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Predicting a comprehensive operationalization of eating disorder recovery: Examining self-concept, personality, and negative affect

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Abstract

Objective: Our goal was to examine potential predictors of a comprehensive operationalization of eating disorder recovery, characterized by physical, behavioral, and cognitive recovery, focusing on constructs related to self-concept, personality, and negative affect.

Method: Participants were women with a history of an eating disorder who provided data via survey and interview at two time points separated by about 7–8 years and who met criteria for an eating disorder diagnosis at baseline (N = 36).

Results: Logistic regression models revealed that self-esteem was a significant predictor of recovery status (OR = 1.12, p = .039) such that individuals with higher self-esteem at baseline demonstrated significantly greater odds of being in full recovery at follow-up. However, when self-esteem was considered in a set along with baseline imposter phenomenon and anxiety, no single construct emerged as a significant unique predictor of recovery in logistic regression analyses.

Discussion: These results highlight the potential importance of self-esteem in relation to recovery, with clinical implications related to bolstering self-esteem as part of eating disorder treatment. Future research should continue to explore predictors using a comprehensive operationalization of eating disorder recovery in larger, more diverse samples to optimally identify factors associated with achieving recovery.

KEYWORDS

anxiety, depression, eating disorders, negative urgency, perfectionism, predictors, recovery, self-concept, self-esteem

1 | INTRODUCTION

Prior research has proposed a comprehensive definition of eating disorder recovery focused on physical, behavioral, and cognitive domains (Bardone-Cone et al., 2010a). This definition distinguishes between full recovery and partial recovery on clinically meaningful variables and has been recommended for use in studying remission/recovery (Ackard, Richter, Egan, & Cronemeyer, 2014). Having a validated, comprehensive operationalization of eating disorder recovery allows for exciting research avenues, such as examining potential predictors of such a robust recovery. Arguably, once it is known that a meaningful recovery state can be attained, it is vital to identify factors associated with achieving recovery and to capitalize on that information in intervention efforts.

A wide array of constructs may theoretically serve as predictors of eating disorder recovery. We chose to focus on constructs not inherently tied to eating pathology to see if noneating disorder constructs may play a predictive role and warrant greater attention in

eating disorder treatment. In the current study, we examined whether self-concept, personality, or negative affect constructs predict a comprehensive conceptualization of eating disorder recovery.

1.1 | Self-concept and recovery

Disturbances in self-concept have been linked to the etiology and maintenance of eating pathology (for a review, see Bardone-Cone, Thompson, & Miller, 2020). Less research has examined self-concept constructs as predictors of recovery, with most existing work focused on self-esteem and self-efficacy.

Self-esteem is broadly defined as an appraisal of one's self-worth (Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995). Meta-analytic work found that self-esteem predicted improved eating disorder outcomes (defined differently across the reviewed studies) 1 year following treatment (Vall & Wade, 2015). Additionally, posttreatment results from an evaluation of outpatient cognitive behavioral therapy demonstrated that participants who were recovered from an eating disorder, defined as no longer meeting criteria for an eating disorder, reported significantly higher self-esteem at baseline than those who dropped out or did not recover (La Mela, Maglietta, Lucarelli, Mori, & Sassaroli, 2013). In a separate transdiagnostic eating disorder sample, higher baseline self-esteem was associated with subsequent positive psychological outcomes, defined as at least a 50% decrease in baseline eating disorder pathology or scoring below a clinical significance cutoff (Dingemans et al., 2016). Evidence also supports a role for self-esteem in specific eating disorder diagnoses. For example, a recent systematic review focused on treatment of individuals with anorexia nervosa (AN) indicated that while self-esteem did not predict remission or weight gain at discharge, baseline self-esteem predicted outcomes following discharge (Kästner, Löwe, & Gumz, 2019). In addition, higher baseline self-esteem has been shown to predict positive weight-related and psychological outcomes in AN (Wild et al., 2016). In a sample with bulimia nervosa (BN), pre-treatment self-esteem predicted lower overall eating disorder severity via Eating Disorder Examination (EDE) global scores 12 months posttreatment (Fairburn, Peveler, Jones, Hope, & Doll, 1993). However, other research has not found support for self-esteem as a predictor of recovery (Peterson et al., 2000; Steele, Bergin, & Wade, 2011).

Self-efficacy, which refers to an individual's level of confidence to achieve a goal (Bandura, 1977), is also connected to eating disorder recovery. Higher self-efficacy was the most robust predictor of favorable treatment outcomes for individuals with BN participating in guided self-help treatment (Steele et al., 2011), predicting decreases in binge eating, overvaluation of weight and shape, and overall eating disorder psychopathology (as measured by EDE global scores). In a sample of individuals with AN and subthreshold AN, higher eating disorder-related self-efficacy at baseline was a significant predictor of shorter length of hospital stay and decreased body dissatisfaction (Pinto, Heinberg, Coughlin, Fava, & Guarda, 2008). Additionally, among adolescents with AN, higher self-efficacy at baseline of inpatient treatment was linked to lower eating pathology at discharge and 3-month follow-up (Vall & Wade, 2017). In contrast, Keshen, Helson, Town, and Warren (2017) found that self-efficacy did not predict symptom severity (assessed using global Eating Disorder Examination-Questionnaire [EDE-Q] scores) at end of outpatient treatment, but did predict premature treatment dropout.

Less studied self-concept constructs that are conceptually interesting in relation to recovery are imposter phenomenon and self-directedness. Imposter phenomenon refers to experiencing the self as fraudulent or false, in particular feeling that others see them as competent, while they themselves feel inadequate (Kolligan & Sternberg, 1991). Bardone-Cone et al. (2010b) found that a fully recovered group had significantly lower imposter phenomenon scores and higher self-directedness (as well as higher self-esteem and self-efficacy scores) than those with an eating disorder and those in partial recovery. To the best of our knowledge, no prospective research exists on imposter phenomenon as a recovery predictor. Self-directedness captures aspects of self-efficacy and self-regulation, reflecting resourcefulness and the ability to adapt behavior as needed to achieve individually chosen goals (Cloninger, 1999). Only limited research has examined self-directedness and recovery: Bloks, Hoek, Callewaert, and van Furth (2004) found that self-directedness predicted recovery at a 2.5-year follow-up in a sample with AN, but not in a sample with BN, while Bulik, Sullivan, Joyce, Carter, and McIntosh (1998) reported that self-directedness was a strong predictor of good outcome 1-year posttreatment in a sample with BN.

1.2 | Personality and recovery

Personality factors are also hypothesized to play a role in eating disorder onset and maintenance, including perfectionism and impulsivity (Claes, Vandereycken, & Vertommen, 2005; Culbert, Racine, & Klump, 2015; Stice, 2002), but less is known about the role of personality in predicting recovery. There is some evidence that perfectionism can present a significant barrier to eating disorder recovery. In a study of youth with eating disorders, perfectionism at intake predicted a lower likelihood of remission, defined as the absence of any clinical eating disorder diagnosis via the EDE, a year later (Johnston et al., 2018). In a sample of adolescents, most with AN, those higher in perfectionism at intake took longer to reach 85% ideal body weight (Phillips et al., 2010). However, in a population-based study, perfectionism was not associated with likelihood of recovery from AN (Keski-Rahkonen et al., 2014). Vall and Wade (2017) found that higher maladaptive perfectionism (concern over mistakes) was associated with higher eating pathology at discharge and 3-month follow-up in their adolescent inpatient sample with AN; interestingly, adaptive perfectionism (personal standards) at baseline was not associated with eating pathology outcome, but increases in this perfectionism dimension between admission and discharge predicted readmission. Thus, there is evidence that perfectionism is an impediment to recovering from an eating disorder. However, there is also evidence from cross-sectional research that once individuals achieve full recovery from an eating disorder (defined as recovery in physical, behavioral, and

cognitive domains), their levels of perfectionism are comparable to those with no history of an eating disorder and are significantly lower than those who are partially recovered from an eating disorder (defined as recovery in physical and behavioral, but not cognitive domains) or who have an eating disorder (Bardone-Cone et al., 2010c). Taken together, these findings suggest that while perfectionism may present a hurdle to eating disorder recovery, those who are able to recover demonstrate healthy levels of perfectionism.

The impulsivity dimension most relevant to eating disorders is negative urgency, which reflects acting impulsively when distressed (Fischer, Smith, & Cyders, 2008). In contrast to perfectionism, little work has examined the predictive role of negative urgency in eating disorder treatment outcomes. An exception is a study by Manasse et al. (2016) who found that, among individuals with binge-eating disorder (BED), those with higher levels of negative urgency at baseline demonstrated slower and less pronounced treatment gains in an open trial of a novel treatment for BED. Similar to perfectionism, individuals in full recovery report significantly less negative urgency compared to those with an eating disorder, and remarkably similar levels of negative urgency to those without an eating disorder history (Bardone-Cone, Butler, Balk, & Koller, 2016).

1.3 | Negative affect and recovery

Negative emotionality, reflecting trait-based tendencies toward experiencing negative affect (e.g., anxiety and depression), has been identified as a risk factor for eating disorders (Culbert et al., 2015; Stice, 2002). Anxiety and depressive symptoms are highly comorbid with eating disorders (Blinder, Cumella, & Sanathara, 2006; Kaye, Bulik, Thornton, Barbarich, & Masters, 2004). To the best of our knowledge, there have been no prospective studies evaluating the predictive effects of anxiety symptoms on eating disorder recovery; however, retrospective data suggest that trait anxiety is negatively associated with eating disorder recovery, defined as absence of eating disorder symptoms for 12 months (Zerwas et al., 2013). Regarding depressive symptoms, a major depressive episode at baseline predicted higher odds of having a diagnosis of AN or BN compared to achieving recovery (defined as no eating disorder symptoms for the past 12 months) 22 years later (Franko et al., 2018). Furthermore, premorbid depressive symptoms were associated with decreased likelihood of recovery from AN, with recovery defined as weight restoration and absence of binge eating and purging for at least 1 year (Keski-Rahkonen et al., 2014). However, Calugi, El Ghoch, Conti, and Grave (2014) found no association between depressive symptoms at baseline and recovery from AN (assessed using EDE global scores) across a 1-year period. A meta-analysis of predictors of eating disorder outcomes identified lower depressive symptoms as a significant predictor of more positive outcomes, although no standardized definition of recovery was used across studies (Vall & Wade, 2015). Cross-sectional research on comprehensive recovery status and anxiety and depressive symptoms revealed that individuals in full recovery had significantly less anxiety and depression than those in partial recovery or with an eating disorder, and similar levels to those with no eating disorder history (Harney, Fitzsimmons-Craft, Maldonado, & Bardone-Cone, 2014).

A caveat of the research reviewed (and all eating disorder recovery research, to date) is that recovery is not consistently operationalized, limiting the validity of comparisons across studies. Furthermore, it is not yet standard practice to include a cognitive dimension of recovery, meaning that samples identified as recovered by virtue of body mass index (BMI) and absence of eating disorder behaviors are likely heterogeneous on cognitive recovery, which has implications for relapse risk (Keel, Dorer, Franko, Jackson, & Herzog, 2005). That said, there are indications that self-esteem, self-efficacy, perfectionism, and depression symptomatology, in particular, may be related to recovery.

In the current study we take advantage of a prospective design to examine which constructs of self-concept, personality, and negative affect, collected at baseline among those with an eating disorder diagnosis, are associated with and predictive of recovery status at follow-up 7–8 years later. The current study is the first to use a comprehensive, validated definition of recovery, capturing physical, behavioral, and cognitive dimensions of recovery, in the examination of predictors of recovery from an eating disorder. We hypothesized that self-concept constructs (high self-esteem, high self-efficacy, low imposter syndrome, high self-directedness) would be associated prospectively with recovery. For personality, we hypothesized that low perfectionism (self-oriented and socially prescribed dimensions) and low negative urgency would be associated with recovery. Finally, for negative affect, we hypothesized that low levels of both anxiety and depression would be associated with recovery.

2 | METHOD

2.1 | Participants and procedure

This study was a follow-up of 96 female patients with an eating disorder history, recruited from a primary care facility with expertise in eating disorders, who participated in a study in 2007–2008 (Bardone-Cone et al., 2010a); two participants were deceased at follow-up (2014–2015) and three did not provide permission to be recontacted, resulting in 91 possible participants. Sixty-six participated in the follow-up study, representing 73% of the 91 possible participants and 85% of the 78, we were able to recontact.

Our interest in predicting recovery from an eating disorder required that the focal sample for the current study was individuals with an eating disorder at baseline who participated in the follow-up study (n = 36). Of this sample, 33 (92%) identified as Whites, one (3%) as Asian, and two (6%) as biracial; in terms of ethnicity, one (3%) identified as Latina. Mean age was 23.88 years (SD = 4.77) at baseline and 31.25 years (SD = 4.62) at follow-up. Highest level of parental education attained (a proxy for socioeconomic status) was on average 16.89 years (SD = 2.96), or a little over a 4-year college degree. At baseline, five (14%) met criteria for AN without amenorrhea, one for BN (3%), and 30 (83%) for eating disorder not otherwise specified

(EDNOS). The 30 of the 66 individuals who participated in both time points but were not included in these analyses were those who met criteria for partial or full recovery at baseline.

At both time points, participants completed a set of questionnaires followed by a set of interviews, including a diagnostic interview to assess eating disorder diagnoses. At baseline, most participants completed the interview in person (64%) with the interview occurring within about 1 week after survey completion. At follow-up, all participants completed both study components remotely (i.e., online survey and phone interview) within about 2 weeks of each other. Interviewers were the first author and several advanced undergraduate, postbaccalaureate, and graduate research assistants, all extensively trained on eating disorder diagnostic criteria and the diagnostic interview used. Participants received remuneration for their participation (a check at baseline, an Amazon.com gift card at follow-up). All aspects of this study were approved by the university's Institutional Review Board.

2.2 | Measures

2.2.1 | Independent variables at baseline

We considered four constructs related to self-concept. *Self-esteem* was assessed with the Rosenberg Self-Esteem Scale (Rosenberg, 1965), a reliable, widely used, and well-validated scale of overall self-esteem (Heatherton & Wyland, 2003). In the current sample, α was .90. *Self-efficacy* was assessed with the General Self-Efficacy Subscale (GSES) of the Self-Efficacy Scale (Sherer et al., 1982), which is composed of items not tied to specific situations or behavior. The GSES has adequate reliability and validity (Bosscher & Smit, 1998; Sherer et al., 1982). In the current sample, α was .87. *Imposter phenomenon* was assessed with the Clance Imposter Phenomenon Scale (CIPS; Clance, 1985). The CIPS has evidence for good reliability and convergent validity (Chrisman, Pieper, Clance, Holland, & Glickauf-Hughes, 1995; Holmes, Kertay, Adamson, Holland, & Clance, 1993). In the current sample, α was .84. Finally, *self-directedness* was assessed with the Self-Directedness subscale of the short form of the Temperament and Character Inventory (TCI-R-140; Cloninger, 1999). The Self-Directedness subscale of the TCI-R-140 has good internal consistency in prior work and in the current sample, α was .85.

For personality, we assessed trait perfectionism with the Multidimensional Perfectionism Scale (MPS; Hewitt & Flett, 1991) to capture two dimensions: *self-oriented perfectionism*, which reflects having very high standards for oneself and is sometimes considered a relatively adaptive dimension, and *socially prescribed perfectionism*, which reflects feeling that others hold excessively high standards for oneself and is considered a maladaptive dimension. The MPS is one of the most commonly used measures of multidimensional perfectionism, with well-established reliability and convergent validity (Hewitt & Flett, 1991). In the current sample, α was .95 for self-oriented perfectionism and .83 for socially prescribed perfectionism. *Negative urgency* was assessed with the Urgency subscale of the UPPS Impulsive Behavior Scale (Whiteside & Lynam, 2001). Reliability and validity of the UPPS has been demonstrated (Whiteside, Lynam, Miller, & Reynolds, 2005). In the current sample, α was .92 for negative urgency.

For negative affect, *trait anxiety*, reflecting anxiety proneness, was assessed using the trait anxiety subscale of the Spielberger State–Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970). The STAI has good reliability and validity and is widely used (Hedberg, 1972; Metzger, 1976; Watson & Clark, 1984). In the current sample, α was .91. *Depressive symptoms* were assessed with the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). The CES-D has demonstrated good reliability and validity (Radloff, 1977). In the current sample, α was .90.

2.2.2 | Dependent variable of eating disorder recovery at follow-up

Following the conceptualization in Bardone-Cone et al. (2010a), full recovery was characterized by the absence of an eating disorder diagnosis along with physical recovery, behavioral recovery, and cognitive recovery, as operationalized below.

For current eating disorder diagnosis, the *Structured Clinical Interview for DSM-IV*, *Patient Edition* (First, Spitzer, Gibbon, & Williams, 2002) was administered to diagnose AN without the amenorrhea requirement, BN, BED, and EDNOS. Based on a random subset (~10%) of diagnostic interviews of those with a history of an eating disorder, κ was 0.67 for current DSM-IV eating disorders, reflecting substantial agreement (Landis & Koch, 1977). For *physical recovery*, BMI was computed based on self-reported weight and height from the survey. There is evidence that self-reports are reasonable proxies for measured reports in eating disorder samples (McCabe, McFarlane, Polivy, & Olmsted, 2001; Wolfe, Kelly-Weeder, Malcom, & McKenery, 2013). A BMI ≥ 18.5 kg/m^2 was required for physical recovery, which reflects the World Health Organization's recommendation of a BMI < 18.5 representing "underweight" (Bjorntorp, 2002). *Behavioral recovery* was assessed during the interview; presence of binge eating, vomiting, laxative use, or fasting (intentionally going without eating for 24 hr to lose/control weight) was assessed over the past 3 months using annotated calendars to assist with recall. Absence of all four eating disorder behaviors was required to meet behavioral recovery criteria. *Cognitive recovery* was assessed in the survey with the EDE-Q (Fairburn & Beglin, 1994) which contains four subscales providing broad coverage of eating disorder cognitions over the past 28 days: Restraint, Eating Concern, Weight Concern, and Shape Concern. Obtaining scores within 1 *SD* of age-matched community norms for each of the EDE-Q subscales (Mond, Hay, Rodgers, & Owen, 2006) was required for cognitive recovery. In the current sample, α's for these subscales were .80–.94.

2.3 | Analytic strategy

To provide descriptive data, we computed means and *SD*s of the potential predictors for the fully recovered and not fully recovered

groups and, to explore associations with attaining full recovery, used *t* tests. To examine prediction, we used logistic regression with potential predictors from baseline as the independent variables and the binary recovery grouping of recovered or not recovered at follow-up as the dependent variable. We used the findings from the *t* tests to guide our choice of potential predictors in logistic regression analyses; namely, we identified variables that differed across recovery and nonrecovery groups at $p < .10$ and examined them both in separate logistic regressions and together as a set to consider unique variance. Given the small sample size and this work being the first test of predictors of this conceptualization of comprehensive recovery, we report significant trends (i.e., $p < .10$) and did not adjust for multiple comparisons.

3 | RESULTS

3.1 | Attrition analyses

To examine attrition bias among those who had an eating disorder at baseline, we compared the 36 participants who had an eating disorder diagnosis at baseline and participated in the follow-up with those who had an eating disorder diagnosis at baseline but did not participate in the follow-up ($n = 17$) (Table 1). Groups did not differ significantly on indicators of eating disorder severity (age at onset of eating disorder, BMI at start of treatment, percentage with a lifetime history of AN, and percentage ever hospitalized due to an eating disorder), or demographics (age, socioeconomic status) based on baseline data. Thus, at least for these aspects, completers and noncompleters appeared similar, minimizing attrition concerns. Completers and noncompleters also did not differ significantly on baseline predictors of self-esteem, imposter phenomenon, either perfectionism dimension, anxiety, or depression. However, noncompleters had lower self-efficacy, lower self-directedness, and higher negative urgency at baseline, suggesting that completers were not representative of the original sample on these three constructs.

3.2 | Recovery at follow-up

At follow-up, nine (25%) of the 36 women with an eating disorder at baseline met criteria for full recovery. The remaining 27 (75%) women did not meet full recovery criteria at baseline; of these 27 women, 16 (59%) met criteria for an eating disorder, four (15%) met criteria for partial recovery (all of the full recovery criteria except for cognitive recovery), and seven (26%) had some symptoms of an eating disorder (e.g., 1–2 binges in the past 3 months) but did not meet criteria for an eating disorder or partial recovery.

3.3 | Group comparisons via *t* tests

There were several differences between those recovered and those not recovered at follow-up (Table 2). For self-concept, those who eventually attained full recovery had significantly higher self-esteem ($p = .026$) and lower levels of imposter phenomenon ($p = .046$) at baseline than those who had not recovered at follow-up. Additionally, there were trends ($p < .10$) among those fully recovered for higher self-directedness, lower negative urgency, and lower anxiety at baseline.

TABLE 1 Attrition analyses

Constructs at baseline	Completers ($n = 36$)	Noncompleters ($n = 17$)	*t* Test
Age at onset of eating disorder (years)	17.55 (3.69)	17.00 (2.72)	$t(42) = -0.50$, $p = .622$
BMI at start of treatment (kg/m^2)	19.51 (3.39)	18.49 (4.09)	$t(47) = -0.90$, $p = .371$
Lifetime history of AN (%)	67%	59%	χ^2 (1, $N = 53$) = 0.31, $p = .578$
Ever hospitalized due to an eating disorder (%)	59%	57%	χ^2 (1, $N = 48$) = 0.01, $p = .915$
Age (years)	23.88 (4.77)	21.71 (3.10)	$t(51) = -1.71$, $p = .093$
Socioeconomic status (years of highest parental education)	16.89 (2.96)	16.24 (2.41)	$t(51) = -0.79$, $p = .432$
Self-esteem	31.47 (8.39)	27.88 (8.16)	$t(51) = -1.47$, $p = .149$
Self-efficacy	59.01 (10.30)	52.47 (10.76)	$t(51) = -2.13$, $p = .038$
Imposter phenomenon	68.50 (11.20)	70.21 (13.30)	$t(48) = 0.46$, $p = .647$
Self-directedness	63.86 (12.03)	53.29 (10.39)	$t(51) = -3.11$, $p = .003$
Self-oriented perfectionism	79.22 (19.66)	77.94 (20.80)	$t(51) = -.0.22$, $p = .829$
Socially prescribed perfectionism	59.44 (13.37)	61.82 (16.13)	$t(51) = 0.57$, $p = .574$
Negative urgency	2.59 (0.69)	3.15 (0.65)	$t(51) = 2.81$, $p = .007$
Anxiety symptoms	54.86 (10.92)	55.53 (7.46)	$t(48) = 0.22$, $p = .828$
Depressive symptoms	22.56 (11.33)	26.59 (10.98)	$t(49)$ 1.21, $p = .232$

Note: Completers refer to those who had an eating disorder at baseline and who participated in the follow-up study; noncompleters were those who had an eating disorder at baseline but did not participate in the follow-up study. For continuous variables, higher values mean higher levels of the construct. Abbreviations: AN, anorexia nervosa; BMI, body mass index.

3.4 | Prediction via logistic regression

For logistic regression analyses, our intended focus was the variables that differed at $p < .10$ across recovery and nonrecovery groups based on *t* tests; this resulted in five variables (Table 2). However, we further winnowed the variables of focus to only include those with no potential for attrition bias; this resulted in three variables: self-esteem, imposter phenomenon, and anxiety. Although we examined all variables in the *t*-test analyses as a first exploration of potential predictors of comprehensive recovery using the current operationalization, we decided to require more rigorous entry criteria for prediction via logistic regression. Additionally, for the logistic regression analyses with the set of independent variables, we were mindful of the need to reduce the ratio of number of variables to number of cases in order to yield interpretable results (Field, 2009).

When the independent variables of self-esteem, imposter phenomenon, and anxiety were examined separately, only self-esteem was a significant predictor of recovery status (OR = 1.12, $p = .039$), accounting for 20% of the variance (Nagelkerke $R^2 = 0.20$) in recovery outcome (Table S1). As a way to further understand the role of self-esteem in relation to subsequent recovery, we examined the lower and upper quartiles of the self-esteem distribution at baseline. Of the eight women in the lower quartile (self-esteem scores <26; low self-esteem), none were recovered at follow-up. In contrast, of the nine women in the upper quartile (self-esteem scores >37; high self-esteem), three (33%) were recovered at follow-up.

When self-esteem, imposter phenomenon, and anxiety were examined together as a set (Nagelkerke $R^2 = 0.24$), none accounted for unique predictive variance in recovery (Table 3). Follow-up examination of the correlations between these three variables yielded high correlations ($r = -.68$, $p < .001$ between self-esteem and anxiety; $r = -.55$, $p < .01$ between self-esteem and imposter phenomenon; $r = .44$, $p < .01$ between imposter phenomenon and anxiety), making it difficult for any variable to account for unique variance above and beyond the others.

TABLE 2 Means, *SD*s, *t* tests, and effect sizes for baseline levels of self-concept, personality, and negative affect constructs for individuals recovered or not recovered at follow-up

Constructs at baseline	Fully recovered at follow-up (*n* = 9)	Not fully recovered at follow-up (*n* = 27)	Cohen's *d* (95% confidence intervals)	*t* Test
Self-concept				
Self-esteem	36.78 (5.72)	29.70 (8.47)	0.89 (0.10 to 1.67)	$t(34) = 2.32$, $p = .026$
Self-efficacy	63.11 (11.32)	57.65 (9.78)	0.54 (−0.23 to 1.30)	$t(34) = 1.40$, $p = .172$
Imposter phenomenon	62.11 (12.83)	70.63 (9.96)	−0.80 (−0.01 to −1.57)	$t(34) = -2.07$, $p = .046$
Self-directedness	70.11 (9.41)	61.78 (12.23)	0.72 (−0.06 to 1.48)	$t(34) = 1.86$, $p = .071$
Personality				
Self-oriented perfectionism	80.67 (22.38)	78.74 (19.11)	0.10 (−0.66 to 0.85)	$t(34) = 0.25$, $p = .803$
Socially prescribed perfectionism	53.56 (16.09)	61.41 (12.04)	−0.60 (−1.36 to 0.17)	$t(34) = -1.56$, $p = .129$
Negative urgency	2.25 (0.82)	2.70 (0.62)	−0.67 (−1.44 to 0.11)	$t(34) = -1.74$, $p = .091$
Negative affect				
Anxiety symptoms	49.22 (10.17)	56.81 (10.66)	−0.72 (−1.49 to 0.06)	$t(33) = -1.86$, $p = .072$
Depressive symptoms	17.38 (8.47)	24.15 (11.75)	−0.61 (−1.41 to 0.20)	$t(32) = -1.51$, $p = .141$

Note: Self-esteem (Rosenberg Self-Esteem Scale)—possible scores: 10–50. Self-efficacy (General Self-Efficacy Scale)—possible scores: 17–85. Imposter phenomenon (Clance Imposter Phenomenon Scale)—possible scores: 20–100. Self-directedness (Temperament and Character Inventory)—possible scores: 20–100. Self-oriented perfectionism and socially prescribed perfectionism (Multidimensional Perfectionism Scale)—possible scores: 15–105. Negative urgency (UPPS)—possible scores: 1–4. Anxiety symptoms (Spielberger State–Trait Anxiety Inventory)—possible scores: 20–80. Depressive symptoms (Center for Epidemiological Studies Depression Scale)—possible scores: 0–60. Higher values reflect higher levels of the constructs. For Cohen's *d* effect sizes, computed using the pooled *SD* across groups as the standardizer, 0.2 = small, 0.5 = medium, and 0.8 = large (Cohen, 1988).

TABLE 3 Logistic regression analyses with independent variables of self-esteem, imposter phenomenon, and anxiety at baseline entered as a set and the dependent variable of recovery outcome at follow-up

Logistic regression analysis with independent variables entered as a set					
	B (*SE*)	Wald	*p*	Odds ratio (OR)	95% confidence interval for OR
Self-esteem	0.06 (0.07)	0.69	.405	1.06	0.92–1.23
Imposter phenomenon	−0.04 (0.04)	0.88	.347	0.96	0.88–1.05
Anxiety symptoms	−0.02 (0.05)	0.22	.642	0.98	0.88–1.08

Note: Recovery outcome was coded so that 1 = fully recovered (*n* = 9) and 0 = not fully recovered (*n* = 27). Nagelkerke R^2 for the model with the variables entered as a set was 0.24 and can be interpreted similarly to *R* squared in linear regression, as the percent of variance accounted for in the dependent variable (recovery status).

4 | DISCUSSION

This work represents the first attempt to identify predictors of a comprehensive definition of eating disorder recovery encapsulating physical, behavioral, and cognitive recovery dimensions. Identifying reliable predictors of eating disorder outcomes has been notoriously difficult. This is likely due to inconsistent recovery definitions employed across studies and to the heterogeneity inherent in past recovery definitions that just focus on physical and behavioral dimensions (resulting in heterogeneity in the cognitive component of recovery). The current work seeks to address the latter concern by including a cognitive dimension of recovery, thereby examining a more comprehensively recovered group that is more homogenous on cognitive features.

The construct with the most promise as a predictor of recovery is self-esteem, with individuals with higher self-esteem at baseline having significantly greater odds of being in full recovery 7–8 years later. This finding aligns with prior work, including meta-analytic findings that self-esteem predicted improved outcomes (Vall & Wade, 2015), but is a more rigorous test compared to earlier work given the requirement of physical, behavioral, and cognitive recovery. Since a sense of self-worth closely tied to weight/shape (i.e., overvaluation of weight/shape) is a common feature of most eating disorders, it is notable that even in the context of that maladaptive perspective on the physical self, being able to retain a broader, positive outlook on the self via high self-esteem had predictive power for recovery. Although self-esteem did not account for unique variance in predicting recovery when imposter phenomenon and anxiety were included in the model, this is likely due to the high correlations among the variables.

Other promising predictors based on the trends in the logistic regression analyses include imposter phenomenon and anxiety. That two of the four self-concept constructs emerged as potential predictors from logistic regression (and a third, self-directedness, showed potential based on *t* tests, with the caveat of potential attrition bias for this construct) highlights the importance of assessing and targeting aspects of the self in treating individuals with eating disorders. One treatment approach recommended by the current findings is the "broad" form of enhanced cognitive behavior therapy (CBT-E) with the additional treatment module on core low self-esteem (Fairburn, Cooper, Shafran, Bohn, & Hawker, 2008). Other therapeutic approaches that bolster aspects of self-concept include acceptance and commitment therapy (ACT; Hayes, 2004) and compassion-focused therapy (CFT; Gale, Gilbert, Read, & Goss, 2014). ACT's focus on being aware and accepting of one's internal experiences and exploration of values to help guide behavior and CFT's focus on self-compassion to counteract self-criticism would both address and support a more positive self-concept which may increase the likelihood of full recovery.

Strengths of this study include the use of a validated, comprehensive operationalization of recovery, the investigation of potential predictors in several noneating disorder domains, and the prospective design. The main limitation is the small sample size which limited our power to find significant findings that may exist and did not permit examination of recovery predictors by eating disorder diagnosis. Another limitation is the constraints on generalizability to other genders and racial/ethnic minorities given the all-female and largely White sample. The use of DSM-IV eating disorder criteria is a limitation. These criteria were used because at baseline (2007–2008), DSM-5 was not yet published; of note, however, individuals captured as EDNOS in DSM-IV would have been included in DSM-5 criteria as AN, BN, or other specified feeding or eating disorder. Finally, the finding that noncompleters had lower self-efficacy, lower self-directedness, and higher negative urgency than completers indicates that analyses involving these constructs included samples that were not representative of those who participated at baseline.

A focus on comprehensive recovery is imperative for future research on predictors given the role of cognitions in relapse and given the high stability of comprehensive recovery once attained (Bardone-Cone et al., 2019). Identifying predictors of comprehensive recovery will necessarily result in smaller recovered samples compared to how recovery has more typically been defined (e.g., absence of an eating disorder; physical and behavioral recovery but no assessment of cognitive recovery); thus, researchers are encouraged to collaborate to attain the larger (and more diverse) samples sizes that multi-site research can generate. In addition to examining noneating disorder constructs as predictors, research should use this comprehensive approach to recovery to investigate eating disorder-specific predictors. For example, meta-analytic work highlights baseline levels of BMI, binge/purge behaviors, weight/shape concern, and greater symptom change early in treatment as predictors of improved outcome (Vall & Wade, 2015); these eating disorder features warrant investigation when recovery is rigorously defined by physical, behavioral, and cognitive recovery.

Regarding self-concept constructs, future research would benefit from considering both global measures (as done here) and domain-specific measures (e.g., self-efficacy related to eating disorder recovery or to interpersonal contexts). Mechanistic work is also needed—for example, to better understand how higher self-esteem eventually leads to full recovery. It would also be important to examine how these constructs' predictive value might vary in adolescent and adult populations. For example, parental self-efficacy appears to be more important than adolescent self-efficacy for youth in treatment for eating disorders (Byrne, Accurso, Arnow, Lock, & Le Grange, 2015; Robinson, Strahan, Girz, Wilson, & Boachie, 2013) and thus may be the more potent self-efficacy predictor of recovery for youth.

In conclusion, the current study is a novel extension of past research as it is the first to explore predictors of a comprehensive, validated definition of recovery inclusive of physical, behavioral, and cognitive domains. Our findings reveal the importance of baseline self-esteem in predicting this robust operationalization of recovery, as well as the potential significance of other self-related (imposter phenomenon) and affect-related (anxiety) constructs. Future work should continue to examine predictors of a validated, comprehensive operationalization of recovery using both noneating disorder factors and symptoms related to eating pathology.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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