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Psychotic phenomena in Binge Eating Disorder: an exploratory MMPI-2 study

Massimiliano Aragona, Anna Maria Petta, Andrea Balbi

Summary

Aim of the study. To study putative psychotic phenomena in patients with Binge Eating Disorder (BED).
Subject or material and methods: Sixty patients with a DSM-5 diagnosis of BED were studied. Scores at the Sc, Pa and other subscales of the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) were used to assess possible psychotic features. Eating phenomena were assessed by the Eating Disorder Inventory-2 (EDI-2). The relationship between them was studied.
Results. Mean BMI was 38.24±8.43. The Sc and Pa scales of the MMPI-2 were above the cut-off in, respectively, 43.33% and 46.67% of patients. Regression analyses show that both Sc and Pa had a significant effect on EDI-2 scores, although only the Sc scale remained significant after adjusting for their possible interrelation. More than 40% of patients reported high scores (65 or more) at the following MMPI-2 "psychotic" subscales: Paranoia (Pa), Schizophrenia (Sc), Social Alienation (Sc1), Emotional Alienation (Sc2), and Lack of Ego Mastery, both cognitive and conative (Sc3 & Sc4). Perfectionism, Impulse Regulation, Ascetism, Social Insecurity, Interoceptive Awareness, Ineffectiveness, and Maturity Fears are the EDI-2 scales significantly influenced by the Sc and Pa MMPI-2 scores.
Discussion. Several putative psychotic phenomena were reported in our sample of binge eaters, and they were related to higher scores on several dimensions of the EDI-2.
Conclusions. At least in some patients, there might be an overlap between some psychotic basic phenomena (disordered sense of basic Self, of bodily experiences, and hyperreflectivity), and those basic disturbances in identity development and Self-schemas which are at the base of eating disorders.

schizofrenia / phenomenology / psychosis / eiting disorders / binginng

INTRODUCTION

Although early classical psychopathological reports on eating disordered phenomena conceived them as part of a psychotic way of being [1], the relationship between psychotic symptoms and eating disorders has remained largely understudied for years [2]. More recent surveys have shown that schizophrenia, paranoia and related features are not so rare in anorectic and bulimic patients [3]. Less evidence is available for those eating disorders that were more recently included in the DSM-5 [4], such as the Binge Eating Disorder (BED). The DSM-IV had included BED in Appendix B among the putative disorders that needed more extensive study before inclusion in the official list of mental disorders [5]. The DSM-5 recognized BED as an official disorder, describing it as the presence of recurrent and distressful episodes of binge eating,

Massimiliano Aragona[1], **Anna Maria Petta**[2], **Andrea Balbi**[3]: Clinical Director of the Day Hospitalization Service for Eating Disorders "Villa Armonia Nuova", ASL RMD, Rome (Italy); [2]Crossing Dialogues Association, Rome (Italy); [3]Director of the Mental Health Department, ASL RMD, Rome (Italy). **E-mail**: massimiliano.aragona@uniroma1.it.

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at least once a week for 3 months. An episode of binge eating is characterized by two criteria: a) eating , in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than what most people would eat in a similar period of time under similar circumstances; and b) a sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating). In DSM-5 such binge-eating episodes have to be associated with at least three of the following features: a) eating much more rapidly than normal; b) eating until feeling uncomfortably full; c) eating large amounts of food when not feeling physically hungry; d) eating alone because of feeling embarrassed by how much one is eating; e) feeling disgusted with oneself, depressed, or very guilty afterward. Finally, the differential diagnosis between BED and bulimia nervosa is based on the lack of compensatory behaviours in the former [6].

A recent PubMed Search (October, 30th, 2014) found one study directly comparing obese females with and without BED (7). It was shown that BED patients had a more severe psychopathological profile than obese controls, including higher SCL-90 interpersonal sensitivity (roughly corresponding to ideas of reference), paranoid ideas, and psychoticism. Moreover, such features were related to BED severity (assessed with the Binge Eating Scale) [7]. Such findings might be particularly relevant, because the co-occurrence of psychiatric disorders (such as mood and psychotic disorders) and BED or obesity has important public health and treatment implications, including the fact that the treatment of BED and obesity co-occurring with psychopathology may be different from obesity without associated psychopathology [8].

Considering the rarity of studies systematically addressing the relationship between BED and possible psychotic phenomena, more research is needed on this topic, assessing possible psychotic phenomena by means of different psychodiagnostic instruments and correlating psychotic scores with dysfunctional areas which are typically related to eating disorders.

This study explores the relationship between putative psychotic phenomena assessed with the Minnesota Multiphasic Personality Inventory-2 (MMPI-2), and Eating Disorder Inventory-2 (EDI-2) eating disorder-related phenomena in a group of patients with BED.

MATERIALS AND METHODS

Sample

All consecutive patients referring to a Day Hospitalization Service specifically dedicated to Eating Disorders were asked to enter the study, to be clinically interviewed by both a psychiatrist and a medical doctor specialized in nutritional issues, and to fulfil assessment instruments. All patients accepted and signed an informed consent. Only those patients having a DSM-5 diagnosis of Binge Eating Disorder (BED) were included in the present study.

Assessment instruments

Body Mass Index (BMI) was computed at admission, in the same session including the psychopathological and the psychodiagnostic evaluations. Main socio-demographic variables were recorded in a chart. Eating disordered behaviours and other phenomena related to eating disorders were formally assessed by means of the Eating Disorder Inventory, 2nd Version (EDI-2), a 91 items self-evaluated questionnaire specifically designed and validated for Eating Disorders and widely used in previous research on these patients [9]. Patients have to evaluate how much often they had the described phenomenon. Items are rated on a six-point scale, item responses being weighted as 0 (never, sometimes or rarely), 1 (often), 2 (usually), or 3 (always). It is possible to obtain a total EDI-2 score (a general measure of severity) and 11 subscales: Drive for Thinness (DT), Bulimia (B), Body Dissatisfaction (BD), Ineffectiveness (I), Perfectionism (P), Interpersonal Distrust (ID), Interoceptive Awareness (IA), Maturity Fears (MF), Ascetism (A), Impulse Regulation (IR), and Social Insecurity (SI). Any dimensional subscale is computed by summing item scores.

The Minnesota Multiphasic Personality Inventory-2 [10] has been used extensively to assess individuals with eating disorders [11]. It is a 567-item self-report questionnaire in which respondents are asked to indicate whether each state-

ment is generally true or false for them. The 567 items are computed to derive 3 validity indices (scales L, F, and K) and 10 clinical scales: Hypochondriasis (Hs), Depression (D), Hysteria (Hy), Psychopathic Deviation (Pd), Masculinity-Femininity (M/F), Paranoia (Pa), Psychasthenia (Pt), Schizophrenia (Sc), Hypomania (Ma), and Social Introversion (SI). Raw scores on each scale are converted to T scores and values 65 and greater are considered clinically significant [12]. In this study, we focus our analysis on the Sc and Pa scales of the MMPI-2. Although possible psychotic phenomena are also included within other MMPI-2 scales (e.g. Ma and Pt scales), we decided to focus only on those scales (Sc and Pa) where the likelihood of detecting possible psychotic phenomena is maximized. Indeed, severe mania and melancholic depression often present with psychotic features, but from a psychopathological point of view they were considered by Jaspers as secondary phenomena arising from the basal disturbance of mood. As a consequence, inclusion of bipolar symptoms was at risk of excessively decreased specificity of studied phenomena. For similar reasons we excluded Pt items: although some of them may be interpreted as a sensible indication of schizophrenic morbid rationalism (à la Minkowski), Pt scale derives from Janet's concept of psychasthenia, whose core are obsessive symptoms. Accordingly, this would also have decreased the specificity of assessed phenomena.

Alternative computations of the item scores are possible in order to derive Harris and Lingoes subscales [10] and content scales [10]. In this study those alternative scales focusing on psychotic phenomena were selected in order to further explore the typology of the items responsible for the total score at the Sc and Pa scales: Persecutory Ideas (Pa1), Poignancy (Pa2), Naïveté (Pa3), Social Alienation (Sc1), Emotional Alienation (Sc2), Lack of Ego Mastery, cognitive (Sc3), Lack of Ego Mastery, conative (Sc4), Lack of Ego Mastery, defective inhibition (Sc5), Bizarre Sensory Experiences (Sc6), Bizarre Mentation (BIZ).

Statistics

Descriptive statistics were used for socio-demographic variables and BMI. On this variables, patients included in the final statistical analysis were compared to patients that had not completed the assessment measures by means of Student's T test or Chi Square Test.

In the study sample mean and standard deviation values were computed for MMPI-2 and EDI-2 scales. The number of patients with BED above the threshold scores of the MMPI-2 scales considered for psychotic phenomena were computed. Differences in EDI-2 scores between patients scoring above and below the threshold for the MMPI-2 Sc and Pa scales were compared by means of Student's T test.

Linear regression models were used to test the influence of Sc and Pa on EDI-2 total scores. In a second step a multiple linear regression model was used in order to consider the reciprocal influence of Sc and Pa as covariate independent variables on EDI-2 dimensions.

RESULTS

Seventy-seven patients fulfilled DSM-5 criteria for BED and were included in the study. Of them, 60 duly completed the aassessment procedure and were included in the statistical analysis. Their mean age was 44.14±12.21, and 91.66% were females. Sociodemographic characteristics are reported in Table 1, and were similar between patients included in the statistical analysis and those that were excluded because had not completed the assessment procedure.

Table 1, Figures 1, 2 – next page.

Mean BMI was 38.24±8.43, ranging from 24.65 to 62.07.

The EDI-2 profile is reported in Figure 1. Body Dissatisfaction received the highest mean scores, followed by Drive for Thinness, Ineffectiveness, Lack of Interoceptive Awareness, and Bulimia. Mean EDI-2 total score was 94.6±35.73.

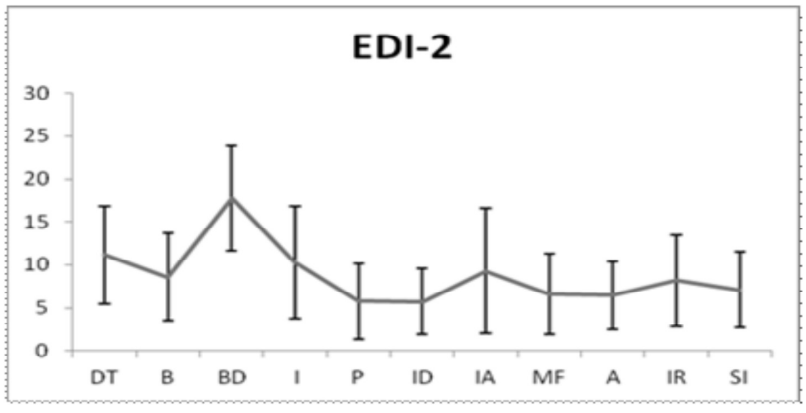
The MMPI-2 dimensional profile is reported in Figure 2. Depression, Hypochondriasis, Psychopathic Deviation, Schizophrenia, Psychasthenia, and Paranoia receiving the highest mean scores.

At the Schizophrenia scale of the MMPI-2, 43.33% of patients scored 65 or greater, while 46.67% scored 65 or greater at the Paranoia scale (30% of patients being above the threshold on both scales). Patients scoring above the cut-off

Table 1. Sociodemographic variables and Body Mass Index (BMI) of patients with BED

Total		60
Age	Mean ± SD	44.14±12.21
	Range	19-68
Gender	Female	55 (91.66 %)
	Male	5 (8.33%)
Marital status	Unmarried	26 (43.33%)
	Married	23 (38.33%)
	Separated/Divorced	8 (13.33%)
	Widower	3 (5.00%)
Job	Employed	36 (60.00%)
	Unemployed	5 (8.33%)
	Looking for work	1 (1.66%)
	Student	4 (6.66%)
	Housewife	8 (13.33%)
	Pensioner/Unable	6 (10.00%)
Educational level	None	0
	Elementary school	2 (3.33%)
	Junior high school degree	12 (20.00%)
	High school degree	40 (66.66%)
	College degree	5 (8.33%)
	Missing	1 (1.66%)
Body Mass Index	Mean ± SD	38.24 ± 8.43
	Range	24.65-62.07

Figure 1. Eating Disorder Inventory-2 Profile (Means ± Standard Deviation)



in the MMPI-2 Pa and Sc subscales were respectively: Persecutory Ideas (Pa1), 36.36%; Poignancy (Pa2), 36.36%; Naiveté (Pa3), 6.82%; Social Alienation (Sc1), 40.91%; Emotional Alienation (Sc2), 50%; Lack of Ego Mastery, Cognitive (Sc3), 45.45%; Lack of Ego Mastery, Conative (Sc4), 52.27%; Lack of Ego Mastery, Defective Inhibition (Sc5), 29.55%; Bizarre Sensory Experiences (Sc6), 20.45%. Finally, 15.91% of patients reported above threshold scores at the Bizzarre Mentation (BIZ) MMPI-2 subscale.

Table 2 – *next page* – presents differences in EDI-2 scales in patients scoring respectively above or below the diagnostic threshold for the Pa and Sc scales of MMPI-2. It is shown that patients above the MMPI-2 Pa threshold have significantly higher levels of Drive for Thinness, Bulimia, Ineffectiveness, Ascetism, Impaired Impulse Regulation, Social Insecurity. Moreover, patients scoring 65 or more at the MMPI-2 Sc scale had significantly higher levels of Bulimia, Ineffectiveness, Perfectionism, Reduced Interoceptive Awareness, Ascetism, Impaired Impulse Regulation, and Social Insecurity.

Linear regression analyses indicate that both Pa and Sc have a significant effect in increasing EDI-2 total scores (respectively, B 1.54, Standard Error 0.41, Beta 0.45, p< .001 for Pa; and B 1.94, Standard Error 0.35, Beta 0.58, p< .001 for Sc). However, after adjusting for their possible interrelation, only the Sc scale remains significant, suggesting that the phenomena related to the Sc score are more strictly influential on EDI-2 total score (Table 3). On this basis, the influence of Pa and Sc scores on the eleven EDI-2 dimensions was studied using a regression model always including Pa and Sc scores together as covariates. As shown in Table 3 – *next page*, the increment of the score at MMPI-2 Sc scale (but not Pa) corresponded to a significant worsening at the following EDI-2 scales: Perfectionism, Impulse Regulation, Ascetism, and Social Insecurity (p<.005 for all), and Interoceptive Awareness and Ineffectiveness (both with p<.001). The

Figure 2. MMPI-2 Profile (Means ± Standard Deviation)

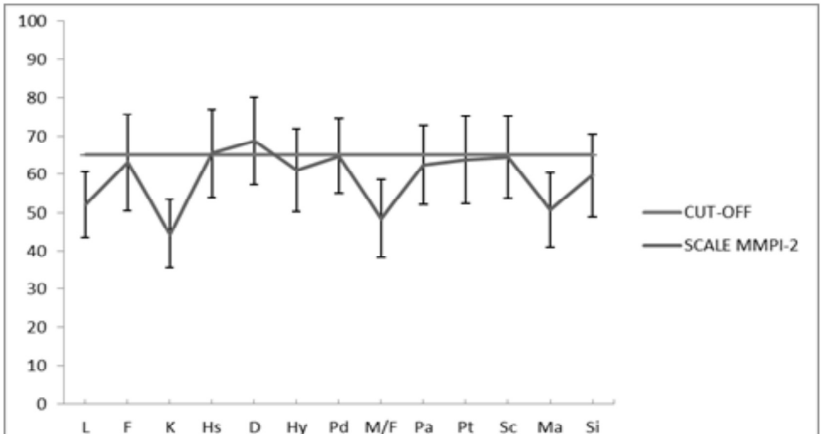


Table 2. Comparison of EDI-2 scores in patients above and below MMPI-2 cut-offs for Pa and Sc

EDI-2 Subscales	MMPI-2 (Mean±SD)			
	Sc≥65	Sc<65	Pa≥65	Pa<65
DT	12.69±5.28	9.94±5.83	12.89±4.62	9.59±6.20*
B	10.23±5.41	7.35±4.60*	10.25±5.66	7.16±4.18*
BD	17.35±6.34	18.06±6.10	18.64±6.73	16.97±5.61
I	14.23±6.44	7.21±4.86^	12.64±6.00	8.16±6.40§
P	8.31±3.65	3.79±3.98^	6.86±4.58	4.78±4.12
ID	6.69±4.64	5.00±3.09	6.46±4.38	5.09±3.36
IA	12.88±7.68	6.53±5.84£	10.75±7.23	8.00±7.33
MF	6.65±5.04	6.62±4.53	7.32±4.75	6.03±4.67
A	8.88±3.79	4.62±3.06^	7.57±3.87	5.50±3.88*
IR	11.19±5.56	5.88±3.99£	9.96±5.83	6.63±4.51*
SI	9.65±4.54	5.18±3.18^	8.82±4.15	5.63±4.13§
EDI-2	115.77±34.86	78.41±27.88^	109.93±34.94	81.19±31.77§

*: <0.05; §: <0.01; £: <0.001; ^: <0.0001

Table 3. Influence of MMPI-2 Pa and Sc scores on EDI-2 scales

Independent Variable(s)	Dependent variable	B	Standrd Error	Beta	P
MMPI-2 Sc	EDI-2 Total score	1.94	0.35	0.58	<0.001
MMPI-2 Pa	EDI-2 Total score	1.54	0.4	0.45	<0.001
MMPI-2 Sc MMPI-2 Pa	EDI-2 Total score	1.67 0.44	0.45 0.47	0.5 0.13	<0.005 N.S.
MMPI-2 Sc MMPI-2 Pa	EDI-2 BD	0.09 -0.1	0.09 0.1	0.16 -0.17	N.S. N.S.
MMPI-2 Sc MMPI-2 Pa	EDI-2 P	0.18 0.01	0.06 0.06	0.45 0.03	<0.005 N.S.
MMPI-2 Sc MMPI-2 Pa	EDI-2 ID	0.03 0.11	0.06 0.06	0.08 0.29	N.S. N.S.

table continued on next page

MMPI-2 Pa scale (but not Sc) is significantly responsible of an increased score at the EDI-2 Maturity Fears scale ($p<.05$). Finally, four EDI-2 scales appear not significantly influenced by neither Pa nor Sc: Body Dissatisfaction, Interpersonal Distrust, Drive for Thinness, and Bulimia.

DISCUSSION

This study explored the relationship between putative psychotic phenomena and eating disorder-related phenomena in a group of patients with Binge Eating Disorder.

Our findings suggest that possible psychotic phenomena can be present in a large part of Binge Eaters. In fact, more than 40% of patients with BED self-reported high scores (65 or more) at several MMPI-2 "psychotic" scales and subscales, including Paranoia (Pa), Schizophrenia (Sc), Social Alienation (Sc1), Emotional Alienation (Sc2), and Lack of Ego Mastery, both cognitive and conative (Sc3 & Sc4). Moreover, Persecutory Ideas (Pa1) and Poignancy (Pa2) were reported by more than 30% of patients. To our knowledge there is only one study from which the prevalence of schizophrenia among patients with BED can be inferred. A study on overweight and obese American veterans [13] reported a table showing that 81.6% of schizophrenic veterans had a Binge Eating Disorder. By computing on these data, we can infer that 2.88% of BED veterans received a diagnosis of schizophrenia, suggesting that psychotic phenomena are present in BED, although at a lower extent com-

MMPI-2 Sc MMPI-2 Pa	EDI-2 IR	0.23 0.03	0.07 0.07	0.46 0.07	<0.005 N.S.
MMPI-2 Sc MMPI-2 Pa	EDI-2 DT	0.07 0.11	0.08 0.09	0.14 0.21	N.S. N.S.
MMPI-2 Sc MMPI-2 Pa	EDI-2 B	0.12 0.09	0.07 0.08	0.26 0.19	N.S. N.S.
MMPI-2 Sc MMPI-2 Pa	EDI-2 IA	0.39 -0.09	0.09 0.1	0.58 -0.13	<0.001 N.S.
MMPI-2 Sc MMPI-2 Pa	EDI-2 A	0.16 0.05	0.05 0.05	0.44 0.12	<0.005 N.S.
MMPI-2 Sc MMPI-2 Pa	EDI-2 I	0.32 0.00	0.08 0.09	0.54 0.00	<0.001 N.S.
MMPI-2 Sc MMPI-2 Pa	EDI-2 MF	-0.08 0.15	0.07 0.07	-0.19 0.34	N.S. <0.05
MMPI-2 Sc MMPI-2 Pa	EDI-2 SI	0.19 0.04	0.06 0.06	0.47 0.09	<0.005 N.S.

pared to the higher rates found in our study. This difference may be due partly to the different assessment instruments used in the two studies (MMPI-2 scores in our study, self-report of a schizophrenia diagnosis in Higgins et al.'s study [13]), and partly to sample differences. In fact, it should be stressed that our Day Hospitalization Service was a second-level service, and thus patients visited there were more likely to be more severely ill than patients usually seen in outpatient facilities. In any case, this difference in prevalence of putative severe psychotic phenomena is noteworthy and calls for further larger studies on the relationship between BED and possible psychotic traits.

We also explored the hypothesis that the presence of possible psychotic experiences might be responsible for higher severity in eating disordered behaviours and related phenomena. Indeed, patients scoring 65 or more at the MMPI-2 Sc and/or Pa scales were more likely to receive significantly higher scores at many EDI-2 scales (EDI-2 total score, as well as Social Insecurity, Impulse Regulation, Ascetism, Interoceptive Awareness (only Sc), Perfectionism (only Sc), Ineffectiveness, Bulimia, and Drive for Thinness (only Pa)).

We performed linear regression analyses to measure to what extent the increasing of Pa and Sc scores were influencing EDI-2 scores. Moreover, in order to avoid confounding effects due to possible multiple interacting variables, Pa and Sc were considered as interconnected variables.

Regression analyses confirmed the role of Sc (and, at a minor degree, Pa) on several EDI-2 scores. In particular, we expected MMPI-2 Pa scores to be mostly associated with two EDI-2 scales, namely Interpersonal Distrust (ID) and Social Insecurity (SI), because a paranoiac person is expected to enter in conflict with the others lived as persecutors, and consequently to withdraw from interpersonal contacts. Our findings show that SI is higher in BED patients with high Pa scores. However, after adjusting for the Sc scale, SI remains significantly related to Sc but not to Pa scores. This suggests that an internal, autistic drive for isolation might be more important than secondary social withdrawal due to paranoiac social conflicts. Also the Interpersonal Distrust (ID) scale do not conform to our expectations, being not higher in BED patients scoring above the Pa and Sc cut-offs. This finding is confirmed by the regression analysis, showing that ID is not significantly influenced by neither Pa nor Sc. However, 36% of BED patients reported high scores at both Pa1 (Persecutory Ideas) and Pa2 (Poignancy) subscales of the MMPI-2, suggest that the relationship between possible paranoiac tendencies and interpersonal distrust might be relevant only for a subset of the BED patients. Consequently, in consideration of how much paranoiac tendencies may influence treatment options and results, this area deserves to be studied in more detail in future studies.

EDI-2 dimensions scoring significantly higher in patients with high Pa scores were Social Insecurity, Ineffectiveness, Ascetism, Bulimia, Drive for Thinness, and Impulse Regulation.

However, none of them remained significant in the regression analysis adjusted for Sc scores, while somehow unexpectedly Pa resulted to significantly increase scores at the Maturity Fears scale independently from Sc scores. A previous

study found Ineffectiveness and Maturity Fears to be the two psychological factors associated to body image delusionality in bulimics [14]. To our knowledge our own are the first findings on this in patients with Binge Eating Disorders, and future studies exploring possible explanations of these data are needed.

Patients with EDI who scored above the cut-off at the Sc scale reported significantly higher scores at the following EDI-2 scales: Perfectionism (P), lack of Interoceptive Awareness (IA), Ascetism (A), Ineffectiveness (I), Social Insecurity (SI), Bulimia (B), and Body Dissatisfaction (BD). The last two (B and BD) did not remain significant at the regression analysis, while the others were confirmed. At the regression analysis, difficulties in Impulse Regulation (IR) also appeared as significantly influenced by Sc scores.

Taken together, this findings suggest that Sc scores have a significant influence in the general severity of BED symptoms (increased EDI-2 scores) as well as in some relevant EDI-2 scales. It is noteworthy that the influence of possible schizophrenic phenomena on eating dimensions is inconstant regarding direct eating behaviours and experiences (like Bulimia and Body Dissatisfaction), while the effect appears more strong and reliable on more basic variables like Perfectionism, Lack of Interoceptive Awareness, Ascetism, Ineffectiveness, and Social Insecurity. This is also confirmed by our finding that the MMPI-2 "psychotic" subscales more frequently increased in BED patients were social and emotional alienation, and lack of Ego mastery (cognitive and conative).

Before concluding, it should be stressed that this study was an exploratory one, and thus several possible limitations were present. In particular, we used a self-assessment instrument to rate possible psychotic symptoms. Future qualitative studies are needed to confirm self-assessed measures, because as it is well known, self-rated instruments are not the best option to reliable detect psychotic phenomena [15], showing the importance of a qualitative valuation of the answers to quantitative instruments. Furthermore, it must be underlined that our data can be useful to discuss possible psychotic features but this must not be equated with a diagnosis. In fact, the latter is the output of a complex process and cannot be reduced to some scoring in self-evaluated instruments. Moreover, our sample was not very large, thus exposing our study to possible sample errors, and there was not a comparison group.

Finally, our BED patients were all visited in a Day Hospitalization service, which is a second level facility for those patients that, being probably more severe, did not respond well to outpatient first line treatments. Accordingly, our findings cannot be directly generalized to the usual BED population visited in outpatient services.

In conclusion, we believe that despite these limitations our study is important because it is one of the first surveys directly exploring the relationship between basic psychotic phenomena and eating-related disturbances in patients with BED. Our hypothesis, which should be explored in future investigations, is that at least in some patients there might be an overlap between the following basic phenomena. At one side, core disordered Self-experiences like those reported in schizophrenia (e.g., Parnas et al., 2005, see in particular those called *sense of basic Self*, *bodily experiences,* and *hyperreflectivity*) [16]. At the other side, those basic disturbances in overall identity development and Self-schemas which are at the base of eating disorders [17]. The EDI-2 Ineffectiveness and the MMPI-2 lack of Ego mastery, the EDI-2 lack of Interoceptive Awareness and the MMPI-2 Emotional Alienation, the EDI-2 Ascetism and Social Insecurity and the MMPI-2 Social Alienation, all these areas that our study found to be significantly correlated in BED patients, might explore from different points of view overlapping basic disturbances.

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