The Influence of Personality Traits on Body Image in Female Patients with an Eating Disorder versus a Dual Diagnosis: A Cross-Sectional Study

Personality Trait Impact on Body Image in ED & DD Groups

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Abstract

Body dissatisfaction (BD) is well-studied in eating disorder (ED) populations but remains unexplored in dual diagnosis (DD) populations, such as co-occurring ED and substance use disorder. This cross-sectional study compared BD levels between ED and DD groups and examined the influence of personality traits. Sixty-five female patients with either an ED (n=39; Mage=26.8, SD=8.8) or DD (n=26; Mage=28.9, SD=8.4) completed standardized measures of BD and personality traits. Descriptive statistics, group comparisons, and linear regression analyses were conducted. BD levels did not significantly differ between groups. In the ED group, higher impulsivity, lower self-transcendence, and younger age were associated with greater BD. In the DD group, higher novelty seeking, confounded by lower self-directedness, was associated with greater BD. These findings suggest that distinct personality traits are associated with BD in ED and DD populations, highlighting potential targets for interventions aiming to alleviate BD.

Keywords: Eating Disorders, Temperament, Substance use

Eating disorders (EDs) are increasingly prevalent and associated with adverse outcomes, including mortality, with most starting around adolescence and having a lifetime global prevalence of 8.4% for women and 2.2% for men (Galmiche et al., 2019; Treasure et al., 2020). There are several subtypes of EDs, with the most studied being anorexia nervosa (AN) and bulimia nervosa (BN). However, other subtypes, such as binge eating disorder (BED) and other specified feeding or eating disorder (OSFED), are the most prevalent (Santomauro et al., 2021; Galmiche et al., 2019). Moreover, regarding the impact on healthy life years (i.e., expected number of years to live in a healthy condition) worldwide, it has been projected that over 3.3 million years are lost due to EDs, and in the United States of America affected individuals experience a worse quality of life and have 48% higher healthcare costs than the general population (Samnaliev et al., 2015; van Hoek & Hoeken, 2020). As such, it is imperative to broaden our understanding of EDs as well as the comorbidities which accompany them, including substance use disorders (SUDs), which may involve substances such as caffeine, tobacco, alcohol, or drugs. Substance use disorder is a psychobiological illness in which there are damaging consequences of continued use where tolerance and withdrawal symptoms are high. It has lasting neurobiological brain alterations in the stress, reward, salience and control systems, potentially causing a need to continue use uninterruptedly (Saunders & Latt, 2020).

SUDs are common among individuals with EDs, particularly those with purging behaviors (Bahji et al., 2019; Dennis & Pryor, 2017; Fouladi et al., 2015); with up to 50% abusing drugs or alcohol (based on United States of America national datasets and almost 500 articles, reports and books; Gregorowski, Seedat & Jordaan, 2013). These individuals with both a SUD and Axis I psychiatric illness (as per the Diagnostic & Statistical Manual-5-Text Revision, DSM-5-TR; American Psychiatric Association, 2022) are diagnosed with a dual diagnosis (DD; Rassool,

2006). In two distinct studies, both adult female patients with an ED, residing in New Zealand and adult patients with a SUD, residing in Glasgow, Scotland, found the comorbidity of the diagnoses to be present alongside a high incidence of neurotic symptoms (e.g., depression, anxiety, irritability; Bulik et al., 1997; Gilchrist et al., 2007), augmenting the necessity for treatment (Harrop & Marlatt, 2010). In addition to experiencing worse ED symptomatology than individuals with a single ED diagnosis (Munn-Chernoff et al., 2020), various studies which were conducted, mainly across Europe and North America, show that this DD group also suffers from poorer health and social outcomes, including increased general medical complications (e.g., drug/ethanol-induced rhabdomyolysis), increased psychopathology (e.g., higher levels of depression, social phobia and mania), longer recovery times, poorer functional outcomes (e.g., unemployment and legal issues) and higher relapse rates of either or both the ED and SUD (García-Gómez et al., 2009; Glasner-Edwards et al., 2011; Gregorowski, Seedat & Jordaan, 2013; Harrop & Marlatt, 2010). Furthermore, while the mortality rate of people with EDs is already 18 times higher than that of the general population (Mandelli et al., 2019), the risk of suicide is substantially elevated among those with a SUD comorbidity (Franko et al., 2005). Together, these vulnerabilities emphasize the importance of identifying associated DD risk factors, to better inform prevention.

Building on the complexities of DD, it is also important to consider early risk factors that may contribute to the development of these co-occurring conditions. One such factor is body dissatisfaction (BD), where prospective findings from a United Kingdom-based cohort study in both males and females indicate that early BD predicts later engagement in risky health behaviors as a young adult (Bornioli et al., 2021; Field et al., 2014), with disordered eating partially mediating effects on smoking and drug use (Bornioli et al., 2021). This suggests that BD warrants

exploration among individuals with a DD, given that arguably they engage in elevated and more concerning levels of disordered eating and risky health behaviors, including substance use, compared with the general population.

When considering BD, personality traits are an important factor. In terms of risk for developing EDs, a study of Russian adolescent girls in the general population found that elevated weight and body dissatisfaction were associated with lower self-directedness, higher novelty seeking, and higher harm avoidance. These girls also showed higher levels of alexithymia, self-distrust, negative emotionality, and dissatisfaction with their family relationships (Meshkova, Mitina & Aleksandrova, 2023). Moreover, individuals in the general population with higher levels of neuroticism (i.e., emotional instability) tend to be more susceptible to increased BD due to greater self-consciousness, appearance investment, appearance comparisons, and sensitivity to rejection (Costa & McCrae, 1992; Benford & Swami, 2014; Allen & Walter, 2016). Importantly, these general population findings align with research in clinical ED samples. For example, research from a Spanish adult female university sample found that neuroticism accounted for 10% of the variance in predicting body dissatisfaction, increasing the risk for EDs (Castejón, Garcés de Los Fayos & Berengüi, 2023). Meanwhile, individuals with a single ED diagnosis who have higher levels of neuroticism also tend to have higher levels of harm avoidance (i.e., anticipatory worry; De Fruyt et al., 2000; Cassin & von Ranson, 2005). Collectively, these findings suggest that personality traits linked to body dissatisfaction in the general population may similarly influence clinical ED presentations.

Longitudinal research among individuals with eating disorders supports this dynamic relationship; for example, in an Italian sample of adolescent and adult female patients with EDs (ranging from ~15-30 years of age), decreases in body dissatisfaction have been shown to predict

subsequent reductions in harm avoidance (Segura-García et al., 2013). Also, in a cross-sectional Belgian adult sample of in and outpatients, higher BD was associated with higher harm avoidance and lower self-directedness (Vervaet, Audenaert & van Heeringen, 2003). Another study looking at Italian adult patients with an ED, found that BD was positively linked to harm avoidance while being negatively associated with self-directedness and cooperativeness (Abbate-Daga et al., 2010). They also found that higher reward dependence predicted greater BD in the BN group, specifically. More generally, research from Europe, North America and Australia with female patients with an ED suggest that higher levels of specific personality traits (such as harm avoidance) can exacerbate ED severity (Marzola et al., 2020; Paganini, Peterson, Andrews, 2021), with certain traits associated with either restrictive or purging ED profiles (Krug et al., 2011; Lilenfeld et al., 2006; Rosińska et al., 2020; Wagner et al., 2006). For example, individuals with restrictive eating behaviors tend to have higher levels of harm avoidance, persistence (i.e., eagerness of effort), and reward dependence (i.e., sentimentality), whereas those with purging behaviors have higher impulsivity and novelty seeking (i.e., exploratory excitability; Jiménez-Murcia et al., 2013; Lavender & Mitchell, 2015; Rotella et al., 2018). Furthermore, individuals with higher novelty seeking and lower self-transcendence (in atypical AN), lower cooperativeness (in AN and BN) and lower self-directedness (in AN) are more likely to drop out of treatment (Riesco et al., 2018; Fassino et al., 2002; Fassino et al., 2003). It has also been suggested that impulsivity in EDs (e.g., BN and BED) and concurrent maladaptive behaviors (e.g., substance use and non-suicidal self-injury) could lead to an increased risk of relapse or cessation of treatment (Lavender & Mitchell, 2015). Additionally, North American research indicates a higher likelihood of comorbid and familial SUDs among women with bulimia nervosa (Bulik et al., 1997; Lilenfeld & Kaye, 1996; Kaye et al., 1996). Moreover, a systematic review identified a

higher prevalence of comorbid SUD in female adult binge-purge ED samples compared to restrictive ones (Bahji et al., 2019). Extending these findings, a recent study conducted among Spanish females with a clinically diagnosed ED identified significantly higher levels of extravagance (related to novelty seeking) among a DD group (ED and SUD) compared with an ED only group (Rosińska et al., 2020).

Overall, while this large body of research hints at a potential association between BD and certain personality traits among individuals with a DD, this has been overlooked in empirical investigation. Therefore, the present study aimed to address this research gap to enhance knowledge regarding risk factors for a DD.

In summary, BD is a recognized risk factor for EDs (American Psychiatric Association, 2022; Andrés & Saldaña, 2014; Dakanalis et al., 2015; Karazsia, Murnen & Tylka, 2017) and substance use (Bornioli et al., 2021; Field et al., 2014). Further, BD has been associated with higher levels of novelty seeking in both the general population and single diagnosis ED groups (Rosińska et al., 2020; De Fruyt et al., 2000; Field et al., 2014). While BD has not been examined among a DD group, research indicates a prevalence of higher novelty seeking in this group (e.g., Bornioli et al., 2021; Krug et al., 2009).

Though examining the relationship between BD and personality traits within individual ED subtypes is important, the present study used a convenience sampling approach, resulting in small and unequal numbers across specific ED diagnoses. Consequently, it was not possible to conduct subtype-specific analyses. Instead, this study represents a first exploratory step by examining these relationships across EDs collectively, providing an initial insight into BD and personality traits in both ED and DD groups. Accordingly, the present study aims to: 1) compare BD among individuals with an ED and a DD and 2) examine the influence of personality traits on

BD in both groups. Although the primary aim was to gain a preliminary understanding of the influence of personality traits on BD in these two groups, the study was guided by specific hypotheses: (1) the DD group would exhibit higher BD than the ED group, and (2) the ED group would show higher reward dependence and harm avoidance (associated with higher BD), whereas the DD group would show higher impulsivity and novelty seeking (associated with higher BD). While hypotheses were specified for these four personality traits, no a priori predictions were made for the other personality traits (persistence, self-directedness, cooperativeness and self-transcendence), and analyses of these traits were treated as exploratory, given the limited prior evidence supporting firm predictions regarding their relationship with body dissatisfaction in these two groups.

Methods

Participant inclusion and exclusion criteria

Participants were eligible for inclusion if they were aged 18 years or older, had received a clinical ED diagnosis (established through a comprehensive semi-structured interview assessing diagnostic criteria, psychopathological features, and sociological variables), and were receiving treatment at a private clinic in Eastern Spain, selected for reasons of convenience sampling. Both female and male patients were eligible to participate. Regarding the DD group, participants were included if they had received a clinical diagnosis of an ED and SUD (via an exhaustive semi-structured interview including the DSM-5 criteria) and were aged 18 years or older. Participants were excluded if they had not received a clinical ED or SUD diagnosis and/or had language barriers.

Setting and final sample of participants

The target sample size was ≥100; however, recruitment through convenience sampling at a private clinic specializing in ED treatment in Eastern Spain yielded 79 participants (71 females; 8 males). Six females were excluded due to missing data and/or incomplete questionnaires, and the eight males were excluded because their small number precluded meaningful sex-based comparisons. The final analytic sample therefore comprised 65 female participants aged 18–52 years (ED: n = 39, M = 26.8, SD = 8.8; DD: n = 26, M = 28.9, SD = 8.4). While all participants spoke Spanish, ethnic profile information was not available. They were all hospitalized as inpatients or day patients, and met the DSM-5 criteria for an ED (American Psychiatric Association, 2013). The group distributions of ED diagnoses can be found in Table 1. The body mass index (BMI) for these two groups had a mean of 19.4 in the ED group (SD=4.4) and 23.0 in the DD group (SD=8.4). In the general population, according to the World Health Organization (WHO, 2025) the BMI classifications are as follows: Underweight (BMI ≤18.5 kg/m2), Normal weight (BMI >18.5–24.99 Kg/m2), Overweight (BMI 25.0–29.99 Kg/m2) and Obese (BMI ≥ 30 Kg/m2). Therefore, in accordance with WHO classifications, the mean BMI values for both the ED and DD groups fell within the 'normal' weight range. However, it is important to note that although the group averages were in the normal range, individual participants in each group were also represented in the 'underweight' and 'overweight' categories, indicating variation in BMI across WHO-defined weight classifications.

Clinical procedure

In this study, the private clinic where participants received treatment follows a multicentric three-phase model, which is applied to both inpatients and day patients. Phase 1 involves recently admitted patients and focuses on identifying the main reasons for admission as well as exploring the possibility of adopting new ways of living. Phase 2 centers on deeper

psychotherapeutic work, addressing core issues. During this phase, inpatients are granted a preapproved period of leave to practice and integrate insights from treatment into their daily lives, while day patients gradually reduce their hospital visits according to a structured schedule. Finally, Phase 3 aims to prevent relapse and support reintegration into society through work, education, and social relationships.

Study variables and measures

Demographic and potential confounder variables

Age and body mass index (BMI) of participants were extracted from the patient history when they were admitted to the clinic. BMI was calculated using the following formula, weight/height^2, where weight is in kilograms and height is in meters. They were included as covariates in the present study due to previous research indicating a positive association between both BD and age, (especially in female samples; Bully & Elosua, 2011; Calzo et al., 2012), and between BD and BMI (Calzo et al., 2012; Fernández-Bustos et al., 2019).

Predictor variables

Personality traits

Two measures were used to assess personality traits. The first was the 240-item Temperament and Character Inventory-Revised (TCI-R; Cloninger, 1999), which includes seven scales. Four of these scales relate to temperament: novelty seeking (higher scores indicate greater impulsivity and temperament), harm avoidance (higher scores indicate greater anxiety, insecurity, worry), reward dependence (higher scores indicate greater friendliness, sentimentality, dependence), and persistence (higher scores indicate greater levels of hard-work, ambition, self-exigence). The three other scales relate to character: cooperativeness (e.g., social acceptance; higher scores indicate greater friendliness, empathy, altruism), self-directedness (e.g.,

responsibility; higher scores indicate greater maturity, self-sufficiency, self-esteem, in alignment with deeper goals and values), and self-transcendence (higher scores indicate greater spirituality, idealism, mysticism). Each of these seven scales have 3–5 subscales associated with them. All items are rated on a 5-point Likert scale (1=completely false to 5=completely true), with the scores of each subscale obtained by the sum of specific items (from 1 to 5, direct or reverse order). However, in this study, only the main scales were analyzed, as the subscales were beyond the scope of this study. The Spanish validated scale was used (Gutiérrez-Zotes et al., 2004), and demonstrated good internal consistency across the scales and subscales (Cronbach's α =0.56 to 0.94).

The second measure, the 30-item Barratt Impulsiveness Scale-11 (BIS-11; Barratt, 1959), assessed impulsivity, specifically, in terms of a lack of cognitive or behavioral control (Hur & Kim, 2009). Thus, this scale and the novelty seeking subscale of the TCI-R, capture related but distinct aspects of impulsivity. The BIS-11 includes three subscales: attentional factor score (i.e., measures attention and cognitive instability, e.g., I am a person with self-control), motor factor score (i.e., measures motor and perseverance, e.g., I do things without thinking), and nonplanning factor score (i.e., measures self-control and cognitive complexity, e.g., I can focus on tasks easily). All items are rated on a 4-point Likert scale (1=rarely/never to 4=almost always/always), with responses summed up to create a total score, with higher scores indicating greater impulsivity. The Spanish validated scale was used (Oquendo et al., 2001), which demonstrated good internal consistency across the subscales (Cronbach's α=0.60 to 0.85).

Outcome variable

Body dissatisfaction

The 10-item BD subscale of the Eating Disorder Inventory-3 (EDI-3:BD; Garner, Olmstead & Polivy, 1983) assessed BD. All EDI-3: BD items are rated on a 6-point Likert scale (from 0=never to 5=always; some items reverse-scored), relating to how the person views their body, with questions such as "I think my stomach is too big", with higher scores indicating greater BD. The BD subscale from the Spanish validated inventory was used (Elosua, López-Jaúregui, & Sánchez-Sánchez, 2010; Elosua & López-Jáuregui, 2012), which demonstrated good internal consistency (Cronbach's α =0.91).

Procedure

Prior to participation, individuals were fully informed about the study and its measures. They were also informed that participation was completely voluntary, they could withdraw at any time, and that their personal information would be kept completely anonymous. Participants had the opportunity to ask questions, then they signed the consent form. The data were collected from January 2018 to September 2020. The self-report measures (TCI-R and BIS-11) were administered to each patient, and any queries were answered throughout the process. These measures were included in a paper-based survey that was administered to the participants by the researchers, but self-completed by each participant. The EDI-3:BD data were extracted from the patient information that was recorded upon admission to the clinic. Once the measures were completed, the associated responses were entered into an excel database, and transferred to STATA 13.0 to be analyzed.

Ethical statement

This study was conducted in accordance with the principles expressed in the Declaration of Helsinki of 1975, revised in 1983, and considering the Organic Law 15/1999 of December 13 on the Protection of Personal Data. It was approved by the Ethics Committee on Animal and

Human Experimentation (CEEAH) from the Autonomous University of Barcelona. Written informed consent was obtained and participation was completely voluntary, with patients being made aware that they could cease participation at any time without consequences.

Data analyses

The normal distribution of variables was evaluated using the Shapiro-Wilk test (*p*-value=0.152), with skewness (i.e., measures if there is a lack of symmetry in a distribution of a sample) and kurtosis (i.e., measures the tailedness of a distribution of a sample, denoting the degree to which the distribution is peaked or flat) inspected. The outcome variable of BD presented with a skewness of -0.63 (e.g., a normal range is between +/- 1) and kurtosis of 3.44 (e.g., where a normal range is between +/-10). The predictor variables presented with a skewness between 0.63 and 2.20 and kurtosis between 2.03 and 7.92, in absolute values.

Descriptive statistics (means and standard deviations) of sociodemographic, anthropometric, clinical variables, and the measures (TCI-R, BIS-11 and EDI-3:BD) were calculated. Inter-group comparisons were conducted using either the Mann–Whitney U test for non-normal quantitative variables, the Chi-square test for the categorical variables, or the Fisher test (when the expected frequencies for categorical variables were < 5). The 95% confidence interval, together with the effect size for quantitative variables by the Cohen coefficient (*d*), and the effect size for categorical variables by the Cramer V (V) coefficient were reported. Internal consistency was reported for all measures using the Cronbach's α coefficient.

Multiple linear regressions were manually performed using the Maximum Likelihood (ML) method of estimation, which is robust to moderate non-normality for continuous outcome variables (Weston & Gore, 2006). The models studied the relationship between the following predictors: age, BMI, TCI-R & BIS-11, and the outcome variable of BD. The significance level

was 0.05 for all statistical tests. In the analyses, the covariates of age and BMI were fixed variables for both groups. The transition from the original regression model to the final model was carried out using a manual backward stepwise approach, in which non-significant variables ($p > 0.05$) were progressively removed. Age and BMI, considered potential theoretical confounders, were retained as fixed variables to control for their effects. Additionally, a statistical power calculation was conducted retrospectively. For the regression model with the ED group, the power was 0.80, considering the initial 10 predictors, the observed $R2 = 0.36$, the probability alpha level (0.05), and the sample size for ED. For the regression model with the DD group, the power was 0.33, considering the initial 10 predictors, the observed $R2= 0.28$, the probability alpha level (0.05), and the sample size for DD. Overlap among covariates was examined with Spearman correlations and with the variance inflation factor (VIF). All variables were included in the correlation analysis to check for multicollinearity, ensuring that no two predictors measured the same construct (Spearman correlations > 0.80 would indicate collinearity). No issues were found, as confirmed by VIF. Changes in the regression model can occur when confounding variables are included, as these can modify associations. The inclusion of variables is guided by theoretical considerations, and variables outside the study's focus are not included. Overall, the correlation analysis helps determine which variables are suitable for regression analyses.

Results

Comparison of BD and its predictors between single ED and DD groups

When looking at BD in relation to the two groups mentioned above, in terms of demographic and clinical variables, together with an intergroup difference comparison some significant differences emerged. While BD was higher in the DD group (Mean=21.6, SD=4.4) than the ED group (Mean=20.2, SD=4.4), this result was not significant. However, BMI (p=0.036,

311 *d*=0.57) was significantly higher in the DD group (Mean: 23.0, SD=8.4) than the ED group
312 (Mean: 19.4, SD=4.4). And BIS-11 attentional factor (*p*=0.034, *d*=-0.03) was significantly higher
313 in the ED group (Mean: 16.2, SD=4.5) than the DD group (Mean: 14.5, SD=3.9). Lastly, the DD
314 group had significantly higher harm avoidance (*p*=0.002, *d*=0.88) and reward dependence
315 (*p*=0.032, *d*=0.83) compared to the ED group.
316 ----------insert Table 2 here or near here----------
317 Table 3 shows correlations between variables for both groups separately. Regarding the
318 relationship between BD and personality traits, there were significant positive correlations in the
319 DD group between BD and novelty seeking (r_s=0.43, *p*<0.05) and cooperativeness (r_s=0.40,
320 *p*<0.05). In contrast, the ED group showed a significant positive correlation between BD and
321 impulsivity (BIS-11; r_s=0.47, *p*<0.005).
322 ----------insert Table 3 here or near here----------
323 Table 4 shows results of the regression analysis. The final model for the ED group
324 indicated that, younger age (B= -0.16, *p*=0.034), lower self-transcendence (B= -0.09, *p*=0.038),
325 higher BMI (B=0.35, *p*=0.027) and impulsivity (BIS-11; B=0.21, *p*=0.005) were related to a
326 higher BD. And the final model for the DD group indicated that higher novelty seeking (B=0.23,
327 *p*=0.015) predicted greater BD, with lower self-directedness confounding the relationship. This
328 means that the coefficient change of the predictor variable of novelty seeking was more than 20%
329 when self-directedness was excluded from the analysis.
330 ----------insert Table 4 here or near here----------
331 **Discussion**

The purpose of this study was to examine and compare body dissatisfaction between eating disorder and dual diagnosis patients, and to explore how this outcome is influenced by personality traits in a cross-sectional sample.

Body dissatisfaction in eating disorder and dual diagnosis groups

The first hypothesis that body dissatisfaction would be significantly higher in the dual diagnosis group than the eating disorder group was not supported. This was surprising, given that findings from the general population found that greater body dissatisfaction predicted later substance use (Bornioli et al., 2019). The findings in the present study may be due to different reasons. First, it may be that body dissatisfaction is pervasive among individuals with an eating disorder, irrespective of having a dual diagnosis, since both disorders manipulate the state (e.g., when an individual experiences a specific situation at a distinct moment in time with various thoughts, feelings and actions which are not stable throughout time (Schmitt & Blum, 2017)) and function of the individual's body, either by malnutrition or substances (Harrop & Marlatt, 2010), thus potentially fostering body dissatisfaction. Further, body dissatisfaction is pervasive among eating disorders and is recognized to persist even after treatment (Keel et al., 2005). This would suggest that individuals with eating disorders are not susceptible to significantly higher levels of body dissatisfaction if additionally diagnosed with a substance use disorder. A second reason may relate to the underpowered sample size. The small effect size indicates that a larger sample size might support the observed trend and generate significant differences. Therefore, future research might consider replicating this study with a larger sample size.

Influence of personality traits on body dissatisfaction in eating disorder and dual diagnosis groups

The first part of the second hypothesis, postulating that the eating disorder group would have higher levels of reward dependence and harm avoidance (correlating with higher body dissatisfaction) relative to the dual diagnosis group, was not supported. Instead, these traits (i.e., defined as distinctive thinking, feeling, and behaving patterns that remain rather stable over time; Schmitt & Blum, 2017) were found to be significantly higher in the dual diagnosis group. Further, neither reward dependence nor harm avoidance were significant predictors in the final linear regression model predicting body dissatisfaction, in the eating disorder group. These findings were surprising, as previous studies have identified higher harm avoidance (Battaglia et al., 1996; Jones et al., 2022) and reward dependence (Rosińska et al., 2020; Bonfà et al., 2008) in eating disorder groups or when compared to dual diagnosis groups (ED and SUD). However, these earlier studies did not include body dissatisfaction in the analyses. When including BD in the analysis, previous research found that BD was positively linked to harm avoidance while being negatively associated with self-directedness and cooperativeness (Abbate-Daga et al., 2010). Although, as there is a paucity of research in relation to self-directedness and cooperativeness, no prior associations were conducted. Additionally, the present study was conducted on a relatively small clinical sample, which suggests that further research is needed to better understand the potential relationships between ED, DD, various personality traits and body dissatisfaction.

In contrast, lower self-transcendence and higher impulsivity emerged as significant predictors of body dissatisfaction in the eating disorder group. The finding that higher impulsivity predicted greater body dissatisfaction in the current study mirrors previous results (Mallorquí-Bagué et al., 2020; Schag et al., 2021), and it may be the case that impulsivity also acts as a moderator of body shame, as suggested by a previous study involving young adult Black women in the United States (Higgins et al., 2015). However, this is the first study to identify a relationship

between self-transcendence and body dissatisfaction in any ED population. While one previous study reported a relationship between higher self-transcendence and lower body dissatisfaction in New Zealand women at risk for developing an ED, this association was not observed in those diagnosed with an ED (Jones, 2022). Other research has suggested that self-transcendence may operate more as a protective buffer than as a direct predictor of body dissatisfaction (Rollero & De Piccoli, 2017). As the empirical evidence remains inconclusive, no prior predictions were asserted regarding this association. Nonetheless, constructs such as body surveillance (i.e., continual monitoring of one's appearance) and objectified body consciousness (i.e., viewing one's body as an object for external evaluation) have been consistently linked to body dissatisfaction and eating pathology in the general population (Callaghan et al., 2015; Fredrickson & Roberts, 1997; McKinley & Hyde, 1996; Knauss, Paxton, & Alsaker, 2008). These constructs may plausibly be inversely related to self-transcendence, as both involve heightened self-focus and reduced immersion in the world around them. While this warrants further investigation, the present findings highlight how this broader non-appearance-based personality trait is relevant to body dissatisfaction among individuals with an eating disorder.

The second part of this hypothesis, that individuals with a dual diagnosis would have higher levels of impulsivity and novelty seeking (correlating with higher body dissatisfaction) compared with the eating disorder group, was only partially supported (i.e., only novelty seeking was significant). The finding that higher impulsivity was not included in the final model predicting body dissatisfaction among the dual diagnosis group was surprising, considering that previous research has identified a greater degree of impulsive behaviors among patients with bulimia nervosa and alcohol dependence, compared to a single diagnosis of bulimia nervosa (Bulik et al., 1997). The smaller sample size in the dual diagnosis group may have contributed to

this unexpected finding in several ways. First, reduced statistical power limits the ability to detect significant associations, meaning that relevant relationships between impulsivity and body dissatisfaction could have gone undetected. Additionally, a smaller sample may not fully capture the diversity of impulsivity subtypes within this group, potentially obscuring specific patterns. Furthermore, the cognitive type of impulsivity most relevant to body dissatisfaction in this DD group may not be fully captured by the Barratt Impulsivity Scale, which primarily assesses cognitive and behavioral control (Hur & Kim, 2009). However, when looking at novelty seeking (i.e., intense excitement in relation to novel stimuli; exploratory excitability), related to impulsivity in terms of new stimuli, many studies have demonstrated a relationship with it and substance use disorder as well as in various ED groups (Krug et al., 2009; Lozano-Madrid et al., 2020; Bulik et al., 1997; Favaro et al., 2005). Therefore, due to this abundance of research in relation to SUD, ED and novelty seeking, we included it in this study. Together, these factors suggest that the impulsivity subtype most pertinent to body dissatisfaction may not have been adequately reflected in the current study. Moreover, it was seen that attentional factor impulsivity (i.e., inability to focus or concentrate on a task) was significantly higher in the eating disorder group compared to the dual diagnosis group. Previous research comparing eating disorder groups and healthy individuals postulates that higher attentional impulsivity may be due to negative mood states (in individuals with AN; Phillipou et al., 2016) or concerns about others seeing one eat (in individuals with BN; Chen et al., 2022). Further, other findings indicate that attentional impulsivity may be linked to more acute eating disorder symptom severity (Langer, Bord & Golan, 2015). In a study of Israeli adult females, it was found that severe cognitive instability (portrayed by invasive thoughts) was linked to higher social insecurity, including asceticism, perfectionism, and ineffectiveness (Langer, Bord & Golan, 2015). They also found a strong-

moderate positive correlation between severe cognitive instability and attentional factor impulsivity. As the latter is linked to an individual's cognitive control, it could potentially provoke body dissatisfaction in individuals with an eating disorder. Therefore, higher attentional impulsivity could lead to higher body dissatisfaction in individuals with an eating disorder. As the individuals are more focused on how others perceive them, their attention may be directed to their outward appearance causing them to become more judgmental of themselves and therefore unable to concentrate on other aspects of themselves or life. Nonetheless, future research should compare attentional impulsivity more so between eating disorder and dual diagnosis groups.

The present finding that lower self-directedness confounded the relationship between higher novelty-seeking and greater body dissatisfaction among the dual diagnosis group warrants attention. Both the relationship between these traits *and* their associated confounding effects with body dissatisfaction are novel in all groups. They extend previous findings that lower self-directedness (i.e., lower ability to adapt one's own behavior to achieve goals) is associated with increased alcohol and drug use in the general population (Steingrimsson et al., 2020), and that higher novelty seeking (i.e., intense excitement in relation to novel stimuli) is related to lower self-directedness among dual diagnosis groups (Mateu-Codina et al., 2016). They suggest that specific personality traits might impact individuals to develop a substance use disorder, and in turn, heighten body dissatisfaction.

Limitations and strengths

While this study provides important novel findings, it is not without limitations. First, it is difficult to determine the direction of causality between personality traits and body dissatisfaction, due to the cross-sectional nature of this study as well as it being underpowered, especially in the DD group. However, the intention of the study was to identify potential

associations and generate hypotheses for future, adequately powered studies. Thus, these analyses provide initial insights that may inform subsequent research and clinical approaches. Future research should consider evaluating personality traits and body image variables at multiple time points during treatment and follow-up (e.g., at treatment initiation, during treatment, at the end of treatment, and at follow-up) to better assess the direction of potential effects, including possible reciprocal relationships. In the present study, this was not possible; despite the various phases of treatment, participants could not be divided according to treatment phase or group. Incorporating this factor in future research could enhance understanding of the impact of each treatment phase as well as overall treatment outcomes. Second, both inpatients and day patients who were at different stages of their treatment were included in the study, which could have confounded findings. These variables warrant separate consideration of their associations with personality traits and body dissatisfaction in future research. Third, the ethnic homogeneity of the groups, combined with the lack of collected data on ethnic profiles, limits the potential applicability of the findings to other non-white populations. Researchers should consider exploring the relationship between personality traits and body image among non-white groups in the future, given that they tend to be overlooked in the research, despite indications over differing symptoms and associated distress across ethnicities (Egbert et al., 2022; Franko et al., 2007). Fourth, with this being a fully female sample, future studies may include other genders, such as males and non-binary individuals, to provide a better understanding of body image in various genders. This is noteworthy to examine in future studies as previous studies have shown that, varying gender identities could cause body image ideals to vary in both adults and adolescents (Gonzales & Blashill, 2020; Roberts et al., 2021) as well as increasing potential ED symptomatology (Roberts et al., 2021). Fifth, the eating disorder diagnoses across the two groups (single ED and DD) were heterogeneous, which may

have influenced the impact of personality traits on body dissatisfaction. Additionally, the small sample sizes within each specific ED diagnosis made it difficult to conduct meaningful comparisons between subtypes. Future studies could focus on more homogeneous groups (e.g., AN, BN, BED) to better understand the specific influence of personality traits on body dissatisfaction in particular ED populations. Sixth, the sample in this study may be subject to social desirability bias and sampling bias due to the cross-sectional and voluntary nature of participation. Future studies could aim to mitigate these factors to obtain a more representative understanding of the examined groups. Lastly, the Body Dissatisfaction subscale focused on aesthetic aspects of body image, including perceived shape and weight. Non-aesthetic facets of positive body image (e.g., body functionality appreciation) warrant examination, given their protective effect for developing eating disorders (Cook-Cottone, 2015; Piran & Teall, 2012a; Piran, 2015).

Nonetheless, this study was associated with various strengths, including being, to the best of our knowledge, the first to examine and compare body dissatisfaction between a dual diagnosis and eating disorder group. Further, the in-depth self-report questionnaires, which demonstrated validity, reliability, and structure (Hook et al., 2021), provided a better understanding of both groups, allowing novel findings to surface. Previous research indicates that self-report questionnaires yield stronger relationships to observed behavior when compared to cognitive measures (Eisenberg et al., 2019). Finally, an additional strength to note is that the questionnaires were validated in Spanish, whereas other research has neglected to use measures that have been validated into a different language (e.g., Poelman et al., 2021).

Implications and future research

This study examined and compared body dissatisfaction in patients with eating disorders and those with dual diagnoses, and explored how personality traits may be associated with this outcome in a cross-sectional sample. Regarding the two hypotheses, only half of one was supported: individuals with a dual diagnosis exhibited higher novelty seeking (with lower self-directedness acting as a confounding factor) compared to the eating disorder group. A novel finding also emerged, whereby lower self-transcendence and higher impulsivity were significant predictors of body dissatisfaction within the eating disorder group.

The present findings may have practical implications for clinicians, highlighting that individuals with either an eating disorder or dual diagnosis could potentially benefit from tailored intervention strategies. Given that body dissatisfaction is a prominent concern associated with eating disorders, it warrants further research and intervention (Fairburn, Cooper & Shafran, 2003; Phillipou, Castle & Rossell, 2018). Clinicians may consider evidence-based treatment strategies that foster self-transcendence and lower impulsivity among patients with a single diagnosis eating disorder, while focusing on approaches aimed at reducing novelty seeking behaviors among those with a dual diagnosis (e.g., Martínez Loredo et al., 2019; Schag et al., 2019).

The present findings also have theoretical implications, suggesting that personality traits could be considered within sociocultural models of eating disorders. For example, the Tripartite Influence Model proposes that sociocultural appearance pressures foster appearance comparisons and internalization of appearance ideals, which in turn lead to body dissatisfaction and disordered eating (Thompson et al., 1999). In the present study, self-directedness was found to confound the relationship between novelty seeking and body dissatisfaction in the dual diagnosis group. Incorporating such personality traits into existing models may provide a more nuanced

understanding of how individuals' alignment with their deeper goals and values interacts with external sociocultural factors.

Regarding avenues for future research, we recommend further exploration on understanding how personality traits may be associated with increased body dissatisfaction in other dual diagnosis groups. For example, this would be valuable to pursue among individuals in the clinical eating disorder population who self-harm (Claes et al., 2012; Islam et al., 2015), where body dissatisfaction has been identified as a salient factor (Muehlenkamp & Brausch, 2012). This could also be explored among individuals with major depressive and anxiety disorders, as many tend to experience a dual diagnosis of eating disorders (Ulfvebrand et al., 2015), which could increase the severity and chronicity of the eating disorder and resistance to treatment (Blinder et al., 2006). Further, given that body dissatisfaction is simultaneously deemed a 'normative discontent' and public health issue (Neumark-Sztainer et al., 2006; Bucchianeri & Neumark-Sztainer, 2014; Rodin, Silberstein, & Striegel-Moore, 1984; Warren et al., 2005), researchers should consider exploring the influence of personality traits on body dissatisfaction in the general population, as these could inform targets for preventative interventions.

Disclosure statements

CRediT authorship contribution statement

Concept – H.L.S., M.R., M.L.G.G., A.G.T & M.S.M.G.; Design – H.L.S., M.R. & S.L.; Supervision – H.L.S., M.R. & S.L; Literature Review – M.R.; Writing –M.R., H.L.S.; Critical Review – H.L.S., S.L., M.L.G.G., A.G.T. & M.S.M.G

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Conflict of interest statement

The authors report no conflict of interest and no additional income to report.

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Ethical considerations

This study was approved by the Ethics Committee on Animal and Human Experimentation (CEEAH, Comissió d'Ètica en l'Experimentació Animal i Humana) from the Autonomous University of Barcelona with approval number 4960.

Consent to Participate

Written informed consent was obtained from each participant and involvement was completely voluntary, with patients being made aware that they could cease participation at any time without consequences.

Consent for Publication

Consent for publication is not applicable to this article as it does not contain any identifiable data.

Data availability statement

Due to the nature of this research, participants of this study did not agree for their data to be shared publicly, so supporting data is not available.

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Table 1

Eating disorder group distributions

Eating Disorder Group	Number of Individuals	Dual Diagnosis Group	Number of Individuals
AN I & II	27	AN I & II	12
BN	2	BN	4
BED	2	BED	3
OSFED	6	OSFED	6
OSFED & BED	1	OSFED & BED	1
OSFED & BN	1	OSFED & BN	0
Total	**39**	**Total**	**26**

AN I & II: Anorexia nervosa I and II; BN: Bulimia nervosa; BED: Binge eating disorder;
OSFED: Other specified feeding and eating disorders;
OSFED & BED: Other specified feeding and eating disorders and binge eating disorder;
OSFED & BN: Other specified feeding and eating disorders and bulimia nervosa

Table 2

Demographic, clinical and personality variables. Comparison between groups.

	Eating Disorder Group (n=39)	**Dual Diagnosis Group (n=26)**			
	Mean (SD)	*Mean (SD)*	*d [95% CI]*	*p*	α
Age (years)	27.0 (9.2)	28.9 (8.4)	0.21 [-0.29; 0.71]	0.251	
BMI	19.4 (4.4)	23.0 (8.4)	0.57 [0.06; 1.07]	**0.036***	
BIS-11 Total	56.6 (9.1)	56.2 (14.0)	0.05 [-0.45; 0.54]	0.862	0.85
Attentional Factor (BIS)	16.2 (4.5)	14.5 (3.9)	-0.03 [-0.53; 0.46]	**0.034***	0.61
Motor Factor (BIS)	19.1 (4.4)	21.4 (7.1)	-0.03 [-0.53; 0.46]	0.180	0.60
Nonplanning Factor (BIS)	20.3 (4.5)	20.2 (6.0)	0.18 [-0.32; 0.67]	0.793	0.79
Body Dissatisfaction Scale (EDI-3)	20.2 (4.4)	21.6 (4.4)	0.31 [-0.19; 0.81]	0.197	0.91
TCI-R					
Novelty Seeking	108.4 (12.1)	112.7 (10.6)	0.37 [-0.13; 0.87]	0.170	0.82
Harm Avoidance	86.8 (8.6)	95.4 (11.1)	0.89 [0.37; 1.41]	**0.002***	0.88
Reward Dependence	90.8 (7.3)	95.0 (8.9)	0.53 [0.02; 1.03]	**0.032***	0.83
Persistence	113.5 (18.6)	109.8 (20.0)	-0.19 [-0.69; 0.30]	0.437	0.94
Self-Directedness	126.0 (12.7)	131.1 (14.6)	0.38 [-0.12; 0.88]	0.106	0.88
Cooperativeness	107.2 (9.9)	110.5 (11.0)	0.32 [-0.18; 0.82]	0.132	0.90
Self-Transcendence	66.2 (15.2)	69.6 (15.6)	0.23 [-0.27; 0.72]	0.338	0.89

BMI: Body Mass Index; BIS-11: Barratt Impulsiveness Scale – 11; TCI-R: Temperament and Character Inventory – Revised; SD: Standard Deviation; n: sample; d: Cohen's d, effect size; 95% CI: Confidence Interval; α=Internal consistency by Cronbach's α coefficient; *p*=*p*-value * $p<0.05$

Table 3

Correlations between variables for both groups.

	1 Age	2 BMI	3 TCI NS	4 TCI HA	5 TCI RD	6 TCI PS	7 TCI SD	8 TCI C	9 TCI ST	10 BIS-11	11 BD
1 Age	-	0.19	-0.26	-0.49*	-0.19	-0.11	-0.15	-0.43*	-0.38	-0.49*	-0.13
2 BMI	0.15	-	-0.17	-0.37	0.33	-0.14	-0.26	-0.19	-0.09	0.07	0.04
3 TCI NS	0.05	-0.30	-	0.57**	0.37	0.52*	0.53*	0.43*	0.46*	0.53*	0.43*
4 TCI HA	0.16	-0.02	0.39*	-	0.45*	0.53*	0.60**	0.58**	0.43*	0.50*	0.21
5 TCI RD	0.03	0.20	0.47**	0.43*	-	0.38	0.36	0.44*	0.39	0.49*	0.38
6 TCI PS	-0.31	-0.24	0.36*	0.12	0.17	-	0.41*	0.51*	0.33	0.37	0.28
7 TCI SD	0.10	0.15	0.49**	0.29	0.59**	0.30	-	0.57**	0.25	0.14	0.12
8 TCI C	0.15	0.20	0.49**	0.29	0.55**	0.26	0.61**	-	0.14	0.40*	0.40*
9 TCI ST	-0.16	0.09	0.23	0.35*	0.39*	0.37*	0.52**	0.23	-	0.34	0.10
10 BIS-11	-0.24	-0.12	0.36*	0.13	0.30	0.55**	0.24	0.07	0.29	-	0.39
11 BD	-0.30	0.15	0.14	0.11	0.23	0.09	0.15	-0.07	-0.08	0.47**	-

Note: Spearman Correlations; VIF <10; BMI: Body Mass Index; TCI-R: Temperament & Character Inventory – Revised; NS: Novelty Seeking; HA: Harm Avoidance; RD: Reward Dependence; PS: Persistence; SD: Self-Directedness; C: Cooperativeness; ST: Self-Transcendence; BIS-11: Barratt Impulsiveness Scale – 11; BD: Body Dissatisfaction (scale from Eating Disorder Inventory-3); * p<0.05, ** p<0.005
Values for ED group are not shaded and values for DD group are shaded.

Table 4

Linear Regression Models.

Criterion		Predictors	B	CI 95%	*p*	*F (p)*	R^2	Rc^2
BD – ED Group	Adjusted Final Model					0.004	0.36	0.29
		Age	-0.16	-0.31; -0.01	**0.034***			
		BMI	0.35	0.04; 0.65	**0.027***			
		TCI ST	-0.10	-0.18; -0.01	**0.005***			
		BIS-11	0.21	0.07; 0.35	**0.032***			
		Constant	11.80	1.09; 22.51	**0.032***			
BD – DD Group	Adjusted Final Model					0.12	0.28	0.14
		Age	-0.09	-0.34; 0.16	0.473			
		BMI	0.11	-0.15; 0.36	0.397			
		TCI NS	0.23	0.05; 0.42	**0.015***			
		TCI SD	-0.05	-0.19; 0.80	0.405			
		Constant	2.36	-21.29; 26.01	0.838			

BD: Body Dissatisfaction (scale from Eating Disorder Inventory-3); ED: Eating Disorder; DD: Dual Diagnosis; BMI: Body Mass Index; TCI-R: Temperament & Character Inventory – Revised; NS: Novelty Seeking; SD: Self-Directedness; ST: Self-Transcendence; BIS-11: Barratt Impulsiveness Scale – 11; *B* Coefficient; CI 95%: Confidence Interval 95%; *p*: *p*-value; *F(p)*: probability of statistic F; R^2: *R* squared; Rc^2:Adjusted R squared, * p<0.05