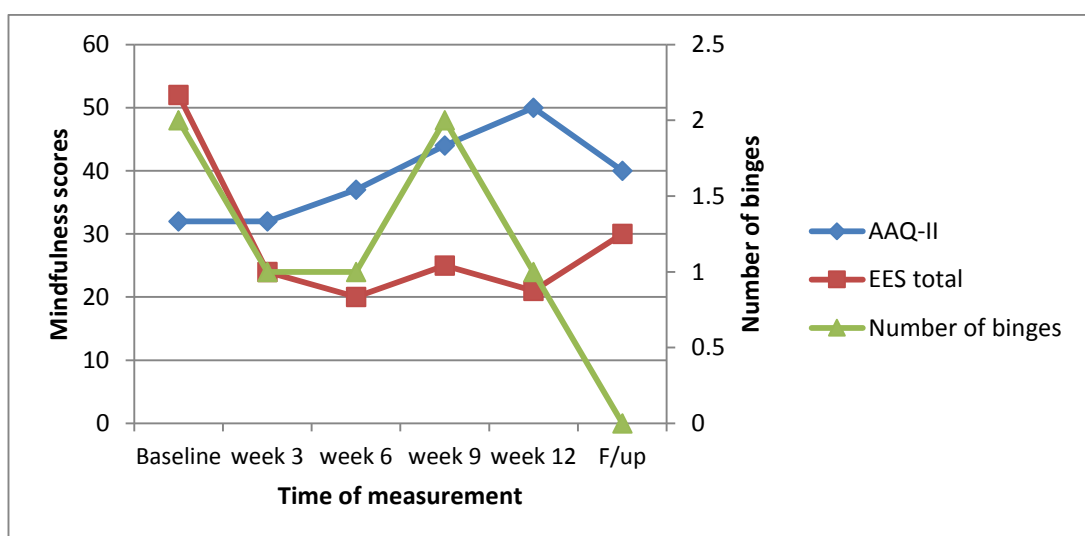


Figure 16. Participant 7 acceptance and emotional eating scores, and number of weekly binges.

There is little change in the mindfulness facets and AAQ-II score from baseline to week three, although non-react reduced slightly. Even so, the number of binges had reduced at week three. Following week three, there was a marked improvement in acceptance, and it continued to increase steadily until week 12, increasing by nearly 20 and indicating a reliable (and close to a clinical) change in acceptance. The non-react mindfulness facet had also increased steadily from week six to week 12, and indicated reliable change in scores from baseline. In addition, the non-judge facet had increased steadily from baseline, with a marked increase between session nine and 12, which indicated a clinical change. However, improvements in non-react, non-judge and acceptance were not maintained at FU. The only mindfulness facet that continued to increase post intervention was 'observe'. The EES score increased at FU despite the fact that Participant 7 had not binged. Although Participant 7 had stopped bingeing at FU, this was not associated with a reliable improvement in her EDE-Q score.

Participant 8

Participant 21 was a 20 year old White British undergraduate student. She had suffered with BN for six years, and had received some support in the past although she reported not finding it helpful and consequently disengaged. At assessment her global EDE-Q was in the clinical range and at FU it demonstrated a clinically significant improvement (4.75 to 0.67). There was a reliable improvement in Participant 8's observe mindfulness score, with a clinically significant improvement in her describe, awareness, non-judge and non-react mindfulness scores. Furthermore, there was a clinically significant improvement in her acceptance and EES scores. She attended 10 group sessions, but data is missing for session six.

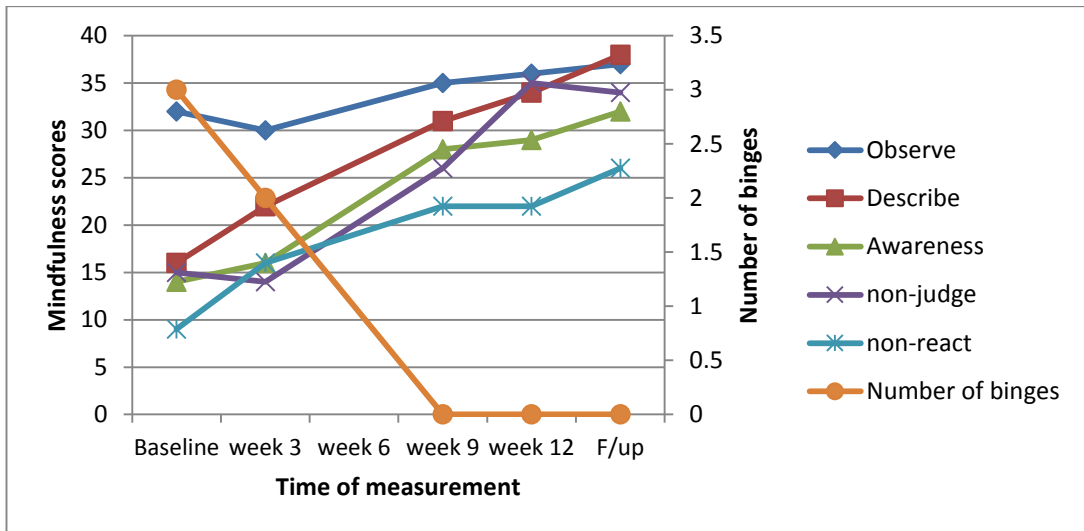


Figure 17. Participant 8 mindfulness scores and number of weekly binges.

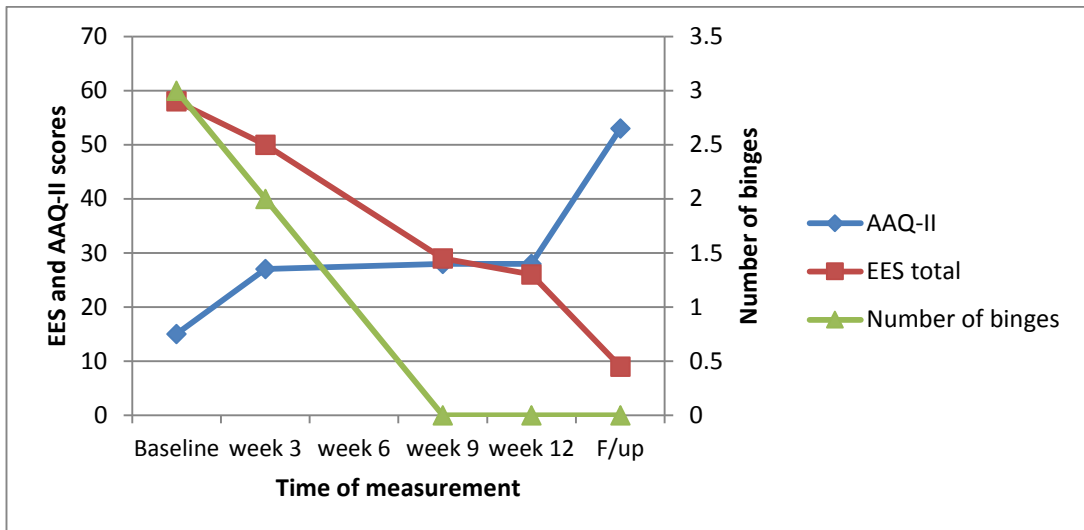


Figure 18. Participant 8 acceptance and emotional eating scores, and number of weekly binges.

There was a noticeable change in describe and non-react mindfulness scores from baseline to week three, with both increasing by approximately one level. Furthermore, the EES score decreased by one level from baseline to week three. All mindfulness facets increased throughout the intervention and maintained improvements at FU, with the most significant change in scores occurring between session three and nine (the middle of the intervention). Following this period, Participant 8 stopped bingeing. Improvements in acceptance occurred at the start of the intervention, with little change

during the intervention, and a marked increase at FU. Improvements in her EDE-Q score from pre to post intervention were associated with a reduction in bingeing.

Participant 9

Participant 9 was a 21 year old undergraduate student from Eastern Europe. She was recruited from UCL. She had experienced BN for approximately one year. When she was 14 years old she attended supportive counselling. At assessment she was meeting with a CBT therapist to work on low self-esteem. These sessions had ended prior to her starting the group. At assessment her global EDE-Q was in the clinical range (4.19). There was a reliable improvement in Participant 9's describe mindfulness facet and acceptance scores from baseline to session 12. There was no change in Participant 9's EES score. She attended 11 group sessions, but data for session six and FU are missing.

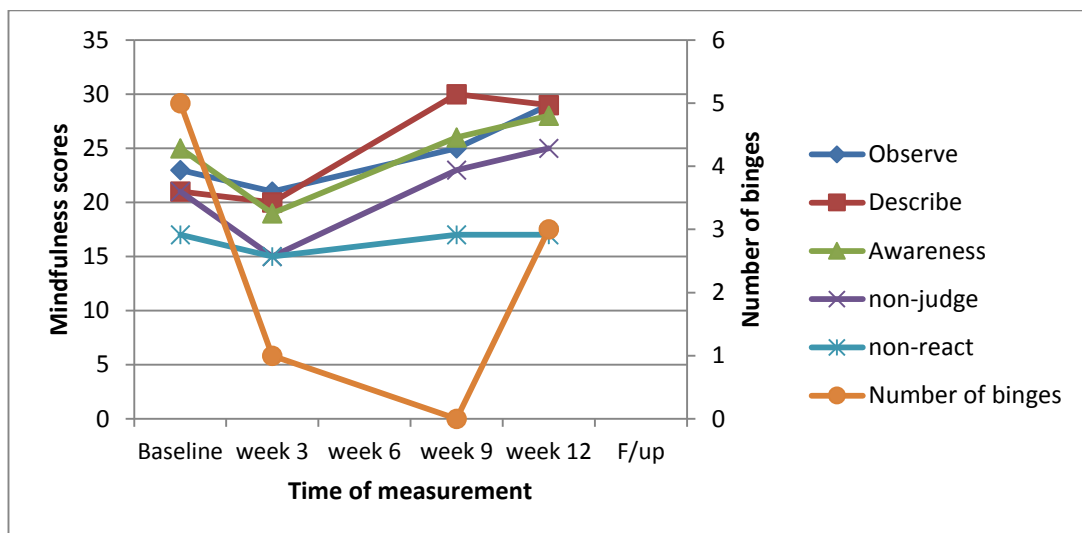


Figure 19. Participant 9 mindfulness scores and number of weekly binges.

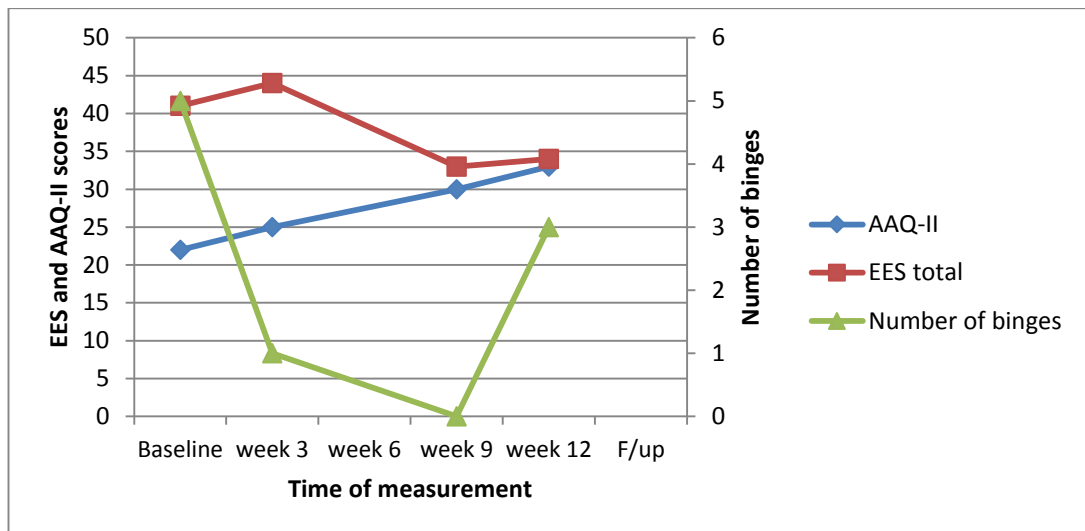


Figure 20. Participant 9 acceptance and emotional eating scores, and number of weekly binges.

From baseline to week three there was a very large reduction in number of binges. This was not associated with an increase in mindfulness, as the awareness and non-judge mindfulness facet scores reliably deteriorated and the other scores remained stable. There was little change in the non-react facet score throughout the intervention. All other mindfulness and acceptance scores increased significantly between sessions three and nine (by one to two levels). The describe score increased by 10 points, and then levelled out, and this was also associated with a decrease in bingeing and the EES. Change is minimal post session nine. Interestingly, the number of binges greatly increased at session 12, although there was variability in the number of binges throughout the intervention.

Participant 10

Participant 10 was a 24 year old White British woman. She was a Masters student and recruited from UCL. She had previously worked in the Mental Health Sector and had some experience co-facilitating DBT groups and regularly practiced mindfulness. She attended bereavement counselling when she was an adolescent. She was

concurrently attending psychodynamic counselling whilst attending the group. She had been experiencing BN for one and a half years. She attended 10 group sessions, but data is missing for week 12. At assessment her global EDE-Q was in the clinical range, and demonstrated a reliable change at FU (3.3 to 2.70) scoring in the 10th percentile for BN population (Aardoom et al, 2012). In addition, Participant 10's awareness and non-judge mindfulness scores reliably improved, as well as her EES score. There was no change in her acceptance scores.

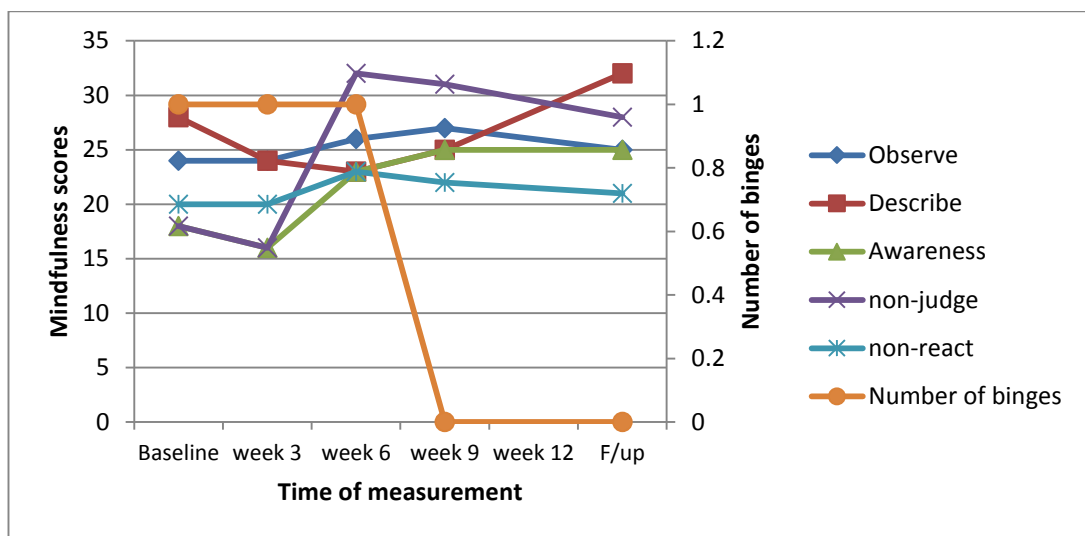


Figure 21. Participant 10 mindfulness scores and number of weekly binges.

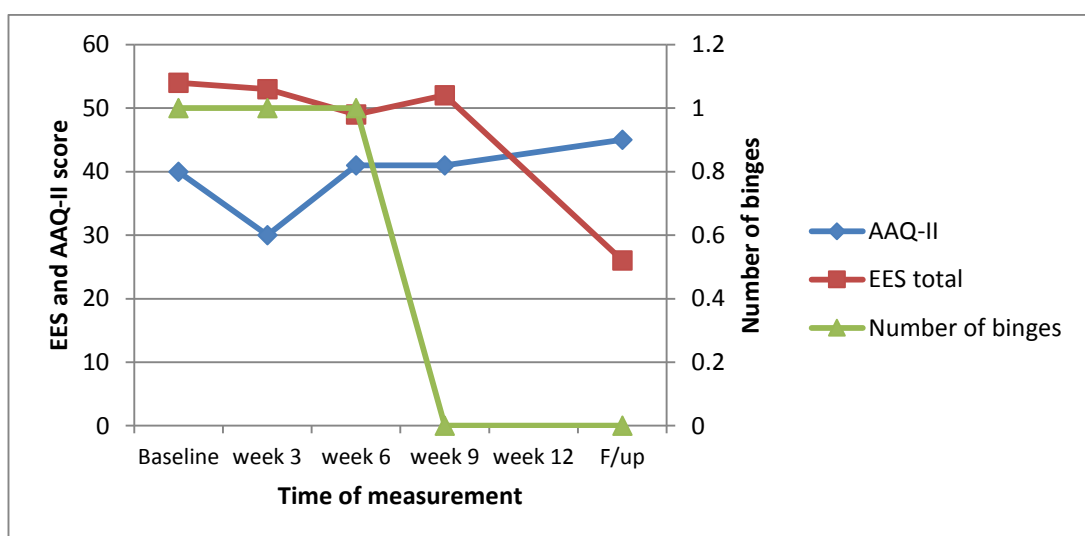


Figure 22. Participant 10 acceptance and emotional eating, and number of weekly binges.

There was no or little change in mindfulness scores from baseline to week three. However, there was a reliable deterioration in acceptance, as it decreased by one level. Participant 10 consistently reported one weekly binge from baseline to week six. From session three to six, the trend for all mindfulness scores, except for 'describe' to increase. Awareness increased by approximately one level and non-judge increased by a substantial three levels, with the latter demonstrating a clinical improvement. However, during the second part of the group, mindfulness scores remained relatively stable with a lack of variability. Interestingly, at this point the 'describe' facet starts to increase. Participant 10 consistently reported one weekly binge until session six, following this the EES score reduced by half. Furthermore, the number of binges reduced to zero, and this was maintained at FU. There was little variability in mindfulness scores.

Participant 11

Participant 11 was a 21 year old White British woman. She was doing an undergraduate degree at UCL and was also recruited from this institution. She had experienced difficulties with food for approximately 10 years. She started bingeing and purging at the age of 14, but thought that her difficulties escalated when she was 18 years old. She saw a CBT therapist around a year ago but disengaged due to finding it too difficult to talk about her difficulties. At assessment her global EDE-Q was in the clinical range, at FU it remained in the clinical range and demonstrated no change in ED symptoms (5.75 to 5.52) or her EES score. She had a reliable improvement in describe and non-react mindfulness facets at FU but a reliable deterioration in awareness. There was no change in her pre to post intervention acceptance scores. She attended 11 sessions, as she was unable to attend session 11.

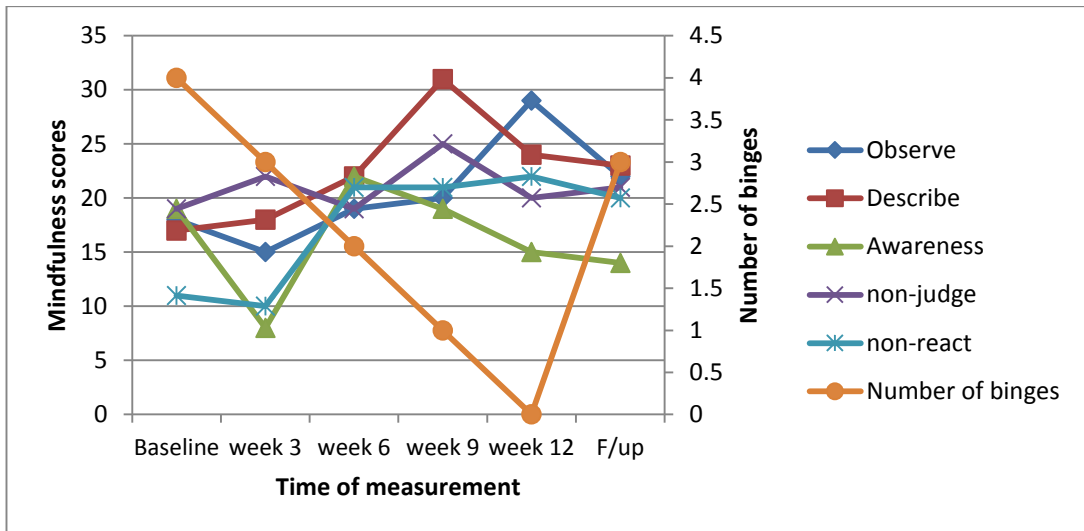


Figure 23. Participant 11 mindfulness scores and weekly number of binges.

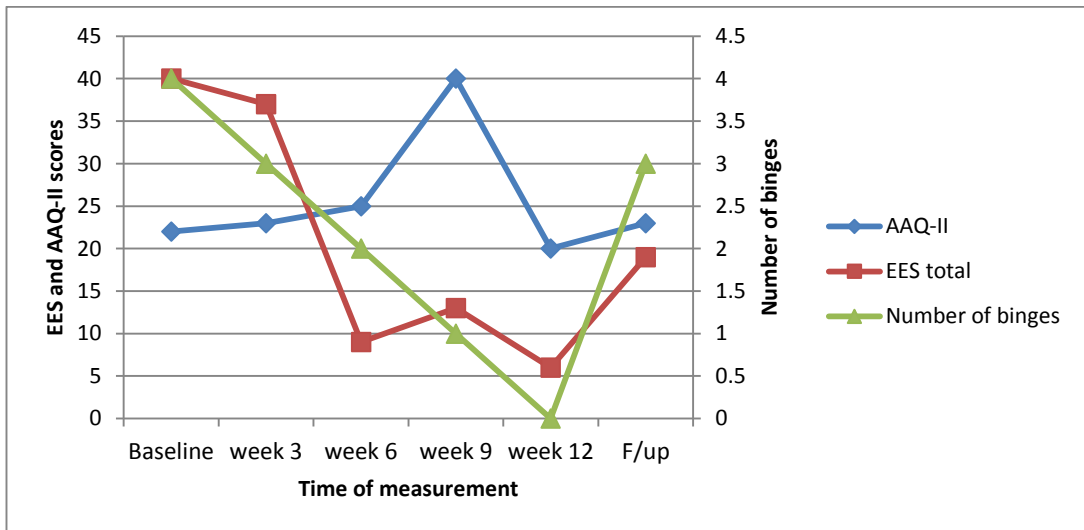


Figure 24. Participant 11 acceptance and emotional eating scores, and number of weekly binges.

Participant 11's number of binges consistently reduced throughout the intervention however, this was not maintained at FU. On the whole the EES score correlated with the reduction on bingeing, although it did have more variability. With regards to facets of mindfulness, there was little change in scores from baseline to week three, although there was a significant reduction in 'awareness'. A large increase occurred in the non-react and awareness mindfulness scores between sessions three and six. Non-react then continued to increase slightly and awareness decreased. For the describe facet

there was a large improvement between session six and nine, but this was not maintained. Overall the trend was for mindfulness scores to remain relatively stable post group, with a decrease in observe. The acceptance scores remained relatively stable throughout the intervention, with a large increase at session nine. This improvement was not maintained with scores returning to baseline level at FU. The lack of change in her EDE-Q score was associated with near baseline number of binges at FU.

Participant 12

Participant 12 was a 29 year old Turkish PhD student and was recruited from UCL. She had intermittently experienced BN for 10 years. She had previously seen a therapist for her ED in Turkey. She attended eight group sessions, but data is missing for week nine and 12. At assessment her global EDE-Q was in the clinical range, at FU it indicated a reliable (and nearly clinical) improvement in ED severity (4.66 – 2.65), and scored in the 10th percentile for a BN population (Aardoom, 2012). Participant 12's observe, describe and non-judge mindfulness scores reliably improved, in addition to her EES score, but there was no change in her acceptance scores.

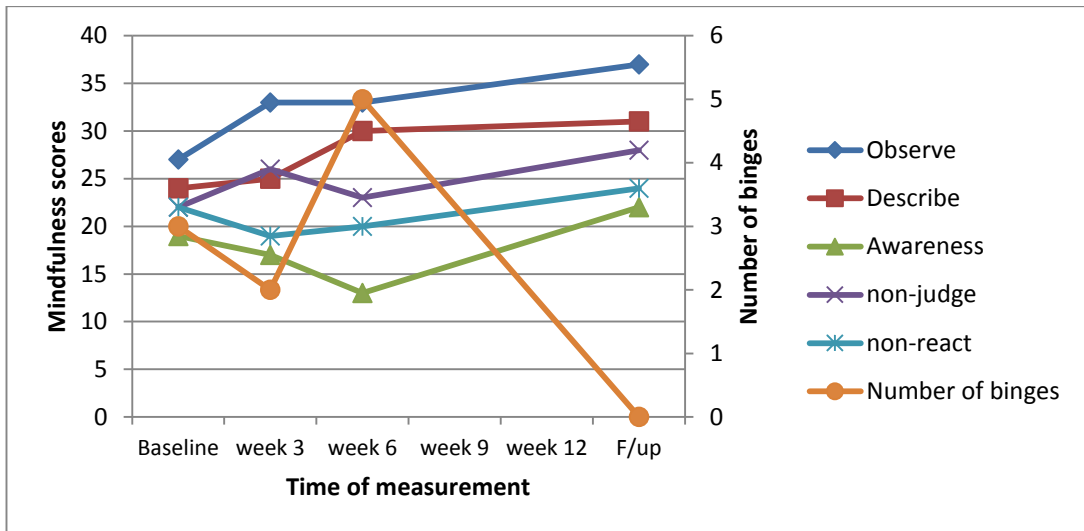


Figure 25. Participant 12 mindfulness score and number of weekly binges.

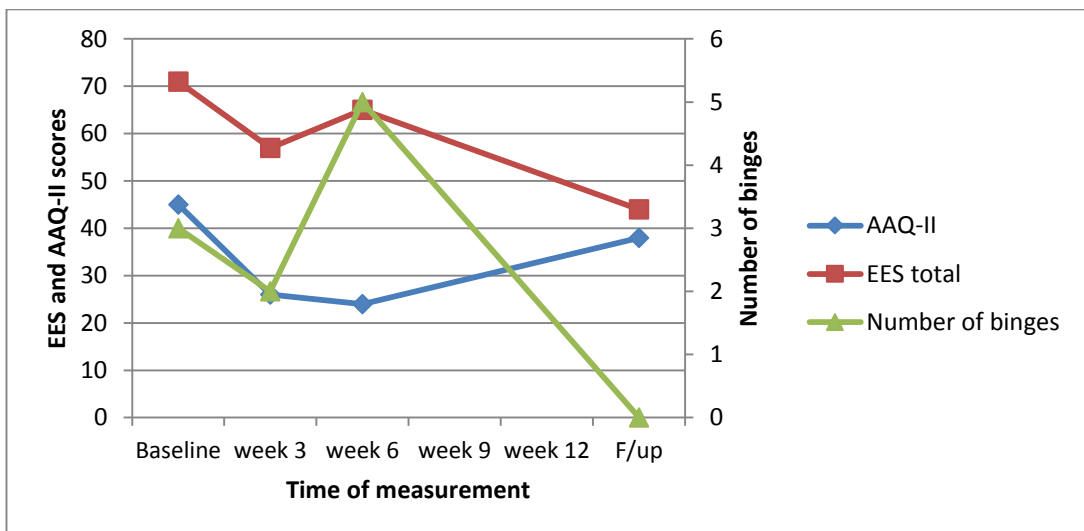


Figure 26. Participant 12 acceptance and emotional eating scores, and number of weekly binges.

There was a noticeable improvement in observe and non-judge facets of mindfulness from baseline to week three, with nearly a two level deterioration in acceptance. This was associated in a reduction in number of binges. There is a lot of variability in the mindfulness scores between sessions three and six, with some remaining relatively stable, some deteriorating while the describe facet improved. This is associated with a large increase in number of binges, and an increase in the EES. Either during the

second part of the intervention or post intervention, the trend appeared to be towards an increase in mindfulness, acceptance and a reduction in the number of binges. Improvements in her EDE-Q was consistent with a reduction in bingeing at FU.

Participant 13

Participant 13 was a 19 year old undergraduate student recruited from UCL. She was from a mixed European background. She had experienced BN for approximately three years, and had never received therapy in the past for ED or any other emotional difficulties. At assessment her global EDE-Q was below clinical cut-off, and demonstrated no reliable change in ED symptoms at FU (1.27-1.59). There was a clinically significant improvement in the observe mindfulness facet. There was a reliable deterioration in Participant 13's acceptance scores, but there was no change in her EES score. She attended 10 group sessions, but data was missing for week nine.

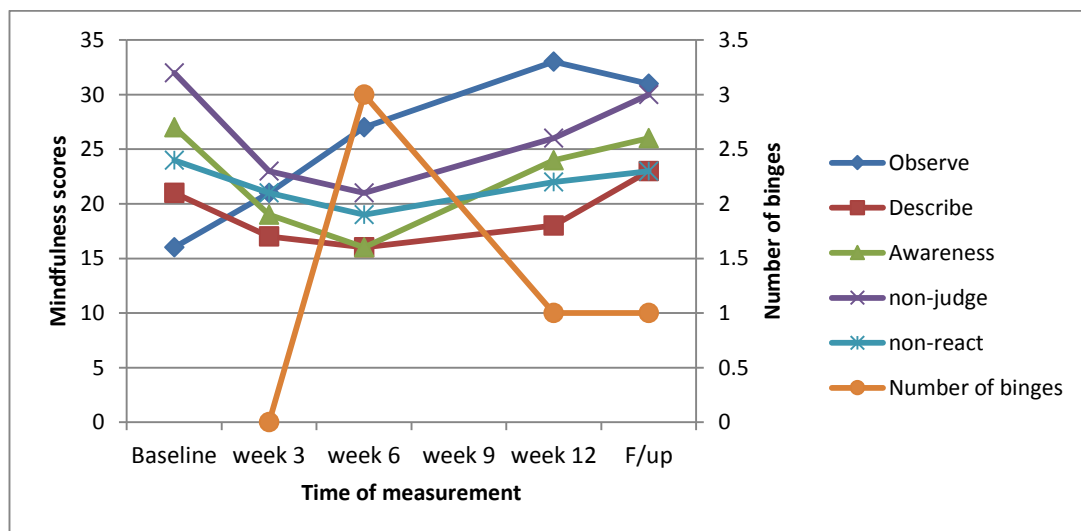


Figure 27. Participant 13 mindfulness scores and number of weekly binges.

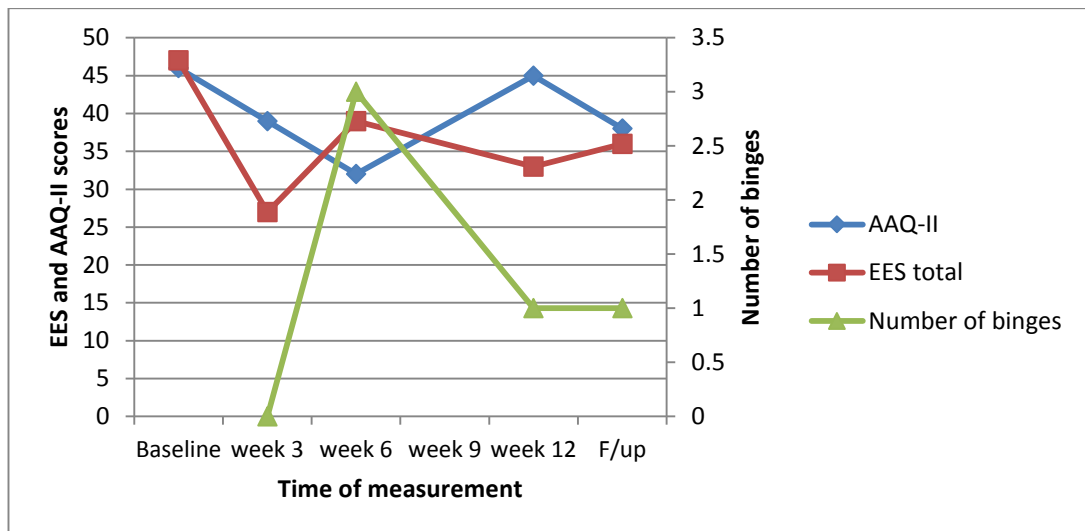


Figure 28. Participant 13 acceptance and emotional eating scores, and number of weekly binges.

Acceptance and mindfulness, apart from the observe facet decreased between baseline and week three. The trend was for the 'observe' facet to increase steadily throughout the intervention, with this facet having the largest change in pre and post scores. The non-react, describe and awareness mindfulness facets and the AAQ-II appeared to follow a similar pattern throughout the intervention with these scores slowly decreasing until week six. This is associated with an increase in bingeing. These scores then either level out or increase between session six and 12. However, it is important to reiterate that data for week nine is missing. Given the curvilinear pattern, scores at FU are similar to the scores at baseline.

Participant 14

Participant 14 was a White British 18 year old woman. She was recruited from the ED Service and had experienced BN for four years. She had received no form of therapy in the past. She attended 11 group sessions. At assessment her global EDE-Q was in the clinical range and at FU it indicated a clinically significant improvement (5-2.46),

scoring at the 5th percentile rank (Aardoom, 2012). There was a reliable improvement in Participant 14's observe and non-judge mindfulness facets, but there was no change in her acceptance or EES scores.

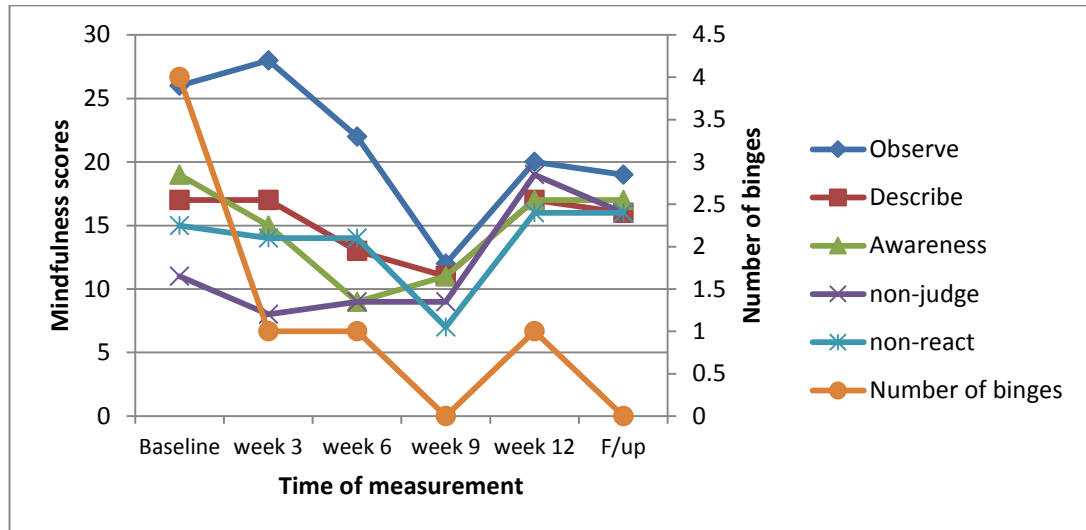


Figure 29. Participant 14 mindfulness scores and number of weekly binges.

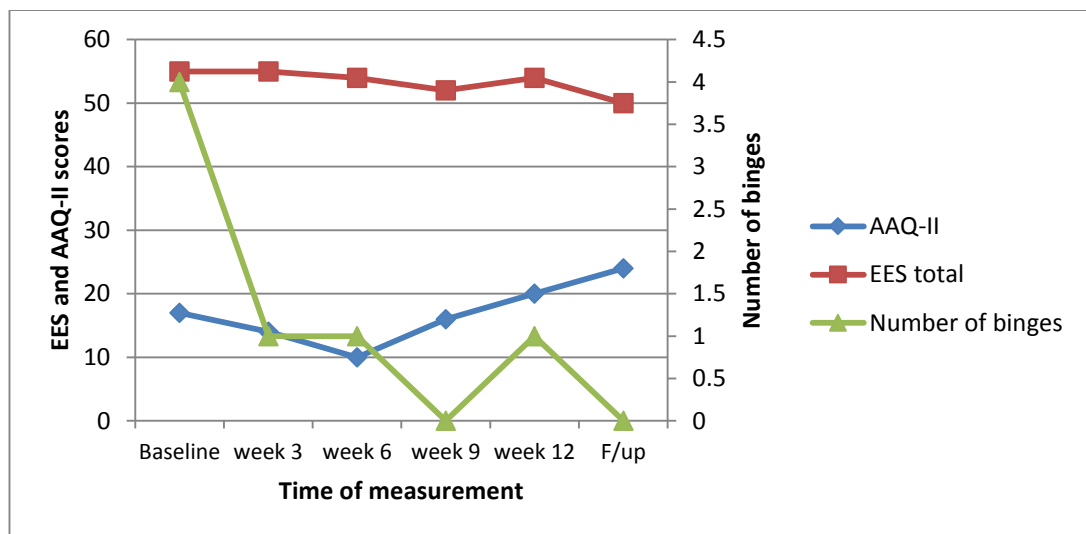


Figure 30. Participant 14 acceptance and emotional eating scores, and number of weekly binges.

From baseline to week three there was a large reduction in number of binges, however the EES remained relatively stable from baseline, during the intervention and at FU. The number of binges was variable throughout the intervention however, the reduction in the number of binges at FU correlates with the improvements in ED

severity. From week six to FU there was a steady but small increase in acceptance. With regards to mindfulness, from baseline to week nine the trend is for mindfulness to decrease, with the observe and awareness facets having the most noticeable reduction. Even though mindfulness and acceptance deteriorated, bingeing did not increase. Between week nine and 12, the trend was for mindfulness to increase, with observe, non-judge and non-react facets improving the most. At FU the mindfulness scores appeared to level out. Due to the curvilinear pattern, FU scores are similar to baseline scores. Participant 14's improvement in her EDE-Q pre to post score is not associated with a reduction in bingeing, but an increase in the behaviour.

Participant 15

Participant 15 was a 23 year old White British woman. She was recruited from the ED Service, and had been experiencing BN for one year. She had never engaged in therapy before. At assessment her EDE-Q global score was in the clinical range (4.34). There was a reliable improvement in Participant 15's describe, awareness and non-react mindfulness scores. Furthermore, there was a clinically significant improvement in her non-judge and acceptance scores, in addition to her EES score. Unfortunately it was not possible to collect data at FU, so analysis is conducted on baseline to week 12. She attended nine group sessions, but data is missing for session six and FU.

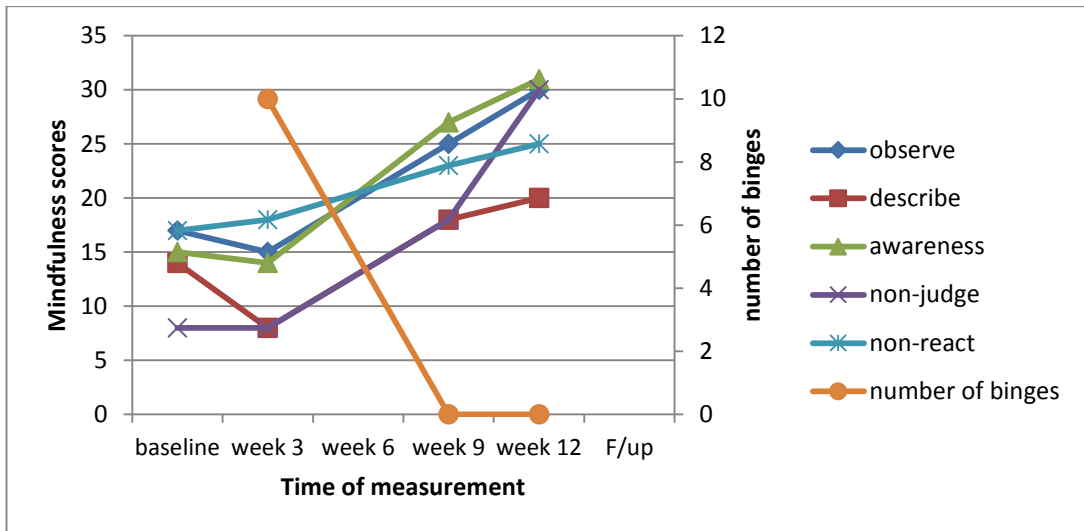


Figure 31. Participant 15 mindfulness scores and number of weekly binges.

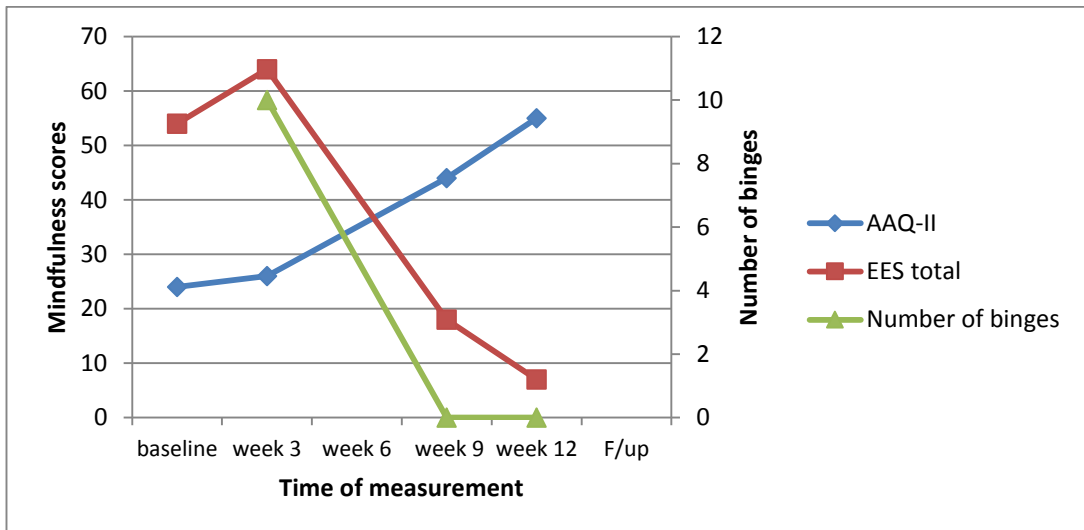


Figure 32. Participant 15 acceptance and emotional eating scores, and number of weekly binges.

Between baseline and session three, mindfulness and acceptance scores remained stable, except for the describe facet which noticeably deteriorated. However, there was a large improvement in mindfulness and acceptance scores between sessions three and six, and this trend continued until session 12. This period is also when bingeing reduces from 10 to zero, and this is associated with a reduction in the EES.

3.4 Summary of Results

A summary of the findings for each participant are shown in Tables 6 and 7. With regards to the participants EDE-Q scores from pre to post intervention, there was a clinically significant improvement in three (20%), a reliable improvement in four (26.7%), no change in four of the participants' scores (26.7%) and a deterioration in one (6.7%) of the participants scores. It was not possible to collect post EDE-Q scores for three (20%) participants. Therefore, the DBT skills group was associated with a reduction in ED symptom severity for at least half of the participants.

Table 6

Summary of EDE-Q and EES scores, and number of weekly binges from assessment to follow up per participant including Reliable and Clinically Significant Change Outcomes

Participant ID	Assessment			Follow up			Reliable and Clinical Change	
	EDE-Q	Number of weekly binges	EES score	EDE-Q score	Number of weekly binges	EES score	EDE-Q	EES*
1	4.55	0	80	3.24	0	28	Reliable Improvement	Clinically Significant Improvement
2	4.27	5	73	3.91	6	41	No Change	Reliable Improvement
3	3.69	4	50	1.76	2	13	Clinically Significant Improvement	Reliable Improvement
4	4.12	5	65	-	2*	57	-	No change*
5	4.48	12	81	5.29	17	87	Reliable Deterioration	No change
6	4.31	1	71	3.53	3	47	Reliable Improvement	No change
7	4.48	2	32	4.37	0	40	No Change	No change
8	4.75	3	58	0.67	0	9	Clinically Significant Improvement	Clinically Significant Improvement
9	4.19	5	41		3*	34	-	No change*
10	3.30	1	54	2.70	0	26	Reliable Improvement	Reliable Improvement
11	5.75	4	40	5.52	3	19	No Change	No change

Participant ID	Assessment			Follow up			Reliable and Clinical Change	
	EDE-Q score	Number of weekly binges	EES score	EDE-Q score	Number of weekly binges	EES score	EDE-Q	EES score*
12	4.66	3	71	2.65	0	44	Reliable Improvement	Reliable Improvement
13	1.27	0	47	1.59	1	36	No Change	No change
14	5	1	55	2.46	3	50	Clinically Significant Improvement	No change
15	4.34	10	54	-	*0	7	-	*Clinically Significant Improvement

* EES scores from assessment to session 12 were assessed due to lack of FU data.

Table 7

Summary of facets of mindfulness and acceptance scores per participant for assessment and follow up with Reliable and Clinically Significant Change Outcomes

Measure	P1	P2	P3	P4*	P5	P6	P7	P8	P9*	P10	P11	P12	P13	P14	P15*
<u>FFMQ:</u>															
Observe	.														
Assessment	15	19	24	17	16	27	26	32	23	24	18	27	16	26	17
Follow-up	26	24	27	26	16	31	37	37	29	25	22	37	31	19	30

Measure	P1	P2	P3	P4*	P5	P6	P7	P8	P9*	P10	P11	P12	P13	P14	P15*
Outcome	CSC	NC	NC	RC	NC	NC	CSC	RC	NC	NC	NC	RC	CSC	RC-D	NC
Describe															
Assessment	25	15	20	22	23	25	19	16	21	28	17	24	21	17	14
Follow-up	32	19	19	24	16	31	22	38	29	32	23	31	23	16	20
Outcome	RC	NC	NC	NC	RC-D	RC	NC	CSC	RC	NC	RC	RC	NC	NC	RC
Awareness															
Assessment	16	20	22	16	15	18	17	14	25	18	19	19	27	19	15
Follow up	23	21	16	20	19	26	23	32	28	25	14	22	26	17	31
Outcome	RC	NC	RC-D	NC	NC	RC	RC	CSC	NC	RC	RC-D	NC	NC	NC	RC
Non-judge															
Assessment	14	13	17	24	26	10	19	15	21	18	19	22	32	11	8
Follow up	20	20	11	23	22	24	23	34	25	28	21	28	30	16	30
Outcome	RC	RC	RC-D	NC	NC	CSC	NC	CSC	NC	RC	NC	RC	NC	RC	CSC
Non-react															
Assessment	16	15	17	16	14	11	17	9	17	20	11	22	24	15	17
Follow-up	26	21	8	17	11	21	20	26	17	21	20	24	23	16	25
Outcome	CSC	RC	CSC-D	NC	NC	CSC	NC	CSC	NC	NC	RC	NC	NC	NC	RC

Measure	P1	P2	P3	P4*	P5	P6	P7	P8	P9*	P10	P11	P12	P13	P14	P15*
AAQ-II															
Assessment	20	21	25	29	20	17	32	15	22	40	22	45	46	17	24
Follow-up	49	35	18	42	15	36	40	53	33	45	23	38	38	24	55
Outcome	CSC	RC	NC	RC	NC	CSC	RC	CSC	RC	NC	NC	NC	RC-D	NC	CSC

RC = Reliable Change (akin to Reliable Improvement), RC-D= Reliable Change-Deterioration (akin to Reliable Deterioration), CSC = Clinically Significant Change (akin to clinically significant Improvement).

* No follow-up data for participants Reliable and Clinically Significant change was calculated from baseline to session 12

Question 1. Are DBT skills groups associated with an increase in facets of mindfulness and acceptance in individuals with BN? If so, what is the pattern of change?

Mindfulness

Attending the DBT group was associated with improvements in mindfulness facets for 13 of the participants, with 5 (33.3%) participants improving in three or more facets. The number of facets, and which particular facets improved was idiosyncratic to each participant, however in assessing change on a group level the non-judge facet increased the most, although there was not a notable difference between facets in terms of frequency of improvement. Deterioration in mindfulness was found in three of the participants, with deterioration in only one facet for two of these. With regards to Participant 1 and Participant 8 who both had reliable and/or clinical improvements in all mindfulness facets, the pattern was for mindfulness to increase steadily throughout the intervention. In some participants the mindfulness facets appeared to change together. For instance, in Participant 10, all facets except for describe changed together from session six to FU. A curvilinear pattern in mindfulness scores was observed in Participants 12, 13 and 14 with skills worsening at the beginning and then improving around sessions six to nine. On the whole, mindfulness skills had worsened or remained the same at session three. However, this was not the case for participants who had improvements in four or more mindfulness facets (Participants 1, 6 and 8 except for 15). This may suggest that individuals whose skills improve in a number of mindfulness facets at the early stages of the intervention are likely to improve further compared to those individuals who experience a worsening of skills early on.

Acceptance

There were improvements in acceptance for eight of the participants (53.3%). An early and constant trend towards improvement was found in five participants,

whereas two participants improvement in acceptance occurred after the group had ended (between session 12 and FU).

The relationship between facets of mindfulness and acceptance was idiosyncratic and particular to each participant. It was observed that if a participant improved in three or more mindfulness facets this was associated with improvements in acceptance. However, those who had few or no change in mindfulness facets or deterioration did not improve in acceptance. This suggests that greater mindfulness is associated with acceptance.

Question 2. Are changes in mindfulness and acceptance associated with changes in bingeing and eating pathology?

Changes in binge eating were not always associated with changes in the global EDE-Q score. For example, Participant 7 had stopped bingeing at FU but there was no reliable change in EDE-Q from pre to post intervention. There appeared to be some association between mindfulness, acceptance and eating pathology however, this was not consistently the case. A reliable and/or clinical improvement in mindfulness as well as in acceptance was associated with improvements in EDE-Q and/or a reduction in bingeing (except participant 2 and 7). Furthermore, Participants 3 and 14 demonstrated clinical improvements in EDE-Q, and had both ceased bingeing at FU, but this was not accompanied with an increase in acceptance, with both participants deteriorating in one or more mindfulness facet(s). In reviewing the mindfulness facets that improved but were not associated with an improvement in ED severity, and the facets that did not change or deteriorated yet the participant's ED still significantly improved, the mindfulness facets that occurred most often were the non-react and observe facets. This could suggest that compared to other mindfulness facets they are less associated with symptoms in BN.

Question 3. Are changes in mindfulness, acceptance, eating pathology/ bingeing behaviour associated with changes in emotional eating?

The DBT intervention was associated with improvements in the EES for seven participants (46.7%), with three participants reporting a clinical improvement (20%) and four participants a reliable improvement (26.7%). The findings in relation to changes in the EES and its association with changes in mindfulness, acceptance and eating pathology are mixed. On the whole improvements in the EES were associated with improvements in the EDE-Q and a reduction in bingeing, however there were exceptions to the rule. For instance, Participant 2 reported improvements in the EES but not in the EDE-Q or bingeing. Furthermore, Participants 6 and 14 had improvements in eating pathology but this was not accompanied by a reduction in emotional eating. The association between acceptance and EES was mixed, with three participants reporting a reliable and/or clinical change in both (Participants 1, 2 and 15), whereas other participants (3, 4, 9, 10 and 12) reported improvements in either acceptance or emotional eating. All participants who reported improvements in the EES, other than Participant 3, also reported improvements in facets of mindfulness. However, it is unclear whether particular facets are more or less associated with emotional eating.

4.0 Discussion

There are challenges when attempts are made to combine the findings from several single case studies, or compare the findings from single case research to findings from group design research (Horner, Swaminathan, Sugai & Smolkowski, 2012). However, attempts have been made to elucidate the main themes.

4.1 Interpretation of the Research Findings

In the majority of cases a DBT skills group for BN appeared to lead to an improvement in mindfulness, however there is considerable variability amongst participants in how many and what particular facets improved. The results of this study suggest that the observe and non-react mindfulness facets may be less linked to change in ED symptoms. In previous research investigating the psychometric properties of the FFMQ, the observe facet was found to be a significant positive predictor of depression, in addition to not correlating with acting with awareness or non-judging (Christopher, Neuser, Michael & Baitmangalkar, 2012). Increased focus on negative thoughts and emotions is linked to rumination. Therefore, simply observing present moment experience is not necessarily beneficial unless it is accompanied with improvements in mindfulness more generally. Therefore, improvements in the observe facet could be associated with worsening symptoms as is the case for Participant 13. With regards to non-react, this finding is more surprising as it is expected that developing skills in allowing thoughts to come and go without getting 'caught up' would be instrumental in stopping bingeing, and allow make space for the opportunity to develop more helpful emotional regulation skills. However, this finding is consistent with previous research that has found inconsistent or limited results for the relationship between the non-react mindfulness facet, bingeing and emotional eating (Adams et al., 2012 & Levin et al., 2014).

The findings of this study highlighted the different patterns of improvements that may occur across individuals for instance, a steady and constant improvement versus a curvilinear pattern (with no change or deterioration between baseline and session three). The latter pattern is particularly interesting as the pattern of change is similar to what we would expect to see in an exposure therapy treatment for anxiety disorders. One hypothesis could be that the beginning of the group caused some individuals to experience negative emotions, and consequently resulted in them

'shutting off from these emotions', resulting in a decrease in mindfulness. The mindfulness module takes place between sessions two and four, and may account for the trend towards improvements for many participants observed at session six. However, worsening mindfulness at the beginning of the group is not necessarily associated with an increase in bingeing, which might be expected. Therefore, another hypothesis could be that participants rated themselves higher in mindfulness at assessment due to a lack of knowledge about the phenomena. Therefore, apparently worsening skills at the beginning of the group could be a reflection of the participant's increased understanding of the concept and recognition of their skill deficit.

It is difficult to compare changes in mindfulness and acceptance as mindfulness is understood to be a multifactorial construct whereas, acceptance is seen as a uni-dimensional construct. However, compared to mindfulness, acceptance appeared less responsive to change. This is consistent with Wildes and colleagues finding (Wildes et al., 2010) that people with ED tend to struggle to accept negative emotional experiences. Increased mindfulness skills appear to be associated with improved acceptance. This is consistent with the claim of Keng and colleagues (Keng et al., 2011) that mindfulness involves awareness and acceptance, and suggests that changes in mindfulness are necessary for changes in acceptance to occur. However, the particular mindfulness facets that were associated with acceptance were idiosyncratic to individual participants which suggest that the relationship between mindfulness and acceptance is more complex than what is currently understood. Furthermore, it is unclear whether improvement in a number of facets or the degree of change in particular facets relates to improvements in BN pathology. For a few participants, there were marked improvements in acceptance post intervention. This could be due to the fact that 'Radical Acceptance' was taught at session 10, and participants' may have needed time to consolidate their learning. Nevertheless in DBT, the dialectic tension of 'acceptance and change' is a thread that runs throughout

the intervention, and influences the therapist's approach and style (Chapman, 2006). In addition, it is thought that the mindfulness orientation encourages total acceptance of the individual, viewing their unhelpful behaviours as their best way of coping with emotional pain (Brodsky & Stanley, 2013). Therefore, you would expect acceptance to increase throughout the intervention. However, this finding may support Perroud et al. (2012) claim that the longer term DBT interventions may be more likely to increase mindfulness and acceptance. The formal concept of radical acceptance was only introduced at week 10 and measurement of it only occurred between two and six weeks after this. Therefore, the participants may understand the concept but be struggling to apply it. Acceptance is a psychological stance that may need much longer to occur than behavioural change.

The study findings suggest that overall improvements in mindfulness facets and acceptance are associated with a reduction in bingeing and/or improvements in ED severity. This would support the findings of Wupperman et al. (2013) that changes in harmful dysregulated behaviours are mediated by deficits in mindfulness. However, it is important to highlight that out of the seven participants who experienced improvements in mindfulness and acceptance, and a reduction in ED, three of those were receiving another form of support at the time of the intervention, with these three participants also being familiar with DBT i.e currently (or previously) receiving standard DBT at the PD Service and another participant having previously co-facilitated a DBT group. Therefore, there may be moderating variables that affect the relationship between DBT and mindfulness for instance, how familiar an individual is with DBT prior to the intervention.

Some participants showed a reliable change in mindfulness but this was not associated with a change in their EDE-Q score. For example, Participant 2 showed a reliable improvement in the non-judgemental facet, but this was not associated with improvements in EDE-Q or bingeing. On the other hand, Participant 3 showed a

reliable deterioration in awareness and non-react facets with a clinical improvement in EDE-Q. This counters previous research suggesting that a judgemental stance and lack of awareness underline ED pathology (Baer, 2006 & Levin et al., 2014). Furthermore, it indicates that treatment factors other than mindfulness and acceptance are likely to play a substantial role in bringing about change in ED symptoms for example, the emphasis placed on 'chain analysis' may be a form of exposure and response prevention and enable the individual to learn skilful new behaviour in-vivo (Lynch, Chapman, Rosenthal, Kuo & Linehan, 2006).

There appears to be an association between changes in the EES and bingeing and eating pathology in general. This supports previous theory that suggests that bingeing can be a means of regulating negative affect (Telch, 1997 & Lavender, Gratz & Tull, 2011). It is also consistent with the belief that teaching individuals' with BN more helpful ways of managing their emotions will reduce their reliance on bingeing by breaking the link between experiencing negative emotions and the urge to binge. However, this was not the case for all of the participants. For example, Participant 14 showed a substantial improvement in ED symptoms yet her EES remained stable throughout the group. This may suggest that individuals do not binge solely as a way of managing negative affect, and the act is likely to occur due to a number of factors, for example mindlessly eating in 'automatic pilot' leading to binge eating. Furthermore, it could suggest that when the relationship between negative emotions and the urge to binge eat is well rehearsed, the speed at which the EES reduces is slower. The relationship between improvements in the EES and the AAQ-II appear to be mixed. This finding may suggest that the relationship between emotional eating and experiential avoidance is more complex than currently thought. On the other hand, it may also highlight that there are a number of factors related to the reasons for emotional eating, and the cause is not just lack of acceptance.

4.2 Clinical Implications

If we simply focus on research that investigates pre to post change “*we enter the clinical arena with one hand tied behind our back*” (Kazdin, 2007). Therefore, the study’s focus changes in a range of measures ‘within-therapy’ provides clinicians with insight and observations about what individual change may look like and the speed at which change is likely to occur. The findings of this study suggest that individual’s mindfulness (and related symptoms) may initially deteriorate, or not improve straight away. This is useful information as there may be a tendency for clinicians to abandon treatment too quickly due to lack of responsiveness. Furthermore, it may be helpful to inform patients engaging in therapy of the fact that symptoms may not improve straight away to manage expectations, and this may also reduce patient drop out.

With regards to mindfulness, the general trend at FU was for it to stay the same or reduce. This is evidence of the importance of ‘relapse prevention’, and perhaps indicates the necessity of ensuring that enough time is spent on encouraging participants to continue practicing skills after therapy ends.

4.3 Limitations of this research study

This study did not use an experimental design. It did not include a control group and there was only a minimal length baseline phase. Participants chose to take part and were not randomised to treatment. As a result no causal claims can be made in relation to the effect of a DBT skills group on mindfulness and acceptance, and the consequences for BN symptoms, as other factors not related to the treatment may have been having an effect. This is particularly the case for those patients who were attending other therapies whilst in the group.

The method of assessing reliable change in the FFMQ presented a challenge due to the lack of reliability data in a comparable population. The median reliability coefficient of four studies that used the FFMQ with an as similar as possible group

was used, however this method is imperfect. There were no norms for the FFMQ and the AAQ-II therefore criterion (a) had to be used to assess clinical change. Criterion (a) is a conservative method, although depending on the degree to which clinical and functional population distributions are non-overlapping it may not be conservative enough.

The reliance on retrospective self-reports in itself can be problematic, especially given how elusive the concept of mindfulness is and how prone to misinterpretation it is. However attempts to record it in the moment would interfere with the act of 'being mindful'.

We were able to obtain further clinical information, pertaining to other diagnoses from participants recruited from the NHS, but we had no access to this information for participants recruited from the university site. It was beyond the scope of this study to conduct full diagnostic interviews with participants. Consequently, university participants may have had a co-morbid disorder that they did not disclose at assessment, and this may have impacted on the findings.

Only one of the group facilitators was formally trained in DBT, and the lack of expertise may impact on the results. However, this is likely to be a reflection of normal clinical settings, and three co-facilitators were training to a doctoral level in Clinical Psychology, and one was a qualified counselling psychologist. Furthermore, one of the aims of Anna Hall's (2015) study was to discover the feasibility of running such groups with non-specialist practitioners.

The author analysed the data, and was also involved in the running of two groups. This presents a potential source of bias with regards to the interpretation of the data. Also, participants who knew that the study contributed to the doctoral theses of two of the group facilitators may have felt obliged to report positively on their symptoms and the benefits of the group.

4.4 Future Research

There is clearly wide scope for research in this area. Initially it will be important to replicate these findings with different therapists for example, formally trained DBT therapists and/or assistant psychologists. It will be useful to study other BN populations for example, in inpatient settings, in addition to investigating differences in purging versus non-purging BN participants, to explore how mindfulness impacts on different compensatory behaviours.

Future research on this topic would benefit from a longer baseline period and larger numbers, using statistical methods to establish with more certainty whether a DBT skills group for BN impacts on mindfulness and acceptance and whether these changes mediate improvement in bulimic symptoms. It would be beneficial for future studies to include a control group or alternative treatment and for participants to be randomised. Furthermore, it would be useful for future research to include more frequent time intervals as this would provide a more detailed understanding of the complex relationship between mindfulness, acceptance and binge eating/ED pathology. Furthermore, it would highlight whether changes in mindfulness precede changes in symptoms of ED. It may be important for researchers to consider the length of the FU period, given the fact that for a sub-set of participants' improvements in acceptance occurred post intervention, this may be indicative of the need for a longer FU period.

It is important for future research to examine the effect of changes in mindfulness following DBT on BN symptoms other than bingeing, for example negative beliefs about weight and shape. Idiosyncratic measures rating the level of distress that certain beliefs elicit may be one way of assessing this. Qualitative research should be considered to explore BN individuals' experience of mindfulness and acceptance in DBT, and their perceptions of its impact on their difficulties.

5.0 Conclusions

To conclude, this study sought to investigate whether a DBT skills group for BN is associated with improvements in mindfulness and acceptance, and whether these improvements were associated with improvements in bingeing or reduction in overall ED symptoms. The research findings provide some evidence that DBT leads to an increase in mindfulness, and suggests that acceptance may be less responsive to change in DBT. The findings suggest that improvements in mindfulness and acceptance may be associated with a reduction in bingeing and ED pathology. It was important to explore *how* participants' mindfulness and acceptance improved, and not just *if* it improved. As a result, the study focused on changes that occurred 'within therapy' and highlighted the individual patterns of change that took place during the intervention. This exploratory approach meant that the study posed just as many questions as it answered, which indicates the need for further research in this area to develop and refine treatments for BN.

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Part 3: Critical Appraisal

This critical appraisal will first discuss the background to the research. It will then critically reflect upon some of the key methodological and conceptual issues encountered during the research process. Subsequent to this it will provide a personal reflection on conducting a clinical intervention in the context of research. The appraisal will conclude by commenting on the impact of the fact that a participant in the study later completed suicide, with particular consideration given to strategies that were considered helpful. The hope is that these reflections will be beneficial for future researchers who may have to deal with this distressing experience.

Background

I met with a potential supervisor who informed me about the current project investigating the effect of Dialectical Behaviour Therapy (DBT; Linehan, 1993) on mindfulness and acceptance. As an eager trainee clinical psychologist with an interest in Acceptance and Commitment Therapy (ACT; Hayes, Strosahl & Wilson, 2004), I was keen to learn more about another 'third wave' CBT approach. Furthermore, I had recently started practicing mindfulness meditation, had developed an interest in Buddhist philosophy and was keen to further my understanding of its application to Clinical Psychology. Although the research topic was very attractive to me, as it was a quantitative project it was a challenging prospect to me as I felt more comfortable using qualitative research methods. Low recruitment numbers presented the opportunity to use a single case design, and this was more congruent with my interest in research as its focus was on the 'individual'. The tension between my clinical and research identity, in addition to my personal views is something that I grappled with at various points throughout the research process.

Methodology

Recruitment from the NHS

The study experienced a much lower recruitment number than was anticipated. This was surprising considering how many mental health services and General Practitioner (GP) practices in the NHS Trust (where the research was taking place) were contacted and informed about the project. Upon reflection there are a couple of factors that may have contributed to the difficulties in recruitment. Successful recruitment requires the support of clinicians, and it is a time huge time investment for all involved. This may feel too much of a burden for over-stretched clinicians. I recall having a conversation about the study with one of the clinicians who worked at one of the research sites. They explained to me that they had not referred any potential participants because they thought that patients should complete their treatment programme first, and if they were still symptomatic at the end of treatment, they would then refer the patient to our study. This could suggest the importance of researcher visibility to act as a memory aid and to answer any questions about the study to increase clinician understanding. On the other hand, it could highlight clinicians' need to ensure that they are delivering effective patient care, which may result in them being sceptical of the research, and present a barrier to recruitment. This demonstrates the importance of building good relationships with the clinicians working at the research sites in order to build trust and persuade them of the research's relevance. In light of the above, rather than contacting a large volume of services (that may already be inundated with research requests) it may have been more advantageous to build a research team of clinicians who were willing to promote the research, and help with recruitment.

Recruitment from UCL

Recruiting participants with bulimia nervosa (BN) from the university site was surprisingly easier than I had envisaged, and easier than recruiting from specialist

services in the NHS. The National Union of Students (NUS) conducted an online survey of 1,200 higher education students and found that 20% of them identified with having a mental health problem (NUS, 2013). This suggests that university students are a group that are potentially at risk of developing mental health problems and require support. As a result university students are a viable option for conducting clinical research trials. Drewnowski, Hopkins and Kessler (1988) found the prevalence of BN in a university sample of 1,007 participants was 2.2. This suggests that it is a relatively common problem for students, and a good recruitment source for research in BN.

All of the students self-identified after they saw a poster informing them of the study. The poster contained both our telephone number and email address, although all of the students chose to express their interest via email. 23 students got in touch regarding the study, however only 12 students were assessed as a number of them did not respond to my reply; said that they had changed their mind or did not attend assessment. Furthermore, three assessed students disengaged prior to the start of the intervention. Although they appeared to be contemplating seeking help this behaviour demonstrates ambivalence. When a student emailed about the study they were sent the Participant Information Sheet (PIS) in the reply email. In retrospect this may have been daunting to the student. Although more time consuming, it may have been more helpful to arrange a time to speak with them on the telephone first to help ease any anxieties they may have had and promote engagement. Despite these issues if we had decided to recruit from the university site earlier in the process we would have been able to increase our sample size.

Measures

The Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 2008) is a measure used to assess eating disorders (ED) in research and clinical practice. It could be suggested that the EDE-Q is not consistent with mindfulness

based therapies underlying assumptions about the nature of psychological distress. These approaches attribute psychological distress to a maladaptive way of experiencing or responding to negative thoughts, rather than solely to the existence of the thoughts. Questions 22 to 28 on the EDE-Q assess ED related cognitions and feelings for example, 'how dissatisfied have you been with your weight?' and 'how uncomfortable have you felt about others seeing your shape or figure...?' These questions assess for the presence of such thoughts but do not capture an individual's relationship to these thoughts. ACT would suggest that negative thoughts are part of the human condition, and emphasis the necessity of approaching these thoughts non-judgementally and with acceptance whilst still engaging in values directed behaviour e.g. eating a balanced diet. It could be suggested that although the EDE-Q captures behaviour change, it does not capture a change in the individual's *experience* of ED cognitions and feelings. This may suggest that it is timely for new measures of ED pathology consistent with the assumptions of mindfulness based approaches.

After reviewing a number of mindfulness measures I decided to use the Five Facet Mindfulness Questionnaire (FFMQ; Baer, Hopkins, Krietemeyer & Toney, 2006) due to the fact that it built on previous mindfulness questionnaires and proposed five distinct facets of mindfulness. Furthermore, it seemed to make sense theoretically to conceptualise mindfulness as five facets, with each facet possibly contributing to eating pathology. However, my research findings suggested that the 'non-react' mindfulness facet may not be associated with BN. This is surprising as theory would suggest that non-reactivity to inner experiences would play an important role in reducing eating pathology. However Tran, Gluck and Nader (2013) found the non-react facet to be a weak indicator of its intended construct due to low item discrimination and construct irrelevance. Furthermore, in a community sample the facet showed inconsistent associations with mental health (Baer et al, 2006). Therefore, the non-react mindfulness measure may not be measuring what it is

supposed to. If this is the case it questions the validity of my findings and suggests that the non-react facet may need revising.

Intervention

A few participants told me that there were too many strategies to learn over the course of the intervention. The DBT manual for BN (Safer, Telch & Chen's, 2009) is a 16 session intervention, and we condensed this into 12 sessions for the purpose of our study and reduced the number of skills taught. However, this feedback suggests that it may have been helpful to reduce the number of skills taught further. Furthermore, a number of participants were concerned about *doing* mindfulness properly, with this tendency being most pronounced in the university participants. Additionally, there was a very high homework completion rate across all groups. It is important to note that women with BN tend to struggle with issues around perfectionism, control, and can be very self-critical (Franco-Paredes, Mancilla-Diaz, Vazquez-Arevalo, Lopez-Aguilar & Alvarez-Rayon, 2004). It will be important for clinicians to keep this in mind when working with women with BN. This may especially be the case in a group intervention, where participants are able to compare themselves to their peers.

Follow Up

Although the follow up (FU) period was relatively short, for seven of the participants (the university students) it occurred during an extremely stressful time of their lives i.e. exam period. Subsequently, during this time they were experiencing an increased level of anxiety, which for all of them was a trigger for bingeing. This demonstrates ecological validity and improvements in mindfulness and acceptance during a highly stressful time which is a strength of the study. Overall, five of the participants demonstrated an improvement in mindfulness and/or acceptance, and three of them showed an improvement in their EDE-Q score. This adds further support

for the effectiveness of DBT for BN for helping individuals with BN manage their emotions.

Conceptual Issues

This is the first study investigating changes in mindfulness and acceptance following DBT for BN. In hindsight it may have been premature to look at whether a DBT group intervention is associated with an increase in mindfulness and acceptance, if this has not yet been established in individual DBT therapy. This is because it is generally difficult to answer *why* group interventions work and whether the mechanisms of change in a group context are comparable to mechanisms of change in individual therapy (Cruwys, Haslam, Fox & McMahon, 2014). Cruwys et al. (2014) conducted a study investigating mechanisms of change for individuals' with ED symptoms in a non-clinical sample after receiving a preventive body acceptance group programme. They found that observing one's peers argue against the 'thin ideal' and observing them no longer embrace that ideal can be a powerful trigger for individual change. This is consistent with feedback that I received from one of the participants. When asked at FU whether she would recommend any changes to the programme, she said that what she had found most helpful was the group discussions and listening to how other group members applied the skills to their difficulties. This participant suggested that having more time dedicated to this would be helpful. This highlights how beneficial vicarious learning is, and the importance of getting the balance right between group discussion and didactic teaching.

For a couple of participants improvements in ED symptoms did not seem to be associated with changes in mindfulness, and this was more so the case for acceptance. It may have been useful to include measures of emotional regulation (ER) and/or distress tolerance (DT) to assess how they change throughout the DBT intervention, in addition to their relationship to mindfulness and acceptance. For instance, participants may be using practical DT skills for example distraction, to help

them tolerate negative affect in the short term so that ER can take place at a later date. Much of the research to date in EDs is focused on the role of mindfulness, ER and acceptance however, recent research findings illustrate the importance of DT (Corstorphine, Mountford, Tomlinson, Waller & Meyer, 2007; Anestis, Selby, Fink & Joiner, 2007). This is something that is lacking in the current study, and its inclusion in future research is recommended.

Personal reflections on conducting research

Research design

It would have been beneficial to use a mixed method approach. However, given the fact that the research design changed quite late in the research process, this was not possible. Due to the lack of research on mechanisms for change in DBT for BN it will be useful to gain an understanding of the participant experience of 'mindfulness' and 'acceptance' in the DBT group intervention, and their beliefs about its relationship to their ED. Furthermore, this would have enabled me to triangulate findings from alternative data sources (Banister, Burman, Parker, Taylor & Tindall, 1995). What I found surprising was how readily participants were to provide feedback on their experience of the intervention, and due to not obtaining these accounts in a standardised interview I am left feeling as though all of this rich data will be lost. Where appropriate I have tried to ensure that the participants 'voice' is heard in this critical appraisal.

Intervention

I was fortunate to gain experience facilitating a group in the NHS and one at the university setting, with the first of the two groups taking place in the NHS. I had no prior experience in facilitating group interventions in a research capacity. As someone who has more experience working therapeutically on an individual basis, the pull to over-step my researcher role was something that I was mindful of during

the intervention. This 'pull' towards my trainee clinical psychologist role was especially strong when a participant presented with potential risk issues or when they approached me for further support, and I felt a 'need' to give them extra time. However, this was not possible in my role as a researcher as it would have compromised the validity of the intervention. The knowledge that all of the NHS participants were under the care of either the ED or Personality Disorder service and were being reviewed in their respective services helped to ease my apprehensions as I was able to liaise with a named clinician if/when necessary. Furthermore, I was running the group in a NHS setting with my external supervisor and the researcher who I was working jointly with, and as a result felt supported. However, my experience of facilitating the university group was quite different. The participants recruited from the university site were not under the care of an NHS service, and at the point of assessment a large proportion of them were not registered with a local GP and only registered with one subsequent to assessment so that they were eligible to attend the intervention. Consequently, none of the participants had regular sessions with an NHS professional, and I was their only contact in relation to their mental health difficulties and this resulted in me feeling an increased sense of duty. This was further compounded by the fact that I was also a student (albeit as a trainee clinical psychologist) at the university site where the study took place and on a couple of occasions passed the participants on campus. It was a challenge for me to negotiate these different identities in the same setting. I found supervision helpful in discussing and managing these issues. In hindsight it would have been helpful to work closer with the university's psychological services to think about how best to support the students. For example, it may have been helpful for the student psychology service to be more involved in the research process. One example could be reviewing the student participants prior to the group starting, half way through and at the end of the group. This is especially the case given the potentially destabilising effect of learning mindfulness skills. As individuals' learn to stop running from and getting entangled

with their emotions, they come face to face with the material that has kept them stuck (Hayes & Feldman, 2006). This resonates with one of the university participant's feedback at FU. She explained that for someone who found it difficult to face their negative emotions the intervention was not long enough and said that the intervention would be most helpful for individuals who have previous experience of receiving support for mental health difficulties.

A participant suicide

One month after the completion of the groups, I was informed that one of the participants in my group had sadly ended her life. I was made aware of this in the context of an already stressful time in my life. I had been undergoing a number of physical health investigations and was behind in the write up of my thesis. This was a tremendous blow to me. In a review of the literature investigating the response of therapists to client suicide, the most common reaction that therapists described were anger, sadness, grief, shock, anxiety, guilt and doubt about competence (Knox, Burkard, Jackson, Schaack, Hess, 2006). At the time it was difficult to disentangle how I was feeling, and I wanted to avoid my emotions and disengage from the research. However, focusing on the write up turned out to be a welcomed distraction from my emotions. Similar to what happens when a person experiences bereavement, it is a process that you have to go through. What helped me through this process was talking to my peers and research (and clinical) supervisors. The Clinical Psychology Doctorate course was very supportive, and a couple of the clinical tutors also spoke to me at length about this. Brown (1987) stated that when a trainee experiences a patient suicide training programmes should provide both emotional support and an intellectual context for understanding and growing from the experience. Although very difficult, the experience has helped me grow as a clinician and as a researcher. For example, I am much more thoughtful about termination of therapy.

Conclusion

At conception, my hopes for this research were in hindsight overly ambitious. I hoped that the research would help illuminate the key mindfulness facets that were associated with attending a DBT group intervention and improvements in BN. However, this was not the case, as patterns of change were idiosyncratic to individual participants. This is still helpful to know. However, what this study does offer is useful information about the pattern of change in mindfulness and acceptance, which will be helpful for clinicians and individuals receiving a group DBT intervention to know.

Despite the recruitment difficulties, and how time consuming it was doing a clinical intervention, I do feel fortunate to have had the experience of delivering a clinical intervention for my research study. Having the space to reflect on practical issues around the implementation of the study and clinical issues that arose throughout the course of the research study in relation to the participants' mental health difficulties has enabled me to develop my research and clinical skills.

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Appendices

Appendix I: Table of Summary of Studies included in the Literature Review

Reference	Design	Recruited from	Experimental group	Comparison group	Measures for Eating Disorder and Eating Disorder severity	Measures for Emotional Abuse	Additional Outcomes (and measures used)	Key Findings
Allison, K.C et al. (2007)	CS	community	BED, n= 176 Night Eating Syndrome (NES), n= 57	Overweight/Obese (OC) , n= 38	SCID-I/P, EDE Interview	CTQ	The Beck Depression Inventory-II (BDI)	<p>BED scored above more clinical cut – points for maltreatment scores (2.4) than OC (1.4, $p < 0.01$) but not the NES group (1.8)</p> <p>There was no sig. diff between the groups on mean CTQ emotional abuse score. BED group (13.0) scored approx double the mean score of the other groups (NES = 6.7, OC=6.5) on emotional neglect and this diff. was sig at 0.01.</p> <p>BDI-II total score was significantly correlated with all types of maltreatment, except physical neglect; emotional abuse (r 0.30), emotional neglect (r 0.27), physical abuse (0.18) and sexual abuse (0.14).</p>
Bardone-Cone, C.M et al. (2008)	CS	Community/ Local ED Clinics	Total BN, n= 138 101 (73.2%) reported no hx of AN 37 (26.8%) reported hx of AN		SCID-P, Criteria for binge eating was established by using the EDE Interview, Eating disorder symptomology was assessed using the EDEQ-Version 4	CTQ	Frost Multi-dimensional Perfection Scale (MPS), Barratt Impulsivity Scale (BIS)	<p>Women with BN hx AN reported significantly higher levels of abuse and neglect compared with women with BN without hx AN. This difference was driven mainly by physical abuse, with emotional abuse and emotional neglect scoring second and third respectively (with medium effect sizes)</p>
Becker, D.F & Grilo, C.M. (2011)	CS	Community	BED, n= 137		SCID-I/P, EDE Interview	CTQ	BDI-II, Rosenberg Self Esteem Scale (RSES)	<p>Emotional neglect reported by 66% of participants and emotional abuse by 52%.</p>

Reference	Design	Recruited from	Experimental group	Comparison group	Measures for Eating Disorder and Eating Disorder severity	Measures for Emotional Abuse	Additional Outcomes (and measures used)	Key Findings
Carretero-Garcia, A et al. (2012)	CS	ED: Hospital (outpatient) HG: University	Eating Disorder Group, n= 150 AN-R, n =33 AN-P, n = 48 BN-P, n= 69	Healthy Control Group, n=150	DSM-IV	Clinical Interview	The Dissociation Questionnaire (part 1), Bulimic Investigatory Test Edinburgh (BITE)	<p>Observed very few statistically sig. associations with variability in psychiatric comorbidity or eating psychopathy; Emotional abuse was sig. associated with dysthymic disorder.</p> <p>Age at dieting onset had a negative association with emotional neglect.</p> <p>No sig. relationship found between BDI score and any of the maltreatment types.</p> <p>Statistically sig. negative relationship found between RSES score and emotional abuse, emotional neglect, physical neglect and sexual abuse.</p> <p>30.1% of ED group reported emotional abuse. Emotional abuse was the most common traumatic event; AN-R, 23.3%, 31.9% for both AN-P and BN-P. Emotional abuse was also most common abuse for HCG. For the AN-P and BN-P group traumatic events tended to occur during childhood whereas, for the AN-R group they occurred in adolescence.</p> <p>No statistical difference found for type of traumatic event (isolated or repeated) and symptom and symptom severity.</p>
Dunkley, D.M et al. (2010)	CS	Community	BED, n= 170 treatment seeking overweight BMI>25		SCID-I/P	CTQ	BDI-II, Rosenberg Self-Esteem Scale (RSES)	<p>Emotional abuse and emotional neglect was sig. associated with self-criticism (sig level 0.001 for the former and 0.05 for the latter). Self-criticism mediates the relationship between emotional abuse and depressive symptoms and body dissatisfaction.</p>

Reference	Design	Recruited from	Experimental group	Comparison group	Measures for Eating Disorder and Eating Disorder severity	Measures for Emotional Abuse	Additional Outcomes (and measures used)	Key Findings
Fosse, G.K & Holen, A. (2006)	CS	Psychiatric hospital outpatients	BN, n= 12 AN, n= 9	Psychiatric Comparison Group without BN, n= 95	Inventory based on criteria of DSM-IV	CTQ - 21 item shorter version	Olweus 1991 inventory for school children – bullying, Parental Bonding Inventory	Women with BN sig. higher on emotional and physical abuse (< 0.05). For AN no sig. diffs found for any types of abuse in childhood. BN scored sig. higher on father over protection (< 0.01) compared to non-BN group and lower on father care (<0.05).
Grilo and Masheb. (2001)	CS	Outpatients	BED, n=145	Female normative sample, n = 1125 (Walker, 1999)	DSM-IV, Questionnaire on eating and weight patterns-revised, EDE-Q	CTQ	The Body Shape Questionnaire, The Beck Depression Inventory, The Rosenberg Self Esteem Scale	The most common form of maltreatment; emotional neglect (69%) followed by emotional abuse (59.3%). Emotional abuse had the strongest association with 3 other forms of maltreatment (physical abuse, physical neglect and emotional neglect; 0.44 or greater). No sig. differences in freq. of any forms of maltreatment by gender or obesity. Emotional abuse was sig. associated with higher body dissatisfaction and depression and lower self-esteem (p <0.03) in men and women. Maltreatment not associated with age at first overweight, age at onset of binge eating or age of diagnosis.
Grilo, C.M & Masheb, R.M. (2002)	CS	Adult outpatient	BED, n= 116	Drug or alcohol dependency, n = 390 (Bernstein et al, 1998) Adult female normative sample, n =	SCID-I	CTQ	DSM-IV-Personality Disorders	The BED group scored highest for emotional abuse and emotional neglect compared to the other groups; 52.6% of the group reported emotional abuse, and 67.2% reported emotional neglect. Emotional abuse was sig. associated with PD (Cluster C; patients with avoidant PD were more likely to report emotional abuse compared to patients without avoidant PD)

Reference	Design	Recruited from	Experimental group	Comparison group	Measures for Eating Disorder and Eating Disorder severity	Measures for Emotional Abuse	Additional Outcomes (and measures used)	Key Findings
Groleau, P et al. (2012b)	CS	Bulimic Spectrum Disorders Group (BSD): Specialised Eating Disorder Program	Total BSD group, n = 176 BN – Purging, n = 123 BN – Non-purging, n = 13 EDNOS – binge purge subtype, n = 34	NE, n = 139	EDE The Eating Attitudes Test	CTI	The Centre for Epidemiological Studies for Depression (CES-D) Ineffectiveness and Perfectionism subscales of the Eating Disorder Inventory-2 (EDI-2) Affective Instability subscale of the Dimensional Assessment of Personality Pathology-Basic Questionnaire (DAPP-BQ)	80.7% of BSD reported emotional abuse (most freq. category). All forms of abuse were sig. more common in BSD than NE group. Emotional abuse was sig. correlated with physical and sexual abuse. Rel. between emotional abuse and symptom severity was partially mediated by ineffectiveness. The rel. between emotional abuse and dieting was fully mediated by ineffectiveness, and the rel. between emotional abuse and oral control was partially mediated by affective instability.
Groleau, P et al. (2012a)	CS	Specialised Eating Disorder Program	Total BSD, n = 216 BN – Purging, n = 136 BN – Non Purging, n = 11 EDNOS, n = 69		EDE	CTI	Dimensional Assessment of Personality Pathology-Basic Question: sensation seeking, affective instability and Compulsivity Subscales, Barrat Impulsivity Scale	79.5% reported emotional abuse (highest category). No gene (dopamine)-environment interaction effects found for emotional abuse.
Hartt, J & Waller, G. (2001)	CS	Eating Disorder Clinic	BN, n = 15 BED, = 3 AN –BP n = 5		DSM-IV, The Bulimic Investigatory Test, Edinburgh (BITE)	The Child Abuse and Trauma Scale (CATS)	The Young Schema Questionnaire, The Dissociative Experiences Scale II	No sig. relationship found between severity of abuse reported and severity of bulimic symptoms. Severity of emotional abuse not related to severity of bulimia or to severity of dissociation. Severity of neglect was

associated with severity of dissociation. Emotional abuse and neglect correlated with beliefs about; Emotional inhibition, Mistrust/abuse, and Vulnerability to harm. Emotional abuse also correlated with Defectiveness/shame (Young Schema Q).

Reference	Design	Recruited from	Experimental group	Comparison group	Measures for Eating Disorder and Eating Disorder severity	Measures for Emotional abuse	Additional Outcomes (and measures used)	Key Findings
Jaite, C et al. (2011)	CS	Adolescent Mental Health Inpatient	AN-R, n = 50 AN-P, n= 27	Healthy control, n = 44	DSM-IV, The structured Inventory for Anorexic and Bulimic Syndromes (SIAB-EX)	CTQ		AN-BP had sig. higher scores on all CTQ subscales in comparison with patients with AN-R and control participants. Emotional abuse and emotional neglect was most prevalent in the AN-BP group, with 52% and 71% reported respectively. There was no sig. diff between AN-R and control participants on any of the subscales. 18.5% of AN-BP reported severe emotional abuse compared to 2% of AN-R and 0% of control group.
Johnson, J.G et al. (2002)	Cohort	Community	Families, n = 782		The parent and youth versions of the Diagnostic Interview Schedule for Children, DSM-IV	Info from child protective agencies registers obtained by researcher, Disorganizing Poverty Interview, self-report	The California Psychological Inventory, The Hopkins Symptom Checklist, The New York High Risk Family Interview	Fifty-two participants (6.6%) received a diagnosis of an ED during adolescence or early adulthood. Low paternal time spent with the child and low paternal affection was associated with elevated risk for problems with eating or weight during early adulthood. Participants who experienced 3 or more types of maladaptive paternal behaviour were approx.3 times more likely to have an ED during adolescence or early adulthood; this was partly mediated by low offspring identification with the father. The rel between maternal maladaptive behaviour and risk for offspring ED was not sig.
Kugu, N et al. (2006)	CS	University Sample	BED, n = 6 BN, n = 15	Healthy Control, n = 21	SCID-I, EAT	Childhood Abuse and Neglect Questionnaire	Rosenburg Self Esteem Scale, Family Assessment Device (FAD)	38.1% had emotional abuse in ED group compared with 4.8% in control group (sig higher). Scores for communication in the family, family unity and emotional attachment in the family were found to be statistically sig

Reference	Design	Recruited from	Experimental group	Comparison group	Measures for Eating Disorder and Eating Disorder severity	Measures for Emotional abuse	Additional Outcomes (and measures used)	Key Findings
Laporte, L et al. (2001)	CS	Psychiatric outpatients	BPD, n =33	AN-R, n = 34 No Clinical difficulties, n = 35	SCID, Eating Attitudes Test	Family Interview for Protectiveness and Empathy	Diagnostic Interview for Borderlines, Borderline Syndrome Index, Revised Symptom Checklist-90	AN group reported the lowest level of verbal abuse (35%) compared to borderline (71%) and non-clinical (39%). 29% of AN group reported experiencing more than one type of abuse and they scored sig. higher on Interpersonal Sensitivity and Phobic Anxiety subscales compared with AN who had experienced no abuse or one type of abuse. However, no sig diff was found in the level of psychopathology between the abused and non-abused AN women.
Lejonclou, A et al. (2014)	CS	Eating Disorder CAMHS service	ED group, n = 50 AN, n = 23 BN, n = 8 EDNOS, n = 19	non clinical group, n = 245	ICD-10, EDE-Q	Linköping Youth Life Experience Scale (LYLES)		Women in ED group reported sig. more diff types of adverse childhood events than the non-clinical group. Whereas, the non-clinical group reported a larger number of non-interpersonal trauma events. The ED group reported sig. more emotional abuse compared to non clinical group (50% compared to 34%). There was no sig. diff found between trauma experiences and ED groups. No sig. correlation between number of traumatic experiences and ED severity as measured on EDE-Q. The ED group(86%) reported higher frequency of repeated trauma compared to non-clinical sample (52%).
Racine, S & Wildes. J, 2015	CS	Inpatient and outpatient	AN, n =188 AN-P, n = 105 AN-R, n = 83		SCID-I, EDE	Childhood Trauma Questionnaire-Short Form (CTQ-SF)	Difficulties in Emotional Regulation Scale	Reports of emotional abuse and sexual abuse were significantly correlated with emotion dysregulation and AN symptom severity, with the magnitude of the emotional abuse-emotion dysregulation relationship being significantly larger than the sexual abuse-

lower in the study group. Self-esteem scores were significantly lower in the study group.

emotion dysregulation relationship. Emotion dysregulation significantly mediated the relationship between emotional abuse and AN symptom severity. AN type (AN-B/P or AN-R) did not moderate this effect. Emotional abuse was not related to symptom severity when controlling for emotional dysregulation.

Reference	Design	Recruited from	Experimental group	Comparison group	Measures for Eating Disorder and Eating Disorder severity	Measures for Emotional Abuse	Additional Outcomes (and measures used)	Key Findings
Schoemaker, C et al. (2002)	CS	Community	BN, n =38	<p>Healthy control group, n= 1350</p> <p>Substance use disorder control group, n =62</p> <p>Dual diagnosis control, n =61</p> <p>Healthy Control group, n = 1350</p> <p>Psychiatric control = 476</p>	DSM-III-R, The Composite International Diagnostic Interview (CIDI)	Clinical Interview		<p>BN Group reported highest rate of psychological abuse compared to other groups (40%). The Dual Diagnosis group scored highest rate of neglect with BN group second (51% and 47% respectively). The BN group was sig. more likely to have experienced psychological abuse compared to health control, substance use and psychiatric control group but not dual diagnosis group. The BN group reported sig. more incidents of multiple abuse (40%) compared with healthy control and substance abuse control, but not psychiatric and dual diagnosis group. Study found that much of the effect of multiple abuse can be attributed to psychological abuse alone. More complex presentation of BN (BN + PSY+ SUD) reported 66% psychological abuse whilst BN pure reported 11% and BN+PSY reported 39%. The same pattern was also reported with neglect.</p>
Vaja, A & Lang, A. (2014)	CS	?	<p>Adolescents</p> <p>AN, n= 26</p> <p>BN, n =18</p>	Secondary school girls, n = 31	DSM-IV, ICD-10	Child abuse and Trauma Scale (CATS)	Difficulties in Emotion Regulation Scale	<p>Sig. diff in reported emotional abuse/ neglect between ED group and comparison group (BN group scoring highest). For anorexia, bulimia and control group the individuals who reported more emotional abuse and negative home environment/neglect scored higher on the DERS. The anorexia group scored the highest DERS score.</p>

Reference	Design	Recruited from	Experimental group	Comparison group	Measures for Eating Disorder and Eating Disorder severity	Measures for Emotional Abuse	Additional Outcomes (and measures used)	Key Findings
Webster, J.J & Palmer, R.L. (2000)	CS	Eating Disorder Service (inpatient and outpatient)	Eating Disorder, n = 80 BN, n = 32 AN, n = 28 MIXED, n = 20	Maj Dep Group, n = 40 Non-Clinical Group, n = 40	DSM-III-R	Childhood Experience of Care and Abuse Interview (CECA)	Sexual Life Events Inventory	AN compared with non-clinical group showed no sig diff in any of the variables. In contrast, BN group reported sig more indifference, discord, lack of care and overall adversity compared to non-clinical group. The MIXED group showed similar picture to the BN group. Maj. Dep group did not differ sig. compared to BN or MIXED. However, scored sig. higher than AN for indifference, antipathy, control and lack of care.
Wonderlich, S.A et al. (2007)	CS	Clinics, university, community	BN, n = 123		EDE, SCID-I/P	CTI	Ecological Momentary Assessment (EMA), The Diagnostic Interview for Borderlines-Revised, The profile of Mood States, The Positive and Negative Affects States	No one abuse type is uniquely associated with BN symptoms. Emotional abuse was associated with greater ED pathology whether evaluated independently from other forms of abuse or controlling for the effects of other abuse. No abuse category was independently sig. associated with lifetime anxiety or substance misuse disorder. However, abuse categories analysed simultaneously were sig. associated with greater likelihood of lifetime anxiety. No abuse type sig. associated with bingeing. Emotional abuse was sig. associated with higher ratings in anger-hostility and higher levels of negative affect.
Wiles, J.E et al. (2008)	CS	Outpatients	Bariatric Surgery patients, n = 230		SCID-I	CTQ	SCID-II (assess for PD)	A history of childhood maltreatment was associated with having a greater number of axis I diagnoses. Emotional abuse was sig. associated with increased rates of mood and anxiety disorders, but not ED. Emotional neglect was sig. associated with increased rates of mood disorders. ED not associated with other types of maltreatment either.

Women were sig. more likely than men to report to report emotional abuse (P=0.03).

Appendix II: Quality of Studies Analysis

Study	1. What type of research question is being asked? – Is it clearly defined?	2. Was the study design appropriate for the research question?	3. Did the study methods address the most important potential sources of bias?	4. Was the study performed according to the original protocol?	5. Does the study test a stated hypothesis?	6. Were the statistical analyses performed correctly?	7. Do the data justify the conclusions?	8. Are there any conflicts of interest? If so are they stated.	Total
Alison K.C, et al. (2007)	1	1	0.5	1	0	1	1	1	6.5
Bardone-Cone, C.M et al. (2008)	1	1	1	1	0	0a	1	1	6
Becker, D.F & Grilo, C.M. (2011)	1	1	0.5	1	0	0b	1	1	5.5
Carretero-Garcia, A et al. (2012)	1	1	0.5c	1	1	1	0	1	6.5
Dunkley, D.M et al. (2010)	1	1	0.5	1	1	1	1	1	7.5
Fosse, G.K & Holen, A. (2006)	1	1	0.5d	1	1	1	1	1	7.5
Grilo & Masheb (2001)	1	1	0.5e	1	0	1	1	0	5
Grilo, C.M & Masheb, R.M. (2002)	1	1	1	1	0	1	1	1	7

Study	1. What type of research question is being asked? – Is it clearly defined?	2. Was the study design appropriate for the research question?	3. Did the study methods address the most important potential sources of bias?	4. Was the study performed according to the original protocol?	5. Does the study test a stated hypothesis?	6. Were the statistical analyses performed correctly?	7. Do the data justify the conclusions?	8. Are there any conflicts of interest? If so are they stated.	Total
Groleau, P et al. (2012b)	1	1	1	1	1	1	1	1	8
Groleau, P et al. (2012a)	1	1	1	1	0	1	1	0	7
Hartt, J & Waller, G. (2001)	1	1	0.5f	1	1	1	1	0	6.5
Jaite, C et al. (2011)	1	1	0.5g	1	1	0	1	0	5.5
Johnson, J.G et al. (2002)	1	1	0.5	1	0	1	1	0	5.5
Kugu, N et al. (2006)	1	1	0.5	1	0	1	1	0	5.5
Laporte, L et al. (2001)	1	1	0.5	1	0	1	1	0	5.5
Lejonclou, A et al. (2014)	1	1	0.5j	1	1	0j	1	0	5.5
Racine, S & Wildes. J. (2015)	1	1	1	1	1	1	1	0	7

Study	1. What type of research question is being asked? – Is it clearly defined?	2. Was the study design appropriate for the research question?	3. Did the study methods address the most important potential sources of bias?	4. Was the study performed according to the original protocol?	5. Does the study test a stated hypothesis?	6. Were the statistical analyses performed correctly?	7. Do the data justify the conclusions?	8. Are there any conflicts of interest? If so are they stated.	Total
Schoemaker, C et al. (2002)	1	1	0.5	1	1	1	1	0	6.5
Vaja, A & Lang, A. (2014)	1	1	0k	1	1	1	0	1	6
Webster, J.J & Palmer, R.L. (2000)	0	1	1	1	0	1i	1	0	6
Wiles, J.E et al. (2008)	1	1	1	1	0	1	1	1	7
Wonderlich, S.A et al. (2007)	1	1	1	1	1	1	1	0	7

Note: Coding: 1 = yes, 0 = no or unable to determine

Question 3: 1 = more than half met, 0.5 = half or fewer met, 0 = none met, see further tables further

a Bardone-Cone, C.M et al. (2008) there were only 37 participants with BNhxAN compared with 101 reporting BN with no hx of AN. Therefore there was low power to detect effect due to the smaller N with regards to the perfectionism and Impulsivity measures. BMI could have been controlled for as a possible confounding variable.

b Becker, D.F & Grilo, CM. (2011) The authors did not adjust for the number of statistical tests that they performed.

c Carretero-Garcia, A et al. (2012) did not use an objective interview for collecting information on experiences of maltreatment. Did not report information on reliability and validity of the DIS-Q and BITE questionnaire. In addition, authors did not use the same measurement tool to investigate maltreatment in Control and experimental group, nor did they specify the properties of the 'ad hoc questionnaire'.

- d Fosse, G.K & Holen, A. (2006) The authors only used a screening tool to assess Eating Disorders. Although the tool is based on DSM-IV it is not a validated measure. Also, they may not have found a significant relationship between anorexia and maltreatment due to the small sample size (n = 9 for anorexia).
- e Grilo & Masheb. (2001) authors did not state inclusion and exclusion criteria for participants. Impacts on replicability.
- f Hartt, J & Waller, G.(2001). Study had a small sample size and the response rate was approximately only 50%. Authors comment on the fact that power analysis indicate that they needed a sample size of 88 (they had 23) would be necessary to ensure that they find an effect if there is one there.
- g Jaite, C et al. (2011). The authors did not correct for the likelihood of type 1 error when conducting multiple test comparisons. The authors recruited the controls from secondary schools however, they do not state the gender distribution of the control group and how it compares to the experimental group. Therefore, age could be a confounding variable.
- h Johnson, J.G et al. (2002) Authors do not comment on whether there were any losses to follow up.
- i Webster, J.J & Palmer, R.L, (2000) The authors compared each disorder group with the control group. Their research conclusions would have been more interesting if they would have compared disorder groups with each other also on abuse.
- j Lejonclou, A et al. (2014) the study had a 43.1% non-response rate for the clinical group meaning that the sample was not representative of the population. Also, small sample size meant that the authors may not have found an effect if there was one present between the groups. The authors did not correct for possibility of type 1 error when conducting multiple tests.
- k Vaja, A & Lang, A. (2014) The authors did not report BMI for study and control group. This could be a confounding variable and bias the findings of the study. The authors did not provide the necessary sampling information.

Cross- Sectional Studies: Did the study methods address the most important potential sources of bias?

Study	1. Was the study sample clearly defined?	2. Was a representative sample achieved (e.g. was the response rate sufficiently high)?	3. Were all relevant exposures, potential confounding factors and outcomes measured accurately?	4. Were patients with a wide range of severity of disease assessed?	Score given
Alison K.C, et al. (2007)	1	1	1	0	3
Bardone-Cone, C.M et al. (2008)	1	1	1	1	4
Becker, D.F & Grilo, C.M. (2011)	1	1	1	0	3
Carretero-Garcia, A et al. (2012)	1	1	0	1	3
Dunkley, D.M et al. (2010)	1	1	1	0	3
Fosse, G.K & Holen, A. (2006)	1	1	0	0	2
Grilo and Masheb. (2001)	0	1	1	1	3

Study	1. Was the study sample clearly defined?	2. Was a representative sample achieved (e.g. was the response rate sufficiently high)?	3. Were all relevant exposures, potential confounding factors and outcomes measured accurately?	4. Were patients with a wide range of severity of disease assessed?	Score given
Grilo, C.M & Masheb, R.M. (2002)	1	1	1	1	4
Groleau, P et al. (2012a)	1	1	1	1	4
Groleau, P et al. (2012b)	1	1	1	1	4
Hartt, J & Waller, G. (2001)	1	0	1	1	3
Jaite, C et al. (2011)	1	1	1	0	3
Kugu, N et al. (2006)	1	1	1	0	3
Laporte, L et al. (2001)	1	1	1	0	3

Study	1. Was the study sample clearly defined?	2. Was a representative sample achieved (e.g. was the response rate sufficiently high)?	3. Were all relevant exposures, potential confounding factors and outcomes measured accurately?	4. Were patients with a wide range of severity of disease assessed?	Score given
Lejonclou, A et al. (2014)	1	0	1	1	3
Racine, S & Wildes. J. (2015)	1	1	1	1	4
Schoemaker, C et al. (2002)	1	0	1	0	2
Vaja, A & Lang, A. (2014)	0	0	1	0	1
Webster, J.J & Palmer,R.L. (2000)	1	1	1	1	4
Wonderlich, S.A et al. (2007)	1	1	1	1	4
Wiles, J.E et al. (2008)	1	1	1	0	3

Note: 1 = yes, 0 = no or unable to determine.

Cohort Study: Did the study methods address the most important potential sources of bias?

Study	1. Is the study prospective or retrospective?	2. Is the cohort representative of a defined group or population?	3. Were all important confounding factors identified?	4. Were all important exposures and/or treatments, potential confounding factors and outcomes measured accurately and objectively measured in all members of the cohort?	5. Were there important losses to follow up? 1=No 0=Yes	6. Were participants followed up for a sufficient length of time?	Score given
Johnson, J.G et al. (2002)	Prospective	1	1	1	0	1	4

Note: 1 = yes, 0 = no or unable to determine.

Outline of Joint Working

As previously stated this project was a joint project carried out in conjunction with another Doctorate in Clinical Psychology Trainee, Anna Hall, who was considering the feasibility of a 'brief 12 week Dialectical Behaviour Therapy skills group for bulimia nervosa'.

Recruitment, data collection and data recording for the current study were conducted jointly with another trainee sharing the sample. Both trainees were equally involved in each stage. However, Anna Hall conducted an additional group with an NHS sample.

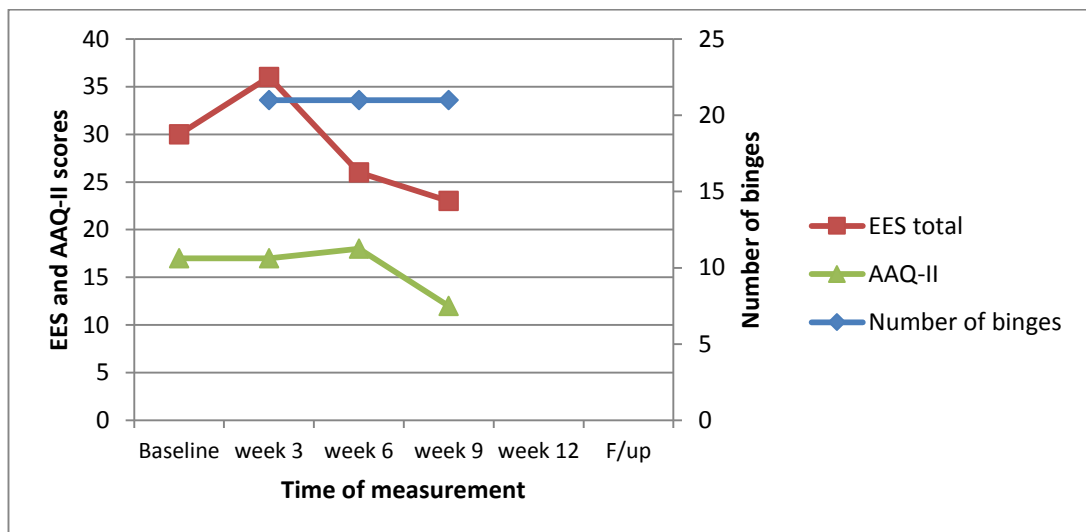
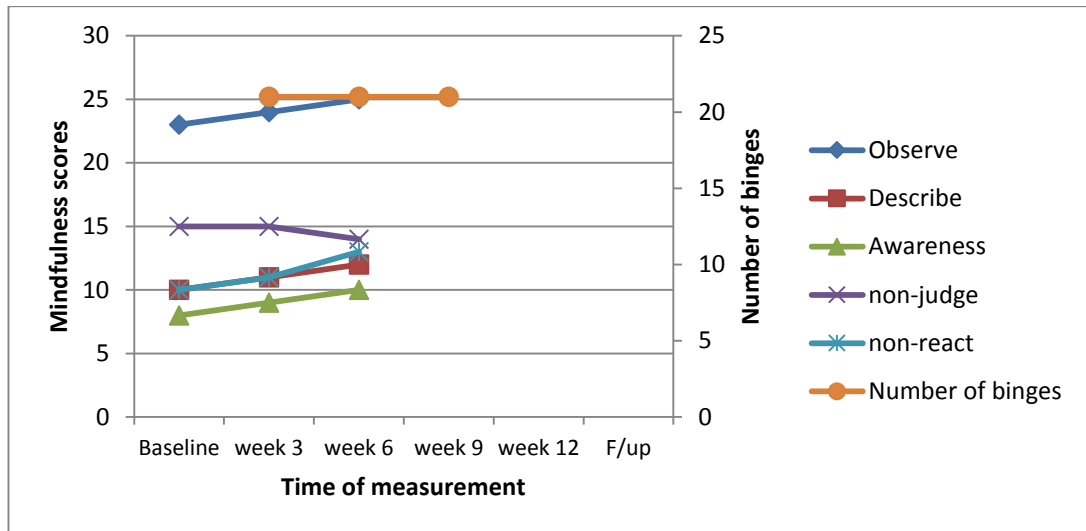
All theoretical conceptualisation, data analysis and write up were done independently and the focus of the studies were different, with Hall (2015) focusing on the feasibility of the intervention.

Reference:

Hall (2015) A brief Dialectical Behaviour Therapy skills group for bulimia nervosa: A feasibility study

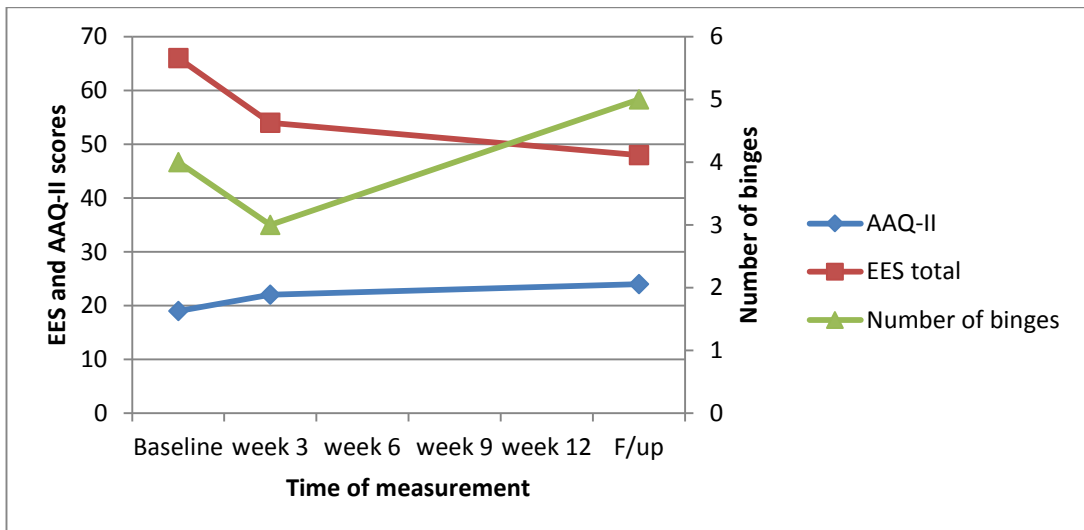
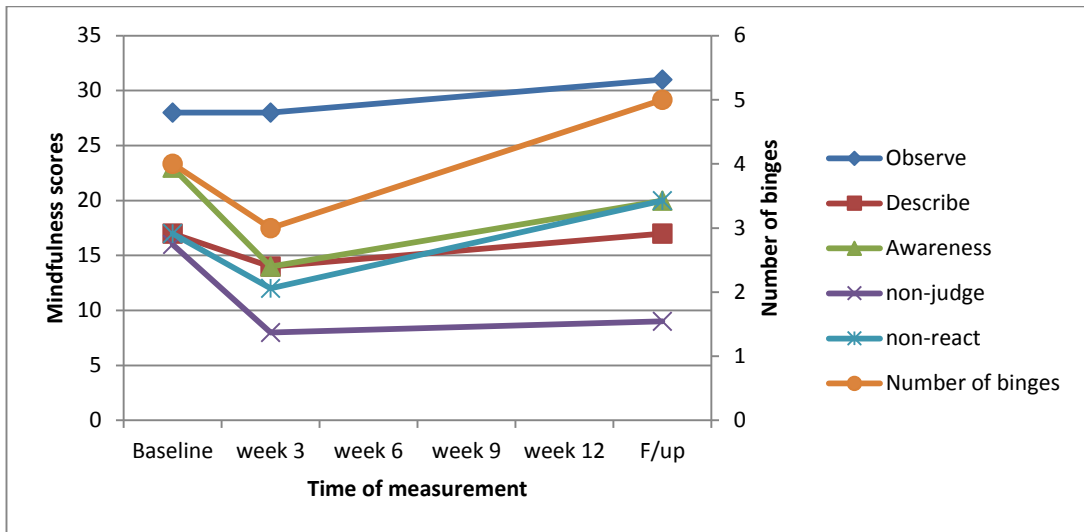
Participant 16

Participant 16 attended seven DBT group sessions. Although she completed the intervention we were only able to obtain two outcomes during the intervention, and had no FU data for her.



Participant 17

Participant 17 attended eight group sessions. She completed the intervention, but we were only able to complete data at one time point during the intervention.



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Therapist/GP Information Sheet
Version 7 (11/06/2014)

Researchers: Anna Hall and Sharlene Akinyemi

Group Dialectical Behaviour Therapy for bulimia nervosa: An effectiveness study
DClinPsy students' research project

You are being asked to invite your patients to take part in a research study. This sheet will give you some more information about why the study is being carried out, what your patient would be asked to do if they decided to take part, and how the study will be conducted.

Broad Outline of the Study

Bulimia nervosa affects approximately 1% of 16-35 year old women, many of whom do not receive mental health care (Hoek, 2006; NICE guidelines, 2004). The NICE guidelines (2004) note significant psychiatric co-morbidities and physical complications associated with eating disorders, demonstrating the importance of good mental health care.

Previous research has shown an important link between the ability to manage emotions and the occurrence of bingeing and purging. There is a model of bulimia nervosa that suggests that bingeing and purging are a way of controlling negative emotions. Dialectical Behaviour Therapy (DBT) is a therapy that aims to help people understand their emotional experiences and learn to regulate their emotions in healthy ways. There have been a small number of studies showing that DBT is an effective treatment for reducing bulimia nervosa symptoms.

This research study is interested in the feasibility of running a 12 week DBT group for people with bulimia and whether the group leads to improvements in bulimic symptoms. It is also interested in whether DBT groups increase mindfulness and acceptance skills in individuals with bulimia nervosa. If DBT is shown to be effective, the study will investigate whether improvements in mindfulness and acceptance predicts improvements in bulimic symptoms. The results of this study could have important implications for the treatment of bulimia nervosa in the future.

Research Questions

1. Does a 12-week DBT group lead to improvements in the participant's symptoms of bulimia, emotional eating difficulties, and daily functioning?
2. Is a 12 week DBT group feasible? This includes the acceptability of the intervention to participants, the ability to recruit to the intervention, retention rates in the intervention, and the acceptability and usefulness of the measures selected.
3. Are there any differences in improvement in symptoms and functioning between those participants with co-morbid personality disorder symptoms and those with bulimia nervosa alone?
4. Do the participant's levels of mindfulness and acceptance increase throughout the group?

If improvements in mindfulness and acceptance are found, do they predict improvements in bulimic symptoms?

5) Methodology

This study involves up to 96 female participants with a diagnosis of bulimia nervosa attending an assessment session, a 12 week DBT group intervention and a follow-up session.

6) Sample

Females between the ages of 18 and 65 years old with a diagnosis of bulimia nervosa and a BMI greater than 18 can take part in the study. Bulimia nervosa is diagnosed if an individual is bingeing and purging at least once a week for a period of 3 months or more, if their self-evaluation is unduly influenced by concerns about weight/shape and if they have a sense of lack of control over eating. Participants must be able to understand and communicate in conversational English.

Site Recruitment and Consent

Participants will be recruited from across the four boroughs covered by mental health services and primary care services of the North East London Foundation Trust (NELFT). Invitations will be sent to all patients who meet the inclusion criteria on the waiting lists of IMPART (personality disorder service), the Eating Disorder service, the four Psychology services, and the four Improving Access to Psychological Therapies (IAPT) teams. In addition the intervention will be offered to clients who meet criteria, as identified by their care coordinators, in the four community clinic services (formerly psychiatric outpatients). Posters will be displayed in the waiting rooms of local GP surgeries and information sent to all GP practice managers in the four relevant boroughs (Barking and Dagenham, Waltham Forest, Havering and Redbridge).

Individuals who respond to an invitation to participate in the study will be invited to an assessment session and given a Participant Information Sheet. In the assessment session the study will be explained in detail and participants can ask any questions they have about the study. If they consent to participate in the study they will be asked to sign a consent form that informs them that they have a right to not participate in the study and can decide they no longer want to participate at any time.

GPs and clinicians in the services named above will be asked to identify potential participants and give those who are interested Participant Information Sheets.

Methods of Data Collection

Demographic details will be recorded for all participants once they have consented to participate in the study. The participants will be asked to complete a number of questionnaires at the assessment, throughout the group and at the follow-up session. The questionnaires are outlined below:

- Standardised Assessment of Personality – Abbreviated Scale (SAPAS)
- Eating Disorder Examination Questionnaire (EDE-Q)
- Borderline Evaluation of Severity over Time (BEST)
- Emotional Eating Scale (EES)

- Work and Social Adjustment Scale (WSAS)
- Service Utilisation Questionnaire
- Five Facet Mindfulness Questionnaire (FFMQ)
- Acceptance and Action Questionnaire (AAQ_2)

At the assessment appointment and the follow-up appointment participants will be asked to fill in all of the above questionnaires (these will take approximately 50 minutes to complete). During the group intervention participants will be asked to complete four of those questionnaires on a weekly basis (taking approximately 20 minutes) and two of those questionnaires every three weeks (taking approximately 15 minutes). To minimise the potential burden of completing questionnaires participants will be given the option of completing the weekly questionnaires on an electronic system which enables them to complete them on home computers, smart phones or tablets.

At the follow-up session participants will also be asked if they are willing to stay for a short qualitative interview. The 30 minute interview aims to find out how participants experienced the group and what they found helpful or unhelpful.

Data Analysis

Pre-treatment and post-treatment scores will be compared using statistical tests to evaluate whether there are any statistically significant differences. The primary outcome measure is the number of bingeing and purging episodes. Statistical tests will be used to investigate whether PD symptoms have an impact on the improvement of bulimic symptoms. Statistical tests will also be used to investigate how changes in mindfulness and acceptance are associated with changes in bulimic symptoms.

Because this is a feasibility study we will also be reporting descriptive statistics on dropout rates and will look for any differences between those that drop out and those that complete treatment.

The qualitative interview will be evaluated using thematic content analysis which draws out the main themes and ideas in people's interviews.

Ethical Approval

This study has been approved by *NAME* Research Ethics Committee.

Funding

This study is being funded by UCL Student Research Funds.

Project Team

Dr. Janet Feigenbaum: Strategic and Clinical Lead for Personality Disorder Services, North East London NHS Foundation Trust and Senior Lecturer at the Research Department of Clinical, Educational and Health Psychology, UCL.

Tel: 0300 555 1213

Email: janet.feigenbaum@nhs.net.

Dr Lucy Serpell: Lead Clinical Psychologist for the Eating Disorder Service, North East London NHS Foundation Trust and Lecturer at the Research Department of Clinical, Educational and Health Psychology, UCL.

Tel: 0207 679 5964

Email: l.serpell@ucl.ac.uk

Ms Sharlene Akinyemi: Trainee Clinical Psychologist at the Research Department of Clinical, Educational and Health Psychology, UCL.

Tel: 07798 585 147

Email: sharlene.akinyemi.10@ucl.ac.uk

Mrs Anna Hall: Trainee Clinical Psychologist at the Research Department of Clinical, Educational and Health Psychology, UCL.

Tel: 07798 585 147

Email: annahall3@nhs.net

References

National Institute for Health and Clinical Excellence (2004). *Eating disorders: Core interventions in the treatment and management of anorexia nervosa, bulimia nervosa and related eating disorders (CG9)*. London: National Institute for Health and Clinical Excellence.

Hoek, H.W. (2006). Incidence, prevalence and mortality of anorexia nervosa and other eating disorders. *Current Opinion in Psychiatry*, 19, 389-394.

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Participant Information Sheet
Version 7 (21/05/2014)

Researchers: Anna Hall and Sharlene Akinyemi

Group DBT for bulimia nervosa: An effectiveness study

We would like to invite you to take part in our research study. Before you decide we would like you to understand why the research is being done and what it would involve for you. One of our team will go through the information sheet with you and answer any questions you have. We'd suggest this should take about 20-30 minutes. Please take some time to read this sheet, and to discuss it with other people if you wish. You are also very welcome to ask us any further questions about the study, or if you find anything on this sheet unclear.

Part 1 of the information sheet

What is the purpose of this study?

Previous research has shown an important link between the ability to manage emotions and the occurrence of bingeing and purging. There is a model of bulimia nervosa that suggests that bingeing and purging are a way of controlling negative emotions. Dialectical Behaviour Therapy (DBT) is a therapy that aims to help people understand their emotional experiences and learn to regulate their emotions in healthy ways. There have been a small number of studies that show DBT is an effective treatment for reducing bulimia nervosa symptoms. There are two parts to this study. Firstly, this study is investigating the feasibility of running 12-week DBT skills groups for individuals with a diagnosis of bulimia nervosa. We will be investigating whether a 12-week DBT skills group is an acceptable intervention and whether it is effective in reducing bulimic symptoms. Secondly, the study aims to investigate whether DBT groups increase mindfulness and acceptance skills in individuals with bulimia nervosa. If DBT is shown to be effective, the study will investigate whether increases in mindfulness and acceptance predict improvements in bulimic symptoms.

Why have I been invited to take part?

You have been invited to take part in this study because a healthcare professional has identified you as someone who has bulimia nervosa or difficulties with bingeing and purging. We aim to recruit approximately 96 people to take part in our study.

Do I have to take part?

No. Taking part in the study is entirely voluntary. It is your choice whether or not you would like to participate. Deciding not to take part in the study will not affect the care you receive from services either now or in the future.

If you do decide to participate, you will be given this information sheet to keep, and you will later be asked to sign a consent form stating that you wish to take part. If you do give consent to take part in the study, you are still free to leave the study at any point, without giving a reason. This will not affect the care you are currently receiving, or will receive in the future. If you decide to withdraw from the study, you can request that all of the information that you have provided be removed by the researcher.

What will happen to me if I take part?

If you wish to take part in the study, then please ring us on 07798 585 147 and we will arrange a time to discuss the study in more detail and to complete the first assessment. Alternatively, if you prefer, you can ask the member of staff who gave you this information sheet to ring us and pass on your contact details. We can then contact you to arrange a convenient time to meet. At this meeting, you will meet with Anna Hall or Sharlene Akinyemi (primary researchers) or another member of the research team and you can ask any other questions you may have. You will then be asked to sign a consent form to say that you wish to take part in the study.

At the assessment appointment you will be asked to fill in eight questionnaires about your mood, your bulimic symptoms and your use of NHS services (the questionnaires will take approximately 50 minutes to complete). The assessment appointment will take approximately one and a half hours to complete. After this meeting, if you agree you would like to go ahead with the study, we will book you into a DBT group running in North East London. You will be asked to attend all 12 sessions of the group, which will run weekly. However we understand that people sometimes have to miss sessions, due to unforeseeable circumstances, and you will not be excluded from the study if this happens. Each group session will last for a duration of two hours. One month after the group has finished we will invite you back for a follow-up session in which we will ask for feedback about the group and ask you to fill in the same questionnaires you filled out in your first assessment.

The main aim of the follow-up session is to find out how you experienced the group and what you found helpful. Your opinions and experiences will help inform the conclusions of our research. As a result we would like to record the follow-up sessions. However this is not compulsory, and if you do agree to your session being recorded, we will ask you to sign a consent form.

As an acknowledgement of your time, we will be offering you a £5 voucher for your participation in the assessment session and a £10 voucher for your participation in the follow-up session. You will receive both of the vouchers when you attend the follow-up session. If you do not attend the follow-up session your £5 voucher from the assessment session will be posted to you.

The meetings and the groups will take place at NHS settings across North East London. From now until the follow-up session, the length of your involvement in our research study will be approximately four months. We will be conducting the research until October 2015.

No part of the study is compulsory, and it is not related to the care that you receive from your GP, hospital or other mental health professionals.

What will I have to do?

If you decide to take part in our research you will be expected to attend the assessment appointment, 12 weekly DBT group sessions and a follow-up appointment. Furthermore, you will be required to complete questionnaires about your mood and bulimic symptoms.

What are the possible disadvantages and risks of taking part?

Some people can find it upsetting to talk about their personal experiences. However, we will support you if you become upset because this is an important part of the therapy. We will also signpost you to other support services if you need further support. You can get further support from your GP, Mental Health Direct and the Samaritans. We will also provide the contact details of the Chief Investigator, Janet Feigenbaum and the Research Supervisor, Lucy Serpell should you need additional support.

People may find filling out a number of questionnaires time consuming and inconvenient. We will ask you to complete eight questionnaires at the assessment and follow-up appointments, this will take approximately 30 minutes. We will ask you to complete four of those questionnaires on a weekly basis (approximately 15 minutes) and two of those questionnaires every three weeks (approximately 10 minutes). Some of these questionnaires are the same or similar to questionnaires that you would be asked to complete in routine practice but others will be beyond standard practice. To minimise the potential burden you will be given the option of completing the weekly questionnaires on an electronic system which can be accessed via the internet and therefore, enables you to complete the questionnaires on your home computers, smart phones or tablets.

What are the possible benefits of taking part?

You may find the therapy effective for learning how to manage your bulimia nervosa and the information gathered during this study will also help to inform our understanding of treatment for bulimia nervosa, which will hopefully be a step towards improving interventions in the future.

What happens when the research study stops?

The results of the research study will be written up as part of Anna Hall's and Sharlene Akinyemi's theses for the Clinical Psychology Doctorate at University College London (UCL). The report of the study could also be published in relevant journals outside UCL. As mentioned, you will not be identifiable from these results. At the end of data collection we will invite you to a meeting to review the results and help us make sense of what we found. In addition we will send you a copy of the report of the study.

What if there is a problem?

Every care will be taken in the course of this study to protect you. Any complaint about the way you have been dealt with during the study or any possible harm you might suffer will be addressed. The detailed information on this is given in Part 2.

Will my taking part in the study be kept confidential?

Yes. We will follow ethical and legal practice and all information about you will be handled in confidence. The details are included in Part 2.

Part 2 of the information sheet

What if relevant new information becomes available?

If this happens, your research therapist might consider you should withdraw from the study. They will explain the reasons and arrange for your care to continue.

What if there is a problem?

If you wish to complain, or have any concerns about any aspect of the way you have been approached or treated by members of staff, you should initially contact Dr Janet Feigenbaum, who is the Chief Investigator for the research, and is based both in NELFT and University College London. If she is not able to resolve the complaint or you are not satisfied with her actions then the normal National Health Service complaints mechanisms are available to you. Please ask your research therapist if you would like more information on this.

If you suspect that harm is the result of UCL or the hospital's negligence then you may be able to claim compensation. After discussing with your research therapist please make the claim in writing to the Dr Janet Feigenbaum, Chief Investigator at IMPART Goodmayes Hospital, Barley Lane, Ilford, IG3 8XP. The Chief Investigator will then pass the claim to the Sponsor's Insurers, via the Sponsor's office. You may have to bear the costs of the legal action initially, and you should consult a lawyer about this.

In the unlikely event that you are injured by taking part, compensation may be available. If you suspect that the injury is the result of the Sponsor's (University College London) or the hospital's negligence then you may be able to claim compensation. If this is the case you may make the claim in writing to Dr Janet Feigenbaum, who is the Chief Investigator for the research. She will then pass the claim to the Sponsor's Insurers, via the Sponsor's office. You may have to bear the costs of the legal action initially, and you should consult a lawyer about this.

Will my taking part in the study be kept confidential?

If you give us consent, we will inform your GP of your participation in this study. If you are currently on the waiting list for a psychological therapy service we will also inform them when you start and complete the study. However, information collected during all stages of the study will be kept strictly confidential. Any information that we collect can only be viewed by members of the research. However, if through the course of the study we became concerned about risk of harm to yourself or others, based on NHS policy, this information will be shared with clinicians involved in your care, if necessary.

Your consent form will be kept in a separate location from your questionnaires, ensuring that this remains anonymous. All data will be stored in secure locations and on computers or flash drives which are password protected. Any published data will also be entirely anonymous meaning individuals cannot be identified.

The data from this study will be stored in accordance with the UCL and NHS Data Protection and Records Management policies.

Who is organising and funding the research?

The research has been organised by Anna Hall and Sharlene Akinyemi, Trainee Clinical Psychologists. They are conducting this study as part of their Clinical Psychology Doctorates. The research will be funded by UCL.

Who has reviewed this study?

This study has been reviewed by the research committee in the clinical psychology department at UCL, by the NELFT Research and Development department and by Bloomsbury Research Ethics Committee.

Further information

Patient Advice and Liaison Service (PALS); they are an independent contact that you can address questions to about taking part in this research:

King Georges' Hospital

Barley Lane
Ilford
Essex
IG3 8YB
Telephone: 0800 389 8324

Contact Details of Researchers

If you wish to contact us to discuss any of the information further or any concerns you have about the study, then please do so by ringing 07798 585 147.

If you feel that we have not addressed your questions adequately or if you have any concerns about our conduct, then please contact our supervisor Dr. Janet Feigenbaum (Strategic and Clinical Lead for Personality Disorder Services, North East London NHS Foundation Trust and Senior Lecturer, Research Department of Clinical, Educational and Health Psychology, UCL) on 0300 555 1213 or by email at janet.feigenbaum@nhs.net.

Thank you very much for taking the time to read this information sheet.

Anna Hall and Sharlene Akinyemi
Trainee Clinical Psychologists
IMPART
Goodmayes Hospital
Barley Lane
Ilford
IG3 8XP

Version 2 (31/01/2014)
Researcher: Anna Hall

Do you have **bulimia**?

Do you **struggle** with bingeing and purging?



We are running a research study into the effectiveness of Dialectical Behaviour Therapy (DBT) for people with bulimia nervosa. We are running 12-week DBT groups for people who would like support to manage their bulimia.

If you are interested in participating in our study or would just like to find out more then contact us on the number or email below.

annahall3@nhs.net
07798 585 147

sharleneakinym@nhs.net
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research department of clinical,
educational and Health Psychology
UNIVERSITY COLLEGE LONDON
GOWER ST
LONDON
WC1E 6BT



Study Number: 14/0104
Patient Identification Number for this trial:

Consent Form
Version 5 (02/07/2014)
Researchers: Anna Hall and Sharlene Akinyemi

Group DBT for bulimia nervosa: An effectiveness study

CONSENT FORM

Before participating in this research study, please read the Participant Information Sheet Version 7 (21/05/2014) and then, if you are happy to participate, complete this form.

Please read the statements below. If you agree with a statement please initial the box next to it and then write your initials and the date, and sign the form in the spaces provided. Your consent form will be stored in a secure location separate from your questionnaires. This will ensure that your completed questionnaire pack remains anonymous. Thank you.

5. I confirm that I have read and understand the Participant Information Sheet Version 6 (26/03/2014) for the above study and have had the opportunity to consider this information, ask questions and have had these answered satisfactorily.
- 7) I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. I understand that if I withdraw from the study, I can request that all of the information I have provided will be removed by the researchers.
- 8) I understand that my participation in the follow up session, and consent to be audio recorded is voluntary. I understand that my decision will not affect

my care after the follow up session. I understand the recording will be used for the purpose of research only, and will be stored in keeping with the data protection act, 1998.

- I understand and agree that my GP will be informed of my involvement in the study, as will any other mental health professionals involved in my care.
- 9) I understand that the information that I provide will be included in the researchers' doctoral thesis, will be published in a scientific journal,
- 10) and may be presented at a national or international conference. I understand that all information included will be anonymised to protect my identity.
- 11) I give my consent to take part in the above study.
- 12) I understand that relevant sections of my medical notes and data, collected during the study may be looked at by individuals from the research team, from regulatory authorities or from the NHS Trust, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.

Please write your initials and the date, and sign below:

INITIALS	
DATE	
SIGNATURE	

Researchers details:

INITIALS	
DATE	
SIGNATURE	



Health Research Authority

National Research Ethics service

**NRES Committee London-
Bloomsbury**

HRA NRES Centre Manchester
Barlow House 3rd Floor
4 Minshull Street
Manchester
M1 3DZ

Telephone: 0161 625 7815
Fax: 0161 625 7299

23 June 2014

Dr Janet Feigenbaum
Department of Clinical, Educational and Health
University College London
Gower Street
London
WC1E 6BT

Dear Dr Feigenbaum

Study title: Group Dialectical Behavioural Therapy (DBT) for Bulimia Nervosa: An effectiveness study

REC reference: 14/LO/0672
IRAS project ID: 143574

Thank you for your email of 16 June 2014, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Vice-Chair.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to make a request to postpone publication, please contact the REC Manager, Dr Ashley Totenhofer, nrescommittee.london-bloomsbury@nhs.net.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

You should notify the REC in writing once all conditions have been met (except for site approvals from host organisations) and provide copies of any revised documentation with updated version numbers. The REC will acknowledge receipt and provide a final list of the approved documentation for the study, which can be made available to host organisations to facilitate their permission for the study. Failure to provide the final versions to the REC may cause delay in obtaining permissions.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at <http://www.rdforum.nhs.uk>.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publically accessible database within 6 weeks of recruitment of the first participant (for medical device studies, within the timeline determined by the current registration and publication trees).

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g. when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non-clinical trials this is not currently mandatory.

If a sponsor wishes to contest the need for registration they should contact Catherine Blewett (catherineblewett@nhs.net), the HRA does not, however, expect exceptions to be made. Guidance on where to register is provided within IRAS.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Ethical review of research sites

NHS sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Non-NHS sites

The Committee has not yet completed any site-specific assessment (SSA) for the non-NHS research site(s) taking part in this study. The favourable opinion does not therefore apply to any non-NHS site at present. We will write to you again as soon as an SSA application(s) has been reviewed. In the meantime no study procedures should be initiated at non-NHS sites.

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

<i>Document</i>	<i>Version</i>	<i>Date</i>
Copies of advertisement materials for research participants	2	31 January 2014
Covering letter on headed paper		04 April 2014
Evidence of Sponsor insurance or indemnity (non NHS Sponsors only)	Arthur J Gallagher International	26 July 2013
GP/consultant information sheets or letters	7	11 June 2014
Interview schedules or topic guides for participants	2	26 March 2014
Non-validated questionnaire [BEST]	Validated	
Non-validated questionnaire [Standardised Assessment of Personality]	Validated	
Non-validated questionnaire [Questionnaire for Feedback Session]	1	09 April 2014
Other [Divisional Clinical Lead Approval email]		04 April 2014
Participant consent form	4	26 March 2014
Participant information sheet (PIS) [Participant]	7	21 May 2014
REC Application Form	3.5	16 June 2014
Research protocol or project proposal	5	14 February 2014
Summary CV for Chief Investigator (CI)	Lucy Serpell	
Summary CV for Chief Investigator (CI)	Anna Hall	
Summary CV for Chief Investigator (CI)	Janet Feigenbaum	
Summary CV for Chief Investigator (CI)	Sharlene Akinyemi	
Summary, synopsis or diagram (flowchart) of protocol in non technical language	Flowchart - Version 4	26 March 2014
Validated questionnaire [WSAS]		
Validated questionnaire [AAQ-II]		
Validated questionnaire [Service Utilisation Questionnaire]		
Validated questionnaire [EDE-Q]		
Validated questionnaire [Five Facet Mindfulness Questionnaire]		
Validated questionnaire [Emotional Eating Scale]		

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document “*After ethical review – guidance for researchers*” gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The HRA website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

Feedback

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website: <http://www.hra.nhs.uk/about-thehra/governance/quality-assurance/>

We are pleased to welcome researchers and R & D staff at our NRES committee members’ training days – see details at <http://www.hra.nhs.uk/hra-training/>

14/LO/0672 Please quote this number on all correspondence

With the Committee’s best wishes for the success of this project.

Yours sincerely

Signed on behalf of:

Reverend James Linthicum
Vice-Chair

Email: nrescommittee.london-bloomsbury@nhs.net

Enclosures: “After ethical review – guidance for researchers”

Copy to: Dr Clara Kalu - University College London
Ms Fiona Horton - North East London NHS Foundation Trust
Mrs Anna Hall - University College London

Appendix X: Reliable and Clinically Significant Change Equation for the EDE-Q and a worked example for Participant 1

Where:

$X_1 - X_2$ = difference in scores

s_1 = standard deviation of sample at pretest

r_{xx} = reliability (eg Cronbach's alpha)

The reliable change criterion is 1.96 times the s_{diff}

Pre score = 4.55, post score = 3.24, i.e. improvement of 1.31.

Calculating Reliable Change

$$SE = s_1 \sqrt{1 - r_{xx}} = 1.04 \sqrt{1 - 0.95} = 0.23$$

$$s_{diff} = \sqrt{2(SE)^2} = \sqrt{2(0.23)^2} = 0.33$$

The Reliable Change Criterion is 1.96 times the s_{diff} . To calculate the reliable change criterion for the EDE-Q the formula is:

$0.33 \times 1.96 = 0.65$. Hence a change of 0.65 or greater would demonstrate a reliable change. Participant 1's score change was = 1.31, demonstrating a reliable improvement.

To calculate Participant 1's reliable change index (RCI) i.e. the magnitude of Participant 1's reliable improvement the formula is:

$$\frac{X_1 - X_2}{s_{diff}} = \frac{4.55 - 3.24}{0.33} = 3.95$$

Jacobson and Tuax (1991) stated that a RCI of larger than 1.96 would be unlikely to occur ($p < 0.05$) without an actual change. Participant 1's RCI was = 3.97, which is greater 1.96. Hence Participant 1's pre to post EDE-Q score demonstrated a reliable improvement.

Calculating Clinically Significant Change

Where:

S_0 = standard deviation of the functional population

S_1 = standard deviation of the dysfunctional population

M_1 = mean of the dysfunctional population

M_0 = mean of the functional population

Pre score = 4.55, post score = 3.24.

The equation to calculate clinically significant improvement is:

$$C = \frac{S_0 M_1 + S_1 M_0}{S_0 + S_1} = \frac{(0.86 \times 4.34) + (1.04 \times 0.93)}{0.86 + 1.04} = 2.47$$

2.47 is the cut off score for clinically significant improvement. Therefore Participant 1's post score would have to be 2.47 or lower to be considered a clinically significant change. Hence Participant 1's score did not show clinically significant change from pre to post.

Appendix XI: Reliable and Clinically Significant Change Equation for the FFMQ and the AAQ-II and a worked example for Participant 1

Where:

$X_1 - X_2$ = difference in scores

s_1 = standard deviation of sample at pretest

r_{xx} = reliability (eg Cronbach's alpha)

The reliable change criterion is 1.96 times the s_{diff}

1. FFMQ

1.1 Observe facet

Pre score = 15, post score = 26

Calculating Reliable Change

$$SE = s_1\sqrt{1 - r_{xx}} = 5.39\sqrt{1 - 0.80} = 2.41$$

$$s_{diff} = \sqrt{2(SE)^2} = \sqrt{2(2.41)^2} = 3.41$$

The Reliable Change Criterion is 1.96 times the s_{diff} . To calculate the reliable change criterion for the observe facet the formula is:

$3.41 \times 1.96 = 6.68$. Hence, a score change of 6.68 or greater would indicate a reliable change. The change in Participant 1's score was = 11, which is greater than 6.68. Hence Participant 1's score showed a reliable improvement.

To calculate Participant 1's reliable change index (RCI) i.e. the magnitude of Participant 1's reliable improvement the formula is:

$$\frac{X_1 - X_2}{s_{diff}} = \frac{26 - 15}{3.41} = 3.23$$

Jacobson and Tuax (1991) stated that a RCI of larger than 1.96 would be unlikely to occur ($p < 0.05$) without an actual change. Participant 1's RCI was = 3.97 which is greater than 1.96 indicating a reliable improvement.

Calculating Clinically Significant Change

A change of 10.78 (2 SDs) or more would demonstrate a clinically significant improvement. Participant 1's score change = 11, and demonstrated a clinically significant improvement.

1.2 Describe Facet

Describe facet: pre score = 25, post score = 32

Calculating Reliable Change

$$SE = s_1\sqrt{1 - r_{xx}} = 6.30\sqrt{1 - 0.90} = 1.99$$

$$s_{diff} = \sqrt{2(SE)^2} = \sqrt{2(1.99)^2} = 2.81$$

The Reliable Change Criterion is 1.96 times the s_{diff} . The formula to calculate the Reliable Change Criterion for the describe facet is:

$2.81 \times 1.96 = 5.51$. Therefore, a score change of 5.51 or greater indicated a reliable change. Participant 1's score change was = 7 which is greater than 5.51 and indicates a reliable improvement.

To calculate Participant 1's RCI for the describe facet i.e. the magnitude of Participant 1's reliable improvement the formula is:

$$\frac{X_1 - X_2}{s_{diff}} = \frac{32 - 25}{2.81} = 2.49$$

Jacobson and Tuax (1991) stated that a RCI of larger than 1.96 would be unlikely to occur ($p < 0.05$) without an actual change. Participant 1's RCI was = 2.49 which is greater than 1.96 indicating a reliable improvement.

Calculating Clinically Significant Change

A change of 12.6 (2 SDs) or greater would demonstrate a clinically significant improvement. Participant 1's score change = 7. Hence Participant 1's score did not demonstrate a clinically significant improvement.

1.3 Awareness facet

Pre score = 16, post score = 23

Calculating Reliable Change

$$SE = s_1\sqrt{1 - r_{xx}} = 5.70\sqrt{1 - 0.89} = 1.89$$

$$s_{diff} = \sqrt{2(SE)^2} = \sqrt{2(1.89)^2} = 2.67$$

The Reliable Change Criterion is 1.96 times the s_{diff} . The formula to calculate The Reliable Change Criterion for the awareness facet is:

$2.67 \times 1.96 = 5.23$. Hence, a score change of 5.23 or greater demonstrated a reliable change. Participant 1's score change was = 7, indicating a reliable improvement.

To calculate Participant 1's RCI for the awareness facet i.e. the magnitude of Participant 1's reliable improvement the formula is:

$$\frac{X_1 - X_2}{s_{diff}} = \frac{23 - 16}{2.67} = 2.62$$

Jacobson and Tuax (1991) stated that a RCI of larger than 1.96 would be unlikely to occur ($p < 0.05$) without an actual change. Participant 1's RCI was = 2.62 which is greater than 1.96 indicating a reliable improvement.

Calculating Clinically Significant Change

A change of 11.4 (2 SDs) or greater would demonstrate a clinically significant improvement. Participant 1's score change = 7. Hence Participant 1's score did not demonstrate a clinically significant improvement.

1.4 Non-Judge

Pre score = 14, post score = 20

Calculating Reliable Change

$$SE = s_1\sqrt{1 - r_{xx}} = 6.53\sqrt{1 - 0.91} = 1.96$$

$$s_{diff} = \sqrt{2(SE)^2} = \sqrt{2(1.96)^2} = 2.77$$

The Reliable Change Criterion is 1.96 times the s_{diff} . The formula to calculate the Reliable Change Criterion for the non-judge facet is:

$2.77 \times 1.96 = 5.43$. Hence, a score change of 5.43 or greater demonstrated a reliable change. Participant 1's score change was = 6, therefore demonstrating a reliable improvement.

To calculate Participant 1's RCI for the non-judge facet i.e. the magnitude of Participant 1's reliable improvement the formula is:

$$\frac{X_1 - X_2}{s_{\text{diff}}} = \frac{20 - 14}{2.77} = 2.17$$

Jacobson and Tuax (1991) stated that a RCI of larger than 1.96 would be unlikely to occur ($p < 0.05$) without an actual change. Participant 1's RCI was = 2.17 which is greater than 1.96 indicating a reliable improvement.

Calculating Clinically Significant Change

A change of 13.06 (2 SDs) or greater would demonstrate a clinically significant improvement. Participant 1's score change = 6. Hence Participant 1's score did not demonstrate a clinically significant improvement.

1.5 Non-react

Pre score = pre score = 16, post score = 26

Calculating Reliable Change

$$SE = s_1 \sqrt{1 - r_{xx}} = 4.35 \sqrt{1 - 0.78} = 2.04$$

$$s_{\text{diff}} = \sqrt{2(SE)^2} = \sqrt{2(2.04)^2} = 2.88$$

The Reliable Change Criterion is 1.96 times the s_{diff} . The formula to calculate the Reliable Change Criterion for the non-react facet is:

$2.88 \times 1.96 = 5.64$. Therefore a score change of 5.64 or greater indicated a reliable change. Participant 1's score change was = 10, demonstrating a reliable improvement.

To calculate Participant 1's RCI for the non-react facet i.e. the magnitude of Participant 1's reliable improvement the formula is:

$$\frac{X_1 - X_2}{s_{\text{diff}}} = \frac{26 - 16}{2.88} = 3.47$$

Jacobson and Tuax (1991) stated that a RCI of larger than 1.96 would be unlikely to occur ($p < 0.05$) without an actual change. Participant 1's RCI was = 3.47 which is greater than 1.96 indicating a reliable improvement.

Calculating Clinically Significant Change

A change of 8.7 (2 SDs) or greater would demonstrate a clinically significant improvement. Participant 1's score change = 10. Therefore, Participant 1's score demonstrated a clinically significant improvement.

2. AAQ-II

Pre score = 20, post score = 49

Calculating Reliable Change

$$SE = s_1\sqrt{1 - r_{xx}} = 10.39 s_1\sqrt{1 - 0.92} = 2.94$$

$$s_{diff} = \sqrt{2(SE)^2} = \sqrt{2(2.94)^2} = 4.16$$

The Reliable Change Criterion is 1.96 times the s_{diff} . The formula to calculate the Reliable Change Criterion for the AAQ-II is:

$4.16 \times 1.96 = 8.15$. Hence a score change of 8.15 or greater indicated a reliable change. Participant 1's score change was = 29, demonstrating a reliable improvement.

To calculate Participant 1's RCI for the AAQ-II i.e. the magnitude of Participant 1's reliable improvement the formula is:

$$\frac{X_1 - X_2}{s_{diff}} = \frac{49 - 20}{4.15} = 6.99$$

Jacobson and Tuax (1991) stated that a RCI of larger than 1.96 would be unlikely to occur ($p < 0.05$) without an actual change. Participant 1's RCI was = 6.99 which is greater than 1.96 indicating a reliable improvement.

Calculating Clinically Significant Change

A change of 20.78 (2 SDs) or greater would demonstrate a clinically significant improvement. Participant 1's score change was = 29. Therefore, Participant 1's score demonstrated a clinically significant improvement.

Appendix XII: Reliable and Clinically Significant Change Equation for the EES and a worked example for Participant 1

Where:

$X_1 - X_2$ = difference in scores

s_1 = standard deviation of sample at pretest

r_{xx} = reliability (eg Cronbach's alpha)

The reliable change criterion is 1.96 times the s_{diff}

Pre score = 80, post score = 28

Calculating Reliable Change

$$SE = s_1 \sqrt{1 - r_{xx}} = 20.80 s_1 \sqrt{1 - 0.81} = 9.07$$

$$s_{diff} = \sqrt{2(SE)^2} = \sqrt{2(9.07)^2} = 12.82$$

The Reliable Change Criterion is 1.96 times the s_{diff} . The formula to calculate the Reliable Change Criterion for the EES is:

$12.82 \times 1.96 = 25.13$. Hence a score change of 25.13 or greater indicated a reliable change. Participant score change was = 52, therefore demonstrating a reliable improvement.

To calculate Participant 1's RCI for the EES i.e. the magnitude of Participant 1's reliable improvement the formula is:

$$\frac{X_1 - X_2}{s_{diff}} = \frac{80 - 28}{12.82} = 4.06$$

Jacobson and Tuax (1991) stated that a RCI of larger than 1.96 would be unlikely to occur ($p < 0.05$) without an actual change. Participant 1's RCI was = 4.06 which is greater than 1.96 and indicates a reliable improvement.

Calculating Clinically Significant Change

A change of 41.6 (2 SDs) or greater would demonstrate a clinically significant improvement. Participant 1's score change was = 52. Therefore, Participant 1's score demonstrated a clinically significant improvement.