Binge-eating disorder: Associations between Self-Criticism and Eating Disorder Psychopathology

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Abstract

In the last few years, Binge-eating disorder (BED) has been more and more recognized as a standalone eating disorder (ED). Research has mainly concentrated on BED symptomology and investigated which cognitive and behavioral aspects are part of this specific ED. Treatment methods have been developed and show relatively good short- and medium-term effectiveness in reducing dropout rates and increasing abstinence from binge-eating episodes. Nevertheless, still approximately half of the BED patients do not recover with the help of the current treatment methods. One reason for this may be that some factors such as self-criticism, which may maintain BED psychopathology, have not been researched in depth and thus not been included in the current treatment methods. The current study used a sample of $N = 125$ participants who were officially diagnosed with BED, to investigate the relationship between self-criticism and BED psychopathology. Two forms of self-criticism, the hated self and the inadequate self, were related to cognitive aspects of BED, such as eating and shape concerns, as well as behavioral markers of BED, otherwise known as binge-eating behavior, while controlling for possible confounding variables, such as self-esteem. Results showed that only the hated self seems to positively affect the cognitive aspects of BED. Neither self-esteem nor the inadequate self seemed to influence BED psychopathology. Binge-eating behavior seemed to be affected by none of the forms of self-criticism nor by self-esteem. The findings of the current study show that self-criticism is a potential maintaining factor for BED and that, especially the hated self, might play a more important role in BED psychopathology than variables such as self-esteem. These findings help to further understand BED psychopathology and are a first step towards developing and customizing treatment possibilities for patients suffering from BED.

Binge-Eating Disorder: Associations between Self-Criticism and Eating Disorder Psychopathology

Even though Binge-eating disorder (BED) has existed for a while, it has only been recognized as a distinct Eating Disorder (ED) in 2013 (American Psychiatric Association, 2013) and has, since then, received increasing attention (de Zwaan, 2001). The main diagnostic criterion for BED is the recurring appearance of binge-eating episodes which are characterized by the intake of large amounts of food within a short time period without being able to stop or control their so-called "binge" (Brownley et al., 2016). In contrast to other EDs such as bulimia nervosa, in which binges are followed by purging behavior like throwing up the consumed food or excessive exercising, in patients with BED the binge-eating episodes are not followed by compensatory behaviors (Brownley et al., 2016). Because patients with BED do not compensate for binges, they tend to be overweight or obese (de Zwaan, 2001). Subsequently, BED is often associated with other chronic physical problems such as cardiometabolic disorders and chronic pain conditions (Kessler et al., 2013).

BED does not only affect the physical health but is also intertwined with the mental health of affected individuals (Kessler et al., 2013). In a study among obese women, Bulik et al. (2002) found co-morbidities with other psychological disorders including phobias, major depressive disorder, panic disorder, and alcohol dependence. Some studies also suggest a significant association of BED with generalized anxiety disorder (Fontenelle et al., 2003; Marcus et al., 1990).

BED is a relatively common but difficult to treat disorder. According to a survey in middle- to high-income countries, BED has a lifetime prevalence of 1.4 percent (Kessler et al., 2013). Another survey, among US households, even estimated a lifetime prevalence of 3.5 percent among women and 2.0 percent among men, making it the most common ED in the USA (Hudson et al., 2007). Because BED involves behavioral and cognitive aspects, the treatment often makes use of a combination of interventions (Brownley et al., 2016). Cognitive-

Behavioral Therapy (CBT), Dialectic Behavior Therapy (DBT), and Interpersonal Psychotherapy are some of the main treatment methods for BED. Often pharmacological treatment is added to the above-mentioned psychological and behavioral treatments (Brownley et al., 2016). Several studies have investigated the effectiveness of the common treatment methods. A meta-analysis, performed by Hilbert et al. (2019), showed that psychotherapy, self-help treatments as well as pharmacological treatment reduced binge-eating episodes among BED patients. Psychotherapy showed higher abstinence odds and lower drop-out rates, compared to self-help interventions or active control groups (Hilbert et al., 2019). Another metanalysis by Hilbert et al. (2020), examining the longer-term effectiveness of BED treatment, showed that abstinence rates still range between 45 and 53% after 12-months of treatment, showing good medium-term effectiveness. Intervals longer than 12 -months, however, still lack research (Hilbert et al., 2020). Even though BED treatments already show short-term as well as medium-term effects on abstinence rates, still only about half of the patients are helped with the common treatment methods (Hilbert et al., 2019). Because of this, it is important to find ways to improve the treatment process further, decrease the dropout rates, and achieve better treatment results. To do so, it is important to get a deeper understanding of the disorder and the psychological mechanisms that are involved in the maintenance and relapse of BED.

Some research has already been done on the complex structure of BED psychopathology. BED psychopathology can be divided into behavioral and cognitive aspects (Fairburn & Beglin, 1994). Binge-eating behavior, on the one hand, is the main behavioral aspect of BED psychopathology (Peterson et al., 2007). Concerns and biases about body shape and eating patterns, on the other hand, fall within the cognitive aspects of BED (Peterson et al., 2007). Shape concern relates to how people perceive their outer appearance, how they evaluate their looks, and how this affects their self-view. Eating concern is associated with constant thoughts about eating, eating in secret, and feeling guilty about eating (Peterson et al., 2007). Constant worry about eating patterns belongs to these types of concerns.

Although the cognitive and behavioral aspects of BED psychopathology have been explored before, only little is known about psychological factors which are associated with ED pathology and might act as antecedents or maintaining factors of BED (Duarte et al., 2014). Exploring these factors further, could lead to a better understanding of BED, and help improve the treatment possibilities. One maintaining factor, which has been explored before and has been implemented into the treatment of EDs, is self-esteem. Self-esteem in general describes the "positive or negative attitude towards the self" (Rosenberg et al., 1995, p. 141). It is closely connected to the worth and value someone gives to themselves (Blascovich et al., 1991). According to Fairburn et al. (2003), low self-esteem plays an important role in the treatment efficacy in EDs as it creates hopelessness among the patients and makes it hard for patients to recognize change and success. Thus, different treatment forms (e.g. Enhanced Cognitive-Behavioral Therapy) have been adapted to increase self-esteem, making it very relevant to the current treatment practice (Fairburn et al., 2009). Nevertheless, one factor, which seems to be involved in the development and maintenance of BED and has not been explored in detail, is self-criticism (Duarte et al., 2014; Kelly & Carter, 2013). Self-criticism is commonly associated with psychopathologies such as depression, along with emotions such as shame and guilt (Kelly & Carter, 2013). It is defined as "the tendency to engage in negative self-evaluations that result in feelings of worthlessness, failure, and guilt when expectations are not met" (Naragon-Gainey & Watson, 2012, p. 94). In other words, self-criticism is known as a combination of having unproportionally high standards towards the self, on the one hand, and being overly hostile with the self if these standards cannot be achieved, on the other hand (Whelton et al., 2007). Self-bashing (Shahar, 2017) and self-devaluation (Gilbert, Clarke, Hempel, Miles, & Irons, 2004) are often used synonymously to self-criticism.

Self-criticism has often been measured as a single construct, yet research shows that it can be measured as several components. Gilbert et al. (2004), for instance, found self-criticism to have two major components: the hated self and the inadequate self. Each of the components

refers to a different part of self-criticism. The hated self refers to the feeling of wanting to hurt the self, being disgusted by the self, and actively hating the self. It describes the more cruel and harsh part of self-criticism and involves self-punishment (Duarte et al., 2014). The inadequate self refers to critiquing the self, dwelling on mistakes, and feelings of inferiority. This component is associated with statements about remembering and being haunted by failings and difficulties to control anger and frustration at the self (Gilbert et al., 2004).

Some studies were conducted, which explored self-criticism regarding EDs in general. Kelly and Carter (2013) for example investigated the role of shame as a mediator between self-criticism and ED pathology. In an analysis with multiple mediators, they found a significant association between self-criticism and ED pathology, which was mediated by shame (Kelly & Carter, 2013). Noordenbos et al. (2014), furthermore, explored the association between critical inner voices, which are commonly associated with self-criticism, and ED psychopathology. Their results showed that 94.5 % of ED patients heard a critical inner voice, whereas only 29.3 % of the healthy control group reported hearing this voice. According to the same study, not only the occurrence of hearing a critical inner voice differed between ED patients and the control group, but the frequency of hearing this voice was also significantly higher in ED patients (Noordenbos et al., 2014).

Even though previous research showed the importance of self-criticism in different psychopathologies, there are only very few studies that examined self-criticism within BED patients. Dunkley et al. (2010), for example, explored the role of self-criticism as a mediator between childhood maltreatment and BED. They found self-criticism to be a mediator between emotional abuse during childhood and depressive symptoms as well as body dissatisfaction in patients with BED (Dunkley et al., 2010). Dunkley and Grilo (2007) found an effect of self-criticism on the over-evaluation of shape concern, which was partially mediated by self-esteem and depressive symptoms. While most of these studies measured self-criticism as a single component, there seem to be even fewer studies that investigate both forms of self-criticism in

relation to BED. Duarte et al. (2014) investigated the associations between body image shame, both forms of self-criticism, and binge-eating behavior in a community sample. Their study showed that the hated self and the inadequate self were positively correlated with body image shame as well as binge eating behavior. While body image shame seemed to be associated with both forms of self-criticism equally, binge-eating seemed to be more associated with the hated self (Duarte et al., 2014). Furthermore, they found the hated self to be a partial mediator between body image shame and binge-eating behavior. A second relevant study by Duarte et al. (2016) investigated the differences between different ED psychopathologies and, among other things, explored the levels of the hated self and the inadequate self in BED patients. In this study, they did not find a significant difference in self-criticism levels between the different EDs. Nevertheless, the most important finding was that, both forms of self-criticism were positively correlated with ED psychopathology. Lastly, Palmeira et al. (2017) investigated the mediating role of both forms of self-criticism between internalized weight stigma and binge-eating in a clinical sample. They found both forms of self-criticism to be correlated with binge-eating, however, only the hated self acted as a mediator between the two variables (Palmeira et al., 2017). These studies underline the importance of the hated self as well as the inadequate self in regard to the cognitive as well as the behavioral aspects of BED psychopathology.

To summarize, BED is a highly prevalent disorder among today´s population. Although treatments show relatively good short- and medium-term effectiveness, still about 50% of patients fail to achieve recovery. Hence, exploring and researching the psychological constructs involved in BED psychopathology is highly relevant to further increase the treatment effectiveness. Cognitive and behavioral aspects of the disorder have already been researched in depth. The field, however, still lacks insight on factors that may play a role in the maintenance of BED. Self-criticism is one of these factors, which needs to be further researched. Some research (e.g. Duarte et al., 2014) has shown that both forms of self-criticism are associated with cognitive as well as behavioral aspects of BED psychopathology. Nevertheless, important

variables such as self-esteem, which might confound this relationship, have been neglected in previous research.

The current study aimed to further investigate the relationship between the two forms of self-criticism (i.e. the hated and inadequate self) and ED psychopathology in BED patients and to evaluate whether self-criticism may be considered as a maintaining factor for BED. In contrast to previous research (e.g. Duarte et al., 2014) the current study will not only investigate the direct associations between the two forms of self-criticism and BED psychopathology but will additionally include other relevant variables such as self-esteem, which may confound the relationship between self-criticism and ED pathology.

Firstly, the levels of self-criticism in BED patients were investigated. It was expected that (1) the mean levels on both self-criticism scales are significantly higher for BED patients compared to a community sample.

Next, the associations between both forms of self-criticism and the behavioral and cognitive aspects of BED psychopathology were examined in a two-step regression analysis. In the first step possible confounding variables, which might explain the variance in BED psychopathology, were added as independent variables. In the second step, the hated self and the inadequate self were added to the regression analysis. This way it was possible to examine whether self-criticism led to additional explained variance in BED psychopathology. Regarding the binge-eating behavior, it was expected that both forms of self-criticism are positive predictors of (2) objective binging. Regarding the cognitive aspects, it was expected that both forms of self-criticism are positive predictors of (3) shape concern and (4) eating concern.

Methods

Design and Procedure

The current study used a cross-sectional research design. The data for the current study was collected among patients who applied for outpatient treatment at Stichting Human Concern, a treatment center for EDs in the Netherlands. Inclusion criteria for the study were that the participants are above the age of 16, which is the minimum age to apply for treatment. Furthermore, the participants had to be diagnosed with BED and had to give informed consent for the participation. The data collection took place between January 2015 and July 2020.

Each participant was diagnosed with BED by a psychiatrist in collaboration with a multi-professional intake team. Using a semi-structured interview, data about the demographics of the participants as well as further information about their history and disorder was collected. During the intake procedure the age, gender, educational level, living situation, and body mass index (BMI kg/m2) of the participants were recorded. Additionally, measures such as the start age of the ED, duration of the ED, the presence of co-morbid psychiatric disorders, and earlier treatments for a psychiatric disorder were included.

All participants were informed about the purpose of the study and had to give informed consent before participation. The consent form stated that they could end their participation at any given moment. The study was approved by the BMS Ethics Committee of the University of Twente.

To ensure the anonymity of the participant´s data, all patient codes, application dates, and questionnaire fill-in dates were excluded from the data file. Furthermore, birth dates were changed into age groups, specific co-morbid disorders were changed into disorder groups, weight and height measures were excluded (only the BMI was included), and results from open-ended questions were deleted.

Participants

The initial sample consisted of 1332 participants with all types of EDs and informed consent for participation in this study. Because the current study only deals with patients with BED, all patients with anorexia nervosa, bulimia nervosa, and other unspecified feeding or eating disorder were excluded (*n* =1199). Additionally, all patients with missing measures were excluded (*n* = 10). The current study, therefore, used a sample of *N* = 125.

As shown in Table 1 the sample was dominated by female participants. Most patients, with 25.6 % (*n* = 32), belonged to the age group 20-25 years. Table 1 shows the percentages and frequencies of participants per age group. The measured BMI ranged from 18.30 to 59.03 (*M* = 35.15, *SD* = 8.49). The duration of the ED varied between .50 and 47 years, with a mean of 16.23 (*SD* = 11.03). 62.4% of the participants already sought treatment for BED or other psychological problems. Regarding co-morbidity, the highest comorbidity was with mood or anxiety disorder. As shown in Table 1, 36 participants (28.08%) belonged to this group. Participants also showed comorbidities with PTSD (12.0%), personality disorders (7.2 %), neurological development disorders (4.8%), and addictive disorders (3.2%).

Table 1

Frequencies and percentages of Participant´s gender, age group, and comorbidity

		Frequency	Percent
Gender	female	120	98.8
Age group	16 -30	61	48.8
	31 - 50	55	44.0
	51 - 70	9	7.2
Comorbidity	Mood/ anxiety disorder	36	28.08
	PTSD	15	12.0
	Personality disorder	9	7.2
	Neurological development disorder	6	4.8
	Addictive disorder	4	3.2
	Other psychiatric disorder	1	.8

Materials

A set of questionnaires was collected of which the following measures were used for this study: the Eating Disorder Examination Questionnaire (EDE-Q), the Forms of Self-Criticizing/Attacking and Self-Reassuring Scale (FSCRS), and the Rosenberg self-esteem scale.

The EDE-Q, originally developed by Fairburn and Beglin (1994), was used to measure eating disorder psychopathology, including shape concern, eating concern, and binge-eating behavior, using a total of 36 items. Binge-eating behavior, otherwise known as objective binging, was measured using one singular item, namely "On how many of these times did you have a sense of having lost control over your eating (at the time you were eating)?". Eating concern was measured using 4 items. Each item used a scale, ranging from 0 (not a single day) to 6 (every day). An exemplary item for this scale is "Over the past 28 days, on how many days did you had a definite fear of losing control overeating?" The scale showed poor reliability (α = .55). Shape concern was measured using 8 items. Again, a scale from 0 to 6 was used for each item. This scale uses items such as "Have you had a definite fear that you might gain weight?" and showed excellent reliability (α = .85). For all scales, the mean values were used for the analyses. The EDE-Q showed a good concurrent validity, as it showed great overlap with an interview measure for ED pathology (Fairburn & Beglin, 1994). Furthermore, the EDE-Q also showed an acceptable criterion validity as it successfully differentiates between cases and non-cases (Mond et al., 2004).

The two facets of self-criticism were measured with the FSCRS developed by Gilbert and colleagues (Gilbert et al., 2004). The questionnaire included a total of 22 items. All items were measured using a 5-point-Likert-scale, ranging from "not at all like me" to "extremely like me". The hated self was measured using 5 items such as "I have a sense of disgust with myself." (Gilbert et al., 2004, p. 37). It showed good reliability (α = .82). The mean values were

calculated. The scale for the inadequate self included variables like "I think I deserve my self-criticism." (Gilbert et al., 2004, p. 37). It was measured using 9 items and showed good reliability ($\alpha = .84$).

Additionally, self-esteem, age, and duration of the ED were used as control variables. Age was used as a control variable, as it is negatively associated with self-criticism (Kopala-Sibley et al., 2013) and was measured using a single item. Furthermore, one could expect self-criticism as well as BED symptomology to increase as the ED continues over the life of the sufferer, which is why the duration of the ED was used as a control variable. The duration of the ED was assessed by one single item. Lastly, self-esteem was found to be a negative predictor for hearing critical inner voices in EDs (Noordenbos et al., 2014), and thus, was used as a control variable, as suggested by Kelly and Carter (2013). Self-esteem was measured using the Rosenberg self-esteem scale (RSE). The questionnaire measured each item on a 4-point scale (Blascovich et al., 1991) ranging from "strongly disagree" to "strongly agree" and included items such as "On the whole, I am satisfied with myself" (Rosenberg, 1965). Here, high scores indicated high levels of self-esteem. The RSE consisted of 10 Items and showed excellent reliability ($\alpha = .92$) (Rosenberg, 1965).

Data Analysis

Analyses were conducted using the statistical software IBM SPSS Statistics. Descriptive statistics were used to show the levels of the hated and the inadequate self in BED patients as well as the scores for objective binging, shape concern, and eating concern. Furthermore, a Pearson´s Correlation analysis was performed to show the correlations between the forms of self-criticism and the aspects of ED pathology. To compare the self-criticism levels of the current study with those of a community sample a t-test was conducted with the help of an online two-sample t-test calculator by Bobbitt (2020). Lastly, separate two-step regression analyses were performed for objective binges, shape concern, and eating concern. In the first step self-esteem, age, and duration of the ED were used as independent variables, whereas in

the second step the hated self and the inadequate self were added. The assessment of Q-Q plots (see Appendix A) as well as scatter plots (see Appendix B), suggested that the assumptions for linearity, normality, and homoscedasticity were met. Furthermore, there was no VIF score (see Appendix C) above 10 suggesting no collinearity between the independent variables. For binge-eating behavior, $n = 1$ outlier had to be removed.

Results

Table 2 shows the descriptive statistics and Pearson´s correlation for all relevant variables. The hated self ($r = .20$, $p < 0.05$) as well as the inadequate self ($r = .24$, $p < 0.01$) were positively correlated with objective binging, shape concern ($r = .46$, $p < 0.01$; $r = .39$, $p < 0.01$), and eating concern ($r = .41$, $p < 0.01$; $r = .27$, $p < 0.01$).

Table 2

Summary of the Means, Standard Deviations and Pearson´s Correlations of the Hated Self, the Inadequate Self, Eating Concern, Shape Concern, and Binging Behavior

	M	SD	Hated self	Inadequate self	Eating concern	Shape concern	Binging behavior
Hated self	1.57	.97	1				
Inadequate self	2.76	.73	.67**	1			
Eating concern	2.73	1.06	.41**	.27**	1		
Shape concern	4.58	1.20	.46**	.39**	.68**	1	
Objective binges	11.04	7.30	.20*	.24**	.37**	.23**	1

**. $p < 0.01$
*. $p < 0.05$

First, the mean scores of the hated self and the inadequate self of the current sample (Table 2) were compared to those of the community sample used by Duarte et al. (2014). It was hypothesized that the self-criticism levels on both subscales of the current sample are significantly higher compared to those measured by Duarte et al. (2014). The levels on the hated

self scale ($t(452) = 14{,}92$, $p < .001$) as well as on the inadequate self scale ($t(452) = 15{,}37$, $p < .001$) were significantly higher compared to those measured by Duarte et al. (2014). The hypothesis can be accepted.

Next, a two-step regression analysis was conducted for objective binging, shape concern, and eating concern, respectively. In the first step self-esteem, age, and duration of the ED were used as independent variables, whereas in the second step the hated self and the inadequate self were added as independent variables.

Regarding binge eating behavior (Table 3), it was expected that (2) both forms of self-criticism are positive predictors of subjective binging. The explained variance of Model 1, which included possible confounding variables, was not statistically significant ($R^2 = .04$, $F(3,119) = 1.59$, $p > .05$). The addition of the hated self and the inadequate self (Model 2) did not increase the significance of the explained variance ($R^2 = .06$, $F(5,117) = 1.55$, $p > .05$). The hypothesis cannot be accepted.

Table 3

Two-Step Multiple Regression Coefficients of Self-Esteem, Age Group, Duration of the ED, the Hated Self, and the Inadequate Self on Objective Binging

Model		*B*	Stand. Error.	*β*	*t*	*p*
1	(Constant)	15.12	2.57		5.90	.00
	Rosenberg self-esteem scale	-26	.15	-.15	-1.68	.1095
	Age group	-75	.61	-.18	-1.23	.22
	Duration of the ED	.12	.12	.15	1.03	.30
2	(Constant)	2.76	7.65		.36	.72
	Rosenberg self-esteem scale	.08	.26	.05	.31	.76
	Age group	-.70	.61	-.17	-1.15	.26
	Duration of the ED	.13	.12	.16	1.08	.28
	Hated self	.81	1.32	.09	.62	.54
	Inadequate self	2.29	1.67	.19	1.37	.17

Regarding shape concern (Table 4), it was expected that (3) both forms of self-criticism are positive predictors. Model 1, in which possible confounding variables were related to shape concern, significantly explained the variance in shape concern (R^2 = .17, $F(3,120) = 7.91$, $p < .01$). When adding the hated self and the inadequate self, the explained variance significantly increased (R^2 = .23, $F(5,118) = 6.96$, $p < .01$). Model 2, therefore, better explained the variance in shape concern. In Model 1, self-esteem showed a significant effect on shape concern (β = -.41, t = -4.84, p <.01). Model 2, however, showed that, when both forms of self-criticism are added, only the hated self acted as a significant predictor (β = .33, t = 2.55, p = .01). The inadequate self (β = .12, t = .95, p >.05) and self-esteem (β = -.08, t = -.56, p >.05) did not significantly affect shape concern in this Model. The hypothesis can be partially accepted.

Table 4

Two-Step Multiple Regression Coefficients of Self-Esteem, Age Group, Duration of the ED, the Hated Self, and the Inadequate Self on Shape Concern

Model		*B*	Stand. Error.	*β*	*t*	*p*
1	(Constant)	5.77	.32		18.23	.00
	Rosenberg self-esteem scale	-.09	.02	-.41	-4.84	.00
	Age group	.05	.08	.10	.71	.48
	Duration of the ED	-.01	.01	-.10	-.75	.46
2	(Constant)	3.60	.91		3.94	.00
	Rosenberg self-esteem scale	-.02	.03	-.08	-.56	.58
	Age group	.06	.07	.10	.76	.45
	Duration of the ED	-.01	.01	-.09	-.72	.48
	Hated self	.40	.16	.33	2.55	.01
	Inadequate self	.19	.20	.12	.95	.34

Regarding eating concern (Table 5), it was expected that (4) both forms of self criticism are positive predictors. Model 1, which included possible confounding variables, significantly

explained the variance in eating concern (R^2 = .09, F(3,120) = 4.15, p< .01). The addition of the hated self and the inadequate self lead to a significant increase in the explained variance (R^2 = .18, F(5,118) = 5.02, p< .01). Model 2, therefore, better explained the variance in eating concern. In Model 1, self-esteem showed a significant effect on eating concern (β = -.31, t = -3.51, p <0.01). In Model 2, however, only the hated self acted as a positive predictor for eating concern (β = .43, t = 3.26, p <0.01). The inadequate self (β = .01, t = .06, p >0.05) and self-esteem (β = .02, t = .17, p >0.05) did not significantly affect eating concern in this Model. The hypothesis can be partially accepted.

Table 5

Two-Step Multiple Regression Coefficients of Self-Esteem, Age Group, Duration of the ED, the Hated Self, and the Inadequate Self on Eating Concern.

Model		*B*	Stand. Error.	*β*	*t*	*p*
1	(Constant)	3.54	.29		12.09	.00
	Rosenberg self-esteem scale	-.06	.02	-.31	-3.51	.00
	Age group	.03	.07	.06	.43	.67
	Duration of the ED	-.01	.01	-.07	-.46	.64
2	(Constant)	1.89	.84		2.25	.03
	Rosenberg self-esteem scale	.01	.03	.02	.17	.87
	Age group	.03	.07	.05	.39	.70
	Duration of the ED	-.01	.01	-.06	-.44	.66
	Hated self	.47	.15	.43	3.26	.00
	Inadequate self	.01	.18	.01	.06	.95

Discussion

The current study aimed to investigate the relationship between the two forms of self-criticism, the hated self and the inadequate self, and the cognitive and behavioral aspects of ED psychopathology in BED patients. The current study is one of the first studies to examine this relationship while also adding other potential maintaining factors. Overall, results suggest a

relationship between self-criticism and ED psychopathology in BED patients. Especially, the hated self seems to be highly relevant to the cognitive aspects of BED psychopathology.

Main findings

Regarding the levels of self-criticism, the current study found that people with a BED diagnosis show higher levels of self-criticism compared to people who do not suffer from BED. This is in line with research done by Noordenbos et al. (2014) as they found similar results for ED patients in general. In contrast to Noordenbos et al. (2014), who combined the two forms of self-criticism to a singular scale, the current study measured both scales separately. The results showed that BED patients show higher levels on the hated self scale as well as the inadequate self scale compared to a community sample. This suggests that feelings of inadequacy as well as hate towards the self are both heightened in people who suffer from BED. Subsequently, self-criticism seems to be a relevant factor in BED.

When examining the correlations, it became apparent that both forms of self-criticism have a positive relationship with the different aspects of ED psychopathology in BED patients. To elaborate on this, the relationship between the two forms of self-criticism and the different aspects of ED psychopathology in BED patients was investigated in more detail. First, the relationship between self-criticism and the behavioral aspect of BED was explored. Here, it was found that neither possible confounding variables nor the two forms of self-criticism seem to affect binge-eating behavior. This finding was unexpected. Previous research did find significant associations between self-criticism and binge-eating behavior (Duarte et al., 2014). These associations were not as high as the associations with the cognitive aspects of BED, nevertheless especially the hated self was expected to affect binge-eating as it was found to be a mediator between body image shame and binge eating (Duarte et al. 2014). This difference could be due to the fact that the current study used a clinical sample whereas Duarte et al. (2014) used a community sample. It could be the case that in patients who suffer from BED, the behavioral aspects are not as much affected by self-criticism. Thus, self-criticism might not

influence binge-eating behavior in patients with BED but might play a more important role in non-pathological cases. Pearson et al. (2015), furthermore, suggest that binge-eating behavior can adopt a habitual nature over time. Patients with BED might fall into binge-eating episodes because it has become a habit. Subsequently, cognitive processes such as self-criticism (Werner et al., 2019) might not directly influence binge-eating behavior. Moreover, Mason et al. (2021) suggest that destructive eating behavior might be affected by the emotional and cognitive states which appear seconds before the behavior only. Relating self-critical tendencies in general to binge-eating behavior might not be the most accurate measure.

Next, the relationship between self-criticism and the cognitive aspect of BED was examined. In the first step, different factors, which were found to be important to ED psychopathology and which may play a role in the maintenance of BED, were related to the cognitive aspects of BED. Here, it was found that self-esteem seems to affect shape concern as well as eating concern. Nevertheless, when adding both forms of self-criticism to the model, the results no longer showed a significant effect of self-esteem on either of the cognitive aspects of BED psychopathology. In this model, it was found that merely the hated self influenced shape concern as well as eating concern. This means that the hated self directly affects concerns about the outer appearance and the eating patterns of patients diagnosed with BED. The inadequate self and self-esteem, however, do not seem to have this effect on the cognitive aspects of BED. In other words, the hated self seems to play a more important role in BED psychopathology than the inadequate self and self-esteem. Interestingly, this finding is not completely in line with previous research on BED. Here, both forms of self-criticism were found to be equally associated with the cognitive aspects of BED psychopathology (Duarte et al., 2014). One reason for this discrepancy could lay in the definitions of the two forms of self-criticism. The inadequate self, on one hand, describes feelings of inferiority and inadequacy and is the more tamed facet of self-criticism, whereas the hated self, on the other hand, describes self-disgust and is associated with self-punishment (Gilbert et al., 2004). The hated self also

tends to be more persistent and is harder to overcome (Werner et al., 2019). This form of self-criticism, therefore, describes the more cruel and rigorous part of self-criticism which may play a more important role in some psychopathologies, including BED psychopathology. People suffering from BED might, accordingly, develop a very harsh attitude towards the self and judge their outer appearance as well as their eating behavior very harshly and experience self-hatred because of this. In a clinical population, as it was used in the current study, the hated self might therefore be more pronounced compared to a non-clinical population, which was used by Duarte et al. (2014). Thus, it might also have a bigger effect on the cognitive aspects in BED patients than it has on the symptomology of healthy people. In line with this, research concerning other psychopathologies did find similar effects to the current study. Mills et al. (2007), for example, found a stronger association between the hated self and paranoid beliefs than between the inadequate self and paranoid beliefs. Different researchers, who investigated the mediating role of self-criticism between external shame and psychological symptoms (Castilho et al., 2017) or weight-stigma and binge-eating (Palmeira et al., 2017), only found the hated self to mediate this effect. The hated self, therefore, seems to play a bigger role in different psychopathologies including BED.

Looking at previous research which found self-esteem to be an important maintaining factor for ED psychopathology and even adapted treatment towards this finding (Fairburn, 2008), it is interesting to find that self-esteem did neither predict the cognitive aspects nor the behavioral aspect of BED psychopathology compared to self-criticism. Nevertheless, this finding is in line with research done by Kelly and Carter (2013), who also did not find a significant effect of self-esteem when using it as a control variable in the relationship between self-criticism and ED psychopathology. This suggests that the hated self may play a more important role in BED psychopathology than self-esteem does. Dunkley and Grilo (2007) found that self-esteem may arise from self-criticism, as self-criticism creates a gap between the ideal

self and the perceived self and therefore generates low self-worth. This could be one possible explanation to why only self-criticism showed an effect in the current study.

Strengths and limitations

One of the main strengths of this study appears to be that it was one of the first studies to investigate the relationships between the two forms of self-criticism and ED psychopathology in BED patients. In previous research, self-criticism has either been measured as a singular construct or only one of the two forms has been investigated in depth. The current study recognized the importance of both forms of self-criticism and managed to investigate their relationship with ED psychopathology while controlling for other, possible confounding variables. Furthermore, this was one of the very few studies to concentrate on BED patients and the aspects of psychopathology specific to them. It is important to retrieve accurate findings specific to different types of disorders, to find out about specific phenomena, and to customize treatment with regards to this. Another strength of the current study was that it managed to control for different important variables to foreclose that they play a bigger role in the relationship between self-criticism and BED psychopathology than self-criticism.

Nevertheless, the study also had some limitations. The first limitation regards the sample size. Because the sample size was rather small, it was not possible to add more than three confounding variables. Thus, it might be the case that other relevant variables, which could explain some of the variance in BED psychopathology, have been missed in the model. Another limitation regarding the sample is that the male population was underrepresented. Research shows that in comparison to other EDs, the gender gap in BED is not very high (Barry et al., 2002). The female to male ratio is about 2:3 in BED patients (Lewinsohn et al., 2002). The current study does not reflect this ratio and therefore does not cover the whole population equally. Because of this, the findings need to be interpreted with caution. The nature of the cross-sectional design facilitates another limitation. Cross-sectional studies merely represent one measurement point and, different to longitudinal studies, do not show how the

measurements develop over time (Levin, 2006). Because of this, the predictive effects measured in the current study need to be interpreted with caution. The last limitation regards the comparison with the research of Duarte et al. (2014). It has to be mentioned that the data for the current study and the data for Duarte et al.'s (2014) study were probably collected in different countries. For the current study, all questionnaires were translated from English to Dutch. This way differences in translation or meaning could have led to discrepancies in results.

Future research

This was one of the first studies in this field and therefore still leaves a lot of room for future research. Looking at the limitations of this study, the main aspect which should be considered by future research is to increase the sample size. This way it would be possible to add other, potentially confounding variables to the analyses to either accept or deny their importance in the relationship between self-criticism and BED psychopathology.

Another interesting point to consider for future research is to further investigate BED in the male population or to look at gender differences. Most research, including the current study, concentrates on the female gender when it comes to EDs (Greenberg & Schoen, 2008). This is often because mostly women seek help with these kinds of disorders. Nevertheless, research shows that especially in BED the males are also commonly affected (Barry et al., 2002). Because of this, it is even more important to investigate what factors contribute to BED in the male population.

Regarding the study design, it is of importance to test whether the findings of the current study can be replicated and supported by a longitudinal study. This way it would be possible to see whether self-criticism can predict ED psychopathology in BED patients.

Taking a step back from BED psychopathology, it would also be interesting to examine the differences between the different types of EDs. Duarte and colleagues (2016) for example did not find a significant difference in self-criticism levels across the three main types of EDs. Future research could investigate whether this could be replicated regarding the direct

relationship between self-criticism and the different psychopathologies or whether self-criticism plays a bigger role in either of the EDs.

Conclusion

Looking back at the current study and its findings it can be concluded that self-criticism does play an important role in ED psychopathology in BED patients. In BED patients, self-hatred influences the cognitions relevant to this psychopathology. Concerns about body shape and eating are very vulnerable to harsh self-criticism and self-bashing. Relevant variables such as self-esteem, which has been one of the focus points in ED research, were not found to play a more important role than the hated self in BED psychopathology. Findings like this are highly relevant on multiple levels. In the first place, they help to further understand BED psychopathology and what maintains it. Additionally, they can help to improve the treatment practice. Until now, treatments have not focused on reducing self-criticism, there are however treatments that specify on increasing self-esteem. Enhanced Cognitive-Behavioral Therapy (CBT-E), for example, includes a module specific to self-esteem (Fairburn et al., 2009). The current study does not suggest that this is not important, it merely suggests that reducing self-criticism might be just as important. Nevertheless, further research needs to be conducted in order to test the effects of self-criticism in BED patients. If the results of the current study can be replicated it might be useful to modify treatment in a way that includes measures to reduce self-criticism is important to increase the treatment effectiveness and outcome. Compassion-focused therapy is one example of a treatment plan, which partially focused on reducing self-criticism and simultaneously increasing self-compassion (Gilbert, 2009). Schema therapy is another very helpful treatment form in the reduction of self-criticism (Werner et al., 2019). Including parts of treatments like this, would be a great opportunity for treatment successes in the future. The current study helped to acknowledge the importance of self-criticism in BED patients and nudges research to further explore the maintain factors of BED and to further improve the treatment possibilities.

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Appendix A

Figure A1

Q-Q Plot for Binge-Eating Behavior

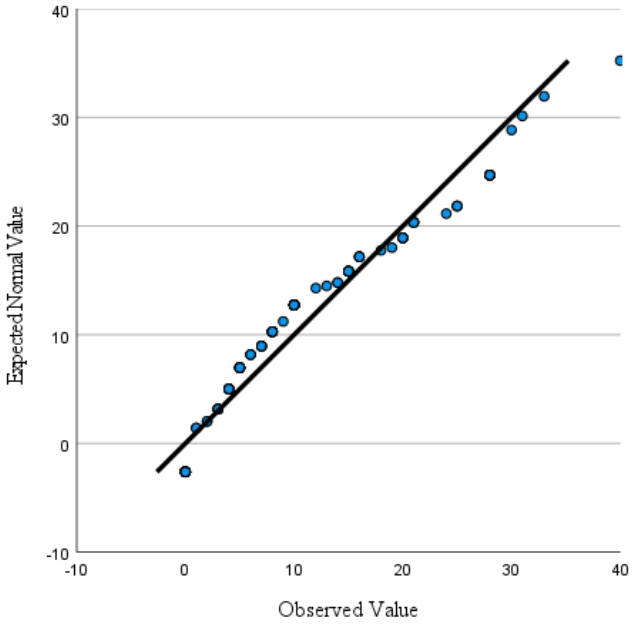


Figure A2

Q-Q Plot for Shape Concern

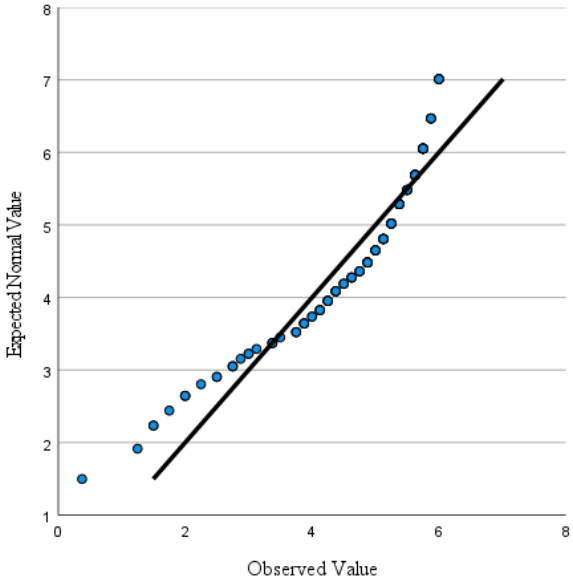
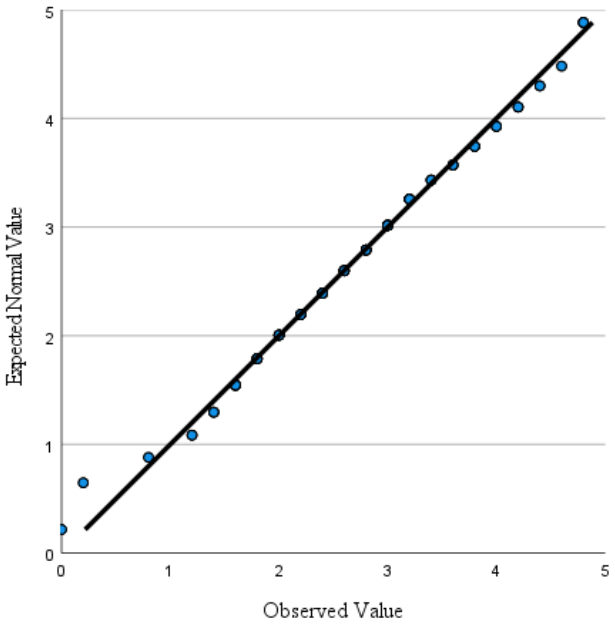


Figure A3

Q-Q Plot for Eating Concern



Appendix B

Figure B1

Scatterplot for Binge-Eating Behavior

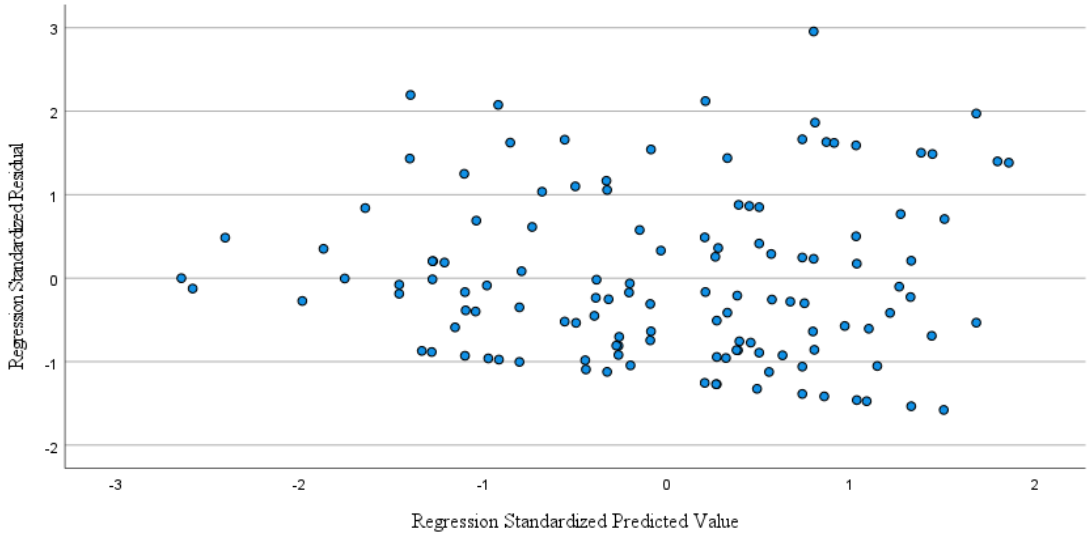


Figure B2

Scatterplot for Shape Concern

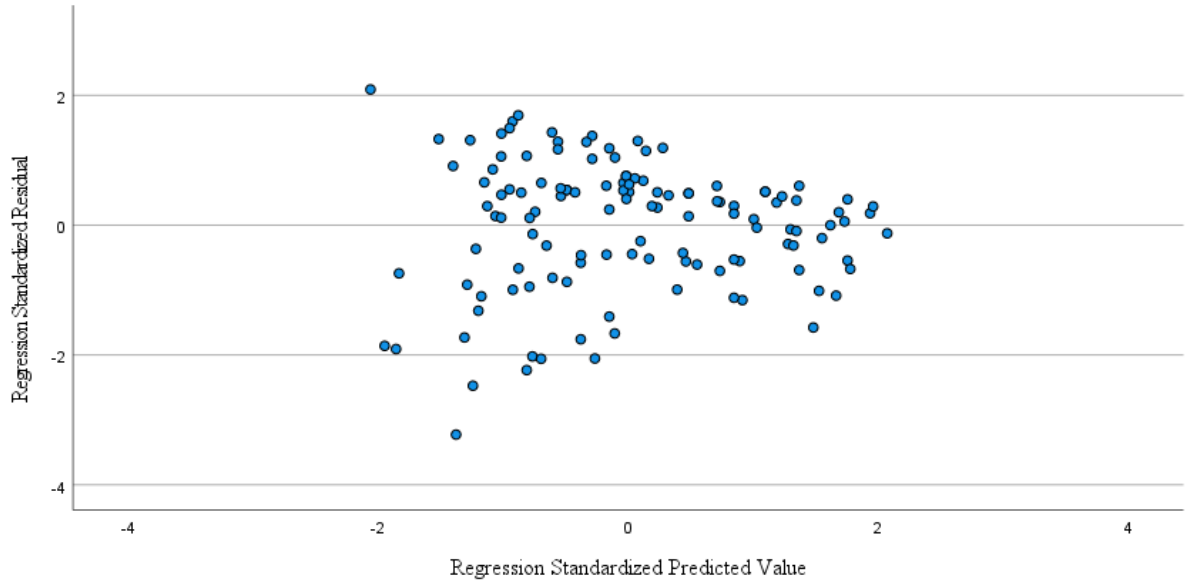
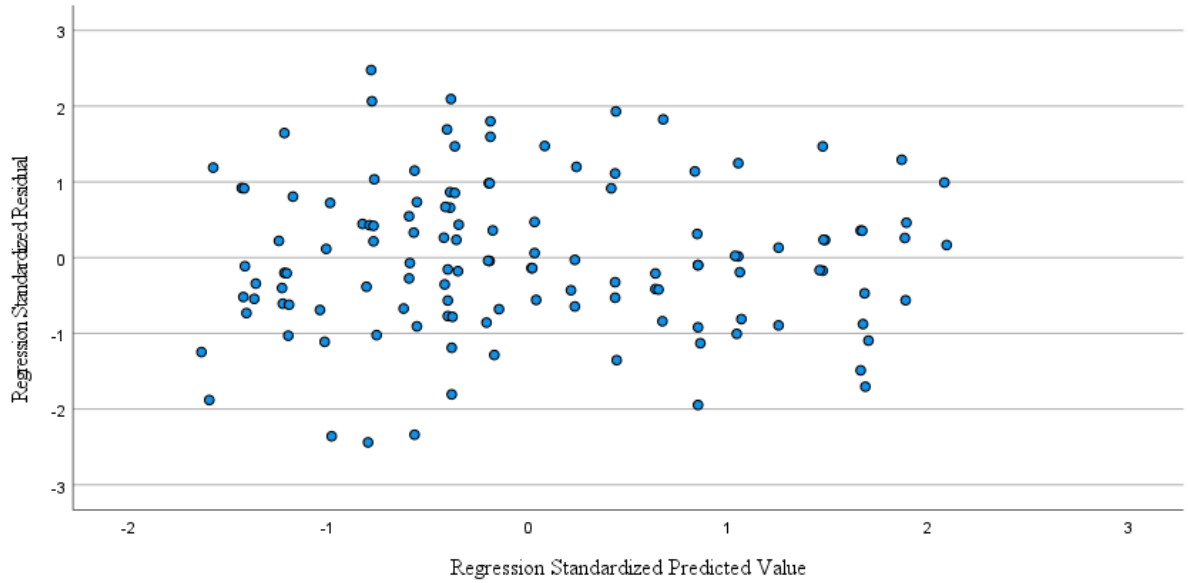


Figure B3

Scatterplot for Eating Concern



Appendix C

Table C1

Collinearity Statistics

Model	Variable	Collinearity Statistics	
		Tolerance	VIF
1	Rosenberg self-esteem scale	.99	1.01
	Age group	.39	2.59
	Duration of the ED	.39	2.58
2	Rosenberg self-esteem scale	.35	2.86
	Age group	.38	2.61
	Duration of the ED	.39	2.58
	Hated self	.40	2.51
	Inadequate self	.44	2.29