SPECIAL ISSUE

Drive for thinness provides an alternative, more meaningful, severity indicator than the DSM-5 severity indices for eating disorders

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Abstract
Objective: To assess an alternative trans-diagnostic indicator for severity based on drive for thinness (DT) for anorexia nervosa (AN), bulimia nervosa (BN), binge-eating disorder (BED), and other specified feeding or eating disorder (OSFED), and to compare this new approach to the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) severity categories for EDs.

Method: A total of 2,811 ED [428 AN-restrictive (AN-R), 313 AN-binge purging (AN-BP), 1,340 BN, 329 BED, 154 OSFED/atypical AN (AT), and 223 OSFED/purging disorder (PD)] patients were classified using: (a) The DSM-5 severity categories and (b) a DT categorisation. These severity classifications were then compared based on ED symptoms, general psychopathology, personality, and impulsive behaviours.

Results: For the DSM-5 categories, most ED patients fell into the ‘mild’ to ‘moderate’ categories. Using the DT categories, AN patients were mainly represented in the ‘low’ DT category, and BN, OSFED/AT, and PD in the ‘high’ DT category. The clinically significant findings were stronger for the DT than the DSM-5 severity approach (medium-to-large effect sizes). AN-BP and AN-R provided the most pronounced effects.

Conclusion: Our findings question the clinical value of the DSM-5 severity categorisation, and provide initial support for an alternative DT severity approach for AN.

Highlights
• This study assessed an alternative trans-diagnostic drive for thinness (DT) severity.
Category for all eating disorder (ED) sub-types, and then compared this to the Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5) severity indices for EDs.

- ED symptoms, general psychopathology, personality, and impulsive behaviours were assessed using both classifications in a total of 2,811 female patients diagnosed with EDs.

- Clinically significant findings were stronger for the DT than the DSM-5 severity category (medium-to-large effect sizes); there was differentiation of the anorexia nervosa (AN) patients into mainly ‘low’ DT, and bulimia nervosa (BN) spectrum patients into mainly ‘high’ DT, vs. most patients were clustered in the ‘mild-to-moderate’ DSM-5 categories.

- Our findings provide initial support for an alternative trans-diagnostic DT severity category that may be more clinically meaningful than the DSM-5 severity indices for EDs.

**KEYWORDS**
classification, drive for thinness, DSM-5, severity indicators

# INTRODUCTION

To improve the diagnosis and treatment of eating disorders (EDs), various efforts have been made to develop better severity measures for clinical practice. The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013) introduced three ED severity specifiers based on body mass index (BMI) for anorexia nervosa (AN), frequency of weekly inappropriate compensatory behaviours for bulimia nervosa (BN), and weekly binge-eating episodes for binge-eating disorder (BED). These three severity indices create the basis for four categories, ‘mild’, ‘moderate’, ‘severe’, and ‘extreme’, for classifying patients. Severity categories are intended to allow clinicians to determine the gradients of disorder severity in terms of the level of impairment, their ED-related attitudes, behaviours, and prognosis. It has been suggested that the current DSM-5 ED severity categories have limitations in their utility for clinicians (Gianini et al., 2017; Lydecker, Ivezaj, & Grilo, 2020; Regier, Kuhl, & Kupfer, 2013), and that a more robust severity classification is needed as a better basis for clinical practice.

## 1.1 The validity and utility of current DSM-5 severity specifiers and categories

Studies have found only limited support for the utility of the DSM-5 ED severity categories (APA, 2013). For AN, community-based studies support the validity of the severity index regarding disorder detection, but not for prognosis (Mustelin, Lehtokari, & Keski-Rahkonen, 2016; Smink, van Hoeken, Oldehinkel, & Hoek, 2014). Accordingly, research assessing clinical AN has shown that the number of hospitalizations was related to higher severity levels (Gianini et al., 2017). However, a range of clinically based studies have found no significant differences between DSM-5 AN severity categories in regard to psychiatric comorbidity, distress, bulimic symptoms, and some other attitudinal (i.e., weight/shape concerns) ED symptoms (Dalle Grave, Sartiran, El Ghoch, & Calugi, 2018; Machado, Grilo, & Crosby, 2017). Other studies have found inconsistent results. Patients in the ‘mild’–‘moderate’ categories engaged in more bulimic behaviours compared to the ‘severe’–‘extreme’ AN categories (Dalle Grave et al., 2018), while patients in the ‘severe’ AN categories exhibited more overall ED symptoms (Dakanalis, Timko, Colmegna, Riva, & Clerici, 2018).

Due to the relatively small AN sample sizes, only one study, to date, (Nakai et al., 2017) has been able to provide frequency distributions for the different BMI severity categories for the AN-restrictive (AN-R) and the AN-binge purging (AN-BP) sub-types separately. However, the study did not assess whether the severity categories for the two AN sub-types differed in ED symptomatology and other associated psychopathologies. This differentiation would be of special interest, given that a categorical boundary between AN-BP and BN has not always been supported in classification studies (Keel, Crosby, Hildebrandt, Haedt-Matt, & Gravener, 2013). Future research, therefore, needs to carefully examine whether
BMI alone is (or is not) an ideal severity-of-illness indicator for AN-BP patients.

For BN, the research, so far, has only provided partial support for the utility of the DSM-5 severity index. Some clinically based studies found that patients in the more severe BN categories had significantly higher psychiatric comorbidity, functional impairments, putative maintenance factors (e.g., perfectionism), ED body-related attitudes, and behaviours than those in the ‘mild’ and ‘moderate’ categories (Dakanalis et al., 2017, 2018; Dakanalis, Clerici, Riva, & Carrà, 2017). Other studies found minimal or no differences for these variables across the different BN severity categories (Gianini et al., 2017; Nakai et al., 2017; Smith et al., 2017). A study by Zayas et al. (2018) supported the utility of the BN severity index regarding ED psychopathology, but only for females, not for males. In terms of community studies, Grilo et al.’s (Grilo, Ivezaj, & White, 2015c) found differences between the severity categories in depressive symptoms, restraint, and eating concerns, but the size of the effect was small, offering only modest evidence that the severity specifiers detect differences on the assessed measures. It is also worth noting that only a few BN individuals fell into the ‘severe’ or ‘extreme’ categories, raising questions about the demarcation between these categories (Grilo et al., 2015c; Jenkins, Luck, Cardy, & Stanford, 2016).

Regarding BED, the majority of clinical studies provides weak or no support for the BED severity index in terms of psychiatric comorbidity, ED body-related attitude, or predicting prognosis between severity categories (Grilo, Ivezaj, & White, 2015a, 2015b; Lydecker et al., 2020). Only a few studies have shown significant differences between the categories in terms of BMI, ED features, comorbidity (anxiety, mood, and personality disorders), and other distress and impairment variables (Dakanalis, Riva, Serino, Colmegna, & Clerici, 2017). Similar to BN, the validity of the BED severity index has been further questioned when various studies were unable to classify individuals into either the ‘severe’ or ‘extreme’ categories (Gianini et al., 2017; Lydecker et al., 2020).

Overall, the utility of all three ED severity indices and their categories are inconclusive, which could be due to small sample sizes assessed in these studies or to measurement issues. Until today, research has mainly assessed the severity index separately for the different ED sub-types, but has not assessed all ED sub-types concurrently in the same study (Gianini et al., 2017; Nakai et al., 2017; Smith et al., 2017). Given the limited scope of studies assessing the utility of the DSM-5 severity indices in more than one ED sub-type, future studies are needed to assess the different severity indices and categories in various ED sub-types concurrently in the same study.

### 1.2 Drive for thinness: An alternative trans-diagnostic severity approach

The weaknesses in research support for the DSM-5 ED severity categories have led researchers to look at alternative approaches to assess severity in EDs, based on the number of purging methods (Gianini et al., 2017), and over-valuation of weight and shapes, a trans-diagnostic feature of EDs (Gianini et al., 2017; Grilo et al., 2015b, 2015c). Overall, there has been a strong research-based support for these alternative severity categories. The study by Gianini et al. (2017) assessed AN, BN, and BED concurrently in their study, but the weight and shape concern alternative approach was only assessed in their BED sample, and trans-diagnostically for the overall ED sample. It is not clear why the shape and weight categories were not assessed separately also for AN and BN. Future studies, should, therefore, assess trans-diagnostic severity indicators in all ED sub-types.

The different ED sub-types share other trans-diagnostic factors (e.g., restrictive eating, drive for thinness, self-esteem, and perfectionism) that have not previously been assessed (Fairburn, Cooper, & Shafran, 2003). Drive for thinness (DT), characterized by an extreme fear of weight gain, resulting in disordered eating patterns (mainly restrictive eating), has consistently been suggested as a cardinal feature of EDs (Chernyk & Lowe, 2010; De Young et al., 2013; Peñas-Lledó, Bulik, Lichtenstein, Larsson, & Baker, 2015). Evidence has shown that patients with AN, BN, and other specified eating or feeding disorders (OSFED) that exhibited lower DT had milder attitudinal and behavioural ED features, and lower comorbidity, than patients scoring high on DT (Abbate-Daga, Pierò, Gramaglia, Gandione, & Fassino, 2007; Penas-Lledo et al., 2009; Ramacciotti et al., 2002; Vervaet, Van Heeringen, & Audenaert, 2004). Although the relationship between DT and BED is not widely investigated, research has indicated that individuals with BED were found to have an excessive concern with shape and thinness and were more likely to have higher DT scores compared to non-bingers (Kuehnel & Wadden, 1994). DT has also been associated with binge-eating severity (De Zwaan et al., 1994). As an alternative to the DSM-5 severity categories, the above suggests that assessing DT as a trans-diagnostic severity indicator for all ED sub-types could be fruitful and would inform future decision-making processes.

### 1.3 The importance of a severity index for OSFED

Despite the potentially dangerous outcomes for OSFED that increase with severity, DSM-5 has not established
severity categories for OSFED sub-types, which could help identify at-risk OSFED patients (Hammerle, Huss, Ernst, & Bürger, 2016). In the DSM-5 severity classification approach, AN shares similar characteristics with OSFED/atypical anorexia (OSFED/AT), except that individuals with OSFED/AT are still within the normal weight range despite significant weight loss. BN and OSFED/purging disorder (PD) also share features, given the overlap in purging behaviours and weight criteria (APA, 2013). In terms of severity, studies have shown that adolescents with OSFED/AT experienced similar frequency of psychiatric comorbidities and suicidal ideations, but more distress related to eating and body concerns (Sawyer, Whitelaw, Le Grange, Yeo, & Hughes, 2016), and also were more affected by DT than their AN counter-partners (Davenport, Rushford, Soon, & McDermott, 2015). The mortality rate for OSFED/PD has been found to be significantly higher compared with BN (Koch, Quadflieg, & Fichter, 2014). This research clearly indicates that adverse consequences for OSFED patients increase with severity levels (Hammerle et al., 2016), yet the DSM-5 has not established severity categories for OSFED sub-types. The DSM-5 AN BMI severity specifier is not useful for OSFED/AT because most patients would fall into the ‘mild’ category.

Establishing severity categories would help capture the gradients of these disorders. Future studies assessing the DSM-5 severity categories could potentially apply the BN severity index criteria of inappropriate compensatory behaviours to OSFED/PD to see whether such behaviours can provide clinically significant information. However, it would also be interesting to assess an alternative severity indicator for this based on a DT severity distinction.

1.4 | The current study

This study aimed to overcome some of the weaknesses of previous studies and fill in important gaps in the research. This was done by applying all the DSM-5 severity categories for AN, BN, BED, OSFED/AT, and OSFED/PD concurrently in the same study, and by assessing an alternative severity category based on DT, a cardinal trans-diagnostic feature among EDs (Fairburn et al., 2003; Peñas-Lledó et al., 2015). For the first time, we also assessed AN-R and AN-BP sub-types separately, and included OSFED/AT and PD in our analyses. Specifically, using a large all-female sample, the aims of the current study were threefold: (1) To look at the frequency of ED severity categories based on (a) the DSM-5 indices for AN, BN, BED, and OSFED/PD (for the latter, the BN criteria were applied) and (b) an alternative DT severity categorization for these ED sub-types; (2) to examine the clinical validity and utility of (a) the DSM-5 severity categories and (b) the DT severity categories in terms of ED-related symptoms, general psychopathology, personality traits, and impulsive behaviours, and (3) to investigate the clinical usefulness of the DT severity categorization also for OSFED/AT for the assessed variables. Based on the previous findings on the DSM-5 severity categories, and the early supporting evidence of trans-diagnostic severity indicators, we predicted that DT would provide a clinically more meaningful way of classifying the different ED sub-types, than the DSM-5 severity categories.

2 | METHOD

2.1 | Sample

The sample comprised 2,811 women with a diagnosis of an ED [428 AN-R, 313 AN-BP, 1340 BN, 329 BED, 154 OSFED/AT, and 223 OSFED/PD] presenting for either inpatient or outpatient treatment to an ED unit in Barcelona (Spain). Patients were diagnosed according to DSM-IV-TR criteria (APA, 2000), and diagnoses were re-analysed and re-codified post hoc using DSM-5 criteria (APA, 2013). For the present analysis, from an initial sample of 2,954 ED patients, the following individuals were excluded: 13 BN sub-threshold, and 11 sub-threshold BED, because the numbers were too small for meaningful comparisons. Furthermore, 119 patients with unspecified feeding and eating disorder (UFED) were excluded from the analyses because of their heterogeneous profile.

2.2 | Measures

2.2.1 | Socio-demographic and clinical information

Several socio-demographic indices were gathered on the ED patients. These included age, education, marital status, employment, and socioeconomic status (based on employment status, occupational status, and educational attainment, as assessed by the Hollingshead Index; Hollingshead, 2011). Clinical information was assessed using a semi-structured face-to-face clinical interview (for further information, please refer to Fernández-Aranda & Turón, 1998). These variables included age of onset, duration of the disorder, number of previous treatments, weekly frequency of binges, vomiting episodes, laxative use, and diuretic use. Height and weight were also measured at intake. The BMI was calculated by dividing body weight in kilograms by the square of height in metres.
2.2.2 | Body composition

Body composition was assessed at intake using the Tanita Multi-Frequency Body Composition Analyzer MC-180MA (Tanita Corporation, Tokyo, Japan), a weighing instrument that uses bioelectrical impedance analysis for the screening of body composition. For the current study, Tanita was used to derive the two body composition variables; the percentage of fat mass, and muscle mass.

2.2.3 | Eating disorder pathology

The eating disorder inventory (EDI-2; Garner, 1991; Spanish version; Garner, 1998) includes 91 items to assess cognitive and behavioural characteristics related to EDs: DT, body dissatisfaction, bulimia, ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness, maturity fears, asceticism, impulse regulation, and social insecurity. Each question is on a six-point scale (ranging from ‘always’ to ‘never’), rated 0–3. The score for each sub-scale is then summed. A global measure of ED severity was obtained based on the sum of all the items on the scale. Internal consistency for the EDI sub-scales was adequate to excellent in our sample, ranging from \( \alpha = .60 \) for the asceticism sub-scale to \( \alpha = .90 \) for body dissatisfaction (\( \alpha = .85 \) was obtained for the DT sub-scale).

2.2.4 | General psychopathology

The Symptom Checklist-Revised (SCL-90-R; Derogatis, 1990; Spanish version; Derogatis, 2002) assesses a broad range of psychopathological symptoms. This test contains 90 items and helps to measure nine primary symptom dimensions: Somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Besides this, it includes three global indices: (a) a global severity index (GSI), designed to measure overall psychological distress; (b) a positive symptom distress index (PSDI), designed to measure the intensity of symptoms; and (c) a positive symptom total (PST). The GSI can be used as a summary of the test. Derogatis (2002) validated this scale in a Spanish population and reported a mean internal consistency (Coefficient alpha) of .75. In the current study, internal consistency for the SCL-90-R scales was excellent in our sample and ranged from .76 for the paranoid ideation sub-scale to .98 for all the SCL-90-R summary scales (PST, GSI, and PSDI).

2.2.5 | Personality

The Temperament and Character Inventory-Revised (TCI-R; Cloninger, 1999; Spanish version; Gutiérrez-Zotes et al., 2004), which comprises 240 items, is structured on seven personality dimensions: Four temperamental factors (novelty seeking, harm avoidance, reward dependence, and persistence), and three character dimensions (self-directedness, cooperativeness, and self-transcendence). Responses are rated on a five-point Likert scale (definitely false, mostly or probably false, neither true nor false or about equally true and false, mostly or probably true, definitely true). Cronbach’s alpha for the TCI-R in the current study sample was good to excellent, and ranged from .80 for the novelty-seeking to .90 for the persistence).

2.2.6 | Impulsive behaviours

The Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental for DSM-IV Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 2002), and the SCID-Clinical Version (First, Williams, Karg, & Spitzer, 2015) from 2015 onwards, were used to assess lifetime alcohol and drug abuse, and current tobacco use. Besides, self-harm, defined as direct and intentional self-injurious behaviours (cutting/burning /hitting/ scratching/hair-pulling), which did not lead to death, and lifetime suicide attempts (with the question ‘Have you ever attempted suicide?’), was assessed by a semi-structured clinical interview (Fernández-Aranda & Turón, 1998).

2.3 | Procedure

All ED patients were first assessed during a structured face-to-face interview [for further information, please refer to Fernández-Aranda & Turón, 1998]. During the interview, the clinical and impulsive behaviours data were retrieved based on the SCID-I (First et al., 2002), and from 2015 onwards the SCID-Clinical Version (First et al., 2015) criteria. ED diagnoses were made using this information. All interviews were carried out by experienced psychologists. Further data were obtained from the ED patients using the above-mentioned self-report questionnaires. Height and weight were assessed at intake using a measurement tape and a scale. Furthermore, body fat and mass were measured at the same time using Tanita device. Confidentiality was maintained throughout the whole assessment, and patients were allowed to withdraw from the study at any time. The Ethics
Committee of our hospital institution approved the current study, and informed consent was obtained from all patients.

2.4 | Categorizing eating disorder patients based on severity

2.4.1 | DSM-5 severity index categories

For each ED sub-type, we divided the patients into groups based on the DSM-5 severity criteria. For AN, where the severity specifiers are based on BMI, group designations were made following an in-person assessment of height and weight at the time of admission to our ED unit. According to DSM-5 (APA, 2013), we used the following severity categories for AN: ‘mild’: ≥17.0 kg/m², ‘moderate’: 16.0–16.99 kg/m², ‘severe’: 15.0–15.99 kg/m² and ‘extreme’: <15 kg/m². For BN, four severity groups based on the weekly frequency of inappropriate compensatory behaviours (vomits, laxative, and diuretic use) were defined (APA, 2013) as follows: ‘mild’ (1–3 episodes/week), ‘moderate’ (4–7 episodes/week), ‘severe’ (8–13 episodes/week), and ‘extreme’ (>14 episodes/week). For BED, the same categorization was used, with the difference that BED was only assessed based on binge eating, and not purging episodes. Given that the DSM-5 has not stipulated a severity index for the OSFED types, and OSFED/AT and PD currently fall into these ED classifications, we decided to use the AN BMI threshold for OSFED/AT, and the BN-purging thresholds for OSFED/PD.

2.4.2 | EDI-2 drive for thinness categories

We used an alternative classification system to the DSM-5 severity index based on the EDI-DT scale. The DT sub-scale assesses excessive concern with dieting, preoccupation with weight, and fear of weight gain. Garner and colleagues (Garner, Olmsted, Polivy, & Garfinkel, 1984) recommended a cut-off score of >14 for the EDI-DT sub-scale for screening purposes, which subsequently has been applied in various other studies (Penas-Lledo et al., 2009). This was the cut-off score that was used in the current study to divide ED patients into ‘low-DT’ and ‘high-DT’ scoring individuals.

2.5 | Statistical analysis

The statistical analysis was done with Stata16 (StataCorp, 2019) for windows. The comparison between the groups in the study (defined by the ED severity group) was based on chi-square tests ($\chi^2$) for categorical variables (such as the impulsive behaviours, self-harm and suicide attempts, and the consumption of substances), and on analysis of variance (ANOVA) for the quantitative measures (age, onset age of the ED, duration of the ED, binges and purging episodes, BMI, % of fat mass, % of muscle mass, and the raw scores in the questionnaires). The comparison for the discriminative capacity of the classifications obtained for the DSM-5 criteria and the EDI-2 DT scale was based on the estimation of effect-size measures: (a) partial eta-squared coefficient ($\eta^2$) was calculated for quantitative measures, through ANOVA procedures (values of 0.06, 0.10, and 0.25 were interpreted as low-poor, moderate-medium, and large-high effect size; Levine & Hullett, 2002); and (b) Cramer’s V coefficient was calculated for categorical measure (values of 0.06, 0.15, and 0.30 were interpreted as low-poor, moderate-medium, and large-high effect size; Cohen, 1988). In this study, discriminative capacity was evaluated using both the results of the significant tests ($p$ value), and the effect-size estimates. It must be considered that $p$ values are strongly related to the sample size. Small samples are under-powered to identify the relationships between the variables, giving non-significant results, even in the case of high differences or relevant effect sizes. Large samples are over-powered, and significance tests usually tend to achieve very small $p$ values ($p < .05$), even in the case of poor differences between the groups, or irrelevant effect sizes. We, therefore, decided to focus on reporting statistically and clinically meaningful findings (moderate-medium and/or large-high effect sizes) in the results section, with all non-significant findings reported in the tables. In addition, Finner’s correction test was used to control the increase in the Type-I error due to multiple statistical analyses. This is a family-wise error rate stepwise procedure, which has been shown to be a more powerful test than the classical Bonferroni correction (Finner, 1993).

3 | RESULTS

3.1 | Demographic

The first block of Table 1 includes the socio-demographic description for the whole sample ($n = 2,811$). Most ED patients were single (74.6%), with primary (43.2%) or secondary (41.3%) study levels, in mean-low (40.8%) to low (50.4%) social indices, and unemployed (60.1%). Mean age was 27.6 years old [Standard Deviation (SD) = 9.2]. The other columns of Table 1 display the frequency distribution for the socio-demographic features stratified by the diagnostic sub-types.
3.2 | Frequency distribution of the various severity categories

The bar-charts included in Figure 1 contain the numbers placed in each severity group according to the DSM-5 and the EDI-2 DT scales for each diagnostic sub-type. Considering the DSM-5 criteria, the more prevalent categories are ‘mild’ and ‘moderate’ (these both groups included 63.7% of AN-R patients, 78.9% of AN-BP, 73.1% of BN, 86.6% of BED, 100% of OSFED/AT, and 79.4% of OSFED/PD). For the EDI-2 DT classification, the proportion of patients in the low score screening group was 85% for AN-R, 72.2% for AN-BP, 12.2% for BN, 54.7% for BED, 22.7% for OSFED/AT, and 18.4% for OSFED/PD.

3.3 | Comparison of the classifications for the severity categories

Table 2 shows the discriminative capacity for defining the severity groups based on the DSM-5 and the EDI-2 DT criteria. Table S1 contains the complete results obtained in the ANOVA and the chi-square procedures, including the frequency distribution within each group (mean and SD for the quantitative measures, and count and proportions for categorical variables), the significance (p value), and effect-size measures (partial η² and Cramer’s V coefficients).

Within AN-R sub-type, the DSM-5 classification achieved an adequate discriminative capacity for the percentage of fat mass, self-harming behaviours, and suicide attempts, and lifetime alcohol and drugs abuse. In terms of the EDI-DT distinction, discriminative capacity for the AN-R was found for some of the EDI-2 (body dissatisfaction, ineffectiveness, asceticism, and social insecurity), and SCL-90-R scales (interpersonal sensitivity, depression, PST, GSI, and PSDI). Regarding the impulsive behaviours, significant and meaningful differentiations were found for current tobacco use, and lifetime alcohol and drug abuse.

AN-BP provided statistically significant findings, with moderate to high effect sizes only for the % fat mass for the DSM-5 differentiation. The differentiation capability of EDI-DT was significantly greater and provided statistically significant findings with moderate to high effect sizes for various EDI-2 (body dissatisfaction, bulimia, interoceptive awareness, ineffectiveness, and asceticism) and SCL-90-R (obsessive–compulsive, anxiety, paranoid, psychotic symptoms, PST, GSI, and PSDI) sub-scales. Finally, for the AN-BP sub-type, the EDI-DT differentiation also provided a significant discriminative finding for the TCI-R self-defectiveness scale and various impulsive behaviours (self-harming, current tobacco use, and lifetime alcohol and drug abuse).

For the BN patients, the DSM-5 severity index criteria achieved discriminative capability for weekly binge-eating episodes, and a range of impulsive behaviours, including self-harm, suicide attempts, and lifetime alcohol and drug abuse. The EDI-2 DT classification achieved discriminative capability for two EDI-2 sub-scales (body dissatisfaction and asceticism), as several impulsive behaviours (self-harming behaviours, current tobacco use, and lifetime alcohol and drug use).

As regards to BED, the DSM-5 severity index criteria achieved discriminative capability for various impulsive behaviours (self-harming, lifetime suicide attempts, and alcohol abuse). The EDI-2 DT classification achieved discriminative capability for two EDI-2 sub-scales (body dissatisfaction and interoceptive awareness), for the global psychopathological distress scale (SCL-90R GSI), as well as lifetime alcohol and drug abuse.

Regarding OSFED/AT, all the patients fell into the ‘mild’ severity group and, therefore, DSM-5 severity groups were not obtained. On the other hand, the EDI-2 DT classification achieved discriminative capability for the following EDI-2 sub-scales (body dissatisfaction, interoceptive awareness, bulimia, and asceticism) and the impulsive behaviours, lifetime suicide attempts, self-harming behaviours, and current tobacco use.

Finally, considering the OSFED/PD diagnosis, the DSM-5 criteria achieved no discriminative capacity for any of the measures assessed, while the EDI-2 DT classification achieved discriminative capacity on the EDI-2 sub-scales body dissatisfaction and asceticism.

4 | DISCUSSION

This study evaluated the clinical usefulness of the DSM-5 severity indicators for all ED sub-types (AN, BN, and BED) concurrently in the same study in a female ED treatment-seeking sample, and, for the first time, also applied the severity indices of BN to OSFED/PD. Furthermore, we were interested to assess whether an alternative severity classification approach based on DT, a transdiagnostic feature of EDs (Fairburn et al., 2003), would provide better utility than the DSM-5 severity categories.

Our first main finding was related to the frequency distribution of the DSM-5 and DT categories for the different ED sub-types. We found that the DSM-5 severity indicator classification system placed all ED patients into the ‘mild’ or ‘moderate’ groups. This raises questions about its validity in identifying ‘severe’ and ‘extreme’ patients. One would expect a good proportion of severe patients to appear in these samples. On the other hand, the DT severity indicator classification system appeared to discriminate more effectively. It placed a significantly
<table>
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<tr>
<th>Marital status</th>
<th>Total N = 2,811</th>
<th>AN-R N = 428</th>
<th>AN-BP N = 317</th>
<th>BN N = 1,364</th>
<th>BED N = 329</th>
<th>OSFED/AT N = 154</th>
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<td>8.9%</td>
<td>44</td>
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<td>17</td>
<td>4.0%</td>
<td>14</td>
<td>4.5%</td>
<td>105</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary/less</td>
<td>1,214</td>
<td>43.2%</td>
<td>152</td>
<td>35.5%</td>
<td>130</td>
<td>41.5%</td>
<td>600</td>
</tr>
<tr>
<td>Secondary</td>
<td>1,160</td>
<td>41.3%</td>
<td>174</td>
<td>40.7%</td>
<td>140</td>
<td>44.7%</td>
<td>566</td>
</tr>
<tr>
<td>University</td>
<td>437</td>
<td>15.5%</td>
<td>102</td>
<td>23.8%</td>
<td>43</td>
<td>13.7%</td>
<td>198</td>
</tr>
<tr>
<td>Social position</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>16</td>
<td>0.6%</td>
<td>1</td>
<td>0.2%</td>
<td>1</td>
<td>0.3%</td>
<td>8</td>
</tr>
<tr>
<td>Mean—high</td>
<td>87</td>
<td>3.1%</td>
<td>12</td>
<td>2.8%</td>
<td>8</td>
<td>2.6%</td>
<td>39</td>
</tr>
<tr>
<td>Mean</td>
<td>145</td>
<td>5.2%</td>
<td>24</td>
<td>5.6%</td>
<td>13</td>
<td>4.2%</td>
<td>70</td>
</tr>
<tr>
<td>Mean—low</td>
<td>1,146</td>
<td>40.8%</td>
<td>176</td>
<td>41.1%</td>
<td>141</td>
<td>45.0%</td>
<td>579</td>
</tr>
<tr>
<td>Low</td>
<td>1,417</td>
<td>50.4%</td>
<td>215</td>
<td>50.2%</td>
<td>150</td>
<td>47.9%</td>
<td>668</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>1,689</td>
<td>60.1%</td>
<td>246</td>
<td>57.5%</td>
<td>225</td>
<td>71.9%</td>
<td>886</td>
</tr>
<tr>
<td>Student</td>
<td>448</td>
<td>15.9%</td>
<td>115</td>
<td>26.9%</td>
<td>41</td>
<td>13.1%</td>
<td>172</td>
</tr>
<tr>
<td>Employed</td>
<td>674</td>
<td>24.0%</td>
<td>67</td>
<td>15.7%</td>
<td>47</td>
<td>15.0%</td>
<td>306</td>
</tr>
<tr>
<td>Age (years-old); mean-SD</td>
<td>27.6</td>
<td>9.2</td>
<td>24.8</td>
<td>8.3</td>
<td>26.2</td>
<td>7.3</td>
<td>27.2</td>
</tr>
</tbody>
</table>

Abbreviations: AN-R, Anorexia Nervosa Restrictive; AN-BP, Anorexia Nervosa Binge Purging; BN, Bulimia Nervosa; BED, Binge-Eating Disorder; OSFED/AT, Other Specified Feeding or Eating Disorders (OSFED)/Atypical Anorexia; OSFED/PD, OSFED/Purging Disorder; SD, standard deviation.
larger proportion of AN (AN-R and AN-BP) patients in the 'mild' DT group. Conversely, a higher proportion of BN, OSFED/AT, and PD patients were placed in the 'severe' DT group. For BED, this distribution seemed more balanced.

A second major finding concerned the relative power of each classification system to differentiate severity. We found that both severity classifications were equally supported for the impulsive behaviours. However, for the ED and general psychopathology measures, the DT differentiation was more robust than the DSM-5 severity categories. Specifically, the DT findings were most pronounced for the AN-BP patients, followed by AN-R. Significant differences with meaningful effect sizes were minimal for the other ED sub-types. In terms of personality, no further significant findings were obtained for either of the two severity classification systems. A minor exception was that higher self-directedness scores were found in the 'low' DT group in the AN-BP sample, compared to the 'high' DT group. Each of the above findings will be discussed in more detail in the subsequent sections.

### 4.1 Distribution of the DSM-5 and DT severity indices

In our study, the DSM-5 severity classification system placed most of the ED patients (>60%) in the 'mild' or 'moderate' categories. Similar distributions have been found in previous community samples for BN (Grilo et al., 2015c; Smink et al., 2014), and BED (Grilo et al., 2015b). This is to be expected, given the lower severity of ED symptoms in such a sample. However, one might expect a different frequency distribution in a clinical sample.

Nevertheless, our DSM-5 severity frequency results agree with previous studies that found that more than 50% of their AN (Dakanalis, Timko, et al., 2018; Machado et al., 2017; Smith et al., 2017), BN (Jenkins et al., 2016),
### Table 2

Discriminative capacity for the severity groups based on the Diagnostic and Statistical Manual-5 and the Eating Disorder Inventory-2 Drive for Thinness criteria: Partial eta square (η²) for quantitative variables and Cramer-V for categorical variables.

<table>
<thead>
<tr>
<th>Measure</th>
<th>AN-R n = 428</th>
<th>AN-BP n = 317</th>
<th>BN n = 1,364</th>
<th>BED n = 329</th>
<th>OSFED/AT n = 154</th>
<th>OSFED/PD n = 223</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DSM-5</td>
<td>EDI-DT</td>
<td>DSM-5</td>
<td>EDI-DT</td>
<td>DSM-5</td>
<td>EDI-DT</td>
</tr>
<tr>
<td>Age (years-old)</td>
<td>.038</td>
<td>.000</td>
<td>.036</td>
<td>.003</td>
<td>.008</td>
<td>.021</td>
</tr>
<tr>
<td>Onset ED (years-old)</td>
<td>.017</td>
<td>.002</td>
<td>.039</td>
<td>.000</td>
<td>.003</td>
<td>.001</td>
</tr>
<tr>
<td>Duration ED (years)</td>
<td>.020</td>
<td>.001</td>
<td>.006</td>
<td>.008</td>
<td>.003</td>
<td>.019</td>
</tr>
<tr>
<td># previous treatments</td>
<td>.056</td>
<td>.006</td>
<td>.008</td>
<td>.017</td>
<td>.068</td>
<td>.006</td>
</tr>
<tr>
<td>Binge episodes</td>
<td>.003</td>
<td>.022</td>
<td>.306</td>
<td>.008</td>
<td>.008</td>
<td>.008</td>
</tr>
<tr>
<td>Purging episodes</td>
<td>—</td>
<td>—</td>
<td>.010</td>
<td>.016</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>—</td>
<td>.009</td>
<td>.036</td>
<td>.003</td>
<td>.000</td>
<td>.039</td>
</tr>
<tr>
<td>% Fat mass</td>
<td>.182</td>
<td>.004</td>
<td>.112</td>
<td>.041</td>
<td>.005</td>
<td>.002</td>
</tr>
<tr>
<td>% Muscle mass</td>
<td>.087</td>
<td>.010</td>
<td>.078</td>
<td>.001</td>
<td>.003</td>
<td>.000</td>
</tr>
<tr>
<td>EDI: Drive thinness</td>
<td>.85</td>
<td>.038</td>
<td>.035</td>
<td>.001</td>
<td>.003</td>
<td>.003</td>
</tr>
<tr>
<td>EDI: Body dissatisfaction</td>
<td>.90</td>
<td>.012</td>
<td>.271</td>
<td>.036</td>
<td>.356</td>
<td>.000</td>
</tr>
<tr>
<td>EDI: Inter. awareness</td>
<td>.80</td>
<td>.014</td>
<td>.080</td>
<td>.028</td>
<td>.198</td>
<td>.005</td>
</tr>
<tr>
<td>EDI: Bulimia</td>
<td>.80</td>
<td>.011</td>
<td>.031</td>
<td>.011</td>
<td>.181</td>
<td>.022</td>
</tr>
<tr>
<td>EDI: Inter. distrust</td>
<td>.79</td>
<td>.022</td>
<td>.047</td>
<td>.015</td>
<td>.035</td>
<td>.004</td>
</tr>
<tr>
<td>EDI: Ineffectiveness</td>
<td>.87</td>
<td>.006</td>
<td>.108</td>
<td>.021</td>
<td>.102</td>
<td>.001</td>
</tr>
<tr>
<td>EDI: Maturity fears</td>
<td>.79</td>
<td>.004</td>
<td>.009</td>
<td>.008</td>
<td>.059</td>
<td>.006</td>
</tr>
<tr>
<td>EDI: Perfectionism</td>
<td>.71</td>
<td>.008</td>
<td>.073</td>
<td>.004</td>
<td>.064</td>
<td>.002</td>
</tr>
<tr>
<td>EDI: Impulse regulation</td>
<td>.80</td>
<td>.026</td>
<td>.073</td>
<td>.021</td>
<td>.091</td>
<td>.004</td>
</tr>
<tr>
<td>EDI: Asceticism</td>
<td>.60</td>
<td>.010</td>
<td>.182</td>
<td>.011</td>
<td>.171</td>
<td>.002</td>
</tr>
<tr>
<td>EDI: Social insecurity</td>
<td>.78</td>
<td>.012</td>
<td>.103</td>
<td>.033</td>
<td>.045</td>
<td>.001</td>
</tr>
<tr>
<td>SCL: Somatization</td>
<td>.90</td>
<td>.004</td>
<td>.055</td>
<td>.014</td>
<td>.091</td>
<td>.005</td>
</tr>
<tr>
<td>SCL: Obsess/compulsive</td>
<td>.85</td>
<td>.004</td>
<td>.051</td>
<td>.018</td>
<td>.128</td>
<td>.002</td>
</tr>
<tr>
<td>SCL: Interp. Sensitivity</td>
<td>.86</td>
<td>.006</td>
<td>.149</td>
<td>.014</td>
<td>.186</td>
<td>.002</td>
</tr>
<tr>
<td>SCL: Depressive</td>
<td>.90</td>
<td>.009</td>
<td>.111</td>
<td>.016</td>
<td>.137</td>
<td>.003</td>
</tr>
<tr>
<td>SCL: Anxiety</td>
<td>.88</td>
<td>.004</td>
<td>.059</td>
<td>.023</td>
<td>.118</td>
<td>.004</td>
</tr>
<tr>
<td>SCL: Hostility</td>
<td>.87</td>
<td>.011</td>
<td>.054</td>
<td>.027</td>
<td>.054</td>
<td>.006</td>
</tr>
<tr>
<td>SCL: Phobic anxiety</td>
<td>.82</td>
<td>.006</td>
<td>.042</td>
<td>.024</td>
<td>.080</td>
<td>.002</td>
</tr>
<tr>
<td>SCL: Paranoid id.</td>
<td>.76</td>
<td>.009</td>
<td>.059</td>
<td>.011</td>
<td>.100</td>
<td>.002</td>
</tr>
<tr>
<td>SCL: Psychotic</td>
<td>.82</td>
<td>.008</td>
<td>.069</td>
<td>.012</td>
<td>.123</td>
<td>.005</td>
</tr>
<tr>
<td>SCL: PST score</td>
<td>.98</td>
<td>.007</td>
<td>.108</td>
<td>.022</td>
<td>.160</td>
<td>.005</td>
</tr>
<tr>
<td>SCL: GSI score</td>
<td>.98</td>
<td>.007</td>
<td>.210</td>
<td>.048</td>
<td>.433</td>
<td>.020</td>
</tr>
<tr>
<td>SCL: PSDI score</td>
<td>.98</td>
<td>.005</td>
<td>.117</td>
<td>.017</td>
<td>.161</td>
<td>.001</td>
</tr>
<tr>
<td>TCI: Novelty seeking</td>
<td>.80</td>
<td>.023</td>
<td>.001</td>
<td>.016</td>
<td>.005</td>
<td>.006</td>
</tr>
<tr>
<td>TCI: Harm avoidance</td>
<td>.90</td>
<td>.005</td>
<td>.061</td>
<td>.016</td>
<td>.056</td>
<td>.003</td>
</tr>
<tr>
<td>TCI: Reward-depend.</td>
<td>.84</td>
<td>.005</td>
<td>.003</td>
<td>.010</td>
<td>.004</td>
<td>.008</td>
</tr>
<tr>
<td>TCI: Persistence</td>
<td>.90</td>
<td>.009</td>
<td>.002</td>
<td>.007</td>
<td>.001</td>
<td>.002</td>
</tr>
<tr>
<td>TCI: Self-directedness</td>
<td>.87</td>
<td>.016</td>
<td>.055</td>
<td>.017</td>
<td>.108</td>
<td>.001</td>
</tr>
<tr>
<td>TCI: Cooperative.</td>
<td>.84</td>
<td>.016</td>
<td>.008</td>
<td>.003</td>
<td>.002</td>
<td>.001</td>
</tr>
<tr>
<td>TCI: Self-transcend.</td>
<td>.84</td>
<td>.006</td>
<td>.005</td>
<td>.011</td>
<td>.003</td>
<td>.001</td>
</tr>
</tbody>
</table>

Note: η² values range from 0 to 1, with higher values indicating a stronger association. Cramer-V values range from 0 to 1, with higher values indicating a stronger association.
and BED (Dakanalis, Zanetti, Colmegna, Riva, & Clerici, 2018; Gianini et al., 2017; Grilo et al., 2015a; Lydecker et al., 2020; Smith et al., 2017) patients were in the ‘mild’ or ‘moderate’ categories.

These DSM-5 discrepant findings may be either due to the inability of the DSM-5 to capture severity appropriately, or because the DSM-5 severity categorization could have been confounded by the level of care. For instance, in the study by Gianini et al. (2017), the AN sample was from an inpatient unit, whereas our AN sample comprised a mixture of inpatients and outpatients.

In regard to the DT severity indicator distinctions, we found that for AN-R and AN-BP, most patients (>70%) were classified into the ‘low’-DT group, but the majority (>75%) of the BN, OSFED/AT, and PD patients were grouped into the ‘high’ DT category. For BED, more than 50% also scored low on DT. However, in this group, the distribution was more balanced (55% ‘low’ DT vs. 45% ‘high’ DT).

It somehow seems paradoxical that such a high proportion of the AN group does not have ‘high’ DT. Nonetheless, our findings are in line with other studies that have also revealed lower DT scores in AN samples (Abbate-Daga et al., 2007; Penas-Lledo et al., 2009; Ramacciotti et al., 2002). The ‘low’ DT scores in our AN sample could be attributable to the fact that this group of patients may have been more likely to minimize, or even deny their DT and fat phobia symptoms. That could be due to ego-syntonic functioning in these patients, so that these individuals are not worried about their weight, because they are already thin (Rieger, Touyz, Swain, & Beumont, 2001).

Our finding, that BN patients were represented in the ‘high’ DT group, whereas BED was represented more evenly across the two severity DT sub-types, agrees with a previous study (Penas-Lledo et al., 2009). Even though our overall findings are mainly in line with the findings of previous studies (Abbate-Daga et al., 2007; Penas-Lledo et al., 2009), it needs to be acknowledged that our cut-off score of >14 on the EDI-DT is significantly higher than that used in other studies. Ramacciotti et al. (2002) used a cut-off score of >7 on the same scale. This means that our study used a higher threshold to be classified into the high-DT group.

### Table 2 (Continued)

<table>
<thead>
<tr>
<th></th>
<th>AN-R n = 428</th>
<th>AN-BP n = 317</th>
<th>BN n = 1,364</th>
<th>BED n = 329</th>
<th>OSFED/AT n = 154</th>
<th>OSFED/PD n = 223</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suicide attempts</td>
<td>.180a</td>
<td>.075</td>
<td>.139a</td>
<td>.056</td>
<td>.223a</td>
<td>.084</td>
</tr>
<tr>
<td>Tobacco use</td>
<td>.090</td>
<td>.121a</td>
<td>.080</td>
<td>.285a</td>
<td>.068</td>
<td>.185a</td>
</tr>
<tr>
<td>Alcohol abuse</td>
<td>.165a</td>
<td>.109a</td>
<td>.144a</td>
<td>.135a</td>
<td>.223a</td>
<td>.105a</td>
</tr>
<tr>
<td>Drug abuse</td>
<td>.177a</td>
<td>.103a</td>
<td>.108a</td>
<td>.114a</td>
<td>.205a</td>
<td>.102a</td>
</tr>
</tbody>
</table>

Note: Effect size [η² for Analysis of Variance (ANOVA) and Cramer-V for chi-square tests (γ²)]. Abbreviations: α, Cronbach-alpha in the study; AN-BP, Anorexia Nervosa Binge Purging; AN-R, Anorexia Nervosa Restrictive; BN, Bulimia Nervosa; BED, Binge-Eating Disorder; DSM-5, Diagnostic and Statistical Manual of Mental Disorders (DSM-5); EDI-2 DT, Eating Disorder Inventory (EDI-2) Drive for Thinness (DT) sub-scale; OSFED/AT, Other Specified Feeding or Eating Disorders (OSFED)/Atypical Anorexia; OSFED/PD, OSFED/Purging Disorder; SD, standard deviation.

aEffect size into the mild/moderate to the high/large range (η² > 0.10 or V > 0.15).

bBold: significant comparison with effect.

Our analysis of the application of the DSM-5 severity classification system identified very limited significant findings. Except for % of body fat for AN, a proxy for BMI, and impulsive behaviours, our findings revealed no significant differences between the DSM-5 severity categories for ED symptoms, general psychopathology, and personality for all ED sub-types. This was not a surprise, as it agrees with other treatment-seeking ED studies, assessing the usefulness of the DSM-5 severity indices. These studies too found only minimal or no support for cross-sectional differences on ED symptoms, and other impairment-related variables for AN (Dalle Grave et al., 2018; Gianini et al., 2017; Machado et al., 2017; Reas & Ro, 2017; Zayas et al., 2018). Other studies assessing BN (Gianini et al., 2017; Grilo et al., 2015a; Jenkins et al.,
2016; Nakai et al., 2017), and BED (e.g., Grilo et al., 2015a; Nakai et al., 2017) also only found a few statistically significant differences in ED symptomatology and associated psychopathology. The effect sizes for these differences were generally small.

We were able to identify significant differences in impulsive behaviours across the severity categories for AN-R, BN, and BED, but not AN-BP. In the case of OSFED/PD, differences were found for self-harming behaviours, suicide attempts, and lifetime alcohol and drug use. Interestingly, a reversed effect was observed for AN, but not BN and BED. We found that a higher BMI, indicating a low severity level, was associated with more impulsive behaviours. One possible interpretation is that the AN patients with a higher BMI are more similar to relatively higher weights in BN and BED, but further research is required to assess this.

We examined lifetime substance abuse in relation to DSM-5 severity classification. To our knowledge, there are only very few studies that have done this, for BN (Dakanalis, Bartoli, et al., 2017; Dakanalis, Clerici, et al., 2017), and for BED (Dakanalis, Colmegna, et al., 2018). Similar to our findings, these studies also found an increase in lifetime substance abuse across the severity groups for BN and BED. For AN-BP, our study found no significant differences across the severity groups in lifetime substance use. This partly agrees with a previous study (Dakanalis, Timko, et al., 2018) that found no significant differences across the AN severity groups in lifetime substance use.

Our findings also agree with the broader impulsivity literature in EDs. These studies have shown that impulsive behaviours are linked to ED symptom severity (Mallorqui-Bague et al., 2020; Todisco et al., 2020; Waxman, 2009; Puccio et al., 2019) and a poorer prognosis (Aguera et al., 2017; Fischer, Peterson, & McCarthy, 2013). Our conclusion is, therefore, that, in the absence of sufficient and robust evidence, caution should be exercised regarding conclusive statements suggestive of the validity of the DSM-5 severity specifiers.

4.3 | The distinctiveness of the EDI-DT severity groups

Our analyses indicate that ‘low’ DT patients, irrespective of their BMI, have less severe ED symptoms than ‘high’ DT scoring patients. We found that the ‘high’ DT group scored generally higher than the ‘low’ DT individuals on several EDI-2 scales for all ED sub-types. They also scored high for impulsive behaviours on all ED sub-types, except for OSFED/PD.

The results were most significant for AN-BP, followed by AN-R. These two groups also showed some significant findings for general psychopathology (i.e., anxiety, depression). The differences for BED, BN, OSFED/AT, and PD for ED symptoms were less significant and there were hardly any significant differences in general psychopathology. This is similar to previous studies that have found higher EDI-2 and depression scores in a ‘high’ compared to a ‘low’ DT group of AN (Abbate-Daga et al., 2007), and OSFED/AT (Davenport et al., 2015) patients.

Our findings that the results for the DT severity distinction were most pronounced for the AN-BP patients, agree, with a previous study that indicated that restricting is a non-weight-based indicator of severity in individuals with AN-BP (De Young et al., 2013). This finding might be related to the changing nature of EDs, as shown by an increase of culture-bound and bulimic forms of EDs. More broadly, our findings are also in line with previous studies that have shown that AN-BP patients tend to have more psychopathology, more co-occurring psychiatric symptoms, and a worse outcome than AN-R (Peat, Mitchell, Hoek, & Wonderlich, 2009).

For the personality measure, the only significant finding was higher self-directedness scores in the AN-BP subtype of the ‘low DT’ (vs. ‘high DT’) severity category. All other findings for DSM-5 and DT classifications were non-significant. This finding agrees with another study (Abbate-Daga et al., 2007) that looked at the same DT distinction in AN patients. Our findings are also in concordance with previous studies that have shown that ED patients with high scores on the TCI-R self-directedness scale responded better to treatment, and were less likely to drop out from treatment (Dalle Grave et al., 2007). These generally overall null findings for personality are surprising. Maladaptive personality traits (high harm avoidance, novelty seeking, persistence, and low levels of self-directedness) have commonly been related to ED severity (Cassin & von Ranson, 2005), prognosis, and the number of hospitalizations (Westen & Harnden-Fischer, 2001).

The finding that the DT distinction was less pronounced for the ED sub-types with bulimic symptoms with a normal weight (BN, BED, and OSFED/PD) is intriguing. It might be related to the fact that, for these ED sub-types, negative affect could have been an important additional severity indicator not considered in the current study. This observation is in line with Stice’s dual pathway model for bulimic symptoms (Puccio, Fuller-Tyszkiewicz, Buck, & Krug, 2019; Stice, Shaw, & Nemeroff, 1998), which specifies dietary restraint, a proxy for DT, and negative affect as key variables. It is also in line with various taxometric studies that have continuously revealed a pure ‘dietary’, and a mixed ‘dietary-depressive’, sub-type in BN (Chen & Le Grange, 2007; Grilo, 2004), and BED (Grilo, Masheb, & Wilson, 2001).
This differentiation is also supported by a recent network analysis study (Forbush, Siew, & Vitevitch, 2016). This was a study of ED symptoms that found dietary restraint and restrictive eating was of central importance, even to the extent that when these two variables were removed from the network, the ED symptoms resulted in fragmented smaller disjointed elements.

4.4 | Theoretical and clinical implications

Our current results may have some implications for questioning current DSM-5 (APA, 2013) criteria. First, intense fear of gaining weight or of becoming fat, which is currently outlined as criterion B for AN in the DSM-5, may potentially not apply to a significant proportion of AN patients that present with AN-BP. AN-BP may not be necessary. AN patients that present with AN-BP may be better regarded as an advanced phase of the AN syndrome. The distinctiveness analyses for the DT severity categories were most evident in AN-BP. However, further longitudinal research, focusing on the DT severity distinctions, is needed to be able to confirm this cross-over hypothesis.

Second, the differentiation between AN–R and AN-BP may not be necessary. AN–R and AN-BP were distributed across the two DT sub-types (with both scoring generally low). The most significant findings for the DT distinctiveness analyses were found for these two AN sub-types. These findings of the study agree with prospective research that suggests that this differentiation might not be necessary (Eddy et al., 2008).

Third, AN-BP may be better regarded as an advanced phase of the AN syndrome. The distinctiveness analyses for the DT severity categories were more evident in AN-BP. However, further longitudinal research, focusing on the DT severity distinctions, is needed to be able to confirm this cross-over hypothesis.

Fourth, the current findings undermine the notion that BMI or the frequency of compensatory behaviours alone are enough to meaningfully determine ED. Severity dimensions based on cognitive domains, such as DT yield, stronger, more clinically useful information, than the DSM-5 severity indices.

Future approaches to assess severity in EDs would, therefore, benefit from comprising a multi-layered approach to exemplify illness severity. This could comprise, among others, a range of affective, social, and biological domains (Keel et al., 2013; Weigel et al., 2019) with the inclusion also of objective measures such as hormonal levels, blood, biochemical, and neurocognitive profiles (Vaz-Leal et al., 2018; Brown et al., 2018; Cassioli et al., 2020; Paslakis et al., 2019). Finally, an important addition to this could be continued examination of trans-diagnostic severity indicators, such as self-esteem, interpersonal problems, perfectionism, and mood intolerance, which are all outlined in the trans-diagnostic theory for EDs (Fairburn et al., 2003). Future studies would also benefit from assessing whether any of the proposed domains and trans-diagnostic factors increase severity through an interactive or multiplicative effect.

Fifth, special consideration needs to be given with regard to how severity can be best assessed for OSFED patients. In the current study, only limited support was provided for the DSM-5 severity index for PD, and the DT differentiation for OSFED/AT, and PD. This suggests that assessing further severity indicators for these ED sub-types would be worthwhile (Riesco et al., 2018; Sawyer et al., 2016). For OSFED/PD, it would be imperative to investigate the extent to which loss of control over eating and subjective binge-eating episodes, both of which have been related to PD (Keel, 2019), affect purging severity.

This study also has a number of implications for clinicians. The results suggest that clinicians should be accustomed to look for the full variety of ED symptoms displayed by their patients, irrespective of their specific DSM-5 ED diagnosis. For instance, our findings suggest that rather than focusing on a single criterion, such as BMI in AN-BP patients, the aggregated occurrence of various features (low BMI, DT, and bulimic behaviours) would need to be taken into consideration to be able to properly assess illness severity. The same principle might apply to the other ED sub-types. DSM-5 does provide clinicians with the flexibility to alter the severity classification of a patient based on factors such as the intensity of symptoms, functional impairment, and the need for supervision. If appropriately used, this might improve the utility of the DSM-5 severity indices. In future studies, it would be interesting to see how clinicians take advantage of this recommendation, and how potential, clinician-judged alterations to these categorizations could be incorporated in a meaningful way into research.

4.5 | Limitations and strengths

The current study is not without limitations, which need to be acknowledged. Firstly, our cross-sectional study design precludes examination of the predictive significance of the DSM-5 and DT severity classifications in terms of prognostic outcomes, treatment-efficacy, or cross-over movements between ED diagnoses. Secondly, our findings are not generalizable to non-treatment-seeking individuals and males with EDs. Thirdly, the EDI-DT scale, which was used to differentiate the ED patients into the ‘low/high’ DT groups, correlated significantly with the other EDI sub-scales (r ranging from .17 for interpersonal distrust to .55 for asceticism). This might partially account for the differences observed for the other EDI sub-scales based on the DT distinction analyses. Fourthly, a number of our findings are based on
self-reported data, where objective data on medical conditions were not available. However, ED diagnosis, ED symptoms, and impulsive behaviours were ascertained through a semi-structured interview. Fifthly, the severity level of the AN-BP sample was assessed exclusively based on BMI and not binge-purging symptomatology. Similarly, BN was assessed based on inappropriate purging behaviours. Excessive exercise and/or ‘severe’ dietary restraint were not assessed. Sixthly, even though our sample size was large, it needs to be acknowledged that the ‘severe’ and ‘extreme’ groups for some of the assessed impulsive behaviours comprised low numbers. This limited the possibility of detecting significant differences between groups. Despite these limitations, the study has some strengths.

Conversely, our study also included various strengths. Firstly, our study allowed for a replication of prior findings of the DSM-5 severity indices and categories in a new ED sample comprising all the official ED sub-types, as well as OSFED/AT and PD. Secondly, we also assessed a novel integration of a trans-diagnostic severity indicator based on DT. Thirdly, only significant findings with effect sizes of a moderate to large effect size were included in our results. This allowed us to understand the robustness in our findings.

5 | CONCLUSIONS

In conclusion, our findings add to the increasing evidence indicating that the DSM-5 severity indices for the different ED sub-types provide only limited clinical utility in differentiating the distinct ED sub-types in terms of ED symptomatology, general psychopathology, and personality. Our findings also provide initial support for an alternative trans-diagnostic DT severity category that may be more clinically useful than the DSM-5 severity indices for EDs. Improved measures as suggested by our findings might help, with prognostic information, and support clinicians in tracking patients’ progress based on a range of ED severity indicators, and not just diagnosis alone, in order to determine more tailored treatments (Kan et al., 2019). Future research is needed to determine the DT-based categories in terms of their relevance for theory, therapy, and for how they could be considered for later diagnostic systems.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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