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The effect of trauma and dissociation on the outcome of cognitive behavioural therapy for binge eating disorder: A 6-month prospective study

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Abstract

Background: Binge eating disorder (BED) is commonly associated with a history of trauma. Yet, there is little insight into the potential effect that trauma, dissociation, and depressive symptoms may have on the outcome of treatment interventions.

Methods: A total of 142 treatment-seeking patients admitted with a diagnosis of DSM-5 BED (88% female; mean age = 38.7; SD = 10.8) took part in a 6-month, protocolized, group cognitive behavioural therapy (CBT). Self-report questionnaires were administered to assess lifetime traumatic experiences, dissociation, and depression. Body mass index and the number of binges per week (BPW) were measured throughout treatment. The main outcomes were the percentage reduction in BPW and remission (i.e., less than one BPW; cf. DSM-5).

Results: Most BED patients (91.5%) reported a history of trauma, with two in three patients reporting three or more traumatic experiences. Whereas the number of traumatic experiences was not significantly associated with a reduction in BPW or remission, a higher traumatic impact score significantly decreased the likelihood of obtaining remission at the end of treatment (OR = 0.96; 95% CI [0.92, 0.99]). Higher levels of dissociative symptoms partially mediated this prospective association.

Conclusions: The impact of traumatic experiences, as opposed to the number of traumatic experiences experienced, negatively predicts remission after 6 months of CBT. These findings highlight the importance of addressing trauma and dissociative features in the CBT treatment of BED.

KEYWORDS
BED, CBT, dissociation, trauma

1 | INTRODUCTION

Binge eating disorder (BED) is characterized by recurrent episodes of binge eating during which people experience a feeling of loss of control over their eating behaviour. Feelings of guilt and shame often follow these episodes but are not accompanied by subsequent compensatory behaviours (such as vomiting, laxative and/or diuretics

abuse, or excessive exercise). BED occurs more frequently in women—approximately three times as many female than male patients—with a global lifetime prevalence in the 1–4% range (Erskine & Whiteford, 2018; Keski-Rahkonen & Mustelin, 2016). BED is associated with a lower quality of life, overweight/obesity, comorbid mental and physical disorders, and suicidality (Erskine & Whiteford, 2018; Grucza, Przybeck, & Cloninger, 2007; Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011). The importance of this disorder was recently emphasized by the DSM-5, with the inclusion of BED as a distinct mental disorder (American Psychiatric Association [APA], 2013).

Existing research has consistently linked binge eating to a history of trauma (Backholm, Isomaa, & Birgegard, 2013; Micali et al., 2017; Vanderlinden & Palmisano, 2018) and depressive and dissociative symptoms (Kent & Waller, 2000; La Mela, Maglietta, Castellini, Amoroso, & Lucarelli, 2010). The latter refers to a disruption in the normal integration of consciousness, memory, perception, behaviour, and body representation. Several recent studies (Caslini et al., 2016; Molendijk, Hoek, Brewerton, & Elzinga, 2017; Palmisano, Innamorati, & Vanderlinden, 2016) observed that patients with BED report elevated rates of trauma and dissociative symptoms than matched controls and patients with anorexia nervosa of the restrictive type. For instance, in a meta-analytical study involving 32 studies, Caslini et al. (2016) found that BED is consistently positively associated with childhood sexual and emotional abuse.

Although findings such as these suggest that trauma, depression, and dissociation may be relevant factors to consider in explaining the onset of eating disorders with bingeing features (Mitchell, Mazzeo, Schlesinger, Brewerton & Smith, 2011; Rayworth, Wise & Harlow, 2004), there is also evidence suggesting that trauma and dissociation are also associated with the frequency and duration of bingeing episodes (Palmisano et al., 2018). Some scholars have argued that depression and dissociation may explain the link between trauma and eating psychopathology, such as bingeing behaviours, characterized by impulsivity (Everill, Waller, & Macdonald, 1995; Moulton, Newman, Power, Swanson, & Day, 2015). It is important to evaluate whether a history of trauma has adverse effects on treatment for BED similar to that of other eating disorders (Castellini et al., 2018) and, if so, whether elevated levels of depression and dissociation may explain this finding. Unfortunately, to the best of our knowledge, no comprehensive study analysing the predictive role of traumatic experiences, depression, and dissociation has ever been published.

Cognitive behavioural therapy (CBT) is currently regarded as the leading evidence-based treatment for BED (Brownley et al., 2016; Hay, 2013; Vocks et al., 2010) by international treatment guidelines (Hilbert, Hoek, & Schmidt, 2017). However, studies on the efficacy of different treatments show only modest effects, with clinically significant change (differently defined across studies) in only 22.2–67.6% of patients (De Jong, Schoorl, & Hoek, 2018), which highlights the need for a better understanding of the factors involved in therapeutic success in this particular population (Lammers, Vroling, Ouwens, Engels, & van Strien, 2015; Linardon, de la Piedad Garcia, & Brennan, 2017). Research on predictors of outcome success in the treatment of BED is scant. Existing evidence highlighted a negative predictive role of unipolar depression, higher baseline frequency of eating disorder symptoms, and slow reductions of symptomatology during treatment (Castellini et al., 2012; Hilbert et al., 2019). Besides these factors, recent research demonstrated that traumatic experiences (i.e., neglect and physical and sexual abuse) negatively predict outcome in the treatment of anorexia and bulimia nervosa (Castellini et al., 2018) but unfortunately did not report data on BED. As such, more research is needed to gain a better understanding of the effect of trauma on the outcome of CBT for BED and the underlying psychological factors that may be implicated and that clinicians could target to prevent potential adverse effects.

Therefore, building upon and extending prior research, the aims of the current study were (a) to describe the co-occurrence of trauma, depression, and dissociation in patients diagnosed with BED, (b) to examine whether trauma negatively predicts treatment outcome after a 6-month CBT, and, if so, (c) to explore whether dissociation and depression mediate this prospective association.

2 | MATERIALS AND METHODS

2.1 | Procedure and treatment protocol

Patients diagnosed with BED were offered a CBT outpatient programme. The treatment team is CBT trained and multidisciplinary, consisting of one psychiatrist, two psychologists (who also administered psychometric tests), one nutritionist, one psychiatric nurse, and one psychomotor therapist. The programme involves well-structured group therapy sessions, with nine participants (maximum) following a step-by-step CBT treatment (Fairburn, Cooper & Shafran, 2003). The approach is manualized and proved effective for the treatment of BED (Vanderlinden et al., 2012). The programme runs 1 day per week (9:00 a.m. to 16:00 p.m.) during a 12- to 24-week period:

In the first part of the day (morning session: 9:00 a.m. to 12:00 p.m.), the programme focuses on several therapeutic goals such as (a) psychoeducation regarding risks associated to obesity and binge eating, (b) enhancing motivation for change, (c) acquiring new, healthy eating behaviours (including self-monitoring of eating behaviour and record keeping), (d) improving awareness of the binge eating triggers and creating possible alternatives to deal with the identified difficult situations, and (e) promoting a positive experience of the body together with an active lifestyle. Patients are encouraged to exercise with moderate intensity for at least 30 min, 5 days a week (Hrabosky, Masheb, White, & Grilo, 2007). The main objective is to improve patients' general well-being and quality of life; loss of weight is not the primary goal. During the second part of the day (afternoon: 1:15 p.m. to 4:00 p.m.), therapy aims at facing the eating disorder's "maintaining factors," and several modules are offered, integrating cognitive restructuring techniques to identify and challenge maladaptive cognitions and thoughts. Other modules focus on (a) how to improve self-esteem and assertiveness; (b) how to identify, tolerate, and express emotions; and (c) how to prevent relapse.

A first evaluation of the evolution takes place after 3 months (12 sessions), when patients can decide to conclude their therapy, and a second evaluation takes place after 6 months (24 sessions). During these meetings, the team discusses and evaluates together with the patient different aspects such as the normalization and regaining of control over the eating behaviour and habits, weight, number of binges per week (BPW), and quality of life, such as introducing an active lifestyle and body perception/experiences. When indicated after the first evaluation, new therapeutic goals and strategies can be defined. A certified clinician determined the diagnosis of BED. For the aims of this study, diagnoses were reclassified according to the DSM-5 criteria (APA, 2013). Exclusion criteria were fulfilling diagnostic criteria for a psychotic disorder and/or high risk of suicide. All patients meeting the criteria for inclusion were proposed to participate in the research and gave their informed consent.

2.2 | Sample description

A total of 142 clinical outpatients participated in the study. Follow-up data were available for 132 patients. Of these patients, 14 (9.8%) decided to stop their treatment before completion of the first evaluation moment at 3 months. Of the remaining 118 patients, 10 completed the first 3 months of therapy, whereas 108 patients fully completed the 6-month CBT therapy programme. The final sample consisted of 125 women (88%) and 17 men

(12%; Table 1). The mean age of the participants was 38.7 years (*SD* = 10.8; range 20–64). The majority of the patients were unmarried (47.2%), followed by married (33.8%), divorced (15.5%), and living together (3.5%). A minority of the patients achieved primary school (4.2%) or middle school (33.1%), whereas the majority obtained a high school (46.5%) or university degree (16.2%). Analyses comparing completers and noncompleters revealed no significant differences on baseline sociodemographic and clinical variables (all $p > .22$). The Ethical Committee of the University Psychiatric Center of KU Leuven approved the study.

2.3 | Instruments

At the start of treatment, data regarding weight status, number of BPW, and sociodemographic variables were collected, and questionnaires were administered. Data regarding weight status and eating pathology were monitored and registered during treatment and at the end of therapy.

The *Traumatic Experiences Checklist* (TEC) was used to investigate the presence and the impact of traumatic experiences in the patients' history (Nijenhuis, Van Der

TABLE 1 Sociodemographic and clinical characteristics of the sample (n = 142)

	n	%
Sex (female)	125	88.0
Status		
Married	48	33.8
Divorced	22	15.5
Living together	5	47.2
Single	67	3.5
Educational level		
Middle school	6	4.2
High school	47	33.1
Post-high school studies	66	46.5
University degree	23	16.2
	Mean	*SD*
Age	38.65	10.83
BMI	37.38	8.19
Weekly episodes of bingeing at admission	4.91	2.09
Duration of illness	14.28	8.51

Note: n = weighted number of cases, % = weighted percentage of sample, *SD* = standard deviation.
Abbreviation: BMI, body mass index.

Hart, & Kruger, 2002). The TEC is a well-validated questionnaire assessing a wide range of traumatic or potentially traumatic experiences such as confrontation with a nearly deadly disease or assault; war experience; loss of significant others; emotional neglect, emotional abuse, physical abuse, sexual harassment, and sexual abuse. If answered affirmatively, every item also asks to rate the perceived impact of each traumatic experience (from 1 to 5). The total number of traumatic experiences ranges between 0 and 29, with the impact score ranging between 0 and 145. The TEC has shown good internal consistency (Cronbach's $\alpha = 0.90$) and test–retest reliability ($r = 0.91$; Nijenhuis et al., 2002).

The *Dissociation Questionnaire* (DIS-Q) was used for the assessment of dissociative symptoms. The DIS-Q (Vanderlinden, Van Dyck, Vandereycken, Vertommen, & Jan Verkes, 1993) has four subscales: (a) identity confusion or fragmentation (referring to derealization and depersonalization experiences), (b) loss of control (referring to the feeling of losing control over behaviour, thoughts, and emotions), (c) amnesia (referring to more or less severe loss of memory), and (d) absorption (referring to experiences of deep concentration). The total score is operationalized as the mean of all subscale scores, with higher scores indicating more severe dissociative symptoms. The DIS-Q was translated and validated in many languages and has shown good internal consistency (Cronbach's $\alpha = .96$), test–retest reliability (interval 3 weeks; r = .92), and validity (Vanderlinden, Van Dyck, et al., 1993).

The *Beck Depression Inventory* (BDI-II) was used to assess depressive symptomatology. The BDI-II (Beck, Steer, & Brown, 1996) is a self-report questionnaire consisting of 21 multiple-choice items and is one of the most widely used questionnaires for assessing the presence and severity of depression. Total scores range between 0 and 63, with higher scores indicating higher levels of depression (10–18 mild, 19–29 moderate, and 30–63 severe depression).

2.4 | Definition of outcome

Two main outcomes were considered in the current study based on previous studies showing the importance of baseline bingeing frequency as an indicator of general psychopathology and treatment outcome (Goldschmidt et al., 2016; Peterson et al., 2000) and on an established methodology for the analysis of outcomes in psychotherapeutic treatments (Jacobson & Truax, 1991). First, *the level of improvement* was defined as the percentage of reduction in BPW between the baseline assessment and the end of treatment. Second, *remission* was defined as

having less than one BPW at the end of treatment (frequency cut-off for a BED diagnosis following DSM-5; APA, 2013).

2.5 | Statistical analyses

Descriptive statistics for categorical variables are reported as numbers and proportions, whereas for continuous variables, means and associated standard deviations are reported. In order to tackle potential nonresponse bias, we handled dropout performing last observation carried forward (National Research Council [US], 2010). Two linear regression equations were constructed to investigate whether the number of traumatic experiences or the traumatic impact score (independent variables) were prospectively associated with a proportional reduction in the number of BPW at follow-up (dependent variable). Similarly, to investigate whether the number of traumatic experiences or the impact score predicted remission at the end of the treatment protocol, we constructed two logistic regressions models with remission as the dichotomous dependent variable and the trauma variables as independent variables. Finally, we evaluated whether dissociation may operate as a mediator between trauma and the main outcome variables using a 10,000 bias-corrected bootstrapping procedure (Hayes, 2013). The indirect effect of dissociation is considered significant if the 95% confidence interval does not contain zero. All analyses controlled for other clinical variables known to be predictive of therapy outcome (i.e., the baseline number of BPW and total BDI score) and for dropout.

3 | RESULTS

3.1 | Clinical characteristics of the sample

The mean duration of illness was 14.3 ($SD = 8.5$) years. On average, patients reported 4.9 BPW ($SD = 2.1$) and had a body mass index of 37.4 ($SD = 8.2$).

Correlations between the number of BPW, body mass index, and other psychopathological aspects at baseline are presented in Table 2. Traumatic experiences were common, with 91.5% of the patients reporting at least one traumatic experience and 65.5% reporting three or more traumatic experiences. For participants reporting trauma, neglect was the most common (57.4%), followed by emotional abuse (50.9%), sexual harassment (33.3%), physical abuse (31.5%), and sexual abuse (20.4%). The mean perceived traumatic impact score was 14.8 ($SD = 12.21$; range 0–60). The total mean dissociation score was 2.22

TABLE 2 Correlations between baseline BMI, BPW, DIS-Q total score, BDI total score, total number of traumas, total impact of traumas, and presence of specific traumas

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. BMI	1	.24**	.02	.05	.04	.19*	.16	−.06	−.04	.00	.08	.06	−.12
2. BPW		1	.10	.08	.05	.06	.03	.02	.18*	−.02	−.01	.16	−.26**
3. DIS-Q			1	.20*	.30**	.36**	.16	.06	.08	.13	.12	−.03	−.22*
4. Number of traumas				1	.85**	.15	.56**	.51**	.48**	.43**	.35**	−.06	−.11
5. Impact of traumas					1	.18*	.58**	.50**	.55**	.42**	.37**	−.12	−.24**
6. BDI total						1	.13	.15	.11	−.03	.22*	−.04	−.1
7. Neglect							1	.38**	.36**	.17*	.12	−.07	−.15
8. Emotional abuse								1	.53**	.18*	.15	−.14	−.23**
9. Physical abuse									1	.07	.16	−.05	−.21*
10. Sexual harassment										1	.36**	.05	.00
11. Sexual abuse											1	−.04	−.03
12. BPW reduction												1	.56**
13. Remission													1

Abbreviations: BDI, Beck Depression Inventory; BMI, body mass index; BPW, number of binges per week; BPW reduction, binges per week reduction in percentage; DIS-Q, Dissociation Questionnaire.
*$p < .05$.; **$p < .01$.

($SD = 0.57$), showing significantly higher levels of dissociation than standardized means from control populations (Nilsson & Svedin, 2006; Vanderlinden, Van Dyck, et al., 1993). Comparing DIS-Q subscales, "loss of control" showed the highest score with a mean of 2.74 ($SD = 0.67$). Mean scores of the other subscales were 2.09 ($SD = 0.70$) for identity fragmentation; 2.25 ($SD = 0.66$) for absorption; and 1.79 ($SD = 0.67$) for dissociative amnesia. Beck Depression Inventory mean score was 23.31 ($SD = 9.95$; range = 2–62), indicating in general moderate depressive symptoms among patients in the sample.

3.2 | Prediction of treatment outcome

Remission was achieved by 37.1% of the patients (n = 49), with an average reduction in BPW of 65.58%. Multivariate models showed that the number of BPW at baseline was not predictive of a proportional reduction in the number of BPW ($\beta = 2.20$; $p < .054$). Yet, in the multivariate models, a higher number of BPW at baseline decreased the likelihood of obtaining remission at the end of treatment (OR = 0.75; $p = .004$). Multivariate models that took into account depressive symptoms and study dropout revealed that the number of traumatic experiences was not related to any of these outcomes (Tables 3 and 4). However, a higher traumatic impact was negatively predictive of obtaining remission after 6 months of CBT treatment (OR = 0.96; Table 4).

TABLE 3 Linear regression predicting percentage reduction in number of binges per week

Model A	B (SE)	95% CI	p
Number of binges	2.48 (1.11)	[0.29, 4.68]	**.027**
Number of traumas	−0.37 (0.64)	[−1.63, 0.89]	.561
BDI total score	−0.08 (0.23)	[−0.54, 0.37]	.726
Completed 6 months of CBT treatment	42.68 (7.32)	[28.19, 57.18]	**<.001**
Model B			
Number of binges	2.48 (1.01)	[0.30, 4.65]	**.026**
Impact of traumas	−0.24 (0.18)	[−0.60, 0.13]	.203
BDI total score	−0.05 (0.23)	[0–.50, 0.41]	.839
Completed 6 months of CBT treatment	42.44 (7.29)	[28.03, 56.86]	**<.001**

Note: Significant p values are highlighted in bold.
Abbreviations: CBT, cognitive behavioural therapy; BDI, Beck Depression Inventory.

3.3 | Mediation analysis

Due to the strong predictive effect of treatment completion, further analyses were carried out for those who completed treatment. Even after controlling for the number of BPW at baseline, dissociative symptoms were found to partially mediate the prospective association between the perceived impact of trauma and remission at the end of 6-month CBT treatment (BCCI95% [−.0290, −.0002]; Figure 1).[1] If we reanalysed the mediation

TABLE 4 Binary logistic regression predicting remission at follow-up

Model C	O.R.	95% CI	p
Number of binges	0.75	[0.61, 0.91]	**.004**
Number of traumas	0.95	[0.85, 1.07]	.420
BDI total score	0.98	[0.94, 1.02]	.298
Completed 6-months of CBT treatment	9.99	[1.22, 81.8]	**.032**
Model D			
Number of binges	0.74	[0.60, 0.90]	**.004**
Impact of trauma	0.96	[0.92, 0.99]	**.015**
BDI total score	0.99	[0.947, 1.03]	.521
Completed 6 months of CBT treatment	9.48	[1.15, 78.3]	**.037**

Note: Significant *p* values are highlighted in bold.
Abbreviations: CBT, cognitive behavioural therapy; BDI, Beck Depression Inventory.
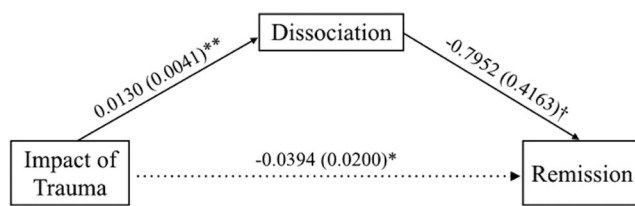
FIGURE 1 Mediation model from trauma score via baseline dissociation to remission from DSM-5 binge-eating disorder at the end of therapy. Standardized coefficients and standard errors between parentheses are presented. Associations between the predictor variable and the mediators are controlled for baseline number of binges per week. Indirect point estimates are shown together with bias-corrected 95% confidence intervals using 10,000 bootstrap samples

models using the subscales of the DIS-Q (i.e., identity confusion, loss of control, and amnesia) as the unit of analysis, loss of control was identified as the subscale driving this effect (BCCI95% [−.0361, −.0024]). The other subscales did not operate as mediators between trauma and remission at the end of 6-month CBT treatment.

4 | DISCUSSION

In this study, we present the results of a prospective observational study designed to investigate the role of trauma, dissociation, and depression on the therapy outcome of a 6-month validated and manualized CBT programme for DSM-5 BED. Three main findings warrant brief comment.

First, as expected, and in line with previous research (Backholm et al., 2013; Micali et al., 2017), findings show that a history of trauma is the rule rather than the exception in patients with BED, with two in three reporting three or more traumatic experiences. Symptoms of dissociation and depression were also common and moderate in severity, in line with previous findings (Castellini et al., 2012; Nilsson & Svedin, 2006; Vanderlinden, Vandereycken, Van Dyck, & Vertommen, 1993). Second, building upon existing research (Adriaens, Pieters, Campfort, Probst, & Vanderlinden, 2008; Vanderlinden et al., 2012), we found that the protocolized CBT treatment was effective, with more than a third of patients having achieved remission at the end of treatment (i.e., not fulfilling criteria for a DSM-5 BED diagnosis). These rates are comparable with those of other CBT studies. Indeed, studies on the efficacy of treatments for BED show clinically significant change (differently defined across studies) in 22.2–67.6% of patients (De Jong et al., 2018). Third, our study provides novel evidence that the subjective *experience* of the trauma—and not the *number*—is a negative prospective predictor of remission at the end of CBT for BED. Also, although depression was not associated with the outcome, mediation analyses suggest that the level of dissociative symptoms at baseline may partially explain why patients who experience a higher impact from trauma are less likely to obtain remission after 6 months of CBT than those with lower perceived impact levels. Further analyses revealed that this finding was mainly driven by loss of control, over and above baseline eating symptomatology. Hence, this analysis suggests that loss of control might elicit impulsivity-related behaviours such as bingeing episodes, and that deserves special attention at the beginning as well as during the treatment.

Reflecting on these findings from a theoretical point of view (Heatherton & Baumeister, 1991; Root & Fallon, 1989; van der Kolk & van der Hart, 1989), our findings tentatively confirm the thought that the *experience* of trauma has a direct destabilizing effect on psychological regulatory functions later in life, of which impulsivity (in the form of bingeing) is a behavioural manifestation. The indirect effect of dissociation fits in this logic, because by narrowing awareness, it may lower the threshold for patients to initiate bingeing behaviours (Vanderlinden & Vandereycken, 1997). Dissociation might also play a role in the therapeutic sessions; by making patients less connected with the therapist and the group, it might make interventions less effective. Similar findings have been reported for borderline personality disorder (Kleindienst et al., 2011), substance abuse (Ford, Hawke, Alessi, Ledgerwood & Petry, 2007), obsessive–compulsive disorder (Rufer et al., 2005; Semiz,

Inanc, & Bezgin, 2014), and various anxiety disorders (Kleindienst et al., 2011; Michelson, June, Vives, Testa, & Marchione, 1998; Ociskova, Prasko, Latalova, Kamaradova, & Grambal, 2016; Rufer et al., 2005; Semiz et al., 2014; Spitzer, Barnow, Freyberger, & Grabe, 2007). Our findings, therefore, may suggest that as long as the underlying harmful traumatic memories are not addressed, as previously argued for anorexia and bulimia nervosa (Castellini et al., 2018), patients are unable to give up their eating-disordered behaviour. Hence, the present findings make a call to evaluate the implementation of additional trauma-specific modules for traumatized patients in treatment for BED, such as Eye Movement Desensitization and Reprocessing (Shapiro, 2001) or the "phase-oriented treatment of structural dissociation" proposed by Steele, van der Hart, and Nijenhuis (2005).

4.1 | Limitations and future research directions

The present study findings need to be interpreted in light of several limitations. First, as the current 6-month CBT was designed to accommodate the global request for shorter and more efficient therapies by health care systems, it is unclear to what extent results are generalizable to longer treatments. Second, in the absence of post-treatment follow-up data, we were not able to assess the stability over time of the presented results. To address this limitation, future studies could follow and reassess patients after therapy completion. Third, although this study increased knowledge about predictors and potential pathways of treatment success among BED patients, studies with larger samples are needed to evaluate larger sets of variables (e.g., family environment and physical and mental disorder comorbidities) using more complex statistical models (e.g., evaluating both additive and interactive multivariate models). Although the present study provides evidence that the perceived traumatic impact negatively predicts remission after 6 months of CBT treatment, the presented models, for instance, did not include information on timing, duration, and frequency of investigated traumatic experiences. Building upon our findings, these are important future research avenues.

4.2 | Conclusions

These limitations notwithstanding, the present study provides valuable information regarding the impact of trauma on CBT for DSM-5 BED patients. Specifically, the current study adds to the existing knowledge that the impact of trauma (as opposed to the number of experienced traumas) may negatively predict the outcome of CBT treatment and that dissociative symptoms such as "loss of control" may partially explain this finding. Taken together, these findings underscore the importance for clinicians to assess and address traumatic memories and dissociative symptoms systematically in patients with BED. Future research is needed to confirm these findings and evaluate the effectiveness of offering additional evidence-based trauma modules to standard CBT for traumatized BED patients who report a high perceived impact of trauma.

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ENDNOTE

[1] When including patients that did not complete therapy, the indirect effect was no longer significant (BCCI95% [−.0244, .0025])

REFERENCES

Adriaens, A., Pieters, G., Van Campfort, D., Probst, M., & Vanderlinden, J. (2008). A cognitive-behavioural program (one day a week) for patients with obesity and binge eating disorder: Short-term follow-up data. *Psychological Topics*, 17(2), 361–371.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (5th ed. ed.). Arlington, VA: American Psychiatric Association.

Backholm, K., Isomaa, R., & Birgegard, A. (2013). The prevalence and impact of trauma history in eating disorder patients. *European Journal of Psychotraumatology*, 4, 22482. https://doi.org/10.3402/ejpt.v4i0.22482

Beck, A. T., Steer, R. A., & Brown, G. (1996). *Manual for the Beck Depression Inventory-II*. San Antonio, TX: Psychological Corporation.

Brownley, K. A., Berkman, N. D., Peat, C. M., Lohr, K. N., Cullen, K. E., Bann, C. M., & Bulik, C. M. (2016). Binge-eating disorder in adults: A systematic review and meta-analysis. *Annals of Internal Medicine*, 165(6), 409–420. https://doi.org/10.7326/M15-2455

Caslini, M., Bartoli, F., Crocamo, C., Dakanalis, A., Clerici, M., & Carrà, G. (2016). Disentangling the association between child abuse and eating disorders: A systematic review and meta-analysis. *Psychosomatic Medicine*, 78(1), 79–90. https://doi.org/10.1097/PSY.0000000000000233

Castellini, G., Lelli, L., Cassioli, E., Ciampi, E., Zamponi, F., Campone, B., ... Ricca, V. (2018). Different outcomes, psychopathological features, and comorbidities in patients with eating disorders reporting childhood abuse: A 3-year follow-up study. *European Eating Disorders Review*, 26(3), 217–229. https://doi.org/10.1002/erv.2586

Castellini, G., Mannucci, E., Lo Sauro, C., Benni, L., Lazzeretti, L., Ravaldi, C., ... Ricca, V. (2012). Different moderators of

cognitive-behavioral therapy on subjective and objective binge eating in bulimia nervosa and binge eating disorder: A three-year follow-up study. *Psychotherapy and Psychosomatics*, *81*(1), 11–20.

De Jong, M., Schoorl, M., & Hoek, H. W. (2018). Enhanced cognitive behavioural therapy for patients with eating disorders: A systematic review. *Current Opinion in Psychiatry*, *31*(6), 436–444. https://doi.org/10.1097/YCO.0000000000000452

Erskine, H. E., & Whiteford, H. A. (2018). Epidemiology of binge eating disorder. *Current Opinion in Psychiatry*, *31*(6), 462–470. https://doi.org/10.1097/YCO.0000000000000449

Everill, J., Waller, G., & Macdonald, W. (1995). Dissociation in bulimic and non-eating-disordered women. *The International Journal of Eating Disorders*, *17*(2), 127–134. https://doi.org/10.1002/1098-108X(199503)17:2<127::AID-EAT2260170204>3.0.CO;2-B

Fairburn, C., Cooper, Z., & Shafran, R. (2003). Cognitive behaviour therapy for eating disorders: a "transdiagnostic" theory and treatment. *Behaviour Research and Therapy*, *41*(5), 509–528. https://doi.org/10.1016/s0005-7967(02)00088-8

Goldschmidt, A. B., Accurso, E. C., Crosby, R. D., Cao, L., Ellison, J., Smith, T. L., ... Peterson, C. B. (2016). Association between objective and subjective binge eating and psychopathology during a psychological treatment trial for bulimic symptoms. *Appetite*, *107*, 471–477. https://doi.org/10.1016/j.appet.2016.08.104

Grucza, R. A., Przybeck, T. R., & Cloninger, C. R. (2007). Prevalence and correlates of binge eating disorder in a community sample. *Comprehensive Psychiatry*, *48*(2), 124–131. https://doi.org/10.1016/j.comppsych.2006.08.002

Hay, P. (2013). A systematic review of evidence for psychological treatments in eating disorders: 2005–2012. *The International Journal of Eating Disorders*, *46*(5), 462–469. https://doi.org/10.1002/eat.22103

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis a regression-based approach*. New York: Guilford Press.

Heatherton, T. F., & Baumeister, R. F. (1991). Binge eating as escape from self-awareness. *Psychological Bulletin*, *110*(1), 86–108.

Hilbert, A., Herpertz, S., Zipfel, S., Tuschen-Caffier, B., Friederich, H., & Mayr, A., ... de Zwaan, M. (2019). Early change trajectories in cognitive-behavioral therapy for binge-eating disorder. *Behavior Therapy*, *50*(1), 115–125. https://doi.org/10.1016/j.beth.2018.03.013

Hilbert, A., Hoek, H. W., & Schmidt, R. (2017). Evidence-based clinical guidelines for eating disorders: International comparison. *Current Opinion in Psychiatry*, *30*(6), 423–437. https://doi.org/10.1097/YCO.0000000000000360

Hrabosky, J. I., Masheb, R. M., White, M. A., & Grilo, C. M. (2007). Overvaluation of shape and weight in binge eating disorder. *Journal of Consulting and Clinical Psychology*, *75*(1), 175–180. https://doi.org/10.1037/0022-006X.75.1.175

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology*, *59*(1), 12–19.

Kent, A., & Waller, G. (2000). Childhood emotional abuse and eating psychopathology. *Clinical Psychology Review*, *20*(7), 887–903.

Keski-Rahkonen, A., & Mustelin, L. (2016). Epidemiology of eating disorders in Europe: Prevalence, incidence, comorbidity, course, consequences, and risk factors. *Current Opinion in Psychiatry*, *29*(6), 340–345. https://doi.org/10.1097/YCO.0000000000000278

Kleindienst, N., Limberger, M. F., Ebner-Priemer, U. W., Keibel-Mauchnik, J., Dyer, A., Berger, M., ... Bohus, M. (2011). Dissociation predicts poor response to dialectical behavioral therapy in female patients with borderline personality disorder. *Journal of Personality Disorders*, *25*(4), 432–447. https://doi.org/10.1521/pedi.2011.25.4.432

La Mela, C., Maglietta, M., Castellini, G., Amoroso, L., & Lucarelli, S. (2010). Dissociation in eating disorders: Relationship between dissociative experiences and binge-eating episodes. *Comprehensive Psychiatry*, *51*(4), 393–400. https://doi.org/10.1016/j.comppsych.2009.09.008

Lammers, M. W., Vroling, M. S., Ouwens, M. A., Engels, R. C., & van Strien, T. (2015). Predictors of outcome for cognitive behaviour therapy in binge eating disorder. *European Eating Disorders Review*, *23*(3), 219–228. https://doi.org/10.1002/erv.2356

Linardon, J., de la Piedad Garcia, X., & Brennan, L. (2017). Predictors, moderators, and mediators of treatment outcome following manualised cognitive-behavioural therapy for eating disorders: A systematic review. *European Eating Disorders Review*, *25*(1), 3–12. https://doi.org/10.1002/erv.2492

Micali, N., Martini, M. G., Thomas, J. J., Eddy, K. T., Kothari, R., Russell, E., ... Treasure, J. (2017). Lifetime and 12-month prevalence of eating disorders amongst women in mid-life: A population-based study of diagnoses and risk factors. *BMC Medicine*, *15*(1), 12. https://doi.org/10.1186/s12916-016-0766-4

Michelson, L., June, K., Vives, A., Testa, S., & Marchione, N. (1998). The role of trauma and dissociation in cognitive-behavioral psychotherapy outcome and maintenance for panic disorder with agoraphobia. *Behaviour Research and Therapy*, *36*(11), 1011–1050.

Mitchell, K., Mazzeo, S., Schlesinger, M., Brewerton, T., & Smith, B. (2011). Comorbidity of partial and subthreshold ptsd among men and women with eating disorders in the national comorbidity survey-replication study. *International Journal of Eating Disorders*, *45*(3), 307–315. https://doi.org/10.1002/eat.20965

Molendijk, M. L., Hoek, H. W., Brewerton, T. D., & Elzinga, B. M. (2017). Childhood maltreatment and eating disorder pathology: A systematic review and dose-response meta-analysis. *Psychological Medicine*, *47*, 1–15. https://doi.org/10.1017/S0033291716003561

Moulton, S. J., Newman, E., Power, K., Swanson, V., & Day, K. (2015). Childhood trauma and eating psychopathology: A mediating role for dissociation and emotion dysregulation? *Child Abuse & Neglect*, *39*, 167–174. https://doi.org/10.1016/j.chiabu.2014.07.003

National Research Council. (2010). The Prevention and Treatment of Missing Data in Clinical Trials. In *National Research Council (US) Panel on Handling Missing Data in Clinical Trials*. Washington (DC): National Academies Press (US). ISBN-13: 978-0-309-15814-5; ISBN-10: 0-309-15814-1

Nijenhuis, E. R. S., Van Der Hart, O., & Kruger, K. (2002). The psychometric characteristics of the Traumatic Experiences Checklist (TEC): First findings among psychiatric outpatients. *Clinical Psychology & Psychotherapy*, *9*(3), 200–210. https://doi.org/10.1002/cpp.332

Nilsson, D., & Svedin, C. G. (2006). Evaluation of the Swedish version of Dissociation Questionnaire (DIS-Q), Dis-Q-Sweden, among adolescents. *J Trauma & Dissociation*, 7(3), 65–89. https://doi.org/10.1300/J229v07n03_05

Ociskova, M., Prasko, J., Latalova, K., Kamaradova, D., & Grambal, A. (2016). Psychological factors and treatment effectiveness in resistant anxiety disorders in highly comorbid inpatients. *Neuropsychiatric Disease and Treatment*, 12, 1539–1551. https://doi.org/10.2147/NDT.S104301

Palmisano, G. L., Innamorati, M., Susca, G., Traetta, D., Sarracino, D., & Vanderlinden, J. (2018). Childhood traumatic experiences and dissociative phenomena in eating disorders: Level and association with the severity of binge eating symptoms. *Journal of Trauma & Dissociation*, 19(1), 88–107. https://doi.org/10.1080/15299732.2017.1304490

Palmisano, G. L., Innamorati, M., & Vanderlinden, J. (2016). Life adverse experiences in relation with obesity and binge eating disorder: A systematic review. *Journal of Behavioral Addictions*, 5(1), 11–31. https://doi.org/10.1556/2006.5.2016.018

Peterson, C. B., Crow, S. J., Nugent, S., Mitchell, J. E., Engbloom, S., & Mussell, M. P. (2000). Predictors of treatment outcome for binge eating disorder. *The International Journal of Eating Disorders*, 28(2), 131–138.

Rayworth, B., Wise, L., & Harlow, B. (2004). Childhood abuse and risk of eating disorders in women. *Epidemiology*, 15(3), 271–278. https://doi.org/10.1097/01.ede.0000120047.07140.9d

Root, M. P., & Fallon, P. (1989). Treating the victimized bulimic: The functions of binge-purging behavior. *Journal of Interpersonal Violence*, 4(1), 90–100. https://doi.org/10.1177/088626089004001006

Rufer, M., Held, D., Cremer, J., Fricke, S., Moritz, S., Peter, H., & Hand, I. (2005). Dissociation as a predictor of cognitive behavior therapy outcome in patients with obsessive-compulsive disorder. *Psychotherapy and Psychosomatics*, 75(1), 40–46. https://doi.org/10.1159/000089225

Semiz, U. B., Inanc, L., & Bezgin, C. H. (2014). Are trauma and dissociation related to treatment resistance in patients with obsessive-compulsive disorder? *Social Psychiatry and Psychiatric Epidemiology*, 49(8), 1287–1296. https://doi.org/10.1007/s00127-013-0787-7

Shapiro, F. (2001). *Eye movement desensitization and reprocessing (EMDR): Basic principles, protocols, and procedures* (2nd ed.). New York: Guilford Press.

Spitzer, C., Barnow, S., Freyberger, H. J., & Grabe, H. J. (2007). Dissociation predicts symptom-related treatment outcome in short-term inpatient psychotherapy. *The Australian and New Zealand Journal of Psychiatry*, 41(8), 682–687. https://doi.org/10.1080/00048670701449146

Steele, K., van der Hart, O., & Nijenhuis, E. (2005). Phase-oriented treatment of structural dissociation in complex traumatization: Overcoming trauma-related phobias. *J Trauma & Dissociation*, 6(3), 11–53.

Swanson, S. A., Crow, S. J., Le Grange, D., Swendsen, J., & Merikangas, K. R. (2011). Prevalence and correlates of eating disorders in adolescents: Results from the National Comorbidity Survey Replication Adolescent Supplement. *Archives of General Psychiatry*, 68(7), 714–723. https://doi.org/10.1001/archgenpsychiatry.2011.22

van der Kolk, B. A., & van der Hart, O. (1989). Pierre Janet and the breakdown of adaptation in psychological trauma. *The American Journal of Psychiatry*, 146(12), 1530–1540. https://doi.org/10.1176/ajp.146.12.1530

Vanderlinden, J., Adriaensen, A., Vancampfort, D., Pieters, G., Probst, M., & Vansteelandt, K. (2012). A cognitive-behavioral therapeutic program for patients with obesity and binge eating disorder: Short- and long-term follow-up data of a prospective study. *Behavior Modification*, 36(5), 670–686. https://doi.org/10.1177/0145445512439313

Vanderlinden, J., & Palmisano, G. L. (2018). Trauma and eating disorders: A literature review. In *Trauma-informed approaches to eating disorders* (pp. 13–30). New York, NY: Springer Publishing Company.

Vanderlinden, J., Van Dyck, R., Vandereycken, W., Vertommen, H., & Jan Verkes, R. (1993). The dissociation questionnaire (DIS-Q): Development and characteristics of a new self-report questionnaire. *Clinical Psychology & Psychotherapy*, 1(1), 21–27. https://doi.org/10.1002/cpp.5640010105

Vanderlinden, J., & Vandereycken, W. (1997). *Trauma, dissociation, and impulse dyscontrol in eating disorders*. New York: Taylor & Francis / Brunner/Mazel.

Vanderlinden, J., Vandereycken, W., van Dyck, R., & Vertommen, H. (1993). Dissociative experiences and trauma in eating disorders. *The International Journal of Eating Disorders*, 13(2), 187–193.

Vocks, S., Tuschen-Caffier, B., Pietrowsky, R., Rustenbach, S. J., Kersting, A., & Herpertz, S. (2010). Meta-analysis of the effectiveness of psychological and pharmacological treatments for binge eating disorder. *The International Journal of Eating Disorders*, 43(3), 205–217. https://doi.org/10.1002/eat.20696