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Body image flexibility: A predictor and moderator of outcome in transdiagnostic outpatient eating disorder treatment

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Abstract

Objective: Predictors of attrition and predictors and moderators of outcome were explored in a transdiagnostic sample of patients who received ten-session Cognitive Behavioral Therapy (CBT-T) for non-underweight eating disorders. Body image flexibility, a protective positive body image construct, was hypothesized to be a significant moderator.

Method: Data from two case series were combined to form a sample of 78 participants who received CBT-T. Baseline measures of body image, negative affect, personality, and motivation were included as potential predictors. Global eating disorder psychopathology at each assessment point (baseline, mid- and post-treatment, 1- and 3-month follow-up) was the outcome variable. Predictors of attrition were assessed using logistic regression, and multi-level modelling was applied for predictors and moderators of outcome.

Results: Body image flexibility emerged as the strongest predictor and moderator of global eating disorder psychopathology, followed by body image avoidance. Body checking, negative affect, personality beliefs and self-efficacy were significant predictors of global eating disorder psychopathology.

Discussion: Higher body image flexibility predicted lower global eating disorder psychopathology at every assessment point. Further research is required to replicate findings and explore the benefit of focusing on positive body image in treatment.

Key Words: Eating disorders; cognitive-behavioral therapy; moderators; predictors; body image flexibility.

The importance of body image flexibility in predicting outcome in transdiagnostic outpatient eating disorder treatment

Body image flexibility (BIF) is the ability to accept and experience both positive and negative thoughts, beliefs, and feelings about one's body, and is considered to be a protective factor for physical and psychological wellbeing (Sandoz, Wilson, Merwin, & Kellum, 2013). Improvements in BIF appear to be associated with positive outcomes in eating disorder symptoms, quality of life, and general mental health (Butryn et al., 2013), even after controlling for general psychological flexibility (Lee, Ong, Twohig, Lensegrav-Benson, & Quakenbush-Roberts, 2017). However, these studies assessed change simultaneously, not allowing for causal interpretations. Only one study (adolescent sample) shows prospectively that pre-treatment flexibility predicts post-treatment quality of life and eating disorder risk, when controlling for baseline levels of these variables (Bluett et al., 2016). The role of BIF in predicting treatment outcomes still needs to be tested in adults with eating disorders.

While cognitive behavior therapy for eating disorders (CBT-ED) does not explicitly target BIF, it does address two key behavioral manifestations of image disturbance - body avoidance (avoidance of mirrors, weighing, tight clothing) and checking (overuse of mirrors, pinching or measuring body parts) (Amin, Strauss, & Waller, 2012). While both behaviors are considered to be risk and maintenance factors for eating disorders (Amin et al., 2012), no study has evaluated whether either influences treatment outcomes.

The aim of this study was to determine whether these three aspects of body image predict and moderate the impact of cognitive-behavioral treatment (Waller, Tatham, & Turner, 2016) considering their roles alongside other, known predictors of treatment outcome (negative outcome, personality disorder pathology, and motivation. First, it is

hypothesized that motivation will be a significant predictor of drop-out (Vall & Wade, 2015). Second, it is hypothesized that higher levels of BIF and lower levels of body image avoidance, body checking, negative affect, personality beliefs, and motivation will be significant predictors of variance in global eating disorder psychopathology over the course of treatment. Third, it is hypothesized that only the body image variables will significantly interact with time to result in greater decreases in global eating disorder psychopathology over the course of treatment.

METHOD

Participants

Data from two case series were combined to explore treatment predictors and moderators, resulting in 105 participants being assessed for suitability (see **Supplementary Figure 1**). Exclusion criteria included: any severe physical and/or psychiatric condition that would interfere with treatment; already receiving eating disorder psychotherapy; difficulty speaking/understanding English. Nine participants were ineligible and four chose not to continue past assessment, thus 92 participants were offered, and 78 (85%) started, treatment. In this latter group, mean age was 27.19 years (*SD* = 9.60; range 15.69 – 68.97), mean BMI was 26.78 (*SD* = 7.84; range 18.20 – 52.40), the majority were female (92.3%) and Caucasian (88.5%). Diagnosis, using DSM-5 criteria, was assessed at baseline and confirmed in supervision.

Measures

Participants completed measures at baseline (assessment session), mid-treatment (session 4), post-treatment (session 10), and after one- and three-month follow-up.

Weight and frequency of disordered eating. Height was measured at baseline

and weight at each therapy session. Frequency of objective bingeing, vomiting, and laxative abuse were calculated each session (obtained from daily food intake diaries and clarified during session). Laxatives and vomiting were combined to create a purging score, given the low frequency of the former.

Global eating disorder psychopathology. The 22-item global eating disorder psychopathology from the Eating Disorder Examination – Questionnaire (EDE-Q; Fairburn & Beglin, 2008) was used. The EDE-Q global score has good psychometric properties (Kelly, Carter, Zuroff, & Borairi, 2013; Mond, Hay, Rodgers, & Owen, 2006). Internal consistency in the current study was .90.

Body image flexibility. The Body Image Acceptance and Action Questionnaire (BI-AAQ; Sandoz et al., 2013) is a 12-item measure of BIF. Higher scores indicate greater BIF. It has strong psychometric properties (see Pellizzer, Tiggemann, Waller, & Wade, 2017). Internal consistency in the current study was .92.

Body image avoidance. The Body Image Avoidance Questionnaire (BIAQ; Rosen, Srebnik, Saltzberg, & Wendt, 1991) assesses the avoidance of body image related situations. The response format was changed from a 6-point to 7-point scale in the present study to match that of the BI-AAQ. Psychometric properties vary across studies due to differing factor structures (see Pellizzer et al., 2017). Internal consistency in the current study was .90. The 14-item version was recently found to have superior fit indices compared to other models (Pellizzer et al., 2017) and thus was used for this study.

Body checking. The Body Checking Questionnaire (BCQ; Reas, Whisenhunt, Netemeyer, & Williamson, 2002) is a 23-item measure of body checking behaviours. The response format has been changed from a 5-point to 7-point scale in the present study to match that of the BI-AAQ. Higher scores indicate greater body checking. Psychometric

properties vary across studies (see Pellizzer et al., 2017). Internal consistency in the present study was .96.

Negative affect. The Depression Anxiety and Stress Scales (DASS21; Lovibond & Lovibond, 1995) is a 21-item measure and a total higher score indicates greater negative affect. The scale has good psychometric properties. Internal consistency was similar in the current study (α = .94 total score).

Personality beliefs. The 65-item Personality Beliefs Questionnaire (PBQ-SF; Butler, Beck, & Cohen, 2007), based on DSM-5 personality diagnoses, yields a total score which increases to indicate greater personality psychopathology. The measure has good psychometric properties (Butler et al., 2007). Internal consistency was strong in the current study (α = .96 total score).

Motivation and self-efficacy. Two 100-point visual analogue scales: "How ready are you to change?" and, "If you decided to change, how confident are you that you would succeed?" assessed motivation and self-efficacy (Feld, Woodside, Kaplan, Olmsted, & Carter, 2001). Both items are sensitive to changes in motivation and have predicted outcome in treatment studies (see Steele, Bergin, & Wade, 2011).

Procedure

Participants were recruited from consecutive referrals to the Flinders University Services for Eating Disorders outpatient clinic, after giving informed consent. They received weekly therapy for ten weeks. Seven trainee psychologists administered the treatment under weekly or bi-weekly supervision by two authors (GW and TW). Two adolescents were included (assent and parent consent obtained), as Family Based Treatment was not appropriate due to cost and family structure, and given the efficacy of CBT for adolescents with BN.

Statistical Analyses

Analyses were conducted with IBM SPSS Version 22. Multi-level modelling (MLM) was used, enabling inclusion of cases with missing data via maximum likelihood estimation. Little's Missing at Random (MAR) test was used to assess whether data were missing at random and predictors of attrition were assessed using binomial logistic regression. Predictors were standardized to aid interpretation.

A predictor was considered to be a significant moderator if the size, sign, or strength of the effect of time on the changing scores of the dependent variable (EDE-Q global score) was dependent on the predictor (Kelly et al., 2013). Seven predictors were examined: BIF, body image avoidance, body checking, negative affect, personality beliefs, readiness to change, and self-efficacy. Models included a fixed- and random-effects portion, to model constant and variable effects across participants. Intercept and time were included as random effects and an autoregressive (AR[1]) structure for random error was applied. The unconditional (null) "Model 1" and conditional "Model 2", where time was the sole predictor, were first examined to confirm there was significant variance in global eating disorder psychopathology and whether time explained some of that variance (i.e., a significant change in psychopathology occurred over time). "Model 3", a conditional model, included the main effects of time and the predictor, and a two-way interaction between time and predictor. If a significant interaction existed, and to enable graphing, a dichotomous variable of the predictor was created using a median split, and each analysis was rerun using the dichotomous variable to generate the mean and standard error for the EDE-Q at each time point for low and high values of the predictor.

RESULTS

Preliminary Analyses

All variables were normally distributed except purging. Little's test was non-

significant $\chi^2(116) = 115.75$, $p = .49$, indicating data were missing completely at random.

Predictors of Attrition

Attrition (starting treatment but terminating prematurely) occurred for 33/78 participants (42.31%). When considered individually, two variables emerged as significant predictors of attrition: negative affect and personality psychopathology (**Supplementary Table 1**).

Predictors of Eating Disorder Symptoms

Table 1 presents the coefficients for all fixed effects in the null model and conditional models predicting global eating disorder psychopathology. Model 1 shows significant within- and between-subject variance in global eating disorder psychopathology while Model 2 demonstrates a significant contribution of time to the decrease in eating psychopathology. Model 3 results show that, with the exception of readiness to change, all variables were significant predictors of variance in eating psychopathology in the expected directions in addition to time. The greatest impact was that of BIF, followed by body image avoidance, negative affect, body checking, personality beliefs, and self-efficacy.

Only two significant interactions with time emerged - BIF, $F(1, 46.34) = 5.97$, $p = .02$, and body image avoidance, $F(1, 167.46) = 6.24$, $p = .01$. Participants with high BIF had significantly lower eating disorder symptoms at every time point and participants with lower body image avoidance had significantly lower eating disorder symptoms at baseline, mid-treatment, and post-treatment (see **Figure 1**). Fit indices support the BIF model as being closest to the true model.

Analyses were rerun sequentially including age, duration of eating disorder, and negative affect as covariates. Only negative affect significantly contributed to outcome, but it did not change the pattern of significance of other variables (with the exception of

personality beliefs, which was no longer a significant predictor). Readiness to change became a significant predictor when duration was included in the model.

DISCUSSION

Contrary to the first hypothesis, neither readiness to change or self-efficacy were significant predictors of dropout in this brief version of CBT-ED. The second hypothesis was partially supported, as all variables (excluding readiness to change) were significant baseline predictors (in the predicted directions) of changes in global eating disorder psychopathology over treatment. The third hypothesis was also partially supported, as BIF and avoidance (but not checking) at the start of treatment were moderators between time and global eating disorder psychopathology over the course of treatment. BIF was the stronger predictor, with higher flexibility predicting significantly better outcomes at each assessment point. Less body image avoidance was associated with significantly better outcomes over treatment, though not follow-up. The focus on overcoming body image avoidance during CBT-ED might allow patients higher in avoidance to 'catch up' by follow-up.

While other variables were not moderators, the majority were significant predictors of variance in global eating disorder psychopathology (Linardon, Garcia, & Brennan, 2017; Vall & Wade, 2015), with the exception of readiness to change. It has previously been suggested and found that behavioral change, rather than stated motivation, is a more powerful predictor of outcome (Waller, 2012). Thus, the use of CBT-T (which strongly emphasizes early behavioral change) might make baseline motivational measures irrelevant to outcome.

Further research is needed to address limitations. CBT-T is a new, shorter therapy that has thus far only been evaluated with case series. Future investigation of

moderators using a randomized controlled design with a longer follow-up and larger sample size is needed to confirm the importance of body image variables as a moderator of treatment. Patients with a BMI under 17.5 were not included, so findings cannot be generalized to this population.

Future treatment studies should explore whether focusing on BIF increases rates of remission and good outcome, either by modifying treatment protocols or using adjunct therapies. For example, imagery rescripting (IR) has been found to result in significantly higher BIF compared to a cognitive dissonance intervention in a sample of body-dissatisfied young women (Pennesi & Wade, 2018). Improvements in BIF post-treatment have been found with a number of treatments, including CBT, Acceptance and Commitment Therapy (ACT), and mindfulness (Bluett et al., 2016; Butryn et al., 2013; Lee et al., 2017).

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Table 1

Fixed effect estimates and model fit indices for models predicting eating disorder symptoms.

	Intercept	Time	Predictor	Predictor * Time	AIC	BIC	Within-Subjects Variance	Between-Subjects Variance
Model 1	2.75 (.13) **				915.43	926.06	1.56 (.16) **	.82 (.23) **
Model 2	4.33 (.12) **	-.65 (.05) **			741.04	758.75	.70 (.07) **	.05 (.01) **
Model 3:								
BI-AAQ	4.30 (.10) **	-.66 (.05) **	-.92 (.11) **	.12 (.05)*	664.49	689.23	.53 (.06) **	.04 (.02)
BIAQ	4.32 (.10) **	-.65 (.05) **	.81 (.11) **	-.13 (.05)*	686.87	711.63	56 (.06) **	.04 (.01) **
BCQ	4.32 (.11) **	-.66 (.05) **	.66 (.12) **	-.08 (.06)	703.58	728.35	.62 (.06) **	.04 (.01) **
DASS	4.33 (.11) **	-.65 (.05) **	.73 (.11) **	-.08 (.05)	673.37	697.99	.58 (.06) **	.03 (.01) **
PBQ	4.36 (.11) **	-.67 (.05) **	.57 (.12) **	-.10 (.06)	716.30	741.06	.64 (.07) **	.04 (.01) **
Readiness to Change	4.32 (.12) **	-.65 (.05) **	-.31 (.12)	.05 (.05)	725.71	750.36	.69 (.07) **	.05 (.01) **
Self-Efficacy	4.32 (.11) **	-.65 (.05) **	-.50(.12) **	.06 (.05)	711.14	735.79	.66 (.07) **	.04 (.01) **

Note. * $p < .05$; ** $p < .001$.

Predictors were only considered significant if < .01 to correct for multiple comparisons.

Estimate (Standard Error).

BI-AAQ = Body Image Acceptance and Action Questionnaire; BIAQ = Body Image Avoidance Questionnaire; BCQ = Body Checking Questionnaire; DASS = Depression Anxiety and Stress Scales; PBQ = Personality Beliefs Questionnaire

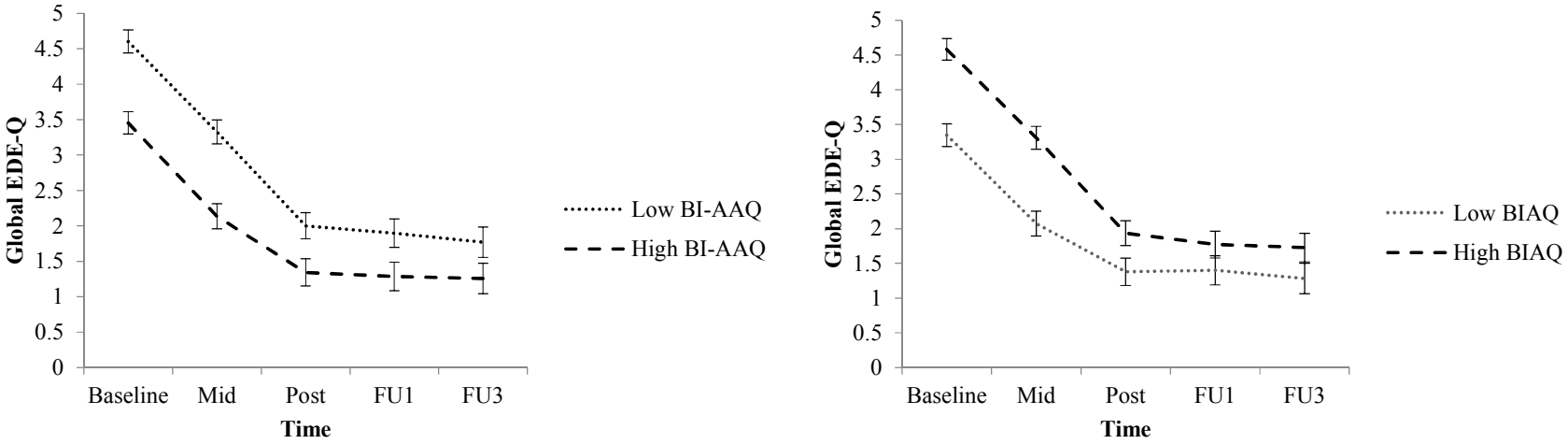

Figure 1. Body image flexibility (BI-AAQ) and Body image avoidance (BIAQ) x Time predicts rate of change in eating disorder symptoms (EDE-Q).

Note. The median was used to split scores into high and low. High scores are 31 and above for body image flexibility and 53 and above for body image avoidance.

Supplementary Table 1

Binary logistic regression analyses assessing predictors of attrition

Variable	Completers *M (SD)*	Attrition *M (SD)*	OR (95% CI)
Body image flexibility	30.66 (12.40)	32.41 (14.04)	1.15 (0.72 – 1.82)
Body image avoidance	50.58 (15.51)	53.69 (19.17)	1.20 (0.76 – 1.91)
Body checking	86.26 (26.84)	92.81 (37.10)	1.24 (0.78 – 1.96)
Negative affect	26.08 (13.74)	33.34 (14.08)	**1.72 (1.05 – 2.81)**
Personality beliefs	83.19 (36.17)	111.34 (47.95)	**2.04 (1.21 – 3.45)**
Readiness to Change	81.81 (20.88)	75.53 (17.97)	0.72 (0.45 – 1.16)
Self-Efficacy	63.70 (22.53)	62.03 (21.91)	0.93 (0.59 – 1.47)

Note.

Significant analyses are bolded.

Means and standard deviations for original, unstandardized predictors.

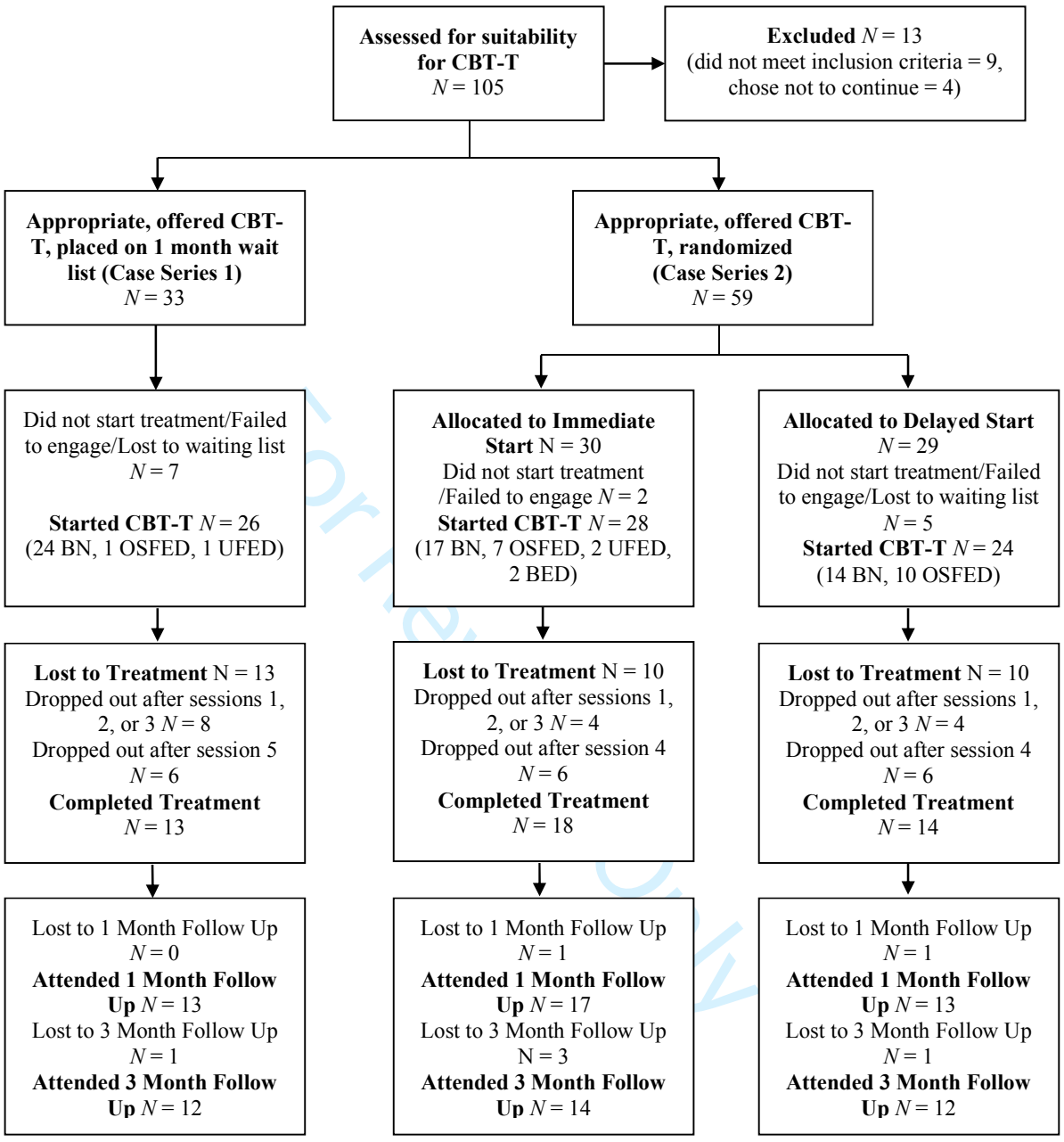

Figure 1. CONSORT diagram

Note. BN = Bulimia Nervosa, OSFED = Other Specified Feeding and Eating Disorder, UFED = Unspecified Feeding and Eating Disorder, BED = Binge Eating Disorder.