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The Role of Basic Symptoms and Aberrant Salience in Borderline Personality Disorder

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ABSTRACT

Background: The prevalence of pre-psychotic symptoms and aberrant salience in BPD has not been systematically studied. The present study aims to investigate the intensity, frequency and correlation between basic symptoms, aberrant salience and borderline personality traits, in subjects that have not yet developed a frank psychotic episode.
Methods: Twenty-eight subjects, 8 males and 20 females, aged between 24 and 55 years (M = 41.36 ± 9.9) has been individually tested throughout the Frankfurt Complaint Questionnaire (FBF), the Aberrant Salience Inventory (ASI) and the Personality Inventory for the DSM-5- Adult (PID-5).
Results: Findings showed that 85.7% of the sample (n = 24) reported significant scores of the aberrant salience traits, which in turn were correlated to basic symptoms. Furthermore, emerged several correlations between pre-psychotic symptoms and PID-5 personality dimensions not only with Negative Affectivity and Detachment but also with Psychoticism.
Conclusions: This study highlights the phenomenological continuity between the borderline personality traits and the attenuated manifestation of the psychotic disease.

Keywords: *BPD; PID-5; basic symptoms; aberrant salience.*

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Introduction

The question of whether Borderline Personality Disorder (BPD) lies on the border of psychotic functioning, or whether it is unrelated to psychotic disorders, has assumed an increasing clinical relevance over years (Liebowitz, 1979; Lenzenweger, Clarkin, Kernberg & Foelsch, 2001; Friedmann & Badic, 2019). Patients with BPD often show attenuated psychotic symptoms, but it is still not clear if they can be considered as an integral part of their syndrome. Literature review suggests that narrowly defined psychotic symptoms, i.e. those defined in the DSM-5 (2013) criteria for psychosis, are not covered in the BPD clinical framework (Schroeder, Fisher & Schäfer, 2013). It is also known that when such symptoms are reported in BPD, they often are attributed to a concomitant and plausibly independent disorder suffered by the patient, such as substance abuse or major affective disorder (D'agostino, Monti & Starcevic, 2019). Furthermore, psychotic symptoms, such as depersonalization and derealization, frequently appear in patients with non-psychotic disorders and non-clinical subjects. Although there is a consensus on the transversal nature of these symptoms when these forms are not frank but attenuated - such as in the case of pre-psychotic symptoms - identification becomes more elusive (Nelson et al., 2013).

The primum movens of psychosis can be a general and nonspecific pre-psychotic phenomenon, which only in a second step become characterized by a distinct individual content; or it can be configured since the outset as a subjective phenomenon in some way inscribed in a personological continuum (Noll, 2018). Thus, the evidence for psychotic symptoms in BPD remains equivocal. According to the psychiatric tradition, the most immediate phenomenic manifestation of psychosis would be basic symptoms, considered by some author as the expression of the minimum degree of negative symptoms (Poletti, Tortorella & Raballo, 2019).

This particular condition of the patient has been described through the identification of a set of symptoms consisting in troubling and abnormal subjective sensations characterized by four aspects:

a) the Basic Symptoms are subjective experiences not objectively observable, which can be described exclusively through the introspection of the patient;

b) they are linked to a discomfort state, characterized by a mood alteration, and are experienced as disturbing;

c) they appear as slight symptoms of subclinical nature, (for example the cognitive deficiencies, as the lack of attention) but their intensity can abruptly vary, becoming seriously invalidating, even in few hours;

d) the Basic symptoms are mostly abnormal: the individuals feel an experience never known before, hence have difficulties to describe its strangeness and this leads to a worrisome emotional destabilization (Rizzo et al., 2015).

In the pre-psychotic phase, the basic symptoms are mixed with preserved coping skills. However, in particular, emotional-stressful conditions very often the subject can manifest the tendency to assign to internal or external neutral stimuli particular increased significance. This process is known as aberrant salience. In this condition, the attention is captured by irrelevant stimuli or information, affecting behavior inappropriately (Godini et al., 2015). According to the model proposed by Kapur (2003), the tendency to assign salience to neutral stimuli is due to excessive dopamine release that underlies psychotic symptoms. Indeed, aberrant salience has been correlated to the development of psychotic symptoms (Roiser et al., 2012; Cicero et al., 2013; Goodwin et al., 2016), and appears to be correlated to psychotic-like experiences (PLEs) in the general population (Gawęda et al., 2018). According to these findings, psychosis would be an induced state of aberrant salience, whose development is mediated by dopamine (Kapur, Mizrahi & Li, 2005).

In literature, there are not many studies aimed at analyzing the relationship that could be involved in basic symptoms, aberrant salience and personality disorders. The hypothesis of a possible correlation is in line with numerous theories and studies carried out over the years. For example, basic second-level symptoms have been observed in subjects that have become schizophrenics, but the mechanism of the transition from the basic symptoms to the hallucinatory symptoms typical of schizophrenia need more deepening (Klosterkötter, 1992). Among the symptoms proper to psychosis, we must, among other things, take into account the psychotic subclinical experiences (es. Linscott e Vanos, 2010; Yung et al., 2009), also co-related to personality disorders, such as the Schizotypic DP (Raine, 2006). Concerning subclinical psychotic experiences, most theoretical models have as a guiding principle the idea that aberrant salience plays not only an important role in the development of psychosis but also involved in the psychotic subclinical experiences (Kapur, 2003).

As for the DP borderline, the literature underlined the presence of a psychotic reactivity stress-related that might hesitate in short psychotic episodes. About the DSM-5 criteria, based as known on the hybrid dimensional-categorical approach, the BPD is defined by the presence of the dimension of Negative Affectivity (resulting from the facets: Emotional Lability, Anxiousness, Separation insecurity, Depressivity) Disinhibition (Impulsivity, Risk-taking), Antagonism (Hostility). On the contrary the dimension of Psychoticism - which consists in the facets: Unusual beliefs and experiences, Eccentricity, Cognitive and perceptual dysregulation - is not recognized; so the question of the nature and role of psychotic experience in the borderline remains unanswered.

The hypothesis from which the present study is born is to investigate the intensity, frequency and correlation between basic symptoms, aberrant salience and borderline personality traits, in subjects that have not yet developed a frank psychotic episode.

Method

Participants/Subject

The final sample is composed of 28 subjects, 8 males and 20 females, aged between 24 and 55 years (average age ± D.S. = 41.36 ± 9.9); all of Italian nationality, mainly married (n = 12; 42.9%), single unmarried (n = 6; 21.4%) or cohabitants (n = 10; 35.7%). The educational level is mainly represented by high school diploma (n = 12; 42.9%) and lower middle school diploma (n = 10; 35.7%), followed by 6 (21.4%) primary school subjects.

The whole sample presents a diagnosis of Borderline Personality Disorder, meeting the DSM-5 diagnostic criteria, but in some cases there are comorbid conditions: bipolar disorder (n = 4; 28. 6%), n.o.s. depression (n = 1; 7.1%), n.o.s. mood disorder (n = 2; 14.3%), eating disorder (n = 2; 14.3%); other diagnosis of psychosis, mood disorders, impulse control, pathological gambling and alcohol addiction are not reported.

Procedure and Measures

To evaluate personality, the presence and quality of basic symptoms and the intensity of aberrant salience experiences the following psychometric measures were used:

The Frankfurt Complaint Questionnaire (FBF) Italian adaptation. Developed by Süllwold in 1986 from the spontaneous complaint of a large group of schizophrenic patients. FBF is a self-report questionnaire, consisting of 98 yes–no question concerning the experience of subjective, not yet psychotic symptoms. Questions are divided into 10 subscales: (1) Loss of Control, (2) Simple Perception, (3) Complex Perception, (4) Language, (5) Thought, (6) Memory, (7) Motility, (8) Lack of Automatism, (9) Anhedonia Anxiety, (10) Sensory Overstimulation. For the evaluation, each affirmatively answered item is ascribed to one of the 10 phenomenological subscales; a total score is also calculated (Stanghellini, Strik, & Cabras, 1991).

The Aberrant Salience Inventory (ASI) is a self-report questionnaire consisting of 29 items with a dichotomous answer (yes) which turned out to be a useful tool for identifying individuals at psychotic risk, so it can be used for prevention, early diagnosis and setting of a possible treatment (Cicero, Kerns & McCarthy, 2010). The factorial analysis revealed a 5 factors structure consisting in: (1) feelings of increased significance; (2) sense sharpening; (3) impending understanding; (4) heightened emotionality and (5) heightened cognition. ASI has proved to be a particularly valuable tool for measuring the aberrant salience construct in healthy samples and clinical samples with a history of psychosis. Starting from the idea that the aberrant salience drives psychotic experience, a relationship was observed between ASI scores and magical thinking, a psychotic-like experience closely linked to psychotic symptoms. Furthermore, the ASI was also correlated with perceptual

aberration, referential thinking, absorption, dissociation and some scales indicative of dopaminergic functioning. The 14-point cut-off score identifies those at risk of psychosis development.

The Personality Inventory for the DSM-5-Adult (PID-5). A self-administered scale used for personality assessment, according to the DSM-5th edition (2013). It consists of 220 items to which the subject must respond by indicating how accurately each statement describes it on a scale that provides: very false or often false; sometimes or somewhat false; sometimes or somewhat true; very true or often true. It assesses 25 personality trait facets including Anhedonia, Anxiousness, Attention Seeking, Callousness, Deceitfulness, Depressivity, Distractibility, Eccentricity, Emotional Lability, Grandiosity, Hostility, Impulsivity, Intimacy Avoidance, Irresponsibility, Manipulativeness, Perceptual Dysregulation, Perseveration, Restricted Affectivity, Rigid Perfectionism, Risk Taking, Separation Insecurity, Submissiveness, Suspiciousness, Unusual Beliefs and Experiences, and Withdrawal, with each trait facet consisting of 4 to 14 items. Specific triplets of facets (groups of three) can be combined to yield indices of the five broader trait domains of Negative Affectivity, Detachment, Antagonism, Disinhibition, and Psychoticism.

Statistical Analysis and procedure

The data obtained were subjected to verification and quality control and, subsequently, to descriptive and inferential statistical analysis. The statistical analysis was performed with Statistical Package for the Social Sciences - SPSS 17.0 software (SPSS Inc, Chicago, IL, USA). Continuous data were expressed as mean ± standard deviation; non-continuous data were expressed as percentages. A correlation analysis (Pearson correlation) was performed to evaluate the possible associations between the basic symptoms, salience and personality domains. Results for $p < 0.05$ were considered significant.

All the patients provided written informed consent after a full explanation of the protocol design, which had been approved by the local ethics committee and was conducted according to the Declaration of Helsinki. Anonymity was granted according to the Italian law for personal information treatment.

Results

Table 1 shows the descriptive statistics obtained from the 28 subjects with borderline personality disorder at the Basic Symptoms Questionnaire (FBF). An observation of the mean obtained shows that the highest scores were recorded concerning the variables DE (Thought), AU (Loss of automatisms) and AN (Anhedonia and anxiety).

FBF	Min	Max	M	SD
KO = Loss of experience	0	7	4.07	2.09
WAS = Simple perception	0	6	2.93	1.63
WAK = Complex perception	0	5	2.14	1.65
SP = Language	0	10	4.71	2.78
DE = Thought	3	10	6.71	2.46
GED = Memory	1	9	4.79	2.29
MO = Motility	1	7	4.07	1.94
AU = Lack of automatism	3	10	6.07	2.30
AN = Anhedonia anxiety	2	10	6.07	2.12
REI = Sensory overstimulation	0	9	4.93	3.10

Table 1 – Descriptives of basic symptoms in a sample of BPD patients (N=14)

As regards the Aberrant Salience measure, the subjects obtained scores spanning from a total minimum of 10 to a maximum of 26, with an average of 17.93 and SD 4.48. Since a > 14-point score indicates the risk of psychosis development, the number of protocols at risk were counted. Findings showed that 85.7% of the sample (n = 24) reported significative aberrant salience traits.

Table 2 represents the main domains of the Clinical Personality Inventory for the DSM-5 (PID-5). Each Sub-scale score higher than 2 is conventionally considered to be descriptive of a trait. Despite subjects did not report scores above 2, the personality trait domain that seems to prevail is Negative Affectivity (considered to be one of the fundamental characteristics of borderline disorder of personality according to the DSM-5). However, if we use the criterion of percentiles proposed by the American Psychiatric Association (APA) in the PID-5 user manual in a sample of 1544 subjects, as well as with the algorithm proposed by Krueger et al (2011), a different result emerges (see table 2). The most represented dimensions, which exceed the 90th and even the 95th percentiles, indicating a result significantly higher than the population mean, are Negative Affectivity and, contrary to what one might expect, Psychoticism.

PID-5	**Min**	**Max**	**Mean**	**Std. D.**	**APA sample percentiles**	**Krueger et al. (2011) algorithm percentiles**
Negative Affect	1	2	1.79	0.42	> 95°	> 90°
Detachment	0	2	1.14	0.53	> 75°	> 75°
Antagonism	0	2	1.00	0.39	> 75°	> 75°
Disinhibition	1	2	1.43	0.51	> 75°	> 75°
Psychoticism	1	2	1.43	0.51	> 90°	> 90°

Table 2 – Personality domains PID-5 in BPD patients

Finally, Pearson's correlations were performed to study the mutual relationships between basic symptoms, personality and salience. As can be seen in table 3, the basic symptoms are correlated with some personality domains, specifically:

(a) the dimension of Complex Perception (eg item 24 FBF "sometimes the colors of familiar things appear to be changed") it is positively correlated with Detachment [r = .583 p = .02];

(b) the dimension of the Language (eg item 40 FBF "Often when I read I am surprised toward a usual word and I have to reflect on its meaning") and the Overabundance of stimuli (eg item 58 FBF "I am excessively awake; I pay suddenly attention to everything that happens despite I don't want it at all") are both positively correlated with the PID-5 domain of Psychoticism [r = .630 p = .01] [r = .794 p = .00];

(c) the dimension of Memory (eg item 62 FBF "It happens that in the middle of an activity, I stop it without a reason") positively correlates with the Negative Affectivity [r = .580 p = .03] as with Antagonism [r = .599 p = .02] and Psychoticism [r = .083 p = .00];

(d) the dimension relating to Anhedonia and Anxiety (eg item 16 FBF "I can no longer experience real enjoyment") resulted positively correlated with the relative domains of Disinhibition [r = .603 p = .02] and Psychoticism [r = .814 p = .00].

FBF	Negative Affectivity	Detachment	Antagonism	Disinhibition	Psychoticism
KO	.018	.196	.000	.112	.327
WAS	-.244	.276	-.120	-.326	-.144
WAK	.156	.583*	.473	.103	.465
SP	.334	.185	.422	.254	.630*
DE	-.136	.033	.239	.043	.348
GED	.580*	.090	.599*	.411	.803**
MO	.392	.434	.101	.507	.430
AU	.331	-.071	.426	.232	.493
AN	.273	.261	.184	.603*	.814**
REI	.454	.378	.380	.407	.794**

Legend: KO = Loss of experience; WAS = Simple perception; WAK = Complex perception; SP = Language; DE = Thought; GED = Memory; MO = Motility; AU = Lack of automatism; AN = Anhedonia anxiety; REI = Sensory overstimulation; * p<.01; ** p<.001.

Table 3 – Correlations between Base Symptoms (FBF) and Aberrant Salience (ASI) in BPD patients

At last, the correlations between basic symptoms and aberrant salience were analyzed. Positive correlations between salience and the areas of Loss of Control, Simple Perception, Anxiety and

Overabundance of Stimuli emerged. The correlation between salience and personality domains, however, was not significant, therefore the two variables seem to be independent. It is, therefore, possible to state that the salience, while being strongly represented in our sample, it is not related to the domains of personalities identified through PID-5.

Discussion

Currently, there is not full agreement in the literature on the psychopathological characterization of psychosis in DBP. The present study aimed to investigate the relationships between basic symptoms, aberrant salience in borderline personality disordered patients.

Recent studies have underlined the non-transient and functionally invalidating nature of borderline psychosis, characterized by a spectrum of symptoms in addition to paranoid ideas and dissociative symptoms. 75% of borderline patients develop dissociative symptoms and paranoid ideas, while 9-30% also develop serious cognitive-perceptive alterations, including auditory hallucinations (Barnow *et al*., 2010).

It is not easy to establish what the boundary line is, whether there is a difference for the frankly psychotic experience. Some Author argued that the auditory hallucinations that develop in the borderline patient are often malevolent, critical, functionally invalidating voices and a source of greater emotional resonance and anxiety than those of the schizophrenic patient (Yee, Korner, McSwiggan, Meares & Stevenson, 2005; Adams & Sanders, 2011; Reitz et al., 2015). The emotional experience would, therefore, seem to be the main difference between borderline and schizophrenic psychoses, which can be superimposed instead from the cognitive and phenomenal point of view (Genovese *et al*., 2015).

Some authors instead consider borderline hallucinations phenomena in themselves, because a partial insight is maintained and a reference to the contents of reality is possible (Slotema *et al*., 2012; Crepulja, 2014; Gras, Amad, Thomas & Jardri, 2014). It appears evident that the psychotic experience of the borderline patient escapes the taxonomic definition of the clinicians, who in the past have often interpreted it as not authentic, exaggerated and manipulative. Sometimes it is not easy to understand if the described phenomena are true hallucinations, understood as actual alterations of the perceptive sphere, or rather vivid fantasies (Francey *et al*., 2018; Paris, 2018; D'Agostino, Monti & Starcevic, 2019). Indeed, some authors believe that psychotic symptoms take on an experiential continuum that does not always allow this distinction.

Therefore today we tend to speak more generically of "dissociative psychosis" (Van der Hart & Witztum, 2008), "non-psychotic hallucinations" (Badcock & Hugdahl, 2012), "traumatic/intrusive

hallucinations" "(Myin-Germeys, Van Os, Schwartz, Stone & Delespaul, 2001) or "stress-related psychotic reactivity" (Dorahy & Palmer, 2016).

In this regard, it has been shown that DBP has a greater psychotic reactivity to daily stresses compared to personality disorders of cluster C, to psychotic disorders and the non-clinical population. The diagnostic criteria should, therefore, contemplate the non-transitory psychotic experience in the DBP and its etiopathogenetic link with the trauma suffered in childhood and with stress (Golier et al., 2003; Bandelow et al., 2005; Martín-Blanco et al., 2016; Kate & Dorahy, 2019).

This would be tied to the activation of the aberrant salience circuit and the dopaminergic hypothesis of psychosis, as proposed by Kapur (2003) to explain the productive symptoms of schizophrenia. From the analysis of the results obtained in our sample, although scarcely numerous and limited in general, it emerges that the symptoms related to the aberrant salience and associated with the pre-psychotic state are present in a significant and related way, to the Borderline personality, diagnosed with the system DSM-5 (2013) and with the related psychodiagnostic tool (PID-5).

Each Sub-scale score higher than 2 is conventionally considered to be descriptive of a trait. Despite subjects did not report scores above 2, the personality trait domain that seems to prevail is Negative Affectivity (considered to be one of the fundamental characteristics of borderline disorder of personality according to the DSM-5). However, if we use the criterion of percentiles proposed by the American Psychiatric Association (APA) in the PID-5 user manual in a sample of 1544 subjects, as well as with the algorithm proposed by Krueger et al (2011), a different result emerges (see table 2). The most represented dimensions, which exceed the 90th and even the 95th percentiles, indicating a result significantly higher than the population mean, are Negative Affectivity and, contrary to what one might expect, Psychoticism.

However, some limitations to this study should be considered. First, the sample size is relatively small, and recruited subjects were from the same mental health service and geographic area, limiting the generalizability and validity of these findings. Therefore, the results obtained should be replicated in a wider sample more representative of the clinical BPD population. Furthermore, the results were obtained through the use of a self-report psychometric measure, which may be influenced by disturbing variables such as: the defensive style; filtered and subjective self-perceptions; social desirability; self-serving biases on positive personal traits and "halo effect" (difficulties in discriminating behaviors). Moreover, no safe conclusions can be drawn about the psychotic PID-5 domains and BPD symptoms outcome, as cut-off standardized points have not yet available in literature.

These results are hardly comparable with the data in the literature, as there have been no studies so far that have investigated these components except for PTSD and the psychotic sphere. Although this is to be considered a preliminary study, we can nonetheless underline the importance of using these tools in the evaluation of personality disorders, as these correlations show that pre-psychotic symptoms are present even in borderline personality disorder, and can be considered premorbid. Besides, the areas of the basic symptoms that have been altered may have a prognostic value, as the symptomatology could invest more precisely the areas of Thought, of the Loss of automatisms and Anhedonia and anxiety.

Future studies should ascertain, through a sample widening, a possible correlation between aberrant salience and personality structure, considering that they could be two independent characteristics of strong value in the clinical context. Another aspect that would be necessary to investigate in the future concerns the possible pharmacological therapy, as some responses (for example those related to the area of control impulse, a typical aspect of the borderline patient) could be vitiated by the pharmacological treatment in progress.

In conclusion, the object of the present work, namely the complex relationship between psychosis and personality, remains to this day still controversial. Indeed, the hypotheses formulated on the type of association that would link the two psychopathological entities remain discordant and are not fully exhaustive from the etiopathogenetic point of view. The premorbid personality was interpreted both as a risk factor for the onset and as a predictor of the course of psychosis, but also as a clinical expression, comparable to psychosis, of an underlying psychopathological nucleus. This last hypothesis would underline more the phenomenological continuity existing between premorbid personality and psychotic disorder, meaning the abnormal personality traits as an attenuated manifestation of the psychotic disease (Rizzo et al., 2015; Rizzo, 2017).

Knowing the basic symptomatology of psychoses, and understanding how this can be connected to aberrant salience and therefore to the appearance of delusions, can be a valid aid for the clinician both for a timely formulation of diagnosis and an early start of therapeutic treatment, and for understand the suffering of the person and thus be able to alleviate it or in any case to process and contain it.

Declarations of interest

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Ethical approval. This article does not contain any studies with human participants performed by any of the authors.

Authors' contribution

M.C., B.C., R.A. & A.R. assisted with concept, study design, data analysis, manuscript preparation and manuscript editing; C.V., L.E., participated at the generation of the initial draft of the whole manuscript, manuscript editing and data interpretation; B.C., C.C., P.G. assisted with manuscript editing; M.M.R.A., Z.R.A. contributed to the improvement, review and supervision of the manuscript. All authors contributed to and have approved the final manuscript.

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