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Severe and enduring anorexia nervosa? Illness severity and duration are unrelated to outcomes from enhanced cognitive behaviour therapy

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Abstract

Objective: The present study aimed to examine whether Anorexia Nervosa (AN) illness severity or duration is associated with retention or treatment response in outpatient, enhanced cognitive behavioural therapy (CBT-E). **Method:** Patients with a confirmed AN diagnosis (N = 134) completed measures of eating disorder symptoms and quality of life, and had their BMI objectively measured before, during, and after treatment. We evaluated whether illness severity or duration predicted treatment outcomes, using longitudinal regression models. **Results:** Greater levels of illness severity and duration were not associated with poorer treatment outcomes. **Conclusions:** Patients with more severe or long-standing AN illness did just as well in CBT-E as any other patient starting treatment. Therefore, classifying individuals as 'severe and enduring' appears to lack clinical utility in CBT-E. Clinicians should continue to administer evidence-supported treatments such as CBT-E for patients with AN, regardless of duration or severity of AN illness.

Public Health Statement: "This study strongly suggests that outpatient CBT-E is an equally acceptable and effective treatment for adults with anorexia nervosa, regardless of duration or severity."

Severe and enduring anorexia nervosa? Illness severity and duration are unrelated to outcomes from enhanced cognitive behaviour therapy

The term 'severe and enduring anorexia nervosa' (SE-AN) is prevalent in clinical and research settings as a descriptor for a subgroup of individuals with AN. SE-AN is typically designated based on illness duration, yet there is no consensus regarding the length of illness that makes up SE-AN (Wildes et al., 2017; Wonderlich et al., 2012). Diverse definitions have been applied, such as at least three years (Hay, Touyz, & Sud, 2012), at least 7 years (Calugi et al., 2016; Touyz et al., 2013), and at least 10 years (Arkell & Robinson, 2008).

Illness duration is associated with poorer prognosis for patients with AN across different treatment settings and modalities (Keel & Brown, 2010). However, there is little evidence regarding the impact of illness duration on specific therapies, such as enhanced cognitive behavioural therapy (CBT-E; Fairburn, 2008). A single study (Calugi et al., 2016) found that patients with or without SE-AN (defined as duration of at least 7 years) did not differ significantly on treatment outcomes following inpatient CBT-E. Groups had similar improvements in BMI, eating disorder symptoms, and general psychopathology at post-treatment and 12-month follow-up. These findings question the clinical utility of the 'severe and enduring' AN construct in CBT-E.

The word 'severe' is embedded in the term SE-AN, yet AN severity is rarely used to classify an individual as SE-AN. The Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013) classifies AN severity based on BMI bands. However, patients with AN categorised as mild (>=17.0 BMI), moderate (16-16.99 BMI), severe (15-15.99 BMI), and extreme (<15 BMI) are indistinguishable on age, clinical impairment, or eating disorder symptoms (e.g., Reas & Ro, 2017). Thus, DSM-5 severity may lack clinical utility at pre-treatment. However, BMI is also not the only variable that could be used to define severity, as the severity of pre-treatment eating disorder attitudes and

cognitions could be used instead. Further research is needed to assess whether BMI or eating disorder symptom severity predict retention or outcome in CBT-E for AN.

Wildes et al. (2017) used structural equation modelling to investigate the validity of the 'severe and enduring' AN construct, concluding that it lacked validity. They criticised the common practice of dichotomising illness severity into categories (e.g., less than or greater than 7 years), arguing that illness duration and severity are dimensions that should be conceptualised as such by researchers and clinicians. While the clinical utility of SE-AN classification has not been established, guidelines have emerged that encourage clinicians to de-emphasise goals of renourishment and weight restoration for SE-AN, and instead focus on harm minimisation and quality of life (Hay et al., 2014; Strober, 2004; Touyz et al., 2013). Rehabilitation over recovery has been recommended, following staging models for psychotic illness (e.g., Arkell & Robinson, 2008). By contrast, goals of weight restoration and renourishment are at the forefront of evidence-supported interventions, such as family-based treatment (Lock & le Grange, 2015) and CBT (Fairburn, 2008) for other individuals with AN.

Recommending different treatment of SE-AN may be premature, given that there is no accepted definition of 'severe and enduring' AN, nor evidence that duration or severity of AN is associated with poorer outcomes in existing evidence-supported treatments. The present study aimed to evaluate whether the severity or duration of AN affect treatment retention or outcome in outpatient CBT-E.

Method

Participants

Participants were 134 consecutive patients who entered CBT-E at a public mental health service with a dedicated outpatient eating disorders service. All patients met DSM-5 criteria for AN (APA, 2013). Exclusion criteria were current psychosis, significant alcohol or substance abuse/dependence, or medical instability. Sample characteristics are presented in

Table 1. The study received approval from the Institution's Human Research Ethics Committee (Approval Number QI 2014/39).

Procedure and Measures

Patients were assessed and treated by Clinical Psychologists experienced in the treatment of eating disorders. The Eating Disorder Examination interview (EDE Version 12; Fairburn & Cooper, 1993) was administered at assessment to determine eating disorder diagnosis. CBT-E was then administered individually (see Byrne et al., 2011 for details of training and implementation). CBT-E is a manual-based treatment (Fairburn, 2008) that has demonstrated efficacy (Fairburn et al., 2009).

Patients were weighed (clothed but without shoes or outer garments) at assessment and every treatment session to calculate objective BMI. Severity of eating disorder attitudes and behaviours was measured using the clinician-rated EDE global score at pre-treatment (α = .91), and the self-report Eating Disorder Examination Questionnaire global score (EDE-Q; Fairburn & Beglin, 1994; α = .94) at pre-treatment, post-treatment, and five weekly intervals throughout treatment. The first 87 patients in the sample also completed the Quality of Life and Enjoyment Satisfaction Questionnaire-Short Form (QLESQ; Endicott et al., 1993, α = .91) (after this, the service discontinued use of this measure). Treatment completion was defined as successful transition through all stages of CBT-E, with mutual termination of treatment by therapist and patient after the final stage. Illness duration was assessed using a self-report questionnaire that asked respondents for detailed information pertaining to the age of onset of key eating disorder cognitions and behaviours, as well as a detailed weight history. Self-report data were used to guide clinical interview to determine the duration (in months) for which the individual presented with uninterrupted symptoms of AN.

Data Analysis

We evaluated whether the duration or severity of AN predicted treatment outcomes. The predictor variables were (a) illness duration, (b) pre-treatment EDE score, and (c) pre-treatment BMI. The outcome variables were (a) treatment completion, (b) change in eating disorder attitudes and cognitions (EDE-Q), (c) change in quality of life (QLESQ), (d) change in BMI over the first five treatment sessions (an indicator of rapid response), and (e) change in BMI over 40 treatment sessions (standard length of CBT-E). Separate analyses were conducted for each predictor and outcome. We used nonparametric and logistic regression to evaluate associations between each predictor and treatment completion. For other outcomes, we used longitudinal regression modelling[1] to test whether there was an interaction between the predictors and time (i.e., did the trajectory of the outcome variable depend on illness duration or severity?). Analyses were conducted using R 3.4.4 (www.R-project.org).

Results

We summarise the salient findings here. The results of all analyses, along with data and code that can be used to replicate or extend our analyses, are available on the Open Science Foundation (URL: masked for anonymous review).

Treatment Characteristics

Sixty-nine (51.5%) participants were classified as treatment completers. They attended a mean of 38.4 (SD = 21.4) sessions. Non-completers attended a mean of 12.2 (SD = 10.2) sessions. Both groups demonstrated significant improvements on EDE-Q and BMI from pre- to post-treatment. Reasons for non-completion ranged from missing scheduled sessions (and not responding to attempts to make contact) through to being unable to continue due to gaining employment or moving away. There were no significant differences between completers and non-completers on pre-treatment variables, except for a small difference in baseline EDE-Q scores (Completers M = 4.14 (SD 1.30), Non-Completers 3.66 (SD = 1.38), Difference = 0.49, 95% CI [.02, .95], d = .36, p = .040.]

Predictor 1: Illness Duration

There was a small association between illness duration and the probability of completing treatment ($p = .039$, pseudo-$R^2 = .10$), however the association was curvilinear (U-shaped, top panel, Figure 1). For example, a patient with illness duration of two years had the same likelihood of completing treatment (64%) as a patient with illness duration of 18 years. Illness duration did not predict changes in eating disorder symptoms, quality of life, or BMI (see bottom panel, Figure 1). Predicted trajectories of change in eating disorder symptoms for patients with 3, 7 and 11 year illness durations are plotted. If illness duration was associated with poorer outcome, the slope of the trajectory for patients with an 11-year illness duration would be flatter (indicating less improvement) than the slope for patients with a 7-year duration, who in turn would have a flatter slope than patients with a 3-year duration. However, the trajectories are parallel, indicating that illness duration has no impact on change in eating disorder symptoms (interaction between illness duration and time - $p = .93$). Similar patterns emerged when we plotted trajectories for the other outcomes variables.

Predictor 2: Pre-treatment Eating Disorder Symptom Severity

Pre-treatment EDE scores did not predict outcome on any of the five dependent variables. Predicted trajectories of change in BMI over the first five sessions of treatment have been plotted for participants with pre-treatment EDE scores of 3.04, 3.97 and 4.66 (corresponding to the 25^{th}, 50^{th}, and 75^{th} percentiles of the distribution of EDE scores here), which indicate low, moderate, and high levels of eating disorder symptoms (see Figure 2). The trajectories are almost perfectly parallel, demonstrating that the severity of problematic eating disorder attitudes and cognitions at pre-treatment has no impact on the amount of change in BMI during the early phase of treatment.

Predictor 3: Pre-treatment BMI

The slope of change in BMI over the course of treatment was associated with pre-treatment BMI scores ($p < .001$). However, this was because participants with low BMI values experienced larger improvements in BMI than participants with relatively high pre-treatment BMIs (see top panel, Figure 3, for predicted trajectories for participants with BMIs of 15, 16, 17 and 18). Pre-treatment BMI did not predict any other outcomes. Figure 3 (bottom panel) illustrates the lack of a relationship between pre-treatment BMI and changes in quality of life. The slope of the trajectory was virtually identical for all levels of BMI.

Comparison with existing proposed 'cut-offs' for SE-AN

To compare directly with previous findings (Calugi et al., 2016), we re-ran analyses after dichotomising illness duration into <7 years and >= 7 year categories. Patients with illness duration >= 7 years had no worse outcome on any variable. The '>=7-year duration' threshold as a predictor of treatment completion performed extremely poorly in a Receiver Operating Characteristic analysis. The sensitivity value (true positive rate) was 32%, specificity 51%, and overall accuracy 41% - worse than flipping a coin. Similarly, we reran our analyses dichotomising patients based on pre-treatment BMI bands, with BMI < 16 defined as 'severe' (DSM-5; APA, 2013) and BMI ≥ 16 as 'non-severe'. The only relationship between severity and outcome was that patients with 'severe' BMI at pre-treatment experienced significantly larger improvements in BMI over CBT-E (Figure 4).

Discussion

The present study examined whether AN duration or severity are associated with decreased likelihood of completing CBT-E or poorer treatment response. We found only two associations between duration/severity and treatment outcome - both at odds with the assumption that greater duration or severity is associated with poorer treatment outcomes (e.g., patients with low BMIs at pre-treatment experienced greater improvements in BMI than those with high pre-treatment BMIs). The consistent lack of associations across many

outcomes and three predictor variables strongly suggests that AN duration and severity are not predictive of poor outcome in CBT-E, and that nosologies that classify SE-AN by dichotomising illness duration or BMI may be of questionable validity and clinical utility.

The status and meaning of 'severe and enduring' AN.

The present findings strengthen recent studies showing that illness duration does not impact on outcomes in CBT-E (Calugi et al., 2017) and extend this research by demonstrating the robustness of this finding when duration and severity are considered dimensionally. There is currently no meaningful cluster of features that constitutes a 'severe and enduring' variant of AN (Wildes et al., 2017; Wonderlich et al., 2012). Consequently, clinicians run the risk of using the term more or less arbitrarily (Broomfield et al., 2017). In the absence of a meaningful construct of 'severe and enduring' AN, it follows that treatment recommendations for AN should be the same, regardless of illness duration or severity. Guidelines proposing different treatment approaches for 'severe and enduring' AN should not be implemented unless clinical researchers can demonstrate that it is a useful construct.

Clinical Implications

The present findings offer hope for individuals who present to routine clinical settings with relatively severe and long lasting AN illness. Evidence-based CBT-E is no less effective or acceptable for these individuals. This information can be conveyed to patients at the start of treatment to instil hope – they have just as much chance of achieving a good outcome in CBT-E as any other patient. In the present study, patients with very low weight (BMI < 16) achieved the greatest weight regain over CBT-E. Thus, even low-weight patients can engage in and benefit from CBT-E, despite engagement requiring complex cognitive and behavioural processes (e.g., reasoning and insight), and the need for real-time monitoring of nutritional intake, thoughts and feelings every day for many months. Removing these critical

components of evidence-based treatments on the basis of duration or severity has the potential to limit treatment gains for individuals who would benefit.

The use of the term 'severe and enduring' has the potential to result in even greater stigma than is currently experienced by individuals with eating disorders (e.g., BEAT, 2016). It can be used as a justification for clinicians to avoid applying effective treatment, as demonstrated by the finding that individuals with enduring AN are more likely to be offered non evidence-supported treatments (Wonderlich et al., 2012). If illness duration and severity make no difference to treatment outcomes in CBT-E, discussion should shift from alternative treatments for SE-AN to improving treatments for all individuals with AN.

Research Implications

Strengths of the present study include the large clinical sample, examining the impact of illness duration and severity on treatment retention and outcome as continuous variables, and examining several indicators of treatment response. The present findings do not rule out the possibility that alternative definitions of 'severe and enduring' might be prognostically useful, and do not permit conclusions regarding the impact of AN severity or duration on longer-term outcomes for patients with AN, as only post-treatment data were available.

Further research is needed to examine whether the present findings generalise to younger patients (< 16 years) or to other evidence-supported treatments for AN. We assessed illness duration based on a detailed self-report questionnaire and clinical interview. Previous studies have similarly relied on self-reported illness duration (e.g., Wildes et al., 2017). While there is mixed evidence regarding the reliability of retrospective accounts (Solhan et al., 2009; Wonderlich et al., 2015), this limitation applies equally to the literature that has advocated the SE-AN categorisation. Further research is needed to determine whether illness duration can be measured reliably using retrospective self-report, when the recall period

spans many years. If not, this may further undermine the utility of classifying an individual based on illness duration until a more reliable measure can be established.

Finally, it is possible that there may be associations between illness duration or severity that we did not have sufficient statistical power to detect in the present study. However, it is unlikely that any clinically significant effects have been missed because our sample size was large, and most outcomes were measured repeatedly during treatment, with all available values included in our regression models, which helps to substantially boost statistical power. The shape of predicted treatment trajectories (which were usually parallel), size of regression coefficients for interactions (which were often close to zero), and magnitude of p-values (which frequently approached 1) also suggest the reason we did not detect associations is because they do not exist or are so small as to be clinically meaningless.

Conclusion

The present findings are consistent with the conclusion of Wildes et al. (2017) that the 'severe and enduring' AN construct lacks predictive validity in terms of response to CBT-E. Individuals with the most severe and long-lasting AN symptoms did just as well in outpatient CBT-E as any other patient. These findings offer hope for individuals affected by AN, and are a timely reminder to clinicians to administer evidence-supported treatments such as CBT-E, regardless of duration or severity of illness.

Footnotes

[1] This is also referred to in the literature as covariance pattern modelling, mixed-effect repeated measures (MMRM), or generalised least square (GLS).

[2] Mean EDE-Q Global for Australia community sample is 1.52 (SD = 1.25; Mond et al., 2004)

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Conflict of interest

None

Ethical standards

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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Table 1

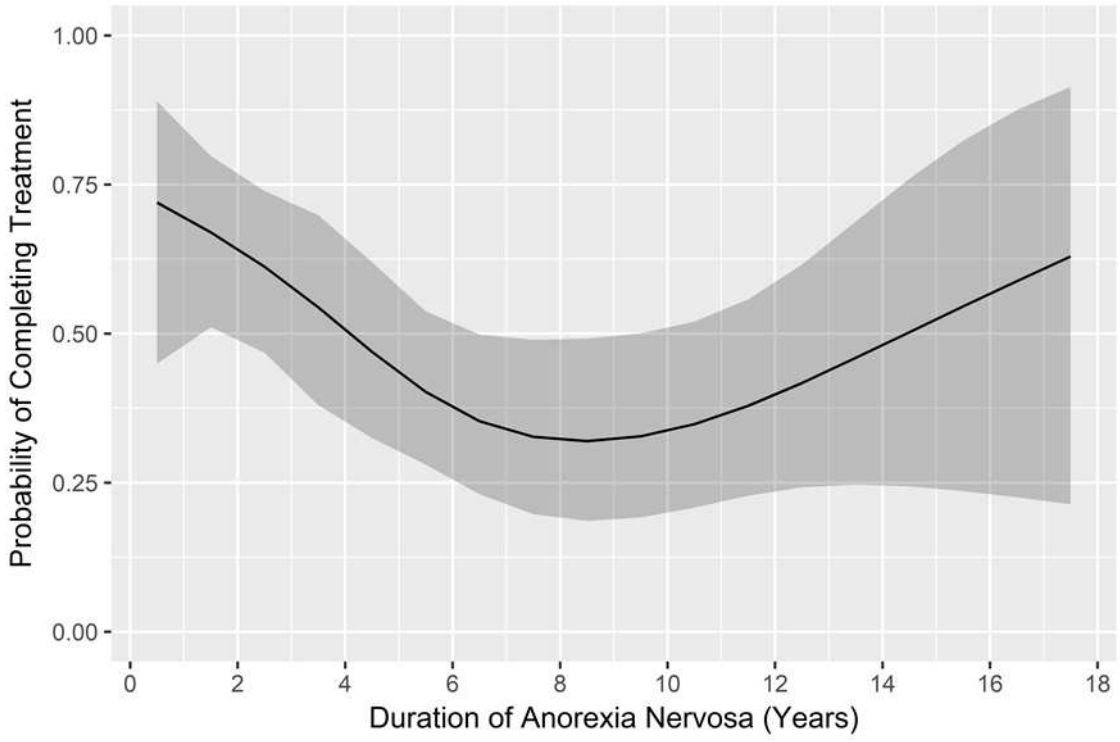
Pre-Treatment Demographic Characteristics

Characteristic	%
Age (years)	22 [18, 25]
Female	97.0
Australian born	76.9
Employed	56.0
Relationship Status	
Single	74.6
Married / Defacto	20.2
Other	5.2
Highest Level of Education Completed	
Less than Year 12	30.9
Year 12	37.4
Trade / Technical	8.1
Tertiary	23.6
Prior History of Psychological Treatment	91.8
History of Psychiatric Hospitalization	55.2
Attempted Suicide	24.6
Engaged in Other Self Harm	44.0
Taking Psychiatric Medication	47.1
Illness Duration (years)	5 [3, 12]
Body Mass Index (BMI)	16.8 (1.5)
EDE Global Score	3.7 (1.3)
EDE-Q Global Score	3.9 (1.4)
QLESQ	45.7 (18.7)

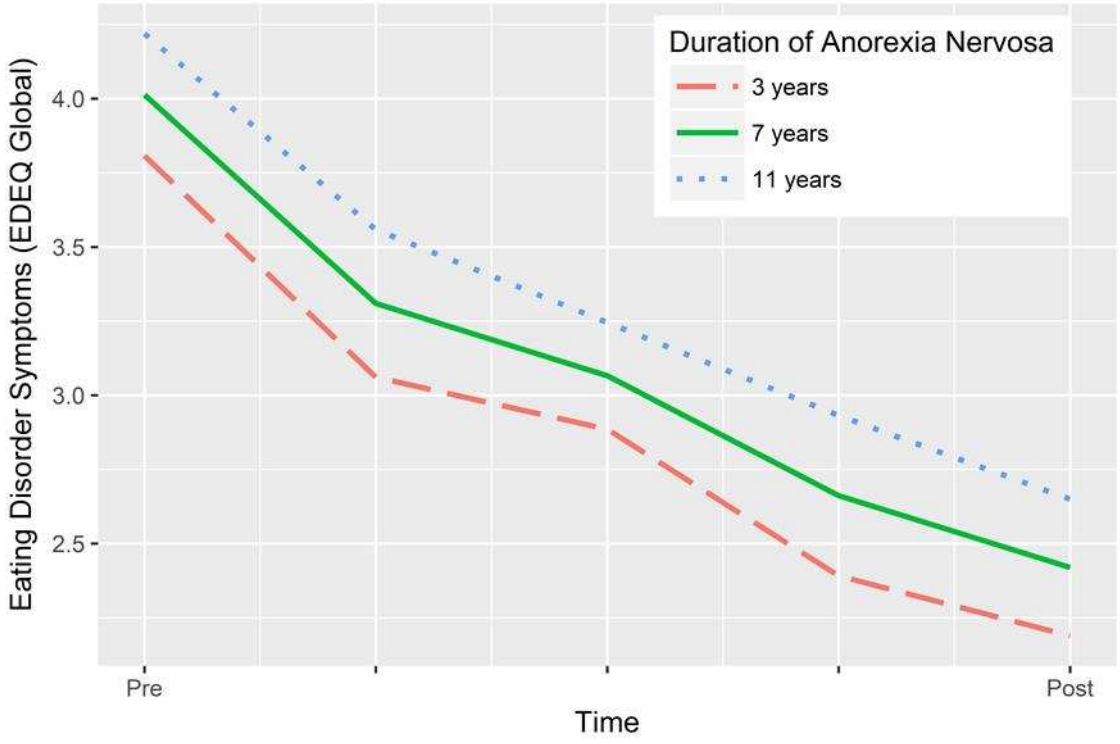
Note. The median and interquartile range (lower quartile, upper quartile) have been reported for age and illness duration as those variables were skewed. Means and standard deviations are reported for BMI, EDE, EDEQ and QLESQ. All other numbers represent percentages. EDE = Eating Disorders Examination. EDE-Q = Eating Disorder Examination Questionnaire. QLESQ = Quality of Life Enjoyment and Satisfaction Scale – Short Form.

Figure 1. Relationships between duration of Anorexia Nervosa and treatment outcome

a) Association Between Duration and Treatment Completion



b) Association Between Duration and Change in Eating Disorder Symptoms



Note. In upper panel, the shaded area represents 95% confidence band.

Figure 2. Relationship between eating disorder symptom severity, as measured by the Eating Disorder Examination (EDE) global score, and change in body mass index (BMI) during the first five sessions of treatment.

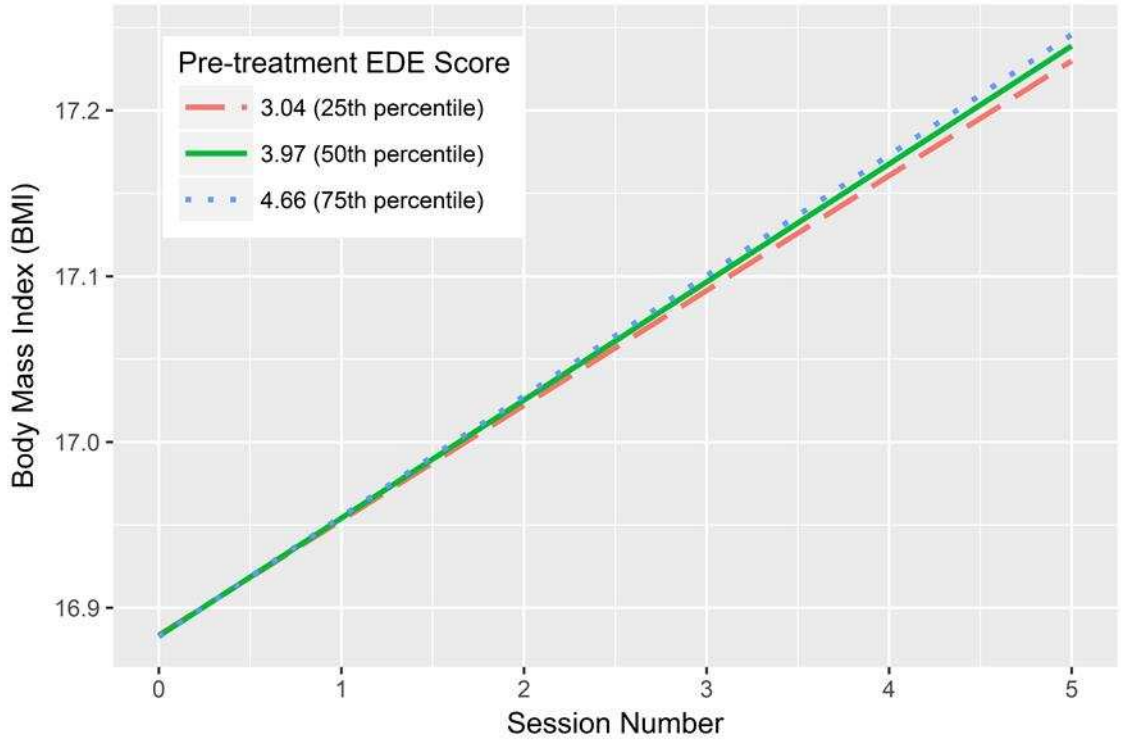
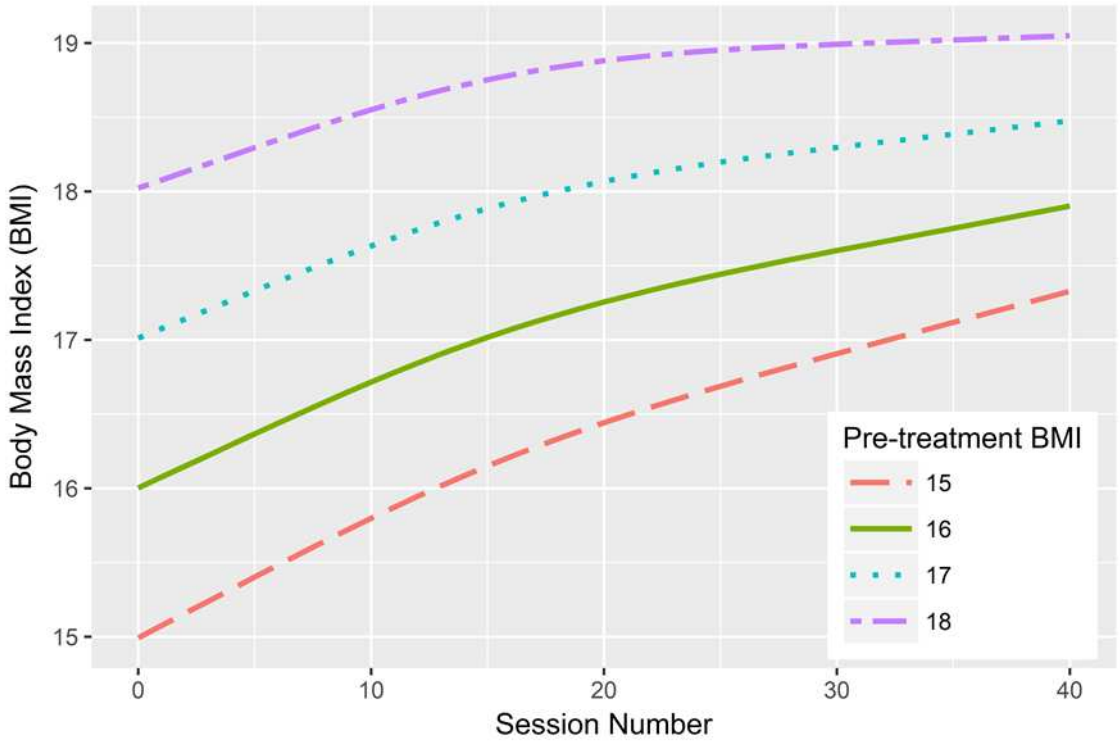


Figure 3. Relationships between severity of symptoms, as measured by pre-treatment Body Mass Index (BMI), and treatment outcome

a) Association Between Pre-treatment BMI and Change in BMI During Treatment



b) Association Between Pre-treatment BMI and Quality of Life

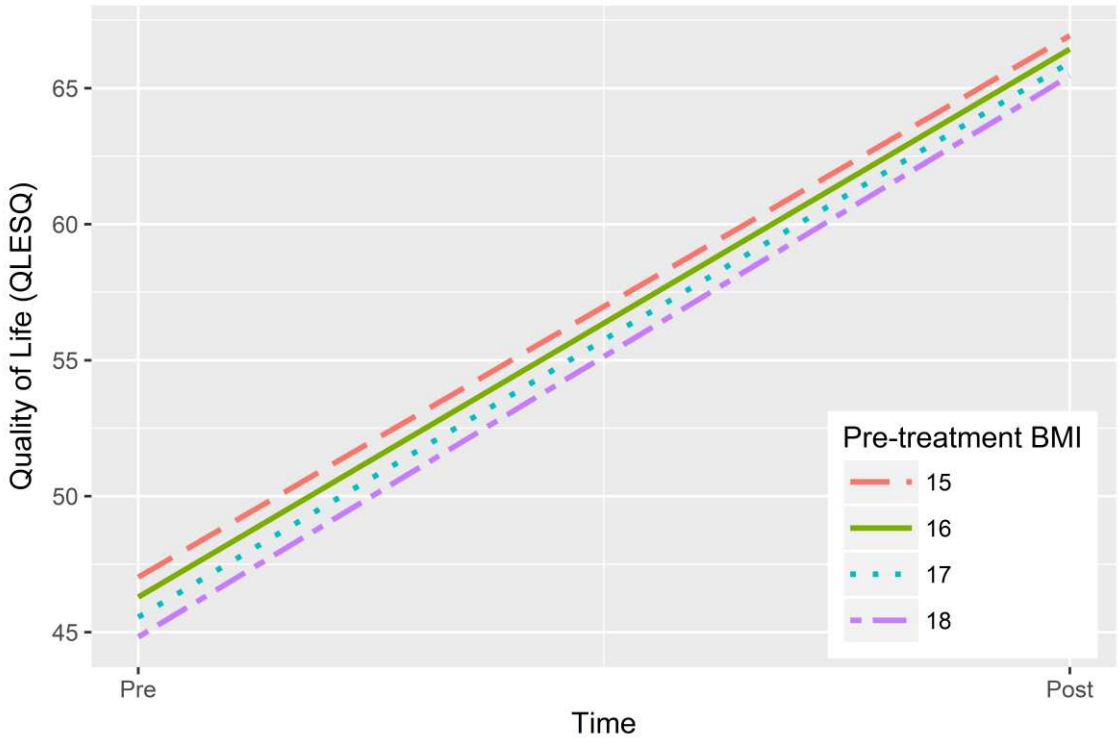
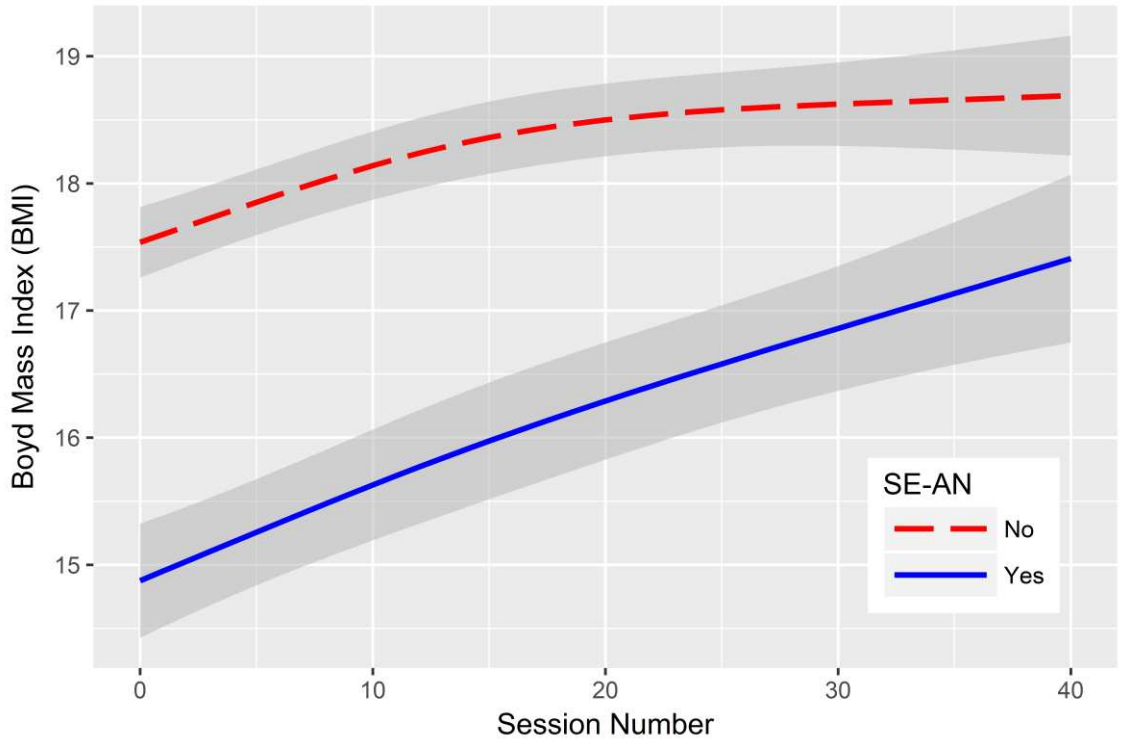


Figure 4. Relationship between Severe and Enduring Anorexia Nervosa (SE-AN) and change in Body Mass Index (BMI) during treatment. Participants with a BMI at pre-treatment < 16 were classified as having SE-AN; those with BMIs ≥ 16 were classified as not having SE-AN.



Note. The shaded areas represent 95% confidence bands.