



Examination of perfectionism and self-concept constructs across stages of eating disorder recovery in men: An exploratory study

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ABSTRACT

Objective: This study examined perfectionism and self-concept constructs across eating disorder recovery stages in men, using a conceptualization of recovery that encompasses physical, behavioral, and cognitive recovery.

Method: Participants were 35 men with an eating disorder history ($M_{age} = 26.60$ years, $SD = 10.81$), categorized as in full recovery, in partial recovery, or with a current eating disorder diagnosis/pathology, and 27 men with no eating disorder history (controls; $M_{age} = 26.44$ years, $SD = 10.08$). Data for determining recovery status were collected from surveys, interviews, and measured weight and height; perfectionism and self-concept were assessed via surveys.

Results: Among the perfectionism constructs, the greatest magnitude of effect sizes involving the fully recovered group was for socially prescribed perfectionism where this group had lower levels of perfectionism than the eating disorder diagnosis/pathology group (Hedge's $g = -1.72$) or the partially recovered group (Hedge's $g = -1.56$). For the self-concept constructs, effect sizes involving the fully recovered group and the other recovery status groups were all large (absolute values: 0.76–1.58) and reflected a large magnitude of difference with fully recovered men having higher self-esteem and self-efficacy and lower social comparison than men with a current eating disorder diagnosis or pathology or those partially recovered.

Conclusion: Full recovery in men was associated with healthy self-concept constructs and with low socially prescribed perfectionism. Future research with larger samples should seek to replicate these findings and, using a longitudinal design, examine these constructs as potential predictors or maintenance factors of comprehensive eating disorder recovery in men.

1. Introduction

Research on eating disorders in males has lagged behind our understanding of eating disorders in females, limiting our insights in an array of areas for men, including eating disorder recovery and factors related to recovery. Although men may be included in research studies, they are often excluded from analyses due to small sample sizes. This can result in a conundrum: do researchers exclude males from their reports

due to small numbers or report on findings from males, even from small samples, acknowledging that achieving statistical significance may be unlikely but providing information on effect sizes and direction of effects? We are choosing the latter with this exploratory study, with the goal of providing guidance for future research. In the current study, we consider perfectionism and self-concept constructs in relation to stages of eating disorder recovery in men. Our focus on these constructs is motivated by their robust associations with eating disorders in primarily

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female samples. Further, the inclusion of optional modules related to perfectionism and low self-esteem in Enhanced Cognitive Behavior Therapy (CBT-E; Cooper & Murphy, 2021), a transdiagnostic intervention effective in treating eating disorders (Dahlenburg et al., 2019b; de Jong et al., 2020), posits these constructs as maintenance mechanisms of eating pathology and targets of intervention.

Extensive evidence points to an association between perfectionism and eating disorders among females (Dahlenburg et al., 2019a; Limburg et al., 2017; for reviews, see Bardone-Cone et al., 2007 and Egan et al., 2011), with some suggesting a similar association for males. In a school-based sample of adolescent boys, the odds of eating disorder symptoms were greater for those with high compared to low perfectionism (Fortes et al., 2014). Considering dimensions of perfectionism among men, socially prescribed perfectionism, conceptualized as perceived high expectations from others of oneself, was a more robust mediator of sociocultural influences on muscle dysmorphia and eating disorder symptoms than self-oriented perfectionism, which reflects high personal standards for oneself (Dryer et al., 2016). Additionally, in a sample of male college students, personality-based cluster analyses found support for an overcontrolled subtype characterized by high perfectionism; this subtype had the highest eating disorder symptoms (Hellberg et al., 2019).

Self-concept encompasses multiple constructs that have been associated with eating disorders, with most research in primarily female samples (Bardone-Cone, Thompson, & Miller, 2020). Of note, a systematic review and meta-analysis found that low self-esteem was “unambiguously” a feature of individuals with anorexia nervosa, also present in those with other eating disorders, and relevant in the treatment of eating disorders (Kästner et al., 2019). A meta-analysis also recently concluded that low self-esteem is a risk factor for the development of eating disorders (Colmsee et al., 2021), and self-esteem features prominently in theories of eating disorder onset and maintenance, and as a focus of prevention and treatment interventions (Bardone-Cone, Thompson, & Miller, 2020; Watson et al., 2016). Self-esteem is negatively associated with eating disorder symptoms in non-clinical samples of men with diverse sexual orientations (Parent & Bradstreet, 2017) and, in a sample of adolescent boys, negatively associated with body dissatisfaction and dietary restraint via a pathway involving internalization of the social media ideal and social comparison (Rodgers et al., 2020). Given that from early on, conceptualizations of eating disorders have been intimately tied to the self (Bruch, 1973) and given review work identifying that low levels of some self-concept constructs (e.g., self-esteem, self-efficacy) and high levels of others (e.g., social comparison – characterized by comparing the self to others and thus inherently involving self-evaluation) are associated with eating disorder symptoms (Bardone-Cone, Thompson, & Miller, 2020), it is important to further explore self-esteem and to expand the self-concept constructs investigated in males with eating disorders.

How these constructs relate to eating disorder recovery in men is unknown. Research indicates that women with an eating disorder history who have attained comprehensive recovery (physical, behavioral, cognitive) have levels of perfectionism and self-concept constructs comparable to women who have never had an eating disorder and significantly lower levels of perfectionism and higher levels of self-esteem and self-efficacy than those with a current eating disorder (Bardone-Cone, Schaefer, et al., 2010; Bardone-Cone, Sturm, et al., 2010). Evidence supports the validity of a comprehensive approach to eating disorder recovery in females (e.g., Ackard et al., 2014; Bardone-Cone, Harney, et al., 2010), and there is preliminary support for this same conceptualization and operationalization in men (Bardone-Cone et al., 2019). In this study, we examined how men with a history of an eating disorder who meet criteria for full recovery compare on perfectionism and self-concept constructs in relation to men who have never had an eating disorder, men in a state of partial recovery operationalized as all the “ingredients” of full recovery except for cognitive recovery, and men with ongoing eating disorder pathology. This study positions

itself more as a hypothesis-generating study than a hypothesis-testing study and thus, although *p*-values will be reported, greater emphasis is placed upon the effect sizes (Kraemer, 2019). This is an important first step in adding to the literature of a still understudied group, so as to bolster our understanding of eating disorders and recovery in men and avoid perpetuating disparities in our knowledge and treatment.

2. Method

2.1. Participants & procedure

Participants initially included 36 men with an eating disorder history and 27 controls (men with no eating disorder history), where “men” refers to gender. Recruitment of the eating disorder history sample occurred from former patients (18+ years) of eating disorder centers ($n = 11$; 31 %), flyers on university campuses and fitness centers/gyms ($n = 8$; 22 %), and email announcements on university listservs to university employees and students ($n = 17$; 47 %). Fliers and listservs recruited men who experienced loss of control while eating, high levels of body dissatisfaction, or a strong focus on altering body weight or shape in order to identify individuals with eating disorder attitudes and behaviors. Controls were recruited via university listserv announcements to university employees and students, recruiting men who had “never had an eating disorder or eating disorder symptoms (e.g., binge eating, severe dieting).” Interested individuals were screened via phone using the Structured Clinical Interview for DSM-IV (SCID; First et al., 1995) with DSM-5 criteria applied to ensure that the eating disorder sample met diagnostic criteria for a lifetime history of an eating disorder and the controls had no eating disorder history. Participants without an eating disorder history were age-matched within five years to the eating disorder history participants.

Participants completed an online survey containing questionnaires about disordered eating, perfectionism, and self-concept. Within a month after the survey, participants attended an in-person session including a set of interviews (including the eating disorder module of the SCID) and the measurement of height and weight. Participants received financial compensation for their participation. The Institutional Review Boards of UNC and Duke University approved this study which was part of a larger study.

2.2. Measures

2.2.1. Defining eating disorder recovery status

Measures used to categorize individuals in terms of full and partial recovery were those used in earlier comprehensive recovery research (see Bardone-Cone, Harney, et al., 2010 for details). Full recovery required: absence of an eating disorder diagnosis (per SCID administered as an in-person interview, using DSM-5 criteria; First et al., 1995); physical recovery, operationalized as a body mass index (BMI) ≥ 18.5 kg/m², which represents the low end of the normal range of BMI per the World Health Organization (Bjorntorp, 2002); behavioral recovery, operationalized as no binge eating, vomiting, laxatives, or fasting in the past three months; and cognitive recovery, operationalized as all four subscales of the Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 1994) within 1 SD of male norms (Quick & Byrd-Bredbenner, 2013). Partial recovery required: absence of an eating disorder diagnosis, physical recovery, and behavioral recovery, but the absence of cognitive recovery (i.e., at least one EDE-Q subscale > 1 SD of norms).

Among those with an eating disorder history, five met criteria for full recovery and seven met criteria for partial recovery. An additional 15 currently met DSM-5 criteria for an eating disorder: anorexia nervosa (AN; 20 %), bulimia nervosa (BN; 27 %), binge-eating disorder (BED; 7 %), and other specified feeding or eating disorder (OSFED; 47 %). Of the initial 36 participants with an eating disorder history, nine neither met criteria for one of the two recovery groups nor met threshold criteria for

an eating disorder diagnosis. In order to minimize uncategorized individuals, we examined the profiles of these men across the three domains to determine whether there was a good fit for them in the existing categories. Closer inspection of these nine revealed that eight only met criteria for physical recovery (four of these men had a history of anorexia nervosa) and did not meet criteria for behavioral or cognitive recovery. We elected to include these eight with those who met criteria for a current eating disorder, conceptualizing this group as “currently ill” with a current eating disorder diagnosis/pathology and increasing the overall sample size for analyses. One participant met criteria for physical and cognitive recovery but not behavioral recovery; since it felt less clear that this individual was “currently ill” in the same way as the others, and yet they did not meet the a priori criteria for full or partial recovery, they were not included in these analyses. Thus, the final group sizes were: currently ill ($n = 23$), partially recovered ($n = 7$), fully recovered ($n = 5$), and controls ($n = 27$). There were no significant group differences in terms of age, race, ethnicity, socioeconomic status (using highest parental education as a proxy), BMI, or lifetime history of AN ($p \geq .257$). When continuous variables were examined for effect sizes, effect sizes for pairwise comparisons were primarily small to medium, with only one large effect size (Hedge's $g = 0.75$) reflecting a large magnitude of difference for age between the fully recovered group ($M = 28.40$ years, $SD = 9.66$) and the partially recovered group ($M = 22.86$ years, $SD = 3.89$).

2.2.2. Perfectionism

The Multidimensional Perfectionism Scale (MPS; Hewitt & Flett, 1991) was used to assess self-oriented perfectionism (self-imposed pressure to be perfect) and socially prescribed perfectionism (feeling pressure from others to be perfect). The MPS is one of the most used measures of multidimensional perfectionism, with well-established validity and reliability (Hewitt & Flett, 1991). From the Perfectionistic Self-Presentation Scale (PSPS; Hewitt et al., 2003) we used the Non-display of Imperfection subscale, reflecting concerns about being seen by others as imperfect and efforts to present as perfect by concealing perceived imperfections. The PSPS subscales have good internal consistency and convergent validity (Hewitt et al., 2003). In the current study, coefficient alpha was 0.90 for self-oriented perfectionism, 0.87 for socially prescribed perfectionism, and 0.90 for nondisplay of imperfection.

2.2.3. Self-concept

Self-esteem was assessed with the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965), a reliable and well-validated scale that is the most widely used measure of overall self-esteem (Heatherton & Wyland, 2003). Self-efficacy was assessed with the General Self-Efficacy subscale of the Self-Efficacy Scale (Sherer et al., 1982), a measure used widely in clinical and educational settings with good reliability and construct validity (Scherbaum et al., 2006; Sherer et al., 1982). Social comparison was measured with the Body, Eating, and Exercise Comparison Orientation (BEECOM; Fitzsimmons-Craft et al., 2012) and assesses comparison tendencies to one's peers in relation to body, eating, and exercise. To our knowledge, the BEECOM is the only social comparison measure that includes items on exercise-related comparisons. The BEECOM has psychometric support in a sample of college women (Fitzsimmons-Craft et al., 2012) and a sample of college men (Sahlan et al., 2020), and we report additional psychometric analyses in supplementary material. In the current study, coefficient alpha was 0.94 for self-esteem, 0.93 for self-efficacy, and 0.97 for social comparison.

2.3. Analytic plan

In keeping with recommendations by Kraemer (2019), this study is best considered a hypothesis-generating study where the focus is effect sizes (Kraemer, 2019). Per Scheel et al. (2021), “nonconfirmatory research” is needed in multiple areas for future hypothesis testing to be

most informative, including in the understanding of relationships between concepts – in the case of this study, the relationship between a comprehensive definition of recovery and perfectionism and self-concept constructs.

Given that there is reasonable support for hypotheses due to prior work on perfectionism and self-concept constructs in relation to comprehensive eating disorder recovery in females, we first present results from inferential statistics. In particular, given the conceptual and empirical associations among the perfectionism constructs (in this sample, $r_s = 0.36$ – 0.55) and self-concept constructs (absolute value $r_s = 0.49$ – 0.69), we first performed two multivariate analyses of variance (MANOVAs). Significant multivariate effects were followed up with univariate analysis of variance (ANOVA) and Tukey HSD tests for pairwise comparisons. Since MANOVA and ANOVA are robust to violations of the normality assumption in large samples, and our sample size is small, we reran the analyses using the Kruskal-Wallis test, a non-parametric alternative to one-way ANOVA, which yielded the same pattern of results. Given that we are framing this study as a hypothesis-generating study and emphasizing effect sizes (details below), and given the similar pattern of results when using ANOVA and Kruskal-Wallis tests, we retained the ANOVA and MANOVA analyses due to their use in similar recovery work, with the acknowledgement that inferential tests results are to be viewed tentatively with the focus on effect sizes in guiding future research.

Last and most importantly, effect sizes are provided for the omnibus tests and for each comparison, regardless of p -value, as recommended by Kraemer (2019). Partial eta squared (partial η^2) is reported for ANOVAs, with benchmarks of 0.01 for a small effect, 0.06 for a medium effect, and 0.14 for a large effect (Cohen, 1988). Hedge's g is reported for all pairwise comparisons, as recommended for group comparisons with small sample sizes (<20) (Lakens, 2013); these effect sizes can be interpreted the same as Cohen's d : small (0.2), medium (0.5), and large (0.8) (Cohen, 1988). Given the small sample size and the exploratory nature of this study, no corrections were made for multiple testing.

3. Results

3.1. Perfectionism

The MANOVA for perfectionism was significant, $F(9, 136.44) = 5.55$, $p < .001$, Wilks' Lambda = 0.47, partial $\eta^2 = 0.22$. Follow-up ANOVAs revealed groups differences for each perfectionism construct (see Table 1). Partial eta squared values for self-oriented perfectionism, socially prescribed perfectionism, and nondisplay of perfectionism were 0.17, 0.28, and 0.34, respectively, and similar to partial eta squared values from a study comparing these same perfectionism constructs and measures across recovery groups in a female sample (0.22, 0.27, and 0.29; Bardone-Cone, Sturm, et al., 2010). The fully recovered group had significantly lower levels of socially prescribed perfectionism than those with an eating disorder diagnosis/pathology and those in partial recovery, and comparable levels to controls. However, the fully recovered group did not significantly differ from other groups in terms of self-oriented perfectionism or nondisplay of imperfection.

Effect sizes from the pairwise comparisons on perfectionism are presented in Table 3. The largest effect sizes involving the fully recovered group were clearly for socially prescribed perfectionism with Hedge's g greater than the absolute value of 1.5 for the fully recovered vs. eating disorder diagnosis/pathology groups and the fully recovered vs. partially recovered groups; the magnitude of these differences was very large in the direction of socially prescribed perfectionism being markedly lower in fully recovered individuals compared to those with a current eating disorder diagnosis/pathology or those partially recovered. The effect sizes comparing the fully recovered group to controls on the three perfectionism constructs were at least medium-large (absolute values: 0.72–1.21), with the fully recovered group scoring higher on self-oriented perfectionism and nondisplay of perfectionism, but lower

Table 1
Perfectionism constructs across eating disorder recovery status groups.

Measure/construct	Current ED/ED pathology (<i>n</i> = 23)	Partially recovered (<i>n</i> = 7)	Fully recovered (<i>n</i> = 5)	No ED history controls (<i>n</i> = 27)	Significance	Pairwise comparisons
Self-oriented perfectionism	80.91 (14.58)	70.71 (11.93)	78.00 (19.07)	67.15 (13.94)	$F(3, 58) = 4.03, p = .011$, partial $\eta^2 = 0.17$	C < CED
Socially prescribed perfectionism	61.57 (12.98)	59.71 (13.21)	39.20 (10.26)	48.15 (12.10)	$F(3, 58) = 7.66, p < .001$, partial $\eta^2 = 0.28$	C < CED FR < PR, CED
Nondisplay of imperfection	52.74 (11.76)	44.57 (11.34)	48.60 (5.81)	36.48 (10.25)	$F(3, 58) = 9.78, p < .001$, partial $\eta^2 = 0.34$	C < CED

Note. Means and (standard deviations) are presented by group. ED = eating disorder. CED = current eating disorder diagnosis or eating disorder pathology by virtue of not meeting criteria for behavioral or cognitive recovery. PR = partially recovered. FR = fully recovered. C = no eating disorder history controls. Self-oriented and socially prescribed perfectionism were assessed with the Multidimensional Perfectionism Scale (Hewitt & Flett, 1991; possible range = 15–105) and nondisplay of imperfection was assessed with the Perfectionistic Self-Presentation Scale (Hewitt et al., 2003; possible range = 10–70). In all cases, higher scores reflect greater levels of the constructs. Pairwise comparisons listed were significant at least at $p < .05$.

on socially prescribed perfectionism, compared to men who never had an eating disorder. As an index of validity, the perfectionism construct effect sizes comparing controls and the eating disorder diagnosis/pathology group were all large (absolute values: 0.95–1.46), as would be expected.

3.2. Self-concept

The MANOVA for self-concept constructs was significant, $F(9, 136.44) = 4.77, p < .001$, Wilks' Lambda = 0.51, partial $\eta^2 = 0.20$. Follow-up ANOVAs revealed group differences for each self-concept construct (see Table 2). Partial eta squared values for self-esteem, self-efficacy, and social comparison were 0.27, 0.18, and 0.44, respectively, which represent a lower effect size for self-esteem than found in a female sample (0.44) and a comparable effect size for self-efficacy (0.21) (Bardone-Cone, Schaefer et al., 2010). The fully recovered group was not significantly different from any of the other groups on any of the self-concept constructs at the $p < .05$ level.

Effect sizes from the pairwise comparisons on the self-concept constructs are presented in Table 3. The largest effect size involving the fully recovered group was for self-esteem with a Hedge's *g* value of 1.58 for the fully recovered vs. partially recovered comparison, representing a very large magnitude of difference with the fully recovered group having markedly higher self-esteem than the partially recovered group. Additionally, effect sizes for social comparison stood out with Hedge's *g* greater than the absolute value of 1.1 for the fully recovered vs. eating disorder diagnosis/pathology groups and the fully recovered vs. partially recovered groups; the magnitude of these differences was very large in the direction of social comparison being markedly lower in fully recovered individuals compared to those with a current eating disorder diagnosis/pathology or those partially recovered. Other effect sizes involving the fully recovered group and the other recovery status groups were also large, with the direction of the magnitude reflecting the fully

recovered group having greater self-esteem than the eating disorder diagnosis/pathology group (Hedge's *g* = 0.76) and higher self-efficacy than the eating disorder diagnosis/pathology group (Hedge's *g* = 0.82) or the partially recovered group (Hedge's *g* = 0.99). The effect sizes comparing the fully recovered group to controls on the three self-concept constructs ranged from quite small (0.11 for self-esteem, 0.06 for self-efficacy) to medium (0.46 for social comparison); for social comparison, the fully recovered group scored higher on social comparison compared to men who never had an eating disorder. As an index of validity, the self-concept construct effect sizes comparing controls and the eating disorder diagnosis/pathology group were all large (absolute values: 0.83–1.70), as would be expected.

4. Discussion

This study represents a first examination of perfectionism and self-concept constructs in men in relation to stages of eating disorder recovery that include recovery operationalized with physical, behavioral, and cognitive criteria. The nature of exploratory work, especially with a small sample size, argues for a hypothesis-generating focus rather than a hypothesis-testing focus (Kraemer, 2019). This approach, including an emphasis on effect sizes, reduces the possibility of Type II errors where meaningful differences are not statistically significant due to low power. We review the patterns of findings related to effect sizes highlighting the fully recovered group as the group of most interest.

Regarding perfectionism, the greatest magnitudes of difference involved socially prescribed perfectionism where the fully recovered group had lower levels than those with a current eating disorder diagnosis/pathology or those partially recovered. These differences achieved statistical significance when using Tukey's tests and mirror findings of socially prescribed perfectionism across stages of recovery in women (Bardone-Cone, Sturm, et al., 2010). Effect sizes involving the fully recovered group and the other recovery status groups were in the small

Table 2
Self-concept constructs across eating disorder recovery status groups.

Measure/construct	Current ED/ED pathology (<i>n</i> = 23)	Partially recovered (<i>n</i> = 7)	Fully recovered (<i>n</i> = 5)	No ED history controls (<i>n</i> = 27)	Significance	Pairwise comparisons
Self-esteem	34.57 (9.71)	28.43 (8.94)	41.80 (5.76)	42.70 (7.99)	$F(3, 58) = 7.04, p < .001$, partial $\eta^2 = 0.27$	C > PR, CED
Self-efficacy	58.09 (12.75)	55.57 (12.74)	68.60 (11.15)	67.96 (10.75)	$F(3, 58) = 4.23, p = .009$, partial $\eta^2 = 0.18$	C > CED
Social comparison	85.61 (22.72)	89.57 (19.63)	59.80 (21.71)	51.56 (16.79)	$F(3, 58) = 15.16, p < .001$, partial $\eta^2 = 0.44$	C < PR, CED

Note. Means and (standard deviations) are presented by group. ED = eating disorder. CED = current eating disorder diagnosis or eating disorder pathology by virtue of not meeting criteria for behavioral or cognitive recovery. PR = partially recovered. FR = fully recovered. C = no eating disorder history controls. Self-esteem was assessed with the Rosenberg Self-Esteems Scale (Rosenberg, 1965; possible range = 10–50), self-efficacy with the Self-Efficacy Scale (Sherer et al., 1982; possible range = 17–85), and social comparison with the Body, Eating, and Exercise Comparison Orientation (Fitzsimmons-Craft et al., 2012; possible range = 18–126). In all cases, higher scores reflect greater levels of the constructs. Pairwise comparisons listed were significant at least at $p < .05$.

Table 3
Effect sizes (Hedge's *g*) for all pairwise comparisons.

	FR v CED	FR v PR	FR v C	PR v CED	PR v C	CED v C
Self-oriented perfectionism	−0.18 (−1.12, 0.76)	0.44 (−0.64, 1.51)	0.72 (−0.24, 1.66)	−0.71 (−1.54, 0.14)	0.26 (−0.56, 1.07)	0.95 (0.37, 1.53)
Socially prescribed perfectionism	−1.72 (−2.76, −0.66)	−1.56 (−2.79, −0.28)	−0.74 (−1.68, 0.22)	−0.14 (−0.96, 0.69)	0.92 (0.07, 1.75)	1.06 (0.46, 1.64)
Nondisplay of imperfection	−0.36 (−1.30, 0.58)	0.39 (−0.69, 1.45)	1.21 (0.22, 2.18)	−0.68 (−1.52, 0.17)	0.76 (−0.08, 1.58)	1.46 (0.83, 2.07)
Self-esteem	0.76 (−0.21, 1.72)	1.58 (0.29, 2.81)	−0.11 (−1.04, 0.82)	−0.63 (−1.46, 0.22)	−1.71 (−2.61, −0.78)	−0.91 (−1.48, −0.33)
Self-efficacy	0.82 (−0.16, 1.77)	0.99 (−0.17, 2.11)	0.06 (−0.87, 0.99)	−0.19 (−1.02, 0.63)	−1.09 (−1.93, −0.22)	−0.83 (−1.40, −0.25)
Social comparison	−1.11 (−2.09, −0.12)	−1.34 (−2.52, −0.11)	0.46 (−0.48, 1.39)	0.17 (−0.65, 1.00)	2.14 (1.16, 3.09)	1.70 (1.05, 2.34)

Note. FR = fully recovered. CED = current eating disorder diagnosis or eating disorder pathology by virtue of not meeting criteria for behavioral or cognitive recovery. PR = partially recovered. C = no eating disorder history controls. Hedge's *g* is reported as the effect size, followed by the 95 % confidence interval for the effect size. The order of entry in computing these effect sizes means that a negative effect size value indicates that the first group's mean is smaller than the second group's mean in the comparison; a positive value indicates the first group's mean is larger than the second group's mean. Effect sizes can be interpreted as: 0.2 = small effect, 0.5 = medium effect, 0.8 = large effect (Cohen, 1988). Values in bold reflect cases when the 95 % confidence interval for the effect size did not include zero.

to small-medium range for self-oriented perfectionism, and in the small-medium range for nondisplay of imperfection and did not reach statistical significance, unlike related work in women (Bardone-Cone, Sturm, et al., 2010). Based on the discrepant pattern of findings for self-oriented perfectionism and nondisplay of imperfection in this work compared to research in a female sample, future research should examine if certain domains of perfectionism function differently in men than women in relation to eating disorder recovery.

For the self-concept constructs, effect sizes involving the fully recovered group and the other recovery status groups were all large (absolute values: 0.76–1.58) reflecting a large magnitude of difference with fully recovered men having higher self-esteem and self-efficacy and lower social comparison than men with a current eating disorder diagnosis/pathology or those partially recovered. These large effects did not translate into significant pairwise comparisons using Tukey's tests although several trended toward significance (e.g., for social comparison: $p = .061$ for fully recovered vs. partially recovered). This general pattern of results is comparable to data among women (Bardone-Cone, Schaefer, et al., 2010), adding to the literature that positive self-concepts may be associated with full recovery from an eating disorder.

This study is the first to examine factors related to a comprehensive conceptualization of recovery in men, a critically understudied population. Rather than leave unexplored factors related to eating disorder recovery in men in this sample due to size (thus “contributing” to lack of information on males and eating disorders), we chose to engage in this exploratory work to develop our understanding of the relationship between a comprehensive definition of recovery and perfectionism and self-concept constructs in men, to guide future research on this topic (including assisting with effect sizes for a priori power analyses), and to facilitate cumulative science (Lakens, 2013). Further, the use of a comprehensive definition of eating disorder recovery, including physical, behavioral, and cognitive indices, is a strength by contributing to the recovery literature (Bardone-Cone et al., 2018). Another strength is the evaluation of multiple domains of perfectionism and self-concept, providing a broader picture of these factors in relation to eating disorder recovery.

The main limitation of the current study is the small sample size. Future research is needed in larger samples to re-examine these questions (especially those with promising effect sizes) and others related to eating disorder recovery in men. Of note, eight men who did not meet criteria for behavioral or cognitive recovery were included with those with a current eating disorder in a “currently ill” group. Although this is a different approach than in past work using the current recovery operationalization, it enabled us to maximally use the sample of participants in data analyses by examining their profiles to consider potential fit in existing categories. Future work with larger samples should

more closely investigate those who do not fit into the categories of full recovery, partial recovery, and current eating disorder to determine how to best include them in this conceptualization. For example, under what conditions would they be included in a “currently ill” group – should meeting only one criterion for recovery result in this grouping, as done in the current study? Should the “partial recovery” group be expanded to include all those who do not meet criteria for an eating disorder or the full recovery criteria? Other limitations related to the sample include the different sample sizes for the eating history and control groups and the different recruitment strategies for these groups. Lastly, although most of the measures used have substantial psychometric support in males, to our knowledge there is only one published study reporting on the BEECOM in men (Sahlan et al., 2020). Given that excessive exercise is a prominent feature of eating disorders in males (Murray et al., 2017), more work examining the BEECOM in men is warranted to understand exercise-related comparison as part of self-evaluation and in relation to eating disorders.

Future research would benefit from longitudinal designs to examine how perfectionism and self-concept factors change throughout the recovery process. Given meta-analytic work supporting self-esteem as a predictor of improved eating disorder outcomes (Vall & Wade, 2015), consensus among patients and therapists that improving self-esteem is critical to eating disorder recovery (Vanderlinden et al., 2007), and research suggesting self-esteem as a predictor of full recovery in women (Bardone-Cone, Miller, Thompson, & Walsh, 2020), future research should examine whether self-esteem predicts recovery, or its maintenance, in men. Additionally, future research should investigate how factors more uniquely related to men, such as attitudes about masculinity and muscularity-oriented disordered eating, may be associated with eating disorder recovery (Murray et al., 2016) and use measures developed to capture disordered eating behaviors and cognitions that may be more represented in men (e.g., Eating for Muscularity Scale; Cooper et al., 2020).

5. Conclusion

In sum, men who have recovered from an eating disorder via physical, behavioral, and cognitive domains show indications of lower socially prescribed perfectionism, higher self-esteem, higher self-efficacy, and lower social comparison than men with an eating disorder diagnosis/pathology or men in partial recovery via an examination of effect sizes. The pattern of findings for self-concept constructs across eating disorder recovery stages was similar to findings for women, but there may be something unique about some aspects of perfectionism across stages for men, in particular self-oriented perfectionism, that function differently for men compared to women. These results are presented as

tentative, given the small sample size, but enlightening and worthy of additional research. It is imperative that eating disorder researchers continue to encourage males to participate in their studies both to examine if findings in other (mainly female) samples apply and to address questions that may be more specific to males; this is a prerequisite for our improved understanding and treatment of eating disorders in men and reduced health disparities.

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CRediT authorship contribution statement

A.M.B-C. designed the study with input from N.Z. and C.M.B. and A. M.B-C. wrote the protocol. A.M.B-C. conducted the statistical analysis with input from N.Z., H.J.W., and C.M.B. A.M.B-C., J.P.W., and K.A.T. wrote the first draft of the manuscript and all authors provided feedback on the manuscript and have approved the final manuscript.

Declaration of competing interest

C.M.B. reports: Shire (grant recipient, Scientific Advisory Board member); Idorsia (consultant); Lundbeckfonden (grant recipient); Pearson (author, royalty recipient); Equip Health Inc. (Clinical Advisory Board). All other authors declare that they have no conflicts of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.eatbeh.2022.101658>.

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