Original Article

The impact of posttraumatic symptomatology on binge eating behaviour and the role of boredom, shame, and guilt

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SUMMARY

Aim

We aimed to investigate the relationship between trauma and binge eating behaviour focusing on the role of emotional states that may play a mediating role such as boredom, shame, and guilt. This study is the first, to our knowledge, to highlight the role of boredom and shame in the relationship between trauma and binge eating behaviour.

Methods

Through an online platform shared on major social networks, we recruited a snowball convenience sample of 1025 subjects (731 females and 293 males; mean age 29.62 years ± 10.9). Recruited subjects completed a psychometric protocol that included the following measurement tools: (1) the International Trauma Questionnaire (ITQ), (2) the Binge Eating Scale (BES), (3) the Short Form of the State Shame and Guilt Scale (SSGS-8), (4) the Short Form of the Multidimensional State Boredom Scale (MSBS-SF). Subsequently, acorrelation, a regression analysis, and a mediation model were performed.

Results

The variables were all positively and significantly correlated; it was shown that the severity of Disturbances in Self-Organization (DSO) symptoms was the variable that most correlated with the severity of binge eating behavior symptoms. Multiple linear regression, in which binge eating behavior was the outcome, produced a significant model. Disturbances in self-organization, boredom, and shame were significant predictors, while PTSD symptomatology and guilt were not significant. Mediation analysis, in which boredom, shame, and guilt acted as mediators, revealed a significant direct effect of disturbances in self-organization symptoms on binge eating behavior symptoms, a significant indirect effect, and a significant total effect. Shame and boredom result significant mediators of the relationship between disturbances of self-organization and binge eating behavior.

Conclusion

This study shows that the way a traumatic experience can influence binge eating behavior is related more to the negative effect of traumatic experiences on disturbances of self-organization symptomatology (emotional regulation, self-conception, and relationships) rather than to the symptoms of re-expiring, avoidance, and hyperarousal (PTSD cluster). Difficulties in emotional regulation are related to the emotional states of boredom and shame that could act as triggers for problematic eating behavior.

Key words: binge eating, trauma, PTSD, disturbances in self-organization, boredom, shame

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Introduction

A traumatic experience can cause posttraumatic stress disorder (PTSD), a condition characterized by aspectrum of psychopathological symptoms such as intrusive thoughts, strategies to avoid memories associated with

the original trauma, hyperarousal with the sense of current threat, and negative alterations in cognitions and mood [1]. The International Classification of Diseases, 11th Revision (ICD-11) proposes the term "complex posttraumatic stress disorder" (cPTSD) as a clinical disorder encompassing the primary symptoms of PTSD. However, it is conceptually distinguished from PTSD based on symptoms that reflect "disorders of self-organisation" (DSO), a cluster of symptoms which is characterized by affective dysregulation (e.g. heightened emotional reactivity, anger outbursts, feeling emotionally numb or dissociated), a negative self-concept (e.g. feeling diminished, defeated or worthless; pervasive feelings of shame, guilt), and enduring disturbances in relationships (e.g., feeling distant from others, having difficulty maintaining intimate relationships [2]. Data collected by Brady et al. suggest that the vast majority of individuals with PTSD meet the criteria for at least one other psychiatric disorder, and approximately 50 per cent have three or more psychiatric diagnoses [3]. This can be related to the negative consequences on emotion regulation associated with functional impairment beyond PTSD symptom severity [4]. PTSD symptoms' severity has been robustly associated with the lack of emotional awareness, lack of emotional clarity, difficulties with engaging in goal-directed behaviors, impulse control difficulties, nonacceptance of emotions, and dysfunctional beliefs about emotion regulation [5].

A possible psychopathological manifestation of trauma may be related to eating behaviors. Binge eating disorder (BED) is a psychiatric disorder characterized by frequent episodes of binge eating, accompanied by a sense of loss of control and psychological distress, in the absence of compensatory weight-control behaviors such as purging or fasting [1]. BED is the most common eating disorder, with a lifetime prevalence of approximately 2% in developed countries [6]. Harrington et al. found that trauma exposure significantly predicted women's binge eating severity [7].

In light of comorbidity, researchers need to explore the factors that may contribute to the maintenance of these two disorders. Rabito-Alcón et al. showed that depressive symptomatology, anxiety, and dissociation significantly mediate the relationship between childhood trauma and eating disorders in adulthood [8]. However, no one focused on the possible contribution that the emotional states common to the two conditions could make.

Among individuals with BED, both internal shame (feelings of being lesser than others) and external shame (experience of one's flaws and deficits being exposed to others) are associated with theseverity of binge eating symptoms [9]. Shame is a highly complex, socially important emotion that involves the negative evaluation of the self [10], it represents an emotion often experienced by traumatised individuals. Posttraumatic shame can be construed as acute or prolonged feelings of distress associated with self-attributions of having committed dishonourable acts in the context of the traumatic situation [11]. The more global and stable the shame-based attributions following trauma are, the higher the likelihood of posttraumatic symptoms will be [12].

Also guilt is also an emotion often experienced by trauma victims and characterising individuals with Binge Eating behaviour; Raffone et al. showed that guilt represents a central driver for compensatory behaviors in the maladaptive eating behavior cycles [13]. Guilt is an unpleasant feeling with an accompanying belief that one should have felt, thought, or acted differently [14]. Posttraumatic guilt can be defined as the fact of experiencing acute or prolonged states of guilt in the context of a traumatic situation. It depends on the types of failed enactments in the traumatic situation that generate negative consequences for self and others [11].

Boredom can be considered both an emotional and motivational state. It can be triggered by external factors, such as lack of choice, monotony, and inappropriate levels of challenge [15]. Ahlich & Rancourt showed that boredom proneness is a significant predictor of emotional eating [16]. It has also been linked to various psychological problems duringthe COVID-19 pandemic, such as increased alcohol and substance use, problematic social media and Internet use, perceived stress, and psychological distress, including symptoms of depression, anxiety, and insomnia [17].

Aims and hypotheses

Based on these considerations, we hypothesized that the severity of trauma and binge eating behaviour might be related and that boredom, shame, and guilt might all play a significant role in predicting binge eating behaviour and in mediating the relationship between posttraumatic and binge eating behaviour. Our goal was to study the relationship between posttraumatic symptomatology and binge eating behavior by focusing on the role that negative emotions triggered and perpetuated by trauma might play in this relationship. Moreover, we wanted to verify the role of shame, guilt, and boredom. Therefore, we aim to investigate the relationships among posttraumatic symptoms, disturbances of self-organization symptoms, binge eating behavior, shame, guilt, and boredom in a non-clinical population. Our goal was to study the relationship between posttraumatic symptomatology and binge eating behavior by focusing on the role that negative emotions triggered and perpetuated by trauma might play in this relationship

Materials and methods

Recruitment

Through Google Forms, publicized and forwarded on major social media networks, a snowball convenience sample of 1025 people was recruited (731 females, 294 males) between 18 and 60 years (mean age 29.62 years). Participants have compiled demographic and self-report questionnaires to assess trauma, binge eating, boredom, shame, and guilt. All participants were informed about the research and did not receive any financial remuneration for participating in this study. The entire protocol was anonymous and the ethical committee of the Department of Dynamic and Clinical Psychology, and Health Studies of the "Sapienza" University of Rome approved this study. All participants who had not consented or responded to all protocol sections were excluded from the research. No specific exclusion criteria were applied.

Measures

Sociodemographic characteristics

We collected some basic socio-demographic information about gender, age, education, nationality, relational status, andsexual orientation, as well as anthropometric parameters to assess body mass index (BMI).

Posttraumatic symptoms

Posttraumatic symptoms were evaluated through theInternational Trauma Questionnaire (ITQ), a brief self-report scale that focuses on posttraumatic stress disorder and complex posttraumatic stress disorder. The ITQ was developed to be consistent with the organizing principles of the ICD-11, as set forth by the World Health Organization, which are to maximize clinical utility and ensure international applicability through a focus on the core symptoms of a given disorder. The ITQ first asks to identify the most distressing traumatic event and how long ago this event occurred. Participants are then instructed to answer all questions about that event. The ITQ includes six items to measure each of the PTSD symptoms across the clusters of Re-experiencing in the Here and Now, Avoidance of internal and external reminders, and Hyperarousal. Participants indicated how much these symptoms have interfered with their ability to function in life in the past month across three items. The ITQ also includes six items measuring each 'Disturbance in Self-Organization' (DSO) symptom from the three clusters of 'Affective Dysregulation', 'Negative SelfConcept', and 'Disturbed Relationships'. The items use a 5-point Likert scale. Both the subscales, PTSD and DSO, of the Italian version of ITQ, have good reliability with an α=0.88 [18,19].

Binge Eating Disorder

The Binge Eating Scale (BES) evaluates Binge Eating behavior. The BES is a 16-item scale self-report measure developed to assess the presence of binge eating behavior (e.g. eating quickly and overeating) and the feelings/cognitions associated with binge eating (e.g. feeling guilty after binge eating) along a 4-point Likert scale. The BES is usually employed as a unidimensional measure of binge eating severity. Marcus has identified three different levels of severity: individuals scoring 17 or less were considered not reporting significant binge eating, those scoring between 18 and 26 were considered moderate binge eaters, and those scoring 27 and above were considered severe binge eaters. These categories had a 98% concordance rate with a diagnosis using a semi-structured interview. The reliability of the Italian version is α=0.89 [20,21].

Shame and guilt

Shame and Guilt were assessed with theState Shame and Guilt Scale (SSGS-8), a psychometric test evaluating 8 items along a 5-point Likert scale. The sum of 4 specific items can be used to detect shame and guilt, respectively, as two different domains. In the Italian version, Shame has an α=0.82 while Guilt has an α=0.87 [22,23].

Boredom

Boredom was evaluated using the short form of the Multidimensional State Boredom Scale (MSBS-SF). The scale consists of 8 items each rated on a 7-point Likert scale that cumulatively assesses the individual's experience of boredom. Cronbach's alpha for the Italian version is 0.95 [24,25].

Statistical Analysis

Continuous variables were statistically represented as means and standard deviations (SD). Dichotomic variables were represented statistically as absolute and percentage frequencies. A bivariate Pearson correlation matrix was performed to test the association level among the different variables based on psychometric tests with the related scales and subscales. A multiple linear regression using stepwise methodology was conducted to quantify the relationship between binge eating disorder, which was the outcome variable in our analysis, and PTSD, disturbances in self-organization, shame, guilt, and boredom, which were the explanatory variables. A mediation analysis was conducted using disturbances in self-organization as a predictor variable, binge eating disorder as outcome variable, and significant explanatory variables derived from multiple linear regression as mediating variables. The effects were considered significant when the resulting confidence interval did not contain 0. Each alpha error lower

than 5% indicated statistical significance. Data analysis was performed using the program JASP 0.16.3.

Results

Table I shows the sociodemographic characteristics of the recruited sample. The mean scores and standard deviations of the psychometric measures are shown in Table II. The sociodemographic aspects revealed that the sample is mainly composed of women (71.3%) and participants in a relationship (65.8%). The sample consisted of individuals resident in Italy (33.1% living in Rome), almost exclusively with Italian nationality (97.6%).

TABLE I. *Demographics characteristics of the sample.*

N=1025; AGE 29.6 ± 10.9.		N	%
GENDER			
	Woman	731	71.3
	Man	294	28.7
NATIONALITY			
	Italian	999	97.5
	Not Italian	26	2.5
SEXUAL ORIENTATION			
	Heterosexual	866	84.5
	Bisexual	64	6.2
	Homosexual	95	9.3
RELATIONSHIP STATE			
	Single	351	34.2
	In a relationship	674	65.8
YEARS OF STUDY			
	<=13	460	44.9
	13<x<15	277	27
	>=15	288	28.1
BMI			
	< 25	735	71.7
	>=25	289	28.3

TABLE II. *Psychometric characteristics of the sample.*

	Mean	Std. Deviation
BES	10.026	7.487
MSBS	29.704	12.233
SHAME	7.540	3.965
GUILT	7.638	4.375
PTSD	9.308	5.805
DSO	8.952	5.676

[a] *PTSD=posttraumatic stress symptomatology, DSO=disturbances of self-organization, MSBS=boredom, SHAME=shame, GUILT=guilt, BES=binge eating behavior.*

Through a pairwise correlation matrix, we found that the considered psychometric variables were all positively correlated. The Pearson correlation coefficient among PTSD, DSO, BES, MSBS, Shame and Guilt were all statistically significant (Tab. III).

Multiple linear regression (Tab. IV) in which BES was the outcome variable and DSO, PTSD, Shame, Guilt and MSBS revealed that the significant model characterized by higher adjusted R^2 (R^2=0.195; p<0.001) was the one with DSO, Shame, and MSBS. Guilt and PTSD were not significant predictors and were therefore excluded from the model conducted with stepwise methodology.

Mediation analysis (Tab. V) revealed a significant direct effect of DSO on BES (Estimate std=0.047; p<0.001); a significant indirect effect of DSO on BES (Estimate std=0.027; p<0.001), in light of the significant mediation of Shame (Estimate std=0.012; p=0.016) and MSBS (Estimate std=0.015; p<0.001); a significant total effect of DSO on BES (Estimate std=0.074; p<0.001). The path plot of the mediation analysis is shown in Figure 1.

Discussion

The association between posttraumatic symptomatology and binge eating symptoms [26,27], is confirmed in this study. The way traumatic events negatively affect eating behavior, however, does not seem primarily to be associated with classic PTSD symptomatology. A traumatic event is characterized by extreme stress that overwhelms a person's ability to cope, potentially causing stable disturbances in self-organization [4]. Our results show that the most negative outcomes of trauma at the level of eating behavior psychopathology are related to the destructive effect of trauma on personal relationships with others, relationship with self, and emotional regulation skills rather than to traumatic symptoms [28]. Boredom, shame, and guilt also correlate more strongly with self-organization disorders than with classic PTSD symptoms. All these emotional states can play a relevant role in binge eating episodes [16,29,30]. From the multiple linear regression conducted using binge eating symptomatology as the outcome variable, it appears that DSO symptoms were the best predictors among those included and that shame and boredom also significantly predicted binge eating behaviors. The psychopathological manifestation of trauma at the eating level can be motivated by the fact that food can represent a reward capable of temporarily increasing the mood [31]. Negative states, like sadness or stress, increase theintake of hedonic foods [32]. This result is in line with other studies in which hypersexual behavior

TABLE III. *Pearson's Correlations between the study's variables*

Variable		PTSD	DSO	MSBS	SHAME	GUILT	BES
1. PTSD	Pearson's r	—					
2. DSO	Pearson's r	0.419***	—				
3. MSBS	Pearson's r	0.343***	0.613***	—			
4. SHAME	Pearson's r	0.366***	0.672***	0.560***	—		
5. GUILT	Pearson's r	0.308***	0.507***	0.393***	0.627***	—	
6. BES	Pearson's r	0.225***	0.420***	0.357***	0.357***	0.248***	—

[a] *PTSD=posttraumatic stress symptomatology, DSO=disturbances of self-organization, MSBS=boredom, SHAME=shame, GUILT=guilt, BES=binge eating behavior.*
[b] ** p<0.05. ** p<0.01. ***p<0.001.*

TABLE IV. *Multiple linear regression.*

Model summary: R^2=0.197; Adjusted R^2=0.195; ***p<0.001.

Model		Unstandardized	Standard Error	Standardized	T	*P*
H_1	(Intercept)	2.951	0.570		5.172	<. 001***
	DSO	0.354	0.054	0.269	6.550	<. 001***
	SHAME	0.190	0.074	0.101	2.571	0.010**
	MSBS	0.083	0.022	0.136	3.704	<. 001***

[a] *Dependent Variable: BES=binge eating behavior. DSO=disturbances of self-organization, MSBS=boredom, SHAME=shame*
[b] ** p<0.05. ** p<0.01. ***p<0.001.*

TABLE V. *Mediation analysis.*

		Estimate std.	Std. Error	*p*
Total effect	DSO→BES	0.074	0.005	<0.001***
Direct effect	DSO→BES	0.047	0.007	<0.001***
Indirect effect	DSO→BES	0.027	0.005	<0.001***
	DSO→MSBS→BES	0.015	0.004	<0.001***
	DSO→SHAME→BES	0.012	0.005	0.01**
Residual covariances	MSBS→SHAME	0.148	0.019	<0.001***

[a] *PTSD=posttraumatic stress symptomatology, DSO=disturbances of self-organization, MSBS=boredom, SHAME=shame, GUILT=guilt, BES=binge eating behavior.*
[b] ** p<0.05. ** p<0.01. ***p<0.001.*

was significantly predicted by trauma [33]. Sex, as well as food, can be used as a mood regulator and a tool to cope with intolerable feelings [33].

Trauma and its consequences on emotion regulation difficulties (DSO cluster) may contribute to difficulties in getting out of a state of boredom. It was demonstrated that people with major pandemic trauma felt more bored, particularly when they lacked clarity about their emotions and struggled more to engage in purposeful behaviors when experiencing negative emotions [34]. Boredom could, therefore, act as a trigger for uncontrolled eating behavior. Havermans compared the amount of food consumed by individuals engaged in a boring task versus a non-boring task, recording almost twice as much food consumption in the former group as in the second [35]. This difficulty in getting out of boredom without resorting to dysfunctional behaviors could be exacerbated in individuals with difficulties in emotional self-regulation [34], which is one of the core symptoms of DSO.

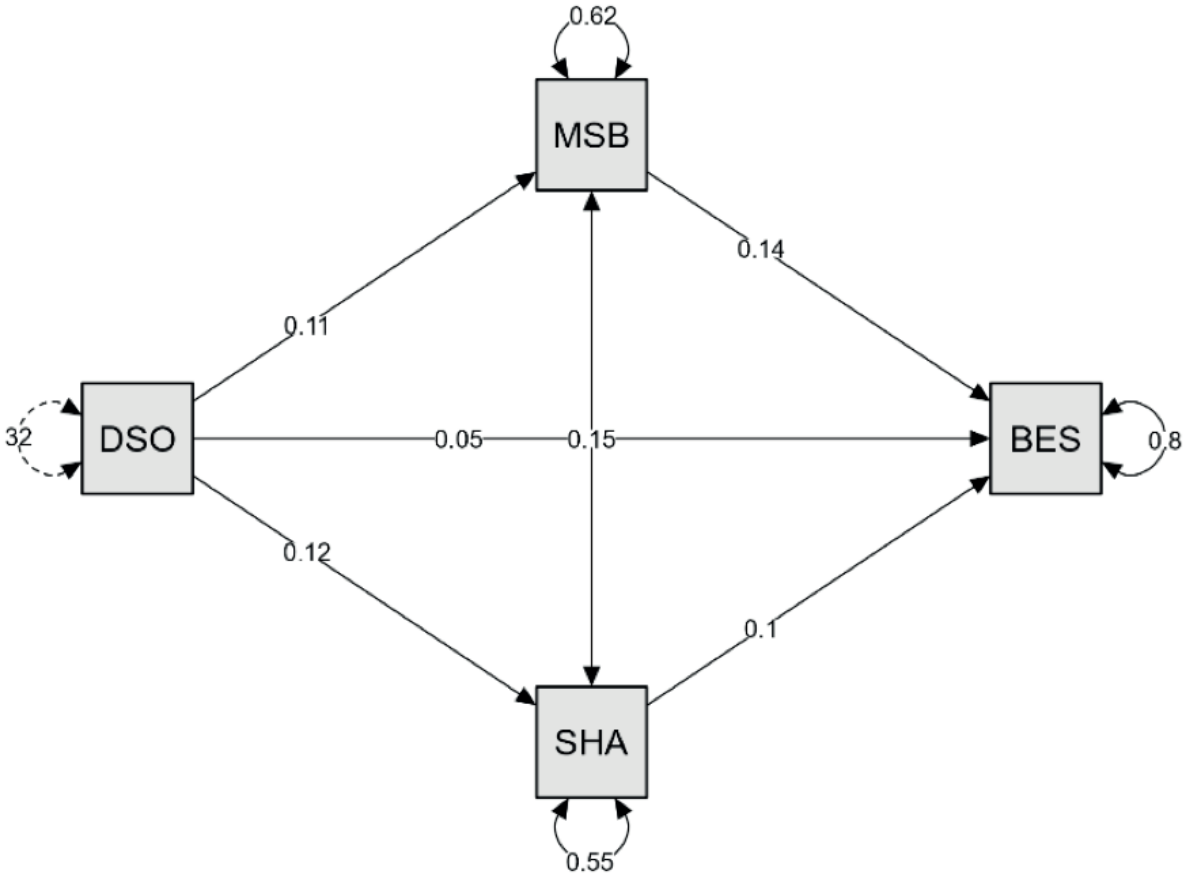

FIGURE 1. *Path plot.*
[a] DSO=disturbances of self-organization, MSBS=boredom, SHAME=shame, BES=binge eating behavior.

Feelings of shame about the traumatic event may act as both a trigger and aperpetuating factor in BED. According to the emotion regulation model of BED, binge eating episodes may represent a dysfunctional coping strategy to attenuate negative emotions [36], this can be further exacerbated in individuals with high levels of disturbances of self-organization, who present difficulties in emotional self-regulation. Many individuals with BED report that distressing psychological states, including experiencing negative thoughts about oneself and feelings of worthlessness precede binge eating episodes [37]. This use of dietary conduct as a strategy of self-medication may be related to emotional self-regulation difficulties associated with disturbances of self-organization, related to traumatic events, according to Mikhai's theory about loss of control eating [38]. Negative emotions trigger loss of control eating, and that loss of control eating is negatively reinforced because it temporarily decreases negative affect; the negative affect would decrease during binge eating episode rather than afterwards, and that episode of binge eating would replace one negative emotion with another that is less aversive [38]. In this sense, the feelings of shame about binge eating behaviors or body weight may promote other binge eating episodes, perpetuating a cycle of shame and binge eating [39]. Individuals with BED face stigmatization and subsequent shame associated with the disorder itself [30]. They also often report that their behaviors are perceived as a problem of poor self-control, a perception that may be internalized, perpetuating feelings of shame [40]. This is also in line with some findings from emerging literature on borderline personality disorder and night eating. Emotional instability in borderline personalities often aggravates compulsive behaviors, including binge eating and night-eating [41]. The interplay between night-eating behaviors and depressive symptoms may depend by the maladaptive eating behavior that is developed as a coping response to negative affect or poor sleep quality [42]. Sleep disruptions may further compromise mood regulation and intensify binge eating tendencies and could therofore be interesting to examinated in the future linked to disturbances of self-organization [43].

The lack of significance of guilt as a predictor of binge eating, in contrast to the significance of shame, can be

explained by the fact that shame is a more complex intrapsychic process than guilt because it involves processes concerning the valuation of the core dimensions of the self, like identity, ego, and personality. In posttraumatic shame, the focus of evaluation concerns moral virtue, the goodness of the self, and the need to cope with feelings of disgrace, disrepute, loss of self-esteem, loss of virtue, and personal integrity. Guilt, on the other hand, concerns different forms of self-recrimination about responsibility for personal actions [11]. Although unpleasant, guilt supports and enforces life-sustaining personal and moral values and creates a sense of control by supporting the idea that there is order and meaning in the world while strengthening the value of reconciling with others and being forgiven for improper actions and failed enactments in traumatic situations [44]. In previous studies, shame has been found more associated with mental health problems than guilt [45] ; whereas shame is maladaptive, guilt may not be [46]. To completely rule out the role of guilt and confirm the results of this study, it would be useful to replicate it with a clinical sample of patients treated for issues related to BED. Mediation analysis shows that self-organization disorders are associated with dysregulated eating behavior both directly and indirectly through related negative affective states. Shame and boredom are significant mediators of the relationship. This result may suggest that self-organization difficulties are often associated with uncontrolled eating behaviors and that negative emotions, such as boredom and shame, could act as triggers for such behaviors, explaining a relevant part of this relationship.

Limitation

The sample of this study is unbalanced by gender and age, a fact that should not be underestimated given the greater susceptibility to psychopathological manifestations related to eating behavior in the female gender [47]. Due to the gender imbalance and the lack of a clinical sample, the study has limitations in the generalisability of the results. The snowball sampling methodology may also have caused sample selection bias. As mentioned in the discussion, to confirm the results of this study could be useful a replication protocol on a clinical population with BED. In addition, some of the traumatic experiences reported by the participants echoed highly stressful and negatively impactful experiences but did not involve events that had led to death or involved threats to one's own or loved ones' physical integrity.

Conclusion

In conclusion, our investigation found a relationship between traumatic experiences and binge eating symptomatology, describing a pathway involving shame and boredom. Self-organization disorders are involved in the relationship between traumatic experiences and binge eating more than the classic PTSD symptoms. Boredom and Shame can act as triggers for the binge eating episode. Clinical interventions in cases of traumatic events should be aimed primarily at improving personal emotional self-regulation skills and particularly at managing boredom and shame, emotional states that are predictive of binge eating episodes. In this sense, the aim of clinical intervention should be to replace binge behaviour in response to shame and boredom with adaptive behaviour. In the case of boredom, this should involve stimulating the subject's creativity, and in the case of shame, it should involve working on self-esteem.

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Conflict of interest statement

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

Data and code

The data that support the findings of this study are available from the corresponding author, Giacomo Ciocca, upon reasonable request.

Author contribution

DD contributed to conceptualization, data curation, formal analysis, investigation, methodology, resources, software, visualization, writing the original draft, and editing the paper after the reviews. GO contributed to the project administration and reviewed the paper. TG reviewed the paper. EC contributed to the conceptualization and reviewed the paper. ADC reviewed the paper. EL contributed to the conceptualization, project administration, and supervision and reviewed the paper. LF contributed to conceptualization, data curation, methodology, resources, supervision, validation and reviewed the paper. GC contributed to conceptualization, data curation, funding acquisition, investigation, methodology, project administration, resources, supervision and reviewed the paper.

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