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University of Southampton

FACULTY OF MEDICINE, HEALTH AND LIFE SCIENCES

School of Psychology

**Eating Disorder Symptoms and Quality of Life: A Role for Moderation?**

by

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Thesis for the Degree of Doctorate in Clinical Psychology

July 2009

15,050 Words

### THESIS ABSTRACT

The thesis commences with a review of the literature on eating disorder (ED) symptoms and Quality of Life (QoL). Limitations of the research are discussed, and gaps in understanding are identified. The review concludes with a discussion on the measurement of QoL in ED research, and summarises the needs of research in this area.

Following from this, the empirical paper investigated whether eating behaviours, general psychopathology, coping styles, and social support moderate the relationship between ED symptoms and QoL. Female students completed questionnaires on ED symptoms, QoL, general psychiatric symptoms, coping styles, and levels of social support. ED symptoms were found to be associated with QoL, and general psychiatric symptoms and maladaptive forms of coping moderated this relationship. The results are considered in relation to prior research, and methodological limitations as well as clinical implications are discussed.

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## DECLARATION OF AUTHORSHIP

I, PAUL JENKINS,

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and the work presented in the thesis are both my own, and have been generated by me as the result of my own original research. I confirm that:

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- none of this work has been published before submission.

**Signed:** .....

**Date:** .....

**Acknowledgements**

I would like to thank my supervisors, Drs Jackie Blissett, Caroline Meyer, Colleen Conley, and Catherine Brignell for their continued support, help, and sage guidance. Without them, this would not have been possible. Above all, I would like to thank the students who graciously gave their time to complete these questionnaires.

### List of Abbreviations Used

AN – Anorexia Nervosa

APA – American Psychiatric Association

BED – Binge Eating Disorder

BMI – Body Mass Index

BN – Bulimia Nervosa

BSI – Brief Symptom Inventory

CIA – Clinical Impairment Assessment

COPE – Brief COPE

DSM – Diagnostic and Statistical Manual of Mental Disorders

ED – Eating Disorder

EDE-Q – Eating Disorder Examination Questionnaire

EDNOS – Eating Disorder Not Otherwise Specified

MCS – Mental Component Summary

MSPSS – Multidimensional Scale of Perceived Social Support

OBE – Objective Bulimic Episode

PCS – Physical Component Summary

QoL – Quality of Life

SBE – Subjective Bulimic Episode

SF-12 – Medical Outcomes Survey Short-Form Disability Scale 12-Item Version

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Quality of Life Research in Eating Disorders: A Review of the Literature

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The literature review has been written in the style of Clinical Psychology Review

## ABSTRACT

The association between eating disorders (EDs) and Quality of Life (QoL) has received much recent research attention, with research showing a consistent relationship between higher levels of ED symptoms and impaired QoL. However, a great deal of uncertainty exists within this area, and little is known about how QoL varies between ED diagnoses. Still less is known about what might moderate the ED-QoL relationship, and the review then discusses what variables might be important in this association. Existing research is considered to identify the most likely moderators of this relationship, and then gaps in the literature are identified. The review concludes with a summary of different ways of assessing QoL within ED populations, and suggests some fruitful avenues for further work.

## Quality of Life and Eating Disorders: A Review of the Literature

### *Literature Search Strategy*

The electronic databases PUBMED, PsycINFO, Medline, EBSCOhost, and Web of Knowledge were searched to provide coverage of the most up-to-date literature. Cochrane and PsychLit databases were also searched, with the use of internet search engine Google® for non-scientific literature (e.g. government-issued healthcare guidance). The search strategy included the key terms concerning the current study, notable “eating disorder”, “eating behavio(u)r”, “quality of life” OR “functional impairment”, in conjunction with other related terms (e.g. “coping”). Following assimilation of the core database, references were followed up to ensure comprehensive coverage.

## EATING DISORDERS

The eating disorders (EDs) are a set of important psychiatric conditions, causing great physical and psychosocial morbidity and generating great interest to the public, the media and the scientific community (Fairburn & Harrison, 2003). They typically affect females - who comprise about 90% of reported cases – and have an approximate prevalence<sup>1</sup> of around 0.3-1.0% for anorexia nervosa and 1-3% for bulimia nervosa (e.g. Cotrufo, Barretta, Monteleone, & Maj, 1998; Doll, Petersen, & Stewart-Brown, 2005; Hoek, 2006; Hoek & van Hoeken, 2003). EDs usually onset during adolescence to early adulthood (Fairburn & Harrison, 2003; Gull, 1874), impacting on those around the sufferer and bringing about substantial

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<sup>1</sup> This refers to the number of assumed cases at a given time.

stress to family, friends and professionals alike (Highet, Thompson, & King, 2005; Lasegue, 1873).

The two “best established” EDs (Garfinkel, 2002, p. 155) are anorexia nervosa (AN) and bulimia nervosa (BN). One further classification, binge eating disorder (BED), is covered in the Diagnostic and Statistical Manual for Mental Disorders, or DSM (APA, 2000) under the subdivision of “eating disorders not otherwise specified”, or EDNOS (see Table 1), but there are grounds to believe it may represent a distinct classification (e.g. Williamson et al., 2002). BED sufferers typically report episodes of binge eating, but without the compensatory behaviours often seen in EDs, such as self-induced vomiting and laxative abuse. Otherwise, EDNOS are reserved for the diagnosis of cases which do not meet full diagnostic criteria for AN or BN, so-called partial syndrome. Although they are the most common variant of EDs seen by clinicians, little research has addressed this category directly (Fairburn & Bohn, 2005).

The DSM-IV criteria used in making diagnoses of EDs in the United States are reproduced in Table 1 (APA, 2000). Although the AP A manual is often taken to be the preferred diagnostic system for EDs (Palmer, 2005), similarities exist with the current international classification, ICD-10 (see Halmi, 2003).

Table 1. DSM-IV diagnostic criteria for the eating disorders (reproduced from APA, 2000, p. 589, 594-595, 787).

*Anorexia Nervosa*

- A. Refusal to maintain body weight at or above a minimally normal weight for age and height (e.g., weight loss leading to maintenance of body weight less than 85% of that expected; or failure to make expected weight gain during period of growth, leading to body weight less than 85% of that expected).
- B. Intense fear of gaining weight or becoming fat, even though underweight.

- C. Disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or denial of the seriousness of the current low body weight.
- D. In postmenarcheal females, amenorrhea, i.e., the absence of at least three consecutive menstrual cycles. (A woman is considered to have amenorrhea if her periods occur only following hormone, e.g., estrogen, administration.)

*Specify type:*

**Restricting Type:** during the current episode of Anorexia Nervosa, the person has not regularly engaged in binge-eating or purging behaviour (i.e. self-induced vomiting or the misuse of laxatives, diuretics, or enemas)

**Binge-eating/Purging Type:** during the current episode of Anorexia Nervosa, the person has regularly engaged in binge-eating or purging behaviour (i.e. self-induced vomiting or the misuse of laxatives, diuretics, or enemas)

#### *Bulimia Nervosa*

- A. Recurrent episodes of binge eating. An episode of binge eating is characterised by both of the following:
  - (1) eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances
  - (2) a sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating)
- B. Recurrent inappropriate compensatory behaviour in order to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, enemas, or other medications; fasting; or excessive exercise.
- C. The binge eating and inappropriate compensatory behaviours both occur, on average, at least twice a week for 3 months.
- D. Self-evaluation is unduly influenced by body shape and weight.
- E. The disturbance does not occur exclusively during episodes of Anorexia Nervosa.

*Specify type:*

**Purging Type:** during the current episode of Bulimia Nervosa, the person has regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas

**Nonpurging Type:** during the current episode of Bulimia Nervosa, the person has used other inappropriate compensatory behaviours, such as fasting or excessive exercise, but has not regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas

*Eating Disorder Not Otherwise Specified*

The Eating Disorder Not Otherwise Specified category is for disorders of eating that do not meet the criteria for any specific Eating Disorder. Examples include

1. For females, all of the criteria for Anorexia Nervosa are met except that the individual has regular menses.
2. All of the criteria for Anorexia Nervosa are met except that, despite significant weight loss, the individual's current weight is in the normal range.
3. All of the criteria for Bulimia Nervosa are met except that the binge eating and inappropriate compensatory mechanisms occur at a frequency of less than twice a week or for a duration of less than 3 months.
4. The regular use of compensatory behaviour by an individual of normal body weight after eating small amounts of food (e.g., self-induced vomiting after the consumption of two cookies).
5. Repeatedly chewing and spitting out, but not swallowing, large amounts of food.
6. Binge-eating disorder: recurrent episodes of binge eating in the absence of the regular use of inappropriate compensatory behaviours characteristic of Bulimia Nervosa

*Binge-Eating Disorder (suggested research criteria)*

- A. Recurrent episodes of binge eating. An episode of binge eating is characterised by both of the following:
  - (1) eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances
  - (2) a sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating)
- B. The binge eating episodes are associated with three (or more) of the following:
  - (1) eating much more rapidly than normal
  - (2) eating until feeling uncomfortably full
  - (3) eating large amounts of food when not feeling physically hungry
  - (4) eating alone because of being embarrassed by how much one is eating
  - (5) feeling disgusted with oneself, depressed, or very guilty after overeating
- C. Marked distress regarding binge eating is present.
- D. The binge eating occurs, on average, at least 2 days a week for 6 months.

**Note:** The method of determining frequency differs from that used for Bulimia Nervosa; future research should address whether the preferred method of setting a frequency threshold is counting the number of days on which binges occur or counting the number of episodes of binge eating.

- E. The binge eating is not associated with the regular use of inappropriate compensatory behaviours (e.g., purging, fasting, excessive exercise) and does not occur exclusively during the course of Anorexia Nervosa or Bulimia Nervosa.

## DIAGNOSING EATING DISORDERS

EDs are diagnosed according to the criteria set out in Table 1. Structured interviews can be used to determine specific diagnoses, such as the Eating Disorders Examination (EDE; Fairburn & Cooper, 1993). Questionnaires such as the EDE-Q (Fairburn & Beglin, 1994) can be used in lieu of lengthy interviews and have been shown to be effective for assessing behavioural features and screening for diagnoses. However, care must be taken when using such measures as they cannot accurately clarify concepts such as loss of control, or define behaviours where ambiguity exists (e.g. Black & Wilson, 1996; Fairburn & Beglin, 1994).

Many people who would not fulfil diagnostic criteria still suffer from distress caused by weight and shape concerns; a population often referred to as “subclinical”. Subclinical cases are frequently seen in adolescent and student samples (Cotrufo, Barretta, Monteleone, & Maj, 1998; Franko & Omori, 1999) and represent an increased risk of developing more serious ED symptoms. However, only a minority of sufferers are seen by mental health services (Hoek, 2006). It appears that subclinical cases demonstrate a degree of psychological symptoms that may be quantitatively related to those with more severe forms of EDs (Cotrufo et al., 1998; Crow, Agras, Halmi, Mitchell, & Kraemer, 2002) but may differ from those on a “normal” spectrum (Gleaves, Lowe, Green, Cororve, & Williams, 2000). This is best understood if a “transdiagnostic” (Fairburn, Cooper, & Shafran, 2003) or “continuum” approach to the EDs is taken. Such a viewpoint advocates that subdividing EDs into distinct disorders often masks many of their key shared

components. Such theorists (see also Fairburn, 2008) argue that a better focus is on the degree of symptomatology expressed by sufferers.

Studies suggest that men and women with EDs demonstrate similar clinical presentations (e.g. Woodside et al., 2001). However, much of the research in EDs has focused on women as they represent the majority of sufferers; as such, there is an inherent bias within the available literature towards female subjects. Although men are likely to suffer in similar ways to women with the disorder, this review remains largely focused on research with female participants, although relevant research has been conducted which considers both genders (e.g. Mond & Hay, 2007).

There is emerging research that even subclinical levels of symptomatology might impact health status, such as dietary energy and nutrition intake (e.g. Beals & Manore, 1998; Crow et al., 2002), in addition to the known physical problems associated with disordered eating (e.g. Lock, Reisel, & Steiner, 2001). Further work needs to be done to identify how “milder” forms of EDs affect general happiness with life, or quality of life, given the documented impact on self-esteem, athletic performance, and social adjustment (e.g. Crow et al., 2002; de la Rie, Noordenbos, & van Furth, 2005; Johnson, 1994).

## QUALITY OF LIFE RESEARCH IN EATING DISORDERS<sup>2</sup>

EDs have long been known to be associated with a wide range of functional impairment, but very little research has been directed at assessing sufferers’ view of how their lives are affected by such disorders (Engel, Adair, Las Hayas, & Abraham, 2008). In the treatment of EDs, studies have defined “symptom improvement” using

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<sup>2</sup> Regarding terminology, a number of terms have been used to refer to quality of life, the term preferred for use here, including “functional impairment” and “life satisfaction”.

domains such as frequency of ED behaviours (e.g. bingeing, purging), psychological symptoms, and general diagnostic severity (e.g. Ro, Martinsen, Hoffart, & Rosenvinge, 2004; Tantillo & Sanftner, 2003). However, Miller (1996) argues that outcome in healthcare is a more continuous process and must be assessed using various measures of physical and psychological functioning. He notes that clients' impressions of their quality of life (QoL) are often more significant than any accompanying medical concerns (although the two may be related, e.g. McKenna et al., 2003). As a result of such suggestions, the National Health Service in the UK (NHS) is beginning to undergo a "revolution" (Holloway, 2002, p. 1), with an increasing focus on measuring outcome in mental health services (e.g. DoH, 2005; Mentality, 2004; Royal College of Psychiatrists, 2006).

Quality of life has proven a difficult concept to define, with both subjective and objective indicators used (see Prince & Prince, 2001). It might be defined as an individual's satisfaction, or happiness, with their current lifestyle and an understanding of this is currently lacking in the literature on EDs. However, QoL research is not without its critics, with some arguing that it has too negative a focus (i.e. based on a pathology model; Bowling, 2003). Measures have also been censured regarding their inability to capture the idiosyncratic determinants of subjects' QoL (Carr & Higginson, 2001) although the use of both generic and specific measures can go some way towards addressing this. Nonetheless, QoL assessment is beginning to form a key part of health care, and should be used as part of a portfolio of measures assessing symptoms and outcome (e.g. Garratt, Ruta, Abdalla, Buckingham, & Russell, 1993).

Although empirical studies into QoL are better established in the treatment of medical conditions, research is expanding into the mental health domain. Keilen, Treasure, Schmidt, and Treasure (1994) argue that QoL assessment represents a rational and under-used tool that can be used to identify those with psychological difficulties who are suffering most. EDs represent a form of psychiatric illness that is both complex and distressing; QoL assessment is an appropriate method in capturing the degree of functioning of those suffering from EDs that is currently under-researched (Doll, Petersen, & Stewart-Brown, 2005). Studies already conducted have used different health-related QoL measures with inpatient (e.g. Abraham, Brown, Boyd, Luscombe, & Russell, 2006), outpatient (e.g. Adair et al., 2007; Mond, Hay, Rodgers, Owen, & Beumont, 2005; Padierna, Quintana, Arostegui, Gonzalez, & Horcajo, 2002), community (e.g. de la Rie et al., 2005; Hay, 2003), and student (e.g. Doll et al., 2005) samples and generally report that the QoL for people with EDs is lower than that of both non-disordered samples and those with affective disorders.

The earliest study looking at impairment caused by EDs was that of Keilen et al. (1994). The authors compared a group of women referred to a tertiary ED service in the UK ( $N = 126$ ) with: a group of males with angina ( $N = 98$ ); a mixed sex group of heart transplant candidates ( $N = 122$ ); a mixed sex group with cystic fibrosis ( $N = 54$ ); and a control group recruited from local colleges of Higher Education ( $N = 91$ ). They used the Nottingham Health Profile (NHP), a self-report measure of health-related QoL; an early precursor to many of the more recent QoL measures.

Not surprisingly, women with EDs (limited only to those with diagnoses of AN or BN) reported lower QoL than healthy controls. However, when the data for all

ED subjects were pooled, they were found to report significantly lower QoL than physically impaired (angina, cystic fibrosis) patients (see also Spitzer et al., 1995) on domains relating to emotional reactions, social isolation, and home relationships. Although the measure used has been criticised on grounds of applicability and sensitivity (Garratt et al., 1993), this study brought to light how psychiatric difficulties had previously been overlooked in terms of the functional impairment caused.

de la Rie et al. (2005) used the Medical Outcomes Study Short-Form Health Survey (SF-36; Ware & Sherbourne, 1992), another generic measure of QoL, to compare samples of ED patients, former ED patients, and the data of population norms. Assessing symptoms using a questionnaire measure (the Eating Disorders Examination-Questionnaire, EDE-Q; Fairburn & Beglin, 1994), they found that EDs have a significant effect on “physical, psychological and social well-being, even after recovery of symptoms” (p. 1519). They suggest that, even after treatment for EDs, some residual effects may remain, with former patients demonstrating lower QoL than population norms. Similar results are reported by Abraham et al. (2006), on a population of female inpatients. Using an ED-specific QoL measure – the QOL-ED – patients’ scores improved following treatment, but still remained higher than those of a female student control group. However, the authors caution that changes seen immediately following treatment may be smaller than those reported at follow-up, possibly reflecting greater psychological change over the longer-term (see also Padierna et al., 2002).

These results might be interpreted in a number of ways: firstly, the treatment might have been ineffective, leaving significant eating concerns in place; secondly,

those studies may have demonstrated poorer QoL at the beginning of the study, although the authors did not permit an assessment of this; thirdly, the measures used might not have been sensitive enough to detect psychological change; or there may exist some other factor accounting for this difference that has yet to be described. Further study is required regarding the QoL of those who have “recovered” from an ED. One limitation of de la Rie et al.’s (2005) study was that they did not assess the comorbidity of any other psychiatric disorders, although they did find that self-esteem is associated with QoL. Although the authors talk of this construct as contributing to both QoL and lower perceived stress, it might be the case that higher self-esteem actually occurs as a *function of* greater QoL (e.g. through participation in more social activities). Although self-esteem has been found to affect QoL in obese populations (De Zwaan et al., 2002), no other studies have included a self-esteem measure within EDQoL.

Other studies have recruited participants from nonclinical, community samples. For example, Doll et al. (2005) reported a UK-based postal study of students’ attitudes (age = 18-64 years). They again used the SF-36 as an index of QoL and a selection of questions assessing ED symptoms and other forms of psychological distress. They found increased rates of psychological and emotional problems in those reporting an ED history, with particular impairment on the MCS. Although the study contained questions from published questionnaires, no measures of eating symptoms were used in full and no confirmation of self-report history could be sought. Therefore, results must be interpreted cautiously, and there may have been an over-reporting bias. The authors admit shortcomings in the use of postal administration although their results correspond well to larger studies, indicating a

fair degree of generalisability. However, the use of questions “to diagnose a probable history [of EDs]” and wider psychopathology (p. 707) without employing standardised criteria or clinical interview to ascertain diagnosis was clearly a further limitation. A questionnaire-based US study by Johnson, Spitzer, and Williams (2001) looked at rates of BN and BED in a primary care sample of women. They found that the presence of such eating pathology was associated with lower QoL, as well as other impairments, such as an increased prevalence of suicidal thoughts. These results suggest that even those women with undiagnosed eating disturbances experience significant deleterious effects.

In summary, initial studies on EDQoL found that both mental and physical domains of functioning, using measures such as the SF-36, are affected by ED symptoms. Mental health components were generally more affected and more resistant to treatment. However, the studies cited above did not permit sophisticated exploration of inter-diagnostic differences and QoL, and this paper now summarises research into diagnostic issues and EDQoL.

### *QoL Differences between ED subtypes*

Although symptom severity is negatively correlated with QoL (e.g. Padierna, Quintana, Arostegui, Gonzalez, & Horcajo, 2000), an important issue concerns how different diagnostic groups report their QoL. For example, although there is a lot of shared pathology in the EDs (Fairburn, 2008) important differences exist between individuals.

The “anorexic personality”, common to many sufferers of AN, is associated with success and achievement and other desirable qualities, a concept known as

egosyntonicity (see Tan, Hope, & Stewart, 2003). ‘Keeping’ the disorder may therefore be seen as more important in life terms than ‘losing’ it (i.e. through treatment) and QoL in such subjects may therefore be relatively high (Mond et al., 2005). Research into QoL might help expand knowledge around the difficult concept of egosyntonicity, whilst also identifying which domains of life are most negatively affected by the presence of pathology. However, this issue complicates research into QoL and has generated some apparently paradoxical findings in the literature (Doll et al., 2005).

Despite the criticisms of Keilen et al.’s (1994) study referred to above, some differences were found within their sample of women with AN and BN. Notably, those with AN had more problems with their social life, home relationships, and physical mobility compared to those with BN and controls, although the authors did not explore these associations in detail. However, this has been generally at odds with other studies. For example, Mond et al. (2005) used the SF-12 (Ware, Kosinski, & Keller, 1996; a 12-item form of the SF-36) in addition to another generic QoL measure, the World Health Organization Brief Quality of Life Assessment Scale (WHOQOL-BREF; WHOQOL Group, 1998) to assess QoL in an Australian sample of ED outpatients. Those diagnosed through clinical interviews (based on DSM-IV) at intake with AN, BN, or BED were included, whilst those not demonstrating full symptoms (i.e. EDNOS or no disorder) were excluded. They found that restricting anorexics had relatively high QoL scores compared to those with purging AN, or BN, with QoL poorest for those with BED. This latter result is likely due to the greater rates of compromised physical abilities in this subgroup (e.g. Kushner & Foster, 2000) although Mond et al. did not find significant differences on the PCS, a

measure of perceived physical impairment. The fact that those with AN report higher QoL may be due to the disorder's egosyntonicity (e.g. Latner, Vallance, & Buckett, 2008). However, Mond et al. provided data only on the composite scores, not reporting any individual discrepancies within the QoL measure. This may have missed important differences between the groups, as reliance on such broad measures can have its dangers (see Ware et al., 1995). In line with this, Padierna et al. (2000) found that outpatient BED sufferers were more impaired on physical domains of functioning than female outpatients with a diagnosis of AN or BN. Although no other inter-diagnostic differences were reported, all ED groups were more impaired than a normed female population, with a trend towards higher QoL for those with the AN restrictive subtype relative to other diagnoses. However, this study used more lenient inclusion criteria than Mond et al. (2005), which may have masked some differences.

In a similar study, de la Rie et al. (2005) studied QoL in a sample recruited through the community. Diagnoses (AN, BN, EDNOS and former ED; patients who met criteria for an ED in the past but did not at present) were based on data obtained through the EDE-Q. They found that ED patients had poorer QoL in most domains of the SF-36 than former patients, although there were no differences between diagnostic groups. This was true even when subscales of the SF-36 were considered (i.e. more fine-grained than simply reporting the PCS or the MCS).

The studies discussed so far provide equivocal results, hinting that few diagnostic differences exist. However, it is notable that the study using perhaps the least sensitive measure (Keilen et al., 1994) showed differences. It may have been that the other studies used subgroups that did not demonstrate severe enough

pathology to allow discrimination. It may also be the case that the MOS Short-Form questionnaires cannot detect subtle differences between diagnoses, at least not at the composite score level. Sample sizes (typically around 100) may have also not been large enough to afford enough statistical power to detect differences. However, non-significant trends generally suggest that those with restricting AN report QoL that is higher than that of purging AN and BN, with BED associated with the greatest functional impairment. Further research is required to reach firm conclusions on this.

Some resolution to this is provided by Abraham et al. (2006) in their sample of 306 ED inpatients. This is likely to have included a more severe group of ED patients, and the authors also report data on both a generic (SF-12) and disorder-specific (the QOL-ED) measure of EDQoL. Diagnoses (AN, BN, EDNOS [including BED], or “no diagnosis”) were made using clinical interview at both admission and follow-up.

They do not report data for the SF-12 on different diagnoses, but using the QOL-ED, which correlates well with the two subscales of the SF-12, the authors found a number of diagnostic differences. Those with AN reported worse QoL on the scale of “body weight”, and a trend towards worse QoL on the “global” scale (a composite score). This is at odds with previous studies reporting higher QoL for such subjects, though this may reflect the added difficulties associated with inpatient admission for AN (see Gowers, Weetman, Shore, Hossain, & Elvins, 2000). BN subjects, however, reported worse QoL for the scales of “eating behaviours” and “eating disorder”, similar to measures of behavioural symptoms of an ED. Compared to subjects diagnosed with EDNOS, those with AN scored worse on the

QoL subsets of “body weight” and “acute medical”, whilst subjects with BN reported worse QoL on nearly all aspects. Such results certainly lend support to assertions that it is the degree of symptomatology displayed, rather than diagnostic label *per se*, that affects QoL.

In summary, only a few studies have looked at diagnostic differences within their samples, and different types of participants have been used in each (i.e. inpatient, outpatient, and day patient). However, only one study has considered diagnostic differences using an ED-specific QoL measure and this recruited only an inpatient sample. Further investigation of these relationships is warranted, perhaps comparing different groups in one study using a number of different measures, particularly as reliance on one QoL measure is not recommended (Mond et al., 2005). There may also be some concerns regarding the sensitivity of the MOS Short-Form scales. Further research will be needed to investigate this suggestion. In any case, it is more likely that an ED-specific questionnaire might be better able to detect differences in QoL (Abraham et al., 2006; Engel et al., 2006).

The EDQoL literature that has been looked at so far suggests that the presence of any degree of ED symptoms is associated with worse QoL than no such pathology. Furthermore, QoL is often self-reported as being highest for those with restricting AN, although the severity of pathology may temper this somewhat. QoL is poorest for those with BED, with BN sufferers and those with purging AN lying between the two. Levels of psychological distress may be comparable to other ED diagnoses, but those with BED also report higher rates of physical morbidity, most often associated with higher rates of obesity seen in this group (Striegel-Moore et al., 2001). However, little is known about what affects the relationship between ED

symptoms and QoL. This review will now address what factors might determine the strength of this relationship.

### *Body Mass Index*

Body Mass Index, or BMI, is expressed as an individual's bodyweight/height<sup>2</sup> (expressed as kg/m<sup>2</sup>). It correlates well to measures of body fat and composition, and is a simple, inexpensive measure appropriate for research studies (Deurenberg, Weststrate, & Seidell, 1991). In ED studies, BMI has been associated with ED symptoms in a variety of different populations although this is clearly not a simple relationship (Davison, Markey, & Birch, 2000; McLaren & Kuh, 2004; Mirza, Davis, & Yanovski, 2005).

As a result of its importance in EDs, BMI has been considered in a number of studies on QoL. Hay (2003) conducted an interview-based study on a large nonclinical population (see Hay, 1998, for details) to assess ED symptoms and generic QoL, using the SF-36 and Assessment of Quality of Life (AQoL; Hawthorne, Richardson, & Osborne, 1999). ED behaviours were identified following a clinical interview, using questions modelled on the EDE (Fairburn & Cooper, 1993).

Hay (2003) reported that both the physical and mental health components of the SF-36 were lower for those with extremes of BMI (i.e. <20 and >30) although no data was reported on the relationship between BMI and the AQoL. However, 40% of the sample was male, and less data exists on this population. Hay does not provide a detailed explanation for the associations of BMI and QoL, although other studies (e.g. Doll et al., 2005; Mond et al., 2005) report similar findings.

More data exists on QoL in obese subjects (who may or may not demonstrate significant eating pathology). Generally, BMI >30 is associated with substantial

decrements in QoL, which are often improved with weight loss. The myriad psychological and physical problems associated with being overweight are often cited by obese patients as major reasons motivating requests for surgical intervention (Kushner & Foster, 2000), suggesting that functional impairment is defined by weight-related dissatisfaction. In support of this, Mond et al. (2007) suggest that the relationship between obesity and QoL is mediated entirely through the degree of weight- and shape-related concerns, reported to be “a more potent mediator... than binge eating” (p. 2774). However, the results of Heo, Allison, Faith, Zhu, and Fontaine (2003) contradict these findings, suggesting that pain and obesity-related comorbidities (e.g. high blood pressure, high cholesterol) mediate the BMI-QoL relationship. However, their telephone-based study did not allow for many dimensions of QoL to be assessed. For instance, it is not clear what daily activities were compromised in this group, and what was important in defining QoL. In any case, there is likely to exist an interaction between the physical symptoms experienced and an individual’s perception of the impact of these symptoms.

QoL studies have been less concerned with identifying trends in underweight populations, and this dimension on its own is highly heterogeneous. For example, someone classified as “underweight” may be so because of dysfunctional eating behaviours (e.g. food restriction, excessive exercise), a distinct medical condition (e.g. long-term chronic health conditions), or something completely unrelated to health status. In terms of EDs, studies have found few effects of low weight on QoL, although this is likely due to methodological shortcomings. In those studies that have been conducted, the results have been generally suggestive of higher QoL for those with AN pathology (e.g. Mond et al., 2005; Padierna et al., 2000) although

some studies have reported no differences between diagnostic groups (e.g. de la Rie et al., 2005; Keilen et al., 1994). Furthermore, epidemiological studies suggest that some aspects of QoL are lower for those with low weight (e.g. Ford, Moriarty, Zack, Mokdad, & Chapman, 2001). Clearly, more controlled research is needed to fully define the relationship between weight status and QoL.

In summary, research has found that those with higher BMIs (i.e. >30) report lower QoL (Ford et al., 2001; Kushner & Foster, 2000). Furthermore, it appears that QoL diminishes as BMI departs from the 'normal range' (Abraham et al., 2006; Ford et al., 2001). It is difficult to disentangle the effects of weight status from related variables, such as psychiatric comorbidity and self-esteem, but BMI is nonetheless an important variable to consider in EDQoL research. Its predictive value, though important, tells us little about what factors affect EDQoL. Studies have focussed more on distinct disorder-related behaviours, an area which we now discuss, beginning at first with bingeing.

### *Bingeing*

Bingeing (or binge eating) refers to a particular kind of overeating, with a subjective loss of control during the episode representing a hallmark of the term (Fairburn & Wilson, 1993). Within this area, a further terminology exists. Objective binge episodes (OBEs) refer to large intakes of food that are associated with a loss of control; subjective episodes (SBEs) refer to similar incidents, but where the food intake is significantly less. Recent diagnostic manuals (e.g. APA, 2000) do not consider the importance of SBEs, although emerging research is beginning to suggest that this is a clinically significant phenomenon (Latner & Clyne, 2008; Latner et al.,

2008). Studies from the literature on obese populations suggest that bingeing is associated with lower QoL, adding to the effects of higher BMI (e.g. Mannucci et al., 1999; Mussell et al., 1996). However, the presence of such behaviours has also been associated with other psychiatric and medical disorders, such as depression (e.g. Kushner & Foster, 2000; Malone & Alger-Mayer, 2004), leading to problems with interpretation.

Abraham et al. (2006) found that lower QoL in their inpatient ED sample was associated with a greater number of days engaged in overeating, although this was not a primary focus of the study. Greater frequency of overeating affected QoL in a number of psychological and (eating disorder-related) behavioural domains, although the authors do not discuss these findings in depth.

Hay (2003) reported that ED behaviours affect QoL in a continuous manner, with QoL being particularly affected by the presence of regular binge eating. The negative impact of bingeing has been supported by other studies, using both disorder-specific and generic measures (de Zwaan et al., 2002). However, Hay (2003) found no significant associations between the PCS of the SF-36 and ED behaviours. This might suggest that binge eating has greater effects on the psychological aspects of QoL. In an unpublished study, Vallance (2006) found that SBEs had a lesser effect than OBEs upon the mental health domain of the SF-36. This might suggest that a loss of control during eating is central to lower QoL, but may add to the effects of ingesting larger quantities of food. This may be due to higher BMIs in those who demonstrate more OBEs although little research has addressed this directly, possibly due to difficulties in separating groups. Goossens, Braet, and Decaluwé (2007), for example, reported a non-significant trend for this

relationship in adolescents and Kenardy et al. (2001) reported a significant association between total binge frequency (an aggregate of SBEs and OBEs) and BMI in women with Type II diabetes. Further research is needed in this area.

Mond et al. (2006) looked at a female community sample and found that regular binge eating was associated with greater functional impairment and lower QoL on the mental health component of the SF-12. Subjective episodes of overeating were particularly detrimental, suggesting that a loss of control during eating might be particularly important in affecting QoL (see Colles, Dixon, & O'Brien, 2008). Other results from this group of researchers (Mond et al., 2004; Mond, Hay, Rodgers, Owen, & Mitchell, 2006) agree with these interpretations, suggesting that regular binge eating is associated with lower QoL. Similarly, in a New Zealand study of adult female outpatients, Latner et al. (2008) reported that the presence of bulimic features was associated with lower mental QoL (MCS of the SF-36). They found that SBEs were significantly associated with lower QoL in subjects who binge, in addition to the effects of compensatory behaviours such as vomiting.

The frequency of bingeing, however, appears to have little additive effect, supporting other findings that there are few differences between individuals who binge and purge once per week, and those who do so more than twice (e.g. Garfinkel, Kennedy, & Kaplan, 1995). Again, it appears that the psychological associations, such as loss of control or extreme weight concerns (e.g. Colles et al., 2008; Latner, Hildebrandt, Rosewall, Chisholm, & Hayashi, 2007), are more important indicators of QoL than the frequency of the behaviours alone. It further appears that what the subject defines as a “binge” (which usually concerns an episode of eating involving a

loss of control, irrespective of the amount eaten; Latner et al., 2007) is the most important factor in determining QoL. This is perhaps not surprising as loss of control is often associated with many “negative” ED features, such as low self-esteem, anxiety, and body dissatisfaction (e.g. Morgan et al., 2002).

In summary then, research suggests that the impact of regular binge eating on QoL is important, but further investigation is required to explore this relationship. It appears that a loss of control during eating, regardless of the size of the meal, is associated with lower QoL, particularly so on psychological components of the measures used. We now consider research that has addressed whether compensatory behaviours might provide additional understanding of the ED-QoL relationship.

#### *Purgng and other compensatory behaviours*

Mond et al. (2006) found that the use of compensatory behaviours (e.g. self-induced vomiting, use of diet pills) negatively affected QoL in a community sample, whether these were purgative in nature or not (see also Mond & Hay, 2007). Those participants who engaged in such behaviours as well as regular bingeing reported particularly low QoL, although Mond et al. did not report data on those subjects who reported regular use of both purging and non-purging methods of weight control, limiting interpretation.

Similar results were reported by González-Pinto et al. (2004) with a population ( $N = 47$ ) of patients with AN referred for care, using the SF-36 as a measure of QoL. Overall they found a lower level of QoL for those with AN, with an additional effect of purging behaviours (see also Padierna et al., 2000). This had strongest effects on the mental health component of the SF-36. In a study of 306 ED inpatients,

Abraham et al. (2006) found that lower EDQoL was associated with higher levels of self-induced vomiting, laxative misuse and exercise, although their design only permitted limited interpretation of these associations.

As with bingeing behaviour (see above), it is unlikely that the frequency of purging is associated with lower QoL. The presence of any episode of purging within the last month negatively affects QoL (Mond et al., 2004), and it has also been suggested that purging may be a more important determinant of QoL than bingeing (Mond et al., 2006a). Similarly, the use of multiple methods of compensatory behaviours is likely to decrease QoL further. Despite such suggestions, there have been few studies with a clear focus on the functional impact of purging, notably with BN or subclinical samples. Future research is needed in this area, particularly in light of recent suggestions (e.g. Edler, Haedt, & Keel, 2007) that the use of different methods of purging might be associated with greater functional impairment.

In summary, although some preliminary findings have emerged, more information is needed to determine what effect the presence of ED behaviours, such as bingeing and purging, has on QoL and what factors exist that might affect this relationship. Excessive amounts of exercise, included in diagnostic manuals as either a compensatory behaviour (APA, 2000) or a symptom (WHO, 1992), is another known correlate of EDs. However, its impact on QoL has only recently been considered. This review will now appraise the scientific literature relevant to this issue.

### *Exercise*

The high prevalence of “excessive exercise” in the EDs has been alluded to in a number of clinical reports (e.g. Pinkston et al., 2001; Shroff et al., 2006) and may be more likely to occur in those with the purging subtype of AN (Shroff et al., 2006). However unstandardised methods and measurements have offered only contradictory and inconsistent findings (Cook & Hausenblas, 2008; Meyer, Taranis, & Touyz, 2008).

Pinkston et al. (2001) compared college females who demonstrated significant features of AN with BMI-matched controls with no such disturbance. Although the groups differed significantly on factors such as psychopathology and ED symptoms, they did not differ on self-reported expenditure of exercise. The AN group reported “more compulsive attitudes toward exercising” (p. 176), suggesting that it is the cognitive component (i.e. dependence on exercise) that is an important difference between the two groups.

In support of this assumption, Cook and Hausenblas (2008) recruited a female college sample (age range = 17-36 years) to further investigate the role of exercise dependence in the exercise-eating pathology relationship. They suggest that an individual’s compulsion to exercise mediates this relationship. Although causal directions are difficult to establish from such cross-sectional data, the results suggest that, when exercise becomes problematic or excessive for an individual, there is a greater risk to develop an ED. Specifically, it is an individual’s *views* about their exercise, not the amount they perform, that may be of critical importance.

Cook and Hausenblas (2008) found that “exercise dependence mediates (but does not moderate) the relationship between exercise behaviour and eating

pathology" (p. 499). However, they used a limited measure of ED cognitions (a subscale of the EDI-II; Garner, 1991), which may have biased the results towards more cognitive domains (i.e. there was little focus on behavioural outcomes, such as restricted eating). As the authors note, this result requires replication with other samples, and also in longitudinal studies in order to more carefully examine causal relationships.

Mond et al. (2006a) note that the cognitive associations with excessive exercise are key, with "feeling guilty after missing an exercise session" being a particularly strong predictor of ED psychopathology (p. 151; see also Mond et al., 2004). These findings have been replicated in a more recent study, using a sample of young American women (Mond, Myers, Crosby, Hay, & Mitchell, 2008). However, the negative psychosocial effects of excessive exercise only seem to become apparent when in the presence of significant ED-related concerns, in line with mediator model approaches, such as that of Cook and Hausenblaus (2008).

In summary, then, research into excessive exercise in EDs is beginning to reach some congruence, with a number of researchers attempting to standardise the terms, definitions, and methods used (e.g. Cook & Hausenblaus, 2008; Pinkston et al., 2001). Exercise appears to have a significant impact on symptoms only when in the presence of an ED, and this relationship is mediated by an individual's compulsion to exercise, i.e. "exercise dependence". The data suggest that attitudes to exercise may affect QoL and other psychological symptoms, only in those individuals with high levels of ED symptomatology, although this remains to be empirically tested. The resources an individual has available to them (i.e. their coping ability) are also likely

to buffer the impact of ED symptoms on QoL and we shall now consider this variable as another influence on the ED-QoL relationship.

### *Coping Styles*

In their study looking at the QoL of ED patients and former ED patients in a community sample, de la Rie et al. (2005) mention self-esteem as a large contributor to QoL. However, they point out that “other independent variables, such as comorbidity and coping... may also contribute to the QOL of ED patients” (p. 1520).

Coping involves an individual’s response to reduce threat, solve a problem, or modulate their emotions (Lazarus & Folkman, 1984). ED sufferers have been found to show less adaptive styles of coping in response to stress (Freeman & Gil, 2004; Ghaderi & Scott, 2000), a finding that has been replicated in nonclinical samples (e.g. Janzen, Kelly, & Saklofske, 1992; Shatford & Evans, 1986).

Maladaptive styles of coping have been found to be negatively associated with QoL (e.g. Friedland, Renwick, & McColl, 1996), although evidence for this in the EDs is lacking. Grylli, Wagner, Hafferl-Gattermayer, Schober, and Karwautz (2005) conducted a study on adolescents with diabetes (a population with a documented high prevalence of EDs; Rodin et al., 2002), comparing the coping styles of those with significant ED-related concerns and those without. They found that functional impairment was greater in the ED group, and this was amplified by maladaptive coping strategies, such as wishful thinking. However, this study was limited to adolescents with a co-existing chronic physical condition, and may not be readily applicable to ED-only adults. One strength of the study was its inclusion in the ED

group of individuals with subclinical levels of symptomatology, recognising the significant impairment suffered by this group.

Mechanisms through which coping might affect symptom levels require further research, although Bennett and Cooper (1999) propose a model of how coping might influence eating behaviour. In their discussion, they suggest that coping is likely to operate directly on symptoms, or its effects will be mediated through other variables (e.g. social support, personality). However, although this provides a useful insight into how coping affects levels of ED pathology, no studies have looked at coping styles as moderators or mediators of the relationship between ED symptoms and QoL.

In Bennett and Cooper's (1999) discussion of variables affecting eating behaviour, they note that coping is strongly related to social support, which itself has been found to provide a buffer, protecting from the harmful effects of stressful events (Cohen & Wills, 1985). For example, adequate and available social support was associated with higher scores on the Satisfaction with Life Domains Scale (SLDS; Baker & Intagliata, 1982), a self-report measure of QoL, in a sample of community mental health patients (Baker, Jodrey, & Intagliata, 1992). In the ED literature, lower levels of social support have been linked to a past or present ED diagnosis (Ghaderi & Scott, 2000) and an increased propensity to binge eat (Freeman & Gil, 2005). The ED literature suggests that social support is typically lower in sufferers, but its relationship to QoL has not been comprehensively assessed. de la Rie, Noordenbos, Donker, and van Furth (2007) found that social support was important for better QoL in both current and former ED patients, noting that sufferers frequently express wishes to increase their levels of social support. Other studies

(e.g. Jones, Evans, Bamford, & Ford, 2008) have supported such interpretation, with sufferers acknowledging that maintaining social relationships during times of disturbed eating can be difficult.

Therefore, as social support buffers, or moderates, the effects of stress on eating behaviour, it is hypothesised that it might also moderate the relationship between eating behaviours, such as bingeing, and QoL.

### *Psychiatric comorbidity*

It is often reported that the presence of a mental illness contributes to poorer QoL (e.g. Gonzalez-Pinto et al., 2004; Kolotkin et al., 2004; Rieger, Wilfley, Stein, Marino, & Crow, 2005). EDs are a psychiatric condition in their own right but are also associated with high levels of *additional* psychiatric comorbidities, notably anxiety and depression (Grilo, Levy, Becker, Edell, & McGlashan, 1996; O'Brien & Vincent, 2003).

In a large study of primary care patients, Spitzer et al. (1995) aimed to find out if different mental disorders were associated with different QoL profiles, with a further focus on the role of comorbidity. As part of a larger study (Spitzer et al., 1994), they used a two-stage screening and interview procedure (the Primary Care Evaluation of Mental Disorders, or PRIME-MD) to diagnose mental disorders in five major groups: mood; anxiety; somatoform; alcohol; and EDs. The sample (60% female, mean age = 55, range = 18-91) also had co-occurring physical illnesses, such as arthritis and hypertension. 3% were diagnosed through this procedure as having an ED. Although 'subthreshold' diagnoses were made for mood and anxiety disorders, only BED was considered in the category for EDs.

To assess QoL, the authors used the SF-20 (Stewart, Hays, & Ware, 1988) as well as asking for the number of days in the past three months participants were “unable to pursue their usual activities because of feeling unwell” (p. 1512). The presence of a mental illness was associated with “substantial decrements” (p. 1513) in QoL, with EDs found to particularly affect social functioning and body pain (cf. Doll et al., 2005; Hay, 2003). However, their sample consisted largely of patients with BED and no measures of illness severity were administered, clearly limiting the study’s applicability. The prevalence of subclinical ED disturbance was not reported.

González-Pinto et al. (2004) also considered the impact of psychiatric comorbidity, using the Structured Clinical Interview for DSM-IV, or SCID (Spitzer, Williams, Gibbon, & First, 1992) to determine diagnoses other than EDs within a sample of 47 patients with AN. They found that the presence of another psychiatric disorder, found in 51% of their sample, negatively affects QoL although the authors did point out difficulties in assessing this in ED patients (e.g. Rosenvinge & Klusmeier, 2000). Assessing QoL using the SF-36, the authors found that the presence of psychiatric comorbidity particularly affected the MCS score, although the authors note difficulties in interpreting comorbidity in EDs. Nonetheless, psychiatric comorbidity appears to be a significant determinant of QoL in EDs, and should be considered in studies of EDQoL.

Mond et al. (2005a) concluded that the presence of symptoms of anxiety or mood disorders did not account for differences in QoL within their sample of ED outpatients. Similar rates of distress to those of González-Pinto et al. (2004) were reported, with around 40-60% “likely to be experiencing clinically significant

symptoms of anxiety and/or depression" (p. 175). Conversely, Padierna et al. (2000) found that the presence of other (non-ED) psychiatric symptoms negatively affected QoL, supported by a later study (Padierna et al., 2002) concluding that improvements in such symptoms are associated with greater self-reported QoL. Although both the Mond et al. and the Padierna et al. studies used outpatients and their characteristics seem roughly comparable, Padierna et al. (2000) reported a higher proportion of participants with AN, and a generally poorer QoL score<sup>3</sup>. This may reflect greater levels of symptom severity in their group. It would be interesting to see how subclinical groups perform in such comparisons, though no studies have directly assessed this.

Some differences in comorbidities have been described between different ED diagnoses with a general trend for greater levels of comorbid pathology being linked to higher levels of ED symptom severity (see Spindler & Milos, 2007, for a recent and concise review). Similarly, those with AN or BN are more likely to have a diagnosis of an affective disorder than those with EDNOS, although this group appears to be more affected than controls (e.g. Doll et al., 2005; Wade, 2007).

In conclusion, it appears that there exist high levels of comorbid psychiatric symptoms in those with EDs, although this is probably greater in strictly-defined AN or BN. Further investigation is needed, with large studies required to see if the presence of other psychopathology symptoms adds to existing detriments in QoL.

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<sup>3</sup> Note: This was calculated from grouped data published by Padierna et al. (2000). It was not possible to compute any statistical comparisons so this conclusion is inferential.

## MEASURING EDQOL

Having discussed how EDQoL is becoming an important outcome in research and treatment studies and how the early studies used mainly generic measures (e.g. SF-36), we now move on to discuss the different, disease-specific, measures that have been used to assess eating disorders.

In terms of using disease- (i.e. ED-) specific measures of QoL, the first published measure is provided by Abraham et al., (2006). Using only a sample of ED inpatients, Abraham et al. obtained similar results to those reported above using generic measures. They did however find that diagnostic subgroups (AN, BN, EDNOS [including BED]) differed on a number of ED-specific subscales from those identified as having “no diagnosis”, which represented a recovered group. However, differences only occurred on certain QoL factors, and not on the “psychological” subscale; the authors suggesting that this was due to any form of ED bringing about impairments on this domain, regardless of specific diagnosis. Further investigation of such differences can aid the understanding of EDs, although it appears that the ED-specific measures are more sensitive in this regard.

Engel et al. (2006) published another ED-specific instrument, the Eating Disorders Quality of Life instrument (EDQOL), designed for use with ED patients. It maintains a broad focus, with limited attention given to ED-specific symptoms and behaviours, possibly reflecting sufferers’ variant perspectives on their EDs, i.e. as representing more than simply dysfunctional eating (e.g. de la Rie et al., 2005). The measure can discriminate between disordered and non-disordered groups, although further research with different groups is required. However, with its individual, subjective focus, the measure may struggle to assess (objective) functional

impairment in sufferers, and may therefore underestimate QoL in certain patients (see Mond et al., 2004).

Las Hayas et al. (2006) developed the Health-Related Quality of Life in Eating Disorders (HeRQoLED), a 50-item self-report questionnaire. They recruited participants (96% female) who were in treatment for a diagnosed ED and a comparison group from the general population, finding that the HeRQoLED was able to discriminate between the two. The questionnaire has a strong focus on the effects of an ED (identified through group pilot discussions) but did not include a binge eating domain, which the authors later addressed in a future revision (Las Hayas et al., 2007). Las Hayas et al. (2006) argue that it is appropriate for use with a general population, although some wording needs to be altered and it appears to have received limited application outside of Spain.

Adair et al. (2007) attempted to overcome some of the drawbacks of those measures listed above. The EDQLS (Eating Disorders Quality of Life Scale) attempts to capture both broad and ED-related issues, validated on patients with EDs. However, this measure was specifically designed to minimise inter-diagnostic differences and is therefore not well-placed to investigate how those with different diagnoses differ in terms of QoL. It has not yet been validated with subclinical, or non-clinical, populations, and it is yet unclear if it is appropriate for this purpose.

In the UK, Bohn and Fairburn (2008) published the Clinical Impairment Assessment questionnaire (CIA), a 16-item measure of EDQoL. Items consider domains of life that are typically affected by ED psychopathology, such as mood, cognitive performance, and interpersonal functioning. It provides both a single score of impairment as a result of ED symptoms and three domain-specific scales

(‘personal’, ‘social’, and ‘cognitive’; Bohn et al., 2008), and is recommended for administration following completion of a measure inviting the subject to think of ED symptoms, such as the EDE-Q (Bohn & Fairburn, 2008). It demonstrates good psychometric properties and generates a cut-off that can predict ED case status (Bohn et al., 2008). One of the CIA’s main virtues over other ED-specific measures is that it is purported to assess functional impairment that occurs *as a result* of an ED, a fact that is clouded in previous attempts at generating such a measure (Bohn et al., 2008) and highlighted as a key feature of EDQoL (Engel et al., 2008).

In conclusion, QoL measures have become an important part of ED assessment and are achieving growing status as an important evaluation and outcome measure. Generic questionnaires, though useful in comparing different populations, are often insensitive in picking up the unique features that might be important in each case. As a result, ED-specific tools are beginning to evolve, with a number of alternative measures available that can assess QoL to a more fine-grained degree than that afforded by questionnaires such as the SF-12. Research now needs to employ existing measures with clinical populations in order to more fully explore what determines QoL, and what interventions might exist that can overcome the drops in QoL that have arisen as a result of eating psychopathology.

## SUMMARY

In summary, this paper has reviewed the extant literature on EDQoL. One evident finding is that the presence of an ED has great impacts on QoL, particularly affecting the psychological aspects of health. This appears to be true even in the absence of full-syndrome disorders (i.e. subclinical, or subthreshold, cases).

However, further research is warranted in this area, with the impact of subclinical levels of symptomatology requiring further study. Specifically, QoL in such participants is under-researched, particularly with ED-specific measures, and little is known about the impact of ED-related behaviours that might not reach a diagnostic threshold.

Furthermore, within the clinical literature, some diagnostic differences appear to exist (e.g. Abraham et al., 2006), with self-reported QoL apparently lowest for those with BED. However, with recent theoretical shifts emphasising a symptom- (as opposed to disorder-) focus (e.g. Fairburn, 2008), more EDQoL research is needed to address the specific impact of the presence of ED symptoms, such as bingeing and vomiting.

Various behaviours and traits, such as ED-related behaviours and BMI, have been found to affect QoL, although there are few studies directly addressing this. The area of excessive exercise has in particular been neglected, surprising given its high rate of prevalence within the EDs (e.g. Shroff et al., 2006). A number of ED-specific QoL measures have been developed to compliment generic measures that have been used, but there has been little research into what factors contribute to the divergent scores obtained with these. More sophisticated models are therefore required in order to further investigate the relationship between degree of ED symptoms and QoL.

Research needs to address, therefore, how QoL is affected in subclinical cases of EDs; eating disorder-specific measures are required to accurately look at this issue. Additionally, studies should address the impact of the presence of ED behaviours, such as bingeing and purging, on QoL. The issue of exercise has been

an area that is as yet under-researched and should be considered alongside these variables. A more complete understanding of these issues might permit models to be constructed that aid understanding of what affects QoL in the EDs.

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Eating Disorder Symptoms and Quality of Life: A Role for Moderation?

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The literature review has been written in the style of the International Journal of Eating Disorders. However, the APA (5<sup>th</sup> Edition) format for referencing has been used for ease of reading.

## ABSTRACT

**Objective:** The aim of this study is to identify whether eating behaviours, general psychopathology, coping styles, and social support moderate the relationship between eating disorder (ED) symptoms and quality of life (QoL).

**Method:** 338 female students completed questionnaires on ED symptoms, QoL, general psychiatric symptoms, coping styles, and levels of social support.

**Results:** An association between ED symptoms and QoL was documented, and it was found that general psychiatric symptoms and maladaptive forms of coping moderated this relationship. The use of an ED-specific measure of QoL appeared to be more sensitive to effects of ED symptoms, suggesting greater sensitivity of such a measure over more generic instruments.

**Discussion:** The results suggest that maladaptive coping styles and the presence of psychiatric pathology are associated with poorer QoL in the presence of higher levels of ED symptoms. The documented relationship between ED symptoms and impaired QoL is supported and factors that might affect this relationship are discussed. These findings require replication with a larger, clinical sample. The implications of the data are discussed.

**Keywords:** quality of life; questionnaires; moderator; students

## Eating Disorder Symptoms and Quality of Life: A Role for Moderation?

### **Introduction**

Quality of Life (QoL) research into eating disorders (EDs) has gained much recent empirical interest, with a burgeoning literature addressing the psychosocial impairment that results from significant ED symptoms (for a review, see Engel et al., 2008). Quality of Life can be defined as a person's satisfaction with their life conditions (Borthwick-Duffy, 1992), and represents a useful and client-centred outcome measure that has previously been under-used in the mental health field (Keilen, Treasure, Schmidt, & Treasure, 1994). An individual's perception of their QoL does not necessarily reflect the severity of psychiatric symptoms, but may vary as a function of any illness present.

Findings have generally reported a negative association between symptoms of an ED and QoL (Mond et al., 2004; 2006b; 2005) although studies have not investigated this association in great depth. Some general conclusions, however, can be surmised. Firstly, EDs are associated with great psychosocial impairment, affecting social relationships, emotional well-being, and general mental health (e.g. Hay, 2003; Mond et al., 2005). However, differences in reported QoL between ED diagnoses are as yet unclear (Engel et al., 2008; Padierna et al., 2000). Additionally, those identified as having "subclinical" levels of symptomatology still report lower QoL than controls (Engel et al., 2008; Hay, 2003). It also appears that ED symptoms affect mental health domains of QoL more than physical domains (Doll et al., 2005; Latner et al., 2008; Mond et al., 2005) although less attention has been given to the attitudinal or cognitive effects of an ED on QoL than the behavioural features.

Whilst it has been established that greater levels of ED symptoms negatively affect QoL, studies so far have neglected to investigate in detail what other factors might affect this relationship. Some authors have suggested that variables such as comorbidity or coping styles might be implicated (de la Rie et al., 2005), although none have investigated this in depth. The presence of psychiatric symptoms has been linked to poorer QoL (Padierna et al., 2000; 2002; Vallance, 2006), and so the mechanisms through which this may operate deserve investigation. Vallance (2006) concluded that “impairment in QOL found in eating disturbances will be increased if symptoms of comorbid disorders are present” (p. 55) although no studies have explicitly tested the potential role in moderating the ED-QoL relationship.

Another potential moderator might be how an individual responds to ED symptoms, or other life stressors (de la Rie et al., 2005). Previous studies have indicated that women with EDs may respond to stressors in less adaptive ways than those without such pathology (e.g. Troop & Treasure, 1997). In particular, Troop, Holbrey, and Treasure (1998) found that women who presented with bulimia nervosa (BN) were more likely to use a self-blame strategy than controls, and both BN subjects and those with anorexia nervosa (AN) report more avoidant coping. Similarly, the presence or absence of social support, affected by ED symptoms (Tiller et al., 1997), may also affect the ED-QoL relationship, although this has not yet been addressed. As such, it would be interesting to investigate whether types of coping, including social support strategies, might affect the association between ED symptoms and QoL.

The frequency of eating disordered behaviours, such as bingeing and vomiting, has also been implicated in impaired QoL in such samples (Latner et al., 2008) and

may exacerbate ED psychopathology, although further research is needed to clarify the nature of this relationship. In a clinical sample of women with EDs, Latner et al. (2008) found that subjective binge episodes, compensatory vomiting and laxative abuse affected QoL although this was found to be greater on physical aspects of QoL, with no significant effects on the mental health components, a finding that seems to be at odds with previous research (e.g. Doll et al., 2005; Mond et al., 2005). ED behaviours might represent another moderator of the relationship between the cognitive aspects of an ED and self-reported QoL.

In assessing QoL in psychiatric samples, generic measures, such as the Medical Outcomes Studies forms (e.g. Stewart et al., 1988; Ware et al., 1996; Ware & Sherbourne, 1992), have most often been used, and have shown that those suffering from an ED are either equally or more impaired than comparable samples suffering from other mental (e.g. de la Rie et al., 2005) or physical (e.g. Keilen et al., 1994) illness (see also Engel et al., 2008). Although such generic measures are useful in comparing impairment across disease conditions, they may mask more subtle differences in psychosocial impairment as a result of an ED, such as ruminative thinking about eating. Furthermore, the wording of certain generic questionnaires may fail to detect differences within ED samples (Doll et al., 2005).

As a result of such criticisms, a number of recent authors (Abraham et al., 2006; Adair et al., 2007; Bohn & Fairburn, 2008; Engel et al., 2006; Las Hayas et al., 2006) have designed and validated QoL measures specific to EDs. Such measures have the advantage of being able to detect the unique aspects of a certain condition and retaining the precision necessary to interpret differences (Engel et al., 2008). The most recent of these, the Clinical Impairment Questionnaire (Bohn et al., 2008;

Bohn & Fairburn, 2008) was developed in the UK and shows a number of distinct advantages over previous measures. It is a simple, brief self-report measure that can generate a cut-off for probable ED cases and demonstrates good psychometric properties (Bohn et al., 2008). However, one of its main virtues is its ability to assess functional impairment resulting from symptoms of an ED, a feature that is omitted from previous measures (Bohn et al., 2008). Given this recent interest in measuring QoL in EDs, it is perhaps surprising that no studies have as yet used a generic QoL measure alongside an ED-specific measure; no studies have directly compared QoL measures in terms of specificity or responsiveness to ED symptoms.

Building on shortcomings in the literature including underuse of ED-specific measures and a limited understanding of the relationship between ED symptoms and QoL, the present study had three main aims: (1) to provide an extension and replication of data on QoL within a nonclinical population likely to show high levels of ED pathology; (2) investigate in greater depth what factors affect the ED-QoL relationship; and (3) provide data that compares results on both a generic and ED-specific measure that have been validated with ED populations.

It is hypothesised that, within a non-clinical sample, greater levels of ED psychopathology (attitudes, beliefs) will be associated with lower self-reported QoL, replicating existing research (e.g. Doll et al., 2005) with student populations. Furthermore, coping styles, levels of social support, and levels of psychopathology are hypothesised to moderate this relationship; at higher levels of ED psychopathology, QoL will be lower in the presence of maladaptive styles of coping, lower levels of social support, and higher levels of psychopathology.

## **Method**

### ***Participants***

Female undergraduates ( $N = 339$ ) were recruited at two large UK universities and a large private university in the Midwest United States. The recruitment process was similar at each university, with potential participants approached using their respective Department of Psychology subject pool. In short, these schemes offer research or academic credit following research participation.

Strict standards of ethical practice were maintained throughout and the study was given approval by Ethics Committees at each university (see Appendices E & F). Participants who enrolled in the study were free to remove their data at any time without affecting their credit allocation. Participants were required to be female adults but no other exclusion criteria were provided. A total of 339 women were enrolled in the study.

Participants ranged from 18 - 42 years ( $M = 19.4$ ,  $SD = 2.2$ ). The mean BMI was  $22.2\text{kg}/\text{m}^2$  (range, 13.4 - 40.4). A substantial minority (14.5%) indicated that they had been seen by a health professional for eating concerns, with 4.4% of the sample having sought treatment for an ED in the past. 1% of the sample reported currently being in treatment for an ED.

### ***Measures***

A battery of questionnaires was compiled to measure quality of life, eating disorder psychopathology, coping styles, social support, and general psychopathology. This comprised six questionnaires:

*Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994)*

This is a 36-item self-report measure adapted from the Eating Disorder Examination interview (EDE), shown to have excellent psychometric properties (Luce & Crowther, 1999). It was specifically designed as a shorter self-report version of the EDE, itself designed for the assessment and diagnosis of EDs, and includes items relating to ED pathology rated on a 7-point Likert scale. A global score can be calculated, alongside four subscales reflecting different aspects of ED psychopathology (Fairburn & Beglin, 1994). Higher scores indicate higher levels of eating psychopathology, and there are also behavioural criteria which can allow an assessment of the behavioural features of an eating disorder, notably episodes of binge eating, self-induced vomiting, laxative use, and use of diuretics.

The EDE-Q has been used with both clinical and non-clinical samples (Fairburn & Beglin, 1994; Luce & Crowther, 1999) and is a useful tool in research studies as both an outcome measure and an assessment of core eating pathology (Mond, Hay, Rodgers, & Owen, 2006c). Cronbach's  $\alpha$  for the Global EDE-Q score in the current sample was .95.

*Brief COPE (Carver, 1997)*

This 28-item self-report questionnaire is designed to assess a wide range of adaptive and maladaptive coping styles. Carver (1997; Carver, Scheier, & Weintraub, 1989) suggests that types of coping can be obtained using the questionnaire, but recommends that a different factor analysis is done with each data set as different samples can exhibit different factors (see below).

Respondents rate on a four-point Likert scale how often they use the coping style in a given item (e.g. "I use alcohol or drugs to make myself feel better"), where 1 = "I usually don't do this at all" and 4 = "I usually do this a lot". The introduction to the questionnaire was modified slightly to that provided by Carver (1997), with the idea of asking participants how they usually react to stressful situations (see Appendix A). It has been used, and found to be reliable, with a number of different populations, including students (Pritchard & Wilson, 2003). Cronbach's  $\alpha$  for each scale was as follows: Positive Coping (.81); Social Coping (.86); Self-Blame (.72); and Externalising (.65).

*Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988)*

This 12-item self-report measure was developed in order to assess an individual's level of social support, an important construct in understanding reactions to psychological stress. A total score of general coping resources can be calculated, alongside three subscales assessing the specific availability of support from: family members; friends; and a significant other (as defined by the participant). Higher scores are indicative of greater levels of support.

The MSPSS has been supported as a useful measure of social support due to its subjective nature, brevity, and the fact that it gives a three-factor score based on perceptions of support from friends, family, and significant others (Chou, 2000). It has been reported to have good psychometric properties and has been correlated with a number of related psychological and social constructs (Zimet et al., 1988). Cronbach's  $\alpha$  for each scale was as follows: MSPSS Total (.91); Family (.91); Friends (.92); and Significant Other (.95)

*The Brief Symptom Inventory (BSI; Derogatis, 1975)*

The BSI is a 53-item self-report measure of current psychiatric symptomatology. Respondents are asked to indicate how much certain symptoms (e.g. “feeling lonely”) have bothered them with the last seven days, rated on a 5-point Likert scale with higher scores indicating more distress. The scale is divided into nine factors: somatisation; obsessive compulsiveness; interpersonal sensitivity; depression; anxiety; hostility; phobic anxiety; paranoid ideation; and psychoticism. These factors can either be used as separate subscales or can be summed to represent a total score indicating global psychological distress; the Global Severity Index, or GSI. The BSI has been used as a measure of general psychopathology in studies of women with eating disorders (Sheffield, Waller, Emanuelli, & Murray, 2006) and has good psychometric properties and published norms for nonclinical samples (Derogatis, 1993). In the current sample, Cronbach’s  $\alpha$  was .96.

*Clinical Impairment Assessment Questionnaire (CIA v. 3.0, Bohn & Fairburn, 2008)*

This self-report questionnaire is a 16-item measure of the degree of functional impairment that is caused as a result of ED psychopathology. It has a 4-point Likert scale of responding (0 = Not At All to 3 = A Lot) and asks respondents to record how their eating attitudes or behaviours have interfered with various aspects of their life over the past 28 days. Higher scores are indicative of greater impairment.

The CIA demonstrates good psychometric properties and generates a cut-off score ( $\geq 16$  points) that can predict case status. Results can be interpreted with either a generic, total, score of impairment, or through three domain scores: ‘personal’,

‘social’, and ‘cognitive’ (Bohn et al., 2008). It was developed on a clinical sample of ED subjects, and a recent Norwegian study has published data supporting its validity from a non-clinical sample of young women (Reas, Rø, Kapstad, & Lask, 2009). Cronbach’s  $\alpha$  for the current sample was .93 for the CIA total score.

*Medical Outcomes Study Short-Form Disability Scale 12-Item Version (SF-12v2)*  
(SF-12 v2, Ware, Kosinski, Turner-Bowker, & Gandek, 2002)<sup>4</sup>

The SF-12 is a validated instrument used for assessing everyday functioning ability (QoL). Longer versions of the measure exist (e.g. SF-20; Stewart et al., 1988; SF-36; Ware & Sherbourne, 1992) but the SF-12 is appropriate for use in QoL studies (Hickie, Andrews, & Davenport, 2002; Mond et al., 2005). The 12 items of the SF-12 are rated on a Likert scale and then summarised into two weighted scales following computation using scoring algorithms: the Physical Component Summary (PCS); and Mental Component Summary (MCS). It is designed to assess everyday functioning in both physical and mental domains, with lower scores indicating greater impairment. The MOS scales have been used in many studies of QoL in ED populations, and the SF-12 demonstrates good psychometric properties, with normative data for a number of different populations (Ware et al., 2002). Cronbach’s  $\alpha$  was .72 for the MCS and .84 for the PCS in the current sample.

### ***Procedure***

Eligible participants signed up for the study following advertisement on online subject recruitment sites of each Department of Psychology or following

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<sup>4</sup> The BSI and SF-12 measures are not included in Appendix A due to copyright permissions

undergraduate psychology lectures. Participants were given verbal, electronic, or written instructions (according to individual preference) if they wished to participate, although all completed printed versions of the questionnaire pack.

Interested participants who signed up were given a unique ID number to allow access to their data without requiring the use of names. Participants were asked to meet with the primary investigator (PEJ) in a quiet room of the university they attended. They were reminded of the aims of the study as well as their rights as participants and signed a consent form (see Appendix A) to indicate their agreement with the procedure. They were then given the booklet of questionnaires which included a demographics form and a debriefing form. Participants were asked to give information about their weight and height so that a Body Mass Index score (BMI) could be obtained ( $\text{kg}/\text{m}^2$ ). Participants were also asked to identify if they had significant eating concerns, or had ever been treated for an eating disorder. The questionnaires were completed with the investigator nearby should any problems arise and took about 20-30 minutes to complete. The questionnaires were presented in a uniform order (presented as listed above) and were given back to the investigator following their completion.

All participants who completed the pack returned it to the investigator in person and were given a debriefing statement, which thanked them for their participation and also provided suggestions if participants felt they needed support with any of the issues raised. The contact details of the investigator and primary research supervisors were provided, and participants were encouraged to contact the researchers if they wanted to.

## **Data Analysis**

### *Distribution of the scores*

Data from the majority of questionnaire subscales were shown to be significantly non-normal (Kolmogorov-Smirnov analyses,  $ps < .01$ ), which remained significant after transforming the data. This is to be expected given the non-clinical nature of the sample alongside the use of clinical measures, as there is likely to be a large proportion of relatively low scores and few towards the clinical range of severity.

Missing data was accounted for by substituting the individual mean of that subscale (e.g. see Fairburn & Beglin, 1994), maintaining individual variation within scores. If more than 25% of a participant's data on a questionnaire was missing, the data for that questionnaire was not used in any analysis.

In order to test the first prediction, Spearman's rank correlation coefficients were calculated to examine the association between ED symptoms and QoL. Although the data were not normally distributed, regression analyses were run on the data due to the stability of such analyses with non-parametric data (see Allison, 1999; Howell, 1997). Regression analyses were then conducted on the data in order to test for moderation effects, following the method outlined by Holmbeck (1997) and Baron and Kenny (1986). Briefly, predictor and moderator variables are entered into a regression, followed by their interaction term. To eliminate multicollinearity, all variables apart from the dependent variable were centred (see Aiken & West, 1991) prior to analysis. Due to the number of tests to be conducted, a significance level of  $p < .01$  was used in order to reduce the chance of Type I error. Data analysis was performed using SPSS version 15.0 for Windows.

## **Results**

### ***Descriptive Statistics***

The demographic characteristics of the samples are given in Table 1.

Table 1. Characteristics of the study sample

Variable	UK Sample (n = 181)	US Sample (n = 158)	Total Sample (n = 339)	t-value, ( <i>p</i> < .01)
Age	19.64 (2.90)	19.02 (0.78)	19.35 (2.20)	2.57, <i>ns</i>
BMI	21.89 (3.39)	22.63 (3.79)	22.24 (3.60)	-1.90, <i>ns</i>
Age of first eating concern	14.04 (2.61)	13.97 (2.63)	14.01 (2.61)	0.75, <i>ns</i>
% seen health professional for an ED (at least once)	12.1	17.7	14.5	1.17, <i>ns</i>
% sought treatment previously	10.1	1.5	4.4	
% currently in treatment	1.4	0.7	1.0	

*Comparisons of means between US and UK samples*

Demographic data (see Table 1) suggested that the US and UK<sup>5</sup> samples were similar in terms of demographics and the rates of ED symptoms and concerns, although higher proportions of those seeking treatment are seen in the UK sample. This may be a reflection of the different models of healthcare between the two countries. Levene's test for homogeneity of variance conducted on demographic and outcome variable suggested that variances were equal between the US and UK samples ( $p > .01$ ). In order to identify if any additional differences existed, the questionnaire data from each group was then compared and analysed using independent samples  $t$ -tests. Table 2 shows the scores for the main variables under study between groups. The results suggest that the majority of the variables were not significantly different between groups, giving strong reason to treat the sample as one group. Only positive coping differed between the samples, demonstrating a small discrepancy in the use of this style between US and UK participants. Due to the number of variables used and the specific hypotheses, this was not considered significant in terms of treating the groups as distinct; the sample was therefore collapsed for all subsequent analyses.

Table 2. Mean scores of variables between countries

Measure	UK Mean (SD)	US Mean (SD)	<i>t</i> value, significance
<i>EDE-Q</i>			
Global Score	1.85 (1.25)	1.82 (1.26)	0.213, ns
<i>MSPSS</i>			
Family	4.00 (1.00)	4.16 (0.95)	-1.54, ns

<sup>5</sup> The data for both UK sites was pooled to form the UK data

Friends	4.16 (0.92)	4.32 (0.81)	-1.68, ns
Significant Other	4.24 (1.02)	4.27 (0.87)	-0.30, ns
Total	4.13 (.78)	4.25 (0.65)	-1.49, ns
<i>BSI</i>			
Depression	0.98 (0.90)	0.85 (0.82)	1.32, ns
Anxiety	0.74 (0.63)	0.71 (0.70)	0.47, ns
Global Index	0.87 (0.59)	0.80 (0.58)	1.13, ns
<i>COPE</i>			
Positive Coping	2.35 (0.48)	2.75 (0.49)	0.72, <i>p</i> < .01
Social Coping	2.81 (0.78)	2.89 (0.72)	-.942, ns
Self-Blame	1.81 (0.50)	1.75 (0.50)	1.18, ns
Externalisation	1.96 (0.52)	2.07 (0.54)	-1.85, ns
<i>CIA</i>			
Total Score	8.91 (8.21)	8.08 (8.56)	0.90, ns
<i>SF-12</i>			
MCS	44.38 (11.33)	46.10 (9.55)	-1.45, ns
PCS	43.69 (5.67)	44.62 (6.11)	-1.49, ns

EDE-Q = Eating Disorder Examination Questionnaire; MSPSS = Multidimensional Scale of Social Support; BSI = Brief Symptom Inventory; COPE = Brief COPE; CIA = Clinical Impairment Assessment; SF-12 = 12-Item Short Form Health Survey; MCS = Mental Component Summary; PCS = Physical Component Summary

#### *Internal Consistency Reliability*

Cronbach's  $\alpha$  for all the measures were acceptable, ranging from 0.65 to 0.96 (see above). In the case of the COPE, following factor analysis Cronbach's  $\alpha$  was used to identify any items that would increase the reliability of the measure if removed.

Aside from Item 9, which was not included in any of the subscales, no singular item

significantly altered the reliability of the measure or subscales. The results of reliability analyses in the present study compare favourably with existing studies using these measures (for full results see Appendices B & C).

#### *Statistical Power*

A power calculation using G\*Power (Faul, Erdfelder, Lang, & Buchner, 2007) was performed, using an  $\alpha$  level of 0.01. Using a post hoc analysis, the sample size of 339, adopting an effect size of 0.08, gave a power of 0.96, which was sufficient to detect significant differences.

#### *Comparison to published data*

The means and standard deviations for each measure are presented in Appendix C<sup>6</sup>, with data from previous studies using these measures reported alongside for comparison. Inspection of the data suggests that the EDE scores were similar to published norms for undergraduate women. However, CIA scores in the current sample were higher than a Norwegian university sample.

#### *Associations between eating pathology and Quality of Life*

Spearman rank correlations (one-tailed) were used to test the hypothesis that higher eating disorder symptoms as assessed by the global EDE-Q score would be associated with decrements in QoL. Table 3 shows correlations between the measure of ED psychopathology and the two QoL measures.

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<sup>6</sup> The data for the COPE is not included, as the PCA conducted with the present sample is unlikely to compare to those already published due to the likelihood of a different factor structure between samples.

Table 3. One-tailed Spearman's Correlation Coefficients between ED psychopathology and QoL

Eating Pathology	SF-12 Physical	SF-12 Mental	CIA Total Score
	Component Score	Component Score	
<b>EDE-Q</b>			
Restraint	.03	-.18*	.57*
Eating Concern	-.04	-.28*	.78*
Shape Concern	-.02	-.31*	.80*
Weight Concern	-.07	-.26*	.79*
Global Score	-.024	-.29*	.81*

Note: \* denotes significance at the  $p < .01$  level. EDE-Q = Eating Disorder Examination Questionnaire; SF-12 = 12-Item Short Form Health Survey; CIA = Clinical Impairment Assessment

The analyses presented in Table 3 support the hypotheses, suggesting that individuals who experience a lot of distress related to ED symptoms suffer effects on their mental health QoL; this is more apparent when an ED-specific measure is used. However, no significant effects of ED symptoms were found on the physical health dimension of the SF-12 (the PCS), suggesting that the relationship between ED symptoms and QoL is limited to mental health domains in this non-clinical group.

Correlations were also conducted between all the hypothesised predictors in the model in order to look for multicollinearity within the data (for full correlation matrix, see Appendix D). A figure of .8 was used to eliminate variables with high inter-correlations (see Huteson & Safroniou, 1999, pp. 78-85). Results demonstrated that multicollinearity was not a cause for concern in any of the analyses and statistics for tolerance within each model were acceptable.

### **Factor Analyses**

Carver et al. (1989) suggest conducting a factor analysis on the COPE for each population, rather than accepting existing analyses *prima facie*. This allows a more specific assessment of coping within the sample, rather than applying existing constructs that may be inaccurate. The resulting analyses (see Appendix B) suggested that four main styles of coping were evident: *Positive Coping*; *Social Coping*; *Self-Blame*; and *Externalising*. These were therefore included as separate constructs in subsequent analyses.

### **Eating Behaviours**

In the first series of regressions, the hypothesis that ED features would be associated with impaired QoL was tested. For the dependent variable, QoL (total CIA score or MCS of the SF-12) was entered and eating behaviours, as assessed by the EDE-Q (Objective Bulimic Episodes, Subjective Bulimic Episodes, vomiting<sup>7</sup>), were entered as independent variables. These behaviours had a significant overall predictive effect [ $F(3, 334) = 42.14, p < .01$ ], accounting for 28% of the variance in total CIA score. All of the individual behaviours had significant and independent effects ( $ps < .01$ ). With the MCS as the dependent variable, only SBEs showed a significant effect, explaining 5% of the variance.

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<sup>7</sup> Laxative and diuretic use were not included in analyses as only a small proportion of people reported such use ( $Ns = 3$  and 4 respectively)

### ***Regression and Moderation Analyses***

#### *Eating Disorder-Specific QoL*

Further regression analyses were conducted in order to examine whether interactions between variables (EDE-Q and moderators) were significant predictors of total CIA score after controlling for their independent effects. In hierarchical regression analyses, the continuous-level predictor (EDE-Q) and the moderators were centred (i.e. the group mean was subtracted; see Aiken & West, 1991) and then multiplied to generate an interaction term (Holmbeck, 1997; Holmbeck, 2002). Unstandardised regression coefficients ( $B$ ) were interpreted from the final step of the regression equation, representing the unique contribution of each variable. Moderator analyses were conducted separately for each variable hypothesised to moderate the ED-QoL relationship, as each was deemed to be independent and conceptually distinct. The presence of a significant interaction demonstrates the presence of moderation, although further analysis is required to provide additional information (Holmbeck, 2002). Table 4 shows values obtained from the regression analyses for only those hypothesised moderators of the ED-QoL relationship that remained significant moderators after analyses. Age, BMI, adaptive coping styles, and social support were not found to act as moderators.

Table 4. Regression of ED symptoms on QoL using the Global CIA score and the interaction of EDE-Q scores and moderators

Step	B	SE B	$\beta$	$R^2$
General Psychopathology as moderator				
EDE-Q	.28	.01	.68*	.65
Psychopathology	.22	.03	.25*	.71
Interaction	.09	.02	.13*	.73
Self-blame coping style as moderator				
EDE-Q	.13	.05	.31	.65
Self-blame	-.08	.06	-.07	.66
Interaction	.10	.03	.56*	.67
Externalising coping style as moderator				
EDE-Q	.33	.01	.79*	.65
Externalising	.02	.03	.02	.65
Interaction	.08	.02	.13*	.67

Note: \* denotes significance at the  $p < .01$  level. EDE-Q = Eating Disorder Examination Questionnaire

Levels of psychopathology and coping styles were significant moderators of ED psychopathology. No eating behaviours significantly moderated the relationship between global EDE-Q scores and total CIA, although OBEs approached significance ( $p = .026$ ).

### *Generic QoL Scale*

An identical procedure to that already described was conducted, replacing the CIA with the Mental Health Composite (MCS) of the SF-12 as the dependent variable<sup>8</sup>. Although the EDE-Q was a significant predictor of MCS scores, it accounted for a great deal less variance than when the CIA was used as an outcome variable ( $R^2 = 0.076$ ). The results of the regression modelling are shown in Table 5.

Table 5. Regression of ED symptoms on QoL using the MCS and the interaction of ED and moderators

Step	B	SE B	$\beta$	$R^2$
Externalising coping style as moderator				
EDE-Q	-2.35	.45	-.28*	.08
Externalising	1.30	1.10	.07	.08
Interaction	-2.10	.72	-.16*	.10

Note: \* denotes significance at the  $p < .01$  level. EDE-Q = Eating Disorder Examination Questionnaire

Only an externalising coping style moderated the ED-QoL relationship, using a generic measure of QoL. A self-blame coping style, shown to significantly moderate the ED-QoL relationship using an ED-specific measure (see above) did not emerge as significant when the MCS was used. Similarly, eating behaviours, age, BMI, positive coping styles, a self-blame coping style, and social support did not moderate the relationship between EDE-Q scores and the MCS.

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<sup>8</sup> No analyses were performed on the Physical Health Composite (PCS) as there were no significant correlations with ED symptoms as measured by the EDE-Q (see above).

Following the suggestions of Holmbeck (2002) and Jose (2008), simple slopes analyses were conducted and graphically represented using ModGraph (Jose, 2008) to interpret the moderation effects. Figure 1 (i-iv) shows the interaction effects of each relationship.

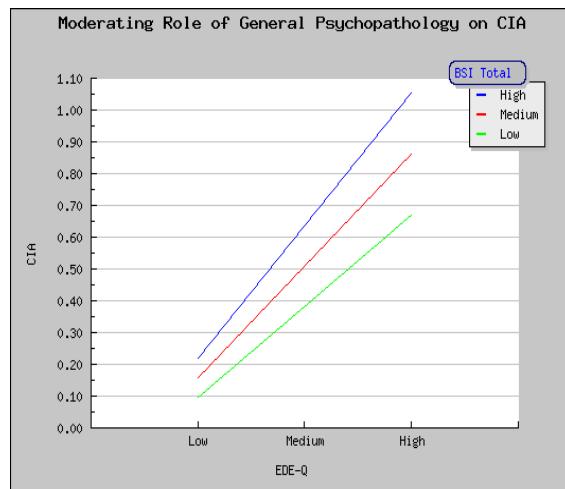


Figure 1(i). The relationship between ED symptoms and ED-specific QoL with general psychopathology as a moderator

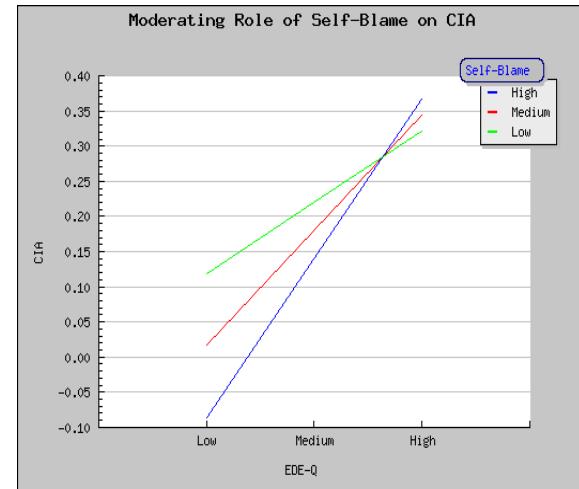


Figure 1(ii). The relationship between ED symptoms and ED-specific QoL with self-blame coping as a moderator

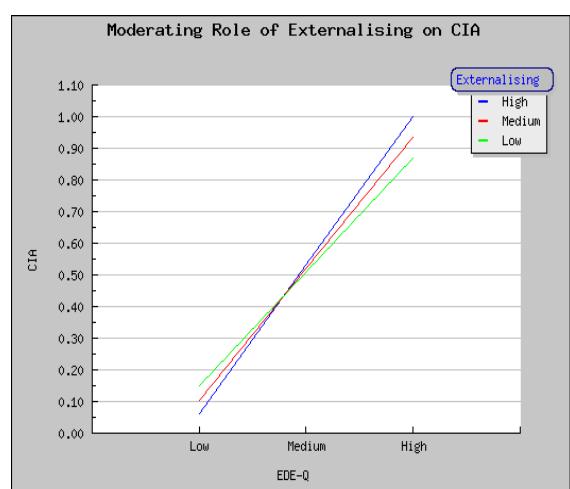


Figure 1(iii). The relationship between ED symptoms and ED-specific QoL with externalising coping as a moderator

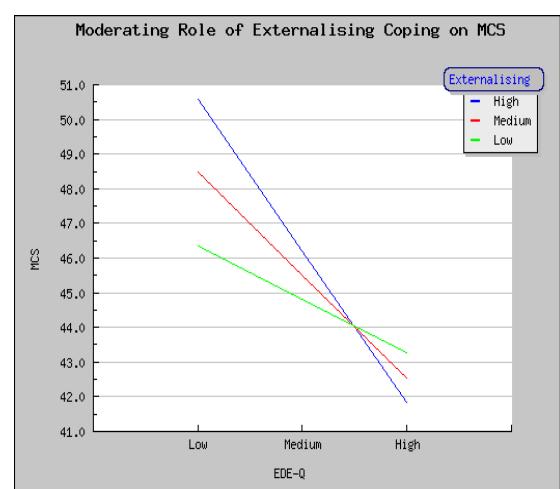


Figure 1(iv). The relationship between ED symptoms and generic QoL with externalising coping as a moderator

As the data in Figure 1 shows<sup>9</sup>, greater levels of general psychopathology are associated with impaired QoL at higher levels of ED symptoms. If an externalising or self-blame coping style is used, this also appears to be associated with poorer QoL at greater levels of ED symptoms. However, at lower levels of ED symptoms, these coping styles appear to have associations with better QoL. This may be related to the role of appraisals in coping (i.e. the perceived ability to cope; Folkman & Lazarus, 1980); participants' ratings of how successfully they use these strategies might also relate to eating behaviours and may explain the trends seen. Other cognitive elements of coping (e.g. level of perceived control over a situation) that are not adequately assessed by the current measure might also affect the relationship between ED symptoms and quality of life in respect to coping.

### ***Conclusion***

In line with the hypotheses, the results indicate that ED symptoms are an important determinant of QoL. The presence of general psychopathology and maladaptive coping styles are associated with decrements in QoL, suggesting that they moderate the relationship between ED symptoms and QoL.

### **Discussion**

#### *Eating Disorder (ED) Symptoms and Quality of Life (QoL)*

A major aim of the present study was to extend and replicate previous work looking at the relationship between ED symptoms and QoL (Abraham et al., 2006; Adair et al., 2007; de la Rie, Noordenbos, Donker, & van Furth, 2007; de la Rie et al., 2005;

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<sup>9</sup> Note: Worse QoL is shown by higher scores on the CIA but lower scores on the MCS

Doll et al., 2005; Engel et al., 2008; Hay, 2003; Jones et al., 2008; Latner et al., 2008; Mond, Hay, Rodgers, & Owen, 2007a; Padierna et al., 2000; Padierna et al., 2002). Using similar methodology and measures, existing research was extended with a nonclinical population at high risk for EDs. Initial findings supported the hypotheses, with ED symptoms found to be highly correlated with impaired QoL. In the first study of its kind to do so, QoL was measured by both an ED-specific measure (the CIA; 2008), and also a generic measure (the SF-12; Ware et al., 1996). ED symptoms were found to be related to the ED-specific measure and also the mental health component of the SF-12. No relationships with physical QoL were found. This supports findings of authors (Mond et al., 2004; 2005; 2006; Padierna et al., 2000) showing that symptoms of an ED are particularly associated with mental health domains of QoL. This is perhaps unsurprising given the psychiatric nature of an ED, and the relative health (i.e. nonclinical nature) of the current sample may have included a low percentage of individuals seriously physically affected by an ED (e.g. severely underweight). It is likely that clinical samples demonstrate a higher degree of impairment, which may have greater effects on the physical aspects of QoL.

The global scale of the EDE-Q assesses the attitudinal aspects of an ED, an important indicator of psychopathology (Mond, Hay, Rodgers, Owen, & Beumont, 2004) which shows greater validity and less openness to distortion than behavioural features as assessed by the EDE-Q (Mond et al., 2008; Mond, Hay, Rodgers, & Owen, 2007b). As hypothesised, a negative association with QoL was documented, suggesting that the cognitive symptoms of an ED are associated with impaired QoL.

Further support of the relationship between ED symptoms and impaired QoL is gained from an analysis of specific eating behaviours. Frequency of disturbed eating behaviours, such as binge eating and vomiting, was found to be negatively associated with QoL, such that those who reported engaging in such behaviours were more likely to have impaired QoL. A recent study (Mond & Hay, 2009) found that SBEs (consumption of 'normal' amounts of food with a perceived loss of control) have more significant negative effects on QoL than other ED behaviours. Although this was replicated by the present study using the MCS of the SF-12, the influence of OBEs (where large amounts of food are ingested in a discrete period of time) and vomiting was also found to be associated with ED-specific QoL. Interpretation of this suggests that ED-specific measures of QoL might be more sensitive to ED behaviours. However, the results lend support to criticisms (e.g. Mond et al., 2006) that the current diagnostic taxonomy underestimates the functional importance of perceived loss of control during binge episodes.

In summary, it seems that a clear relationship exists between levels of ED symptomatology and impaired QoL in nonclinical participants. Specifically, cognitive and attitudinal symptoms are highly associated with QoL whilst the behavioural features of an ED explain additional variance. Specific behaviours such as binge eating and vomiting are also associated with poorer QoL, although the influence of these might be missed by generic QoL measures, such as the SF-12. A further aim of this study was to investigate in more detail the ED-QoL relationship, particularly with reference to what might moderate the effect of ED symptoms on QoL.

***Moderators of the Relationship between Eating Disorders and Quality of Life***

Few other studies have addressed what might affect the ED-QoL relationship, an important focus for research (de la Rie et al., 2005). Basing hypotheses on empirical findings, it emerged that psychopathology (in addition to any significant ED concerns present) and negative coping styles moderated the relationship under study. Despite predictions to the contrary, levels of social support, and specific eating behaviours did not act as moderators. ED behaviours may act in a predictive role, and it may be that social support is not an important factor in predicting QoL associated with ED symptoms. The presence of moderation was more visible when an ED-specific measure of QoL was used.

The results can be summarised to suggest that maladaptive coping styles and greater levels of psychopathology are associated with impaired QoL when in the presence of greater ED symptoms.

***Psychopathology***

The present data confirmed existing findings (Gonzalez-Pinto et al., 2004; Padierna et al., 2000; Padierna et al., 2002; Vallance, 2006) that additional psychopathology is associated with lower self-reported QoL when in the presence of significant eating concerns. As anxiety and mood disorders are commonly found within ED samples, the exact role for a distinct disorder in lowering QoL may be a moot point (Mond et al., 2004). However, implications for treatment and prevention may remain as it is likely that improvements in general psychological distress will be seen upon successful resolution of eating concerns.

The results of the current study extend existing data with analyses suggesting that additional psychopathology adds significantly to QoL impairment as measured by the CIA. Although this appears to contradict the recent findings of Becker et al. (2009), who found only limited association between CIA scores and general psychiatric distress, the measures of pathology used in the current study were more reliable. Nonetheless, ED symptoms (as measured by the EDE-Q) in both studies accounted for a large proportion of the variance in CIA scores. The present study investigates this relationship further, suggesting that additional levels of psychopathology are associated with greater EDQoL impairments in the presence of ED pathology.

Using a more generic measure of QoL, levels of psychopathology were not found to moderate the ED-QoL relationship. It may be that levels of general psychiatric distress outweigh the effects of an ED alone, masking any moderation effects that may be present.

In conclusion, it appears that levels of general psychological distress add to the QoL impairments in the presence of significant ED concerns. Although this is less likely to be found using a generic QoL measure, results using an ED-specific measure argue in favour of such an interpretation.

### *Coping styles*

The influence of styles of coping was found to show a relatively consistent pattern across the two QoL measures, with the data suggesting that negative coping styles, particularly an externalising style, impair QoL at greater levels of ED

symptoms. Conversely, adaptive coping was not found to moderate the ED-QoL relationship.

The current study extends existing research (e.g. Troop, Holbrey, & Treasure, 1998) suggesting that maladaptive forms of coping in the presence of significant ED concerns are associated with greater impairments of QoL than in the absence of such coping. A self-blaming or externalising coping style is likely to amplify the negative effects of an ED in individuals with significant ED concerns, although further research is needed to clarify the causal direction of this relationship. However, at low levels of pathology, it appears that negative coping styles actually reduce the impact of ED on QoL, suggesting that the impact of negative coping on eating symptoms only becomes apparent at higher levels of symptomatology. This would be interesting to look at in clinical and community samples to see if the trends shown here remain.

More adaptive styles of coping were not found to affect the ED-QoL relationship. Previous studies have shown that those with ED symptoms do not differ from controls in the degree of problem-solving coping shown (Troop et al., 1998; Wolff, Crosby, Roberts, & Wittrock, 2000). It is likely that those with ED pathology may have the necessary resources for positive coping, but make greater use of negative strategies (e.g. see Lena, Fiocco, & Leyenaar, 2004). Replication of these results may have implications for the treatment of EDs, suggesting that QoL is unlikely to improve through augmenting problem-solving abilities alone (cf. Stice & Shaw, 2004).

Other clinical implications of the current findings relate to current guidance on the treatment of EDs, suggesting that those with subclinical syndromes might still

experience significant distress. In clinical practice, this might mean less of a reliance on strict diagnoses, and perhaps more assessment of how distressed clients are with their problems around eating. Similarly, although BMI is a medically relevant criterion, the results of the current study suggest that it has less of a role in clients' perceived. As suggested by previous authors (e.g. Miller, 1996), outcome data represents an important part of health service evaluation. This might make increased use of QoL measures, which appear to be easily applied to the field of EDs.

### ***Measuring EDQoL***

Both generic and ED-specific measures were used in the present study to investigate QoL. The results appeared to be generally comparable, with ED symptoms associated with greater impairment as measured by the CIA and also the mental component scale of the SF-12, supporting existing data. However, as this study appears to be the first to compare two such measures directly, the results confirmed existing suggestions (Adair et al., 2007; Engel et al., 2006) that generic measures may miss details specific to an ED. For example, a number of eating behaviours were found to affect ED-specific QoL although only the frequency of subjective binge episodes (SBEs) was associated with lower scores on the SF-12 (see above). In addition, an externalising coping style was associated with greater QoL in the presence of ED symptoms, regardless of which measure was used, although a self-blame style and additional psychopathology were found only to moderate the effect of EDE-Q scores on the CIA.

Using more than one measure may reduce the chance of missing an effect when one is present, although further research is needed to clarify whether self-

blame and the presence of additional psychopathology really do affect QoL. Certainly, this seems like an intuitive suggestion that is supported by other research (e.g. Vallance, 2006) but the results of this nonclinical study must be interpreted with some caution. The current data provides further support for the use of the CIA as an ED-specific measure of QoL, furthering its use with both a UK and US student population.

### ***Study Limitations and Future Research***

There exists a great deal of debate around using self-report measures in the EDs, and also in fields such as coping research. However, the feasibility of such a large scale study as this would have been reduced without the use of such measures and the use of self-report data is essential in some cases (e.g. subjective QoL measurement). Nonetheless, the limitations of self-report data are well documented and include confusion around the terms being used (e.g. “large amounts of food”, “loss of control”) and potential misreporting of frequencies as a result of a wish not to disclose or inaccuracy in recalling events (Smyth et al., 2001). Whilst acknowledging these difficulties, the use of self-report measures generates interesting data upon which more in-depth studies can be based.

The population under study was comprised of well-educated young females attending institutions of higher education, and so the addition of a community sample would have increased the study’s potential application. The inclusion of a measure of self-esteem (see de la Rie et al., 2005) would have been of benefit as this is another potential moderator of the ED-QoL relationship that was not included in the present study.

It is not possible to say whether ED symptoms are a cause or an effect of QoL. However, the fact that QoL improves after a reduction in symptoms (Padierna et al., 2002), and that certain measures are designed to assess QoL *resulting from* ED symptoms (e.g. Bohn et al., 2008), suggest that ED symptoms represent a strong predictor of QoL. Further research (e.g. longitudinal studies) will be required to confirm this assumption, although the mounting evidence implies that impaired QoL results from ED symptoms or some highly associated variable (e.g. interpersonal distress). Future research might then identify additional predictors of QoL, and incorporate this information into treatment.

Future research might include replication with a larger, community sample to increase the confidence in any recurring findings and might include additional measures (e.g. self-esteem). It is likely, however, that the inclusion of any measures of social support would be of little benefit. Recruitment of a clinical sample of ED patients is required to extend the findings presented here, and a study of this nature is currently underway.

### ***Conclusion***

The evidence base for impaired QoL in ED populations is now beginning to grow (Engel et al., 2008). The development and use of measures specific to EDs is helping elucidate the important determinants of functional impairment in such samples. However, little is known about what factors might influence the effect of ED symptoms on self-reported QoL. The current study was designed as an investigation of this, and suggested that an individual's level of general psychiatric distress and coping styles are important. These results suggest that the consequences

for QoL of ED symptoms in a nonclinical population will be additionally impacted by the presence of other psychopathology. An individual's response to stressful situations (i.e. their coping style) is also likely to affect the relationship, with a more externalising or self-blaming style particularly likely to affect their QoL at higher levels of eating distress. The current study had the additional advantage of comparing findings resulting from a generic and ED-specific QoL measure, and demonstrated considerable consistency between the two.

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### Appendix A: Booklet of Questionnaires

#### **Contents of booklet**

- Information sheet/Consent form
- Demographic form
- Measures
  - Eating Disorder Examination Questionnaire (EDE-Q)
  - Brief COPE
  - Multidimensional Scale of Perceived Social Support (MSPSS)
  - Brief Symptom Inventory (BSI)
  - Clinical Impairment Assessment (CIA)
- Debriefing sheet

**Identification Number:.....**

**Participant Information Statement**

**Quality of life and Eating Behaviours**

You are invited to take part in a research study into the relationship between eating disorder symptoms, coping, exercise, eating-related behaviours and quality of life.

If you agree to participate in this study, you will be asked to complete items from 5 questionnaires that assess your general (everyday) attitudes, beliefs and behaviours as well as those associated with exercise and eating. The questionnaires vary in length from 12 to 53 questions and should take you 40-50 minutes to complete.

All the information you provide is anonymous as no data is collected linking you to your information. Should you wish to withdraw your data following participation, please contact the researcher, Paul Jenkins (pej106@soton.ac.uk), quoting your identification number located in the top right-hand corner of this sheet. Should you wish to discuss any issues that arise as a result of taking part in this study please contact Dr Caroline Meyer - Telephone: (01509) 22 30 32, or E-mail: [C.Meyer@lboro.ac.uk](mailto:C.Meyer@lboro.ac.uk)

All aspects of the study, including results, will be strictly confidential. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report. If you wish to receive a copy of the report, please send an email request quoting your ID number to Dr Caroline Meyer: [C.Meyer@lboro.ac.uk](mailto:C.Meyer@lboro.ac.uk)

Participation in this study is completely voluntary and you are not under any obligation to consent. You are free to withdraw at any time, and there is no penalty should you decide to do so. If you are willing to participate in this study, please read and sign the participant consent form, before filling out the questionnaires. This information sheet is for you to keep.

*Please detach and keep the above if you wish*

**Statement of Consent**

**Identification Number:.....**

I \_\_\_\_\_ have read the above informed consent form. I understand that I may withdraw my consent and discontinue participation at any time without penalty or loss of benefit to myself. I understand that data collected as part of this research project will be treated confidentially, and that published results of this research project will maintain my confidentiality. In signing this consent letter, I am not waiving my legal claims, rights, or remedies.

I give consent to participate in the above study:

Yes      No

Signature

Date

**Identification Number:.....**

**Descriptive Information + Health Screen**

**Instructions:**

Please complete all the following information as accurately as possible.

**Sex:** Female  Male  (please tick box that applies)

**Age:**.....years.....months

**Height:**.....cm, or feet/inches (please delete as appropriate)

**Weight:**.....kg, or stones/pounds (please delete as appropriate)

**Language:** Is English your first language? Yes  No  (tick box that applies)

**Health Status:**

Have you ever had concerns about your eating, shape or weight? Yes  No

If so, when did your concerns begin? ..... (approximate age)

Have you ever spoken to your GP, or another health professional, about these concerns?

Yes , No , Not applicable

If so, when did you contact them? .....

Are you currently receiving, or have you previously received, treatment for an eating disorder? (tick box that applies)

Currently , or Previously

Thank you.

### Eating Questionnaire (EDE-Q)

#### Instructions

The following questions are concerned with the **PAST FOUR WEEKS ONLY (28 days)**. Please read each question carefully and circle the appropriate number on the right. Please answer all the questions.

On how many days out of the past 28 days.....	N0 days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
(1) Have you been deliberately <u>trying</u> to limit the amount of food you eat to influence your shape and weight?	0	1	2	3	4	5	6
(2) Have you gone for long periods of time (8 hours or more) without eating anything in order to influence your shape or weight?	0	1	2	3	4	5	6
(3) Have you <u>tried</u> to avoid eating any foods which you like in order to influence your shape or weight?	0	1	2	3	4	5	6
(4) Have you <u>tried</u> to follow definite rules regarding your eating in order to influence your shape or weight; for example a calorie limit, a set amount of food, or rules about what or when you should eat?	0	1	2	3	4	5	6
(5) Have you wanted your stomach to be empty?	0	1	2	3	4	5	6
(6) Has thinking about food or its calorie content made it more difficult to concentrate on things you are interested in; for example, read, watch TV, or follow a conversation?	0	1	2	3	4	5	6

(7) Have you been afraid of losing control over eating?	0	1	2	3	4	5	6
(8) Have you had episodes of binge eating?	0	1	2	3	4	5	6
(9) Have you eaten in secret (do not count binges)	0	1	2	3	4	5	6
(10) Have you definitely wanted your stomach to be flat?	0	1	2	3	4	5	6
(11) Has thinking about shape or weight made it more difficult to concentrate on things you are interested in; for example, read, watch TV, or follow a conversation?	0	1	2	3	4	5	6
(12) Have you had a definite fear that you might gain weight or become fat?	0	1	2	3	4	5	6
(13) Have you felt fat?	0	1	2	3	4	5	6
(14) Have you had a strong desire to lose weight?	0	1	2	3	4	5	6

(15) Over the past 4 weeks (28 days) on what proportion of times that you have eaten have you felt guilty because of the effect on your shape or weight? (Do not count binges). Circle the number that applies.	0 – None of the times 1 – A few of the times 2 – Less than half the times 3 – Half the times 4 – More than half the times 5 – Most of the time 6 – Every time
---	---

(16) Over the past four weeks (28 days), have there been any times when you have felt that you have eaten what other people would regard as an unusually large amount of food given the circumstances? (Please circle the answer that applies).

0 – No

1 – Yes

(17) How many such episodes have you had over the past four weeks? [ ] [ ] [ ]

(18) During how many of these episodes of overeating did you have a sense of having lost control over your eating? [ ] [ ] [ ]

(19) Have you had other episodes of eating in which you have had a sense of having lost control and eaten too much, but have not eaten an unusually large amount of food given the circumstances?

0 – No                    1 – Yes

(20) How many such episodes have you had over the past four weeks? [ ] [ ] [ ]

(21) Over the past four weeks have you made yourself sick (vomit) as a means of controlling your shape or weight?                    0 – No                    1 – Yes

(22) How many times have you done this over the past four weeks? [ ] [ ] [ ]

(23) Have you taken laxatives as a means of controlling your shape or weight?

0 – No                    1 – Yes

(24) How many times have you done this over the past four weeks? [ ] [ ] [ ]

(25) Have you taken diuretics (water tablets) as a means of controlling your shape or weight?

0 – No                    1 – Yes

(26) How many times have you done this over the past four weeks? [ ] [ ] [ ]

(27) Have you exercised hard as a means of controlling your shape or weight?

0 – No                    1 – Yes

(28) How many times have you done this over the past four weeks? [ ] [ ] [ ]

Over the past four weeks (28 days) – please mark which best describes your behaviour	NOT AT ALL	SLIGHTLY		MODERATELY		MARKEDLY
(29) Has your weight influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5
(30) Has your shape influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5
(31) How much would it upset you if you had to weight yourself once a week for the next four weeks?	0	1	2	3	4	5
(32) How dissatisfied have you felt about your weight?	0	1	2	3	4	5
(33) How dissatisfied have you felt about your shape?	0	1	2	3	4	5
(34) How concerned have you felt about other people seeing you eat?	0	1	2	3	4	5
(35) How uncomfortable have you felt seeing your body; for example, in the mirror, in shop window reflections, while undressing, or taking a bath or shower?	0	1	2	3	4	5
(36) How uncomfortable have you felt about others seeing your body; for example, in communal changing rooms, when swimming, or wearing tight clothes?	0	1	2	3	4	5

### Brief COPE

These items deal with ways you've been coping with the stress in your life. There are many ways to try to deal with problems. These items ask what you usually do. Obviously, different people deal with things in different ways, but I'm interested in how you've tried to deal with it. Each item says something about a particular way of coping. I want to know to what extent you do what the item says. Don't answer on the basis of whether it seems to be working or not—just whether or not you're doing it. Use these response choices. Try to rate each item separately in your mind from the others. Make your answers as true FOR YOU as you can.

1 = I haven't been doing this at all

2 = I've been doing this a little bit

3 = I've been doing this a medium amount

4 = I've been doing this a lot

1. I've been turning to work or other activities to take my mind off things.....
2. I've been concentrating my efforts on doing something about the situation I'm in.
3. I've been saying to myself "this isn't real.".....
4. I've been using alcohol or other drugs to make myself feel better.....
5. I've been getting emotional support from others.....
6. I've been giving up trying to deal with it.....
7. I've been taking action to try to make the situation better.....
8. I've been refusing to believe that it has happened.....
9. I've been saying things to let my unpleasant feelings escape.....
10. I've been getting help and advice from other people.....
11. I've been using alcohol or other drugs to help me get through it.....
12. I've been trying to see it in a different light, to make it seem more positive.....
13. I've been criticizing myself.....
14. I've been trying to come up with a strategy about what to do.....
15. I've been getting comfort and understanding from someone.....
16. I've been giving up the attempt to cope.....
17. I've been looking for something good in what is happening.....
18. I've been making jokes about it.....
19. I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.....
20. I've been accepting the reality of the fact that it has happened.....
21. I've been expressing my negative feelings.....
22. I've been trying to find comfort in my religion or spiritual beliefs.....
23. I've been trying to get advice or help from other people about what to do.....
24. I've been learning to live with it.....
25. I've been thinking hard about what steps to take.....
26. I've been blaming myself for things that happened.....
27. I've been praying or meditating.....
28. I've been making fun of the situation.....

Multidimensional Scale of Perceived Social Support (Zimet et al., 1988)

Please rate the degree to which you agree with the statements below on a scale of **1** (“strongly disagree”) to **5** (“strongly agree”). Please respond as honestly as possible and try to complete all items.

1. There is a special person who is around when I am in need:

1                    2                    3                    4                    5

2. There is a special person with whom I can share my joys and sorrows:

1                    2                    3                    4                    5

3. My family really tries to help me:

1                    2                    3                    4                    5

4. I get the emotional help and support I need from my family:

1                    2                    3                    4                    5

5. I have a special person who is a real source of comfort to me:

1                    2                    3                    4                    5

6. My friends really try to help me:

1                    2                    3                    4                    5

7. I can count on my friends when things go wrong:

1                    2                    3                    4                    5

8. I can talk about my problems with my family:

1                    2                    3                    4                    5

9. I have friends with whom I can share my joys and sorrows:

1                    2                    3                    4                    5

10. There is a special person in my life who cares about my feelings:

1                    2                    3                    4                    5

11. My family is willing to help me make decisions:

1                    2                    3                    4                    5

12. I can talk about my problems with my friends:

1                    2                    3                    4                    5

CIA

## **Debriefing Statement**

### **Eating Behaviours and Quality of Life**

The aim of this research was to investigate how Quality of Life is affected by eating disorder symptoms. It is expected that a number of variables (such as social support and current eating attitudes) will affect this relationship. Your data will help our understanding of eating disorders and their effects. Once again results of this study will not include your name or any other identifying characteristics. The research did not use deception. You may have a copy of this summary if you wish and are welcome to contact Caroline Meyer for a copy of the report when it is finished, quoting your ID number.

If you have any further questions please contact me, Paul Jenkins, at [pej106@soton.ac.uk](mailto:pej106@soton.ac.uk).

If you feel you have been affected by any of the issues discussed in this study, please contact Dr Caroline Meyer at [C.Meyer@lboro.ac.uk](mailto:C.Meyer@lboro.ac.uk). Alternatively, you may wish to contact your General Practitioner or other health professional.

Thank you for your participation in this research.

Signature \_\_\_\_\_ Date \_\_\_\_\_

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the Chair of the Ethics Committee, Department of Psychology, University of Southampton, Southampton, SO17 1BJ.

Phone: (023) 8059 5578.

### Appendix B: Factor Loadings of Brief COPE

A Principle Components Analysis (PCA) was run on all 28 items of the Brief COPE with orthogonal rotation (varimax). One item (Item 9) was deleted due to low and consistent loadings across factors. The Kaiser-Meyer-Olkin measure of sampling adequacy for all variables was 0.73, which demonstrates a middling (good) variable selection for analysis (Ferguson, James, O'Hehir, Sanders, & McManus, 2003).

Bartlett's test of sphericity indicated that correlations between items were sufficiently large for PCA,  $\chi^2 (338) = 4068.75, p < .001$ . Analyses generated a four factor model which explained 46% of the total variance. An inspection of the solution suggested that the factors could be labelled as: *Positive Coping* (e.g. "I've been taking action to try to make the situation better"); *Social Coping* (e.g. "I've been getting help and advice from other people"); *Self-Blame* (e.g. "I've been criticising myself"); and *Externalising* (e.g. "I've been making jokes about it"). The MSPSS was also used to obtain construct validity for the Social Coping scale, with analyses suggesting a significant correlation between the two scales,  $r_s = .46, p < .01$ . The factor loadings are shown below.

Item	Rotated Factor Loadings			
	Positive Coping	Social Coping	Self- blame	Externalising
1. I turn to work or other activities to take my mind off things	<b>.375</b>	-.020	.098	.300
2. I've been concentrating my efforts on doing something about the situation I'm in	<b>.492</b>	.001	-.160	-.071
3. I've been saying to myself "this isn't real."	.091	-.050	<b>.490</b>	.277
4. I've been using alcohol or other drugs to make myself feel better	-.271	.035	.302	<b>.434</b>
5. I've been getting emotional support from others	.006	<b>.869</b>	.000	.061
6. I've been giving up trying to deal with it	-.259	.111	<b>.583</b>	.108

7. I've been taking action to try to make the situation better	<b>.628</b>	.097	-.306	.005
8. I've been refusing to believe that it has happened	-.014	-.041	<b>.548</b>	.117
9. <i>I've been saying things to let my unpleasant feelings escape</i>	.102	.266	.297	.216
10. I've been getting help and advice from other people	.145	<b>.891</b>	-.056	.014
11. I've been using alcohol or other drugs to help me get through it	-.266	.000	.318	<b>.423</b>
12. I've been trying to see it in a different light, to make it seem more positive	<b>.570</b>	-.028	-.144	.329
13. I've been criticizing myself	-.108	-.010	<b>.658</b>	-.100
14. I've been trying to come up with a strategy about what to do	<b>.650</b>	.108	-.172	-.010
15. I've been getting comfort and understanding from someone	.143	<b>.873</b>	-.054	.038
16. I've been giving up the attempt to cope	-.147	.020	<b>.681</b>	.079
17. I've been looking for something good in what is happening	<b>.629</b>	-.018	-.171	.383
18. I've been making jokes about it	.101	-.059	-.065	<b>.786</b>
19. I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping	.074	.187	.086	<b>.504</b>
20. I've been accepting the reality of the fact that it has happened	<b>.402</b>	.054	-.240	.119
21. I've been expressing my negative feelings	-.047	<b>.437</b>	.236	-.062
22. I've been trying to find comfort in my religion or spiritual beliefs	<b>.691</b>	.033	.210	-.234
23. I've been trying to get advice or help	.138	<b>.851</b>	-.071	.028

from other people about what to do				
24. I've been learning to live with it	<b>.470</b>	.043	.048	.318
25. I've been thinking hard about what steps to take	<b>.667</b>	.253	-.065	.047
26. I've been blaming myself for things that happened	-.053	.034	<b>.695</b>	-.034
27. I've been praying or meditating	<b>.693</b>	.060	.175	-.211
28. I've been making fun of the situation	.032	-.031	.085	<b>.726</b>
Eigenvalues	4.82	3.45	2.75	1.92
% of variance	17.20	12.32	9.84	6.87

### Appendix C: Comparison of questionnaire data to published studies

Studies of similar populations (females, students, young adults, etc.) were used when possible.

Measure and domain	Mean (SD)	Norm
<i>EDE-Q</i>		Luce et al. (2008), university females
Restraint	1.59 (1.40)	1.62 (1.54)
Eating Concern	1.02 (1.08)	1.11 (1.11)
Shape Concern	2.55 (1.55)	2.27 (1.54)
Weight Concern	2.19 (1.55)	1.97 (1.56)
Global Score	1.84 (1.26)	1.74 (1.30)
<i>MSPSS</i>		Zimet et al. (1988), undergraduate males and females
Family	4.07 (0.99)	5.80 (1.12)
Friends	4.24 (0.87)	5.85 (0.94)
Significant Other	4.26 (0.95)	5.74 (1.25)
Total	4.19 (0.73)	5.80 (0.86)
<i>BSI</i>		Cochran & Hale (1985), undergraduate females
Global Index	0.83 (0.58)	0.71 (0.42)
<i>CIA</i>		Reas et al. (2009), university women
Total Score	8.52 (8.37)	6.40 (7.50)
<i>SF-12</i>		Ware et al. (2002), females
MCS	45.19 (10.56)	49.42 (9.80)
PCS	44.12 (5.89)	49.11 (9.92)

*EDE-Q* = Eating Disorder Examination Questionnaire; *MSPSS* = Multidimensional Scale of Perceived Social Support; *BSI* = Brief Symptom Inventory; *CIA* = Clinical Impairment Assessment; *SF-12* = 12-Item Short-Form Health Survey; *MCS* = Mental Component Summary; *PCS* = Physical Component Summary

Appendix D: Correlations among scales

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) MSPSS Total	-						
(2) Positive Coping	.211	-					
(3) Social Coping	.458	.173	-				
(4) Self-Blame	-.251	-.210	.019	-			
(5) Externalising Coping	-.015	.056	.043	.155	-		
(6) EDE-Q Total	-.119	-.083	-.024	.452	.203	-	
(7) BSI Total	-.347	-.140	-.140	.540	.177	.425	-

*MSPSS = Multidimensional Scale of Perceived Social Support; EDE-Q = Eating Disorder Examination Questionnaire; BSI = Brief Symptom Inventory*

### Appendix E: Letters of Ethical Approval

This email is to confirm that your ethics form submission for "What Predicts Quality of Life in Eating Disorders? Moderators Between Eating Psychopathology and Quality of Life Among Non-Clinical Women." has been approved by the ethics committee

Project Title: What Predicts Quality of Life in Eating Disorders? Moderators Between Eating Psychopathology and Quality of Life Among Non-Clinical Women.  
Study ID : 394, Approved Date : 2008-03-10 16:32:28

The University of Southampton's Research Governance procedures now require you to submit the following documents:

- School Ethics Application form and, when available, approval letter
- Insurance and Research Governance Application and either
- School Ethics Application form

or

- Protocol
- Participant Information sheet
- Consent form
- Risk assessment

Please note that everything other than the approval letter and the IRGA should have already been uploaded to, and reviewed by, the Ethics Committee.

For more information about the documents we require, forms and downloadable templates, please consult our website:

<http://www.resource1.soton.ac.uk/legalservices/rgo/regprojs/uosethics.html> (You will be prompted to log into sussed.)

Documents are to be presented to:  
Research Governance Office  
University of Southampton  
George Thomas Building, Room 4007  
Highfield  
Southampton  
SO16 1BJ

Please note that you cannot begin your research before you have had positive approval from the University of Southampton Research Governance Office (RGO) and Insurance Services. You should receive this by letter in a maximum of two working weeks from submission of valid documentation.

If you experience any delay beyond this period please contact Pippa Smith.  
[http://www.psychology.soton.ac.uk/psyweb/psychobook/admin/ethics/research\\_governance.doc](http://www.psychology.soton.ac.uk/psyweb/psychobook/admin/ethics/research_governance.doc)

*Ref No: G06/P2*

**LOUGHBOROUGH UNIVERSITY**  
**ETHICAL ADVISORY SUB-COMMITTEE**

**RESEARCH PROPOSAL**  
**INVOLVING HUMAN PARTICIPANTS**

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**Title:** Personality, exercise and eating-related attitudes and behaviours

**Applicants:** Dr C Meyer

**Department:** Human Sciences

**Date of clearance:** 12 October 2008

**Comments of the Sub-Committee:**

The Sub-Committee agreed to issue clearance to proceed.

BHAM 1

**BHAM 2**



Research Services  
Lake Shore Campus  
6525 N. Sheridan Road | Chicago, Illinois 60626  
Phone: 773.508.2171

October 3, 2008

Colleen Conley  
Room 624  
Damen Hall, LSC

Dear Dr. Conley,

Thank you for submitting the research project entitled: **What Predicts Quality of Life in Eating Disorders? Moderators between Eating Psychopathology and Quality of Life among Non-Clinical Women**, for expedited review by the Institutional Review Board for the Protection of Human Subjects. After careful examination of the materials you submitted, we have approved this project as described for a period of one year. The IRB has approved the final version of the consent form. Enclosed is an official stamped version of the form. Please make copies of this original form and use it for obtaining consent from participants.

Approximately eleven months from your initial review date, you will receive a renewal notice stating that approval of your project is about to expire. This notice will give you detailed instructions for submitting a renewal application. If you do not submit a renewal application prior to **October 3, 2009**, your approval will automatically lapse and your project will be suspended. **When a project is suspended, no more research or writing regarding human subjects may be done until the project is reevaluated and re-approved.** I recommend that you respond to these annual renewals in a complete and timely fashion.

**This review procedure, administered by the IRB, in no way absolves you, the researcher, from the obligation to immediately inform the IRB in writing if you would like to change aspects of your approved project** (please consult our website for specific instructions). You, the researcher, are respectfully reminded that the University's ability to support its researchers in litigation is dependent upon conformity with continuing approval for their work. Should you have questions regarding this letter or general procedures, please contact the Compliance Manager at (773) 508-2689. Kindly quote File #74061, if this project is specifically involved.

With best wishes for the success of your work,

Dr. Raymond H. Dye, Jr.  
Chair, Institutional Review Board

cc:

#### Appendix F: Reflections on Ethical Issues

Following an interesting discussion in the viva voce examination, the author devoted some time to reflecting on the ethics involved in the current study. The investigators were always mindful of the BPS Guidelines regarding research with human participants, particularly the responsibility of investigators to protect participants from harm. In order to do so, provisions were made (e.g. in the Debriefing Form) to inform participants of appropriate contacts should they feel distressed. They were also advised to contact the researcher if they felt uncomfortable or in need of further advice. Guidelines of the Universities involved were observed, and other relevant guidance (e.g. the Data Protection Act (1998) and the Declaration of Helsinki) was also sought.

This need for care also needs to be balanced against participants' rights to confidentiality, which was also a key element to the current study. The research was designed in discussion with four PhD-level investigators in the field of eating disorders, and at no time did any of the investigators feel uncomfortable with the protocol. Furthermore, four Ethics boards approved the study. However, following discussion with Prof. Kuyken, a prominent researcher in mood disorders, it was felt that further protection might have been afforded those reporting significant levels of psychological distress. As such, the author has become more aware of the implications of this discussion regarding any future research. Issues around protection, particularly when research questions are asked about severe mental illness (e.g. suicide), will be forefront in the authors mind when conducting similar research.