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1 Running head: PSYCHOMETRIC PROPERTIES OF THE ED-15-Y

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6 A brief session-by-session measure of eating disorder psychopathology for children and
7 adolescents: Development and psychometric properties of the Eating Disorder-15 for Youth
8 (ED-15-Y)

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Data Sharing

The data that support the findings of this study are available from the corresponding author upon reasonable request. The data are not publicly available due to privacy and ethical restrictions.

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Conflict of Interest Statement

The authors have no conflict to declare.

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Abstract

Objective: Despite evidence supporting the use of measures to track ongoing progress and outcome in treatment, there is a relative absence of measures that are appropriate for this purpose in youth with eating disorders. This study examined the psychometric properties of the Eating Disorder-15 for Youth (ED-15-Y) scale, including its ability to detect short-term change in symptomatology. **Method:** Youth ($N = 203$) ages 8 to 18 years completed self-report questionnaires and semi-structured diagnostic interviews upon initial presentation for an outpatient eating disorders assessment at an academic medical center. **Results:** The ED-15-Y demonstrated excellent reliability (internal consistency, split-half reliability) and high sensitivity to change early in treatment (change from sessions 1 to 8, adjusting for baseline score). Further, these data demonstrate that the ED-15-Y has excellent convergent validity, being highly correlated with a well-tested, longer measure of eating disorders psychopathology—the Eating Disorders Examination-Questionnaire (EDE-Q). These data also support good discriminant and concurrent validity, differentiating between youth without an eating disorder or with ARFID and youth with eating disorders involving weight and shape concerns (e.g., anorexia nervosa, bulimia nervosa). **Discussion:** The ED-15-Y may be a useful tool to briefly assess eating disorder psychopathology in youth as young as 8 years old. Its sensitivity to change very early in treatment suggests that it has the potential to be used as a routine outcome measure in the context of treatment.

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Introduction

Despite the importance of evidence-based assessment in children and adolescents with eating disorders, there is a paucity of measures designed to assess eating disorder psychopathology in youth. Upon examining the randomized trials for youth with eating disorders cited in Lock’s (2015) literature review and several more recent trials, the Eating Disorders Examination (Fairburn & Cooper, 1993) is the most frequently used measure of outcome. However, the EDE interview is costly and time-intensive, and it is generally not feasible as a measure of outcome in non-research settings. Although not reported in the main outcome publications, over half of the trials for adolescents with AN or BN in the past 15 years (Le Grange, Lock, Agras, Bryson, & Jo, 2015; Le Grange, Crosby, Rathouz, & Leventhal, 2007; Lock, Agras, Bryson, & Kraemer, 2005; Lock et al., 2010; Lock et al., 2015) have also had participants complete the parallel self-report Eating Disorders Examination – Questionnaire (EDE-Q) (Fairburn & Beglin, 1994), which has very strong convergence with the interview (Berg et al., 2011).

There are significant advantages to the EDE-Q as an outcome measure, including perceived anonymity, time efficiency, and geographical flexibility, which makes the EDE-Q more feasible as an outcome measure in clinical practice. However, the EDE-Q was developed for women ages 16 to 35 (Fairburn & Beglin, 1994), and data on its psychometric properties in adolescents is extremely limited. Available studies examined the factor structure of the EDE-Q in adolescents ages 14-18 (White, Haycraft, Goodwin, & Meyer, 2014), demonstrating good internal consistency of the measure, and demonstrated some evidence of validity in adolescent inpatients ages 11-18, given significantly higher global scores for those with binge/purge type AN compared to those with restrictive type AN (Jennings & Phillips, 2017). There are currently

1 two adolescent-specific adaptations of the EDE-Q—the Eating Questionnaire - A (EDE-A;
2 CORC, 2020) and the Youth Eating Disorder Examination-Questionnaire (YEDE-Q;
3 Goldschmidt, Doyle, & Wilfley, 2007). The EDE-A made significant changes to the wording of
4 question and changed the timeframe from 28 days to 14 days. Community norms for youth ages
5 12-14 are available (Carter, Stewart, & Fairburn, 2001), but psychometric properties of the EDE-
6 A have not been examined. In contrast, the YEDE-Q has been used primarily in overweight
7 populations (Balantekin et al., 2017; Eichen et al., 2019; Kass et al., 2017; Sheinbein et al., 2019;
8 Skjåkødegård et al., 2016). Only one study of eating disorders was identified that used the
9 YEDE-Q, which demonstrated some evidence of convergent validity in adolescent inpatients
10 with AN (Noetel et al., 2016). In summary, the available measures for youth with eating
11 disorders are relatively long (near 30 items), they are limited to youth older than age 11-12 or 14,
12 and their psychometric properties in youth with eating disorders are largely unexamined. Further,
13 the original EDE-Q is more often selected as an outcome measure in youth with eating disorders
14 as young as 12, despite the absence of psychometric data for children and the availability of
15 measures more appropriate for adolescents, albeit with minimal psychometric data.

16 An additional barrier to assessment of eating disorder psychopathology in youth is the
17 absence of measures that would be appropriate for assessing week-to-week changes. Systematic
18 monitoring of patients' symptoms throughout the course of treatment, or routine outcome
19 monitoring (ROM), is increasingly important as a facet of evidence-based care. Indeed, mental
20 and physical health outcomes are significantly improved when usual care incorporates
21 measurement feedback systems using ROM (Bickman et al., 2011; Carlier et al., 2012;
22 Shimokawa et al., 2010). However, ROM relies on the availability of brief, psychometrically
23 strong outcome measures. While two measures of session-to-session symptom change have been

1 developed for adults with eating disorders (Tatham et al., 2015; Gideon, Hawkes, Mond,
2 Saunders, Tchanturia, & Serpell, 2016), their application would be inappropriate in younger
3 populations.

4 Given the lack of measures available to assess eating disorder psychopathology in youth
5 and the absence of measures appropriate to track change over time, this study leveraged an
6 existing brief measure of eating disorder psychopathology in adults (ED-15; Tatham et al.,
7 2015). At the time of initial adaptation, the ED-15 was the only available measure of its kind,
8 demonstrated excellent psychometric properties, and seemed suitable for adaptation. With
9 careful consideration of the developmental and reading level for youth as young as 8 years of
10 age, the ED-15 for youth (ED-15-Y) was adapted from the ED-15. This study examines the
11 psychometric properties of the ED-15-Y, including its reliability (factor structure, internal
12 consistency), sensitivity to change over time, and validity (convergent, discriminant, concurrent).

13 **Methods**

14 Participants were youth up to 18 years who presented to a specialty eating disorders
15 program at an academic medical center for an initial psychiatric evaluation between November
16 2015 and April 2020. All youth who provided assent/consent were included, except those
17 younger than 8 years due to their developmental capacity to understand and complete a battery of
18 self-report questionnaires. A subsample received outpatient treatment within the program and
19 provided session-to-session reports of symptoms. The primary treatment modality offered in the
20 program was family-based treatment (Lock & Le Grange, 2013), but adolescent focused therapy
21 (Lock, 2020), cognitive behavior therapy (Fairburn, 2008), and dialectical behavior therapy
22 (Linehan, 2014) were also delivered where appropriate. Written informed consent/assent was
23 obtained from youth and their caregiver(s). All procedures were approved by the Institutional

1 Review Board at the University of California, San Francisco.

2 **Procedures**

3 Demographic and clinical information was collected during the intake interview and via
4 questionnaires. Weight (without shoes in light indoor clothing) was taken on a regularly
5 recalibrated scale, and percent of median body weight was calculated using the 50th Body Mass
6 Index percentile according to Center for Disease Control norms for age and gender (CDC, 2002).

7 **Measures**

8 **Eating Disorder-15 for Youth (ED-15-Y).** The original ED-15 (Tatham et al., 2015)
9 was designed as a brief measure of eating disorder psychopathology for adults, with 10
10 attitudinal items and five behavioral items that inquire about the frequency of binge eating,
11 vomiting, laxative use, restricting, and driven exercise in the past week. The attitudinal items
12 yield a total score and two subscale scores (eating concerns and weight/shape concerns).

13 In consultation with other experts in child and adolescent eating disorders, the ED-15 was
14 adapted by the first author for use with youth ages 8 to 18 (see ED-15-Y measure in Supporting
15 Information). The scale was modified from a seven-point scale (0-6) to a five-point scale (1-5),
16 and language was modified for age appropriateness. The modified ED-15-Y has a Flesch-
17 Kincaid grade level of 3.7, indicating that the language was appropriate for youth in the third
18 grade (age 8), and a Flesch reading ease of 84.8, indicating excellent readability. These initial
19 adaptations were administered to a group of ten pediatric patients (ages 8 through 17) with eating
20 disorders. None reported any difficulty understanding the items, and their explanation of the
21 instructions and items demonstrated good item clarity. Therefore, this initial adaptation was
22 finalized with minor formatting changes as suggested by one caregiver. The total score is the
23 mean of the first ten items, with scores ranging from 1 to 5. Youth completed the ED-15-Y at the

1 initial assessment and at each session early in treatment if they engaged in treatment between
2 October 2015 and October 2018 for an eating disorder involving weight and shape concerns.

3 **Eating Disorder Examination Questionnaire (EDE-Q).** The EDE-Q (version 6.0;
4 Fairburn & Beglin, 2008) is the leading questionnaire for assessing eating disorder
5 psychopathology (Berg, Peterson, Frazier, & Crow, 2011). Its global score has demonstrated
6 good reliability (Luce & Crowther, 1999) in adolescents with AN (Herzog, Keller, Sacks, Yeh,
7 & Lavori, 1992) and BN (Binford, Le Grange, & Jellar, 2005).

8 **Eating Disorders in Youth-Questionnaire (EDY-Q).** The EDY-Q (Hilbert & van Dyck,
9 2016) assesses early-onset restrictive eating disturbances characteristic of Avoidant-Restrictive
10 Food Intake Disorder (ARFID) and other less common eating disorders in youth ages 8-13. The
11 total score is comprised of 12 items that focus exclusively on ARFID symptoms. The EDY-Q
12 demonstrated acceptable reliability and adequate convergent and discriminant validity (Kurz,
13 Van Dyck, Dremmel, Munsch, & Hilbert, 2015).

14 **Symptoms and Functioning Severity Scale (SFSS).** The SFSS (Bickman, Athay, et al.,
15 2010) is a 26-item global measure of general psychopathology in youth that demonstrates
16 excellent reliability and validity (Athay, Riemer, & Bickman, 2012).

17 **Multidimensional Anxiety Scale for Children (MASC-10).** The MASC-10 (March et
18 al., 1997) is an abbreviated 10-item global measure of anxiety symptoms in patients ages 8-18.
19 The questionnaire demonstrates good internal and test-retest reliability (March, Sullivan, &
20 Parker, 1999) as well as good discriminative validity (Rynn et al., 2006).

21 **Children's Depression Inventory-2 (CDI-2).** The CDI-2 Short form (Kovacs & MHS
22 Staff, 2011) is a 12-item measure of global depressive symptoms for ages 7-17 years. The
23 questionnaire demonstrates good reliability and discriminative validity (Kovacs & MHS Staff,

1 2011).

2 **Mini International Neuropsychiatric Interview Kid (MINI-Kid).** The MINI-Kid is a
3 widely used semi-structured interview that is used to diagnose co-occurring psychiatric disorders
4 with high reliability and validity (Sheehan, Sheehan, et al., 2010). Version 7.0.2 was
5 administered by clinical psychologists or psychology interns who were supervised live by a
6 clinical psychologist to assess *Diagnostic and Statistical Manual of Mental Disorders, Fifth*
7 *Edition* co-occurring psychiatric disorders.

8 **Eating Disorder Assessment for DSM-5 (EDA-5).** The EDA-5 is a semi-structured
9 interview used to assist in determining DSM-5 eating disorder diagnosis (Sysko et al., 2015).
10 Clinicians (licensed clinical psychologists and clinical psychology interns who received live
11 clinical supervision by a licensed psychologist) administered this measure in the context of the
12 initial evaluation and further specified the eating disorder diagnosis as clinically indicated.

13 **Data analyses**

14 All analyses were conducted with IBM SPSS Statistics 27.

15 **Reliability.**

16 **Factor structure.** Factor structure for the ten attitudinal items was examined using
17 principal axis factoring with an unspecified number of components and an oblique rotation to
18 establish whether the scale represented one global factor or multiple subscales.

19 **Internal consistency.** Internal consistency and split-half reliability (first five items versus
20 last five items) for the ED-15-Y were examined using Cronbach's alpha and Spearman-Brown
21 coefficients, respectively. Internal consistencies were examined for each of the other self-report
22 measures as well.

23 **Sensitivity to change over time.** The ED-15-Y is designed to be sensitive to change over

1 time and should therefore demonstrate only moderate temporal stability. Greater improvement
2 early in treatment is a robust predictor of outcome at end of treatment and follow-up (Vall &
3 Wade, 2015), so early symptom change was examined to assess sensitivity to change over time.
4 Given that prior studies have examined early change through session eight (Doyle, Le Grange,
5 Loeb, Doyle, & Crosby, 2010; Le Grange, Accurso, Lock, Agras, & Bryson, 2014; Le Grange,
6 Doyle, Crosby, & Chen, 2008) and our expectation that cognitive improvement would not be
7 expected much earlier than this time, multilevel mixed-effects models examined change in the
8 ED-15-Y from sessions 1 to 8. The first eight sessions were generally scheduled within the first
9 two months of treatment. The model included baseline ED-15-Y score and session number, with
10 the expectation that there would be a statistically significant decrease in ED-15-Y score across
11 sessions.

12 **Validity.**

13 ***Convergent validity.*** Eating disorder psychopathology. Convergent validity for the ED-
14 15-Y was established through Pearson's correlations with the EDE-Q. Given that the EDE-Q is
15 not well-established for younger populations, separate correlations were provided for youth ages
16 8 to 13 and adolescents 14 years and older. We also examined the Pearson chi-squared values of
17 the crosstabulations between each of the five behavioral items on the ED-15-Y and their parallel
18 items on the EDE-Q. Agreement on frequency was also measured, using correlations between
19 each pair of behavioral items for youth who endorsed the behavior on both measures.

20 Other psychopathology. Pearson's correlations were examined between the ED-15-Y and
21 measures of overall psychopathology (SFSS), anxiety (MASC-10), and depression (CDI-2). As a
22 comparison, correlations between these measures and the EDE-Q were also examined. We
23 expected moderate to strong correlations between the ED-15-Y and co-occurring

1 psychopathology (general, anxiety, and depression), and expected the correlations to be
2 comparable to those with the EDE-Q.

3 ***Discriminant validity.*** A Pearson's correlation was examined between the ED-15-Y and
4 ARFID symptomatology (EDY-Q). As a comparison, the correlation between the EDY-Q and
5 the EDE-Q was also examined. We expected a small correlation between ARFID
6 symptomatology and both the ED-15-Y and EDE-Q, as these measures should measure unique
7 symptom combinations.

8 ***Concurrent validity.*** Scores on the ED-15-Y were compared by eating disorder diagnosis
9 using a one-way ANOVA. Given the lack of weight and shape concerns in ARFID, we
10 anticipated that ED-15-Y scores in youth with ARFID would be significantly lower than those
11 with eating disorders involving weight and shape concerns (i.e., AN, Atypical AN, BN) and not
12 significantly different than youth without an eating disorder. We further expected that scores
13 would be highest for BN and significantly greater than scores for youth with AN or Atypical AN,
14 given minimization of symptoms in AN-like presentation and research indicating that eating
15 disorders psychopathology in adolescents presenting for treatment appears to be more severe in
16 BN than AN (Binford, Le Grange, & Jellar, 2005; Gorrell et al., 2020). We also expected that
17 youth with Atypical AN would report more severe eating disorder psychopathology compared to
18 those with "typical" AN, given more recent research suggesting a significant difference between
19 these groups (Garber et al., 2019; Noetel et al., 2016; Sawyer et al., 2016).

20 **Results**

21 Of those evaluated ($N = 363$) in the specialty eating disorders program, 83.3% ($n = 252$)
22 agreed to participate in this observational study, four of whom were excluded due to age younger
23 than 8 years. The final sample for this study included 203 youth due to missing data on the ED-

1 15-Y or EDE-Q for 44 youth (17.7%). Participants were mostly White (75.9%) girls (75.9%)
 2 with a mean age of 15.09 years ($SD = 1.99$). Most were adolescents ages 14 to 18 ($n = 151$), with
 3 a smaller group of children ages 8 to 13 ($n = 52$). The most common diagnoses were AN (26.6%)
 4 and Atypical AN (27.5%). Additional detail about demographic and clinical characteristics is
 5 provided in Table 1.

6 Demographic and clinical factors were examined in relation to missing ED-15-Y/EDE-Q
 7 data, revealing that missingness was not associated with any measured factors, including age,
 8 gender identity, race, ethnicity, eating disorder diagnosis, duration of illness, weight, treatment
 9 history, or co-occurring diagnosis ($ps > .06$).

10 INSERT TABLE 1 ABOUT HERE

11 **Reliability**

12 **Factor structure.** The unrotated factor analysis revealed one factor (eigenvalue = 6.791),
 13 consisting of all ten items, with loadings from 0.702 to 0.936. All other unrotated factors had
 14 Eigenvalues of .794 and lower. The direct oblimin rotation did not result in a multifactor solution
 15 because only one factor could be extracted, and therefore the solution was not rotated. ED-15-Y
 16 items had the following loadings on the single, general factor: worry about losing control over
 17 eating (.702), avoid people/places due to appearance (.738), think about food and eating
 18 constantly (.751), compare body negatively to others (.889), avoid looking at body (.726),
 19 uptight or nervous about weight (.915), body checking (.833), strict rules about eating (.610),
 20 uptight or nervous about shape (.936), and worry others will judge shape (.881).

21 **Internal consistency.** The ED-15-Y demonstrated excellent internal consistency
 22 (Cronbach's alphas = .946) and split-half reliability (Spearman-Brown coefficients = .945).
 23 Internal consistencies (Cronbach's alphas) were .973 for the EDE-Q, .719 for the EDY-Q, .863

1 for the CDI-2, .799 for the MASC-10, and .925 for the SFSS.

2 **Sensitivity to change over time**

3 Youth with eating disorders involving weight and shape concerns ($n = 57$) completed the
 4 ED-15-Y an average of 4.04 times ($SD = 2.41$) in the first eight sessions. The majority of these
 5 youth were engaging in family-based treatment ($n = 48, 87.7%$) for AN or Atypical AN ($n = 42,$
 6 $76.3%$). Completed ED-15-Ys ($n = 230$) were relatively evenly distributed across sessions (i.e.,
 7 ED-15-Ys per session represented 10.0% and 15.2% of all available data). There was a
 8 significant effect of time on ED-15-Y scores, such that scores decreased by 0.118 ($SE = 0.017, F$
 9 $= 50.895, p < .001$) per session in the early phase of treatment (i.e., total reduction of .823
 10 between sessions 1 and 8), after adjusting for baseline ED-15-Y score ($B = 0.532, SE = 0.110, F$
 11 $= 23.284, p < .001$).

12 **Validity**

13 **Convergent validity.** Eating disorder psychopathology. The ED-15-Y demonstrated high
 14 convergence with the longer self-report measure of eating disorder psychopathology (EDE-Q) in
 15 adolescents 14 years and older ($r = .892, p < .001$) and youth ages 8 to 13 ($r = .935, p < .001$). The
 16 five behavioral items on the ED-15-Y were compared to their matching items on the EDE-Q
 17 (i.e., dietary restraint, binge eating, vomiting, laxative misuse, and driven exercise). Given the
 18 different timeframes of the measures, not all of the youth who endorsed behaviors on the EDE-Q
 19 (past month) would be expected to endorse those behaviors on the ED-15-Y (past week), but all
 20 of the youth endorsing behaviors on the ED-15-Y would be expected to endorse those behaviors
 21 on the EDE-Q. There was statistically significant convergence across all five behaviors (dietary
 22 restraint: $\chi^2 = 83.670$, binge eating: $\chi^2 = 69.691$, vomiting: $\chi^2 = 91.054$, laxative misuse: $\chi^2 =$
 23 63.096 , driven exercise: $\chi^2 = 80.482, ps < .001$). Table 2 provides data on alignment in

1 presence/absence of each of the five behaviors on the ED-15-Y and EDE-Q. Of note, 22% ($n =$
 2 11) of the 51 individuals who endorsed binge eating in the past week had not endorsed binge
 3 eating in the past month, suggesting that the ED-15-Y item may be more sensitive to detecting
 4 binge episodes than the EDE-Q. For those who endorsed behaviors on both the ED-15-Y (days
 5 or episodes in past week) and EDE-Q (days in past month rated on a Likert scale), the correlation
 6 coefficients for behavior frequencies were as follows: restraint (days in past month v. past week:
 7 $r = .618$), objective bingeing (days in past month v. episodes in past week: $r = .687$); vomiting
 8 (days in past month v. episodes in past week: $r = .684$); and driven exercise (days in past month
 9 v. past week: $r = .819$) ($ps < .01$). The correlation for laxative misuse was not calculated due to
 10 low frequency of this behavior ($n = 5$). Missing data (skipped questions) occurred more
 11 frequently on the EDE-Q than the ED-15-Y for binge eating (6.4% v. 0.5%), vomiting (6.4% v.
 12 1.0%), laxatives (6.9 v. 0.0%), and driven exercise (6.4% v. 0.0%), with no differences in
 13 restraint (0% overall).

14 INSERT TABLE 2 ABOUT HERE

15 Co-occurring psychopathology. ED-15-Y correlations with overall psychopathology
 16 (SFSS total score: $r = .671$), anxiety (MASC-10 T-score: $r = .482$), and depression (CDI-2 T-
 17 score: $r = .734$) were moderate to strong and comparable to correlations between the EDE-Q and
 18 these measures (SFSS: $r = .605$, CDI: $r = .697$, and MASC: $r = .402$) (all $ps < .001$), as expected
 19 given the overlap between these domains and eating disorder psychopathology. Consistent with
 20 expectations, these correlations were smaller than the direct correlation between the ED-15-Y
 21 and EDE-Q.

22 **Discriminant validity.** As expected, the association between the ED-15-Y and ARFID
 23 symptomatology was weak (EDY-Q: $r = .347$, $p < .001$) and comparable to the EDE-Q's

1 association with the EDY-Q ($r = .356, p < .001$).

2 **Concurrent validity.** Diagnosis (comparing scores of individuals with AN, Atypical AN,
3 and BN to those with ARFID and also no eating disorder) was significantly associated with ED-
4 15-Y scores ($F = 21.575, p < .001$) (see Figure 1). Post-hoc comparisons indicated that ED-15-Y
5 scores were not significantly different between youth with no eating disorder and those with
6 ARFID ($p = 0.13$). For youth with an eating disorder involving weight and shape concerns (i.e.,
7 AN, atypical AN, and BN), their scores were higher than for youth without an eating disorder (ps
8 $\leq .005$) or youth with ARFID ($ps < .001$). Consistent with expectations, youth with BN had
9 significantly higher scores than those with AN or atypical AN ($ps < .01$), and youth with atypical
10 AN had higher scores than those with AN ($p = .018$).

11 INSERT FIGURE 1

12 Discussion

13 This study provides support for the use of the ED-15-Y to assess eating disorder
14 psychopathology in youth ages 8 to 18 years. It had a robust single-factor solution and can
15 therefore be scored as a single scale. The ED-15-Y eating disorders psychopathology score (first
16 ten items) and the behavioral items (last five items) demonstrated excellent reliability,
17 convergent validity, discriminant validity, and concurrent validity in this study. The ED-15-Y
18 demonstrated high sensitivity to change over time for youth with eating disorders involving
19 weight and shape concerns, establishing its utility in measuring session-to-session change in
20 symptomatology. The statistically and clinically significant change (reduction of .82 on a five-
21 point scale) is particularly notable because most youth were receiving family-based treatment for
22 AN or Atypical AN and might not have been expected to demonstrate cognitive change within
23 the first eight sessions of treatment.

1 Convergent validity was established with the ED-15-Y's strong association with the
2 EDE-Q ($r_s = .89$ and $.94$ for adolescents and youth, respectively). The strength of the correlation
3 is somewhat surprising given the different timeframes of the measures (seven versus 28 days),
4 but it is similar to that between the EDE-Q and the "short" version of the EDE-Q that refers to
5 the past seven days in a previous study of adults with eating disorders ($r = .82$, Gideon et al.,
6 2016). It is possible that attitudinal symptoms are relatively stable in the month prior to
7 presentation. Alternatively, youth may be more highly influenced by recent attitudinal symptoms
8 because recent history is more salient and/or easier to recall, or because youth have difficulty
9 differentiating between the past week and the past month timeframes. Measures of general
10 psychopathology, depression, and anxiety also helped to establish discriminant validity, with
11 correlations that were moderate and comparable to those between the same measures and the
12 EDE-Q. Concurrent validity was demonstrated through expected mean differences by diagnosis,
13 where youth with BN had the highest scores, followed by youth with Atypical AN, then AN, all
14 of whom had higher scores than youth with ARFID or no eating disorder.

15 This is the first study to our knowledge examining a brief measure of eating disorder
16 symptoms for youth. Strengths of this study include the use of a cross-diagnostic sample of youth
17 with eating disorders, including children as young as eight years old, and its examination of
18 psychometric properties, including factor structure, reliability, sensitivity to change over time,
19 and multiple types of validity. Limitations of this study include the relatively modest sample
20 size, missing data, and the lack of a community sample with which to establish community
21 norms and examine factor structure equivalence across age groups. In addition, the use of the
22 EDE-Q in this young sample is inappropriate given the lack of psychometric data on the EDE-Q
23 in children. Nevertheless, the high correlation between the ED-15-Y and the EDE-Q in the

1 younger sample demonstrates some convergence, and this represents just one of several types of
2 validity examined in this study.

3 Since early treatment response is a potent predictor of outcome at the end of treatment for
4 youth with AN (Doyle, Le Grange, Loeb, Doyle, & Crosby, 2010; Le Grange, Accurso, Lock,
5 Agras, & Bryson, 2014) and BN (Le Grange, Doyle, Crosby, & Chen, 2008), measures with high
6 reliability, validity, and sensitivity to detect change (or lack thereof) early in therapy are
7 essential. Even when empirically-supported treatments are implemented in the context of trials,
8 only about half of youth respond well (Le Grange, Lock, Agras, Bryson, & Jo, 2015; Lock, Le
9 Grange, Agras, Moye, Bryson, & Jo, 2010). Further, treatment effects may be diluted in “real
10 world” practice due to implementation drift (Accurso, Fitzsimmons-Craft, Ciao, & Le Grange,
11 2015; Accurso, Le Grange, & Graham, 2020; Kosmerly, Waller, & Robinson, 2014),
12 highlighting the importance of other potential avenues to improve treatment outcomes in youth
13 with eating disorders. To this aim, ROM may be an important potential avenue to pursue.

14 The ED-15-Y is a free, rapidly administered, easily scored measure of eating disorder
15 psychopathology for youth that is sensitive to change over time, allowing clinicians to
16 objectively track youth outcome in the context of treatment. However, future efforts are needed
17 to determine whether the ED-15-Y would be an appropriate measure for ROM. Future research
18 with the ED-15-Y might allow for session-by-session examination of how psychotherapy process
19 (e.g., common factors such as therapeutic alliance, or use of particular treatment techniques)
20 predicts patterns of symptom change. Such research is needed to inform our understanding of
21 how cognitive symptoms respond to changes in weight and/or binge/purge behaviors, as well as
22 the relation between eating disorders psychopathology and co-occurring psychopathology over
23 time. In combination, this knowledge can advance the refinement and optimization of existing

1 treatments for youth with eating disorders.

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1 Figure 1. ED-15-Y scores across eating disorder diagnoses with mean (SD).

2

3 Abbreviations: Eating disorder (ED), Avoidant Restrictive Food Intake Disorder (ARFID),
4 Anorexia nervosa (AN), Bulimia nervosa (BN), Other Specified Feeding or Eating Disorder
5 (OSFED).

6