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Impulsivity and Trait Anger as Predictors of Symptom Intensity in Binge-Eating Disorder Among Adult Women

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Research Article

Keywords: binge-eating disorder, anger, anger expression, impulsivity, urgency

Posted Date: May 28th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9620137/v1

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Additional Declarations: No competing interests reported.

Abstract

Purpose Evidence suggests that impulsivity and anger are associated with eating disorders. However, most research to date has focused either on eating disorders in general or on bulimia nervosa. Studies examining the potential associations of impulsivity and anger with binge-eating disorder (BED) remain limited. The aim of this review was to investigate these relationships.

Methods Women aged 25 to 50 years who met the diagnostic criteria for BED (*N* = 225) were assessed using an author-developed questionnaire evaluating BED symptoms, the *State–Trait Anger Expression Inventory-2* (STAXI-2), and the short version of the *UPPS-P Impulsive Behavior Scale* (S-UPPS-P).

Results BED symptom intensity showed weak positive associations with trait anger, outward expression of anger, impulsivity, and both positive and negative urgency. Negative correlations were found between BED symptom intensity and both outward and inward anger control. Significant differences emerged between the low- and high-intensity BED groups in nearly all aspects of anger, as well as in impulsivity and urgency. Impulsivity and trait anger were found to predict BED symptom intensity to a certain extent.

Conclusions Higher levels of anger, impulsivity, and urgency were associated with greater BED intensity in adult women. However, these associations were weak, suggesting that the variables examined represent only one part of a more complex psychopathological mechanism. Research on the potential relationship between BED and anger remains limited, and the majority of the available studies have focused primarily on bulimia nervosa.

Level of Evidence: Level IV, based on a cross-sectional observational design without a control group

1. Introduction

Binge-eating disorder (BED) is characterized by frequent, recurrent episodes of binge eating accompanied by a subjective sense of loss of control over eating. Consuming large amounts of food is not associated with physical hunger, and these episodes result in substantial psychological distress and overall suffering. The defining feature of a binge-eating episode is the experience of loss of control over eating; additionally, at least three of the symptoms listed by the American Psychiatric Association in the *DSM-5-TR* must be present [1]. Episodes of binge eating occur in the absence of compensatory behaviors aimed at preventing weight gain.

Previous research indicates that individuals with BED are more likely to rely on maladaptive emotion regulation strategies than individuals without eating disorders [2–3]. Individuals with a disturbed relationship with food experience intrusive thoughts about eating, which contribute to increased psychological distress and negative emotions. This gives rise to a vicious cycle in which negative emotions intensify food-related thoughts, and these thoughts further exacerbate the emotional distress [2, 4–5].

Impulsivity, often linked to emotional dysregulation, is a key factor in BED [6], and marked impulse dysregulation has also been associated with difficulties in anger expression [7–8]. Impulsivity is defined as the inability to resist an impulse, drive, or temptation to perform an act that may be harmful to oneself or others [1]. It involves a predisposition toward rapid, unplanned reactions to internal or external stimuli, often with undesirable consequences [9]. A specific dimension of impulsivity that plays a significant role in eating disorders characterized by binge eating is urgency, which refers to acting under the influence of intense, difficult-to-regulate affect. Anger, in turn, is an emotion characterized by tension and hostility, often elicited by frustration, a sense of being wronged, or perceived injustice [1]. Spielberger [10] proposed a multidimensional model of anger that distinguishes between state anger and trait anger. Within this framework, trait anger is understood as a relatively stable personality characteristic reflecting individual differences in the tendency to respond with anger.

There is evidence that impulsivity and anger are associated with eating disorders [11–12]. Impulsivity, conceptualized as a multidimensional construct, is an important factor in both the onset and maintenance of binge eating [13]. Although research on anger in this area remains limited, available studies suggest that affected individuals – articularly patients with bulimia nervosa (BN) – report higher levels of anger than healthy controls [8, 11, 14] and tend to suppress and internalize it excessively [15–16]. Arnow et al. [17] emphasized that anger plays an important role in overeating and binge eating, and that rumination on anger-related thoughts and memories may constitute a maintaining factor in BED [18]. In addition, several studies have pointed to associations among obesity, anger, and impulsivity [19–20]. Obesity itself is also significantly associated with BED [20]. Moreover, compared with individuals with obesity but without a BED diagnosis, patients with BED have been found to exhibit reduced inhibitory control [21–22] and stronger food cravings [23]. This is further supported by findings showing that higher levels of emotional dysregulation and impulsivity significantly increase vulnerability to BED symptoms [24]. Furthermore, research suggests that impulsivity is the only trait consistently associated with both anger and eating-disorder symptoms, although the available evidence concerns mainly bulimia nervosa (BN) and is based on relatively dated studies [8, 25]

Most research to date has focused either on eating disorders in general or on bulimia nervosa. Contemporary research examining the potential associations of BED with impulsivity and the experience of anger remains limited. The aim of the present study was to investigate these relationships. We hypothesized that binge-eating disorder would be associated with higher levels of impulsivity, more frequent experiences of anger, and a greater tendency to suppress its expression. We further hypothesized that more severe BED would be associated with higher levels of the variables under investigation.

2. Materials and Methods

2.1. Procedure

The study employed a cross-sectional design. Data were collected online via a survey link. Participation was promoted through various social media platforms (e.g., Instagram and Facebook), primarily within online support groups for individuals who engage in binge eating. The study included adults only. Participants were informed about the aim of the study and its procedures, as well as about the anonymity of participation and their right to withdraw at any

time. The study was approved by the Research Ethics Committee of the Institute of Psychology at the Cardinal Stefan Wyszyński University in Warsaw (registration number: 19/2022).

2.2. Participants

The study sample consisted of 225 women aged 25 to 50 years (*M* = 33.22, *SD* = 6.1). The participants were members of online support groups for individuals who engage in binge eating. Eligibility for inclusion in the study group required verification of the presence of BED symptoms. For this purpose, the authors used a questionnaire developed specifically for the study and closely based on the *DSM-5-TR* criteria [1]. In accordance with these criteria, the study included individuals who met the necessary condition for a BED diagnosis, namely recurrent episodes of binge eating accompanied by at least three additional symptoms. Participants who were currently receiving treatment for BED, whether pharmacological or psychotherapeutic, were excluded from the study sample. Individuals diagnosed with schizophrenia or bipolar disorder were also excluded.

2.3. Instruments

BED Symptom Scale. The scale developed by Lewandowska was based on the *DSM-5-TR* diagnostic criteria of the American Psychiatric Association for mental disorders. It is a self-report instrument consisting of eight items assessing BED symptoms and one control item addressing compensatory behaviors (Item 9). Participants were asked to report symptoms experienced over the previous month and to rate the intensity of each symptom on a 4-point scale ranging from 1 (*mild*) to 4 (*very severe*). The instrument was designed to verify the presence of BED symptoms in each participant and to assess their intensity.

The State-Trait Anger Expression Inventory-2 (*STAXI-2*) [10]. This self-report instrument assesses a broad range of variables related to the experience, expression, and control of anger. It comprises 10 subscales and 57 items, each rated on a 4-point Likert scale. In the present study, the overall Trait Anger scale and the following subscales were used: Anger Expression-In, Anger Expression-Out, Anger Control-In, and Anger Control-Out. The Polish adaptation of the instrument has shown high reliability for the Trait Anger subscale (Cronbach's α = .83), as well as for the Anger Expression (Cronbach's α = .74) and Anger Control (Cronbach's α = .88) scales.

Short UPPS-P Impulsive Behavior Scale (*S-UPPS-P*) [26]. This self-report questionnaire assesses five personality dimensions of impulsivity. The instrument consists of 20 items and comprises five subscales: Negative Urgency, Positive Urgency, Lack of Premeditation, Lack of Perseverance, and Sensation Seeking. The Polish adaptation of the instrument has demonstrated high internal consistency across all subscales (Cronbach's α values of .80 or higher).

2.4 Statistical analysis

Statistical analyses were conducted using IBM SPSS Statistics, version 29. Basic descriptive statistics and the Kolmogorov-Smirnov test of normality were computed. Based on a k-means cluster analysis, three groups differing in BED symptom intensity were identified. Cluster analysis was used in an exploratory manner to detect potential subgroups that differed in the pattern and intensity of BED symptoms. Given the relatively small sample size, the stability of this solution is limited; accordingly, the cluster-analytic findings should be interpreted as preliminary and hypothesis-generating rather than confirmatory.

Correlation analyses were performed using Spearman's rank-order correlation coefficient. Differences in the variables under study across the three BED symptom intensity groups were examined using one-way ANOVA, followed by Tukey's post hoc tests. In the final step, a linear regression model was tested to determine whether impulsivity and trait anger predicted BED symptom intensity.

Given the exploratory nature of the study, we chose not to apply conservative corrections for multiple testing (e.g., Bonferroni correction) across all analyses. This decision was primarily motivated by the need to avoid inflating the risk of Type II error, which could obscure potentially meaningful associations in a relatively small and homogeneous sample. Nevertheless, particular emphasis is placed on findings with the lowest *p* values ($p < .001$), as these results are less susceptible to Type I error and more likely to remain robust under potential correction procedures.

3. Results

3.1. Descriptive Statistics and Correlation Analysis

As a first step, basic descriptive analyses of the collected data were conducted. Means and standard deviations for the analyzed variables are presented in Table 1.

Table 1
Descriptive Statistics and Normality Test

Variables	*M*	*SD*	*Sk.*	*Kurt.*	*K-S*	*p*	*Min*	*Max*
Age	33.22	6.09	.795	.012	.114	< .001	25	50
Intensity of BED symptoms	20.50	7.55	− .384	− .818	.093	< .001	4	32
Trait Anger	26.76	6.09	− .035	− .490	.071	.008	13	40
Anger Expression-Out	18.65	4.85	.379	− .104	.081	< .001	9	32
Anger Expression-In	22.54	4.42	− .472	− .171	.087	< .001	9	31
Anger Control-Out	21.96	4.47	− .086	− .114	.077	< .001	10	32
Anger Control-In	22.28	4.64	− .458	.313	.107	< .001	8	32
Impulivity	45.27	8.39	.647	.668	.084	< .001	28	76
Negative Urgency	10.93	2.82	− .089	− .570	.086	< .001	4	16
Positive Urgency	8.89	3.15	.472	− .372	.140	< .001	4	16
Sensation Seeking	8.98	2.08	.770	.134	.158	< .001	5	16
Lack of Premeditation	7.92	2.632	.760	.748	.163	< .001	4	16
Lack of Perseverance	8.56	2.89	.519	.748	.123	< .001	4	16
Note. Analyses were performed for N = 225 observations; K-S – Kolmogorov-Smirnov test								

Correlation analysis was then conducted. The results showed weak positive associations between BED symptom intensity and Trait Anger (rho = .29, $p < .01$), Anger Expression-Out (rho = .17, $p < .05$), Impulsivity (rho = .25, $p < .01$), Positive Urgency (rho = .18, $p < .01$), and Negative Urgency (rho = .13, $p < .05$). In contrast, BED symptom intensity was negatively correlated with both Anger Control-Out (rho = − .28, $p < .01$) and Anger Control-In (rho = − .22, $p < .01$). Detailed results are presented in Table 2.

Table 2
Rho-Spearman's Correlations Between Variables for the Entire Sample

Variables	Intensity of BED	Trait Anger	Anger Expression-Out	Anger Expression-In	Anger Control-Out	Anger Control-In	Impulivity	Negative Urgency	Positive Urgency	Sensation Seeking	Lack of Premedit
Intensity of BED	-	.293**	.166*	.122	− .281**	− .217**	.247**	.133*	.184**	.099	.096
Trait Anger	.293**	-	.619**	.087	− .558**	− .351**	.255**	.322**	.154*	− .009	.064
Anger Expression-Out	.166*	.619**	-	− .165*	− .632**	− .347**	.185**	.318**	.203**	− .142*	.005
Anger Expression-In	.122	.087	− .165*	-	.277**	.077	.058	.076	.066	.013	− .080
Anger Control-Out	− .281**	− .558**	− .632**	.277**	-	.594**	− .242**	− .238**	− .141*	.007	− .76**
Anger Control-In	− .217**	− .351**	− .347**	.077	.594**	-	− .165*	− .133*	− .074	− .014	− .210**
Impulivity	.247**	.255**	.185**	.058	− .242**	− .165*	-	.553**	.718**	.401**	.601**
Negative Urgency	.133*	.322**	.318**	.076	− .238**	− .133*	.553**	-	.430**	− .075	.140*
Positive Urgency	.184**	.154*	.203**	.066	− .141*	− .074	.718**	.430**	-	.162*	.208**
Sensation Seeking	.099	− .009	− .142*	.013	.007	− .014	.401**	− .075	.162*	-	.191**
Lack of Premeditation	.096	.064	.005	− .080	− .176**	− .210**	.601**	.140*	.208**	.191**	-
Lack of Perseverance	.182**	.048	.032	.076	− .052	.008	.614**	.074	.236**	.186**	.397**
Note. * $p < .05$; ** $p < .01$; *** $p < .001$											

3.2. BED Symptom Intensity in Relation to Anger Expression, Anger Control, and Trait Anger

In the next step, a k-means cluster analysis was conducted to identify three groups differing in BED symptom intensity. The results of the between-cluster comparisons are presented in Table 3.

Table 3
Comparison of BED Symptom Intensity Groups with Respect to Trait Anger, Anger Expression-Out, and Anger Control

Variables	Group 1 (*M* = 9) *N* = 43		Group 2 (*M* = 19) *N* = 90		Group 3 (*M* = 28) *N* = 92		*F(2)*	*p*	η^2	post hoc
	M	*SD*	*M*	*SD*	*M*	*SD*				
Trait Anger	23.88	5.73	26.34	6.025	28.52	5.79	**9.23**	**< .001**	**0.079**	1–3
Anger Expression-Out	17.19	4.39	18.48	4.78	19.5	4.99	**3.55**	**.031**	**0.031**	1–3
Anger Control-Out	24.14	3.94	22.13	4.27	20.78	4.54	**8.96**	**< .001**	**0.075**	1–2 1–3
Anger Control-In	23.93	4.02	22.69	4.20	21.11	5.037	**6.29**	**.002**	**0.054**	1–3

Note. Post hoc comparisons were performed using Tukey's test; coefficients shown in bold indicate statistically significant associations.

Cluster analysis identified three groups: Group 1, with a mean BED symptom intensity score of 9 (mild BED); Group 2, with a mean score of 19 (moderate BED); and Group 3, with a mean score of 28 (severe BED). To compare the three groups with mild, moderate, and severe BED symptom intensity, a one-way analysis of variance (ANOVA) was conducted. The results showed that the groups differed significantly in Trait Anger ($F(2) = 9.23$, $p < .001$), Anger Expression-Out ($F(2) = 3.55$, $p = .031$), Anger Control-Out ($F(2) = 8.96$, $p < .001$), and Anger Control-In ($F(2) = 6.29$, $p = .002$). The observed effects were moderate for Trait Anger and Anger Control-Out, and small for Anger Expression-Out and Anger Control-In [27]. To determine the sources of these differences, post hoc tests were performed. The results indicated that the mild BED group differed from the severe BED group on all variables examined. Compared with individuals with mild BED symptom intensity, those with severe BED symptom intensity showed higher levels of Trait Anger ($M = 28.52$, $SD = 5.79$, $p < .001$) and Anger Expression-Out ($M = 19.50$, $SD = 4.99$, $p = .031$), as well as lower levels of Anger Control-Out ($M = 20.78$, $SD = 4.54$, $p < .001$) and Anger Control-In ($M = 21.11$, $SD = 5.04$, $p = .002$). Means, standard deviations, *F* values, and the results of Tukey's post hoc test for each group are presented in Table 3.

3.3. BED Symptom Intensity and Impulsivity, Negative Urgency, and Positive Urgency

In the next step, the same three BED symptom intensity groups were compared with respect to impulsivity and urgency. To this end, a one-way analysis of variance (ANOVA) was again performed. The results showed that the groups differed significantly in Impulsivity ($F(2) = 5.37$, $p = .005$), Negative Urgency ($F(2) = 3.12$, $p = .046$), and Positive Urgency ($F(2) = 4.46$, $p = .013$). However, the observed effect sizes were small [27]. To determine the sources of these differences, post hoc tests were conducted. The results again showed that the mild BED group differed from the severe BED group on all variables examined. Compared with the mild BED group, individuals with severe BED symptom intensity showed higher levels of Impulsivity ($M = 46.97$, $SD = 8.73$, $p = .005$), Negative Urgency ($M = 11.21$, $SD = 3.17$, $p = .046$), and Positive Urgency ($M = 9.34$, $SD = 3.28$, $p = .013$). In addition, the mild BED group ($M = 7.65$, $SD = 2.68$, $p = .013$) showed lower levels of Positive Urgency than both the moderate BED group ($M = 9.02$, $SD = 3.11$) and the severe BED group ($M = 9.34$, $SD = 3.28$). Means, standard deviations, *F* values, and the results of Tukey's post hoc test for each group are presented in Table 4.

Table 4
Comparison of BED Symptom Intensity Groups in Terms of Impulsivity, Negative Urgency, and Positive Urgency

Variables	Mild Intensity BED (1) *N* = 43		Moderate Intensity BED (2) *N* = 90		Severe Intensity BED (3) *N* = 92		*F(2)*	*p*	η^2	post hoc
	M	*SD*	*M*	*SD*	*M*	*SD*				
Impulivity	42,00	7,64	45,09	7,97	46,97	8,73	**5.37**	**.005**	**0.046**	1–3
Negative Urgency	9,98	2,46	11,10	2,52	11,21	3,17	**3.12**	**.046**	**0.027**	1–3
Positive Urgency	7,65	2,68	9,02	3,11	9,34	3,28	**4.46**	**.013**	**0.039**	1–2 1–3

Note. Post hoc comparisons were performed using Tukey's test; coefficients shown in bold indicate statistically significant associations.

3.4. Predicting BED Symptom Intensity from Impulsivity and Trait Anger

In the final step, a linear regression analysis was performed to determine whether Impulsivity and Trait Anger predicted BED symptom intensity. Two predictors were entered into the model: Impulsivity and Trait Anger, with BED symptom intensity as the dependent variable. The model was well fitted to the data, $F(2, 222) = 16.32$, $p < .001$, adjusted $R^2 = .13$, and explained 13% of the variance in the dependent variable, suggesting a moderate predictive value of these variables. Both Trait Anger and Impulsivity emerged as significant predictors in the model. Higher levels of Trait Anger were associated with greater BED symptom intensity ($\beta = .33$, $t(222) = 4.12$, $p < .001$), as were higher levels of Impulsivity ($\beta = .20$, $t(222) = 3.08$, $p = .002$). Detailed regression results are presented in Table 5.

Table 5
Prediction of Intensity BED Based on Trait Anger and Impulsivity – Linear Regression Analysis

	B	***SE***	**β**	***t***	***p***
***F*(2;222) = 16.32; *p* < 0.001** **$R^2_{adj.}$ = 0.13**					
(Constant)	3.759	3.06		1.23	.220
Trait Anger	.326	.079	.263	4.12	**< .001**
Impulsivity	.177	.057	.197	3.08	**.002**
Note. Dependent variable: Intensity of BED; predictors: (Constant), Trait Anger, Impulsivity					

4. Discussion

The present study examined various aspects of anger and impulsivity in women with binge-eating disorder (BED). Positive, albeit weak, associations were found between BED symptom intensity and both trait anger and anger expression-out, as well as negative associations between BED and anger control. This pattern is consistent with emotion regulation accounts, according to which individuals with BED are more likely to experience difficulties in managing negative emotions [2–3] The findings suggest that it may not be the intensity of anger itself, but rather a limited capacity for its adaptive regulation, that plays a significant role in BED. This is consistent with Spielberger's [10] conceptualization, according to which dysfunctional patterns of anger expression and control constitute relatively stable personality dispositions that promote maladaptive behaviors. In addition, transdiagnostic models of eating disorders conceptualize binge eating as a short-term emotion regulation strategy. Individuals with an increased tendency to respond with anger and reduced control over its expression may be more likely to experience states of emotional tension that facilitate episodes of loss of control over eating [3, 28–29]. This interpretation is further supported by an interesting study showing that greater involvement in binge-eating episodes was associated with a greater tendency toward physical aggression among U.S. college students [30]. It is worth noting that the effect sizes for the anger-related variables ranged from moderate to small. This may suggest that anger is one of many affective risk factors, and that its role may become particularly evident in interaction with other processes, such as impulsivity, rumination, or low frustration tolerance.

The positive associations between BED symptom intensity and impulsivity, as well as positive and negative urgency, are consistent with models highlighting the central role of emotional reactivity in impulsive eating. Urgency, a specific dimension of impulsivity related to acting under the influence of strong emotions, has previously been identified as an important risk mechanism in eating disorders [6, 31]. The present findings suggest that both negative and positive emotional arousal may contribute to binge-eating episodes. This result is in line with the view that binge eating serves not only to reduce negative affect, but is also linked to reward-related mechanisms. The stronger association between positive urgency and BED may be explained by the tendency to associate eating with reward and pleasure, a tendency that may be further reinforced by the widespread availability of palatable food. Previous studies indicate that individuals diagnosed with BED show greater reward sensitivity and more reactive behavior than individuals without this diagnosis [32–33].

Comparisons across groups differing in BED intensity further support this interpretation. Women with more severe symptoms were characterized by greater impulsivity, higher trait anger, and lower control over anger expression than women with mild BED. This suggests that as difficulties in emotion regulation increase, BED symptoms may also become more severe. This interpretation is consistent with previous findings on impaired inhibition and impulse control in BED [21–22].

The regression analysis showed that trait anger and impulsivity were significant, albeit moderate, predictors of BED symptom intensity. The finding that the model explained 13% of the variance suggests that the variables examined represent an important, but not exclusive, component of the mechanisms underlying the disorder. This finding should therefore be interpreted as moderate, yet consistent with the multifactorial nature of BED. It is possible that impulsivity functions as a relatively stable vulnerability factor, whereas difficulties in the regulation of anger may act as a trigger for binge-eating episodes. It is also possible that anger is particularly relevant only in a specific subgroup of patients with BED, such as those characterized by high impulsivity. BED is increasingly recognized as a multifactorial disorder involving emotional dysregulation, impulsivity, and impaired control over eating behavior [33–34].

5. Strength and limits

This study contributes current evidence to the still relatively underexplored area of anger and impulsivity in BED. The findings may have important implications for clinical practice, supporting the inclusion of techniques focused on emotion regulation – particularly the experience and regulation of anger – in the treatment of BED. Interventions aimed at strengthening skills in recognizing, tolerating, and adaptively expressing anger may be especially beneficial for patients with a more pronounced impulsive-affective profile.

The findings should be interpreted in the context of several study limitations that, despite our efforts, could not be entirely avoided. Because the number of male participants was too small, men were excluded from the sample. Consequently, the final sample consisted exclusively of women, which limits the generalizability of the findings.

The cross-sectional nature of the study design precludes conclusions regarding the direction of causal relationships. The exploratory character of the cluster analysis likewise calls for caution in interpretation. The questionnaire used to assess the presence and intensity of BED symptoms was neither standardized nor normed. This limits the extent to which the findings can be generalized and therefore warrants caution in their interpretation. However, the consistency of

the items with the *DSM-5-TR* diagnostic criteria supports the credibility of the data collected. Future studies should focus on developing and validating a standardized instrument for the assessment of BED.

6. Conclusions

The findings largely support the underlying theoretical assumptions, indicating that both impulsivity and trait anger are significantly associated with BED symptom intensity, although these associations were small in magnitude. The positive associations between BED symptom intensity and both trait anger and anger expression-out, together with the negative association between BED and anger control, point to a consistent pattern of emotional dysregulation. Overall, the results support the view that difficulties in anger regulation and impulsivity, including urgency, are significantly, albeit moderately, associated with the intensity of BED symptoms in women. At the same time, the observed relationships were weak, suggesting that the variables examined represent only part of a more complex psychopathological mechanism. To date, relatively few studies have investigated the potential relationship between BED and the experience of anger, and most of the available literature in this area has focused primarily on bulimia nervosa.

What is already known on this subject?

Previous research has shown that both impulsivity and difficulties in emotion regulation are associated with eating disorders, particularly bulimia nervosa, while evidence specific to binge-eating disorder (BED) remains limited. Studies also suggest that anger may play a role in disordered eating, but its relationship with BED has been insufficiently explored.

What this study adds?

This study shows that both trait anger and impulsivity are moderate but significant predictors of binge-eating disorder (BED) symptom severity in adult women, with anger regulation (rather than anger intensity alone) playing an important role. It also demonstrates that different dimensions of impulsivity are associated with more severe BED symptoms. These findings suggest that targeting both impulsivity and anger regulation may be relevant for improving assessment and treatment approaches in BED.

Declarations

Acknowledgments: The authors wish to thank all the participants for their time and openness in sharing their experiences

Authors' Contributions: Conceptualization, K.L., W.K.; methodology, K.L., W.K., W.S.; data collection, K.L.; analyses, K.L.; interpretation of data, K.L., W.S., W.K., J.I.; writing—original draft preparation, K.L.; writing—review and editing, K.L., W.S., W.K., J.I.; supervision, W.K. All authors read and approved the final manuscript. All authors read and approved the final manuscript.

Funding: No funding was received for conducting this study.

Competing interests: The authors declare that they have no competing interests.

Ethics approval and consent to participate: The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Ethics and Bioethics Committee of the Cardinal Stefan Wyszyński University in Warsaw (19/2022; date of approval: 15 September 2022). Informed consent was obtained from all participants involved in the study.

Consent to publish: Not applicable

Consent to participate: Informed consent was obtained from all individual participants included in the study

Data Availability Statement: The datasets are available from the corresponding author on reasonable request

Additional information

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