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ORIGINAL ARTICLE

# 'Impaired Autonomy and Performance' predicts binge eating disorder among obese patients

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## Abstract

**Purpose** The present study examined the predictive value of early maladaptive schema (EMS) domains on the diagnosis of binge eating disorder (BED).

**Methods** Seventy obese patients seeking treatment for weight loss were recruited and allocated to either group 1 (obese) or group 2 (BED-obese) according to clinical diagnosis. Both groups underwent psychometric assessment for EMS (according to the latest four-factor model), eating and general psychopathologies. Logistic regression analysis was performed on significant variables and BED diagnosis.

**Results** In addition to showing higher values on all clinical variables, BED-obese patients exhibited significantly higher scores for all four schema domains. Regression analysis revealed a 12-fold increase in risk of BED with 'Impaired Autonomy and Performance'. Depression did not account for a higher risk.

**Conclusions** Impaired Autonomy and Performance is associated with BED in a sample of obese patients. Schema therapy should be considered a potential psychotherapy strategy in the treatment of BED.

**Level of evidence** Level III, case–control study.

**Keywords** BED · Binge · Obesity · EMS · Schema · Schema therapy

## Introduction

Binge eating disorder (BED) is the most common eating disorder (ED), with a lifetime prevalence of 3% in the general population [1, 2] and up to 50% in clinical samples of obese subjects accessing weight loss services [3]. Its high prevalence, the psychiatric [4, 5] and medical [6] comorbidities and the lack of evidence-based pharmacological treatment have all contributed to capture clinical and scientific attention.

To date, psychotherapy, and in particular cognitive-behavioural therapy (CBT), is the most highly rated treatment approach for BED, even though the data indicate that many individuals either relapse or do not fully recover after treatment in the long term [7–9]. According to some authors, CBT is 'necessary, but not sufficient' to successfully treat EDs because it focuses on dysfunctional thoughts about weight and shape while neglecting other longitudinal factors related to the onset and maintenance of EDs [10]. As a consequence, it has been argued that mixed interventions that consider different pathological domains could optimise efficacy outcomes in BED [11].

Schema therapy (ST), the therapeutic focus of which are early maladaptive schemas (EMS) [12], belongs to the third wave of CBT for the treatment of complex disorders and has already been proposed for the treatment of BED [11]. EMS are negative representations of oneself, others and the environment that develop during childhood and are assumed to be enduring, resistant to change, self-confirmatory and self-perpetuating [13]. Young identified 18 EMS clustered within five domains [12]. More recently, a four-factor model (i.e.,

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Disconnection and Rejection, Impaired Autonomy and Performance, Excessive Responsibility and Standards, Impaired Limits) has been proposed as the most appropriate in relation to childhood experiences of need-thwarting parenting, having a better model fit [14]. The schema-focused model of eating disorders is largely supported by the literature [15]. According to this model, the EMS subtend core ED psychopathology, where eating behaviours serve to avoid (for restrictive EDs) or relieve (for bingeing EDs) emotions after a schema has been triggered [10]. ST has also proved efficacious in treating the comorbidities often found in patients with EDs [16], such as depression.

Bingeing has been correlated with several schemas (i.e., 'vulnerability to harm', 'social isolation', 'dependence–incompetence', 'enmeshment and unrelenting standards') [17, 18], and above all 'emotional inhibition'. A small number of studies have explored EMS in BED [17–19]. According to Pugh [15], BED is associated with higher scores on 'dependence–incompetence' and 'emotional inhibition' schemas: that is, BED patients do not trust in their ability to function autonomously and successfully achieve goals; they also experience difficulty in communicating emotions because of fear of being embarrassed, judged and rejected [20].

Combined, these results suggest that ST may be a promising therapy for BED. However, there is a lack of consistency across studies. This, and several methodological biases or limitations, has so far prevented a scientific consensus from being reached. In some studies, binge eating has been assessed with different tools, such as diary reports [19, 21], general eating pathology subscales [20, 22] or questionnaires built on DSM criteria [23]. In others, schemas have been studied in association with bulimic habits rather than BED diagnosis [17, 19, 20, 24]. The use of self-report instruments or self-report bingeing in some studies could have led to underestimations of BED [25]. In addition, the use of different versions of the Young Schema Questionnaire (YSQ) (short- versus long-form) with different numbers of EMS (14, 15, 16, 18 or 19) and models with different numbers of factors [17, 19, 20, 23, 26, 27], as well as more attention being given to EMS rather than domains, has contributed to the low consistency among findings [28].

On the basis of the above, this study had two aims: first, to explore EMS according to the four-factor model in obese subjects with BED versus a matched control group of obese patients; and second, to study the plausible predictive value of schema domains, together with eating and general psychopathologies, on BED diagnosis.

## Materials and methods

### Participants

All obese patients seeking weight loss treatment at the Department of Medical and Surgical Sciences of the University 'Magna Graecia' in Catanzaro (Italy), from September 2017 to March 2018, were invited to participate. They were entered into the study according to the following eligibility criteria: body mass index (BMI) > 29.9 kg/m$^2$; age between 18 and 60 years; and having the ability to give valid consent and answer self-report questionnaires. Having a disease affecting the nervous system, major psychiatric disorders, taking drugs that could alter the ability to complete psychometric assessment or that could influence eating habits and being unable to give valid consent were considered exclusion criteria. All participants were given information about the aim of the study, the voluntary nature of participation and the management and storage of data; and all gave their written informed consent before any further steps were taken. The study was conducted in accordance with the ethical principles set out in the Helsinki Declaration. The research protocol was authorised by the local Ethical Committee.

### Measures

A trained psychiatrist interviewed participants and performed the structured clinical interview for the DSM-5 (SCID-5) [29] to assess patients for psychiatric disorders and conduct the eating-disorder examination (EDE 17.0D) [30]. Participants also underwent a nutritional and anthropometric evaluation (controlling for light clothing); standing height was measured to the nearest 0.1 cm and body weight to the nearest 0.1 kg at 8.00 a.m. Height and weight were measured using a portable stadiometer (Seca 220, GmbH & Co., Hamburg, Germany) and a balance scale (Seca 761, GmbH & Co., Hamburg, Germany), respectively, allowing BMI (kg/m$^2$) to be calculated. Each candidate individually completed the following scales and questionnaires:

- The Binge Eating Scale (BES) [31] investigates the presence and severity of binge eating through 16 items. A total BES score of < 17, 17–27 and > 27 indicates, respectively, unlikely, possible and probable BED. In the present study, the threshold was set at 17. Cronbach's alpha was 0.89.
- Beck Depression Inventory (BDI) [32] is a self-report tool for evaluating the severity of depressive symptoms. It is made up of 21 items with three or four state-

ment options from which patients choose the one that best fits their perception. Scores of < 10, 10–16, 17–29 and > 30 indicate, respectively, minimum, mild, moderate and severe depression. A total score > 16 was considered the clinical cut-off. Cronbach's alpha was 0.91.

– The Young Schema Questionnaire—Short Form 3 (YSQ-S3) [33]— is a self-report inventory that consists of 90 items rated on a six-point scale (from 'completely untrue of me' to 'describes me perfectly'). According to Bach et al.'s [14] newly proposed model, the 90 items of YSQ-S3 are grouped into 18 EMSs clustered around four domains: (1) Disconnection and Rejection: emotional deprivation, social isolation, emotional inhibition, defectiveness, mistrust/abused, pessimism; (2) Impaired Autonomy and Performance: dependence, failure, subjugation, abandonment, enmeshment, vulnerability to harm; (3) Excessive Responsibility and Standards: self-sacrifice, unrelenting standards, self-punitiveness; (4) Impaired Limits: entitlement, approval/admiration seeking, insufficient self-control. In our study, alpha coefficients ranged from $\alpha = 0.740$ (Excessive Responsibility and Standards) to $\alpha = 0.865$ (Impaired Autonomy and Performance).

## Statistical analyses

Data were analysed using the Statistical Package for the Social Sciences, version 21.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics included frequencies and percentages, and means and standard deviations for categorical and continuous variables, respectively. Differences between groups were explored through Chi-squared and *t* test as appropriate.

Logistic regression analysis was run to assess the extent to which significant variables and schema domains were independently associated with BED. A *p* value of < 0.05 was considered statistically significant.

# Results

According to their diagnosis, participants were assigned to group 1 (obese patients, $N = 36$) or group 2 (BED-obese patients, $N = 34$). Table 1 summarises the socio-demographic characteristics of the groups. The groups were similar on age, BMI, civil or marital status, employment and education; there were significantly fewer men in group 2.

Table 2 shows the comparisons between the groups on EDE, BES, BDI and YSQ scores. Group 2 has higher mean

**Table 1** Socio-demographic features of the sample

| | Group 1 | | Group 2 | | Statistics | *p* |
|---|---|---|---|---|---|---|
| | Obese | | BED-Obese | | | |
| Age† | 36 | 10.1 | 34 | 12.1 | $t = -1.220$ | .227 |
| Gender‡ | | | | | | |
| Men | 13 | 36.1 | 5 | 14.7 | $\chi^2 = 4.194$ | **.041** |
| Women | 23 | 63.9 | 29 | 85.3 | | |
| BMI† | 42.0 | 9.0 | 38.7 | 6.1 | $t = 1.785$ | .079 |
| Civil status‡ | | | | | | |
| Married | 20 | 55.6 | 20 | 58.8 | $\chi^2 = 1.171$ | .557 |
| Divorced | 3 | 8.3 | 5 | 14.7 | | |
| Single | 13 | 36.1 | 9 | 26.5 | | |
| Employment status‡ | | | | | | |
| Housewife | 8 | 22.2 | 8 | 23.5 | $\chi^2 = .703$ | .951 |
| Employed | 14 | 38.9 | 15 | 44.1 | | |
| Unemployed | 9 | 25 | 8 | 23.5 | | |
| Retired | 1 | 2.8 | 1 | 2.9 | | |
| Student | 4 | 11.1 | 2 | 5.9 | | |
| Education level‡ | | | | | | |
| Primary | 8 | 22.2 | 12 | 35.3 | $\chi^2 = 2.763$ | .251 |
| Secondary | 23 | 63.9 | 15 | 44.1 | | |
| University | 5 | 13.9 | 7 | 20.6 | | |

Boldface indicates statistical significance

*BMI* body mass index

†Results are presented as means (SD)

‡Results are presented as frequencies (%)

**Table 2** Results of psychopathological assessment

| | Group 1 | | Group 2 | | *t* | *p* |
|---|---|---|---|---|---|---|
| | Obese | | BED-Obese | | | |
| | Mean | SD | Mean | SD | | |
| BES | 8.2 | 4.3 | 29.9 | 6.7 | − 16.147 | **< .001** |
| EDE | | | | | | |
| Restraint | 1.8 | 1.6 | 2.3 | 1.8 | − 1.262 | .211 |
| Eating concern | 1.1 | 0.9 | 3.1 | 1.6 | − 6.590 | **< .001** |
| Shape concern | 3.6 | 1.6 | 4.4 | 1.7 | − 1.982 | .052 |
| Weight concern | 2.9 | 1.1 | 3.9 | 1.6 | − 3.240 | **.002** |
| Total score | 2.5 | 1.1 | 3.6 | 1.5 | − 3.399 | **.001** |
| BDI | 12.2 | 10.8 | 28.3 | 11.0 | − 6.137 | **< .001** |
| YSQ schema domains | | | | | | |
| Disconnection and rejection | 1.9 | 0.7 | 2.7 | 0.8 | − 3.981 | **< .001** |
| Impaired Autonomy and Performance | 1.8 | 0.5 | 2.7 | 0.9 | − 5.309 | **< .001** |
| Excessive responsibilities and standards | 2.9 | 0.6 | 3.5 | 0.7 | − 3.924 | **< .001** |
| Impaired limits | 2.2 | 0.6 | 3.1 | 1.0 | − 4.427 | **< .001** |

Boldface indicates statistical significance

*BES* bingeeating scale, *EDE* eating disorder examination, *BDI* beck depression inventory, *YSQ* Young schema questionnaire

values for eating and weight concerns as measured by the EDE. The BED-obese patients also have higher average scores for BES, BDI and all four schema domains.

The results of logistic regression (− 2 Loglikelihood = 31.933; $R^2$ Nagelkerke = 0.692) (Table 3) reveal that 'Impaired Autonomy and Performance' (YSQ) and 'eating concern' (EDE 17.OD) are independently associated with a BED diagnosis. Depression does not enter in the regression model, supporting a lack of association with BED diagnosis.

## Discussion

This research sets out to explore the schema domains according to Young's recent four-factor model in obese patients with and without BED and to ascertain whether these schema domains, together with eating and general psychopathologies, might plausibly be associated with a BED diagnosis in an obese sample. The results showed all four schema domains to display significantly more severe values in the BED-obese group. However, only the 'Impaired Autonomy and Performance' domain was shown to be independently associated with a BED diagnosis, suggesting that it may be crucial in the development and maintenance of the disorder.

In previous studies, several EMS belonging to various domains have been found to be associated with bingeing [17, 18] (i.e., the social isolation EMS loading with the Disconnection and Rejection domain; the abandonment EMS loading with the Impaired Autonomy and Performance domain; the enmeshment EMS loading with the Excessive Responsibilities and Standards domain; and the entitlement EMS loading with the Impaired Limits domain). Hence, it plausibly explains why all four domains may result in more severe values in BED group.

Another study [19] using a different four-factor model [34] found unhealthier domains in a BED sample than in a healthy control sample. More recently, others investigating schema domains in overweight and obese subjects in relation to food addiction and bingeing [35] have found binge eating severity to be associated with 'Disconnection and Rejection',

**Table 3** Logistic regression with BED diagnosis as dependent variable

| | *B* | Wald | *p* | Exp(*B*) | 95% CI per EXP(*B*) | |
|---|---|---|---|---|---|---|
| | | | | | Inf. | Sup. |
| Impaired Autonomy and Performance | 2.495 | 5.537 | **.019** | 12.121 | 1.517 | 9.685 |
| EDE eating concern | 1.209 | 7.290 | **.007** | 3.352 | 1.393 | 8.064 |
| Constant | − 7.651 | 8.560 | .003 | .000 | | |

Boldface indicates statistical significance

*EDE* eating disorder examination

'Impaired Limits' and 'Other-Directedness' domains, but not with Impaired Autonomy and Performance. It is worth mentioning that these authors did not conduct a clinical assessment of BED and that the mean BES scores were much lower than those found in our study; moreover, the analysis was carried out on a single sample demonstrating both food addiction and binge eating, and having considerable comorbidity with other addiction disorders.

In our data, eating and weight concerns characterised the BED-obese patients: thinking and worrying about what, when and how to eat and its impact on body weight certainly impaired the everyday functioning of these patients. In fact, 'eating concerns' turned out to be independently associated with this diagnosis.

Our study confirms the pathological values of depression for obese patients with BED [4, 36, 37]. However, the question of whether depression precedes, is comorbid with or is a consequence of BED remains unresolved, because most studies have had cross-sectional design. EMS appears to be vulnerability factors for depression, both in cross-sectional and longitudinal studies [38–41], but studies also support a strong association between dysfunctional schemas and both BED and depression [22]. Comparing the EMS exhibited by patients with either major depression, bulimia or bulimia and major depression, Waller and colleagues inferred that whilst the patients with major depression and bulimic depressed patients showed broadly similar EMS (social isolation and defectiveness/shame), they could still be differentiated in terms of their expression of certain core beliefs, above all 'failure to achieve' [16]. In the present study, depression was significantly more common among the BED patients, but did not prove to be independently associated with a BED diagnosis, as Impaired Autonomy and Performance did. Leung et al. found that differences in EMS between dieters testing positive or not for EDs were not influenced by actual depression [42], supporting the hypothesis that depression is an 'insufficient causal factor' for EDs and that EMS are needed [15]; nevertheless, future research should consider longitudinally whether the correlation between schemas and ED pathology persists after the resolution of depressive symptoms.

The small sample size, in accordance with our naturalistic design, and the absence of a normal weight healthy control group—obese subjects without BED were considered the 'healthy controls' for our BED subjects—are limitations of our study. Nevertheless, the main strength is the accuracy of BED diagnosis, performed using both clinical interview and standardised assessment instruments in accordance with DSM-5 criteria. With respect to the aforementioned methodological bias of YSQ, the present protocol made use of the short-form because of its greater convenience and comparable psychometric properties [16] and of the four-factor model, which is empirically and conceptually more consistent either with Young's schema therapy or need-thwarting parenting experienced in childhood [14]. The inclusion of an age- and weight-matched control group of obese patients is another strength corroborating previous studies supporting different phenotypes for obese patients with and without BED [4].

In conclusion, 'Impaired Autonomy and Performance' was associated with a BED diagnosis in obese patients. The evaluation of EMS in young adults or adults that already meet the diagnosis of BED found its rationale in some evidences suggesting that improvement in autonomy (reduced sensitivity to others and greater capacity to manage new situations) is associated with recovery in ED patients [43]. Lastly, as schema domains develop in childhood before BED takes place, they could be evaluated as early risk factors for EDs in primary prevention campaigns targeting young overweight and obese children.

## Clinical implications and further research

The persistence or recrudescence of eating psychopathology after conventional psychotherapy (i.e., CBT) can be understood in terms of a deeper disturbance in schema cognition and other longitudinal and enduring factors, such as personality, depression and emotional dysregulation, not addressed by CBT [10, 44]. According to the schema-focused model of EDs, eating behaviours are thought to operate as coping strategies, preventing or alleviating emotions activated by schemas in the absence of alternative and more appropriate coping strategies; accordingly, the need for psychotherapy that addresses more specific domains other than eating disorders appears as a reasonable one [11].

The rationale for ST is rooted in its effectiveness in treating enduring cognition disorders and personality disorders [1], depression [16] and emotion dysregulation [45], which often are comorbid with eating psychopathology.

Few studies have explored ST efficacy in BED [15]. To date, there is more robust evidence for CBT; ST could be considered an augmentation strategy in circumstances in which CBT fails and when eating disorders are comorbid with affective and personality disorders [10].

To our knowledge, only one randomised controlled trial (RCT) study has compared the effectiveness of conventional CBT versus ST; it found no significant differences either at baseline or after 12 months in bingeing frequency, abstinence and remission rates, weight loss or EDE psychopathology. The authors argued that the study's power was such that it was unlikely to detect group differences; moreover, other limitations were hypothesised to account for the results, such as limited generalisability for ethnicity and unusual length of time of therapies [11]. Further, randomised controlled trials with longer follow-up are needed to establish the extent to

which ST could be more effective than conventional CBT, alone or in combination, in the long term.

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## Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethical approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Approval from the Ethical Committee of University Hospital Mater Domini at Catanzaro was obtained before data were collected for the current study.

**Informed consent** Patients gave their informed consent before any research procedure took place.

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