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Eating Disorder Examination–Questionnaire (EDE–Q): Norms for Clinical Sample of Female Adolescents with Anorexia Nervosa

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## Introduction

The Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Cooper, 1993; Fairburn, Cooper, & O'Connor, 2008) is a well-established self-report instrument that measures eating disorder behaviors and attitudes, and is derived from the Eating Disorder Examination (EDE) interview (Fairburn & Cooper, 1993; Fairburn et al., 2008). The EDE-Q is relatively brief and cost-efficient, and is used for research and clinical purposes. Normative data are needed for appropriate analysis and interpretation of EDE-Q scores. Additionally, normative data provides a baseline distribution in a representative sample of individuals with eating disorders and establishes a baseline for comparison to healthy controls and individuals who have recovered from an eating disorder. Currently, normative data exists in a myriad of adult populations such as undergraduate students (Darcy, Hardy, Lock, Hill, & Peebles, 2013; Keane, Clark, McGrath, Farrelly, & MacHale, 2017; Kelly, Cotter, & Mazzeo, 2012; Lavender, De Young, & Anderson, 2010; Luce & Crowther, 1999; Luce, Crowther, & Pole, 2008; Nakai et al., 2014; Quick & Byrd-Bredbenner, 2013; Reas, Overas, & Ro, 2012; Ro, Reas, & Lask, 2010; Villarroel, Penelo, Portell, & Raich, 2011), community samples (Hilbert, de Zwaan, & Braehler, 2012; Machado et al., 2014; Mond, Hay, Rodgers, & Owen, 2006; Mond, Hay, Rodgers, Owen, & Beumont, 2004), eating disorder (ED) samples (Brewin, Baggott, Dugard, & Arcelus, 2014; Dahlgren, Stedal, & Ro, 2017; Jennings & Phillips, 2017; Smith et al., 2017), and both ED and community samples (Aardoom, Dingemans, Slof Op't Landt, & Van Furth, 2012; Welch, Birgegard, Parling, & Ghaderi, 2011).

Few studies have examined normative data in adolescent populations. Normative EDE-Q data are available for healthy adolescent girls in the United Kingdom (Carter, Stewart, &

Fairburn, 2001) and Portugal (Machado et al., 2014), and healthy adolescent boys and girls in Australia (Mond. et al., 2014), Malaysia (Musa et al., 2016), and Mexico (Penelo, Negrete, Portell, & Raich, 2013). One Swedish study (Mantilla & Birgegard, 2016) reported norms on clinical and healthy adolescents using a 14-day time frame version of the EDE-Q, which had been specifically modified for adolescents (Carter et al., 2001). To the knowledge of these researchers, despite increased research and clinical use of the EDE-Q in adolescent populations, normative data in a clinical sample in the United States (U.S.) has not been published. Thus, the purpose of the present study was to provide EDE-Q norms for a sample of adolescent females diagnosed with anorexia nervosa (AN) admitted to inpatient treatment for an eating disorder.

## **Methods**

### ***Participants***

Participants were 88 female adolescents who had been admitted to an inpatient eating disorders unit in the Northeastern U.S. between January 2012 and December 2015. All patients met criteria for anorexia nervosa based on either the *Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> Edition (DSM-IV)*; American Psychiatric Association [APA], 2000) or *DSM-5* (APA, 2013), which was dependent upon the year of admission with the *DSM-5* being used exclusively starting October 1, 2015. A clinical interview, conducted by a psychiatrist or psychiatric nurse practitioner, determined the diagnosis of the specific eating disorder.

### ***Procedure***

Procedures were approved by the local institutional review board. Medical charts were reviewed to obtain information. Participants had completed the EDE-Q (© 2008 by Christopher G. Fairburn and Sarah Beglin) within 24 hours of admission to the inpatient unit. Anthropometric measurements (i.e., height, weight) were supervised and taken by nursing staff

and occurred on calibrated scales with the patient wearing underwear and/or hospital gown. The anthropometric devices were inspected and calibrated per the treatment facility's protocol.

### ***Measures***

The EDE-Q 6.0 is a 28-item measure (© 2008 by Christopher G. Fairburn and Sarah Beglin) derived from the EDE (Fairburn & Cooper, 1993). The EDE-Q is scored using a 7-point, forced-choice rating scale (0–6) with scores of 4 or higher indicative of clinical range. The subscale and global scores reflect the severity of eating disorder psychopathology. To obtain subscale scores, the ratings for the relevant items are added together and the sum divided by the total number of items forming the subscale. If ratings are only available on some items but more than half, then a score is obtained by dividing the resulting total by the number of rated items. A “global” score is the sum of the four subscale scores divided by the number of subscales (i.e., four).

Internal consistency in the EDE-Q has been shown to be good, with Cronbach's alpha coefficients ranging from .70 to .83 in a clinical sample and from .78 to .93 in a general population sample (Luce & Crowther, 1999; Peterson et al., 2007). Among studies included in a recent systemic review of the psychometric properties of the EDE-Q, internal consistency was acceptable with the following range of alpha coefficients: Restraint (.70–.85), Eating Concern (.73–.86), Shape Concern (.83–.93), and Weight Concern (.72–.89) (Berg, Peterson, Frazier, & Crow, 2012).

### ***Statistical Analyses***

Data are presented as mean (*SD*) scores on the EDE-Q global and subscale scores. For the EDE-Q subscale scores, percentile ranks are provided. Independent *t*-tests were used to compare female adolescents based on AN subtype (i.e., restricting, binge-eating/purging), using two-tailed

tests with a Bonferroni-corrected  $p$ -value set at .05 for statistical significance. Internal consistency was calculated using Cronbach's coefficient alpha ( $\alpha$ ). All analyses were conducted using SPSS version 21.0. The statistical significance (alpha) level was set at  $p \leq .05$ , and all tests were two-tailed.

## Results

### *Demographics and Clinical Characteristics*

Participants had a mean age of 15.2 years ( $SD = 1.9$ ; range = 11–18) and the mean body weight at time of admission was 42.4 kg ( $SD = 5.5$ ; range = 28.1–54.2). The majority of patients were Caucasian (90.9%;  $n = 80$ ) and restricting subtype (72.7%;  $n = 64$ ). The average length of stay was 16.2 days ( $SD = 12.4$ , range = 3–87), with the average change in body weight being 2.5 kg ( $SD = 1.7$ ) and the average change in percent of IBW was 4.7 ( $SD = 3.2$ ). Table 1 presents demographic and clinical characteristics based on AN subtypes. No group differences based on AN subtype were detected.

Table 1.

Demographics and clinical characteristics among female adolescents with AN who are admitted to inpatient treatment for an eating disorder ( $N = 88$ )

Characteristic	Restricting $M (SD)$	Binge-eating/ purging $M (SD)$	$t$
Age (years) at time of admission	15.0 (1.9)	15.6 (1.8)	-1.268
Weight (kg) at time of admission	41.7 (5.4)	44.2 (5.3)	-1.949
Weight (kg) at time of discharge	44.3 (5.6)	46.5 (5.5)	-1.687
Change in weight over time (kg/days)	.20 (.11)	.17 (.13)	1.200
Percent of IBW at time of admission	78.8 (6.3)	82.0 (8.2)	-1.717
Percent of IBW at time of discharge	83.7 (6.1)	86.3 (8.0)	-1.431
Change in percent of IBW over time (percent/days)	.38 (.20)	.31 (.24)	1.344
Length of stay (days)	16.0 (13.6)	16.8 (8.8)	-.251

Note: AN = anorexia nervosa; IBW = ideal body weight; kg = kilogram.

### *Eating Disorder Examination–Questionnaire*

Table 2 presents the mean EDE-Q global and subscale scores, standard deviations, and percentile ranks. Utilizing a cut-off of  $\geq 4$  as a marker of clinical significance, 76.1% of female adolescents ( $n = 67$ ) scored in the clinically significant range on the Restraint subscale, 61.4% ( $n = 54$ ) scored in the clinically significant range on the Eating Concern subscale, 78.4% ( $n = 69$ ) scored in the clinically significant range on the Shape Concern subscale, 73.9% ( $n = 65$ ) scored in the clinically significant range on the Weight Concern subscale, and 76.1% ( $n = 67$ ) scored in the clinically significant range on the Global scale. Table 3 presents the mean EDE-Q subscale and global scores by eating disorder diagnoses. Independent t-tests were conducted to compare EDE-Q subscale and global scores in patients with AN-R and AN-BP. There were significant differences in scores for individuals with AN-R and AN-BP, with patients with binge-eating/purging having significantly higher scores on the global scale and four subscales compared to restricting subtype.

Table 2.

Means, standard deviations (*SD*), and percentile ranks for EDE-Q global and subscale scores among adolescents with AN who are admitted to inpatient treatment for an eating disorder ( $N = 88$ )

	Restraint	Eating concern	Shape concern	Weight concern	Global score
Mean ( <i>SD</i> )	4.00 (1.85)	3.28 (1.75)	4.55 (1.78)	4.10 (1.79)	3.98 (1.65)
Percentile rank					
5	.00	.09	.48	.00	.38
10	.80	.40	1.11	1.00	.97
15	1.34	1.20	2.38	1.87	1.75
20	1.80	1.36	2.95	2.36	2.80
25	3.25	1.65	3.93	2.85	3.08
30	3.60	2.60	4.13	3.40	3.39

35	3.80	2.83	4.52	3.83	3.95
40	4.20	3.20	5.08	4.32	4.15
45	4.20	3.41	5.25	4.51	4.28
50	4.60	3.60	5.44	4.80	4.43
55	4.80	3.79	5.50	5.00	4.58
60	4.88	4.00	5.63	5.00	4.83
65	5.17	4.00	5.63	5.20	4.92
70	5.20	4.20	5.88	5.20	5.01
75	5.40	4.40	5.88	5.40	5.15
80	5.64	4.64	6.00	5.60	5.36
85	5.93	5.13	6.00	5.93	5.51
90	6.00	6.00	6.00	6.00	5.71
95	6.00	6.00	6.00	6.00	6.00
99	—	—	—	—	—

Table 3.

Mean (*SD*) EDE-Q global and subscale scores among female adolescents with AN who are admitted to inpatient treatment for an eating disorder by diagnoses ( $N = 88$ )

	Restricting	Binge-eating/ purging	<i>t</i>	<i>p</i>
Restraint	3.76 (1.89)	4.64 (1.61)	-2.011	.047
Eating concern	2.97 (1.74)	4.13 (1.47)	-2.880	.005
Shape concern	4.31 (1.88)	5.20 (1.34)	-2.458	.017
Weight concern	3.81 (1.84)	4.87 (1.42)	-2.845	.006
Global	3.71 (1.70)	4.71 (1.30)	-2.617	.01

In this study, Cronbach's alpha was .96 for the global score, .87 for the restraint subscale, .78 for the eating concern subscale, .95 for the shape concern subscale, and .87 for the weight concern subscale.

## Discussion

The EDE-Q is a well-established measurement tool used for both research and clinical purposes to assess of eating disorder psychopathology. The purpose of the current study was to establish norms for the EDE-Q among an inpatient sample of female adolescents diagnosed with AN. In this study, there were differences in EDE-Q subscale and global scores between AN



subtypes, with patients with AN-BP scoring higher on the subscales and global scale compared to patients with AN-R. This finding is consistent with previously published research indicating individuals with AN-R reported lower EDE-Q total and subscale scores compared to persons with AN-BP and other eating disorders (Kelly & Carter, 2014).

Female adolescents in this study reported higher mean EDE-Q scores on the subscales and global scale compared to previously published studies of healthy female adolescents (Carter et al., 2001; Machado et al., 2014; Mond. et al., 2014; Penelo et al., 2013). In other words, female adolescents in the present study reported greater severity of eating disorder psychopathology compared to healthy female adolescents. Compared to previously published research on female adolescents with AN, mean EDE-Q subscale scores were higher and the global EDE-Q score were either higher or similar in the present study (Aardoom et al., 2012; Mantilla & Birgegard, 2016; Passi, Bryson, & Lock, 2003). The difference in scores may be explained by the setting from which patients were recruited. Unlike the present study, previously published studies included patients from residential and/or outpatient settings (Aardoom et al., 2012; Mantilla & Birgegard, 2016; Passi et al., 2003). Since the present study included an inpatient sample of female adolescents with AN, the higher EDE-Q scores may be indicative of more severe ED psychopathology among those seeking and receiving inpatient treatment for AN.

All female adolescents in the present study were diagnosed with AN and admitted to a specialized ED inpatient treatment facility, but only 61.4–78.4% of the sample reported clinically significant scores on the EDE-Q global scale and/or subscales. These results are consistent with previously published research indicating that only 66.1-72.4% of adolescents with ED had clinically significant EDE-Q scores on the global scale or subscales (Mantilla & Birgegard, 2016). There may be several reasons for the lack of clinically significant scores among all of the

patients. First, individuals with AN often do not recognize the seriousness of the disorder (APA, 2013). Moreover, compared to adults, adolescents tend to have more denial of their illness and less desire to seek help (Fisher, Schneider, Burns, Symons, & Mandel, 2001). As healthcare providers and researchers, this is an important consideration when assessing ED psychopathology, specifically via self-report measures. Second, the EDE-Q was developed using female adult populations, and the measure may not be developmentally appropriate to fully capture the unique experience of adolescents. To accurately assess ED psychopathology in adolescents, a modified version of the EDE-Q or a supplementary measure needs to be taken into consideration. For example, Carter and colleagues developed a modified version of the EDE-Q for adolescents with a shorter time frame (14 days versus 28 days) and age appropriate language (Carter et al., 2001). Another example is the Youth EDE-Q, which was adapted from the EDE-Q for adults with age appropriate language and added pictures and vignettes to describe loss of control eating (Goldschmidt, Doyle, & Wilfley, 2007). However, there is limited psychometric data available for these modified versions with existing data examining children with overweight or obesity (Kass et al., 2017). Future research will need to compare modified assessment tools or the development of new measures to more adequately assess ED psychopathology in adolescents with AN, which may lead to more appropriate diagnoses and treatment interventions for this subpopulation. Finally, the EDE-Q is a self-report measure and individuals may not understand the language of ED symptoms when answering the questions. Passi and colleagues examined whether information provided during administration of the EDE would alter responses to the EDE-Q in a sample of adolescents with AN (Passi et al., 2003). Findings suggest that additional information provided by the clinician during the administration of the EDE, helped adolescents to more accurately respond to the

EDE-Q.

The findings of this study should be interpreted in the context of a few limitations. The present sample was small and included female adolescents who were admitted to an inpatient setting exclusively for ED. With a small sample size, it is premature to conclude whether the EDE-Q adequately measures ED behaviors and cognitions in this clinical subpopulation. Future research will need to include a larger sample of female adolescents with AN to provide a more thorough interpretation of EDE-Q scores. Furthermore, future research that examines norms for the EDE-Q among adolescents with eating disorders will need to include male adolescents, sexual minorities, and take into consideration the range of ED diagnostic categories across the continuum of care (e.g., outpatient, inpatient).

As far as the researchers are aware, this is the first study to report normative data on the EDE-Q among a solely inpatient sample of female adolescents diagnosed with AN. Despite the fact that this was a clinically diagnosed population requiring inpatient treatment, only 61.4–78.4% of the subjects scored in the clinically significant range on the global and/or subscale scores of the EDE-Q. This raises the question of whether or not the EDE-Q is adequately measuring ED psychopathology among adolescent patients with AN. Furthermore, the difference in EDE-Q scores among the AN subtypes suggests that patients with AN-BP may have more severe ED psychopathology and treatment options may need to differ based on AN subtypes.

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