

**THESIS FOR THE DEGREE OF CLIN.  
PSY. D. (VOLUME I). EATING DISORDERS:  
ATTITUDES TOWARDS EMOTIONAL  
EXPRESSION AND PREVALENCE IN  
WEIGHT-CATEGORY SPORTS.  
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# ABSTRACT

Volume I contains a literature review exploring the prevalence of eating disorders in those who participate in weight category sports and an empirical paper investigating the attitudes towards emotional expression and eating disorders in men and women, exploring comparisons between the sexes. Volume II contains 5 Case Practice Reports. The first describes a behavioural and psychodynamic formulation of a 2 ½ year old boy with feeding difficulties. The second evaluates the implementation of the Choice and Partnership Approach (CAPA) in a Birmingham Child and Adolescent Mental Health Service (CAMHS). It asks the question “Does using CAPA reduce waiting times to assessment and treatment” and finds a reduction in waiting list times post CAPA implementation. The third report is a single case design study, assessing the efficacy of a Cognitive Behavioural Therapy (CBT) intervention delivered to a 20 years old woman with obsessive compulsive disorder. The fourth report tells the story of a couple managing the difficulties that come with adjusting to chronic, progressive illness within a marriage, from a systemic perspective. The final piece is a presentation reporting the case study of a woman with anorexia nervosa who was treated using a CBT approach.

# **DEDICATION**

To my Mum. For always being there.

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ATTITUDES TOWARDS  
EMOTIONAL EXPRESSION AND  
EATING DISORDERS: A  
COMPARISON OF MEN AND  
WOMEN

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## Abstract

**Objective:** to investigate associations between attitudes towards emotional expression and eating disorders in men and women.

**Method:** 126 men and 145 women from the University of Birmingham, participated in this cross-sectional, questionnaire design study. The Eating Disorder Examination Questionnaire and Attitudes towards Emotional Expression Questionnaire were used to measure eating behaviours and attitudes towards emotional expression respectively.

**Results:** Men and women had similar attitudes towards emotional expression. In women, attitudes towards emotional expression and eating disorders were strongly associated and fear of social rejection predicted eating disordered behaviours. In men, negative mood was a greater predictor of eating disordered behaviours than attitudes towards emotional expression.

**Discussion:** Men and women's attitudes towards emotional expression are associated with eating disordered behaviours in different ways. Therefore different treatment guidelines may be needed. Fear of social rejection predicted eating disordered behaviours, suggesting protection of interpersonal relationships is important to those with eating disorders.

## **Introduction**

This study aims to explore attitudes towards emotional expression and eating disorders in men and women. This may further our understanding of sex-based influences on eating disorders, allowing effective tailoring of treatment programmes for men and women.

### **Background**

Literature suggests emotions play a pivotal role in the development and maintenance of eating disorders in women (e.g. Bruch, 1978; Corstorphine, 2006; Heatherton & Baumeister, 1991), although it is uncertain how this occurs. Attitudes towards emotional expression are a relatively unexplored area that may provide an explanation. This is significant given the prevalence of cognitive therapeutic techniques aimed at modifying dysfunctional attitudes. Emotional regulation difficulties and inexpression have been found in those with eating disorders (e.g. Heatherton & Baumeister, 1991; Schmidt & Treasure, 2006). For example, Kyriacou, Easter and Tchanturia (2009) qualitatively explored patients, parents and clinicians' views on attitudes towards emotions in Anorexia Nervosa (AN), finding consistently negative attitudes. Patients reported trying to avoid emotions altogether, fearing becoming vulnerable to attack; believing "emotions are terrifying...to express them is a sign of weakness", and emotions leave one "exposed to being exploited". Although, this was a small-scale study, multiple viewpoints from patients, parents and clinicians add validity to their findings.

These findings described above parallel those of Meyer, Leung & Barry et al. (2010). Positive associations between beliefs that: to display emotion is a sign of weakness, feelings should be kept under control and one will be rejected by others if they express

emotion (measured using the Attitudes Towards Emotional Expression Scale (ATEE), (Joseph, Williams, Irwing, & Cammock, 1994) and concerns about eating, weight and shape (measured using the Eating Disorder Examination Questionnaire (EDE-Q), (Fairburn & Beglin, 1994) were found in 122 non-clinical women (Meyer et al., 2010). This was replicated in a clinical sample of women, (Leung, De Feo, Gilbert, & Meyer, 2010) where these beliefs and the beliefs that one should not express emotions were significantly associated with eating concerns. Meyer et al. (2010) suggest the link between fear of negative social evaluation and eating and weight-related concerns (Gilbert & Meyer, 2005), means individuals who worry about their weight due to concerns about how others perceive them, may suppress emotions for similar reasons. The rigid thinking characteristic of individuals with eating disorders means these attitudes cause a perception that deviation from full emotional control is perceived as weakness (Meyer, et al., 2010). The present research aims to replicate and extend Meyer et al.'s, (2010) findings through investigating attitudes towards emotional expression in women and men. This would potentially strengthen the validity of these results.

Understanding the association between attitudes towards emotional expression and eating disorders is important because attitudes inhibiting emotional expression have been associated with emotional distress following difficult life-events (Joseph, et al., 1994; Williams, Hodgkinson, Joseph, & Yule, 1993). Beliefs that one should suppress their emotions prevents individuals from seeking social support, causing isolation and inability to access help with emotional difficulties, or opportunity to disconfirm beliefs that emotional expression is harmful (Joseph, et al., 1994; Williams, et al, 1993). Although the research by Joseph, et al., (1994) and Williams, et al., (1993) looked specifically at

posttraumatic stress disorder (PTSD), their results may be relevant to those with eating disorders. This is because emotional in-expression has been found in those with eating disorders (e.g. Heatherton & Baumeister, 1991; Schmidt & Treasure, 2006), although the processes underlying this in-expression are still unclear. If it is due to emotional suppression, then it may limit individuals' ability to access supportive networks.

Retaining emotionally distressing information has been linked to poor mental health (Pennebaker & Beall, 1986; Pennebaker, Hughes, & O'Heeron, 1987), whilst accepting social support has been associated with positive mental health (Sarason, Sarason, & Pierce, 1990). Therefore, an understanding of how attitudes towards emotional expression are associated with eating disorders will help clinicians to aid patients in learning to access these supportive networks, accept social support and thereby improve their mental health.

### **Factors Influencing Attitudes Towards Emotional Expression**

**Early Learning Environments.** Theories suggest early learning environments influence attitude development (Corstorphine, 2006). Modelling of emotional expression or suppression by significant others in early childhood may become internalised and influence attitudes towards emotional expression. For example, explosive displays of anger, by a parent, may lead the child to believe anger is dangerous or toxic (Corstorphine, 2006). If a child is ignored or shouted at when they cry, they may learn that sadness is unacceptable. When these individuals feel sad or angry, because of their beliefs that these emotions are unacceptable, they may then experience secondary emotions such as guilt or shame (Corstorphine, 2006). Such beliefs may lead individuals to develop strategies to exclude these emotions (Corstorphine, 2006). Research has found

that binge eating can be used as a way to distance the individual from an emotional experience (see Corstorphine, 2006; Waller, Kennerley, & Ohanian, 2007). Furthermore, restrictive eating and purging have been shown to be used as ways of punishing the self for emotional expression that is viewed as unacceptable (see Fox, 2009).”

Geller, Cockell and Hewitt et al., (2000) found emotional suppression was associated with protection of interpersonal relationships in women. The study showed participants believed they were perceived as weak or shameful for experiencing sadness. A qualitative study of women with anorexia nervosa (Fox, 2009) found emotional inhibition served interpersonal functions. It was seen as protective of others and prevented rejection from loved ones. Negative emotions were seen as fundamentally wrong and needing punishment (Fox, 2009). This is a comprehensive study which explored in depth the development of emotional attitudes and eating disorders and supports the ideas of Corstorphine (2006) and Waller, et al., (2007) above. These studies show a link between attitudes towards emotional expression, social relationships and eating disorders. It is therefore possible that attitudes towards emotional expression may predict eating disordered behaviours in women. For example, those who endorse the statement “You should always hide your feelings” on the ATEE may also endorse eating disordered behaviours as measured by the EDE-Q.

**Cultural Factors.** Additionally, cultural factors may influence attitudes towards emotional expression, as suggested by Hochschild’s normative theory of emotion (1975, 1981). It predicts culturally influenced sex-differences in emotions and expressiveness and is supported by self-report studies, observer ratings of expressive behaviours and electromyography (e.g. Greenwald, Cook, & Lang, 1989; Gross & John, 1995; Kring &

Gordon, 1998; Kring, Smith, & Neale, 1994). Cultural norms regulate the type, intensity, duration, and target of emotional behaviour providing standards for individuals to judge theirs and other's emotions (Simon & Nath, 2004). If one's feelings and expressions depart from cultural norms, emotion and/or expression management is engaged in to create a more acceptable response. These norms specify that women should, and men should not, be emotionally expressive. Specifically, men should not express sadness and women should not express anger (Simon & Nath, 2004). Therefore, we would expect men and women to have different attitudes towards emotional expression in this research.

In relation to sex differences and emotional expression, Meyer, Leung & Waller et al., (2005) investigated men and women's responses to anger in relation to bulimia. They found women used bulimic behaviours to prevent feelings of anger, whereas men did so in response to anger, (i.e. to calm down). This study emphasised how anger manifests differently between the sexes and the functions eating disorder behaviours serve. Therefore, culturally-learned attitudes towards emotional expression may interact with eating disordered behaviours in different ways for men and women.

More recently, Lavender and Anderson (2010) investigated emotional regulation difficulties in college men. Negative affect, BMI and emotional dysregulation accounted for 24% of the variance in disordered eating and 16.7% in body dissatisfaction. Therefore, limited access to emotion regulation strategies significantly predicted disordered eating, which is supported by prior research (Sim & Zeman, 2006; Whiteside et al., 2007). The authors suggest Western society emphasises traditional, masculine roles meaning men who experience unwanted emotional states may respond with feelings of



shame, guilt or anger. These secondary feelings may be dealt with using eating disordered behaviours such as bingeing, purging or ED in general (see Heatherton & Baumeister, 1991). These theories suggest culture influences different attitudes towards emotional expression in men and women. This study will test the hypothesis that men and women have different attitudes towards expressing emotions and explore possible interactions with eating disordered behaviours. If different attitudes predict eating disorders in women to those that predict eating disorders in men, this may allow treatments to be tailored appropriately. For example if fear of being perceived as weak influences eating disorders in men, but not for women, then treatment programmes can address fear of weakness as part of standard treatment packages for men. This may be different from treatments targeted for women, who may require a different focus.

### **Men and Eating Disorders**

**Prevalence.** Traditionally, eating disorders research has focused on women, yet evidence suggests eating disorders are increasingly common in men (Bunnell, 2010; Muise, Stein, & Arbess, 2003; Weltzin et al., 2005). Figures suggest men account for 10% of people with AN and 10-15% of people with bulimia nervosa (BN) (Muise, et al., 2003). Rates of binge eating disorder (BED) are reportedly similar in both sexes (Striegel-Moore & Franko, 2003). When sub-threshold eating disorders are included, the ratio of women to men changes from the percentages given above to 2:1 for those with AN and 3:1 for those with BN (Muise, et al., 2003). Eating disorders not otherwise specified (EDNOS) is more prevalent than AN and BN (Taraldsen, Eriksen, & Gotestam, 1996) accounting for another 5% of the male population (Gotestam & Agras, 1995). Body dissatisfaction was reported as high as 83% in an athletic, male population (Parks & Read, 1997) and 95% in male college students (Mishkind, Rodin, Silberstein, & Striegel-

Moore, 1986). However, prevalence data are wide and varied depending on the source (adolescents, community samples, clinical cases) and sample size, meaning it is difficult to assess the scope of the problem. Additionally, it is thought eating disorders in men are under-diagnosed and under-treated (Andersen, 1999; Labre, 2002; Weltzin, et al., 2005). Men may see it as a “feminine disorder” and feel ashamed about reporting symptoms or presenting for treatment (Schneider & Agras, 1987).

**Behaviours in Men and Women.** The clinical features of eating disorders are reportedly similar in men and women (Andersen, 1990; Andersen, 1995; Fernández-Aranda et al., 2004; Hay, Loukas, & Philpott, 2005; Woodside et al., 2001) as both use dieting, binge eating, purging (Labre, 2002) have body image distortion (Gruber, Pope, Lalonde, & Hudson, 2001; Mangweth et al., 2004) and body dissatisfaction (Crisp, Burns, & Bhat, 1986; Fichter & Daser, 1987; Steiger, 1989; Ussery & Prentice-Dunn, 1992). However, the ways eating disorders present in men may differ. Men are more likely to be pre-morbidly overweight, engage in binge eating and over-exercise, rather than dieting and are as likely to view themselves as too small, as too big (Carlat, Camargo, & Herzog, 1997; Harvey & Robinson, 2003; Muise, et al., 2003). Other similarities between men and women include: psychiatric co-morbidities (e.g. depression, anxiety and substance misuse) (Geist, Heinmaa, Katzman, & D., 1999); personality features (e.g. perfectionism, interpersonal distrust) (Fernández-Aranda, et al., 2004; Schneider & Agras, 1987); psychosocial histories (e.g. adverse childhood experiences) (Andersen, 1984) and protective factors (Croll, Neumark-Sztainer, Story, & Ireland, 2002). Therefore, some authors suggest eating disorders in men and women can be conceptualised and treated in similar ways (Braun, Sunday, Huang, & Halmi, 1999; Carlat, et al., 1997).

However, literature reviews also find men have different body concerns to women. Men tend to be less concerned about weight but are more focused on shape, specifically, the “masculine ideal” of large shoulders, narrow hips and waist (Andersen, 1984; Andersen & DiDomenico, 1992). Whilst women almost universally want to be thinner, men want to be larger or smaller depending on their body type (Furnham, Badmin, & Sneade, 2002; Muise, et al., 2003). The desire for a “masculine” body means those with ectomorph body types may eat heavily to gain weight, whilst endomorphic body types may want to lose weight. In both cases, body dissatisfaction is linked to distress and low self-esteem (Cohane & Pope, 2001). For men, there is an emphasis on muscularity and exercise as a key behavioural tool: specifically to compensate for overeating, manage fears of weight gain and reduce emotion-related distress (see Weltzin, et al., 2005 for review).

This study will test the hypothesis that men and women have different scores on the EDE-Q in terms of severity (women will score higher on all subscales) and profiles of scores on individual subscales.

**Theories.** Despite the clinical relevance of understanding eating disorders in men, the literature is relatively sparse with studies exploring demographic features, psychiatric profiles or risk factors (see Blashill, 2011; Harvey & Robinson, 2003; Muise, et al., 2003; Weltzin, et al., 2005 for reviews). Similarities between men and women have been found in these areas leading some authors to conclude they can be treated the same when understanding and treating eating disorders (Braun, et al., 1999; Carlat, et al., 1997). Others have focused on media influences and propagation of the “masculine ideal” as explanatory forces (Connan, 1998; Furnham, et al., 2002; Labre, 2002) without

explaining why some men are more susceptible to these influences. Few have explored the development of eating disorders in men and how this is similar or different to women. This research investigates the association between attitudes towards emotional expression and eating disordered behaviours in men and women, exploring similarities and differences in these associations between the sexes.

### **Hypotheses:**

There are well-established links between mood and eating pathology (Bruch, 1978; Corstorphine, 2006; Heatherton & Baumeister, 1991), so it is important to control for mood in the analyses. The Positive and Negative Affect Scale (PANAS: Watson, Clark, & Tellegen, 1988) will be used in this study. It is also important to control for age and BMI, as the prevalence of eating disorders varies with age (Hilbert, de Zwaan, & Braehler, 2012) and beliefs about one's shape, weight or diet may be influenced by their body weight (Ackard & Peterson, 2001; Davis & Furnham, 1986; Littleton & Ollendick, 2003).

### **After controlling for BMI, mood and age:**

1. Men and women will have significantly different attitudes towards emotional expression. This is based on findings from Gross & John (1995) that men are less emotionally expressive than women.
2. Women will have a higher incidence of eating disorders than men. This is based on a review by Muise et al., (2003) that women have higher incidences of eating disorders

than men and men's concerns about their bodies, and weight management strategies differ slightly from women's.

3. This study will also explore whether attitudes towards emotional expression predicts eating disordered behaviours and attitudes in men and women. This is drawn from findings by Leung et al., (2010) and Meyer et al., (2010) who found significant correlations between attitudes towards expressing emotions and eating disorders in clinical and non-clinical women. An understanding of how attitudes towards emotional expression predicts eating disorders could help clinicians to explore the root of these attitudes with patients, predict potential triggers to eating disordered episodes and allow therapy approaches to be tailored accordingly.

## **Method**

This research is a cross-sectional, questionnaire design study. A non-clinical population is used as research shows sub-clinical cases resemble the pathology of diagnosable eating disorders (Garfinkel et al., 1996; Garfinkel et al., 1995; Zaider, Johnson, & Cockell, 2000). Significant rates of eating psychopathology have been found in university samples, in both sexes (Lavender & Anderson, 2010; Sanlier, Yabanci, & Alyakut, 2008) demonstrating this is a valid research population. This allows access to a greater sample size, which is pertinent given the low number of men treated for eating disorders in clinical settings. Significant research findings can then be tested in clinical samples.

## Participants

Three thousand, seven hundred and fifty one students (undergraduate and postgraduate) from the College of Life and Environmental Sciences (University of Birmingham) were invited to participate in the research. This included the Schools of: Biosciences (1120 students); Geography, Earth and Environmental Sciences (1000 students), Psychology (1010 students) and Sport and Exercise Science (621 students). Three hundred and forty five students started the questionnaires (13% of total population) and 271 of these, completed the full set (79%). Of the 271 completers, 126 were men (46.4%). Participants' mean age was 22.0 years (Standard deviation (SD): 4.2) and BMI was 22.8 (SD: 4.2). The overall response rate was 7%. Those who started but did not complete the questionnaires (data available for 66% of non-completers) were not different from the completers in: Age ( $U = 5556$ ,  $z = -0.497$ ,  $p = 0.619$ ); BMI ( $U = 5121$ ,  $z = -1.206$ ,  $p = 0.228$ ); Sex ( $\chi^2 = 0.016$ ,  $p = 0.898$ ) and School ( $\chi^2 = 2.201$ ,  $p = 0.699$ ), suggesting the sample is similar to those who chose not to complete it. There was insufficient data to assess if this was the case for PANAS, ATEE and EDEQ scores.

## Measures

**Eating Disorder Examination Questionnaire (EDE-Q)** (Fairburn and Beglin, 1994): A self-report questionnaire assessing disordered eating behaviors (e.g., frequency of purging) and attitudes (e.g., fear of gaining weight). Respondents report how many times in the last 28 days each statement applies. For example "Have you felt fat?" Responses range from "No days", to "Everyday". There are four subscales; higher scores reflect greater pathology. It has good construct validity and is a robust tool for clinical and non-clinical, male and female, research populations (Lavender & Anderson, 2010; Luce, Crowther, & Pole, 2008; Mond, Hay, Rodgers, & Owen, 2005). Cronbach's alpha

= 0.92 (global score), in this study. However it is not a diagnostic measure, as this requires clinical interview, which is beyond the scope of the current research. The EDE-Q was used to investigate attitudes towards emotional expression in clinical (Leung et al., 2010) and non-clinical women (Meyer et al., 2010). Using the same measure in this study allows replication of these studies, potentially strengthening the validity of the present results.

**Attitude Towards Emotional Expression (ATEE)** (Joseph, et al., 1994): A 20-item, self-report measure of attitudes towards emotional expression. It contains four subscales: the belief that: emotional expression is a sign of weakness (Weakness); one should keep emotions to oneself (Non-expression); emotions should be controlled (Control); and others will be reject you if you express emotion (Social Rejection). Higher scores indicate negative attitudes. Cronbach's alpha = 0.88 in this study. It has been validated in trauma populations (Joseph, et al., 1994), where higher ATEE scores correlated with Posttraumatic Stress Disorder and generalised psychiatric symptoms. It was used to measure attitudes towards expressing emotions in women with clinical eating disorders (Leung et al., 2010) and non-clinical women Meyer et al., (2010).

**Positive and Negative Affect Scale (PANAS)** (Watson, et al., 1988): A 20-item, self-report measure of positive (e.g., interested) and negative affect (e.g., distressed) subscales. It uses a five point scale from “very slight or not at all” to “extremely”. Cronbach's alpha = 0.88 (positive) and 0.86 (negative subscales). Participants rate items based on their feelings over the past four weeks. Cumulative positive and negative mood

scores are calculated from individual items. It was included to control for mood, to ensure associations found are due to the investigated variables, not secondary effects of mood.

**Height and Weight:** were recorded via self-report, to calculate Body Mass Index (BMI). Whilst research has shown participants tend to underestimate weight and overestimate height (Spencer, Appleby, Davey, & Key, 2002), the authors suggest self-report is still a valid method for identifying relationships between variables. However, it is worth noting reported BMI may be lower than when objectively measured.

### **Procedure**

Invitations were sent via schools' email distribution lists, with a hyperlink to "Survey Monkey", a secure site hosting the questionnaires. Data was downloaded directly onto an Excel spreadsheet, then converted to SPSS-14 for analysis. Questionnaire order: Demographics (Sex, Age, Height, Weight, School); PANAS; EDE-Q; ATEE. There were no external incentives for participation. Data was collected during the summer and autumn terms of 2011. Participants were directed towards the University Counselling Service or the Beating Eating Disorders Website (B-EAT) if they had concerns about eating disorders. University of Birmingham Ethical Review Committee granted ethical approval.

### **Description of power analysis**

Using Cohen's (1988) conventions for describing effect sizes as small, medium or large, the proposed study would require approximately 759 participants in order to identify a small experimental effect, 109 participants in order to show a medium experimental



effect and 52 participants to show a large experimental effect (power = 0.80; alpha = 0.05 two-tailed; OLS multiple regression with 8 predictor variables). Given that small effect sizes would be of limited practical utility and Meyer et. al. (2010) report medium effect sizes then a sample size of between 110 and 120 participants would constitute a reasonable balance between precision and clinical utility.

### **Analysis Preparation**

A one-sample Kolmogorov-Smirnov Test showed all data except BMI and EDE-Q Shape (women) and PANAS Positive and ATEE Non-expression (men) were not normally distributed, so non-parametric tests were used for most subsequent analyses. It is possible that PANAS, EDE-Q and ATEE scores vary depending on “school-of-study” or “term” collected. A Mann-Whitney U test was conducted on “Terms” and Chi Square on “Schools, to assess if this was the case. No significant differences were found.

If a substantial portion of questionnaires were incomplete (e.g. ATEE or EDE-Q), the data was not included in the analyses.

The main analysis explored differences between men and women on: Age (Mann-Whitney U test), BMI (Mann-Whitney U test) and School (Chi Square). Spearman’s Rho assessed correlations between ATEE and EDE-Q subscales in men and women. Stepwise regressions were conducted to determine which ATEE subscales predicted EDE-Q subscale scores. It is worth noting that stepwise regression is a parametric test and the data presented here is non-parametric, this could be problematic as Noreen (1988) notes that, when the dependent variable is categorical and the explanatory variables are fixed, ordinary least squares (OLS) regression errors may be heteroscedastic. This means OLS estimates of parameters may be inefficient and significance levels associated with

regression parameters may become unreliable. However, Maddala (1983, p. 21) states that if the explanatory variables are multivariate normal, the usual OLS regression t and F tests are exact and the unreliability caused by heteroscedasticity does not apply. Given that the Q-Q plots for the data in this study did not indicate that the explanatory variables showed deviation from multivariate normality and that the ordinal dependent variable is conceptualized as representing discrete points on an underlying continuous variable, it was considered that OLS regression was appropriate for these data.

This decision is substantiated by a Monte Carlo simulation of ordinary least squares regression and logistic regression in the prediction of categorical outcome data (Pohlmann, and Leitner, 2003). In this simulation the OLS and logistic predicted values were highly correlated and it was concluded that both models can be used to test relationships with binary dependent variables.

Bonferroni corrections were applied to account for multiple testing. Mood, Age and BMI were entered into the final regression models to control for potential confounding effects.

## **Results**

### **Descriptives**

Table 1 shows the sample characteristics. Analyses tested whether men and women were similar for Age, BMI and School as described above. There was no significant differences for Age ( $U = 8340$ ,  $z = -1.251$ ,  $p = 0.211$ ) and School ( $\chi^2 = 5.713$ ,  $p = 0.222$ ), but there was for BMI ( $U = 6934$ ,  $z = -3.233$ ,  $p < 0.001$ ), indicating men's BMI is greater than women's in this sample.

**Table 1. Age and BMI (Means  $\pm$  Standard Deviation)**

**(Data from other university samples are provided to assess whether the current study sample is representative of the larger population)**

	<b>Study Data</b> <b>Men (n =</b> <b>126)</b>	(Lavender, De Young, & Anderson, 2010) Men (n = 404)	<b>Study Data</b> <b>Women (n =</b> <b>145)</b>	Luce et al (2008) Women (n = 723)
<b>Age (years)</b>	<b>22.3 <math>\pm</math>4.3</b>	19.02 $\pm$ 1.41	<b>21.6 <math>\pm</math>4.2</b>	18.7 $\pm$ 1.2
<b>BMI (kg/m<sup>2</sup>)</b>	<b>23.5 <math>\pm</math>4.5</b>	25.26 $\pm$ 4.23	<b>22.2 <math>\pm</math>3.9</b>	22.6 $\pm$ 3.9

**Hypothesis 1. There will be significantly different scores on the ATEE subscales between men and women.**

Mann Whitney U-Tests revealed no significant differences in ATEE subscales between men and women (Table 2), suggesting men and women have similar attitudes towards emotional expression.

**Hypothesis 2: There will be a significant difference between men and women's scores on the EDE-Q.**

Mann-Whitney U- Tests revealed men and women's scores on the EDE-Q were significantly different, in the expected direction. Women scored higher on all subscales (Table 2). Percentages for scores above clinical cut-off are in Table 3.

**Table 2. Mean (SD) ATEE and EDE-Q subscale scores.**

	<b>Men (n=126)</b>	<b>Women (n-145)</b>	<b>Mann Whitney U score</b>	<b>Z Value</b>	<b>P Value</b>
<b>ATEE Weakness:</b> Mean (SD)	1.91 (0.71)	1.91 (0.80)	8865	- 4.23	0.672
<b>ATEE Non-expression</b> Mean (SD)	3.12 (0.64)	3.00 (0.78)	8537	- 0.935	0.350
<b>ATEE Control</b> Mean (SD)	2.76 (0.82)	2.67 (0.97)	8614	- 0.812	0.417
<b>ATEE Social Rejection</b> Mean (SD)	2.55 (0.78)	2.64 (1.03)	8676	- 0.716	0.414
<b>EDEQ – Restraint</b> Mean (SD)	<b>1.18 (1.4)</b>	<b>2.02 (1.6)</b>	<b>6195</b>	<b>-4.598</b>	<b>0.001</b>
<b>EDEQ – Eating Concern</b> Mean (SD)	<b>0.42 (0.8)</b>	<b>1.24 (1.5)</b>	<b>5490</b>	<b>-5.826</b>	<b>0.001</b>
<b>EDEQ – Shape Concern</b> Mean (SD)	<b>1.54 (1.4)</b>	<b>2.81 (1.8)</b>	<b>5316</b>	<b>-5.939</b>	<b>0.001</b>
<b>EDEQ – Weight Concern</b> Mean (SD)	<b>1.15 (1.2)</b>	<b>2.34 (1.7)</b>	<b>5292</b>	<b>-5.985</b>	<b>0.001</b>

ATEE Scale: 0 – 4; EDE-Q Scale: 0-6; higher scores indicate more negative attitudes towards the expression of emotions and more unhealthy eating practices.

**Table 3. Percentage of participants scoring above the clinical cut off. Comparison with other study samples.**

<b>Scales</b>	<b>Study Data Men (n = 126)</b>	(Lavender, et al., 2010) Men (n = 404)	<b>Study Data Women (n = 145)</b>	Luce et al (2008) Women (n = 723 )
<b>EDEQ – Restraint</b>	<b>4.8%</b>	2.2 %	<b>7.6 %</b>	7.9%
<b>EDEQ – Eating Concern</b>	<b>0.8%</b>	1%	<b>2.2%</b>	2.2%
<b>EDEQ – Shape Concern</b>	<b>9.5%</b>	7.7%	<b>14.8%</b>	14.8%
<b>EDEQ – Weight Concern</b>	<b>4.8%</b>	3.7%	<b>13.1%</b>	10.2%
<b>EDEQ – Global</b>	<b>1.6%</b>	1.7%	<b>8.3%</b>	5.6%

Range = 0 – 6, with 6 being the highest level of clinical risk. Clinical cut off  $\geq 4$

**Hypothesis 3. Which ATEE subscales predict EDE-Q scores in men and women?**

For men, ATEE Non-expression was positively correlated with EDE-Q Shape concern (Table 4). ATEE Social rejection was positively correlated with EDE-Q Eating concern, Shape concern and Weight concern ( $p < 0.006$ ). No other subscales correlated in men. For women, all ATEE subscales were significantly, positively correlated with all EDE-Q subscales. Therefore the pattern of correlations differs, with women showing correlations between ATEE and EDE-Q across all subscales, and men mainly showing correlations between Social Rejection and EDE-Q.

**Table 4. Spearman's Rho Correlations between ATEE subscales and EDE-Q subscale scores for men and women.**

		<b>EDE-Q Restraint</b>	<b>EDE-Q Eating Concern</b>	<b>EDE-Q Shape Concern</b>	<b>EDE-Q Weight Concern</b>
<b>ATEE Weakness</b>	Men	0.032	0.181	0.162	0.185
	Women	0.394**	0.456**	0.471**	0.473**
<b>ATEE Non- expression</b>	Men	0.024	0.180	0.242**	0.197
	Women	0.292**	0.341**	0.391**	0.367**
<b>ATEE Control</b>	Men	0.047	0.131	0.197	0.163
	Women	0.427**	0.512**	0.493**	0.490**
<b>ATEE Social Rejection</b>	Men	0.040	0.242**	0.253**	0.263**
	Women	0.474**	0.608**	0.598**	0.582**

\*\*p < 0.006 (Bonferroni correction)

### Regression Models

Stepwise linear regressions were conducted with dependent variables of each EDE-Q subscale and independent variables of each ATEE subscale to determine significant predictor variables in the model. For men, ATEE Social rejection significantly predicted EDE-Q Eating Concern, Shape Concern and Weight Concern (Table 5). ATEE Non-expression, Weakness and Control were non-significant. No ATEE subscales predicted EDE-Q Eating Restraint.

**Table 5.**

**Male Stepwise Linear Regression Table for ATEE and EDE-Q subscales (significant predictors only).**

		<b>EDE-Q Eating Concern</b>	<b>EDE-Q Shape Concern</b>	<b>EDE-Q Weight Concern</b>
<b>AEE Social</b>	<b>β</b>	0.204	0.280	0.281
<b>Rejection</b>	<b>t</b>	2.315	3.247	3.258
	<b>Adjusted R<sup>2</sup></b>	0.034	0.071	0.071
	<b>p</b>	0.02*	0.002**	0.001**
	<b>Confidence Intervals</b>	0.215 to 0.22	0.191 to 0.787	0.169 to 0.694

\*\*p < 0.01

\*p < 0.05



For women, ATEE Social rejection was the dominant predictor of: Eating Restraint; Eating Concern, Shape Concern and Weight Concern (Table 6). No other ATEE subscales were significant.

**Table 6.**

**Female Stepwise Linear Regression Table for ATEE and EDE-Q subscales (significant predictors only).**

<b>Independent Variables</b>		<b>EDE-Q Restraint</b>	<b>EDE-Q Eating Concern</b>	<b>EDE-Q Shape Concern</b>	<b>EDE-Q Weight Concern</b>
<b>AEE Social Rejection (a)</b>	<b><math>\beta</math></b>	0.474	0.608	0.598	0.582
	<b>t</b>	6.433**	9.148**	8.933**	8.570**
	<b>Adjusted R<sup>2</sup></b>	0.220	0.365	0.354	0.335
	<b>p</b>	0.000	0.000	0.000	0.000
	<b>Confidence Intervals</b>	0.521-0.982	0.690 to 1.070	0.817 to 1.281	0.757 to 1.210

a. Predictors in the Model: (Constant), AEE\_SOCIAL\_REJECTION.

\*\* p<0.01

**Controlling for Mood.** PANAS +VE and PANAS –VE were entered into the first step of regression to assess if results were due to primary mood effects.

For men, ATEE Social Rejection was no longer a significant predictor (Table 7).

Negative mood predicted a greater portion of variance in EDE-Q Eating Concern, Shape Concern and Weight Concern, than Social Rejection. This suggests Social Rejection is no longer a significant predictor of EDE-Q subscales when negative mood is accounted for in men.

**Table 7.**  
**Regression Model for Men, controlling for Negative and Positive Mood.**

Independent Variables	Dependent Variables		
	EDE-Q Eating Concern	EDE-Q Shape Concern	EDE-Q Weight Concern
<b>PANAS –VE</b>	<b><math>\beta</math></b> 0.269	0.339	0.316
	<b>t</b> 2.834	3.744	3.461
	0.005**	0.000**	0.001**
<b>Confidence Intervals</b>	0.010 to 0.054	0.031 to 0.101	0.023 to 0.085
<b>PANAS +VE</b>	<b><math>\beta</math></b> 0.009	-0.044	-0.047
	<b>t</b> 0.097	-0.491	-0.515
	<b>p</b> 0.923	0.625	0.607
<b>Confidence Intervals</b>	-0.023 to 0.025	-0.048 to 0.029	-0.43 to 0.025
<b>ATEE Social Rejection</b>	<b><math>\beta</math></b> 0.102	0.137	0.140
	<b>t</b> 1.045	1.470	1.489
	<b>Adjusted R<sup>2</sup></b> 0.077	0.160	0.145
	<b>p</b> 0.276	0.144	0.139
<b>Confidence Intervals</b>	-0.096 to 0.311	-0.083 to 0.561	-0.71 to 0.502

a ) Predictors in the Model: (Constant), PANAS\_NEGATIVE

b) Excluded Variables: ATEE SOCIAL\_REJECTION.

\*\*p< 0.01

\* p <0.05

For women, positive and negative mood reduced the power of ATEE Social Rejection marginally, although it remained significant. The contributions of mood were non-significant for all EDE-Q subscales, bar Eating Concern, where negative mood contributed a small, significant portion of variance (Table 8.) Therefore Social Rejection significantly predicts EDE-Q subscales for women, after controlling for mood.

**Controlling for Age and BMI.** Age was not significantly correlated with ATEE or EDE-Q subscales. BMI significantly correlated with EDE-Q Restraint for men (0.330,  $p < 0.006$ ) and EDE-Q Weight Concern for women (0.285,  $p < 0.006$ ). As Restraint was not significantly correlated with any ATEE subscales for men, BMI was not added into the regression model for men. For women, it contributed a small but significant portion of variance in Weight Concern ( $p < 0.05$ ). The predictive power of ATEE Social Rejection remained at the  $P < 0.001$  level.

**Table 8.****Regression Model for Women, controlling for Negative and Positive Mood.**

<b>Independent Variables</b>	<b>Dependent Variables</b>			
	<b>EDE-Q Eating Restraint</b>	<b>EDE-Q Eating Concern</b>	<b>EDE-Q Shape Concern</b>	<b>EDE-Q Weight Concern</b>
<b>PANAS –VE</b>	<b>β</b> 0.121	0.198	0.156	0.127
	<b>t</b> 1.370	2.458	1.916	1.516
	<b>p</b> 0.173	0.015*	0.057	0.132
	<b>Confidence Intervals</b> -0.11 to 0.62	0.007 to 0.067	-0.001 to 0.073	-0.009 to 0.065
<b>PANAS +VE</b>	<b>β</b> -0.040	-0.113	-0.179	-0.136
	<b>t</b> -0.465	-1.510	-2.372	-1.741
	<b>p</b> 0.643	0.133	5.496	0.084
	<b>Confidence Intervals</b> 0.788 (Collinearity Statistics: Tolerance)	-0.050 to 0.007	-0.078 to -0.007	-0.066 to 0.004
<b>AEE Social Rejection</b>	<b>β</b> 0.402	0.458	0.439	0.455
	<b>t</b> 4.557	5.784	5.496	5.522
	<b>Adjusted R<sup>2</sup></b> 0.210	0.398	0.388	0.347
	<b>p</b> 0.000**	0.000**	0.000**	0.000**
	<b>Confidence Intervals</b> 0.365 to 0.924	0.427 to 0.871	0.492 to 1.046	0.490 to 1.038

\*\*p &lt; 0.01

\* p &lt; 0.05

## Discussion

This study investigated the role of attitudes towards emotional expression in predicting eating disordered behaviours in men and women, using a non-clinical university sample. The response rate (7%) was low so caution should be used in generalising from results. However, the study sample was similar to non-responders suggesting they may be representative of the study population. The age range of 22 years (SD: 4.2) was greater than other university samples (Lavender, et al., 2010; Luce, et al., 2008), but BMI (22.2, SD: 3.9) was similar to other studies for women (Luce, et al., 2008) although slightly lower (23.5, SD: 4.5) for men (Lavender, et al., 2010). 1.6% of men scored above clinical cut-off on the EDE-Q (Global scores) which is markedly lower than the 8.3% of women. This is comparable to previous research with men (1.7%: Lavender, et al., 2010) but higher than previous research with women in university (5.6%: Luce, et al., 2008), and community samples (5%: Mond, et al., 2005).

### Attitudes Towards Emotional Expression

The first hypothesis was men and women would have different attitudes towards emotional expression, however there were no significant differences on ATEE scores. This suggests that men and women have similar attitudes towards emotional expression. This is interesting as Western culture suggests men are less emotionally expressive than women, with theory and research supporting this idea (e.g. Greenwald, et al., 1989; Gross & John, 1995; Kring & Gordon, 1998; Kring, et al., 1994; Vigil, 2009). However, there is controversy in the literature, with some authors (e.g. Wester, Vogel, Pressly, & Heesacker, 2002; Zayas, Tabak, Gunaydyn, & Robertson, 2009) arguing between-sex differences in emotional expression are small and inconsistent, suggesting social or

contextual factors are more influential in emotional expression. For example, Parson's (1955, 1964) functional theory of gender and emotion suggests men and women only express emotions differently due to different social positions (e.g. caregiver versus breadwinner). Modernisation of sex roles means men and women's attitudes towards emotional expression could have become equalised. One would expect few differences in status for students, potentially explaining the lack of differences in attitudes. Further research using community samples and greater age-spans is needed to test this hypothesis.

It is notable that mean ATEE scores for Non-expression, Control and Social Rejection, for both sexes, were above the mid-point, suggesting both have relatively negative views towards emotional expression. This study supports the argument that there is little attitudinal difference towards emotional expression between men and women. However, differences between *attitudes* towards behaviour and the engaging in the *behaviour* itself could also explain these findings. The Theory of Planned Behaviour (Ajzen, 1991) (TPB) suggests attitudes explain a large portion of variance in predicting behaviours, but other factors, such as perceived behavioural control, also contribute. For example, one may believe "getting emotional is a sign of weakness" but also perceive it as out of control and so cry when they are upset, despite believing themselves to be weak. Therefore, although men and women's attitudes towards emotional expression do not differ, their observable behaviours might, dependent upon additional factors. It is therefore important to fully assess patients' observable emotional expressivity in clinical settings as well as attitudes towards emotional expression.

### **Eating Attitudes and Behaviours**

The second hypothesis suggested women's EDE-Q scores would be higher than men's, following research in community samples (Hudson, Hiripi, Pope Jr, Harrison, & Kessler, 2007; Lavender, et al., 2010). This was supported with significantly more women scoring above clinical cut-off on the Eating Restraint, Eating Concern, Shape Concern and Weight Concern subscales than men. This supports research suggesting women experience more severe eating pathology than men, despite similar clinical features of altered diet, body dissatisfaction and psychiatric co-morbidity (Woodside, et al., 2001). Although men were relatively less concerned than women on all EDE-Q subscales, when they did show concern it was predominantly about shape. Conversely, women were predominantly concerned about shape and weight equally. This supports research (Andersen, 1984; Andersen & DiDomenico, 1992; Furnham, et al., 2002) suggesting men and women have different body image preoccupation with men being more concerned with having a masculine shape than about weight. Although in this study women were also concerned about their shape, they had greater concerns about their weight than men.

### **Attitudes Towards Emotional Expression and Eating Attitudes and Behaviours**

The third hypothesis explored which ATEE subscales predicted EDE-Q scores in men and women. The results support those of Meyer et al., (2010) who found significant associations between ATEE Weakness, Control and Social Rejection and EDE-Q Eating Concern, Shape Concern and Weight Concern in non-clinical women and Leung et al., who found significant associations between ATEE Non-expression, Control and Social Rejection and EDE-Q Eating Concern in clinical women. This adds credibility to the

finding that attitudes towards emotional expression are significantly associated with eating disordered behaviours in women.

Regression analyses showed ATEE Social Rejection was the main predictor of each EDE-Q subscale for women after controlling for age, BMI and mood. For men, Social rejection was the main predictor for EDE-Q Eating Concern, Shape Concern and Weight Concern after controlling for age and BMI but was non-significant when accounting for negative mood. This suggests negative mood is an important factor in the association between attitudes towards emotional expression and eating disordered behaviours for men. It is interesting to note that EDE-Q Restraint was not associated with any ATEE subscales for men, even allowing for factors such as mood. This could be because men with eating disorders are less likely to restrict their diet than women (Furnham, et al., 2002), being more likely to exercise or increase their diet to influence shape and weight (Bunnell, 2010).

The results indicate that for women, fear of social rejection if one were to express their emotions predicts eating disordered behaviours. This supports research by Fox (2009) who interviewed women with anorexia about their emotional experiences from a developmental perspective. He found an interpersonal element to emotional inhibition, whereby it was seen as protective of others and prevented rejection. This fits the endorsement of statements such as “My bad feelings will harm other people if I express them”. Geller et al., (2000) also found associations between emotional suppression and protection of interpersonal relationships.



It is thought individuals with eating disorders experience difficulties with interpersonal relationships (Bruch, 1973; Kucharska-Pietura, Nikolaou, Masiak, & Treasure, 2004), and so it is possible these individuals are hypervigilant in self-protection from potential relationship ruptures. It is thought social functioning difficulties maintain eating disorder patterns (Fairburn & Harrison, 2003) as interpersonal situations frequently trigger eating disordered behaviours. This suggests protection of social relationships is a highly important goal. Meyer et al., (2010) suggest the links between fear of negative social evaluation and eating and weight-related concerns (Gilbert & Meyer, 2005), means those who worry about their weight due to concerns about how others perceive them, may suppress their feelings for similar reasons.

EDE-Q Eating Concern, Shape Concern and Weight Concern were significantly correlated with ATEE Social Rejection, and Shape Concern was significantly correlated with ATEE Non-Expression for men. This is a different pattern to women, for which all ATEE and EDE-Q subscales were correlated. This suggests that although men and women have similar attitudes towards expressing emotions, there are different associations with their eating behaviours. It is interesting that Social Rejection was the most significant predictor of eating behaviours of all ATEE subscales, for men as well as women, although this was no longer the case when negative mood was taken into account. This suggests fear of social rejection and low mood are related, but it is mood that plays the dominant role in predicting eating behaviour in men.

### **Limitations**

The ATEE explores attitudes towards emotional expression without specifying which emotions or in which circumstances. Corstorphine (2006) suggests individuals respond to

different emotions differently dependent on childhood experiences. It is unclear which emotions participants are thinking of or if this is comparable across participants. Future research could ask about specific emotions to improve understanding of the relationship between attitudes towards expressing emotions and eating disorders. It is also unclear from the questionnaire instructions whether participants are asked about their attitudes in the first person (e.g. “I should always keep my feelings to myself”) or in the third person (e.g. “Other people should keep their feelings to themselves”). Individuals may have different attitudes regarding their own emotional expression than those of others. It is impossible to know from which perspective questions were answered and whether this is consistent across participants. Future research could clarify this in the instructions.

This research was conducted with a non-clinical, university sample, with a low response rate so one should use caution when generalising from these results. It could be that only those with a specific interest in the topic participated. This could potentially skew results towards those with greater eating pathology. Alternatively, individuals may be reluctant to participate if they are uncomfortable thinking about emotions or eating patterns.

Without ATEE and EDE-Q data for the remaining sample it is difficult to establish the effect of this response bias. The EDE-Q scores were similar to other studies using university samples (Lavender, et al., 2010; Luce, et al., 2008) suggesting these biases may be consistent across research populations. Significant eating disorder rates have been found in university samples (Sanlier, et al., 2008) and sub-clinical cases have been shown to resemble the pathology observed in diagnosable eating disorders (Garfinkel, et al., 1995; Zaider, et al., 2000). This suggests the results here could be useful in understanding clinical cases.

### Summary

This research aimed to explore the relationship between attitudes towards emotional expression and eating disordered behaviours in men and women. A further aim was to compare results in men and women to help ascertain whether the theoretical underpinnings of eating disorders are similar enough across sex to warrant applying similar treatment protocols and research evidence to clinical problems. The results showed women displayed higher levels of eating disordered behaviours and whilst both groups were mostly concerned about shape, women were as concerned about their weight, whilst for men this was less concerning. Men and women were found to have similar attitudes towards expressing emotions. However, it is unclear whether men and women differ in their actual expression of emotion. Some research in healthy populations has found few sex differences in emotional expression (Simon & Nath, 2004; see Wester, et al., 2002 for review) with some authors (Parsons, 1955, 1964; Zayas, et al., 2009) suggesting that social position is a greater influence of emotional expressivity than sex. Future research could explore the role of social position in an eating disorders population to investigate this hypothesis.

ATEE Social rejection was the main predictor of EDE-Q subscales in the regression analyses for women. This supports research suggesting women with anorexia are likely to inhibit their feelings to protect interpersonal relationships (Fox, 2009; Geller, et al., 2000). It is thought this could be due to the early learning environment, where some emotions are seen as unacceptable by caregivers (Corstorphine, 2006). In this environment, expression of certain emotions may lead to harm of others or loss of relationships (Fox, 2009) so strategies, such as eating disordered behaviours are

developed to minimise these feelings (see Heatherton et al., 1991; Corstorphine, 2006).

Treatment approaches for women should focus on exploring individuals' attitudes towards emotional expression and in particular, understanding the meaning of social rejection for the individual and how it impacts upon their eating behaviours.

For men, Social rejection was no longer a predictor once negative mood was controlled for. This suggests although there are some similarities between men and women in predicting eating disordered behaviours, negative emotion plays a larger role in this association for men. Future research should explore the role of negative mood and eating disorders in men, with treatment approaches focusing on understanding the role of mood for the individual. Additional research is needed to further delineate the similarities and differences between men and women with eating disorders to improve theoretical understanding, treatment protocols and outcomes.

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DO THOSE WHO PARTICIPATE IN  
WEIGHT-CATEGORY SPORTS HAVE  
EATING DISORDERS?

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## Abstract

**Objective:** To review the relevant literature to ascertain whether weight-category athletes have eating disorders.

**Method:** A systematic review was conducted. All articles in the Cochrane Library, Ovid, Web of Science and the Cumulative Index to Nursing and Allied Health Literature databases were screened against *a priori* inclusion/exclusion criteria. Prevalence of eating disorders in weight-category athletes was examined across studies.

**Results:** Sixteen studies were identified. No studies found substantive evidence of eating disorders in weight-category athletes. Where measured on and off-season, eating disorder symptomatology were found to disappear. When measured using clinical interview, eating disorder symptomatology were found to be non-clinical.

**Discussion:** Eating disorder assessment tools suitable for use with sports populations are needed. Sports populations require assessment of prevalence of symptoms off-season and co-morbid psychological difficulties. However use of unhealthy weight-loss practices are an issue for weight-category athletes, although they do not have clinical eating disorders.

## **Definition of Eating Disorders in this Review**

King (1989) emphasises the importance of distinguishing behaviours (regardless of how extreme) aimed at reducing weight for vocational reasons, from eating disorders.

Transient behaviours are more likely to be associated with sport demands than eating disorder symptomatology (King, 1989) and it is necessary to assess athletes' emotional and psychological states as well as individual behaviours. Clinical interviews considering this criterion, conducted by trained professionals, are needed to ascertain the presence of eating disorders (Anderson, Lundren, Shaprio, & Paulosky, 2004).

Accordingly, this review will adopt the following definition of eating disorders. Presence of: 1) Excessive concern with dieting, fear of weight gain or "smallness" (to remain applicable to males) and/or 2) Episodes of binge eating and/or purging; and 3) Psychological Characteristics, which may include body dissatisfaction. These should be present on and off-season for athletes (Dale & Landers, 1998).

### **Clinical Relevance**

Frequent and intense cycles of rapid weight loss and gain (Olios, Grave, & Rijrlini, 1999) combined with restrictive dieting may occur in sports where weight influences performance (Brownell & Rodin, 1992) and may increase the risk of eating disorders (Andersen, Barlett, Morgan, & Brownell, 1995; Marquat & Sobal, 1994; Oppliger, Landry, Foster, & Lambrecht, 1993). However, the status of weight-category athletes in relation to eating disorders is not clear. A systematic review is needed to provide evidence regarding whether these athletes have a higher prevalence of eating disorders. This will improve our understanding of eating disorders and the role of weight-category

sports. An understanding of the variety of forms eating disorders can take, including those who wish to lose or put on weight, and who might be at risk of developing these difficulties, will help clinicians to target health prevention and treatment programmes to those who need them. It will also improve the awareness of lay people, thereby enabling friends, family, sport and health professionals to detect eating disorders and improve access to treatment and healthier outcomes.

Given the anticipated high risk of those participating in weight-category sports for eating disordered behaviours, in combination with mixed findings within the field, this is an area that warrants review.

### **Definition of Weight-category Sports**

In this literature review, “weight-category sports” are defined as sports where participants are split into weight-dependent categories for competition (Sundgot-Borgen & Larsen, 1993). Known sports include: Weight lifting; bodybuilding, wrestling; martial arts, horse racing and rowing. These sports involve building high muscle mass to low body fat ratios. For the purpose of this review it is necessary to define the sports that will be included (see Table 9).

### **Prevalence**

Eating disorders are prevalent in modern society with significant health and quality of life consequences (Hay & Mond, 2005; Stice, Marti, Shaw, & Jaconis, 2009). Exercise is seen as a protective factor for mental health in the general population (Kerr & Van Den Wollenberg, 1997; King, Taylor, & Haskell, 1993; Martinsen & Stephens, 1994; Raglin, 1990; Steptoe, Kimbell, & Basford, 1998) and for eating disorders in particular (Levine,

Marcus, & Moulton, 1996; Pendleton, Goodrick, Poston, Reeves, & Foreyt, 2002).

However compulsive exercise is also a compensatory behaviour, that may serve purging functions for those with eating psychopathology (DSM-IV-TR, 2000), and has been linked with eating disorders aetiology (Davis & Kaptein, 2006). For example, research has demonstrated links between perfectionism, compulsive exercise and eating disorders (Goodwin, Haycraft, Willis, & Meyer, 2011; Meyer, Taranis, Goodwin, & Haycraft, 2011).

Results are mixed regarding whether athletic involvement increases (see Brownell & Rodin, 1992 for review) or reduces risk (Davis & Cowles., 1989; Kurtzman, Yager, Landsverk, Wiesmeier, & Bodurka, 1989) for eating disorders. For example, a meta-analysis showed non-weight-category athletes had greater body image than non-athletic controls (Hausenblas & Symons-Downs, 2001), whilst weight-category athletes are thought to be at increased risk of eating disorders (Sundgot-Borgen & Torstveit, 2004) due to competing in weight classes below their natural body weight, to achieve competitive advantage (O'Connor, Lewis, & Kirchner, 1995; Steen & Brownell, 1990). “Muscle Dysmorphia” is a condition associated with eating disorders and exercise in men, where individuals believe they are “puny” or “weak” despite substantial muscle mass (Pope, Gruber, Choi, Olivardia, & Phillips, 1997). It is usually seen in those with body dissatisfaction who participate in muscle development activities, and they are more likely to use anabolic steroids and unhealthy eating and exercise routines (Olivardia, Pope, & Hudson, 2000).

### **Why might Weight-Category Athletes be at risk of Eating Disorders?**

There is evidence that exposure to lean body ideals increases body dissatisfaction (Cohane & Pope, 2001; Leit, Gray, & Pope, 2002) due to disparities between media images and what is possible to achieve naturally (Davis, Brewer, & Weinstein, 1993). Body dissatisfaction is a risk factor in the development of eating disorders and is a key part of eating disorder symptomatology (Bruch, 1962; Cash, 1996; DSM-IV-TR, 2000). It is thought weight-lifting and bodybuilding are ways to achieve this muscular ideal (Plante & Rodin, 1990). Competitive bodybuilding requires intensive weight training to gain muscle and lose fat through aerobic exercise and dietary manipulation, with a focus on body shape (Pickett, Lewis, & Cash, 2005). Significantly, those who diet are more likely to develop an eating disorder than those who have never dieted (Patton et al., 1990). Wrestlers have been found to use self-induced vomiting, laxative misuse, diuretic misuse, excessive exercise, fasting, fluid restriction and sweating to “make weight” (Enns, Drewnowski, & Grinker, 1987; Lakin, Steen & Oppliger, 1990; Oppliger, et al., 1993; Woods, Wilson, & Masland, 1988). These are all of which are common symptoms of Bulimia Nervosa suggesting wrestlers may have symptoms of bulimia nervosa.

Therefore, this literature review will ask the question “Do those who participate in weight-category have eating disorders?”



**Table 9. Definition of Weight-Category Sports.**

<b>Sport</b>	<b>Definition</b>
<b>Bodybuilding</b>	<p>Judging criteria incorporates three categories:</p> <ol style="list-style-type: none"> <li>1) Symmetry of muscularity across the body and muscle groups</li> <li>2) Development of muscle definition</li> <li>3) Overall fat –free muscle mass (World Natural Bodybuilding Federation Judging Criteria, 2011).</li> </ol> <p>Weight classes vary depending on the competition.</p>
<b>Weightlifting</b>	<p>Participants aim to lift the greatest possible weight in one repetition.</p> <p>There are eight weight categories for adult men and seven for adult women.</p>
<b>Rowing</b>	<p>Athletes race against each other on rivers, lakes or oceans using oars.</p> <p>Two weight categories: lightweight and heavyweight.</p> <p>Autumn season: lightweight male teams must average less than 160lbs with a maximum of 165lbs for any one individual.</p> <p>Lightweight female teams must average less than 130lbs.</p> <p>Heavyweight teams do not have weight restrictions (Skyora, Grilo, Wilfrey, &amp; Brownell, 1992).</p>
<b>Martial Artists</b>	<p>Includes a range of combat sports, including judo, tae-kwon-do, karate, boxing and jujitsu.</p> <p>Athletes have to make weight to compete in their chosen weight division, often 5-10% below their natural body weight (Filaire, Rouveix, Pannafieux, &amp; Ferrand, 2007).</p>
<b>Wrestling</b>	<p>Two opponents try to pin each other to the floor.</p> <p>The winner is usually the participant with the greater strength, technique and overall fitness (British Wrestling Association).</p> <p>Weight categories vary depending on the age and sex of the competitor and the style of wrestling.</p>
	<p>Horse racing requires that jockeys conform to certain low weight limits.</p> <p>The horse carrying weight limits are set by racing authorities and</p>

<b>Horse Racing</b>	allowances for the weight of the jockey change with the level of experience (apprentice/conditional) and the number of race wins. The average weight of a jockey is approximately 115 lbs (www.brs.org.uk).
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### Search Strategy

The Cochrane Database of Systematic Reviews, PsychInfo, Web of Science and Cumulative Index to Nursing and Allied Health Literature databases were searched using the search terms: "eating disorder\*" OR "body image" OR "diet\*" OR "eating attitude\*" OR "eating behaviour\*" OR "eating behavior\*" OR "anore\*" OR "bulimi\*" OR "bing\*" OR "binge eating disorder\*" OR "purg\*" OR "body weight" OR "body size" OR body shape" OR "weight gain" OR "weight loss" OR "weight perception" OR "weight control" OR "body dissatisfaction" AND "sport\*" OR "exercise" OR "athlet\*" OR "athletic participation" OR "athletic performance" OR "athletic training" OR "college athlet\*" OR "box\*" OR "jockey" OR "horse rac\*" OR "judo" OR "karate" OR "martial art\*" OR "weight lift\*" OR "bodybuild\*" OR "body build\*" OR "wrestl\*" OR "row\*" OR "weight categor\*" in the main article topic. Results were refined to "English", "Human", "Articles", "Reviews" and "Academic Journals" where appropriate (see Appendix 6, Search Strategy for full details).

**Inclusion criteria:** 1. Main article focus: Weight-category sports (including bodybuilding, martial arts, rowing, boxing, weight-lifting and wrestling)

2. The main focus of the article to be about the prevalence of eating disorders. For this to include excessive concern with dieting, fear of weight gain or “smallness” and/or episodes of binge eating and/or purging.
3. Use of standard assessment tools to assess eating disorders e.g. Eating Disorders Inventory (EDI: Garner, 1991), Eating Attitudes Test (EAT: Garner & Garfinkel, 1979), Eating Disorders Examination (EDE: Fairburn & Cooper, 1993), Muscle Dysmorphia Inventory (MDI: Rhea & Lantz, 2000a, 2000b).
4. Peer reviewed journal articles.

**Exclusion criteria:** 1. Single case or case studies.

2. Book chapters (non-peer reviewed).
3. Dissertation abstracts (non-peer reviewed).
4. Main article focus: Body Image without reference to eating behaviours.

For a summary of articles including their participants, measures, outcomes and quality status see Appendix 8.

## **What does the Literature say?**

The search revealed sixteen papers that met inclusion criteria (see Table 10. for an overview). Papers were quality assessed using seven key criteria devised specifically for this review: 1) Sample size: Lack of power calculations means it is difficult to assess which papers have the power to detect effect sizes in their results. Studies with less than 30 participants per analysis group were not awarded a point in this category; 2) Clear sample groups: Studies where control or experimental groups are mixed (i.e. competitive

and non-competitive athletes together or weight-category with non-weight category athletes together) were not awarded a point in this category. 3) A non-weight category control group: Studies with a non-weight category control against which to compare their data are awarded a point in this category ; 4) Clinical interview: studies that make use of clinical interviews to establish the presence of eating disorders are awarded a point in this category; 5) Data collected on and off-season: Studies who compare data from the athletic season to data outside of the athletic season are awarded a point in this category; 6) Reliability co-efficients and clinical cut-offs stated: Studies that state either reliability co-efficients or clinical cut-offs are awarded half a point in this category. Studies that state both are awarded a whole point; and 7) Overall reporting: Studies with good quality reporting, as defined by criteria adapted from the CONSORT critical appraisal guidelines (Moher, Schulz, & Altman, 2001) and The Thomas Evaluation Tool (Thomas, Ciliska, Dobbins & Micucci, 2004) were awarded a point in this category. However, adapting the criteria from these two measures does mean there could be biases in the results. As this section is only linked to one point on the quality criteria this is an acceptable bias. Papers scoring 4 and above were assessed as good quality, scores of 3-4 as medium quality and 0-2 as low quality (see Appendix 7 for Quality Criteria scores).

### **Eating Attitudes and Behaviours**

Eating attitudes and behaviours are the main component of eating disorder symptomatology (DSM-IV-TR, 2000). In one study, Goldfield, Blouin, & Woodside (2006) found male competitive bodybuilders and non-competitive bodybuilders had more Drive for Bulk than men with Bulimia. However, men with Bulimia scored higher on all other EDI subscales, bar Perfectionism and Drive for Tone, on which there were no group effects. In a related study, (Goldfield, 2009) female competitive bodybuilders had higher

**Table 10. Overview of Articles**

<b>Subject</b>	<b>Papers</b>
<b>Sports</b>	Three articles explored eating disorder in wrestlers, six investigated weightlifters, seven looked at bodybuilders and four looked at martial artists.
<b>Measures</b>	Eight studies used a version of the EDI; six used the EAT, five used body dissatisfaction measures; three used measures of body image disturbance; two used DSM-IV, Paper and pencil versions of the Eating Disorder section of the Computerised Diagnostic Interview Schedule (CDIS), two used the EDE (Clinical interviews) and seven measured as least one aspect of psychological characteristics (depression, self-esteem, perfectionism, ineffectiveness, interoceptive awareness, interpersonal distrust, maturity fears or emotional intelligence) that was unrelated to body image. Three studies used a Drive For Bulk scale: a 6-item scale adapted from the Drive for Thinness scale of the EDI. The direction of items is reversed (e.g. “too big” changed to “too small”) and references to body parts are adapted, appropriate to males (Blouin & Goldfield, 1994). Two studies used a Drive for Tone scale: a 5-item subscale developed to assess participants desire for leaner and more toned body parts with the same 5-point Likert rating scale as the EDI (Goldfield, et al., 2006). Both Drive for Bulk and Drive for Tone are considered to be part of the body dissatisfaction spectrum.
<b>Control Groups</b>	Six studies used athletic groups as controls; three used physically active controls; six used sedentary controls; one used a group with eating disorders and six used other weight-category sports groups.
<b>Outcomes</b>	Seven studies reported evidence of weight-category athletes being at risk of eating disorders; seven studies could not find evidence of weight-category athletes being at risk of eating disorders; two studies reported lower risk of eating disorders and two studies reported that

	they were unable to tell whether unusual patterns of eating and weight control were due to eating disorders or demands of the sport.
<b>Quality</b>	Two studies were judged to be of good quality, four of medium quality, ten of low quality.

Drive for Bulk, Bulimia and Drive for Tone than recreational weight-trainers. The authors conclude this indicates risk of eating disorders in bodybuilders. The DSM-IV Paper and Pencil version of the Computerised Diagnostic Interview Schedule (Blouin, Perez & Blouin, 1988) was used by both studies, potentially adding weight to their findings. However, as with other questionnaire measures, methodological limitations regarding the inability to assess whether participants' understanding of questions matches the researchers' means clinical interviews are still needed to validate their findings. Additionally, that men with Bulimia had significantly greater psychological difficulties associated with their eating behaviours, than competitive bodybuilders, suggests bodybuilders psychological profiles may not correspond to eating disorder profiles. The high scores on Drive for Bulk found in the bodybuilding sample could be consistent with sport demands. These two studies could also be considered within the body image section, given their findings on Drive for Bulk and Drive for Tone. Brooks, Taylor, Hardy, & Lass (2000) found weightlifters had higher EDI scores than exercisers. However lack of information presented in this study about methodological design limits critical review and so these results will not be considered further in this review.

Walberg & Johnston (1991) found higher rates of menstrual dysfunction (a common adjunct to eating disorders in women) in female competitive bodybuilders than recreational weight-lifters and controls, although EDI subscale scores were not as high as

females with anorexia. The authors found preoccupation with eating and body fat, as demonstrated by individual questionnaire items e.g. “I am terrified of becoming fat” yet they rightly state this does not equate to eating disorders. Pickett et al., (2005) found a small, significant effect on the EAT between male competitive bodybuilders and active controls. This is described as consistent with the degree of eating restraint that accompanies successful bodybuilding, especially in competition. A more detailed description of the areas assessed by the EAT and how this fits with eating disorder psychopathology would be useful in assessing this statement’s accuracy. They also found competitive bodybuilders and non-competitive weight-trainers had healthier body image and less social physique anxiety than controls and this is taken as evidence that muscle dysmorphia and/or eating disorders are not present in this population. Whilst, Smith, Wright, Bruce-Low, & Hale (2005) argue uncertainty regarding whether the non-competitive weight-training group define themselves as bodybuilders or weightlifters diminishes their findings (see Methodological Issues: Sampling Issues, for full details), the finding that competitive bodybuilders had greater EAT scores yet healthier body image, than controls, is still relevant.

**Summary.** Some unhealthy eating practices (Goldfield, 2009; Pickett, et al., 2005; Walberg & Johnston 1991) and body dissatisfaction (Goldfield, et al., 2006) were found in bodybuilders, although these were not as high as scores of those with eating disorders (Goldfield, et al., 2006; Walberg & Johnston 1991). Goldfield, (2009) and Goldfield, et al., (2006) scored 1/7 for quality, whilst Walberg & Johnston (1991) scored 2.5/7 meaning their results should be taken with caution. Conversely, Pickett, et al.,

(2005) found evidence of increased body satisfaction and self-esteem in bodybuilders, with a quality rating of 3.5/7, so more weight should be given to these findings.

### **Drive For Thinness**

Dale & Landers (1998) found more in-season wrestlers scored above clinical cut-off on the EDI than non-wrestlers and off-season wrestlers (repeated measures), and so suggest the eating and weight concerns were linked to competition. It is noticeable that only Drive for Thinness scores significantly differentiated the groups, meaning wrestlers may not show a full eating disorders profile, even when in-season. Unfortunately scores on the EDI psychological variables were not analysed. It would be useful to see if those scoring above clinical cut-off on eating subscales, also had elevated psychological subscale scores. Participants classed as “at risk” (scoring above clinical cut-off on any EDI subscale) were assessed for Bulimia Nervosa using EDE interviews. No participants met diagnostic criteria. Interviews revealed weight concerns were exclusively sport-related (Dale & Landers, 1998). Like Pickett et al., (2005), lower body dissatisfaction was found in athletes than controls. It is suggested wrestlers’ goals to be physically fit for competition may enhance body image. Dale et al., (1998) found similar numbers (9% of total sample) endorsed the item “I have thought of vomiting to lose weight” as other studies (Lakin, et al., 1990; Oppliger, et al., 1993; Woods, et al., 1988), but follow up interview found only 1% had actually done so, and for 0.5% this was a one-off. It is therefore important to use clinical interview as a follow up-tool. Those who present “at risk” on questionnaire measures, particularly on only one item, may not have an eating disorders profile.



**Summary.** There is good evidence that the wrestlers in this sample do not have bulimia nervosa (Dale & Landers, 1998) as shown through clinical interview and reduction of symptoms off-season. This study has a quality rating of 6/7 lending weight to their findings.

### **Weight Fluctuations and Dieting.**

Intercollegiate wrestlers had significantly higher EAT scores than skiers/swimmers (Enns, et al., 1987), meaning wrestlers have greater eating disorder symptomatology than skiers/swimmers. although only questions regarding weight fluctuations and dieting differentiated the groups; activities that may be essential for wrestlers (Enns, et al., 1987). There were no significant group differences in body size estimates, all being quite accurate. Wrestler's food restriction and weight loss were found to be greater nearer the season's end. Following on from Dale, et al (1998), this could mean they are directly influenced by competition. It was noted that not all wrestlers are under equal pressure to lose weight as heavier groups may be able to compete without losing weight. The authors suggest future research should record pre-season weight to assess this.

**Summary.** Wrestlers had higher EAT scores than controls, but this was found to be due to greater weight fluctuations and dieting (Enns, et al., 1987), which could be due to sport demands (Enns, et al., 1987). They also did not have body image distortion, a common symptom of eating disorders (Anderson, et al., 2004). This study has a quality rating of 2.5/7 meaning caution should be taken when interpreting their results.

### **Body Image**

Rouveix, Bouget, Pannafieux, Champely, & Filaire (2006) found judoists with lower “body esteem-weight satisfaction” and “body esteem” had higher EAT scores, although it is difficult to know if this equates to overall low body esteem in the judo group. Filaire et al., (2007) found judoists and cyclists had lower Body Esteem Appearance and Weight Satisfaction than student controls, although none of their participants met clinical cut offs on the EAT. The study is limited by the mixed experimental group (cyclists and judoists) and the small sample, but supports Ravaldi, et al., (2003) who found body dissatisfaction in non-competitive bodybuilders but no incidence of clinical eating disorders at interview, despite significantly elevated EDE scores (suggesting significant eating disorder symptomatology). In non-physically active controls, body dissatisfaction was related to being overweight. In this study, the bodybuilders were not overweight but did show body dissatisfaction (Ravaldi, et al., 2003), suggesting their dissatisfaction may be related to altered body shape perception, which could increase their risk of eating disorders.

Pasman & Thompson (1988) found weightlifters did not underestimate their size and were more accurate in size estimation than runners and sedentary controls. They suggest accurate size assessment could be influenced by self-observation through access to mirrors on training walls, although greater social comparisons may also take place. Weightlifters had greater Drive for Thinness than controls and equal to runners, although they did not reach anorexia norms (Pasman & Thompson, 1988). In this study, weightlifters either wanted to add bulk to lift heavier weights (power-lifters), or to shape the body to achieve a specific form (bodybuilders), meaning this was not a pure group of weightlifters.

Lantz, Rhea, & Cornelius (2002) investigated muscle dysmorphia finding more symptomatic behaviours in competitive bodybuilders than competitive power-lifters. Specifically, bodybuilders had greater physique dissatisfaction, physique protection (desire to avoid the body being seen by others), dietary manipulation and use of pharmacological aids. However the reliability coefficients for some of the Muscle Dysmorphia Inventory (MDI) scales in this study are very low. Cronbach's alpha for "exercise dependence" was 0.51 for power-lifters, 0.55 and 0.56 for "physique protection" and 0.35 and 0.57 for "pharmacological use", (power-lifters and bodybuilder respectively). These figures are below the recommended guidelines of 0.7 (Streiner & Norman, 1989) and so may not be accurately measuring what they report to measure. Therefore, only results pertaining to physique dissatisfaction and dietary behaviour are of interest. Additionally, some data was collected immediately after competition, meaning performance may have influenced responses (Lantz, et al., 2002). It is interesting that this study finds greater dietary behaviours and body dissatisfaction in bodybuilders compared to power-lifters, as power-lifters are also weight-category athletes. The authors suggest emphases on muscular size and definition in bodybuilding may promote pathological concerns, whilst power-lifters focus only focus on physique when relevant to weight-category qualification. The dominant focus for power-lifters being weight lifted in a single repetition. Data regarding weight loss and gain between competitive and non-competitive seasons to assess whether power-lifters are required to lose large amounts of weight to compete, or if their resting weight is close to their competitive weight, would strengthen the study. The authors state concerns on one factor are not enough to diagnose muscle dysmorphia, yet there is no data regarding how many participants scored above

clinical cut-off on more than one measure. It is not clear if the participants who had concerns about their body size were the same participants with unhealthy dietary practices.

Lantz, et al., (2002) and Ravaldi, et al., (2003) data contrast with Pickett et al., (2005), who found male competitive bodybuilders and recreational weight-trainers had greater body satisfaction than athletically active controls. It also contrasts with Costarelli & Stamou (2009), who found martial artists had healthier body image than controls. Ravaldi, et al., (2003) used the Body Uneasiness Test whilst Pickett et al., (2005) and Costarelli & Stamou, (2009) use the Multidimensional Body Self Relations Questionnaire. Pickett et al., (2005) also use the Body Areas Satisfaction Scale, the Social Physique Anxiety Scale and the Texas Social Behaviour Inventory . The Lantz et al., (2002) study relies on one subscale of the MDI, the others not reaching reliability standards, and uses power-lifters as a control. It is possible that competitive bodybuilders have greater body dissatisfaction than power-lifters but less than active controls. Pickett, et al., (2005) compare their results using the Multidimensional Body Self Relations Questionnaire to others in the field who have found similar results (Choi, Pope, & Olivardia, 2002) and their results also fit with meta-analytic results where non-weight category athletes reported more positive body image than controls (Hausenblas & Symons-Downs, 2001).

**Summary.** Body image distortion was not found in weight lifters (Pasman & Thompson, 1988) or competitive bodybuilders (Pickett, et al., 2005), the latter showing greater body satisfaction than recreational weight-trainers. The first study has a quality

rating of 2/7 meaning the results should be taken with caution, the latter scores 3.5/7 and supports Costarelli & Stamou, (2009), who also have a quality rating of 3.5/7. These results contrast with findings by Lantz, et al., (2002) and Filaire, et al., (2007), who have quality ratings of 3 and 2.5/7 respectively. Pickett, et al., (2005) uses a wider range of tools to measure body dissatisfaction and more detailed reporting, lending greater weight to their findings. Body dissatisfaction in addition to dietary manipulation was found in judoists (Rouveix, et al., 2007; Quality rating of 3.5/7), and bodybuilders (Lantz, et al., 2002) indicating a possible presence of eating disorder profiles. Clinical interviews are needed to substantiate these findings and determine whether results are due to sport demands or mental health.

### **Psychological Characteristics**

**Self-Esteem and Depression.** Low self-esteem is part of the Cognitive Behavioural Therapy model for bulimia nervosa (Byrne & McLean, 2002; Fairburn, 1997) whilst depression is a common correlate of eating disorders (Cooper & Fairburn, 1986) and so both should be measured when assessing for eating disorders (Anderson, et al., 2004). Depression predicted EAT scores in judoists and cyclists (Filaire, et al., 2007), but no group differences were found on mood or anxiety (Blouin & Goldfield, 1994; Costarelli & Stamou, 2009; Filaire, et al., 2007; Goldfield, 2009; Ravaldi, et al., 2003; Rouveix, et al., 2007). These studies taken in combination suggest that whilst depression was associated with eating disorders in weight-category athletes, there were no differences in levels of depression between experimental and control groups in five of the studies in which it was assessed. In the sixth, competitive bodybuilders had lower depression scores than men with Bulimia (Goldfield, et al., 2006).

Self-esteem was lower in bodybuilders than martial artists, (Blouin & Goldfield, 1994) who are also weight-category athletes, but higher than active controls (Pickett, et al., 2005). A third study found no differences in self-esteem between judoists and sedentary controls (Rouviex, et al., 2007). Combined, these studies suggest the role of self-esteem for weight-category athletes is unclear.

**Perfectionism.** Links between perfectionism, compulsive exercise and eating disorders have been found (Goodwin, et al., 2011; Meyer, et al., 2011), warranting its assessment within a sports population. Bodybuilders had higher perfectionism (as measured by the EDI) than martial artists, but not runners (Blouin & Goldfield, 1994) whilst no differences in perfectionism were found between martial artists and non-athletes (measured by Multidimensional Perfectionism Scale) (Filaire, et al., 2007; Rouveix, et al., 2007), nor was it was not correlated with EAT scores in judoists (Rouveix, et al., 2007).

**Ineffectiveness, Interoceptive Awareness, Interpersonal Distrust and Maturity Fears (as measured by the EDI).** Bodybuilders had lower Interoceptive Awareness (awareness of internal body signals, e.g. emotional stimuli or hunger signals) than runners and greater feelings of Ineffectiveness than martial artists (Blouin & Goldfield, 1994) whilst non-competitive bodybuilders had higher Maturity Fears and Interpersonal Distrust than “healthy young males” (Oliosi, et al., 1999). These studies’ data co-occur with elevated scores on the EDI eating (Blouin & Goldfield, 1994; Oliosi, et al., 1999) and body dissatisfaction scales (Blouin & Goldfield, 1994) suggesting possible evidence of eating disorder profiles in weight-category athletes. However, in the

Olios, et al., (1999) study, the level or type of exercise of each group is not clearly defined, making it difficult to know which population is being measured against whom. For Blouin, et al., (1994) an interpretation of what may differentiate bodybuilders from runners or martial artists is not discussed. This is significant given runners are also considered at risk for eating disorders and martial artists are weight-category athletes, so there may be other influential variables impacting upon results.

However, pathological EDI profiles (Bulimia, Body Dissatisfaction, Ineffectiveness, Interoceptive Awareness and Maturity Fears) were found in a subsection of wrestlers and lightweight rowers (Thiel, Gottfried, & Hesse, 1993). It is unclear what is different about this subgroup of wrestlers and rowers with EDI profiles from those without and therefore whether this equals greater prevalence than a non-weight-category population. The authors suggest the findings demonstrate “sub-clinical eating disorders” yet this cannot be ascertained without clinical interview. They do state athletes have increased risk of eating disorders if sports require an unnatural weight (Striegel-Moore, Silberstein, & Rodin, 1986), the decisive factor being deviation from the biological set-point (Garner, Rockert, Olmstead, Johnson, & Coscina, 1985; Keys, Brozek, Henschel, Michelsen, & Taylor, 1950). Measurement of the difference between non-competitive Body Mass Index (BMI) and competitive weight-category would strengthen their results and those of the other studies in this review.

**Emotional Intelligence.** Emotional difficulties are thought to play a key role in eating symptomatology (e.g. Bruch, 1978; Heatherton & Baumeister, 1991), and low emotional intelligence is commonly found in those with eating disorders. However,

martial artists were found to have higher emotional intelligence and healthier body image than non-athletes (Costarelli & Stamou, 2009). In addition to the lack of group differences found on the EAT scores, the results of this study suggest to us that the presence of an eating disorders profile in this sample is unlikely.

**Summary.** Weight-category athletes were not found to have higher anxiety, depression or perfectionism scores than controls (Blouin & Goldfield, 1994; Costarelli & Stamou, 2009; Filaire, et al., 2007; Goldfield, 2009; Goldfield, et al., 2006; Ravaldi, et al., 2003; Rouveix, et al., 2007). Findings relating to self-esteem are unclear with three studies finding contrasting results (Blouin & Goldfield, 1994; Pickett, et al., 2005; Rouveix, et al., 2007). One study found higher perfectionism and lower self esteem in a group of bodybuilders (Blouin & Goldfield, 1994), but this was compared to martial artists who are another weight-category group and the study's quality rating is 1.5/7, meaning caution should be taken when interpreting their results. Costarelli & Stamou, (2009) found martial artists had greater emotional intelligence than non-athletes, with a quality rating of 3.5/7, lending weight to their findings. Psychological and eating difficulties were found in combination (Blouin & Goldfield, 1994; Oliosi, et al., 1999; Thiel, et al., 1993), however quality ratings for these studies are 1.5, 2 and 2.5/7 respectively, as methodological issues makes their findings difficult to assess. Clinical interviews would be advantageous in validating their findings.

### **Methodological Issues**

**Sampling Issues.** Goldfield et al. (2006) assessed competitive bodybuilders who were training for competition or had recently competed, yet those in training may



have stricter regimes than those who have just competed meaning there may be variables that are unaccounted for in their analysis. The non-competitive bodybuilders in this study engaged in traditional weight training without competing in bodybuilding or intending to do so (Goldfield et al., 2006). This causes methodological concerns (Smith, et al., 2005) as most people who consider themselves “bodybuilders” do not compete (Kubistat, 1988). Research shows those who weight train for fitness or bodybuilding purposes have different psychological characteristics (Lantz, et al., 2002; Smith, Hale, & Collins, 1998) due to different lifting motives. Those desiring muscle strength may lift the heaviest weights possible in one repetition, whereas bodybuilders may be motivated by muscle size and definition (Fussell, 1991; Klein, 1993). It is also important to distinguish recreational weightlifters who follow the sport’s aims by lifting weights relative to their body size, from gym-goers using weights within a fitness regime. The latter group are not under the same pressures to lose weight or reach finely-tuned ratios of muscle-to-fat as recreational weight-trainers or bodybuilders. Goldfield (2009) revises his methodology, redefining those who weight train from bodybuilders to weightlifters. Whilst this shows consideration of this point, it does not address personal motivations for weight-training, which can only be ascertained through asking participants. This methodological issue also applies to Blouin, et al., (1994), Brooks, et al., (2000), Oliosi, et al., (1999), Pasman, et al., (1988), Pickett et al., (2005) and Ravaldi, et al., (2003). The only study in the bodybuilding literature to circumvent this pitfall is Lantz, et al., (2002) who used competitive samples of bodybuilders and power-lifters.

Within experimental groups, Filaire, et al., (2007) used judoists and cyclists in one group, whilst Walberg & Johnston (1991) used female competitive bodybuilders and recreational

weight-lifters. Although Walberg & Johnston (1991) separate these groups in some analyses, the small competitive bodybuilders sample makes it hard to draw conclusions.

**Sample Size.** Sample sizes ranged from 12 to 113, with small samples often resulting from splitting groups into competitive and non-competitive (e.g. Blouin & Goldfield, 1994; Oliosi, et al., 1999; Walberg & Johnston, 1991), and male and female groups (e.g. Pasmaan & Thompson, 1988). In none of the studies were a priori power calculations detailing the sample size needed to detect an effect reported, meaning it is difficult to tell which studies have achieved the necessary power.

**Measures.** Inclusion criteria for this literature review included use of standardised assessment measures for eating disorders. The majority of the studies use the EAT or the EDI with one study using the MDI (Lantz, et al., 2002). However, it is not clear if they have been validated with sports populations. Dale & Landers (1998) used the EDI as a screening tool with clinical interview as a follow-up measure. Of those who scored in the “at risk” category, (scores above clinical cut-off on one of the eating-related subscales), none were classified with eating disorders. Similarly, Ravaldi, et al., (2003) found that whilst non-competitive bodybuilders scored higher on the EDE than the control group, no participants met diagnostic criteria. This suggests that traditional eating disorder questionnaire measures may not be sufficient to differentiate sports-related eating and dieting practices from eating disorder symptomatology. It may be that additional questions regarding prevalence of symptoms off-season and questions and motivations for eating and dieting practices are necessary to ensure reliable and valid results.

Research is needed to clarify this area. Dale & Landers (1998) and Ravaldi, et al., (2003) are the only papers to use clinical interview as a diagnostic measure and therefore are the most valid papers in making this assessment.

**Importance of defining Eating Disorders.** The articles in this review purport to explore eating disorders and use at least one standardised measure, designed specifically for eating disorders assessment. However, the authors note limitations of questionnaire measures in providing diagnoses. They therefore use phrases like “abnormal eating attitudes” (Filaire, et al., 2007). Whilst this allows exploration of eating disorders without making unwarranted claims about their prevalence, the effect is that some papers claim to find the population under study is “at risk” of developing eating disorders with varying quality of evidence. “At risk” is a broad statement and so a clear definition of eating disorders is needed. However this is mostly poorly defined (Blouin & Goldfield, 1994; Oliosi, et al., 1999) or not provided (Brooks, et al., 2000; Costarelli & Stamou, 2009; Filaire, et al., 2007; Goldfield, 2009; Goldfield, et al., 2006; Pasman & Thompson, 1988; Pickett, et al., 2005; Ravaldi, et al., 2003; Walberg & Johnston, 1991) making it difficult to discern what is being measured. Only Dale & Landers, (1998); Enns et al., (1987); Lantz, et al., (2002); Rouveix, et al., (2007) and Thiel, et al., (1993) make reasonable attempts to define their constructs. Unhealthy eating behaviours and weight loss practices are not symptomatic of eating disorders without co-morbid psychological difficulties (King, 1989), yet only a few studies explicitly explore psychological difficulties and discuss the impact of these findings on their results (Costarelli & Stamou, 2009; Filaire, et al., 2007; Pickett, et al., 2005; Ravaldi, et al., 2003 and Rouveix, et al., 2007).

The number of constructs in a measurement tool that participants need to show elevated scores in to arouse clinical concern is also not discussed. This is only explicitly stated in Dale & Landers (1998) and Lantz et al., (2002). Few state the clinical cut-offs (Costarelli & Stamou, 2009; Dale & Landers, 1998; Filaire, et al., 2007; Lantz, et al., 2002; Ravaldi, et al., 2003; Rouveix, et al., 2007; Walberg & Johnston, 1991) or the reliability coefficients (Dale & Landers, 1998; Lantz, et al., 2002; Pasman & Thompson, 1988; Pickett, et al., 2005; Rouveix, et al., 2007), making it difficult to assess the reliability of results. Diagnoses of eating disorders require symptomology to be consistent over time (DSM IV-TR), not just during the sporting season (Dale & Landers, 1998) requiring research to assess eating practices during the on and off-season. This is only undertaken by Dale & Landers (1998).

Several studies (Blouin & Goldfield, 1994; Goldfield, et al., 2006; Pickett, et al., 2005; Walberg & Johnston, 1991) try to compare competitive with non-competitive samples. However these are all undertaken in the bodybuilding research where lack of clarity regarding whether control groups are self-classified bodybuilders, weight-lifters or gym-goers limits results (see Sampling Issues). Overall, Dale & Landers (1998), Lantz, et al., (2002) and Rouveix, et al., (2007) are the most consistent in relation to clear assessment and reporting of all of these areas (experimental and control groups, reliability coefficients and clinical cut-offs) whilst Filaire, et al., (2007), Costarelli & Stamou (2009), Ravaldi, et al., (2003) and Pickett, et al., (2005) do so on for some of these areas, but not all (see quality criteria table, appendix 7).

## Conclusions

Weight-category athletes were often found to have unhealthy eating practices but these studies tended to either be low quality (Goldfield, 2009; Walberg & Johnston 1991) or found concurrent positive body image (Pickett, et al., 2005) suggesting a clinical eating disorders profile is unlikely. Elevated Drive for Thinness was found in a group of in-season wrestlers, but this was not found to equate to eating disorders when assessed by clinical interview. Drive for Thinness scores were also found to reduce after the competitive season had finished (Dale & Landers, 1998), suggesting symptoms were related to sporting demands rather than mental health. This is good quality paper with the highest rating of 6/7.

Wrestlers were found to have more weight fluctuations than non-weight category athletes, but they did not have accompanying body image distortion (Enns, et al., 1987), suggesting weight-cycling may be linked to sport demands. This is a low quality paper meaning caution should be taken when interpreting their results. There were conflicting findings regarding body image in weight-category athletes with two medium-to-good quality papers finding greater body satisfaction (Costarelli & Stamou, 2009; Pickett, et al., 2005) and four papers finding greater body dissatisfaction (Filaire, et al., 2007; Lantz, et al., 2002; Ravaldi et al., 2003; Rouveix, et al., 2007). However, none of these papers found concurrent evidence of eating symptomatology. Specifically, Ravaldi et al., (2003), found no evidence of eating disorders in a sample of male non-competitive bodybuilders using clinical interviews.

Finally, in relation to psychological characteristics, there was no evidence of greater anxiety, depression or perfectionism in weight-category athletes, all of which are common correlates of eating disorders (Cooper & Fairburn, 1986; Hewitt, Flett & Ediger, 1995). Specifically, martial artists were found to have greater emotional intelligence than controls (Costarelli & Stamou, 2009). It is difficult to draw conclusions about the role of self-esteem due to mixed findings. Three studies found evidence of eating difficulties in combination with psychological constructs as measured by the EDI (Blouin & Goldfield, 1994; Oliosi, et al., 1999; Thiel, et al., 1993). However, these are all low quality papers meaning caution is needed in generalising from their results. Use of clinical interview or discussion of clinical cut-offs would strengthen their results.

In conclusion, evidence was not found for the presence of eating disorders in weight-category athletes. It is notable that the studies of higher quality included a range of weight-category athletes (wrestlers, bodybuilders and martial artists), and did not find evidence of eating disorders in any group. They did all find positive evidence against the presence of eating disorders, suggesting weight-category athletes do not have a greater prevalence of eating disorders. Whilst those who diet or have body dissatisfaction may be “at risk” of eating disorders (Filaire, et al., 2007) there is not sufficient evidence of increased risk in a sports population. Indeed, the lack of increased prevalence in weight-category athletes, despite the greater weight fluctuations, dietary manipulation and compensatory strategies (Blouin & Goldfield, 1994; Enns, et al., 1987; Filaire, et al., 2007; Goldfield, 2009; Goldfield, et al., 2006; Oliosi, et al., 1999; Thiel, et al., 1993) suggests sports participation could be a protective factor. This highlights the need for robust eating disorder measurement tools for sports populations. Future research with large, well-defined samples, use of non-weight-category controls, clinical interview and

testing on and off-season would strengthen the research field. However, given the presence of unhealthy eating and weight loss practices, including self-induced vomiting (Filaire, et al., 2007), laxative use (Filaire, et al., 2007; Walberg & Johnston, 1991) diuretic use (Filaire, et al., 2007; Goldfield, et al., 2006) and frequent weight cycling (Costarelli & Stamou, 2009; Enns, et al., 1987; Filaire, et al., 2007; Olios, et al., 1999), future research needs to focus on educating athletes about possible healthier ways to “make weight” and on the dangers of unhealthy dietary and weight loss practices (Dale & Landers, 1998).

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**APPENDIX 1.**

**INVITATION TO PARTICIPATE**

## **Attitudes towards Expressing Emotions and Eating disorders in Men and Women.**

### Invitation

You are being invited to take part in this research study, which is exploring attitudes towards expressing emotions and eating disorders in men and women. Please take your time to read this information carefully before making a decision about whether you would like to participate. You are under no obligation to take part in the study and if you change your mind about participating then please do not complete the forms. The information form will outline what is involved if you wish to participate in the project. If you wish to discuss any part of this study or would like further information before making your decision then please do not hesitate to contact us.

### What is the purpose of this research?

Eating disorders and related body concerns are becoming increasingly common in men and yet research has so far focused on understanding eating disorders in women. The purpose of this study is to explore the role of attitudes towards emotional expression and eating disorder, looking specifically at similarities and differences between men and women. This is a new area of research and may help to improve psychological therapies for both men and women with a diagnosis of an eating disorder.

### Why have I been chosen?

This research is investigating the view of a student population. This is because student groups include a wide range of people with different attitudes and eating and body concerns. Important trends that are found can then be explored more directly with those with eating disorders.

### What do I have to do?

If you wish to take part then please click on the link (link to online questionnaire) and then tick the relevant box to confirm that you consent to participate in this research. The questionnaire should take approximately 30 minutes to complete. Your individual responses will remain confidential and you will be assigned a personal identification code. This will be made up of your initials and the last three digits of your phone number. There are three questionnaires for you to fill in which will come up automatically, on the screen, one at a time, if you choose to consent. Please complete all of the questions, as if items are left out this affects the accuracy of the results. Your individual questionnaire responses will remain confidential and you will be assigned an identification number.

### Do I have to take part?

You do not have to take part in the research if you do not wish to. In this case, do not tick the consent box and do not complete the questionnaires. If you do not feel comfortable completing some of the questions for any reason then you may leave these blank although this may affect the quality of the results. If you change your mind about participating then do not finish the questionnaires or submit them to the researcher. If you wish to withdraw your completed responses after submitting your forms then you should contact the

researcher (via email or post) with your personal identification code. You do not have to provide a reason. Your data will then be removed from the research and your questionnaires will be deleted. You may withdraw your data at any time up until 31<sup>st</sup> January 2012.

What are the potential benefits and disadvantages from taking part in this study?

Participants often enjoy completing questionnaires and may value being able to contribute to research in an interesting and relevant field. Some individuals may feel inconvenienced by the time taken to complete questionnaires, or they may feel distressed by the content. If you feel distressed by the content of the questionnaires, if you have any concerns about the issues raised or if you think you may be suffering from an eating disorder then you can contact the following for help and advice:

Beating Eating Disorders Website

[www.b-eat.co.uk](http://www.b-eat.co.uk)

0845 634 1414

University Student Support and Counselling

[www.as.bham.ac.uk/studentlife/counselling/contact](http://www.as.bham.ac.uk/studentlife/counselling/contact)

Counselling and Guidance, 3 Elms Road, The University of Birmingham, Edgbaston, Birmingham, B15 2TT

0121 414 5130

What if there is a problem?

Should you have cause to complain you can contact the Programme Director of the University of Birmingham Clinical Psychology Doctorate course:

Jan Oyebo, University of Birmingham, School of Psychology, Edgbaston, Birmingham B15 2TT

What will happen to the results of the research study?

Results of this study are hoped to be published in a research journal. No published data will be identifiable as yours. If you wish to receive information about the research results once they are completed then please contact Vanessa Jones separately at the email address below. This would include information about any trends identified by the research and information about how to access any published articles.

If you require further information or have any questions then please contact:

Email: [vcj965@bham.ac.uk](mailto:vcj965@bham.ac.uk)

Post: Vanessa Jones, Clinical Psychology Department, Frankland Building,

University of Birmingham, Edgbaston, Birmingham, B15 2TT.

## **APPENDIX 2.**

# **QUESTIONNAIRE MEASURES**



## POSITIVE AND NEGATIVE AFFECT SCALE (PANAS)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent these feelings have been true for you over the last 4 weeks.

1	2	3	4	5
Very slightly	A little	Moderately	Quite a bit	Extremely
or not at all				

_____ Interested	_____ Irritable
_____ Distressed	_____ Alert
_____ Excited	_____ Ashamed
_____ Upset	_____ Inspired
_____ Strong	_____ Nervous
_____ Guilty	_____ Determined
_____ Scared	_____ Attentive
_____ Hostile	_____ Jittery
_____ Enthusiastic	_____ Active
_____ Proud	_____ Afraid

## EATING DISORDERS EXAMINATION- QUESTIONNAIRE (EDE-Q)

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

	No 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 or weight?							
2. Have you gone for long periods of time (8 hours or more) without eating anything in order to influence your shape or weight?							
3. Have you <u>tried</u> to avoid eating any foods which you like in order to influence your shape or weight?							
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?							
5. Have you wanted your stomach to be empty?							
6. Has thinking about food or its calorie							

content made it much more difficult to concentrate on things you are interested in; for example, read, watch TV, or follow a conversation?							
7. Have you been afraid of losing control over eating?							
8. Have you had episodes of binge eating?							
9. Have you eaten in secret? (Do not count binges.)							
10. Have you definitely wanted your stomach to be flat?							
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?							
12. Have you had a definite fear that you might gain weight or become fat?							
13. Have you felt fat?							
14. Have you had a strong desire to lose weight?							
15. 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.)							
<p>16. 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 YES or NO and put appropriate number in box.)</p> <p>17. How many such episodes have you had over the past four weeks?</p> <p>18. During how many of these episodes did you have a sense of having lost control over your eating?</p>	YES	NO	( )	( )			
<p>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 <u>not</u> eaten an unusually large amount of food given the circumstances?</p> <p>20. How many such episodes have you had over the past four weeks?</p>	YES	NO	( )				
<p>21. Over the past four weeks have you made yourself sick (vomit) as a means of controlling your shape or weight?</p>	YES	NO					

22. How many times have you done this over the past four weeks?	(      )
23. Have you taken laxatives as a means of controlling you shape or weight?	YES      NO
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?	YES      NO
26. How many times have you done this over the past four weeks?	(      )
27. Have you exercised <u>hard</u> as a means of controlling your shape or weight?	YES      NO
28. How many times have you done this over the past four weeks?	(      )

Over the past four weeks (28 days), please circle the number which best describes your behaviour.

	Not at all		Slightly		Moderately		Markedly
29. Has your weight influenced how you think about yourself (judge) yourself as a person?	0	1	2	3	4	5	6
30. Has your shape influenced how you							

think about (judge) yourself as a person?	0	1	2	3	4	5	6
31. How much would it upset you if you had to weigh yourself once a week for the next four weeks?	0	1	2	3	4	5	6
32. How dissatisfied have you felt about your weight?	0	1	2	3	4	5	6
33. How dissatisfied have you felt about your shape?	0	1	2	3	4	5	6
34. How concerned have you been about other people seeing you eat?	0	1	2	3	4	5	6
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	6
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	6

## ATTITUDES TOWARDS EMOTIONAL EXPRESSION QUESTIONNAIRE

		Disagree very much	Disagree somewhat	Neither agree nor disagree	Agree some what	Agree very much
1	I think you should always keep your feelings under control	1	2	3	4	5
2	I think you ought not to burden other people with your problems	1	2	3	4	5
3	I think getting emotional is a sign of weakness	1	2	3	4	5
4	I think other people don't understand your feelings	1	2	3	4	5
5	When I'm upset I bottle up my feelings	1	2	3	4	5
6	You should always keep you feelings to yourself	1	2	3	4	5
7	Other people will reject you if you upset them	1	2	3	4	5
8	My bad feelings will harm other people if I express them	1	2	3	4	5
9	If I express my feelings, I'm vulnerable to attack	1	2	3	4	5
10	You should always hide your feelings	1	2	3	4	5
11	When I'm upset, I usually try to hide how I feel	1	2	3	4	5
12	I seldom show how I feel about things	1	2	3	4	5

13	Turning to someone else for advice or help is a sign of weakness	1	2	3	4	5
14	It is shameful for a person to display his or her weaknesses	1	2	3	4	5
15	I should have complete control over my feelings	1	2	3	4	5
16	If other people know what you are really like, they will think less of you	1	2	3	4	5
17	When I get upset, I usually show how I feel	1	2	3	4	5
18	People will reject you if they know your weaknesses	1	2	3	4	5
19	If a person asks for help, it is a sign of weakness	1	2	3	4	5
20	I don't feel comfortable showing my emotions	1	2	3	4	5



**APPENDIX 3.**

**ETHICAL APPROVAL**

## Letter of Ethical Approval

Dear Vanessa

Re: Application for Ethical Review ERN\_10-1298

Many thanks for the below response.

On behalf of the Committee, I am pleased to confirm that the conditions for ethical approval of this study have now been met.

Thank you,

Gemma.

Gemma Williams

Deputy Research Ethics Officer, Research Support Group

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Web: [www.rcs.bham.ac.uk](http://www.rcs.bham.ac.uk)

## **APPENDIX 4.**

# **Eating Disorder Diagnostic Criteria from DSM IV-TR**

## **Anorexia Nervosa**

\* Refusal to maintain body weight at or above a minimally normal weight for age and height, for example, 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.

\* Intense fear of gaining weight or becoming fat, even though underweight.

\* Disturbance in the way 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.

\* In postmenarcheal females, amenorrhea, i.e., the absence of at least 3 consecutive menstrual cycles. A woman having periods only while on hormone medication (e.g. estrogen) still qualifies as having amenorrhea.

### **Type**

*Restricting Type:* During the current episode of Anorexia Nervosa, the person has not regularly engaged in binge-eating or purging behavior (self-induced vomiting or 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 behavior.

## **Bulimia Nervosa**

\* Recurrent episodes of binge eating characterized by both

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, (such as a feeling that one cannot stop eating or control what or how much one is eating).

\* Recurrent inappropriate compensatory behavior to prevent weight gain, such as self-induced vomiting, misuse of laxatives, diuretics, enemas, or other medications, fasting, or excessive exercise.

\* The binge eating and inappropriate compensatory behavior both occur, on average, at least twice a week for 3 months.

\* Self evaluation is unduly influenced by body shape and weight.

\* The disturbance does not occur exclusively during episodes of Anorexia Nervosa.

### **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 behavior but has not regularly engaged in self-induced vomiting or misused laxatives, diuretics, or enemas.

## **Eating Disorder Not Otherwise Specified**

This diagnosis includes disorders of eating that do not meet the criteria for the above two eating disorder diagnoses. Examples include

1. For female patients, all of the criteria for Anorexia Nervosa are met except that the patient has regular menses.
2. All of the criteria for Anorexia Nervosa are met except that, despite significant weight loss, the patient'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 less than twice a week or for less than 3 months.
4. The patient has normal body weight and regularly uses inappropriate compensatory behavior after eating small amounts of food (e.g., self-induced vomiting after consuming two cookies).
5. The patient engages in 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 regular inappropriate compensatory behavior characteristic of Bulimia Nervosa.

## **APPENDIX 5**

### **ABBREVIATIONS GLOSSARY**

**ABBREVIATION GLOSSARY**

AN: Anorexia

ATEE: Attitudes Towards Emotional Expression Questionnaire

BMI: Body Mass Index

BN: Bulimia Nervosa

DSM-IV: Diagnostic and Statistical Manual of Mental Disorders Four.

ED: Eating Disorders

EAT: Eating Attitudes Test

EDI: Eating Disorder Inventory

EDE: Eating Disorder Examination

EDE-Q: Eating Disorder Examination Questionnaire

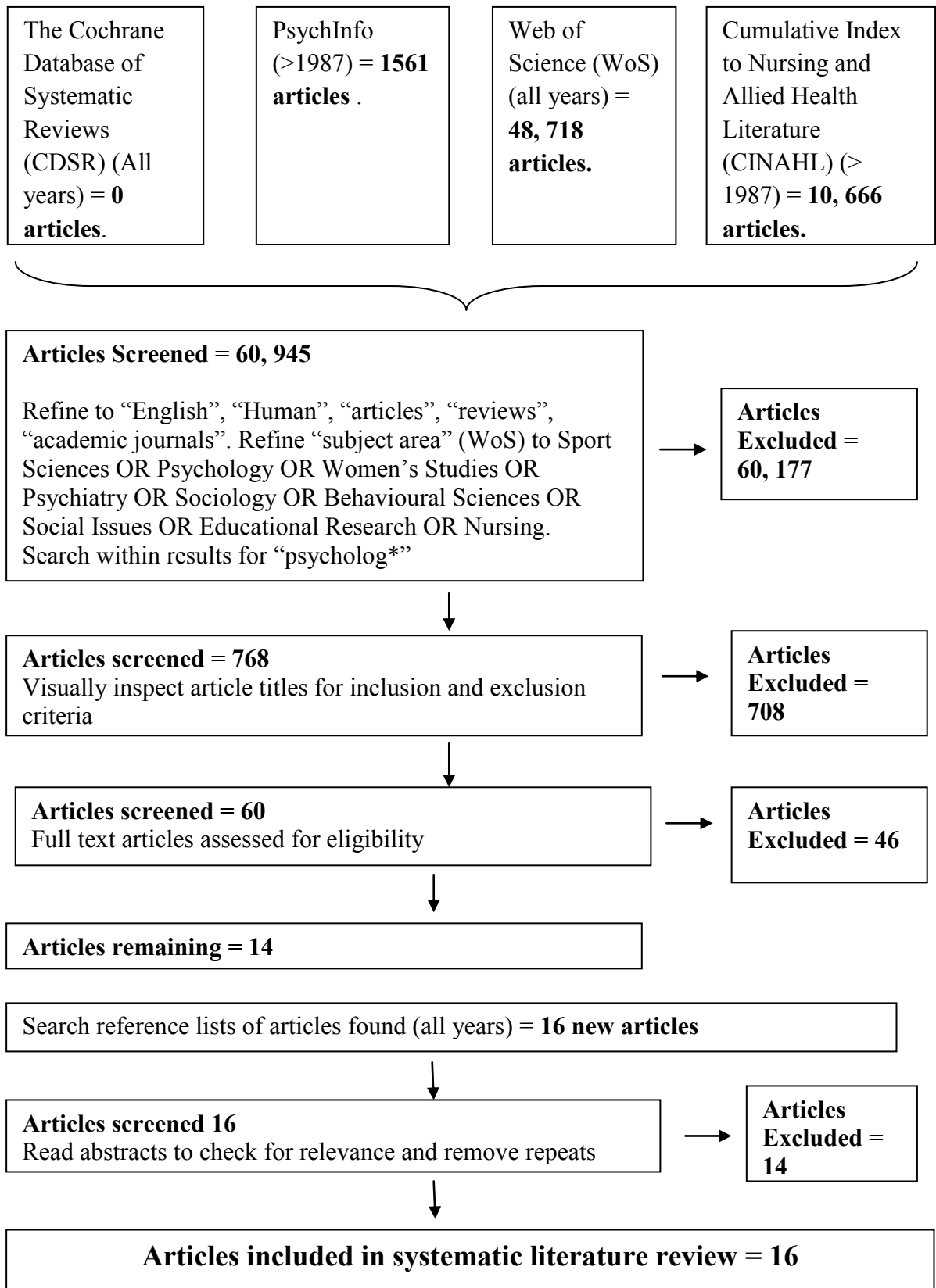
MDI: Muscle Dymorphia Inventory

PANAS: Positive and Negative Affect Scale

**APPENDIX 6**

**SEARCH STRATEGY**





**APPENDIX 7.**  
**QUALITY CRITERIA**

## QUALITY CRITERIA

Papers	Sample Size	Clear Groups	Non Weight-Category Control	Clinical Interview	Measured on and off season	States reliability co-efficients and clinical cut-off	Good Overall Reporting	Total Score / 7
Enns, Drewnowski & Grinker (1987).	N	Y	Y	N	N	N	1/2	2.5
Pasman & Thompson. (1988).	N	N	Y	N	N	1/2	1/2	2
Walberg & Johnston (1991).	Y	N	Y	N	N	1/2	N	2.5
Theil, Gottfried & Hesse. (1993).	Y	Y	N	N	N	N	1/2	2.5
Blouin & Goldfield. (1994).	N	N	Y	N	N	N	1/2	1.5
Olios, Grave, Burlini (1999)	Y	N	Y	N	N	N	N	2
Dale & Landers (1999).	Y	N	Y	Y	Y	Y	Y	6
Brooks, Taylor, Hardy & Lass (2000).	N	N	Y	N	N	N	N	1
Lantz, Rhea and Cornelius (2002).	Y	Y	N	N	N	Y	N	3
Ravaldi, Vannacci, Zucchi, Manucci, Cabras, Boldrini, Murciano, Rotella	Y	N	Y	Y	N	1/2	Y	4.5

& Ricca (2003).								
Pickett, Lewis & Cash (2005).	Y	N	Y	N	N	1/2	Y	3 .5
Goldfield, Blouin & Woodside (2006).	N	N	Y	N	N	N	N	1
Rouveix, Bouget, Pannafieux, Champely and Filaire. (2007).	N	Y	Y	N	N	Y	N	3
Filaire, Rouviex, Pannafieux & Ferrand. (2007).	N	N	Y	N	N	1/2	Y	2 .5
Costarelli & Stamou (2009).	N	Y	Y	N	N	1/2	Y	3 .5
Goldfield. (2009).	N	N	Y	N	N	N	N	1

<b>Quality</b>	<b>Rating</b>	<b>Studies</b>	<b>Rating /7</b>
Good quality	4+ out of 7	Dale & Landers (1998) Ravaldi, et al., (2003)	6 4.5
Medium quality	3- 4 out of 7	Costarelli & Stamou, (2009) Pickett, et al., (2005) Lantz, et al., (2002) Rouviex, et al., (2007)	3.5 3.5 3 3
Low Quality	0 – 3	Filaire, et al., (2007) Thiel, et al., (1993) Walberg & Johnston (1991) Enns, et al., (1987) Pasman & Thompson (1988) Olios, et al., (1999) Blouin & Goldfield (1994) Brooks, et al., (2000) Goldfield, et al., (2006) Goldfield, (2009)	2.5 2.5 2.5 2.5 2 2 1.5 1 1 1

**APPENDIX 8.**

**SUMMARY TABLE OF STUDIES**

## SUMMARY TABLE OF STUDIES

Authors	Title	Study Location	Participants	Measures	Outcome	Quality Status
Walberg & Johnston, (1991).	Menstrual function and eating behavior in female recreational weight lifters and competitive body builders.	North America.	103 female bodybuilders (12 competitive, 89 non competitive). 92 non-weight trainers (control).	Forced choice questionnaire: weight training patterns, menstrual patterns, attitudes towards one's body and diet behaviour; Eating Disorder Inventory; Percent body fat estimations.	Menstrual dysfunction rates were higher in competitive than non-competitive weight-lifters. None of the average Eating Disorder Inventory subscale scores were as high as anorexia nervosa patient averages. Approximately 15% of weight-lifters could be described as "weight preoccupied".  Little evidence of bulimia nervosa in weight-lifters or controls.  Data suggests some weight-lifters have excessive concern with food and weight loss.	2.5 / 7 Low Quality.  Definition of menstrual dysfunction is poor and inconsistent. Some inconsistencies in the text and reporting.  Details of the questionnaire they developed are not given.  Definition of weight lifters and body builders is not clear.
Blouin & Goldfield,	Body-Image and steroid use in	North	139 athletes (43 bodybuilders	Eating Disorder Inventory; Beck	Sub-group of male bodybuilders who show	1.5 / 7 Low Quality.

(1994).	male body-builders.	America.	(18 competitive, 25 recreational), 48 runners, (23 competitive, 25 recreational), 48 tae kwon do (24 competitive, 24 recreational)). Recruited from athletic centres.	Depression Inventory; Rosenberg Self-Esteem scale; modified version of the Anabolic Steroid Questionnaire; Drive for Bulk scale.	profile of body-related attitudes and psychological characteristics similar to those commonly seen among eating disorder patients and associated with anabolic steroid use. Bodybuilders reported more dissatisfaction than other athletes, had high drive to gain weight and enlarge certain body parts. Bodybuilders also reported perfectionism, feelings of ineffectiveness, low interoceptive awareness and low self-esteem.	Some sampling issues. Lack of clarity regarding sample criteria and small numbers once split into competitive groups. Eating disorders are not defined.  Some inconsistent reporting and hard to read at times. No discussion of clinical significance.
Olios, Grave & Burlini, (1999).	Eating attitudes in non-competitive male body builders.	Europe.	60 non-competitive male bodybuilders and 60 healthy male controls.	Eating Disorder Inventory; Symptom Checklist.	Bodybuilders showed higher levels of drive for thinness, larger number of diets and strict rules about body weight compared to controls. Not exclusively correlated to preparation before competition. Higher psychiatric symptoms and higher maturity fears and interpersonal distrust.	2 / 7 Low Quality.  Clinical interviews are not used despite the interviewing for other psychiatric problems.  Discussion of risk of eating disorders without defining terms or explicitly mentioning eating disorders in the



						introduction.  Detail missing throughout and key points are not clear.
Lantz. Rhea & Cornelius, (2002).	Muscle dysmorphia in elite level power lifters and bodybuilders: a test of difference within a conceptual model.	North America.	Elite level power lifters (n = 68; 63 male, 5 female). Elite level bodybuilders (n = 100; 79 male, 21 female).	Muscle Dysmorphia Inventory (Body size symmetry; dietary behaviour; exercise dependence; physique protection, supplement use, pharmacological use).	Elite level competitive bodybuilders engage in more behaviours characteristic of muscle dysmorphia than elite level power lifters. Bodybuilders report greater dissatisfaction with their physique, engagement in physique protection, dietary manipulation and likelihood of using pharmacological aids to improve physique development than power lifters.	3 / 7 Medium Quality.  Good discussion of the Muscle Dysmorphia Psychobehavioural model  However, rationale and interpretations are incomplete.
Ravaldi, Vannacci, Zucchi, Manucci, Cabras, Boldrini, Murciano, Rotella &	Eating Disorders and Body Image Disturbances among Ballet Dancers, Gymnasium Users and Body-	Europe.	113 female dancers; 54 female gymnasium users; 44 male non-competitive bodybuilders; 105 female and	Beck Depression Inventory; State-Trait Anxiety Inventory and Body Uneasiness Test. Structured Clinical Interview for DSM-IV;	Prevalence of eating disorders higher in ballet students and gym users than controls. Absence of eating disorder diagnoses in bodybuilders. Body image disturbance was "common" in dancers and bodybuilders,	4.5 / 7 Good Quality.  Unclear definition of bodybuilding group and male controls. Inclusion and exclusion criteria needed.

Ricca, (2003).	builders		30 male non sport or regular physical activity participants (schools and universities).	Eating Disorder Examination – 12.	independent of Body Mass Index and eating disorders (more than gym users).	Good use of clinical interview. Clear and consistent reporting throughout.
Pickett, Lewis & Cash, (2005).	Men, muscles, and body image: comparisons of competitive body-builders, weight trainers, and athletically active controls.	North America.	120 males; 40 competitive body builders; 40 non-competitive weight trainers; 40 athletically active controls.	Multidimensional Body Self Relations Questionnaire; Social Physique Anxiety Scale; Texas Social Behaviour Inventory; Eating Attitudes Test; Ratings of weigh in distress; Percentage body fat and distress rating.	Bodybuilders had significantly higher self-esteem scores and eating disorders attitudes than active controls. 2 bodybuilders and 2 weight trainers met eating disorder criteria. Competitive bodybuilders and weight trainers had more favourable views of their bodies than controls and less social physique anxiety, although Bodybuilders wished to be larger. Bodybuilders and weight trainers reported more “cognitive behavioural investment” in their physical appearance. Those in competitions were no more invested in appearance	3.5 / 7 Medium Quality.  Unclear regarding whether non-competitive weight-trainers class themselves as bodybuilders.  No mention of effect of runners and martial artists as controls.  Well-structured, clear results and consistent reporting of the major issues.

					than non-competitors.	
Goldfield, Blouin & Woodside, (2006).	Body Image, Binge Eating, and Bulimia Nervosa in Male Body-builders.	North America.	74 participants; 22 Men with Bulimia, 27 competitive male bodybuilders and 25 recreational bodybuilders.	Beck Depression Inventory; Eating Disorders Inventory; Paper and pencil version of the Eating disorder section of the Computerised Diagnostic Interview Schedule; a bodybuilding questionnaire; Anabolic Steroid Questionnaire; Drive for Bulk scale, Drive for Tone scale.	Nearly 30% of competitive bodybuilders met bulimia nervosa criteria in lifetime (8% of recreational bodybuilders) and also higher than other male athletes and general population. No group differences in prevalence of over-concern with weight and shape, ratings that body shape was as important as friends or work or desire to obtain a more toned and lean body. MBN scored higher on body dissatisfaction but not as high on Drive for Bulk than competitive bodybuilders and recreational weight-lifters. No group differences for lifetime prevalence of using vigorous exercise, strict dieting or diuretics to lose weight or fat or perfectionism, (elevated in all groups).	1 / 7 Low Quality.  Small sample and unclear regarding whether recreational bodybuilders would self-label as this.  Inconsistent reporting of results and discussion. Difficult to see how the discussion fits with the results and previous research.

Goldfield, (2009).	Body image, disordered eating and anabolic steroid use in female body-builders.	North America.	45 participants: 20 competitive female bodybuilders, 25 recreational female weight-training controls.	Beck Depression Inventory; Eating Disorder Inventory; Paper version of Eating disorder section of the Computerised Diagnostic Interview Schedule. A bodybuilding questionnaire; Anabolic Steroid Questionnaire, Drive for Bulk scale, Drive for Tone scale.	Lifetime prevalence of bulimia nervosa was 15% and 12 % in competitive bodybuilders and recreational weight lifters respectively – both higher than general population. Binge eating significantly more common in competitive bodybuilders and more frequent use of strict dieting than recreational weight lifters. Competitive bodybuilders had greater body dissatisfaction characterised by stronger Drive for bulk and muscle tone than recreational weight lifters. 40% rate of anabolic steroid use in CBB – consistent with muscle dysmorphia.	1 / 7 Low Quality.  Small sample and lack of non-athletic control. Unclear regarding whether recreational weight lifters class themselves as bodybuilders.  Little interpretation of results or explanation of potential biases.  No definition of eating disorder.
Pasman & Thompson, (1988).	Body image and eating disturbance in obligatory runners, obligatory weightlifters,	North America.	90 participants (30 obligatory runners, 30 weightlifters and 30 sedentary controls). 15 males and 15	Obligatory Exercise Questionnaire; Size Estimation Accuracy; Eating Disorder Inventory	Weight lifters were more accurate raters of their size dimensions than runners and controls. Females generally had greater body dissatisfaction than males but no difference in the	2 / 7 Low Quality.  Small sample, especially when split by sex. Weightlifting group not well defined, inclusion and exclusion criteria

	and sedentary individuals.		females in each group.	(psychological variables excluded); Body Self Relations Questionnaire (Physical Appearance Evaluation subscale).	weight lifter group. Weight lifters and runners had equal Drive for Thinness to each other and higher than controls.	needed.  Psychological characteristics excluded from analysis without explanation. Reasonable reporting with good, clear structure.
Brooks, Taylor, Hardy & Lass, (2000).	Proneness to eating disorders: Weightlifters compared to exercisers.	North America.	25 Weightlifters, 25 exercisers.	Eating Disorders Inventory 2.	Average weightlifters score was more than 1 standard deviation higher than the exercisers scores.	1 / 7 Low Quality.  Not enough information to critique their findings.
Theil, Gottfried & Hesse, (1993).	Sub-clinical eating disorders in male athletes: A study of the low weight category in rowers and wrestlers.	Europe.	84 athletes (25 wrestlers, 59 rowers) from the lower weight categories.	Socio-demographic questionnaire (sport training, binge eating and other behavioural characteristics relevant in the context of Eating Disorder); Eating Disorders Inventory.	Elevated presence of sub-clinical eating disorders. 8% of rowers and 16% of wrestlers show pathologic Eating Disorder Inventory profiles (overall = 11%). Frequency of binge eating is 52% (at least double that of general male population).	2.5 / 7 Low Quality. Difficult to read and follow, overly complex language. No delineation of rowers from wrestlers.  Good use of methodology although unclear use of controls.  Recognise that Drive for Thinness is not enough to diagnose eating disorder, but do not define sub-

						clinical eating disorder. No evidence to warrant this claim.
Enns, Drownowski & Grinker, (1987).	Body comparison, body size estimation and attitudes towards eating in male college athletes.	North America.	26 intercollegiate wrestlers; 21 intercollegiate swimmers and cross-country skiers (control).	Body composition measurements; Food records; Eating Attitudes Test- 26; Body size estimates.	Changes in weight and dieting behaviour differed between wrestlers and controls. 4 wrestlers scored about clinical cut-off who also scored highly on Drive for Thinness. Wrestlers significantly reduced their diet and lost more weight than controls.	2.5 / 7 Low Quality.  Small sample. Hypotheses not stated or how they will be tested. Rationale for study and use of control not well-defined. Little scientific rationale for interpretations in discussion.  However, accurate interpretation of data.
Dale & Landers, (1999).	Weight control in wrestling: Eating disorders or disordered eating?	North America.	85 male wrestlers (29 high school, 56 junior high) and 75 male non-wrestlers (29 high school, 46 junior high). 57% non-wrestlers participated in	Eating Disorders Inventory; Eating Disorder Examination.	No difference between in- and off – season wrestlers and non-wrestlers being “at risk” for bulimia nervosa. In-season wrestlers differed significantly from non-wrestlers on Drive for Thinness. Nearly all concerns were related to wrestling and making weight rather than generic	6 / 7 Good Quality.  Good use of clinical interview and off-season testing.  Some sampling issues with the mixed control group.

			other sports (track and field, soccer, basketball, football and baseball). 12-18 years old.		concerns. These were transient as no significant differences from non-wrestlers or male norms when off-season.	
Rouveix, Bouget, Pannafieux, Champely and Filaire, (2007).	Eating attitudes, body esteem, perfectionism and anxiety of judo athletes and non-athletes.	Europe.	24 national judo athletes (12 males, 12 females) and 31 sedentary subjects (17 males, 14 females).	General Questionnaire; Health/medical history to assess musculoskeletal injuries; EAT-26 Self Esteem Scale; Body Esteem Scale; Multidimensional Perfectionism Scale.	25% of female judo athletes were “at risk” of developing an eating disorder. No differences noted between male athletes and non-athletes in eating behaviours. 37% of male athletes used weight loss methods early in their career. 58 % of female athletes had menstrual disorder. No higher scores on perfectionism in judo athletes compared to controls.	3 / 7 Medium Quality.  Small sample and discussion of male/female differences despite very small numbers.  Generally accurate reporting, although some inconsistencies.
Filaire, Rouviex, Pannafieux & Ferrand, (2007).	Eating attitudes, perfectionism and body-esteem of elite male judoists	Europe.	52 participants: 12 judoists (national level), 15 road cyclists and 17 controls (moderately	General Questionnaire; EAT-26, Body Esteem Scale; Multidimensional Perfectionism	No participants scored above 20 on the EAT (“at risk” group). 60% of athletes used weight loss methods putting them at risk of developing eating	2.5 / 7 Low Quality.  Small sample and mixed experimental group of judoists and cyclists.

	and cyclists.		active mathematic students).	Scale; Profile of Mood States.	disorders. Purging behaviours such as vomiting (4%), laxative (10%) and diet pills (8.5%) were reported. Athletes had significantly higher Dieting and Bulimia subscale scores than controls.	Good reporting overall although unclear at times.
Costarelli & Stamou, (2009).	Emotional Intelligence, body image and disordered eating attitudes in combat sport athlete.	Europe.	20 national and international Tae Kwon Do and Judo athletes (14 females; 6 males) and 40 non-athletes (32 female and 8 male students).	EAT- 26; Multidimensional Body-Self Relations Questionnaire; State-Trait Anxiety Inventory; BarOn Emotional Intelligence Questionnaire.	Athletes had higher emotional intelligence than non-athletes, especially in factors such as assertiveness, coping with stress and flexibility. Differences were more pronounced within females. 35% of athletes had lost or gained weight to make classification but no difference between them and non-athletes on Eating Attitudes Test.	3.5 / 7 Medium Quality. Clear sample groups although small. Good measurement of psychological variables. Some inconsistencies in reporting.



**APPENDIX 9**

**PUBLIC BRIEFING DOCUMENT**

## **Vanessa Jones**

# **Eating Disorders: Attitudes towards Emotional Expression and Prevalence in Weight-Category Sports.**

### **Empirical Paper: Attitudes toward Emotional Expression and Eating Disorders: A Comparison of Males and Females.**

#### **Background and Aims**

Emotional difficulties are linked with the development and maintenance of eating disorders in women (e.g. Bruch, 1978), although it is uncertain how this occurs. Attitudes towards emotional expression is a relatively unexplored area that could provide an insight. This is significant given the prevalence of cognitive therapeutic techniques aimed at modifying dysfunctional attitudes. Attitudes towards emotional expression were significantly associated with eating disorders in a group of women with eating disorders (Leung, De Feo, Gilbert, Meyer, 2010) and non-clinical women (Meyer, Leung, Barry & De Feo, 2010). This study aims to strengthen these findings through replicating the findings in non-clinical women.

There is little research exploring eating disorder in men. This study aims to add to the literature through exploring attitudes towards emotional expression in non-clinical men. This study aims to compare men and women to assess if their eating behaviours are associated with attitudes towards emotional expression in similar ways. This research will allow more effective tailoring of clinical treatments to both men and women.

**Methodology**

Participants completed online questionnaires including: demographic information; the Positive and Negative Affect Scale (PANAS); the Eating Disorders Examination Questionnaire (EDE-Q) and the Attitudes towards Emotional Expression (ATEE). 126 men and 145 women from the College of Life and Environmental Sciences participated.

**Results**

Women had significantly greater scores on the EDE-Q than men and showed a different pattern of concerns. Men and women did not have different attitudes towards expressing emotions. However in women fear of social rejection significantly predicted eating disordered behaviours, whereas in men, negative mood was a more significant predictor variable.

**Conclusions and Clinical Implications**

Men and women were found to have similar attitudes towards emotional expression. This supports research that claims sex-differences in emotional expression are more likely to be due to social factors such as status and role than biological sex-differences (Wester, Vogel, Pressly & Heesacker, 2002; Zayas, Tabak, Gunaydyn, & Robertson, 2009). In women, fear of social rejection significantly predicted eating disordered behaviours. This supports links between interpersonal difficulties and eating disordered behaviours (Fox, 2009). For men, social rejection did not predict

eating disordered behaviours once negative mood was factored into the equation. This suggests different processes underlie eating disorders in men and women. Further research is needed to explore these differences in more detail.

## **Literature Review : Do those who participate in Weight-Category Sports have Eating Disorders?**

### **Background and Aims**

Those who participate in weight-category sports could be at risk of eating disorders due to use of strict diets, frequent weight cycling (Lamar-Hildebrand, Saldanha, & Endres, 1989). However, it is unclear whether these practices amount to increased prevalence of eating disorders in weight-category sports. Disordered eating is not pathological unless accompanied by psychological co-morbidity (King, 1989). Unhealthy eating and weight control practices should be evident on and off season to warrant claims regarding the presence of eating disorders.

### **Results**

16 papers were reviewed. Three articles explored eating disorders in wrestlers, six investigated weightlifters, seven looked at bodybuilders and four looked at martial artists. Seven studies reported evidence of weight-category athletes being at risk of eating disorders; seven studies could not find evidence; two studies reported lower risk of eating disorders and two studies reported that they were unable to tell whether unusual patterns of eating and weight control were due to eating disorders or demands of the sport.

**Findings**

There was no evidence found to support the assertion that those who participate in weight-category sports have eating disorders. Numerous studies found evidence of unhealthy eating and weight-control practices, some citing this as evidence of an increased risk of eating disorders. However, when this was investigated using clinical interview, these were found to be due to the demands of the sport rather than mental health difficulties (Dale & Landers, 1999; Ravaldi, Vannacci, Zucchi, Mannucci, Cabras, Boldrini, Ricca, 2003). Future research should utilise clinical interviews to improve the quality of evidence in this field.

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## **APPENDIX 10.**

# **INFORMATION FOR CONTRIBUTORS**

International Journal of Eating Disorders

European Eating Disorders Review