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Predicting probable eating disorder case-status in men using the Clinical Impairment Assessment: Evidence for a gender-specific threshold

Brianne N. Richson[a], **Sarah N. Johnson**[a], **Trevor James Swanson**[a], **Kara A. Christensen**[a], **Kelsie T. Forbush**[a,*], **Jennifer E. Wildes**[b]

[a]Department of Psychology, University of Kansas, Lawrence, KS, USA

[b]Department of Psychiatry and Behavioral Neuroscience, University of Chicago, Chicago, IL, USA

Abstract

The Clinical Impairment Assessment (CIA) is a widely used self-report measure of the psychosocial impairment associated with eating-disorder symptoms. Past studies recommended a global CIA score of 16 to identify clinically significant impairment associated with a probable eating disorder (ED). However, to date, research on the properties of the CIA has been conducted in majority-women samples. Preliminary research on gender differences in CIA scores suggested men with EDs report less impairment on the CIA relative to women with EDs. Thus, the purpose of this study was to test if a different impairment threshold is needed to identify cases of men with EDs. We hypothesized that a lower CIA threshold, relative to that identified in majority-women samples, would most accurately identify men with EDs. Participants (N = 162) were men from our university-based and general community-based ED participant registry who completed the CIA and Eating Disorder Diagnostic Scale. Both precision-recall and receiver operating characteristic curves assessed what CIA global score threshold most accurately identified men with EDs. Both analytic approaches indicated that a CIA global score of 13 best predicted ED case-status in men. Consistent with past research, men with a clinically significant ED appear to report lower impairment on the CIA. Results have implications for screening and assessing for substantial ED-related impairment in men. Additionally, past research using the CIA to identify men with EDs may have underidentified men with clinically significant symptoms.

Keywords

Eating disorders; Impairment; Assessment; Gender; Men

*Corresponding author at: Department of Psychology, University of Kansas, Lawrence, KS, 66045. kforbush@ku.edu (K.T. Forbush).

CRediT authorship contribution statement

Ms. Richson, Ms. Johnson, Dr. Swanson, and Dr. Forbush all contributed to the conceptualization of the current study. Ms. Richson, Ms. Johnson, and Dr. Swanson all contributed to study analyses and writing different components of the initial manuscript submission, with Dr. Swanson compiling the code for the primary study analyses, and Ms. Richson also writing syntax pertaining to measure scoring. Dr. Christensen primarily oversaw data cleaning for these data; Ms. Richson also contributed to data cleaning. Drs. Christensen, Forbush, and Wildes all provided critical feedback on manuscript drafts for the original submission and throughout revisions. All authors contributed to the revision process in response to reviews.

Declaration of competing interest

None.

1. Introduction

Eating disorders (EDs) are serious, often chronic psychiatric disorders associated with increased mortality (Fichter & Quadflieg, 2016), medical consequences (Westmoreland et al., 2016), and reduced quality of life (Mond et al., 2012). EDs are associated with impairment in various domains including social, interpersonal, cognitive, mobility, and role functioning (Cardi et al., 2018; Marques et al., 2011; Swanson et al., 2011). Impairment may also be a key reason for treatment seeking (Forrest et al., 2017; Mond et al., 2009), and effective treatments target impairment (Fairburn, 2008). Thus, valid assessments of ED-related impairment are needed to better identify and treat EDs.

ED research (including research on ED-related impairment) has historically focused on women despite increasing rates of ED behaviors among men (Madden et al., 2009; Mitchison et al., 2014). Men are less likely than women to receive or seek treatment for an ED (Bohrer et al., 2017; Thapliyal et al., 2018). The stereotypical notion that EDs only affect women may make men with EDs less likely to seek treatment (Griffiths et al., 2015). Relatedly, men with EDs may be less likely than women to recognize they have an ED (Robinson et al., 2013). Women that have symptoms consistent with an ED may also be more likely to be diagnosed with an ED than men with the same symptoms (Currin et al., 2007). Therefore, increased attention to ED-related impairment in men is critical to identifying, diagnosing, and treating EDs in men.

Research has examined how functional impairment (i.e., impairment in roles at work, home, etc.) or health-related quality of life differs in men and women with ED symptoms (Mitchison & Mond, 2015). Differences in functional impairment or quality of life between men and women were insignificant or yielded small effect sizes (Bentley et al., 2014; Mitchison et al., 2013; Striegel et al., 2012; Woodside et al., 2001). However, some studies revealed gender differences in specific symptom contributions to impairment. Mond and Hay (2007) reported that binge eating, fasting, and weight/shape concerns were significantly associated with functional impairment in community men, compared to only weight/shape concerns in women. Griffiths et al. (2016) noted the negative relationship between body dissatisfaction and mental-health related quality of life was stronger in men than women. In summary, when general (i.e., non-ED specific) functional impairment or quality of life is assessed, men and women report similar levels of impairment, but certain ED symptoms may be more strongly associated with impairment in men versus women.

Given that impairment attributed to ED symptoms predicts treatment seeking for ED symptoms (Mond et al., 2009), the measurement of ED-related impairment has received increased attention. One measure that has increased utility in assessing ED-related impairment relative to broader impairment measures is the Clinical Impairment Assessment (CIA; Bohn et al., 2008; Bohn & Fairburn, 2008). The CIA assesses impairment across domains often affected by EDs. Its global score reflects three domains: personal, cognitive, and social impairment. Personal impairment reflects self-criticism associated with EDs (e.g., feeling like a failure). Cognitive impairment reflects interference with cognitive functioning associated with EDs (e.g., difficulty concentrating due to ED symptoms). Social impairment reflects interpersonal difficulties related to EDs (e.g., difficulty with social

eating). Receiver operating characteristic curve analyses identified a global score of 16 as the optimal threshold for distinguishing patients with an active ED from those in remission/recovery (Bohn et al., 2008), as well as for differentiating women with EDs from community controls without ED psychopathology (Reas et al., 2016). Nevertheless, these studies relied on majority-women (Bohn et al.; specific percentage unclear) or all-women (Reas et al.) samples. Consequently, it is unclear if the 16-point CIA-threshold performs equally well in identifying men with EDs.

Using an inaccurate CIA-threshold in ED research on men may underidentify men with substantial ED-related impairment and mischaracterize how impaired men with EDs are. Importantly, men with EDs exhibited significantly lower CIA scores relative to women with EDs in two studies (Dahlgren et al., 2017; Welch et al., 2011). A considerable limitation of these studies is the underrepresentation of men; only 7% of Dahlgren et al.'s sample were men ($n = 47$ out of $N = 667$), and only 2.4% of Welch et al.'s sample were men ($n = 57$ out of $N = 2383$). Despite evidence that men reported less impairment on the CIA than women in clinical samples (Dahlgren et al., 2017; Welch et al., 2011), no past studies tested if a different CIA-score threshold may be needed to identify probable ED-cases in men.

1.1. Purpose and hypotheses

Because measures of ED psychopathology have largely been developed using theoretical frameworks focused on women, knowledge about the assessment of ED-related impairment in men is critical to identifying and treating men with EDs. In light of conflicting research on impairment in men with EDs, it is necessary to clarify if a different CIA-score threshold signifies the presence of clinically significant impairment in men with EDs to ensure that men with EDs are accurately identified. To our knowledge, no studies have examined the psychometric properties of the CIA in men. This gap in psychometric data warrants attention given that accurate measurement of ED-related impairment in men could facilitate recognition and treatment of more men with EDs. Our aim was to establish the global CIA-score threshold that accurately identifies men with probable EDs using a similar analytical approach to past research (Bohn et al., 2008; Reas et al., 2016). Based on previously reported CIA-score differences between men and women with EDs (Dahlgren et al., 2017; Welch et al., 2011), we hypothesized that a lower CIA-threshold, relative to that identified in majority-women samples, would accurately identify men with EDs.

2. Method

2.1. Participants and procedure

Participants were members of our ED registry, which consisted of individuals recruited for studies on eating, weight, and body-image concerns from two Midwestern universities and surrounding communities. Registry participants were recruited via fliers, newspaper/bus advertisements, and mass emails sent to university faculty, staff, and students, all with the aim of recruiting individuals with EDs (see Forbush et al., 2016 & Forbush et al., 2018 for further information). Registry participants who identified as "male" and completed the CIA/Eating Disorder Diagnostic Scale (EDDS; Stice et al., 2000) as screening measures were included in this study, regardless of ED psychopathology. Study procedures were

approved by university Institutional Review Boards. Participants provided consent prior to questionnaires. Nineteen participants were excluded due to missing EDDS items (e.g., self-induced vomiting frequency) that prevented determination of ED diagnosis. An additional 19 participants were excluded due to not responding to any CIA/EDDS items. Table 1 displays demographics/ED diagnoses for the final sample (N = 162); Table 2 displays demographics by diagnosis.

2.2. Measures

2.2.1. Clinical Impairment Assessment (CIA)—The CIA is a 16-item self-report measure of impairment associated with EDs. Respondents completed the CIA in reference to how eating behaviors, exercise behaviors, or eating/body-related cognitions affected functioning over the previous four weeks. Items are measured on a four-point Likert scale: 0 = 'not at all,' 1 = 'a little,' 2 = 'quite a bit,' and 3 = 'a lot.' Total scores reflect the sum of items; higher scores indicate greater ED-related impairment. The CIA demonstrated satisfactory to high test-retest reliability in young-adult women and patients with EDs (Bohn et al., 2008; Reas et al., 2010). Internal consistency ranged from satisfactory to excellent in young-adult women (Reas et al., 2010; Vannucci et al., 2012), Bohn et al.'s majority-women patient sample (2008), and Fijian adolescent girls (Becker et al., 2010). In Dahlgren et al.'s (2017; 93% women, total N = 667) and Jenkins' (2013; 93.7% women, total N = 190) mixed-gender patient samples, internal consistency was excellent. In this sample, internal consistency was excellent (α = 0.942). The CIA also demonstrated good convergent and discriminant validity in young-adult women (Reas et al., 2010; Vannucci et al., 2012) and Bohn et al.'s majority-women patient sample (2008). However, its psychometric properties in samples of boys/men are unknown. Interested readers can access the CIA here: http://www.wales.nhs.uk/sitesplus/documents/866/CIA.pdf.

2.2.2. Eating Disorder Diagnostic Scale (EDDS)—The EDDS (Stice et al., 2000) is a self-report measure that assesses symptoms consistent with diagnostic criteria for anorexia nervosa (AN), bulimia nervosa (BN), binge-eating disorder (BED), and other specified feeding or eating disorders (OSFEDs). Past research demonstrated that the EDDS converged with interview-based ED diagnoses in women, had acceptable psychometric properties in women, and that item responses were not moderated by gender (Schaefer et al., 2019; Stice et al., 2004). Probable *DSM*-5 ED-diagnoses were established using the EDDS; BMI was calculated from EDDS height/weight items.

2.2.3. DSM-5 eating disorder diagnoses—With permission from the EDDS copyright holder, a question assessing subjective binge-eating episodes was added. EDDS responses were used to identify DSM-5 diagnoses of AN, BN, BED, and OSFED. OSFED presentations that were considered probable EDs included: 1) subthreshold-AN, 2) subthreshold-BN, 3) subthreshold-BED, and 4) compensatory eating disorder or purging disorder. Subthreshold-AN was defined by having both a BMI of 18.5–18.99 and the presence of at least one other AN symptom (e.g., fear of weight gain); individuals with a BMI < 18.5 that had additional symptoms but did not fully meet other AN criteria were also considered subthreshold-AN. Subthreshold-BN consisted of men who reported objective binge-eating episodes and/or inappropriate compensatory behaviors at a lower

frequency than required for full diagnosis. Subthreshold-BN also included men who met all BN criteria, except for endorsement of overvaluation of weight/shape. Subthreshold-BED included men who reported objective binge-eating episodes at a lower frequency than required for full diagnosis. Subthreshold-BED also included men who had objective binge-eating episodes, but did not endorse at least three out of five Criterion B symptoms that are required for a full-threshold BED diagnosis (e.g., eating rapidly, eating alone due to embarrassment, etc.) *and/or* did not endorse the dichotomous item about becoming "very upset" by binge eating.

The EDDS contains one item to assess ED-related impairment. Given that it is unclear whether men with an ED have similar or different levels of impairment to women with an ED, we did not require endorsement of this impairment item. In other words, we excluded the EDDS impairment item from our diagnostic rubric because we were concerned that only including participants who endorsed impairment would lead to a sample with greater impairment, which would hamper our ability to test whether men with probable EDs reported lower ED-related impairment on the CIA.

2.3. Statistical analyses

Using logistic regression, ED case-status was regressed onto CIA global scores in R software. Both precision-recall and receiver operating characteristic curves tested the performance of CIA global score in characterizing ED case-status and identify a reliable 'cutoff' score. Area under the curve assessed the efficacy of the CIA as an ED-classification tool for men (Hanley & McNeil, 1982). Curves were examined to obtain an optimal case-status threshold by maximizing 1) sensitivity and precision (precision-recall), and 2) sensitivity and specificity (receiver operating characteristic).

Receiver operating characteristic curves perform best with balanced datasets (i.e., equal class-membership), whereas precision-recall curves are preferable for imbalanced datasets (Saito & Rehmsmeier, 2015). Given that the ratio of probable ED-cases to non-ED cases in our sample is unequal and that past CIA research utilized receiver operating characteristic curves, we utilized both metrics to assess if they produced a similar threshold.

Receiver operating characteristic and precision-recall curves optimize different characteristics of a classifier. Both curves are obtained by varying the threshold (in terms of predicted probabilities) and computing relevant statistics for each candidate value. Receiver operating characteristic curves plot the *true positive rate* (i.e., sensitivity, or recall) against the *false positive rate* (i.e., the inverse of specificity, or the true negative rate) for each threshold. Precision-recall curves maximize the true positive rate along with *precision* of classification. Therefore, receiver operating characteristic curves balance the accuracy of categorization across the two classes, while precision-recall curves maximize the accuracy of positive-class categorization (i.e., probable ED-case). While both precision and the false positive rate aim to limit false positives, the former is concerned with reducing its proportion in the *positive class*, while the latter focuses on minimizing its proportion in the *negative class*. Precision-recall is, therefore, often preferable for identifying members of a relatively underrepresented or rare class (e.g., men with EDs).

2.3.1. Missing data—Multiple imputation was performed using *Amelia* (Honaker et al., 2011). Missing values were imputed 1000 times; an aggregated dataset was created wherein missing values were replaced with their rounded averages taken across imputations. Analyses were also performed on imputed datasets to assess if results reflected sampling variability.

2.3.2. Model performance assessment—Participants were coded as a probable ED-case or non-ED case (the binary dependent case-status variable) based on if EDDS responses were or were not consistent with a DSM-5 ED (i.e., AN, BN, BED, OSFED). CIA responses were summed for the CIA global score predictor variable.

Generally, an area under the curve value of 0.5 indicates that the classifier (i.e., CIA total) performs no better than chance, whereas 1.0 indicates perfect classification. Values within [0.51, 0.70] are “less accurate”, those within [0.71, 0.90] are “moderately accurate”, and those within [0.91, 0.99] are “highly accurate” (Swets, 1988).

3. Results

Less than 1% of CIA values were missing and were imputed for curve analyses. Table 2 presents mean CIA scores by diagnosis.

Fig. 1 displays precision-recall and receiver operating characteristic curves for our model predicting ED case-status from CIA totals. Both curves exhibited moderately accurate area under the curve values (0.861 for receiver operating characteristic, 0.829 for precision-recall). These values were highly consistent when computed separately for each imputed dataset. Area under the receiver operating characteristic curve demonstrated a mean and median of 0.861 ($SD < 0.001$). Area under the precision-recall curve demonstrated a mean and median of 0.829 ($SD < 0.001$). The similarity of these values to values generated by the aggregated dataset indicated that missing data and subsequent imputation had negligible effects on results.

Both curves produced the same threshold recommendation: a CIA global score of 13. As both curves produced this result, we report one set of characteristics. A CIA-threshold of 13 was associated with: *Sensitivity* = 0.800, *Specificity* = 0.815, *Precision* = 0.767. These values aptly characterized the central tendencies of the distributions observed across imputed datasets. For the receiver operating characteristic curve, *Sensitivity* = {$M = 0.811$, $SD = 0.008$}, *Specificity* = {$M = 0.804$, $SD = 0.011$}, and *Precision* = {$M = 0.759$, $SD = 0.009$}. For precision-recall, *Sensitivity* = {$M = 0.807$, $SD = 0.007$}, *Specificity* = {$M = 0.804$, $SD = 0.011$}, and *Precision* = {$M = 0.759$, $SD = 0.009$}.

The consistency of optimal CIA-threshold values across imputed datasets was examined. Across receiver operating characteristic analyses a threshold of 13 was selected 51% of the time, 12 was selected 49% of the time, and 14 was selected <1% of the time. For precision-recall analyses a threshold of 13 was selected 50.1% of the time, and 12 was selected 49.9% of the time. Both approaches thus tended toward a threshold of 12 or 13 (13 being more frequent).

We also identified men with notable ED symptoms that specified OSFEDs did not capture. Thirteen men had recurrent compensatory behaviors and full overvaluation of weight/shape, but did not report subjective binge episodes. These presentations consisted of exercise and/or fasting as the primary compensatory behaviors and thus may be better characterized by 'muscularity-oriented disordered eating' (Murray et al., 2017) or normative compensatory exercise (Schaumberg et al., 2014), rather than a clinical ED. Additional analyses in which these men ($n = 13$) were added as probable ED-cases yielded most frequently chosen thresholds of 6 (precision-recall) and 11 (receiver operating characteristic). Adding only men who endorsed more than one compensatory behavior yielded most frequently chosen thresholds of 8 (precision-recall) and 12 (receiver operating characteristic). There were also men who reported subjective binge eating and compensatory behaviors, but had subthreshold overvaluation. Adding these men ($n = 6$) to the probable ED-case class yielded most frequently chosen thresholds of 5 (precision-recall) and 12 (receiver operating characteristic). Overall, the mean EDDS symptom composite for these men ($n = 19$) who were considered non-ED cases in our primary analyses was 21.11 ($SD = 10.15$), which was lower than the diagnostic groups included in our primary ED-case class (see Table 2).

Finally, as a post-hoc assessment of the optimal threshold from our primary analyses (a CIA score of 13), an independent samples *t*-test compared mean EDDS composite scores between men with CIA scores ≥13 and men with scores <13; men who scored ≥13 on the CIA had significantly greater EDDS composite scores than men who scored <13, $t(149) = 10.936$, $p < .001$.

4. Discussion

This study is the first to identify a CIA score-threshold associated with probable ED-cases in a sample of men. Results supported the hypothesis that a lower CIA global cut-off score, relative to the cut-off score of 16 generated by majority-women samples, would optimally identify probable cases of men with EDs. Specifically, findings indicated that a CIA score of 13 most accurately predicted probable ED-cases in men. This threshold is consistent with research indicating that men with EDs demonstrate significantly lower CIA scores (i.e., lower impairment) relative to women with EDs (Dahlgren et al., 2017; Welch et al., 2011). Additionally, even lower thresholds were observed when we also included men with possible OSFEDs (e.g., compensatory exercise and/or fasting without subjective binge eating). Results highlight that CIA scores below the previously-published threshold of 16 still reflect probable ED-cases in men, which has implications for using the CIA to track treatment progress and screen for EDs in men.

Our focus on a sample of men is a strength of this research; results likely are more generalizable to men than previous CIA research. Additionally, we employed a rigorous statistical approach that combined the receiver operating characteristic curves utilized in past studies (Bohn et al., 2008; Reas et al., 2016) with a precision-recall approach, which may be preferable for capturing true cases of men with EDs because precision-recall prioritizes distinguishing between true and false positives.

Limitations of this study also should be noted. First, we relied on self-report ED symptoms rather than clinician-rated diagnosis through semi-structured interview to determine ED case-status. Although research in girls and women indicated the EDDS demonstrated good convergence with interview-based measures (Stice et al., 2004), results should be replicated in clinical and non-clinical samples of men diagnosed with EDs through interviews. Second, we did not require a specific impairment threshold to meet criteria for an ED diagnosis because doing so would have hampered our ability to detect a lower impairment threshold in men. Further, some research indicates that the presence of any disordered eating is associated with reduced quality of life and future well-being (Herpertz-Dahlmann et al., 2008). Therefore, the presence of ED symptoms warrants attention regardless of impairment. However, in real-world settings, requiring the presence of impairment assists in making formal diagnoses. Third, findings may not generalize to more ethnically/racially diverse groups or to demographic features we did not assess (e.g., socioeconomic status, sexual orientation). Fourth, though the CIA is ideally completed immediately following an ED-symptom measure, participants completed the CIA prior to the EDDS, which may have influenced recollection of impairment. Finally, the reliability and validity of the CIA in men is unknown, so results should be interpreted with some caution. Men with EDs may experience impairment not captured by CIA items. Moreover, specificity/sensitivity of a single cutoff-score can vary across situations (McFall & Treat, 1999); therefore, a CIA score of 13 should not be stringently interpreted as reflective of probable ED-case status until results are replicated. Given that analysis of the imputed datasets revealed that a threshold of 12 was selected nearly as often as 13, further research could establish whether a threshold of 13 performs consistently better than 12 across independent samples.

There are several interesting future directions. In this study, we tested the ability of the CIA to distinguish men with DSM-5 EDs from those without. It is possible that an even lower CIA-threshold is needed to identify men who do not meet criteria for an ED, but are at risk for developing an ED and could benefit from preventative care. For example, muscularity-oriented disordered eating does not meet criteria for DSM-5 ED, but men with muscularity-oriented disordered eating may still benefit from treatment (Hoffmann & Warschburger, 2017; Murray et al., 2017). In addition to men being *more* likely to exhibit muscularity-oriented presentations not captured by DSM-5 EDs, men may be *less* likely to endorse loss-of-control eating despite consuming an objectively large amount (Lewinsohn et al., 2002; Striegel-Moore et al., 2009). Self-report measures may not capture nuances in how some men experience binge-like episodes, and self-reported measures of binge eating may be less reliable over time in men than women (Forbush et al., 2019). Finally, we did not measure comorbid psychopathology (e.g., anxiety, depression); some impairment could be accounted for by non-ED symptoms. Future research could examine if men with EDs are more likely to endorse non-ED-specific impairment.

Research is needed to examine if CIA-score gender differences are due to lower impairment in men with EDs or differences in how certain items perform. Differential item functioning could test if men and women with equal levels of the CIA ‘impairment construct’ have equal probabilities of endorsing each item (Meulders & Xie, 2004). Alternatively, a measurement invariance approach could confirm if the CIA measures the same constructs across genders. Evidence that CIA-score dissimilarities reflect differences in how men and

women respond to CIA items despite comparable underlying impairment would indicate a need to refine existing conceptualizations and measures of ED-related impairment to be more inclusive of men. Alternatively, if men with EDs are less impaired than women with EDs, increased promotion of mental health literacy among men about the negative consequences of EDs may promote treatment seeking, as symptomatic but minimally-impaired individuals may not otherwise seek treatment. Additionally, the ED-case class contained predominantly individuals on the binge-eating spectrum. Research examining if impairment differs between binge-eating and more purely restrictive presentations is mixed, with some research suggesting binge eating is associated with higher CIA scores than purely restrictive presentations, some suggesting the opposite, and some finding no difference (e.g., Dahlgren et al., 2017; DeJong et al., 2013; Reas & Rø, 2018). Future research should clarify how results vary by ED diagnosis.

In conclusion, a lower global CIA score of 13 may be needed to detect men with probable EDs. A lower threshold of ED-related impairment should be considered when using the CIA to assess men.

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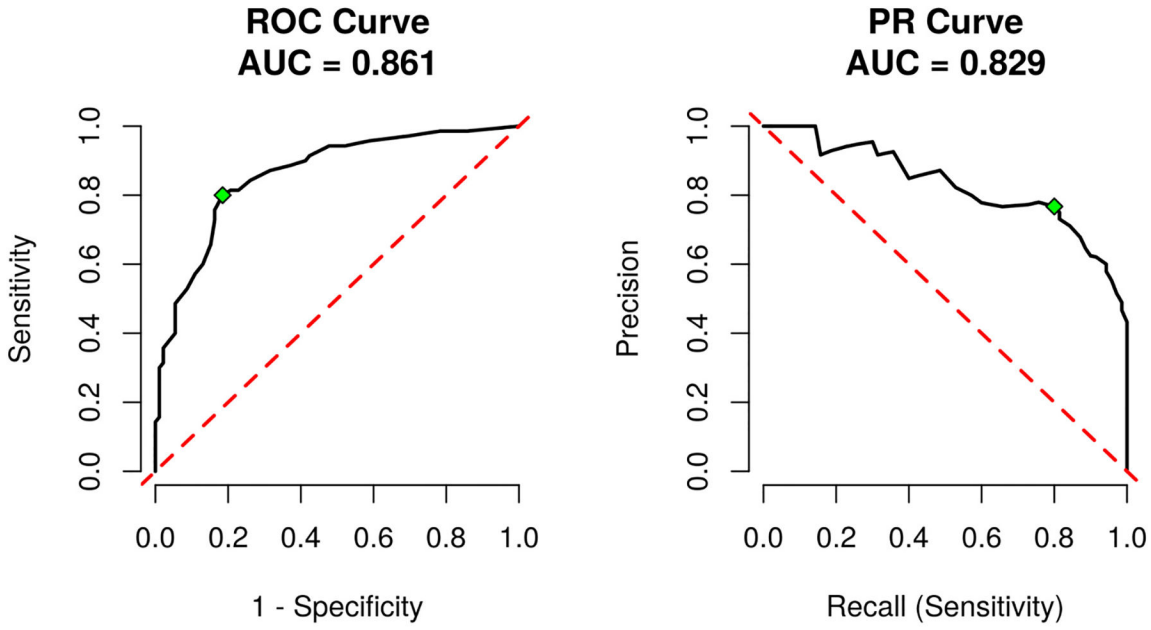

Fig. 1.

Receiver operating characteristic (ROC) curve & precision-recall (PR) curve.

Note. The receiver operating characteristic and precision-recall curves depicted used Clinical Impairment Assessment total scores to identify optimal cutoff values for identifying men with an ED. The optimal threshold is reflected by the point plotted on each curve.

Table 1

Participant characteristics ($N = 162$).

Characteristic	
Age *M* (*SD*)	23.1 (7.1)
Eating Disorder Diagnosis *n* (%)	
AN	2 (1.2)
BN	29 (17.9)
BED	8 (4.9)
OSFED	31 (19.1)
No eating disorder diagnosis	92 (56.8)
Body mass index *M* (*SD*)	25.9 (5.3)
CIA Total *M* (*SD*)	13.3 (11.1)
Race *n* (%)	
White	122 (75.3)
Black or African American	8 (4.9)
American Indian or Alaskan Native	2 (1.2)
Asian American or Pacific Islander	25 (15.4)
Multiracial	3 (1.9)
Missing	2 (1.2)

Note. AN: anorexia nervosa. BN: bulimia nervosa. BED: binge-eating disorder. OSFED: other specified feeding or eating disorder. The OSFED category consisted of men with the following ED presentations: sub-AN ($n = 2$), sub-BN ($n = 17$), sub-BED ($n = 8$), and men with subjective binge eating, compensatory behaviors, and full-threshold overvaluation of weight/shape (i.e., compensatory eating disorder/purging disorder; $n = 4$). CIA: Clinical Impairment Assessment.

Table 2

Demographic characteristics by eating-disorder diagnosis.

	M (*SD*)	Range
Age		
AN	20.00 (1.41)	19–21
BN	23.04 (4.90)	18–37
BED	26.86 (3.58)	23–31
OSFED	24.72 (12.31)	18–78
No ED	22.42 (5.43)	18–40
BMI		
AN	16.82 (0.13)	16.73–16.91
BN	28.13 (5.30)	22.24–46.24
BED	32.66 (5.03)	24.41–38.01
OSFED	26.52 (6.24)	17.57–43.93
No ED	24.66 (4.23)	16.44–43.07
CIA		
AN	24.50 (3.54)	22–27
BN	24.32 (9.17)	7–42
BED	25.25 (12.98)	11–48
OSFED	16.90 (10.11)	0–38
No ED	7.39 (7.25)	0–32
EDDS symptom composite		
AN	46.50 (4.95)	43–50
BN	50.56 (14.55)	27–81
BED	33.06 (6.64)	22–42
OSFED	35.15 (15.54)	11–67.50
No ED	10.39 (10.13)	0–45

Race	***n***	**%**
AN		
White	2	100
BN		
White	17	58.6
Black or African American	2	6.9
Asian American or Pacific Islander	9	31.0
Missing	1	3.4
BED		
White	4	50
Asian American or Pacific Islander	4	50
OSFED		
White	19	61.3
Black or African American	3	9.7
Asian American or Pacific Islander	8	25.8

Race	*n*	%
Missing	1	3.2
No ED		
White	80	87.0
Black or African American	3	3.3
Asian American or Pacific Islander	4	4.3
American Indian/Alaskan Native	2	2.2
Multiracial	3	3.3

Note. AN: anorexia nervosa. BN: bulimia nervosa. BED: binge-eating disorder. OSFED: other specified feeding or eating disorder. BMI: body mass index. CIA: Clinical Impairment Assessment. EDDS: Eating Disorder Diagnostic Scale. Symptom composite scores may differ from published norms for the EDDS DSMIV composite because the maximum composite score differs by version. Also, our symptom composite did not include the night-eating frequency item due to the study's omission of the item. Finally, a small subset of participants provided two different responses for overvaluation of weight and overvaluation of shape; in these instances, the average of the two responses contributed to the symptom composite.