

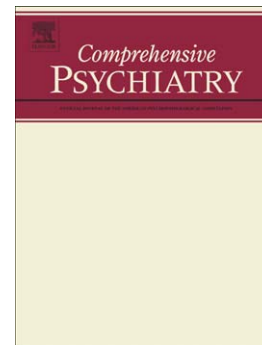
Accepted Manuscript

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PII: S0010-440X(15)30132-2
DOI: doi: [10.1016/j.comppsy.2016.01.003](https://doi.org/10.1016/j.comppsy.2016.01.003)
Reference: YCOMP 51615

To appear in: *Comprehensive Psychiatry*



Please cite this article as: Duarte Cristiana, Ferreira Cláudia, José, At the core of eating disorders: Overvaluation, social rank, self-criticism and shame in anorexia, bulimia and binge eating disorder, *Comprehensive Psychiatry* (2016), doi: [10.1016/j.comppsy.2016.01.003](https://doi.org/10.1016/j.comppsy.2016.01.003)

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**At the core of eating disorders: Overvaluation, social rank, self-criticism and shame in
Anorexia, Bulimia and Binge Eating Disorder**

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Highlights

- ED patients present differences in the clinical manifestation of the disorder.
- There are no differences in relation to weight, shape and eating overvaluation.
- There are no differences in self-criticism, negative social comparisons and shame.
- Overvaluation is linked to shame through self-criticism and social comparisons.
- Results support the relevance of treatments targeting self-criticism and shame.

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At the core of eating disorders: Overvaluation, social rank, self-criticism and shame in Anorexia, Bulimia and Binge Eating Disorder

Abstract

This study examined the similarities and differences in eating psychopathology symptoms, overvaluation of body shape, weight and eating, general psychopathology, social comparison, self-criticism and shame, between AN, BN and BED patients. Also, the mediator effect of self-criticism and social comparison on the association between overvaluation and shame, was tested.

Participants were 119 patients (34 AN, 34 BN and 51 BED) diagnosed through the Eating Disorder Examination.

Results indicated that BED patients are older and present higher BMI. The groups differed regarding eating disorders' symptomatology, but no significant differences were observed in overvaluation, self-criticism, shame and overall psychopathology symptoms. The path model confirmed that overvaluation has a significant indirect association with shame, which is mediated by severe self-criticism and negative social comparisons. The model was found to be invariant between the clinical groups.

These findings contribute for the understanding of the common processes that feed the perpetual cycle of eating psychopathology. Thus, these data have potential implications for transdiagnostic approaches to treatment.

Keywords

Overvaluation of weight, shape and eating; Anorexia Nervosa; Bulimia Nervosa; Binge Eating Disorder; Self-criticism; Shame

1. Introduction

The differences and similarities between anorexia nervosa (AN) and bulimia nervosa (BN) have been an important issue for both clinicians and researchers (Fairburn, 2008). Furthermore, there has been a research focus on to what extent BN patients differ from BED patients (Martin, Williamson, & Thaw, 2000; Masheb & Grilo, 2000; Vervaet, van Heeringen, & Audenaert, 2004; Wilfley, Schwartz, Spurrell, & Fairburn, 2000). However, the comparison between these three main eating disorders' conditions has received less attention. According to the fifth version of the DSM, although these three diagnostic categories involve persistent eating-related difficulties linked with significant physical or psychosocial impairments, they are conceptualized as substantially distinct and autonomous conditions, with specific clinical courses, characteristics and treatment needs (American Psychiatric Association, 2013). Transdiagnostic approaches for eating psychopathology (Fairburn, 2008; Fairburn, Cooper, & Shafran, 2003) suggest that these disorders present distinct clinical manifestations (e.g., severe restraint or attempts to restraint one's eating; binge eating episodes; compensatory behaviours). However, such manifestations derive from a common psychopathological core characterized by the overvaluation of eating, body shape and weight and their control in the judgment of one's self-worth (Cooper & Fairburn, 1993; Fairburn, 2008). This overvaluation has been identified as playing a key role in maintaining the disorder (Fairburn et al., 2003; Fairburn, Peveler, Jones, Hope, & Doll, 1993).

Even though the overvaluation of shape and weight is a necessary diagnostic criterion for the diagnosis of BN and AN (American Psychiatric Association, 2013), the importance of this dimension in one's self-evaluation is still not recognized in BED current diagnostic criteria. This has been highlighted as a caveat in current conceptualizations of BED as there is growing research on body image difficulties in BED that suggests that this feature should also be included in BED diagnostic criteria. In fact, studies have shown that BED patients present similar levels of overimportance of shape and weight in comparison to BN and AN, and higher

levels in comparison to non-disordered eating controls (Eldredge & Agras, 1996; Grilo et al., 2009; Grilo, Masheb, & White, 2010; Martin et al., 2000; Masheb & Grilo, 2000; Vervaet et al., 2004; Wilfley et al., 2000).

Moreover, recent studies reveal that eating disorders share important mechanisms operating in the onset and maintenance of the disorder. A sense of inferiority and defectiveness, and the adoption of maladaptive emotion regulation strategies have been highlighted as key in eating disorders (Duarte, Pinto-Gouveia, & Ferreira, 2014; Ferreira, Pinto-Gouveia, & Duarte, 2013b; Kelly & Carter, 2013; Pinto-Gouveia, Ferreira, & Duarte, 2014). In fact, there is evidence that eating disorders' patients tend to engage in an excessive focus on social rank and especially on how they stand in relation to others based on body image (Ferreira, Pinto-Gouveia, & Duarte, 2013a; Gilbert, 2002; Goss & Allan, 2009; Matos, Ferreira, Duarte, & Pinto-Gouveia, 2014). These patients often reveal a tendency to compare themselves negatively with others and to engage in harsh self-criticism, which have been associated with the severity of eating disorders symptoms (Duarte et al., 2014; Pinto-Gouveia et al., 2014).

These processes of social comparison and self-criticism may be understood as defensive self-monitoring strategies used as a maladaptive way to become closer to what is socially valued (e.g., a thin body shape) and thus to enhance one's social status and sense of being praised and accepted by the social group (Goss & Allan, 2009; Goss & Gilbert, 2002). Nonetheless, research has consistently shown that perceptions of low social rank and self-criticism are important contributors for emotional distress (Blatt & Zuroff, 1992; Luyten et al., 2007) and are associated with feelings of inferiority and defectiveness (Gilbert, Clarke, Hempel, Miles, & Irons, 2004; Gilbert et al., 2010), which are part of the phenomenon of shame. Indeed, shame is conceptualized as a self-conscious and socially-focused emotion derived from perceptions of being perceived as flawed, inadequate or defective (Gilbert, 1997; Gilbert, 1998; Gilbert, 2002; Gilbert, 2007). Shame is associated with a range of psychopathological conditions (Kim, Thibodeau, & Jorgensen, 2011), and research converges on the idea that shame plays a crucial and distinctive role in the understanding of the eating disorder pathology, operating both as a risk and as a maintenance factor (Ferreira et al., 2013b; Gee & Troop, 2003; Grabhorn, Stenner,

Stangier, & Kaufhold, 2006; Gupta, Rosenthal, Mancini, Cheavens, & Lynch, 2008; Kelly & Carter, 2013; Pinto-Gouveia et al., 2014; Sanftner, Barlow, Marschall, & Tangney, 1995; Swan & Andrews, 2003). In fact, research seems to support the claim that shame fuels the maintenance cycle of eating psychopathology by stimulating pathological eating behaviours, which may further increase the obsessive focus on the control over body image and weight, and a sense of failing to reach standards to feel valued (Gilbert, 2002; Goss & Allan, 2009; Pinto-Gouveia et al., 2014). Nonetheless, there is no research on the relationship between overvaluation and shame in patients with eating disorders. Theoretical accounts suggest that there is a complex and cyclical association in which shame predicts the development of the overimportance of body weight, shape and eating, and the engagement in disordered eating behaviours to manage such shame feelings (Gilbert, 2002; Pinto-Gouveia et al., 2014). Moreover, it is plausible that overvaluation lead to more shame by predicting the engagement in defensive processes of social comparison and self-criticism.

In fact, as the overvaluation of body weight, shape and eating stems from a sense of self-inefficacy and defect, it is hypothesised that this system to evaluate self-worth involves the tendency to constantly monitor how one stands in relation to others regarding the physical appearance domain, which, in patients with eating disorders, mirrors how much personal value one has in comparison to others (Ferreira et al., 2013a; Gilbert, 2002; Goss & Gilbert, 2002). This overvaluation can also be associated with a critical relation with oneself, a maladaptive strategy adopted to correct the self, avoid mistakes or even punish or attack the self for its flaws (Gilbert, Clarke, Hempel, Miles, & Irons, 2004). These strategies of internally tracking one's value may, in turn, paradoxically intensify negative perceptions that one is failing in creating positive feelings in others, but rather that others see the self negatively (e.g., as inferior, flawed, worthless; (Gilbert, 1997; Gilbert, 1998), which then may promote the engagement in the defensive attitudinal and behavioural outputs that characterize eating disorders. Understanding these associations and the mechanisms underlying these self-other experiences may be particularly important for the development of specific eating disorders' evaluation protocols and interventions. The inclusion of a detailed assessment and a clinical focus on these maladaptive

processes, may improve the effectiveness of such treatment approaches, allowing the break of the pathological cycle between the overvaluation of body image, weight and eating, and shame feelings in patients with eating disorders. In this sense, it seems crucial to clarify the characteristics that distinct eating disorders' diagnoses share and to understand the relational pathways between the overvaluation of weight, shape and eating, and self-criticism, social comparison and shame. To our knowledge, no previous study has compared patients with AN, BN and BED (DSM-5; (American Psychiatric Association, 2013), on these variables, and how these relate and interact in such clinical conditions.

The current study aimed at contributing for a better understanding of the distinctive and common features across patients with AN, BN and BED. This study analysed whether patients with AN, BN and BED differed significantly in regard to clinical features of eating psychopathology, especially the eating psychopathology core – overvaluation of body shape, weight and eating – and indicators of mental health distress (i.e., symptoms of anxiety, stress and depression). Furthermore, we aimed at clarifying the characterization of patients with eating disorders in relation to external shame and emotional regulation processes operating in the disorder, namely self-criticism and social comparison. Finally, this study aimed at examining a model investigating the role of self-evaluation and emotion regulation processes that these patients share. The tested model suggests that in patients with eating disorders, regardless of the specific clinical condition, the relationship between the compulsive focus on weight, body shape and eating, and higher levels of shame, would be influenced by negative social comparisons based on physical appearance and self-criticism. To make this model more robust, we controlled for the effect of depressive symptoms as a simultaneous mediator, given the high association between self-criticism, negative social comparisons and shame, and depression (e.g., Gilbert et al., 2004). We hypothesize that the impact of the core eating psychopathology of overvaluation in patients with eating disorders on increased levels of the painful experience of existing negatively in the social arena – external shame – would be fully mediated by its effect on maladaptive self-monitoring strategies – social comparison and self-criticism. It is expected that

instead of allowing for self-correction and self-enhancement, these mechanisms paradoxically feed a flawed sense of self in the eyes of others.

2. Material and method

2.1. Sample

A total of 119 adolescent and adult female outpatients seeking-treatment at Portuguese public hospitals with eating disorders were enrolled in the study. Thirty-four patients presented Anorexia Nervosa, 34 Bulimia Nervosa, and 51 Binge Eating Disorder. The diagnoses followed DSM-5 criteria for eating disorders and were established through the Eating Disorder Examination 17.0D (Fairburn, Cooper, & O'Connor, 2008). Patients with AN had ages ranging from 13 to 36 ($M = 19.85$; $SD = 4.96$), and presented 7 to 18 years of education ($M = 12.15$; $SD = 3.03$), and the majority were single (91.2%). Patients with BN presented ages ranging from 15 and 49 years old ($M = 26.91$; $SD = 9.23$), and years of education ranging from 6 to 17 ($M = 11.88$; $SD = 3.25$), with 73.5% being single and 20.6% married/living with a partner. Patients meeting the diagnosis for BED presented ages between 20 and 57 years old ($M = 38.48$; $SD = 10.47$) and years of education ranging from 4 to 19 ($M = 13.20$; $SD = 4.30$), with 64.7% being married/living with a partner and 29.4% were single. Regarding BMI, the AN patients' BMI ranged from 13.32 to 17.50 ($M = 16.04$; $SD = 1.19$); BN values ranged from 17.81 to 47.33 ($M = 24.94$; $SD = 7.19$); BED patients' BMI ranged from 20.83 to 50.32 ($M = 35.52$; $SD = 8.10$).

2.2. Measures and procedure

All ethical requirements were followed prior to data collection, with all procedures being approved by the involved institutions Ethics Committees. The procedure and aims of the study were explained to the potential participants. Written informed consent was obtained from those who accepted. Selection criteria for patients were as follows: i) to consent to participate in the study, ii) to meet the diagnostic criteria for AN, BN or BED (APA, 2013), as established by the Eating Disorder Examination 17.0D; iii) to have ages below 60 years old; iv) absence of

pregnancy or severe medical conditions; v) absence of severe comorbid mental disorder (e.g., bipolar disorder, severe major depression, and schizophrenia, substance and alcohol abuse), according to a screening clinical interview based on criteria from DSM-5 (American Psychiatric Association, 2013). The study assessment procedures were conducted by two of the researchers, who have a large clinical experience with patients with eating disorders, and previous training and supervision in applying the Eating Disorder Examination interview. The individual assessment was conducted at the Psychiatry and Eating Disorders Care Units of the hospitals. The researchers were blind to the patients' current diagnosis as established by the respective therapist in the intake assessment. Sixteen potential participants failed to meet the inclusion criteria and were excluded from the study. The 119 participants that met the selection criteria after the interviews assessments were asked to answer to the self-report measures and had their height and weight measured. The researchers were present during the questionnaires completion and assisted participants' whenever required. In cases where patients presented more severe symptomatology or to prevent bias due to fatigue, an additional session was schedule for the questionnaires completion.

2.3. Measures

EATING DISORDER EXAMINATION 17.0D (EDE 17.0D; FAIRBURN ET AL., 2008; FERREIRA, PINTO-GOUVEIA, & DUARTE, 2010). EDE IS AN INVESTIGATOR-BASED CLINICAL INTERVIEW THAT ALLOWS FOR A COMPREHENSIVE ASSESSMENT OF KEY BEHAVIOURAL AND PSYCHOLOGICAL FEATURES OF EATING DISORDERS. THIS INTERVIEW COMPRISES THE SUBSCALES RESTRAINT, EATING CONCERN, WEIGHT CONCERN AND SHAPE CONCERN, AND A GLOBAL SCORE IS OBTAINED BY CALCULATING THE MEAN OF THE SUBSCALES' SCORES. THE OVERVALUATION OF BODY SHAPE, WEIGHT AND EATING WAS CALCULATED IN THE CURRENT STUDY AS THE MEAN OF THE ITEMS ASSESSING THESE DIMENSIONS. THE EDE PRESENTS GOOD PSYCHOMETRIC PROPERTIES, INCLUDING INTERNAL CONSISTENCY (.78 IN THE CURRENT STUDY), DISCRIMINANT AND CONCURRENT VALIDITY, AND TEST-RETEST RELIABILITY (FOR A REVIEW SEE FAIRBURN, 2008).

OTHER AS SHAMER SCALE (OAS; GOSS, GILBERT, & ALLAN, 1994; MATOS, PINTO-GOUVEIA, & DUARTE, 2011). THE OAS COMPRISES 18 ITEMS THAT MEASURE EXTERNAL SHAME, THAT IS, EVALUATIONS

THAT ONE IS NEGATIVELY EVALUATED, LOOKED DOWN OR CRITICIZED BY OTHERS, AS BEING FLAWED, INFERIOR, DEFECTIVE, OR WORTHLESS. PARTICIPANTS ARE ASKED TO RATE EACH ITEM ON A 5-POINT LIKERT SCALE (0 = 'NEVER' TO 4 = 'ALMOST ALWAYS') ACCORDING TO THE FREQUENCY WITH WHICH THEY MAKE THESE EVALUATIONS. GOSS ET AL. (1994) FOUND THAT OAS PRESENTS GOOD RELIABILITY, WITH A CRONBACH'S ALPHA OF .92 (.94 IN THE CURRENT STUDY).

Forms of Self-Criticizing & Self-Reassuring Scale (FSCRS; Castilho, Pinto-Gouveia, & Duarte, 2013; Gilbert et al., 2004). The FSCRS is a 22-item scale that measures self-criticism and the ability to self-reassure in face of setbacks or failures. The scale includes two forms of self-criticism: inadequate-self, which refers to a sense of inadequacy and inferiority; and hated-self, which entails feelings of disgust, hatred and contempt for the self. In the current study, the two self-criticism subscales were considered. Participants are asked to answer on a 5-point Likert scale (ranging from 0 = 'Not at all like me', to 4 = 'Extremely like me') how they feel and think about themselves when things go wrong for them. Gilbert et al. (2004) found that the scale presents good internal consistency, with Cronbach's alphas of .86 for hated self and .90 for inadequate self (.83 and .87, in the current study, respectively).

Social Comparison through Physical Appearance Scale (SCPAS; Ferreira et al., 2013a). SCPAS measures social comparisons based on physical appearance in relation to Peers and to Models/Actresses/Celebrities. Participants are asked to rank themselves (on a 10-point scale) in comparison to others taking into account the physical appearance domain, regarding 11 bipolar constructs (e.g., inferior/superior, valued/devalued). Lower scores characterize more unfavourable social comparisons based on physical appearance. In the current study were considered comparisons with Peers. The SCPAS presented high internal consistency in its original study (Ferreira et al., 2013a), presenting a Cronbach's alpha of .94 in the current study.

DEPRESSION ANXIETY AND STRESS SCALES (DASS21; APÓSTOLO, MENDES, & AZEREDO, 2006; LOVIBOND & LOVIBOND, 1995). DASS21 INCLUDES 21 ITEMS THAT MEASURE LEVELS OF DEPRESSION, ANXIETY AND STRESS SYMPTOMS. PARTICIPANTS ARE ASKED TO RATE, USING A 5-POINT LIKERT SCALE (0 = 'DID NOT APPLY TO ME AT ALL' TO 4 = 'APPLIED TO ME VERY MUCH, OR MOST OF THE TIME'), THE FREQUENCY IN WHICH THEY EXPERIENCED EACH SYMPTOM OVER THE PAST WEEK. DASS21 HAS GOOD

PSYCHOMETRIC PROPERTIES AND IN THE CURRENT STUDY THE SCALE PRESENTED CRONBACH'S ALPHA VALUES OF .88 FOR THE DEPRESSION, .85 FOR THE ANXIETY AND .89 FOR THE STRESS SUBSCALE.

THE INSTRUMENTS USED IN THE CURRENT STUDY IN THEIR PORTUGUESE VERSION WERE PREVIOUSLY VALIDATED AND USED IN SAMPLES WITH SIMILAR CHARACTERISTICS TO THOSE OF THE CURRENT STUDY (E.G., FERREIRA ET AL., 2013A, 2013B; MACHADO, MACHADO, GONÇALVES, & HOEK, 2007; PINTO-GOUVEIA ET AL., 2014).

2.4. Statistical Analyses

Data were analysed using SPSS (v. 21 SPSS; Armonk, NY: IBM Corp.). Differences between the groups in categorical variables were examined through chi-square tests. Comparison of the variables among groups was conducted with ANOVA procedures and post-hoc comparisons for quantitative variables (Scheffe). Effect sizes were reported using partial eta squares (η_p^2), with $\eta_p^2 = .01$ referring to a small effect size, .06 to a medium effect size and .14 to a large effect size (Tabachnick & Fidell, 2013). Post-hoc power calculations revealed that the sample size was adequate to detect medium to large effects [$f = .30$, $p < .05$, power = .80; G*Power; (Faul, Erdfelder, Lang, & Buchner, 2007)]. The following analyses were conducted in the total sample, considering current approaches to eating disorders (Fairburn, 2008).

Product-moment Pearson Correlation analyses were conducted to test for the correlations between the variables considered in the hypothesized model that was examined (Cohen, Cohen, West, & Aiken, 2003). These associations were further assessed through a path analysis calculated using the software AMOS (v. 21; ANALYSIS OF MOMENTARY STRUCTURE, SPSS INC. CHICAGO, IL). PATH ANALYSES ALLOWS FOR THE SIMULTANEOUS EXAMINATION OF STRUCTURAL DIRECT AND INDIRECT ASSOCIATIONS BETWEEN EXOGENOUS VARIABLES (IN THIS STUDY OVERVALUATION OF BODY SHAPE, WEIGHT AND EATING, IN THE CURRENT STUDY), MULTIPLE MEDIATORS (HATED SELF FORM OF SELF-CRITICISM, NEGATIVE SOCIAL COMPARISONS BASED ON BODY IMAGE, AND DEPRESSIVE SYMPTOMS) AND ENDOGENOUS VARIABLES (EXTERNAL SHAME), WHILE CONTROLLING FOR ERROR (KLINE, 2005). ALTHOUGH THE STUDY'S DESIGN IS CROSS-SECTION AND THUS IT DOES NOT ALLOW THE ESTABLISHMENT OF DIRECTION OF INFLUENCE BETWEEN VARIABLES, THE PATH MODEL EXAMINED IN THE CURRENT STUDY MAY CONTRIBUTE FOR THE

UNDERSTANDING OF THE RELATIONAL PATHWAYS BETWEEN THE STUDY VARIABLES AND WHETHER THEY ARE CONSISTENT WITH THE UNDERLYING HYPOTHESISED THEORETICAL MODEL (E.G., (HAYES, 2013): WHETHER, IN A MIXED CLINICAL SAMPLE OF PATIENTS WITH EATING DISORDERS, THE OVERVALUATION OF BODY WEIGHT, SHAPE AND EATING HAS A SIGNIFICANT EFFECT ON EXTERNAL SHAME, THROUGH THE MECHANISMS OF SELF-CRITICISM (HATED SELF), UNFAVOURABLE SOCIAL COMPARISONS, AND DEPRESSIVE SYMPTOMS. TO ACCOUNT FOR THE POSSIBLE RECIPROCAL INFLUENCE BETWEEN THE EXAMINED VARIABLES, TWO ALTERNATIVE MODELS WERE ALSO EXAMINED. THE MAXIMUM LIKELIHOOD ESTIMATION METHOD WAS USED TO CONDUCT THE PATH ANALYSES AND THE REQUIRED ASSUMPTIONS REGARDING MODEL COMPLEXITY AND SAMPLE SIZE WERE MET TO OBTAIN VALID AND ROBUST RESULTS (HAIR ET AL. 2010). THE FOLLOWING GOODNESS OF FIT INDICES WERE SELECTED TO ASSESS THE ADEQUACY OF THE MODEL: CHI-SQUARE (χ^2), TUCKER LEWIS INDEX (TLI), COMPARATIVE FIT INDEX (CFI), AND ROOT-MEAN SQUARE ERROR OF APPROXIMATION (RMSEA). THE SIGNIFICANCE OF THE DIRECT, INDIRECT AND TOTAL EFFECTS WAS ASSESSED BY CHI-SQUARE TESTS; THE SIGNIFICANCE OF THE MEDIATIONAL PATHS WERE FURTHER EXAMINED THROUGH THE BOOTSIRAP RESAMPLING METHOD, WITH 5000 BOOTSIRAP SAMPLES AND 95% BIAS-CORRECTED CONFIDENCE INTERVALS (CI). A SIGNIFICANT MEDIATION EFFECT IS DENOTED WHEN ZERO IS NOT INCLUDED IN THE INTERVAL BETWEEN THE LOWER AND THE UPPER LIMITS OF THE CI (KLINE, 2005). A MULTIGROUP ANALYSIS WAS ALSO CONDUCTED TO TEST FOR MODEL INVARIANCE BETWEEN THE GROUPS (CHEUNG & RENSVOED, 2002).

EFFECTS WITH $P < .050$ WERE CONSIDERED STATISTICALLY SIGNIFICANT.

3. Results

Sociodemographic and weight status variables

The comparison of the sociodemographic features across the three clinical groups revealed statistically significant differences in age, with BED patients being significantly older, followed by BN patients and finally the AN patients were the younger, according to Scheffe post-hoc comparisons. The three groups did not present statistically significant differences regarding years of education (Table 1). In relation to marital status, there were statistically

significant differences across all groups ($\chi_{(6)}^2 = 38.4$; $p < .001$), with AN patients being more frequently single and the BED patients being more frequently married.

ANOVA comparisons yielded significant differences on BMI across all groups, with AN patients presenting the lowest BMI values, and BED patients presenting the highest BMI values (Table 1).

Eating psychopathology

Table 1 presents means, standard deviations and results of ANOVA analyses, effect sizes, and Scheffe post-hoc tests comparing EDE and its subscales across the groups, adjusting for BMI. Results revealed that there were significant differences regarding the specific indicators of eating psychopathology. In fact, the three eating disorders groups presented significant differences regarding all EDE subscales and total score. In particular, AN and BN patients presented significantly higher levels of eating restraint than BED patients. In relation to eating concern, BN and BED patients presented significant differences between them, with BN patients presenting the most pathological score. Regarding shape and weight concern, AN patients presented lower scores in comparison to BN and BED patients, which did not present statistically significant differences between them. The same pattern was found in the global EDE score. Nonetheless, regarding the overvaluation of weight, shape and eating the three groups of patients did not present statistically significant differences between them.

Insert Table 1 approximately here

Overall psychopathology

There were no significant differences between the groups in relation to overall psychopathology, namely depressive, anxiety and stress symptoms, after adjusting for BMI.

Self-criticism, social comparison and shame

Findings adjusting for BMI indicated that no statically significant differences on self-criticism, either in the form of inadequate self and hated self, were observed across groups. Regarding social comparisons based on physical appearance, results indicated that there were no statistically significant differences between AN and BN patients, neither between BN patients and patients with BED. Patients with AN and BED presented a statistically significant difference in relation to social comparison, with patients with AN presenting higher scores. Finally, no statistically significant differences on the specific emotion of shame between the groups were found.

3.1. Correlations

Product-moment Pearson correlations' results (Table 2) indicated that the severity of eating psychopathology and overvaluation, presented significant associations with unfavourable social comparisons, higher levels of self-criticism, either in the form of inadequate self or hated self, shame, and indicators of nonspecific psychopathology (depression, anxiety and stress symptoms). Moderate to strong associations were found between self-criticism and social comparisons and shame. These variables were also significantly associated with depression, anxiety and stress symptoms. No significant associations were found between eating psychopathology severity, overvaluation of weight, shape and eating and BMI. Partial correlations controlling for the effect of BMI confirmed the direction and strength of the associations.

Insert Table 2 approximately here

3.2. Path analysis

Preliminary analyses indicated no evidence for multicollinearity; the Skewness coefficients ranged from to -2.10 to .46, and the Kurtosis coefficients ranged from -.97 to 4.14, confirming that there was no serious violation of normal distribution (Kline, 2005).

As expected, the initial model indicated that the direct effect between the overvaluation and shame was nonsignificant ($b_{\text{shame}} = -1.58$; $SEb = 1.46$; $Z = -1.08$; $p = .279$), and thus the model was recalculated without this path. Results confirmed that all paths were significant and that the model presented an excellent model fit [$\chi_{(1)}^2 = 1.17$, $p = .280$; $TLI = .99$, $CFI = 1.00$; $RMSEA = .04$; $p = .348$], accounting for a total of 53% of the variance of external shame. Results indicated that overvaluation presented a significant direct effect on self-criticism of .44 ($b_{\text{overvaluation}} = .47$; $SEb = .14$; $Z = 3.41$; $p < .001$), of -.23 on social comparison ($b_{\text{overvaluation}} = -11.61$; $SEb = 2.40$; $Z = -4.84$; $p < .001$), and of .40 on depression ($b_{\text{overvaluation}} = 1.77$; $SEb = 0.78$; $Z = 2.26$; $p = .024$), which shared a significant amount of variance. These hypothesized mediators presented a significant direct effect on external shame. In fact, self-criticism presented an effect of .43 ($b_{\text{self-criticism}} = 3.02$; $SEb = 1.30$; $Z = 2.32$; $p = .020$), social comparison an effect of -.20 ($b_{\text{social comparison}} = -.27$; $SEb = .07$; $Z = -4.22$; $p < .001$) and depression an effect of .41 ($b_{\text{depression}} = .58$; $SEb = .21$; $Z = 2.80$; $p = .005$). Finally results indicated that together, self-criticism, social comparison and depression fully mediated the relationship between overvaluation and external shame, with an effect significantly different from 0 ($CI = .13, .40$, $p < .001$), according to the Bootstrap resampling method. The model invariance between the groups was examined through a multigroup analysis. Findings supported the model invariance between the three eating disorders groups ($\Delta CFI = .01$; $\Delta\chi_{(12)}^2 = 8.983$; $p = .704$; (Cheung & Rensvold, 2002).

In order to clarify the role of the variables tested in the model, two alternative models were also tested. A model examining the effect of social comparison and overvaluation (independent variables) on external shame (dependent variable), having self-criticism and depressive symptoms as mediators revealed a poor model fit [$\chi_{(3)}^2 = 17.72$, $p = .000$; $TLI = .68$, $CFI = .94$; $RMSEA = .26$; $p = .001$]. The effect of self-criticism, depressive symptoms and social comparison as independent variables, predicting shame, having overvaluation as mediator, was also examined. This model also revealed an unacceptable fit [$\chi_{(3)}^2 = 84.81$, $p = .000$; $TLI = -.11$, $CFI = .67$; $RMSEA = .48$; $p = .000$].

Insert Figure 1 approximately here

4. Discussion

The current study aimed at analysing, in three eating disorders diagnoses – AN, BN, BED, eating disorders' symptoms and core features, nonspecific depressive, anxiety and stress symptomatology, and external shame, self-criticism and social comparisons, important self-evaluation and emotion regulation processes that have been identified as operating in eating psychopathology severity (Duarte et al., 2014; Ferreira et al., 2013a; Kelly & Carter, 2013; Pinto-Gouveia et al., 2014).

Findings indicated that the clinical groups that comprised the sample of the current study present similar characteristics to those of other studies with eating disorders samples (Grilo et al., 2009; Pinto-Gouveia et al., 2014; Wilfley et al., 2000). In regard to the demographic variables we found a different distribution of ages between the groups, with the patients with AN being younger in comparison to the BN patients and the BED patients, which are older. Moreover, as expected results indicated that the three groups of patients present statistically significant differences in regard to BMI, with the patients who present binge eating – BN and BED – presenting higher levels of BMI in comparison to the AN patients. Results were also in accordance with prior research that supports a high comorbidity between BED and excess weight and obesity. In fact, differences regarding age and BMI between these groups are well established and reflect the characteristics and epidemiology of these clinical conditions (Hudson, Hiripi, Pope, & Kessler, 2007).

The three clinical groups presented important differences in relation to the clinical manifestation of the eating disorder, that is, attempts to restrain one's eating behaviour, concerns about eating, and concerns about body shape and weight. However, results suggested that the differences between the groups may be less pronounced in relation to the core psychopathological feature of eating disorders – overvaluation of body shape, weight and eating

(i.e., the undue influence of weight, shape and eating in one's self-evaluation). These findings are in accordance to prior research that shows that patients with BN and BED do not differ between them in relation to this core feature of eating disorders (Grilo et al., 2009), but the current study contributes for the understanding of this aspect by suggesting that these two clinical groups (diagnosed according to current diagnostic criteria of DSM 5) may be similar between them and also similar to AN patients. This indicates that regardless of physical features (i.e., levels of BMI and thus closeness to or distance from the thin body shape), AN, BN and BED patients may be identical in what regards the nucleus of the disorder – that their self-worth is unduly dependent of the ability to control one's eating, body shape and weight (Cooper & Fairburn, 1993; Fairburn, 2008). Findings also suggest that patients may not present significant differences in relation to overall emotional distress symptoms (depressive, anxiety and stress symptomatology).

There is growing evidence that common mechanisms contribute for the severity of eating psychopathology and among these mechanisms, shame, perceptions of inferiority in social rank comparisons and self-criticism, have been highlighted as playing a particularly important role in both nonclinical and clinical samples (Duarte et al., 2014; Ferreira et al., 2013a; Kelly & Carter, 2013; Matos et al., 2014; Pinto-Gouveia et al., 2014). The comparisons between the three main eating disorders diagnoses in the current study indicated that patients presented identical levels of self-criticism, negative social comparisons and external shame.

Although the sample size of the current study lowered the statistical power of the analysis, these findings suggest that even though there is evidence for the distinctiveness of the phenomenological expression of the eating disorder between the three clinical conditions (e.g., severe restraint and low weight in AN patients, recurrent binge eating in BED and BN, and the adoption of compensatory behaviours in the latter), they present similar levels of the severity of the core psychopathology of eating disorders, nonspecific psychopathology symptoms, and affective and emotion regulation maladaptive mechanisms. These results seem to support the adequacy of eating disorders' transdiagnostic treatments, but simultaneously the need to consider the specificity of each group or the phase of the disorder.

Moreover, as shame has been identified as a key and specific emotion operating as a risk and maintenance factor of eating disorders (Goss & Allan, 2009; Goss & Gilbert, 2002; Pinto-Gouveia et al., 2014), this study also aimed at understanding how the overvaluation of body shape and weight, and eating, is associated with an increased sense of a shamed self (e.g., the threatening perception of being negatively evaluated by others). Furthermore, we hypothesized that this association is not linear and that important processes – a severe form of self-criticism and negative social comparisons based on body image – would mediate it. Results confirmed this by showing that the effect of the overvaluation on increased external shame was fully mediated by unfavourable social comparisons and harsh self-criticism, even when controlling for the effect of depressive symptoms. This model accounted for 53% of shame variance and was shown to have an excellent fit to the data. Previous research suggested that disordered eating behaviours and attitudes may have the maladaptive function of attempting to get close to a socially valued body image in order to feel safe, accepted and valued by others (Ferreira et al., 2013a; Pinto-Gouveia et al., 2014). These findings suggest that placing one's sense of self worth on eating behaviour and physical appearance is not linked to a more valued sense of self, but in contrast, it has the paradoxical effect of being associated with maladaptive processes of self-monitoring and self-correction. These processes, in turn, were found to be linked to higher levels of flawed and diminished sense of self, which may contribute to the maintenance of the disorder. Moreover, results revealed that the model was invariant between the eating disorders groups, further supporting that these are shared transdiagnostic processes and mechanisms operating in these disorders.

These results may point to important treatment directions. In particular, these findings highlight the relevance of working with AN, BN and BED patients' self-criticism and sense of inferiority, helping them to develop alternative adaptive emotion regulation processes, such as compassion (Ferreira et al., 2013, 2014; Gilbert, 2002; Goss & Allan, 2009), that undermine the dominance of the overvaluation of body weight, shape and eating on their sense of self, and, in turn, the consequent deleterious cycle that maintains the disorder (e.g., compassion-focused approaches to eating disorders (Goss & Allan, 2010).

These findings should however be understood with caution given the cross sectional nature of the study. Actually, this study aimed at understanding the associations between a given set of variables, but conclusions regarding causality cannot be drawn at this point. Future prospective and experimental studies should be conducted to clarify these associations and propose causal inferences. Moreover, the small sample sizes in each group limit the generalization of the current findings. In fact, although the power of the analysis allowed for the detection of medium to large effects, it was reduced for the identification of small effects, which can result in Type II error (accepting a false null hypothesis). Thus, although the current findings point out to important trends, interpretations regarding the common features between patients with eating disorders should be made with caution. Future research with larger samples is required to corroborate the pattern of differences and similarities between the clinical samples investigated in the current study. This could inform conceptualizations and treatment approaches for eating disorders, namely the need to consider that the overimportance of body weight and shape is relevant not only to AN and BN, but also for BED. Another important limitation of this study is that it comprised a sample of treatment-seeking patients, and thus these may not be representative of the generality of those suffering with body image and eating-related problems.

Conclusion

The current study examines the differences and similarities in patients with eating disorders. In particular, this study clarifies that core features and mechanisms operating in the maintenance of eating psychopathology (e.g., a sense of inferiority and severe self-criticism) are common to the three main eating disorders diagnoses, and how they interact in the understanding of shame, a central emotion in eating disorders that requires particular clinical attention.

Acknowledgements

Research by the first author (Cristiana Duarte) is supported by a Ph.D. Grant (SFRH/BD/76858/2011), sponsored by FCT (Portuguese Foundation for Science and Technology).

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Table 1.

Comparison of sociodemographic and weight status variables, eating psychopathology, overall psychopathology, shame and self-criticism between groups ($N = 119$)

	AN ($n = 34$)		BN ($n = 34$)		BED ($n = 51$)		$F; df$	Significance	η_p^2	Post-Hoc
	M	SD	M	SD	M	SD				
Age	19.85	4.96	26.91	9.23	38.48	10.47	45.36; 2	< .001	.45	AN < BN < BED
Years of education	12.15	3.03	11.88	3.25	13.20	4.30	2.75; 2	.069	.05	AN; BN; BED
BMI	16.03	1.19	24.94	7.19	35.52	8.10	82.77; 2	<.001	.60	AN < BN < BED
Adjusting for BMI										
<i>Eating psychopathology</i>										
Eating Restraint	4.16	1.12	4.00	0.98	3.01	1.12	13.16; 2	<.001	.19	AN;BN>BED
Eating Concern	3.38	1.61	4.24	1.40	2.66	1.22	16.25; 2	<.001	.22	BN>BED
Shape Concern	4.63	1.12	5.49	0.60	5.16	0.66	9.66; 2	<.001	.14	AN<BN;BED
Weight Concern	3.65	1.41	4.76	1.08	4.85	0.78	12.94; 2	<.001	.18	AN<BN;BED
Overvaluation	5.56	0.75	5.78	0.54	5.58	0.72	1.00; 2	.371	.02	AN; BN; BED
Total	3.96	1.09	4.62	0.67	3.92	0.60	10.74; 2	<.001	.16	AN;BED<BN
<i>Overall psychopathology</i>										
Depression	9.50	6.25	12.38	5.98	11.86	5.52	1.79; 2	.172	.03	AN; BN; BED
Anxiety	6.75	5.30	8.66	5.52	8.73	5.49	1.16; 2	.318	.02	AN; BN; BED
Stress	11.25	5.39	17.79	4.87	12.43	5.06	0.72; 2	.488	.01	AN; BN; BED
<i>Self-criticism, social comparison and shame</i>										
Social Comparison	44.91	22.17	35.29	15.88	34.47	18.84	6.30; 2	.003	.10	AN>BED
Hated self	1.66	1.28	2.15	0.99	2.01	0.96	1.80; 2	.170	.03	AN; BN; BED
Inadequate self	2.65	0.91	3.01	0.66	2.76	0.75	2.30; 2	.105	.04	AN; BN; BED
Shame	35.65	15.65	40.33	11.78	42.52	14.74	1.95; 2	.147	.03	AN; BN; BED

Table 2.

Product moment Pearson correlations between the study variables (N = 119)

	1	2	3	4	5	6	7	8	9
1_EDE	1								
2_Overvaluation	.49***	1							
3_Inadequate self	.38***	.24**	1						
4_Hated self	.45***	.30**	.66***	1					
5_Shame	.32***	.21*	.52***	.64**	1				
6_Social comparison	-.49***	-.41***	-.47**	-.68***	-.66***	1			
7_Depression	.40***	.20*	.45**	.66***	.59***	-.56***	1		
8_Anxiety	.37***	.21*	.27**	.48***	.45***	-.41***	.71***	1	
9_Stress	.36***	.21*	.51**	.55***	.49***	-.41***	.79***	.77***	1
10_BMI	-.02	.13	.07	.22*	.25**	-.35***	.21*	.16	.15

*** $p < .001$; ** $p < .010$; * $p < .050$

Note: EDE = Eating Disorder Examination; Overvaluation = Overvaluation of body shape, weight and eating as measured by the Eating Disorder Examination; Inadequate self and Hated self = Subscales of the Forms of Self-Criticism and Self-Reassurance scale; Social Comparison = Social Comparison through Physical Appearance Scale – Peers comparison; Depression, Anxiety and Stress = Depression, Anxiety and Stress Scale 21

Figure 1. Path model representing the association between overvaluation of body shape, weight and eating, and external shame, mediated by the hated self form of self-criticism, negative social comparisons based on body image, while controlling for the effect of depressive symptoms, with STANDARDIZED ESTIMATES AND SQUARE MULTIPLE CORRELATIONS ($N = 119$).

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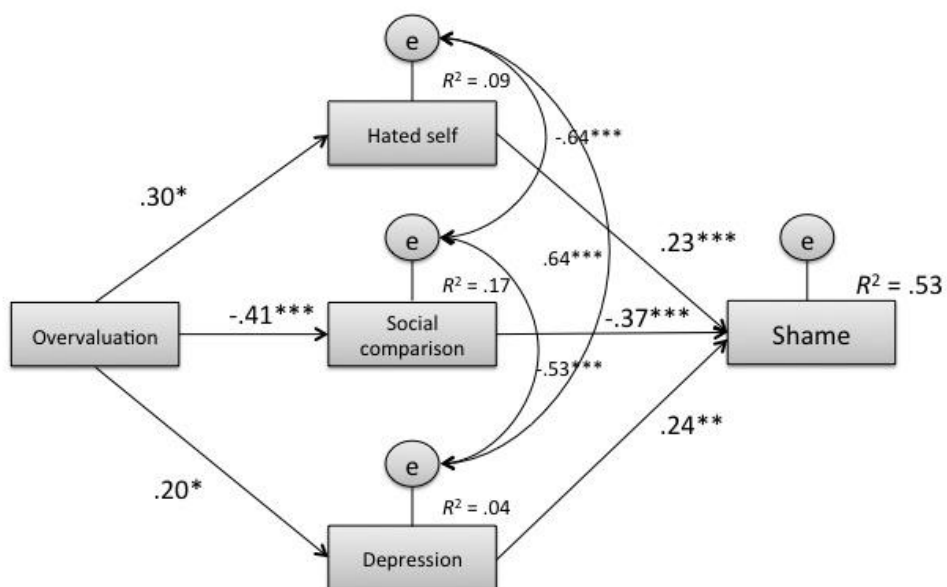


Figure 1