

Less Symptomatic, but Equally Impaired: Clinical Impairment in Restricting versus  
Binge-eating/Purging Subtype of Anorexia Nervosa

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## Abstract

**Objective:** This study investigated subtype differences in eating disorder-specific impairment in a treatment-seeking sample of individuals with anorexia nervosa (AN). **Method:** The Clinical Impairment Assessment (CIA) and the Eating Disorder Examination- Questionnaire (EDE-Q) were administered to 142 patients. Of these, 54.9% were classified as restricting type (AN-R) and 45.1% were classified as binge-eating/purging type (AN-B/P) based on an average weekly occurrence of binge eating and/or purging episodes ( $\geq 4$  episodes/28 days). **Results:** Individuals with AN-B/P exhibited higher levels of core ED psychopathology (dietary restraint, eating concern, shape/weight concerns) in addition to the expected higher frequency of binge/purge episodes. No significant differences existed between AN subtypes in the severity of ED-related impairment. Overall, weight/shape concerns and binge eating frequency significantly predicted level of impairment. Differential associations were observed between the type of ED pathology that significantly contributed to impairment according to AN subtype. **Discussion:** Although those with AN-B/P showed higher levels of core attitudinal and behavioural ED pathology than AN-R, no significant differences in ED-specific impairment were found between AN subtypes. Eating disorder-related impairment in AN was not related to the severity of underweight or purging behaviours, but was uniquely and positively associated with weight/shape concerns and binge episode frequency.

*Keywords:* anorexia nervosa; impairment; subtype; quality of life

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Anorexia nervosa (AN) is characterized by a relentless restriction of energy intake despite potentially life-threatening medical consequences and premature mortality (Fichter & Quadflieg, 2016; Keshaviah et al., 2014). Anorexia nervosa is also associated with a range of functional impairment, including social isolation and/or a failure to achieve academic or employment potential (Klump, Bulik, Kaye, Treasure, & Tyson, 2009; Schmidt et al., 2016). Despite these sequelae, individuals with AN are often steadfast in failing to recognize or acknowledge the seriousness of low body weight, rarely complaining about severe underweight per se. Rather, the drastic reduction in food intake and weight loss is valued as an extraordinary achievement or sign of self-discipline (APA, 2013) and experienced as highly reinforcing (Walsh, 2013) at least initially, with potentially anxiolytic effects for some individuals (Kaye, Wierenga, Bailer, Simmons, & Bischoff-Grethe, 2013).

This paradox is reflected in studies of quality of life (QOL) and impairment, which have often yielded inconsistent findings pertaining to AN. Some studies have demonstrated no differences in impairment between AN and other eating disorders (ED) (Dahlgren, Stedal, & Ro, 2017; DeJong et al., 2013), less impairment (Bamford & Sly, 2010; Doll, Petersen, & Stewart-Brown, 2005; Padierna, Quintana, Arostegui, Gonzalez, & Horcajo, 2000; Welch, Birgegard, Parling, & Ghaderi, 2011), and on some domains, even comparable health-related QOL to healthy controls (Mond, Hay, Rodgers, Owen, & Beumont, 2005), whereas others report worse functioning in AN (Abraham, Brown, Boyd, Luscombe, & Russell, 2006). Discrepant findings may intrinsically reflect the “egosyntonic” nature of the illness, associated dysfunctional cognitions of AN linked to the undue influence of shape and weight control on self-evaluation, or limited insight or minimization of the

detrimental aspects of the illness (Attia, 2014; Halmi, 2013). Inconsistencies in findings may also reflect methodological differences such as precision in measurement (i.e., illness-specific versus generic measures), as generic measures are less nuanced and demonstrate less sensitivity in detecting differences between ED diagnoses and outcome than illness-specific measures (Ackard, Cronmeyer, Richter, & Egan, 2015; Mitchison et al., 2013). The majority of studies have utilized generic measures, such as the SF-36, to assess quality of life in AN (see Agh et al., 2016; Baiano et al., 2014; Jenkins, Hoste, Meyer, & Blissett, 2011 for reviews).

Additionally, inconsistencies in prior research may relate to symptom heterogeneity within the AN diagnostic category itself. Anorexia nervosa has two diagnostic subtypes in the DSM-5, including restricting type (AN-R) and binge-eating/purging type (AN-B/P) (APA, 2013). The restricting type of AN is characterized by weight loss primarily accomplished via fasting or excessive exercise, while AN-B/P is applied to individuals who regularly engage in binge eating *and/or* purging behavior (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas) during the past 3 months. Several studies have linked AN-B/P to negative correlates such as impulsivity, substance use, self-harm and suicidality (Buhren et al., 2014; Peat, Mitchell, Hoek, & Wonderlich, 2009; Peterson et al., 2016), metabolic parameters and the incidence of medical complications upon hospital admission (Rylander, Brinton, Sabel, Mehler, & Gaudiani, 2017), and neurobiological correlates such as inferior inhibitory control and greater punishment sensitivity (Lock, Garrett, Beenhakker, & Reiss, 2011; Murao et al., 2017). These findings suggest it may be similarly important to delineate AN subtypes to disentangle the degree and type of functional impairment observed in AN.

Only a few studies have investigated ED-specific quality of life or functional impairment in AN by subtype and results are mixed. A few studies have demonstrated poorer global functioning (De Young et al., 2013) or greater ED-related impairment (DeJong et al., 2013; Martin et al., 2016)

in AN-B/P compared to AN-R, whereas others have found no significant subtype differences (Bamford & Sly, 2010; Ekeroth, Clinton, Norring, & Birgegard, 2013). For instance, the study by Bamford and Sly (2010) found that although those with AN-R and AN-B/P had lower scores on the illness-specific ED-QOL (and hence better quality of life) than those with eating disorder not otherwise specified (EDNOS), there were no significant differences between AN subtypes. Similarly, Ekeroth et al. (2013) found no significant differences between AN subtypes in patients receiving specialized ED treatment in Sweden, although individuals with AN-B/P had higher levels of impairment than atypical AN, purging disorder, and unspecified feeding or eating disorder (USFED). The relatively few studies yielding mixed findings warrants additional research to improve our understanding of potential subtype differences in impairment associated with AN. Furthermore, little is known about potential subtype differences across the various life domains in which impairment may occur.

The main purpose of this study was to investigate AN subtype differences across key domains of ED-related impairment (global, personal, social, cognitive) in a clinical sample of AN patients. From a clinical standpoint, addressing perceived impairment as an outright treatment goal may help facilitate therapeutic alliance and strengthen adherence, constituting an important patient-reported outcome beyond symptom-centric outcome measures. This seems particularly relevant in light of some evidence of a bidirectional, or reciprocal relationship between improvement in quality of life and ED symptoms, with improvement in one domain leading to improvement in the other (Mitchison, Dawson, Hand, Mond, & Hay, 2016; Mitchison, Morin, Mond, Slewa-Younan, & Hay, 2015). As a secondary aim, we investigated the unique associations between ED-related impairment and core cognitive and behavioral features of ED, including severity of BMI. This is an understudied issue, as prior investigations of the unique contributions of individual eating disorder features to ED-related impairment have either utilized community samples (Hovrud & De Young, 2015; Jenkins,

Rienecke, Conley, Meyer, & Blissett, 2015) or mixed diagnostic samples (Dahlgren et al., 2017), or have more broadly investigated correlates of health-related QOL rather than illness-specific impairment (Abbate-Daga et al., 2014; Weigel, Konig, Gumz, Lowe, & Brettschneider, 2016). Understanding the unique associations between low weight, core ED pathology, and psychosocial impairment may help inform treatment planning, and shed light on treatment ambivalence and the outwardly paradoxical behaviors observed in AN, such as engaging in extreme dietary restriction despite the sequelae of malnutrition and starvation. To summarize, the purpose of this study was to 1) investigate AN subtype differences in ED-specific impairment across life domains, and to 2) investigate the unique associations between ED-related impairment and core ED pathology in a low-weight, treatment-seeking sample of adults with AN-R and AN-BP.

## METHOD

### Participants

The total sample consisted of 146 (140 women, 6 men) adult inpatients or outpatients recruited from seven specialist eating disorder centres in Norway (Reas & Rø, 2017). All patients met the International Classification of Diseases- 10<sup>th</sup> Revision (ICD-10) criteria for F50.0 (WHO, 1992), which corresponds to the DSM-5 code for AN (307.1; APA, 2013). Any case (N = 4) with missing frequency data required to classify into AN subtype were excluded, leaving a total of 142 cases (136 females, 6 males). Due to unsystematic recording of AN subtypes in the dataset, we operationally defined the AN subtypes based on endorsement of average weekly (1 x per week) occurrence of binge eating ( $\geq 4$  OBEs) or purging behaviour ( $\geq 4$  total episodes of self-induced vomiting or laxative use) on the Eating Disorders Examination-Questionnaire during past 28 days. Although the DSM-5 lacks specification on frequency counts to operationally define regular engagement (“recurrent episodes”), we applied a once per week threshold, which is in line with prior

research (De Young et al., 2013) as well as the binge-purge frequency criteria for other DSM-5 ED (APA, 2013). A composite purging variable was created by summing the total frequency of self-induced vomiting and laxative use.

### Assessment Measures

The *Eating Disorder Examination-Questionnaire* (EDE-Q) (Fairburn & Beglin, 1994, 2008) consists of 28-items that assess the core attitudinal and behavioral symptoms of eating disorders. The EDE-Q is comprised of four clinically-derived subscales (dietary restraint, eating concerns, shape concerns, weight concerns) of 5-8 items per scale, each of which is scored using a forced-choice format (0-6). The Norwegian version of the EDE-Q has shown adequate psychometric properties (Reas, Wisting, Kapstad, & Lask, 2011; Rø, Reas, & Stedal, 2015). Excellent internal consistency for the global EDE-Q was found in the present study ( $\alpha = .94$ ).

The *Clinical Impairment Assessment (CIA) questionnaire* version 3.0 (Bohn et al., 2008) is a 16-item self-report measure of functional impairment secondary to ED psychopathology during the past 28 days (Bohn et al., 2008). Items probe impairment in domains of life typically affected by an ED, including mood and self-perception, cognitive functioning, interpersonal functioning, and work performance over the past 4 weeks (e.g., “Over the past 28 days, to what extent have your eating habits, exercising, or feelings about your eating, shape, or weight...”). A global score and three domains (personal, social, and cognitive) are calculable to offer a global index and domain-specific indices of impairment. Respondents rate items using a forced-choice, 4-point Likert scale with responses ranging from ‘not at all’ to ‘a lot’. Global scores range from 0 to 48, and higher scores represent greater impairment. The Norwegian version of the CIA (Reas, Rø, Kapstad, & Lask, 2010; Reas, Stedal, Lindvall Dahlgren, & Rø, 2016) has shown satisfactory psychometric properties. Excellent internal consistency for the CIA global score was found in the present study ( $\alpha = .93$ ).

### Statistical Analyses

Analyses were conducted using IBM SPSS Statistics version 21.0. Independent-samples *t*-tests or the non-parametric alternative Mann Whitney U test were used to investigate differences between AN subtypes in global and domain-specific (cognitive, social, psychological) impairment and ED pathology, BMI and age. Effect sizes were calculated in SPSS using eta-squared ( $\eta^2$ ) and interpreted as small = .01, medium = .06, and large = .14 (Cohen, 1988; Miles & Shevlin, 2011). Linear multiple regression analyses were performed to test the unique associations between core attitudinal and behavioral features of ED and the global CIA score. Covariates were selected due to clinical and theoretical significance and included BMI, core ED psychopathology (dietary restraint, shape/weight concerns, eating concerns) and frequency of core ED behaviors (binge eating, purging, excessive exercise). Due to a high correlation (.86) and consequent potential for multicollinearity, an aggregate shape/weight concerns scale was constructed, in line with prior studies (Dahlgren et al., 2017; Hovrud & De Young, 2015). To maximize power, the main regression analysis was performed utilizing the entire sample of AN. A significance level of  $p < .05$  was applied and analyses were two-tailed. Data were anonymized and the study received approval from the Regional Committee for Medical Research and Ethics.

## RESULTS

### Subtype differences between AN-B/P and AN-R

The total sample consisted of 142 patients (136 females, 6 males). A total of 78 (54.9%) were classified as AN-R and 64 (45.1%) were classified as AN-B/P (see Table 1). Mean age and BMI ( $\text{kg}/\text{m}^2$ ) for the total sample was 25.76 years ( $SD = 8.6$ ; 17-61) and 15.7 ( $SD = 1.9$ ; 9.09 – 19.83). The AN-R group had a lower BMI than AN-B/P,  $M_s = 15.4$  versus 16.1,  $t(140) = 2.28$ ,  $p = .024$ , eta-squared = .04. Individuals with AN-R versus AN-B/P reported significantly less ED core



psychopathology (dietary restraint, eating concern, shape/weight concerns), with moderate-to-large effect sizes. In line with basis for classification, AN-R engaged in significantly fewer binge eating episodes and less frequent purging behaviour, yet frequency of excessive exercise did not differ significantly (Table 1). No significant subtype differences were found for the global or domain-specific impairment (personal, social, cognitive). To examine whether findings were attributable to BMI, we also performed a supplementary multivariate general linear model (MANCOVA) entering BMI as a covariate. As presented in the supplementary materials (data shown in Supplementary Table 1), results were unchanged after controlling for BMI.

### Multiple Linear Regression

A correlation matrix is presented in Table 2 to illustrate the bivariate relationships between impairment, age, BMI, and ED pathology. Inspection of the frequency variables for OBE, purging, and excessive exercise revealed non-normal distributions; thus, these variables were transformed using a square root transformation prior to multiple regression analysis. The total variance explained was 44.7%,  $F(7,138) = 13.07$ ,  $p < .001$  (Table 3). Two variables emerged as significant predictors of the global CIA, namely, weight/shape concerns ( $\beta = .367$ ,  $p = .002$ ), which accounted for 13.4% of unique variance and objective binge episode (OBE) frequency ( $\beta = .235$ ,  $p = .014$ ), which accounted for 5.5% of unique variance in impairment. A follow-up analysis by subtype revealed that shape/weight concerns ( $\beta = .573$ ,  $p < .001$ ) was the sole significant predictor of ED-related impairment in AN-R, accounting for 12.3% of the variance, whereas eating concerns ( $\beta = .412$ ,  $p = .003$ ) and OBE frequency ( $\beta = .309$ ,  $p = .008$ ) accounted for 9.1% and 7.0% of the variance for AN-B/P, respectively.

## DISCUSSION

This study investigated AN subtype differences in global and domain-specific ED-related impairment in a clinical sample of AN. We also investigated the unique associations between

impairment and core attitudinal and behavioral features of ED, including severity of underweight. Results showed that individuals with AN-B/P exhibited higher levels of ED pathology than AN-R, with the exception of excessive exercise. These findings held even after controlling for a lower BMI in the AN-R group, and thus, our findings were not attributable to severity of low BMI. Despite greater ED symptomology among individuals with AN-B/P, we found no significant differences in the level of ED-specific impairment between AN-R and AN-B/P ( $M_s$  33.2 vs 31.6, respectively). Likewise, there was no evidence to suggest that life domain-specific impairment (personal, social, cognitive) differed significantly between AN subtypes. In other words, the absence of recurrent episodes of binge eating and purging which classified the AN-R group did *not* preclude compromise by impairment for these individuals. Our findings are consistent with a large Swedish clinical register study ( $N = 2233$  patients; of which 29.5% had AN), which found no significant differences in CIA global scores between AN-B/P and AN-R ( $M_s$  33.6 versus 29.07) (Ekeroth et al., 2013).

Our study suggests that among low weight, treatment-seeking samples of AN, weight/shape concerns and binge eating frequency, but not low BMI or purging behavior, uniquely contributed to ED-related impairment. Owing to the distinct symptom profile, we also investigated the unique contributions by subtype. Results followed the same pattern, except that eating concerns was also a significant predictor of ED-related impairment in AN-B/P, in addition to binge eating. This is perhaps unsurprising, as the items reflect core ED psychopathology related to binge eating, including fears of losing control over eating, subjective distress over secretive eating, guilt about eating, and food/eating preoccupation. This study contributes to our understanding of impairment in AN, and extend prior studies of community and transdiagnostic samples (Dahlgren et al., 2017; Hovrud & De Young, 2015). Findings converge and extend Hovrud and De Young (2015), who found that weight/shape concerns and binge eating frequency, along with depression, uniquely

accounted for ED-specific impairment in a normal-weight community sample, of which few had a BMI  $\leq 18.0$  (N = 8; 16%). The transdiagnostic study by Dahlgren et al. (2017) found that along with BMI, the severity of weight/shape concerns, binge eating, and eating concerns accounted for unique variance in a transdiagnostic sample.

Collectively, our study converges with prior findings indicating that low BMI and purging behaviour are perceived as less impairing (Becker et al., 2010), and are likely positively-valued aspects of ED pathology consistent with shape and weight goals, whereas weight/shape concerns and binge eating contribute uniquely to ED-related impairment (Dahlgren et al., 2017; Hovrud & De Young, 2015). From a clinical standpoint, identifying and addressing aspects of ED pathology perceived to be impairing may facilitate therapeutic engagement and strengthen adherence. Therapeutically, the present findings suggest that targeting shape/weight concerns and alleviating binge eating may be initially preferred as treatment goals from the patient's perspective. Illustrating the adverse role of dietary restraint and purging in the maintenance of binge eating may prove useful as groundwork to facilitate improvement, in line with cognitive-behavioural models (Fairburn, 2008).

As implied by the diagnostic label, individuals with AN-R engage primarily in extreme dietary restriction to exert control over weight. Perhaps surprisingly then, our study found that individuals with AN-B/P versus AN-R reported higher levels of dietary restraint (i.e., avoidance of eating, food avoidance, fasting, dietary rules). Yet this finding is consistent with several prior studies investigating restraint in AN (Ekeroth et al., 2013; Elran-Barak et al., 2014; De Young et al., 2013). For instance, De Young et al. (2013) found that women with AN-B/P engaged in more frequent restrictive types of eating behaviors (i.e., fasting 8 hours or more, skipping meals, calorie limit) than women with AN-R, and notably. Notably, restrictive eating was unrelated to the

frequency of binge eating, which raises the possibility that engaging in dietary restriction may have comprised a non-compensatory, or “routine” weight control behavior among individuals with AN. The authors concluded that AN subtype may be a proxy for the degree of ED pathology, conveying clinically useful – and BMI independent – information about illness severity (De Young et al., 2013).

In our sample, the average BMI for the total sample fell into the severely underweight category ( $M = 15.7$ ;  $Md = 15.9$ ;  $SD = 1.9$ ,  $9.09 - 19.83$ ) according to the DSM-5 severity specifications for AN. The severity of BMI, however, did not exert influence over perceived ED-related impairment. Generally, prior research has shown that quality of life appears to worsen as BMI departs from the normal range (Jenkins, Hoste, Conley, Meyer, & Blissett, 2011; Jenkins, Hoste, Meyer, et al., 2011). An extremely low body weight due to malnutrition and starvation propels a cascade of medical sequelae which can have detrimental and lasting effects on health and functioning (Mehler & Brown, 2015). Research utilizing generic measures or health-related quality of life have shown a larger role for BMI in predicting impairment as related to physiological aspects of illness (e.g., pain, mobility) (Weigel et al., 2016), than studies such as ours which investigated self-reported impairment perceived as secondary to ED. The current investigation lends greater insight into the intense drive for thinness observed clinically in AN, as well as the persistent lack of recognition of the seriousness of low BMI despite the associated medical implications.

Limitations of the present study should be considered. Our study was cross-sectional, and we lacked historical data to discern whether fluctuations had occurred in diagnostic subtype, nor were data available on length of illness. Poor stability of AN subtypes has been observed, with studies showing significant crossover from AN-R to AN-B/P (i.e., 62% of women migrated from AN-R to AN-B/P at 8-years FUP) (Eddy et al., 2008). However, age as a proxy of illness length did not differ between AN subtypes, nor was age significantly correlated with impairment. Additionally, this

investigation is based on the subtyping scheme outlined in the DSM-5 (APA, 2013), which is intended to describe current symptoms rather than longitudinal course, to convey information relevant to immediate treatment targets (APA, 2013). Nonetheless, the degree and nature of impairment may change as the illness becomes more entrenched over time, with various life domains becoming more, or less, impacted with illness progression. It is unknown whether findings generalize to alternative models to the DSM-5 which have been proposed for subtyping AN (Forbush, Hagan, Salk, & Wildes, 2017; Wildes, Forbush, & Markon, 2013); for instance, a recent study has found that classifying individuals with AN into restraint and dietary restraint-negative affect subtypes outperformed the DSM-5 scheme (Forbush et al., 2017), and poorer ED-related QOL was found for the restraint-negative affect group.

The present study included the EDE-Q subscales due to theoretical and clinical relevance, yet we acknowledge the potential shortcomings in terms of replicability, as several studies have failed to demonstrate the originally proposed factor structure for this instrument (Allen, Byrne, Lampard, Watson, & Fursland, 2011; Berg, Peterson, Frazier, & Crow, 2012). The use of the CIA is considered a strength, as this measure provides an index of psychosocial impairment secondary to ED pathology, with solid evidence of discriminant validity and accuracy in determining caseness (Bohn et al., 2008; Reas et al., 2016). However, approximately 50% of the total variance in ED-related impairment was attributable to unmeasured factors. This is consistent with Hovrud and De Young (2015), who found that depression increased the total explained variance in CIA scores from 46% to 58.6%. We lacked a measure of depression, nor did we assess facets of personality such as maladaptive perfectionism (Lavender et al., 2016) or negative urgency (Culbert et al., 2016), which have also been associated with different aspects of ED pathology in women with AN. Lastly, our

sample was comprised of adults aged 17-60 years, with a mean age of 26 years, and findings may not generalize to children or adolescents with AN.

In summary, this study investigated AN subtype differences in ED-specific impairment and the unique associations between ED-related impairment and core ED pathology in a low-weight, treatment-seeking sample of adults with AN. Consistent with prior research (De Young et al., 2013; DeJong et al., 2013; Ekeroth et al., 2013; Welch et al., 2011), findings showed higher levels of ED pathology in AN-B/P than AN-R. Despite being less symptomatic, however, individuals with AN-R were as equally impaired as AN-B/P. Weight/shape concerns and binge eating frequency, rather than severity of BMI or purging behavior, contributed uniquely to self-reported ED-related impairment in AN.

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Table 1. Means (SD) for age, BMI, CIA and EDE-Q scores and comparison by AN subtype

	<i>AN-R</i> ( <i>N</i> = 78)	<i>AN-B/P</i> ( <i>N</i> =64)	<i>Test Statistic</i>	<i>p-value</i>	<i>Effect size</i>
Age	25.6 (8.6)	25.9 (8.7)	.220	.826	.007
BMI	15.4 (1.9)	16.1 (1.7)	2.28	.024	.04
Global CIA	31.6 (11.0)	33.2 (9.7)	1.27	.204	.01
<i>Personal impairment</i>	13.3 (4.5)	14.4 (3.7)	1.74	.085	.02
<i>Social impairment</i>	9.7 (4.3)	10.5 (3.9)	1.04	.298	.007
<i>Cognitive impairment</i>	8.5 (4.1)	8.8 (3.9)	.426	.670	.001
EDE-Q global	3.2 (1.5)	4.2 (1.2)	4.41	< .001	.12
<i>Dietary restraint</i>	3.0 (1.9)	4.1 (1.6)	3.73	<.001	.09
<i>Eating concern</i>	2.6 (1.4)	3.7 (1.2)	4.87	<.001	.14
<i>Shape/Weight concerns</i>	3.5 (1.5)	4.2 (1.9)	3.55	<.001	.08
OBE, episodes <sup>a,b</sup>	.22 (1.08)	12.93 (23.5)	7.67	< .001	.64 <sup>d</sup>
Purging, episodes <sup>a,b,c</sup>	.38 (1.01)	29.8 (29.3)	9.52	<.001	.79 <sup>d</sup>
Excessive exercise, episodes	16.7 (17.8)	14.7 (16.5)	.792	.429	.004

*Note:* M = mean, SD = standard deviation, BMI = body mass index, EDE-Q = Eating Disorder Examination-Questionnaire, OBE = objective binge eating, CIA = Clinical Impairment Assessment. AN-R = anorexia nervosa, restricting subtype. Of the six males cases, there were three in each group, which constituted 3.8% in the AN-R and 4.7% in the AN-B/P groups, respectively,  $\chi^2(1) = .06$ ,  $p = .804$ . To ensure gender was not a contributing factor to the findings, we ran the analyses again after removing the men and the results did not change. <sup>a</sup> Variables used to classify AN subtypes, shown here for descriptive purposes only. <sup>b</sup> Purging includes the frequency of episodes of self-induced vomiting and laxative misuse; <sup>c</sup> Mann-Whitney U test. <sup>d</sup> Effect size for Mann Whitney calculated as  $r = z/\sqrt{t^2 + (N1 + N2 - 2)}$  and interpreted as .1 = small, .3 = medium, and .5 = large effect. Other tests shown were independent-samples t-tests with eta-squared calculated as  $t^2/t^2 + (N1 + N2 - 2)$  and interpreted as .01 = small effect, .06 = moderate effect, and .14 = large effect (Cohen, 1988, pp. 284-287).

Table 2. Bivariate correlational matrix between CIA global and domain scores, age, BMI, and ED pathology

Variables	1	2	3	4	5	6	7	8	9
1. CIA	-	<b>-.178</b>	<b>-.126</b>	<b>.533**</b>	<b>.467**</b>	<b>.126</b>	<b>.447**</b>	<b>.246*</b>	<b>.673**</b>
2. Age	<b>.049</b>	-	<b>.185</b>	<b>.265*</b>	<b>.114</b>	<b>.118</b>	<b>-.136</b>	<b>-.090</b>	<b>-.243</b>
3. BMI	<b>-.051</b>	<b>.096</b>	-	<b>.092</b>	<b>.155</b>	<b>.114</b>	<b>-.095</b>	<b>.105</b>	<b>-.059</b>
4. OBE	<b>.142</b>	<b>-.056</b>	<b>.087</b>	-	<b>.210</b>	<b>.067</b>	<b>.102</b>	<b>.050</b>	<b>.418**</b>
5. Purging	<b>.086</b>	<b>-.078</b>	<b>.042</b>	<b>.322**</b>	-	<b>-.161</b>	<b>.050</b>	<b>.181</b>	<b>.056**</b>
6. Excessive Exercise	<b>.421**</b>	<b>.045</b>	<b>.163</b>	<b>-.056</b>	<b>.171</b>	-	<b>.372**</b>	<b>.374**</b>	<b>.247</b>
7. Wt/Shape Concerns	<b>.566**</b>	<b>.159</b>	<b>.279**</b>	<b>.069</b>	<b>.071</b>	<b>.431**</b>	-	<b>.668**</b>	<b>.373**</b>
8. Restraint	<b>.425**</b>	<b>.170</b>	<b>.303**</b>	<b>.202</b>	<b>.159</b>	<b>.333**</b>	<b>.698**</b>	-	<b>.489**</b>
9. Eating Concerns	<b>.501**</b>	<b>-.024</b>	<b>.130</b>	<b>.255*</b>	<b>.340**</b>	<b>.340**</b>	<b>.725**</b>	<b>.676**</b>	-

Note: Correlations for AN-restricting type are to the left of, and below, the diagonal (N = 78). Correlations for AN-binge/purging type are to the right of, and above the diagonal (N = 64). CIA = Clinical Impairment Assessment; OBE = objective binge episodes. BMI = body mass index (kg/m<sup>2</sup>); \*p ≤ .05; \*\*p < .001

Table 3. Linear regression results accounting for CIA impairment due to ED symptoms (N= 142)

Parameter	$\beta$	$t$	$p$	Lower 95% CI	Upper 95% CI
BMI	0.14	-1.87	.084	-1.69	0.01
Binge eating	0.24	2.49	<b>.014</b>	0.23	1.87
Purging	0.12	-1.26	.209	-1.06	0.18
Excessive exercise	0.13	1.60	.111	0.14	1.33
Restraint	0.05	0.49	.619	0.73	1.38
Eating concerns	0.21	1.95	.054	-0.15	3.34
Weight/shape concerns	0.37	3.20	<b>.002</b>	1.06	3.86

*Note:* Bold denotes values of  $p \leq .05$ . BMI = body mass index ( $\text{kg}/\text{m}^2$ ); CIA = Clinical Impairment Assessment. Bootstrapped 95 % confidence intervals based on 5000 iterations. A composite variable for purging included the total frequency of self-induced vomiting and laxative misuse. The sole significant predictor of the total CIA score for AN-restricting type was weight/shape concerns (beta = .573,  $p < .001$ ). For AN binge/purge subtype, eating concerns (beta = .412,  $p = .003$ ) and OBE frequency (beta = .309,  $p = .008$ ).