

Comorbidity of Borderline Personality Disorder and Disordered Eating: A Difficult Challenge for Psychiatry?

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Abstract: *Background;* Disordered eating is common in individuals with Borderline Personality Disorder (BPD). Both BPD and certain forms of disordered eating are known to be associated with poor impulse control. Our aim is to identify the clinical and psychometric characteristics of patients with BPD and disordered eating, with particular emphasis on impulsivity.

Methods; A convenience sample of patients with DSM-IV BPD was enrolled from five Italian outpatient mental health services. The BPD sample was divided into two groups according to the presence of clinically significant disordered eating and compared with a third group of outpatients with only disordered eating.

Results; In the BPD sample, 52% had disordered eating. Patients with BPD+disordered eating had more lifetime suicide attempts ($p=0.046$) and hospitalizations ($p=0.038$) and showed higher impulsivity on the Barratt-Impulsiveness-Scale ($p=0.026$) specifically in the domain of attentional impulsivity ($p<0.001$), as well as greater depressive symptoms on the Beck-Depression-Inventory ($p=0.006$). A correlation was found between attentional impulsivity and all of the Eating-Disorder-Examination-Questionnaire subscales apart from the restriction one.

Conclusions; Disordered eating is common among individuals with BPD and these patients represent a significantly more impulsive subgroup with a higher rate of suicidality, and therefore a challenge for clinicians. Attentional impulsivity could represent a novel treatment target for this group of individuals.

Keywords: disordered eating, borderline personality disorder, food addiction, Impulsivity, attentional impulsivity, personalized treatment.

1. INTRODUCTION

'Disordered eating' is a dysfunctional behavior commonly present in individuals affected by Borderline Personality Disorder (BPD) and can be considered as a part of its psychopathological core or as a comorbid condition. People with borderline personality disorder have a greater prevalence of eating disorders than people in the general population (Zanarini *et al.*, 2010). For example, the study by Zanarini and her colleagues (Zanarini *et al.*, 2010) found that 53.8% of patients with BPD also met criteria for an eating disorder (compared to 24.6% of patients with other personality disorders).

In this study, 21.7% of patients with BPD met criteria for anorexia nervosa and 24.1% for bulimia nervosa.

Disordered eating can be defined as abnormal eating behaviours that do not necessarily meet *all* the criteria for an eating disorder diagnosis (Tabler & Geist, 2016), but can also be present in individuals with eating disorders. These behaviours include binge eating, dieting, skipping meals regularly, self-induced vomiting and restricting food intake, among others. Disordered eating can be classified into overarching categories such as binge eating with or without eliminatory activities and chronic restriction of food: Borderline Personality Disorder is associated with both types of behaviour, and particularly with impulsive eating pathology such as bingeing and purging (Sansone *et al.*, 2004).

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Disordered eating was found to be common occurring in up to 61% in patients with BPD, whether or not they were diagnosed with a co-morbid eating disorder (Marino & Zanarini, 2001). Exact rates of the prevalence of disordered eating in individuals with Borderline Personality Disorder, however, vary and depend on factors such as culture, assessment of the eating behaviour and presence of other comorbidities (Sansone *et al.*, 2004).

Various etiopathogenetic models have been proposed to explain the interaction between Personality Disorders (PD) and ED (Lilenfeld *et al.*, 2006). Regardless of the model, patients with BPD and disordered eating are frequently observed in clinical practice and deserve particular attention in terms of differential diagnosis and therapeutic intervention.

A key trait shared by BPD and Eating Disorders (ED) is impulsivity, defined as a predisposition toward rapid, unplanned reactions to internal or external stimuli with diminished regard to the negative consequences of these reactions to the impulsive individual or to others (Chamberlain & Sahakian, 2007). Indeed, BPD may be considered an impulse-control disorder but there are no studies investigating different impulsivity constructs in patients with BPD in relation to disordered eating.

The importance of impulsivity in determining a broad range of clinical outcomes in patients with mental health disorders has been recognized for a long time. Lacey & Evans (1986) proposed multi-impulsive personality disorder with a clinical core of impulsivity being a risk factor for multiple addictions (Lacey & Evans, 1986). They suggested that in clinical categories such as substance use disorders, eating disorders and personality disorders there is a significant number of patients who have a very poor prognosis and are characterized not just by the specific presenting symptom but by a multiplicity of associated harmful impulsive behaviors. That is, "high impulsivity" individuals are more likely to be involved in more separate types of impulsive acts than "low impulsivity" subjects. The authors proposed that the aforementioned group of patients, who place very large demands both on the psychiatric and emergency services, form a unitary 'multi-impulsive personality' cluster that would repay detailed research cutting across the boundaries of the specialist services (Lacey & Evans, 1986). Later works such as by Kennedy and Gruning endorsed this hypothesis (Kennedy &

Gruning, 1990). Fichter and colleagues identified a multi-impulsive personality disorder or multi-impulsive bulimia (Fichter *et al.*, 1994) and defined it as the contemporary presence of criteria for the diagnosis of bulimia nervosa and certain impulsive behaviors (e.g., suicide attempts, severe auto-aggression, shop lifting (other than food), alcohol abuse, drug abuse, or sexual promiscuity). It is likely that such a disorder would include patients with BPD and eating disorders comorbidity. Multi-impulsive individuals were more frequently separated or divorced, had less schooling and held less-skilled jobs, showed more general psychopathology – anxiety, depression, anger and hostility, psychoticism – and had overall a less favorable course of illness compared to uni-impulsive bulimics. Fichter suggested that multi-impulsive bulimia or multi-impulsive disorder should be classified as a distinct diagnostic group on Axis I or that an impulsive personality disorder should be introduced on Axis II. Nagata and Matsunaga also described this disorder and showed its consistency across different cultures (Nagata *et al.*, 200); Matsunaga *et al.*, 200).

Impulsivity is a complex and multifaceted concept. Self-rated scales such as the Barrat Impulsiveness Scale-11 (BIS-11) (Patton *et al.*, 1995) are frequently used to measure impulsivity, from the perspective of manifest behaviours and cognitions. In the case of the BIS, three domains are addressed (attentional impulsivity, motor impulsivity, non-planning impulsivity; see methods). These subscales have proved useful in addressing different subtypes of impulsivity (compared to the total score). As an example of this, studies have found that motor impulsivity (*i.e.*, "to act on the spur") is specifically increased in disorders such as ADHD, OCD, Gambling Disorder (Fineberg *et al.*, 2010), whilst attentional impulsivity (inability to focus attention, distractibility) has been linked to overeating (Meule, 2013).

Our study will evaluate how clinical and psychopathological factors vary among patients with a BPD diagnosis and disordered eating compared to patients suffering from BPD without eating symptoms and to individuals with disordered eating alone, using validated rating scales and some clinical factors. Our a-priori hypothesis is that patients with BPD and disordered eating will show higher impulsivity on the BIS-11 and a greater severity on the clinical variables linked to impulsive behaviors. In particular we aim at identifying a specific impulsivity profile for patients with BPD and disordered eating using the BIS-11. Our a-

priori hypothesis is that patients with BPD and disordered eating will show higher impulsivity on the BIS-11 and a greater severity on the clinical variables linked to impulsive behaviors. In particular we aim at identifying a specific impulsivity profile for patients with BPD and disordered eating using the BIS-11.

2. METHODS

2.1. Study Design and Participants

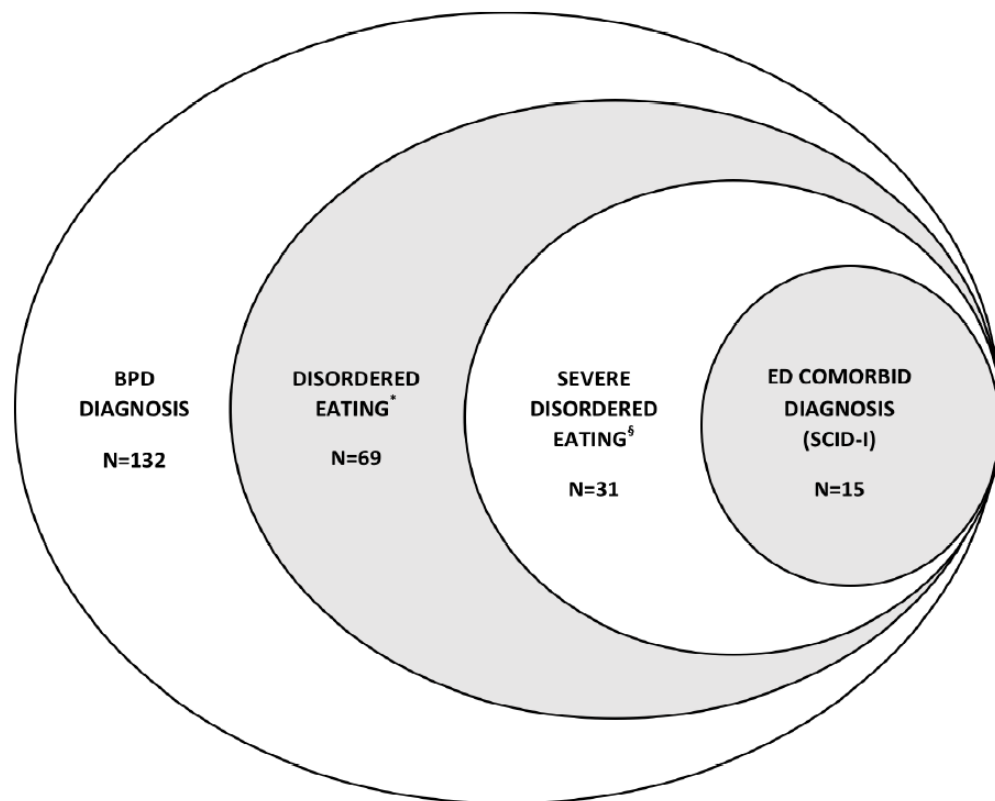
This is a cross-sectional study that recruited patients suffering from BPD and/or disordered eating (DE) referred to psychiatric services in Bologna between March 2014 and August 2018. All the participants were at least 18 years of age and were

screened for the following criteria of exclusion: intellectual disability, schizophrenic spectrum disorders, and difficulty understanding written or spoken Italian.

Ethical approval for this project was obtained in 2014 and renewed in June 2018 (15th of June 2018; EC code: 297/2018).

A total of 152 patients with DSM-IV diagnosis of Borderline Personality Disorder were recruited from five outpatient mental health services and subdivided into two groups according to the presence of disordered eating.

We compared them with a third group of 46 individuals with disordered eating (DE) referred to



*Patients were considered to have disordered eating if characterized by at least one of:

- a global EDE-Q score equal or above 2,3
- a score in any of the EDE-Q subscales equal or above 4,00
- at least 4 objective binge eating episodes (items 13-14 present altogether) and/or at least 4 eating restraint episodes per month

[§] Severe eating dysregulation was defined as a score on EDE-Q global scale over 4 with at least one of the following values in significant items: item 2 (restraint) > 13; items 13-14 (objective binge eating) > 4; one or more of items 15-16-17 (compensatory behaviors) > 4; item 18 (physical exercise) > 20.

Figure 1: Disordered eating in BPD patients.

Eating Disorder Service of Maggiore Hospital in Bologna. Borderline Personality Disorder diagnosis was an exclusion criterion for this third sample.

We therefore obtained three study groups: one made of patients diagnosed with BPD and no disordered eating (BPD-only), one with patients characterized only by disordered eating (DE-only), and one with patients having both BPD and disordered eating (BPD+DE).

2.2. Psychometric Instruments

All the participants completed sociodemographic and clinical forms and the following instruments:

- (1) Structured Clinical Interview for Personality Disorders according to DSM-IV (SCID-II)
- (2) Barratt Impulsiveness Scale-11 (BIS-11)
- (3) Beck Depression Inventory (BDI)
- (4) Eating Disorder Examination - Questionnaire (EDE-Q)

Additional clinical information was indirectly obtained by analyzing paper and digital medical records and consulting with psychiatrists. In particular, we focused on four predetermined clinical variables: substance-use, self-harm, suicide attempts, and hospitalizations.

The Structured clinical interview for Personality Disorders according to DSM-IV (SCID-II) (First *et al.*, 1997) was used to obtain a diagnosis of Borderline Personality Disorder. The BPD diagnosis according to DSM-IV had an excellent interrater reliability ($k=.90$) (Maffei *et al.*, 1997).

The Barratt Impulsiveness Scale (BIS-11) evaluated the level of impulsiveness: a self-administered questionnaire, currently in its eleventh edition, Likert-type, made up of 30 items (Patton *et al.*, 1995). This psychometric tool was developed to evaluate personological and behavioral impulsiveness. BIS-11 in its Italian version was validated by Fossati and colleagues (Fossati *et al.*, 2001). In this study the BIS-11 questionnaire had an acceptable internal consistency (Cronbach's $\alpha=0.85$). The test consists of 4 scales of which the first one offers a total score of the impulsiveness of the subject, while the others evaluate particular components of the construct of impulsiveness: cognitive impulsivity, increased in

patients with attentional and concentration difficulties, motor impulsiveness, increased in patients who act with little if any premeditation, non-planning impulsiveness, increased in patients not oriented towards planning the future.

Eating behavior was explored using the Eating Disorder Examination-Questionnaire (EDE-Q) (Cooper *et al.*, 1989): it is a self-administered questionnaire comprising 33 items that evaluates the characteristics and severity of the ED. It consists of 4 subscales that analyze different psychopathological eating dimensions and an average score that gives a global evaluation of the disorder: restraint, eating concern, shape concern, weight concern. In the present study we used the validated Italian version 6.0 (Calugi *et al.*, 2017). Cronbach's Alpha is 0.79.

Depressive symptomatology was measured with the Beck Depression Inventory-II (BDI) (Beck *et al.*, 1996): a self-evaluation tool that measures the presence and severity of depressive symptoms. The test is a 21-question multiple choice self-report inventory. The current version is adapted to the diagnostic criteria of a major depressive episode according to the fourth version of the DSM. The internal consistency measured with Cronbach's Alfa is 0,86 for the Italian validated version of the BDI-II (Sica & Ghisi, 2007).

2.3. Disordered Eating

Disordered eating was identified using a clinical approach based on EDE-Q criteria. According to the scientific literature available on the scale we chose three cut-offs based on sensibility and specificity to identify what clinically could be defined as disordered eating (Mond *et al.*, 2004; Quick & Byrd-Bredbenner, 2013).

Patients were considered to have disordered eating if characterized by at least one of:

- a) a global EDE-Q score equal or above 2,3
- b) a score in any of the EDE-Q subscales equal or above 4,00
- c) at least four objective binge eating episodes (items 13-14 present altogether) per month and/or at least four days per month with eating restraint episodes (item 2)

Severe eating dysregulation was defined as a score on EDE-Q global scale over 4 with at least one of the

following values in significant items: item 2 (restraint) > 13; items 13-14 (objective binge eating) > 4; one or more of items 15-16-17 (compensatory behaviors) > 4; item 18 (physical exercise) > 20.

2.4. Statistical Analyses

The sociodemographic and clinical characteristics of the entire sample and the three groups were synthesized using mean and standard deviations for continuous variables (median or interquartile distances were used when appropriate) and absolute frequencies and percentages for categorical variables. Dichotomous variables were compared using chi-square tests and continuous ones using Student's T or ANOVA between groups; correlations between variables were analyzed using Pearson's correlation coefficient. The statistical analyses were made using SPSS for Windows, IBM (version 22.0). The level of significance was fixed at $p < 0.05$ and corrected for multiple post-hoc comparisons in ANOVA after Bonferroni correction.

3. RESULTS

We excluded 20 patients with BPD for unavailability or incompleteness of data on eating behaviors. We found that out of 132 subjects with BPD, 69 (52%) had a clinically significant disordered eating (DE). Therefore, we divided our BPD sample into two groups according to the presence of disordered eating and compared them with a third one composed of 46 individuals with only disordered eating:

1) 46 patients with DE only

2) 63 BPD patients without disordered eating (BPD-only)

3) 69 BPD patients with disordered eating (BPD+DE)

Out of 69 patients with BPD and disordered eating conducts, 31 had a severe form of disordered eating according to EDE-Q criteria (Figure 1).

No significant differences were present among groups in terms of sociodemographic variables (Table 1).

When examining the type of disordered eating present in the first and third group, we found in both groups a higher percentage of bingeing/binge-purging compared to restrictive activities. In the BPD group, 78% of individuals with disordered eating had bingeing conducts. This finding is in line with other studies identifying a high proportion of patients with BPD having binge eating disorder (BED), bulimia nervosa (BN) or eating disorders not otherwise specified (EDNOS) (Jonge *et al.*, 2003; Steiger & Bruce, 2007). Therefore, in our sample, disordered eating is for the most part represented by bingeing behaviors with/without compensatory conducts.

Concerning clinical variables, substance use and self-harm were more common in the two groups of subjects with BPD compared to patients affected only by DE. Frequencies of suicide attempts and hospitalizations were higher in individuals characterized by both BPD and disordered eating compared to the groups with BPD only and DE only (Table 2).

Table 1: Sociodemographic Variables in the Three Groups

Variable		DE-only group N=46	BPD-only group N=63	BPD+DE group N=68
Median Age		32	30	29
Gender N (%)	Males	8 (17%)	12 (19%)	9 (13%)
	Females	38 (83%)	51 (81%)	60 (87%)
Marital Status N (%)	Single	29 (63%)	42 (67%)	47 (68%)
	Common-law	3 (6%)	6 (10%)	5 (7%)
	Married	9 (20%)	3 (5%)	12 (17%)
	Divorced/separated	5 (11%)	12 (18%)	5 (7%)
Occupation N (%)	Employed	27 (59%)	24 (38%)	28 (41%)
	Unemployed	5 (11%)	21 (33%)	27 (39%)
	Students	14 (30%)	18 (29%)	14 (20%)

Table 2: Clinical Variables in the Two Groups with BPD Diagnosis

Variable	BPD-only N=63	BPD+DE N=68	Chi-square	p
Self-harm N (%)	39 (61.9%)	44 (64.7%)	$\chi^2 = 0.00121$	$p = 0.972$
Substance use N (%)	26 (41.3%)	22 (32.4%)	$\chi^2 = 0.992$	$p = 0.319$
Suicide attempts N (%)	9 (14.5%)	19 (29.2%)	$\chi^2 = 4.00^*$	$p = 0.046$
Hospitalizations N (%)	15 (24.2%)	27 (41.5%)	$\chi^2 = 4.31^*$	$p = 0.038$

* $p < 0.05$ **Table 3: Barratt Impulsiveness Scale-11 (BIS-11) and Beck Depression Inventory (BDI) Mean Scores in the Three Groups**

	Group	BIS-Total score (SD)	BIS-Motor (SD)	BIS-Attentional (SD)	BIS-Non planning (SD)	BDI (SD)
Mean	DE-only	58.0 (10.44)	18.4 (4.47)	21.1 (3.95)	18.2 (4.14)	18.1 (13.67)
	BPD-only	68.5 (10.41)	24.3 (5.36)	16.5 (3.52)	26.1 (4.17)	22.1 (12.72)
	BPD+DE	73.5 (10.33)	25.6 (5.02)	19.4 (4.66)	26.5 (4.69)	29.0 (9.65)

In the psychometric scales there were differences among the study groups (Table 3).

The Barratt Impulsiveness Scale-11 was characterized by a higher total score in the BPD+DE group. Attentional impulsivity was higher in groups characterized by disordered eating behaviors (DE-only and BPD+DE groups), while motor and non-planning subscales' scores were greater in the groups with BPD (BPD-only and BPD+DE groups). Depressive symptoms measured through BDI were more severe in

the BPD+DE group compared to the other two groups (Table 4).

When comparing the two groups with a BPD diagnosis, motor and non-planning impulsivity on the BIS did not show significant differences, while the total score and the attentional subscale score were higher in the group with both personality disorder and disordered eating (BPD+DE) (BIS-11 total score: mean difference 4.97, $p = 0.026$; BIS-11 attentional subscale: mean difference 2.9, $p < 0.001$). The BDI score was higher in

Table 4: ANOVA for Multiple Comparisons of BIS-11 and BDI Scales (Bonferroni Post-Hoc Corrections)

Scale	Group A	Group B	Mean difference (group A versus group B)	Standard error (SE)	p
BIS Total score	BPD+DE	DE	15.86463 [†]	2.04147	<0.001
		BPD	4.96711 [†]	1.86527	0.026
BIS Motor Impulsivity	BPD+DE	DE	7.36446 [†]	0.98318	<0.001
		BPD	1.27498	0.89832	0.473
BIS Attentional Impulsivity	BPD+DE	DE	-1.74450	0.80396	0.069
		BPD	2.92874 [†]	0.73457	<0.001
BIS Non-planning impulsivity	BPD+DE	DE	8.32975 [†]	0.85972	<0.001
		BPD	0.44169	0.78551	1.000
Beck Depression Inventory (BDI)	BPD+DE	DE	10.92500 [†]	2.46915	<0.001
		BPD	6.90164 [†]	2.20530	0.006

† $p < 0.05$

Table 5: Correlation Matrix between BIS-11 and EDE-Q Scales

		EDE-Q Restraint	EDE-Q Eating	EDE-Q Weight	EDE-Q Shape	EDE-Q mean
BIS-11 Total score	<i>Pearson's r</i>	0.0005	0.091	0.147	0.191 [*]	0.123
	<i>p-value</i>	0.956	0.350	0.132	0.048	0.204
BIS-11 Motor	<i>Pearson's r</i>	-0.063	-0.038	0.045	0.120	0.021
	<i>p-value</i>	0.519	0.699	0.647	0.217	0.828
BIS-11 Attentional	<i>Pearson's r</i>	0.135	0.313 [*]	0.244 [*]	0.240 [*]	0.270 [*]
	<i>p-value</i>	0.166	0.001	0.011	0.013	0.005
BIS-11 Non-planning	<i>Pearson's r</i>	-0.029	-0.013	0.013	0.085	0.013
	<i>p-value</i>	0.765	0.892	0.891	0.384	0.893

^{*} $p < 0.05$

the BPD+ED group compared to the BPD-only group (mean difference 6.9, $p = 0.006$).

Correlations were found between the attentional subscale of the BIS and the EDE-Q, in detail the attentional subscale of the BIS correlated with the EDE-Q global score (Pearson $r = 0.270$, $p = 0.005$) and the subscales food (Pearson $r = 0.313$, $p = 0.001$), weight (Pearson $r = 0.244$, $p = 0.011$), and body (Pearson $r = 0.240$, $p = 0.013$) (Table 5).

4. DISCUSSION

Among the patients suffering from BPD included in the study, 52% showed clinically significant disordered eating behavior. This finding suggests that disordered eating is extremely common in BPD and that one out of two patients accessing clinical services will show some degree of this dysfunctional behavior, in certain cases to the extent of receiving a comorbid eating disorder diagnosis. In particular, in our sample, the “impulsive” types of disordered eating (characterized by bingeing) were the most frequent compared to “compulsive” forms (characterized by restriction) and were associated with increased levels of general and attentional impulsivity. Therefore, the coexistence of Borderline Personality Disorder and disordered eating identifies a multi-impulsive clinical phenotype. In the present study, according to our a-priori hypothesis, we showed that this group of individuals has higher levels of impulsivity measured through the BIS-11 and its subscales, higher depressive symptoms assessed through the BDI, and greater severity on two of the clinical variables we investigated (hospitalizations and suicide attempts), compared to patients of the BPD-only (Table 6) and DE-only groups. Indeed, it would seem that patients with BPD and disordered eating are likely to be often encountered in daily practice and to constitute a therapeutic challenge for clinicians.

Table 6: Summary of Clinical Differences between BPD Patients with and without Disordered Eating (DE)

Variable	Group	
	BPD only	BPD+DE
Depressive symptoms	–	+
General impulsivity	–	+
Motor impulsivity	=	=
Attentional impulsivity	–	+
Non-planning impulsivity	=	=
Hospitalizations	–	+
Self-harm	=	=
Suicide attempts	–	+
Substance use	=	=

– : feature not significantly present compared to BPD-DE group
 + : feature significantly present compared to BPD only group
 = : no statistical difference

Disordered eating may represent a specific psychopathological dimension in BPD that, like other dysfunctional behaviors, results from difficulty in regulating impulses (especially on the cognitive level by conferring less resistance to so-called food cues); However, when present with other risky behaviors, this dimension can determine a multi-impulsive profile that seems to be characterized by a poorer prognosis.

Translational neuroscience approaches aimed at recognizing and defining clinical endophenotypes may hold future promise for unravelling the relationship between disordered eating, BPD and poor impulse control. In a population study by Hou and colleagues (Hou *et al.*, 2011), attentional impulsivity was hypothesized to mediate the association between impulsive eating and attentional bias toward food cues. Preliminary evidence suggests that attentional

impulsivity may increase the susceptibility that highly palatable food-cues attract attention and trigger eating behavior. The exact mechanisms, however, are yet to be determined (Appelhans, 2009; Heatherton & Wagner, 2011). Meule and colleagues also found that a higher degree of attentional impulsivity was associated with a higher BMI and binge eating in a non-clinical sample of obese women with disordered eating behaviour (Meule & Platte, 2015). Motor impulsivity was also linked to bingeing, especially in interaction with attentional impulsivity (*i.e.*, self-regulatory failure in eating-regulation such as addiction-like overeating may particularly emerge when both attentional and motor impulsivity levels are elevated), while non-planning impulsivity did not appear to play a role in eating-related self-regulation. In another study comparing a group of Binge Eating Disorder patients with controls, attentional impulsivity was observed to be linked to bingeing behaviors, motor impulsivity involvement was present to a lesser extent and non-planning impulsivity was unchanged (Hege *et al.*, 2015).

In our study, the subscales of the BIS identifying specific facets of impulsivity have a peculiar distribution between the three groups. The present work suggests that the motor and non-planning subscales are features more specific to BPD itself and the more classical behavioral traits that go along with its psychopathological core such as the tendency toward self-harming and substance abuse. In contrast, a high attentional BIS score, in our sample, seems to be a characteristic of BPD patients who have disordered eating. The results obtained were significant and in accordance with the scientific literature, in particular with a study by Meule and Platte on a non-clinical sample whose results were replicated in our research on a clinical sample (Meule & Platte, 2015). To our knowledge, there are no studies linking attentional impulsiveness to disordered eating behavior in subjects affected by BPD.

Moreover, the group with BPD and disordered eating reported an average BDI score higher than the other groups: it could be hypothesized that negative affect and preoccupations increase the risk of impulsive actions such as bingeing and overeating by reducing the cognitive resistance to environmental cues and increasing attentional impulsivity (Mason *et al.*, 2018). A positive correlation was found between the attentional subscale of the BIS and all the subscales of EDE-Q except the restraint one. As expected, the attentional BIS does not appear to correlate with restrictive behavior and is more frequently associated

with eating disorder characterized by bingeing (Martinussen *et al.*, 2017).

If our findings are corroborated, a high attentional impulsivity (attentional bias, distractibility, racing thoughts, poor cognitive control and resistance to environmental cues) may prove to be a specific treatment target in patients with BPD and disordered eating. It's possible to think that the high attentional impulsivity could make these patients similar to those with Attentional Deficit Hyperactivity Disorder (ADHD) and hypothetically a question for future research could be the possible role of stimulant medications, that could improve the distractibility and attentional bias and give more ability to focus, resist and not give in to environmental cues. This hypothesis is corroborated by the studies by McElroy and colleagues, who showed in two multicenter randomized controlled trials that Lisdexamfetamine dimesylate (LDX) may be an effective pharmacotherapy for BED (McElroy *et al.*, 2016). SSRIs are known to be effective in Eating Disorders such as Bulimia Nervosa, while we know from previous studies and meta-analyses that SSRIs did not give positive results in BPD. Could SSRIs have a role in this specific subpopulation of patients with Borderline Personality Disorder and bingeing? In our study we showed that the group BPD+DE is characterized by high depressive symptoms and therefore antidepressant could also improve negative affectivity that worsen attentional impulsivity. These questions should lead to new research heuristics on this subject and in particular to longitudinal studies exploring the interaction between Borderline Personality Disorder and disordered eating and refining new forms of personalized patient-centered care.

This area of altered attentional impulsivity could be the specific target of psychotherapies. Dialectical Behavioral Therapy (DBT) is the gold standard treatment for Borderline Personality Disorder and when focused on the dimension of "emotional eating" it has been shown to be effective in reducing pathological eating behaviors in BED (Telch *et al.*, 2001), BN and AN-BP (Kröger *et al.*, 2010). Attention Bias Modification Therapy (AMBT) (Cox *et al.*, 2014), a specific form of psychotherapy that acts on attentional bias, could also be a hypothetical treatment, alone or in augmentation to DBT, to be investigated in future research for these patients. This approach could improve neurocognitive abilities such as attention, working memory and executive functions, which may be impaired in this set of individuals.

4.1. Limitations

Our study presents some limitations: the cross-sectional design is not the most suited to identify specific clinical and psychopathological features of BPD in relation to disordered eating, therefore longitudinal studies should be conducted in the future to more accurately investigate this relationship.

Our study focused on a structured diagnosis of Borderline Personality Disorder and this group was compared with another group of people with disordered eating but without a formal DSM diagnosis. This is because our primary aim was to identify disordered eating in individuals with Borderline Personality Disorder. We used a conventional and practical definition for disordered eating, and we accept that this would not represent the true comorbidity between BPD and Eating Disorders (EDs). In addition, we recruited patients with BPD from general psychiatric services, and therefore there could have been a selection bias for patients with personality disorder and impulsive eating behaviors. Possibly, if we had focused on EDs and recruited the comorbid group from Eating Disorders services, a greater number of patients with compulsive tendencies *e.g.*, Anorexia Nervosa, would have been found.

Also, the differences among study groups could depend on other factors not taken into consideration by us, such as other comorbidities or treatment received. Further studies with more extensive evaluation of eating profile and impulsivity *e.g.*, using cognitive tasks in patients with BPD, are needed.

Despite these limitations, our study has the advantage to rely on extensive clinical examination, use of internationally validated scales and standardized diagnostic criteria of personality disorders. Our sample size was large enough to draw conclusions and no statistically significant difference among the groups was found concerning various confounding factors such as: sex, age, other sociodemographic factors, and type of DE.

5. CONCLUSIONS

Many patients with BPD have symptoms that overlap with eating disorders and are often encountered in mental health services. In our study, the comorbid group was characterized by a higher clinical severity of symptoms (particularly impulsive behaviors such as suicide attempts). One of the unanswered

questions in current clinical practice is which psychiatry service should take care of those patients, as many of them might be referred to eating disorders services and constitute a great challenge for eating disorders clinicians due to their higher impulsivity and risky behaviors. These patients sometimes may have a real comorbidity (primary eating disorder), while other times the symptoms may be an expression of a secondary eating disorder, which is part of the BPD (Zanarini *et al.*, 2010). Impulsivity could be a treatment target. This is in line with the "food addiction" hypothesis (Avena *et al.*, 2011) that suggests that some EDs share many features with addictive behaviors such as reduced control, inability in postponing gratifications, underestimation of negative consequences, and cravings (Gearhardt *et al.*, 2012; Gearhardt *et al.*, 2013).

We know that impulse control disorders are one of the most difficult challenges mental health services have to face (Bi *et al.*, 2017) and hence this type of patients with a multi-impulsive profile may deserve particular attention. The impulsivity pattern and the attentional problem these subjects may have could contribute to high drop-out rates from treatment and to missing appointments, so clinicians and staff may need to regularly contact them as a reminder and aid for organizing. Mental health services should be endowed with strategies (*e.g.*, basic cognitive-behavioral and pharmacological techniques) to treat impulsivity with a dimensional and transdiagnostic approach.

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