

Hallucinations and Other Psychotic Symptoms in Patients with Borderline Personality Disorder

Kamila Belohradova Minarikova¹, Jan Prasko¹⁻⁴, Michaela Holubova^{5,6}, Jakub Vanek¹, Krystof Kantor¹, Milos Slepecky³, Klara Latalova¹, Marie Ociskova¹

¹Department of Psychiatry, Faculty of Medicine and Dentistry, Palacky University, University Hospital, Olomouc, The Czech Republic; ²Institute for Postgraduate Education in Health Care, Prague, The Czech Republic; ³Department of Psychology Sciences, Faculty of Social Science and Health Care, Constantine the Philosopher University, Nitra, The Slovak Republic; ⁴Jessenia, a.s., Rehabilitation Hospital Beroun, AKESO Holding, Beroun, The Czech Republic; ⁵Department of Psychiatry, Hospital Liberec, Liberec, The Czech Republic; ⁶Department of Pedagogy and Psychology, Faculty of Science, Humanities and education, Technical University, Liberec, The Czech Republic

Correspondence: Jan Prasko, Department of Psychiatry, Faculty of Medicine and Dentistry, Palacky University, University Hospital, I. P. Pavlova 6, Olomouc, 779 00, The Czech Republic, Email praskojan@seznam.cz

Background: Psychotic symptoms in BPD are not uncommon, and they are diverse and phenomenologically similar to those in schizophrenia spectrum disorders. Despite their prevalence in BPD patients, knowledge about the characteristics and severity of hallucinations is limited, especially in modalities other than auditory.

Aim: This review summarises the causes, phenomenology, severity, and treatment options of hallucinations and other psychotic symptoms in BPD.

Methods: The PubMed database was used with the following key terms: “borderline personality disorder” and ‘hallucinations’ and “psychotic symptoms”. Articles were selected between January 1990 and May 2021. The primary keyword search yielded a total of 545 papers, of which 102 articles met the inclusion criteria and were fully screened. Papers from the primary source reference lists were also screened, assessed for eligibility, and then added to the primary documents where appropriate (n = 143). After the relevance assessment, 102 papers were included in the review. We included adult and adolescent studies to gather more recent reviews on this topic.

Results: Hallucinations are significantly prevalent in BPD, mainly auditory, similar to schizophrenia spectrum disorders. The relationship between hallucinations and depression, anxiety, suicidality, schizotypy, and loneliness in BPD has been discovered but requires more research. Studies for treatment options for hallucinations in BPD are lacking.

Conclusion: Recognition of psychotic symptoms in patients with BPD as distinguished psychopathological phenomena instead of diminishing and overlooking them is essential in the clinical assessment and can be useful in predicting complications during treatment. More focused research in this area is needed.

Keywords: borderline personality disorder, psychotic symptoms, hallucinations, treatment, pharmacotherapy, psychotherapy

Introduction

Borderline personality disorder (BPD) is characterized by chronic instability of emotions and self-image leading to self-destructive behaviour and relationship difficulties.¹ One of BPD criteria is transient stress-related paranoid thoughts.² In addition, the clinical picture includes cognitive-perceptual symptoms such as suspiciousness, ideations of reference, paranoid thoughts, delusions, derealization, depersonalization, and hallucination-like symptoms.² Historically, the term “a borderline state” or “a borderline patient” described clinical features that were both psychotic and neurotic in nature.³

For a long time, the categorization of BPD patients was inconsistent – some considered “borderline” as either a form of schizophrenia (ie, latent, pseudoneurotic, or borderline schizophrenia) or as a personality disorder (ie, Kernberg’s borderline personality organization).^{4,5} With the introduction of the DSM-III,⁶ BPD was separated from a schizotypal personality disorder (which was then considered a psychotic disorder), and BPD criteria entered the psychiatric classification system.⁵ However, psychotic symptoms were, despite their presence, not included.⁷ It was not until the

fourth revision of the DSM (DSM-IV) that psychotic symptoms like “severe dissociative symptoms” or “transient stress-related paranoid ideations” were added as a criterion to the diagnosis of BPD.⁸ The DSM-5 BPD criteria remain unchanged in Section II.² In Part III of the DSM-5, the state of “psychoticism” (ie, cognitive and perceptual dysregulation) is included as a possible, non-essential feature of BPD.²

As for the International Classification of Diseases and Related Health Problems (ICD), the BPD diagnosis did not enter until 1992 in the 10th edition as a borderline subtype of the emotionally unstable personality disorder.⁹ Psychotic symptoms were not present among the criteria. The impending 11th edition of the ICD will adopt a multi-dimensional assessment of borderline personality disorder, including “transient dissociative symptoms or psychotic signs in situations of high affective arousal”.¹⁰

Psychotic symptoms in BPD have been usually described as short-lived, less severe, and qualitatively different from those in psychotic disorders such as schizophrenia, despite the historical inclusion of “borderline” in psychotic disorders. The terms “quasi-psychotic” (limited, brief, and non-bizarre), “transient”, “atypical”, “pseudo-“, or even “factitious” have been often used.^{11,12} However, recent research shows that psychotic symptoms in people with BPD (auditory verbal hallucinations in particular) show more similarities with psychotic disorders than differences. Psychotic symptoms in BPD are also markers of more severe psychopathology and worse prognosis (specifically more frequent hospitalizations and suicidality).^{13–16} However, there is no common consensus on their aetiology, phenomenology, severity, or management.^{17–20}

This review aimed to summarise the causes, phenomenology, severity, and treatment of hallucinations and other psychotic symptoms in BPD. We also assessed evidence against the long-standing concept that psychotic signs in BPD are different and less severe than in psychotic disorders. We included adult and adolescent studies to gather more recent reviews on this topic.^{16,21–24}

Several research questions have been formulated:

- (1) How common are hallucinations and other psychotic phenomena in BPD?
- (2) What factors influence psychotic symptoms in BPD?
- (3) Are psychotic symptoms in BPD linked with the severity of the disorder?
- (4) Are hallucinations and other psychotic symptoms in BPD different from other disorders?
- (5) What are the treatment options for hallucinations in BPD?

Method

A narrative review was conducted using the PubMed database to search for articles published between January 1990 and May 2021, using the following key terms: “borderline personality disorder) and (hallucinations or psychotic symptoms)” or hospitalizations or suicidality. Inclusion criteria were (1) published in a peer-reviewed journal; (2) studies in humans only; or (3) reviews on a related topic; (4) English language. The exclusion criteria were: (1) abstracts from conferences; (2) thesis or dissertation papers; (3) textbooks; (4) popular articles; (5) editorial commentaries; (6) animal model studies.

Additional texts were retrieved by searching the reference lists of the primary sources. Texts were collected and systematized according to relevance.

Results

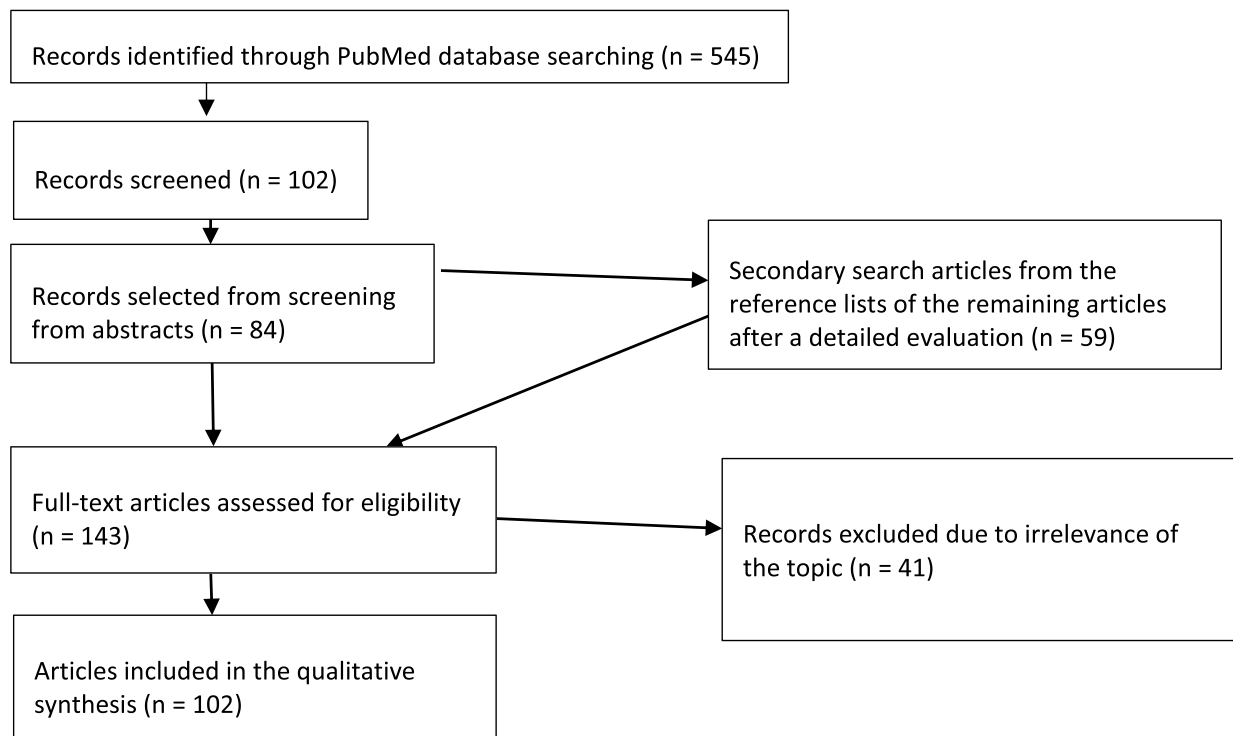
Selection of Studies

Figure 1 describes the flow chart of the source literature selected for the review article. The primary keyword search yielded 545 articles, of which 102 papers met the inclusion criteria and were thoroughly reviewed. Secondary papers from the reference lists of the primary selected articles were examined, assessed for eligibility, and added to the list of primary papers (n = 143). A total of 102 papers were used for review (Figure 1).

(1) How Common are Hallucinations and Other Psychotic Phenomena in BPD?

Prevalence of Psychotic Symptoms in BPD

Over the past three decades, studies have shown that the prevalence of psychotic symptoms ranges from 26% to 54%.^{13–17,24} Auditory verbal hallucinations are the most common form of psychotic symptoms in patients with BPD.^{15,25,26} For instance,



PubMed: (borderline personality disorder) and (hallucinations or psychotic symptoms)
 Select clinical trials, meta-analysis, randomized controlled trials, review, systematic review

Figure 1 Diagram of the literature selection process.

Yee et al found in their initial research that out of 171 patients with BPD, 50 of them reported hallucinations. Other psychotic phenomena can also be present. They selected ten patients for case reports who experienced auditory hallucinations. These patients reported a high occurrence of other psychotic phenomena too. Nearly all (90–100%) experienced a thought insertion and thought blocking. Although none of the patients thought that somebody else was causing this. The feeling of being under the external influence was reported in 7 out of 10 patients.²⁷

Another study with 30 participants with BPD reported psychotic symptoms unrelated to affective disorder or drug abuse to be present in 60% of patients. Hallucinations were the most prevalent symptom, and other symptoms included ideas of reference of non-psychotic nature (27%) and delusions (20%). Half of the patients with delusions (10%) met the criteria for previously undiagnosed schizophrenia.²⁵

In the following text, we separated information on hallucinations and other psychotic phenomena, due to the significant difference in evidence on these topics.

Prevalence and Quality of Hallucinations in BPD

Auditory verbal hallucinations have been studied most frequently in patients with BPD. Studies in adults with BPD have shown that 29% - 50% of patients report auditory verbal hallucinations.^{15–17} Kingdon et al compared auditory verbal hallucinations in patients with BPD to those with schizophrenia and those with comorbid BPD and schizophrenia. Auditory verbal hallucinations were found in 46% of patients with BPD, 66% of patients with schizophrenia, and 90% of patients with comorbid BPD and schizophrenia.¹⁵

Slotema et al thoroughly described hallucinations in a sample of 60 BPD patients (37 in the hallucination group). Auditory, visual, olfactory, and tactile hallucinations were present at least once a month in 65%, 51%, 31%, and 47%, respectively. Eighty percent of respondents experienced hallucinations in more than one modality. The frequency of the

hallucinations ranged from once a week to once a day, and the average duration lasted one to several minutes. Fifty percent of the hallucinations had malicious content. Furthermore, 23–47% of the patients related their hallucinations to previously experienced traumatic events. For most patients perceived their auditory hallucinations as repetitive words or whole phrases. Visual hallucinations were complex images but without a specific pattern of appearance during the day. Patients' belief that the hallucinations were real ranged from probable to quite convincing. The participants sometimes interacted with their hallucinations and sometimes obeyed benign and malevolent commands, and visual commands were rarely present. Stress and discomfort caused by hallucinations ranged from mild to substantial. Interference with daily routine also varied from one specific activity to several activities.²⁸

Other hallucinatory modalities may also occur. For example, a recent study examining 324 patients with BPD found that the prevalence of different types of hallucinations was 27% for auditory hallucinations (including auditory-verbal and nonverbal), followed by 17% for olfactory, 15% for tactile, 11% for visual, and 8% for gustatory hallucinations.¹⁷

From these studies, it can be concluded that psychotic symptoms in BPD influence a significant number of patients with BPD and clinically relevant treatment issues.

(2) What Factors Influence Psychotic Symptoms in BPD?

Despite the well-reported occurrence of psychotic symptoms and hallucinations in BPD, little is known about their aetiology and characteristics, especially in other forms than auditory hallucinations.^{21,24} Some studies focused solely on hallucinations; others included other psychotic symptoms.

Hallucinations and Stress

Stress is a reaction with many definitions but generally involves emotional or physical tension.²⁹ Psychosocial stress is, among others, connected with dopamine dysregulation, which can lead to psychotic symptoms.³⁰ The exact pathophysiology of this process in BPD is unknown; however, some clinical data point to a possible connection.

Two studies examined the effect of stress on psychotic symptoms in BPD. Niemantsverdriet et al found a positive correlation between the severity of hallucinations and the number of current life stressors.¹⁷ Glaser et al discovered that patients with BPD reported the strongest psychotic reactivity to stress in everyday life, compared to patients with psychotic disorder, other personality disorders and healthy controls. This included various psychotic symptoms (such as stress-related paranoid thoughts), including hallucinations. They hypothesised that this would be concerning mainly “greater” stressors such as interpersonal problems; however, even on “smaller” daily stressors, patients with BPD reported overall higher reactivity.³¹

Hallucinations, Childhood Trauma and Dissociation

Hallucinations in BPD are also associated with posttraumatic stress disorder and a history of childhood trauma, especially emotional abuse,¹⁷ but sexual and physical.³² Patients with hallucinations experienced abuse more likely than patients without hallucinations. It is worth mentioning that a similar relationship was found in hallucinating patients with other disorders.^{32–34}

Beatson stated that auditory verbal hallucination is highly correlated with elevated levels of dissociation and a history of childhood trauma.²² Tschoeke et al compared BPD and schizophrenia patients according to verbal hallucinations and dissociation. Dissociation was more frequent in BPD, but the hallucinations were deemed indistinguishable, according to diagnostic criteria, and more exploration of dissociative pathology is probably needed.²⁶

Hallucinations and Loneliness

Loneliness is a subjective experience of poor social relationships and can lead to various psychiatric disorders and somatic illnesses.^{35,36}

Hoffman described its influence on psychotic symptoms through “social deafferentation”. This hypothesis states that social isolation of vulnerable individuals can cause the social “programs” in our brain to create false social connections in the form of complex, emotionally impactful hallucinations and delusions.^{37,38} The social deafferentation hypothesis is similar to the theory involving “anthropomorphism”, as Epley et al described. The authors suggest that people are

primarily motivated to maintain social connections with other individuals in their environment. If they cannot do this, they may compensate for loneliness by perceiving human representation in non-human objects, increasing the likelihood of hearing voices.³⁹

These hypotheses partially come from the fact that schizophrenia is strongly associated with previous social isolation.⁴⁰ Forty percent of patients with schizophrenia described their voices as familiar or recognisable voices.⁴¹ A positive correlation has been found between loneliness and psychotic disorders.^{42,43} In the Australian National Psychosis Survey (n = 1825), up to 80% of individuals with a psychotic disorder reported feeling lonely.⁴⁴

“Chronic feelings of emptiness” and “a pattern of unstable and intense interpersonal relationships” present two of the BPD criteria. Emptiness is closely linked to feelings of hopelessness, loneliness, and isolation.⁴⁵ Patients with BPD report more and stronger feelings of loneliness than healthy controls,⁴⁶ and chronic loneliness is one of the most persistent aspects of the disorder.⁴⁷ Interestingly, the loneliness was met by 81% of BPD patients with hallucinations and 48% without hallucinations. Medians of social loneliness score and total loneliness score were higher in BPD patients with hallucinations than BPD patients. The severity of both schizotypy and loneliness was also associated with hallucinations.²⁸

Although patients with BPD and hallucinations possibly experience more painful feelings of loneliness than those without hallucinations, this relationship needs to be explored more deeply. No direct relationship between hallucinations and current relational problems has been described. Although it is worth mentioning that feelings of emptiness, loneliness and social isolation were found to reflect the level of psychiatric stress as well.⁴⁵

Psychotic Symptoms and Schizotypal Personality

Historically, borderline personality disorder was associated with schizophrenia and schizotypal personality.⁵ Schizotypy is a theory of a particular personality organisation based on behavioural and neurobiological findings. It presumes that psychosis is not a qualitative state but rather lies at the end of a continuum of psychiatric symptoms. Certain personalities tend to react to psychological pressure by psychosis.⁴⁸ A strong association between BPD and schizotypy has been found, which could also explain the high prevalence of hallucinations in BPD patients.^{49–51}

Schizotypal Personality Questionnaire (SPQ) is one method that explores this vulnerability. The questionnaire measures nine dimensions of schizotypy, arranged into clusters – *the cognitive-perceptual cluster* (“ideas of reference”, “social anxiety”, “odd beliefs/magical thinking”, “unusual perceptual experiences”, and “suspiciousness/paranoid thoughts”), *the interpersonal cluster* (“no close friends,” “constricted affect,” and again “social anxiety” “suspiciousness/paranoid thoughts”), and *the cluster of disorganization* (“eccentric/odd behaviour and appearance”, “odd speech”).⁵² High SPQ scores have been previously associated with an increased vulnerability to psychosis.⁵³

Slotema et al linked the severity of schizotypal characteristics (using SPQ) with hallucinations in BPD. The three SPQ clusters were significantly higher in patients with hallucinations. For the schizotypal subgroups, all cognitive-perceptual and disorganization clusters scores were significantly higher in the group experiencing hallucinations. Only *the suspiciousness/paranoid thoughts* group significantly differed in patients with hallucinations when examining the *interpersonal cluster scores*. Schizotypy severity positively correlated with hallucination severity. The significant correlation between schizotypy and hallucination severity persisted even after omitting the “unusual perceptions” subgroup from the total schizotypy scores.²⁸ Another study also found higher scores for the *cognitive-perceptual*, *interpersonal*, and *disorganization clusters* in patients with BPD and hallucinations than those without them.^{49,51} The link between schizotypy and hallucinations is consistent with the findings of Sommer et al, who investigated a population with auditory verbal hallucinations without psychiatric diagnoses.⁵⁴

Association with schizotypy has also been found in patients with other personality disorders, especially schizotypal personality disorder.^{49,51,55} In 23 patients with BPD (no difference between presence/absence of hallucinations) and 12 patients with schizotypal personality disorder, no differences were found between scores on the three clusters of schizotypy.⁵¹ A comorbid schizotypal personality disorder was found in 7% of the BPD patients.⁵⁶

Psychotic Symptoms in Young Adults

Adolescence and young adulthood is the period when usually start manifesting both BPD^{57,58} and psychotic disorders.⁵⁹

It can be difficult to distinguish whether the psychotic symptoms stem from BPD or signify a vulnerability for developing a psychotic disorder. BPD symptoms in adolescence have been associated with psychotic symptoms and depressive and hypomanic symptoms.⁶⁰

While most studies have examined the co-occurrence of psychotic symptoms and BPD in adults, there is limited research examining associations of BPD and early stage of psychotic disorders in young adulthood. Several investigations have inspected whether the BPD diagnosis predicts a higher risk of transitioning from predisposition to psychotic disorder in vulnerable adults. These studies concluded that BPD does not seem to increase or decrease the transition risk to a psychotic disorder. For those who did develop a psychotic disorder, a BPD diagnosis or BPD symptoms were not related to any specific psychotic disorder diagnosis.^{61–64}

Caspi et al, who studied young adults, proposed that one general underlying dimension, the “p” factor, summarizes an individual’s vulnerability to developing any form of psychopathology, and those psychotic symptoms are at the top of the p factor. Any individual with an intense vulnerability to general psychopathology may experience psychotic symptoms, regardless of the current diagnosis.⁶⁵ Incorporating this model into personality pathology, Sharp & Wall and Sharp et al suggested that BPD symptoms in adolescents can be understood as a manifestation of internalizing and externalizing psychopathology severe enough to lead to subsequent mental disorders, even psychotic disorders.^{58,66} Based on this assumption, Calvetti et al suggested that BPD should be viewed as a severity factor, similar to psychosis. When they occur together, they act synergistically in determining prognosis.⁶⁷

A recent study of 15 to 18-year-olds found a positive correlation between psychotic symptoms, as defined by the Youth Self Report (YSR), and BPD severity, defined as the number of criteria met in DSM-IV classification, after adjustment for other psychopathology and functional impairment.⁶⁸ In another study of 15 to 25-year-olds with BPD, those who experienced auditory verbal hallucinations showed higher psychopathology (ie, self-harm, paranoid thoughts, dissociation, anxiety, and general distress) than those who did not hallucinate.⁶⁹ Zandersen & Parnas concluded that young people (aged 15–25 years) with BPD and psychotic symptoms risk many future mental health struggles, including non-psychotic and psychotic disorders. These outcomes add to the findings in adult patients and signify that patients with BPD and psychotic symptoms should be considered more at risk than patients without ones. Young people who have both BPD and psychotic symptoms tend to experience more severe psychopathology and show a higher risk of poorer prognosis, including the development of another severe mental disorder (without being specific to any partial disorder), as well as adverse outcomes beyond the binding concept of diagnosis (eg, suicidality, severe and enduring functional impairment).⁷⁰

(3) Are Psychotic Symptoms in BPD Linked with the Severity of the Disorder?

Several studies suggested that psychotic symptoms in BPD indicate disorder severity and poor treatment outcomes.^{13–17} Some studies explored hallucinations, in particular, others considered a wide variety of psychotic symptoms.

Psychotic Symptoms and Suicidality

Suicidal ideations and behaviour are major topics in psychiatric disorders in general. Suicides and suicide attempts of individuals with mental illness are almost ten times more frequent than those without illness. Both BPD and psychotic disorders are linked with increased suicidality. Up to 9% of patients with BPD and 14% of patients with schizophrenia end their life by committing suicide.⁷¹

Some studies investigated the specific link between psychotic symptoms, suicidal plans, and suicidal attempts in patients with BPD.

Generally, auditory verbal hallucinations were linked with increased suicide plans and attempts, more frequent hospitalization²⁴ and a higher level of suicidality.²² Kelleher et al found a 2.23-fold increase in suicide attempts in patients with visual and auditory hallucinations.⁷²

Psychotic symptoms in BPD were linked with a higher incidence of suicide plans and attempts during the month before the study. Also, all subscales of the psychotic symptoms questionnaire PSYRATS correlated positively with suicide plans (as well as emotional and phenomenological subscales).⁷³

Cavelti et al revealed in their review that co-occurrence of BPD and psychotic symptoms is a marker of severe pathologies, such as the increase in suicidality.⁶⁷ Schroeder et al investigated the associations between psychotic-like

symptoms and suicidality. The higher number of suicide attempts was associated with hallucinations and delusions and the severity of comorbid PTSD and depression. Interestingly, the age of initial hospitalization showed fewer and number of hospitalizations no associations at all with suicidal attempts.⁷⁴

Psychotic Symptoms and Psychiatric Hospitalizations

The severity of an illness may also be assessed by the number of hospitalizations and readmissions to the hospital. Scarce information is available on this topic.

Psychotic symptoms in BPD predict more hospitalizations in a two-year follow-up and shorter intervals until another hospitalization.⁷³ Both hallucinations and delusions in BPD patients predict faster readmission to an acute psychiatric ward after discharge.⁷⁵ A co-occurring psychotic episode in patients with BPD is a significant predictor of referral to a specialized psychiatric unit for severe mental disorders after treatment in an outpatient facility.⁷⁶ Cavelti et al also found an increase in hospitalizations for patients with BPD and hallucinations.⁶⁷

Psychotic Symptoms and Other Comorbidities

Adults with BPD and auditory verbal hallucinations meet more BPD criteria and have more comorbid mental disorders.²⁰ The previously mentioned study by Slotema et al compared BPD patients with and without hallucinations. Psychotic symptoms were linked with more severe depression, anxiety scores, schizotypy, and more pronounced feelings of loneliness. However, it is unknown whether BPD patients with more severe hallucinations experience more severe symptoms of depression and anxiety. Also, no significant difference was found between the two groups with respect to their global assessment of functioning.²⁸

In three other studies, hallucinations and other psychotic symptoms in BPD were associated with affective disorders.^{14,77,78} (Pope 1985). However, in two other studies, the presence of affective disorders failed to predict any subsequent psychotic symptoms for BPD patients. The difference between psychotic symptoms in BPD patients with and without mood disorder across the lifespan was not established.^{20,79,80}

Distinguishing between BPD and schizophrenia may also be complicated because these two conditions may co-occur. In the study of Kingdon et al of 111 patients, 19 of them suffered both from BPD and schizophrenia.¹⁵ Slotema et al found in their sample a prevalence of comorbid non-specified psychotic disorder at 20%, namely schizophrenia in 2%.²⁴ This knowledge may be important because there is also evidence that young people with both first-episode psychosis and co-occurring BPD have insufficient access to standard treatments, including the recommended prescription of antipsychotic medication.⁸¹

(4) Are Hallucinations and Other Psychotic Symptoms in BPD Different from Other Disorders?

Studies comparing psychotic symptoms in individuals with schizophrenia or BPD found more similarities than differences.^{13–17} More distinct evidence has been found concerning hallucinations; other psychotic symptoms were less frequently mentioned.

Hallucinations in BPD and Schizophrenia

In studies comparing BPD and schizophrenia, verbal auditory hallucinations specifically bear no significant differences in frequency, duration, location (ie, inside or outside the head), loudness, distress, or persuasiveness.^{15,20,26,27} As for differences between patients with BPD or schizophrenia, hallucinations in BPD seems generally less disruptive in everyday life.²⁰ Tschoeke et al did not find any significant difference in the prevalence of commentary voices, whereas dialoguing voices were more common in patients with schizophrenia (71%) compared to patients with BPD (40%).²⁶ Kingdon et al compared auditory verbal hallucinations in patients with BPD to those with schizophrenia or with comorbid BPD and schizophrenia.¹⁵ Patients with BPD had higher scores in Psychotic Symptoms Rating Scales (PSYRATS) in the amount and degree of malicious content and distress from auditory verbal hallucinations, compared to patients with schizophrenia. BPD patients also felt more controlled by their voices.²⁶ However, other studies suggested that BPD patients had more emotional resistance to distress from hallucinations.⁸²

In a study by Slotema et al, auditory verbal hallucinations (also assessed by PSYRATS) were compared in 3 groups: patients with BPD, patients with schizophrenia/schizoaffective disorder, and individuals without a psychiatric diagnosis. In BPD patients, the average frequency of auditory verbal hallucinations was at least once a day for several minutes or longer, and in most patients, auditory verbal hallucinations were noted in the head region. Most patients believed that their voices were from an internal cause and thought they had no control over their voices most of the time. Further questions on the internal cause responses revealed that 29% stated that the voices were like their own thoughts, and 33% thought they were experiencing hallucinations due to their mental disorder. The voices were female in 65% of patients and male in 76%. The voice owner was known to the patient in 30% of patients. The most prominent voice was speaking several phrases in most patients. Fear caused by auditory verbal hallucinations was higher in the BPD group. All items related to the characteristics of auditory verbal hallucinations and subsequent distress did not differ between BPD and schizophrenia/schizoaffective disorder patients, except for the item “life disruption,” which was higher in the schizophrenia/schizoaffective disorder group. Compared to the controls, patients with BPD had much higher in almost all items, except for “location” and “loudness”. These studies suggest that auditory verbal hallucinations in BPD are frequent, severe, and phenomenologically similar to those in schizophrenia.²⁰ Also, auditory verbal hallucinations in BPD patients have been found to occur at a younger age (adolescence) than in schizophrenia patients (early adulthood).²⁶

Other Psychotic Symptoms in BPD and Schizophrenia

Compared to patients with schizophrenia, patients with BPD report fewer delusions, conceptual disorganization, and negative symptoms (such as blunted affect or social withdrawal).^{15,26} In another study by Niemantsverdriet et al, hallucinations in patients with BPD were associated with delusions, but not negative symptoms or disorganization.¹⁷ Although this could be explained if schizotypal features, especially cognitive-perceptual symptoms, were predominant in this subgroup – this has not been investigated.

(5) What are the Treatment Options for Hallucinations in BPD?

Since information on the treatment of hallucinations in BPD is scarce, studies evaluating the efficacy of antipsychotics, cognitive-behavioural therapy, or non-invasive brain stimulation methods are needed.

Antipsychotic medications have been studied in patients with BPD for cognitive-perceptual symptoms, ie, suspiciousness, ideas of reference, paranoid thoughts, delusions, derealization, depersonalization, and hallucination-like symptoms⁸³ or “psychotic symptoms.” Three meta-analyses found small to medium effect sizes.^{83–85} In a systematic review of studies reporting treatments for psychotic symptoms, both typical and atypical antipsychotics tended to have positive effects on psychotic features in the context of BPD.⁷³

Since loneliness is a contributing factor in hallucinations, according to Lim et al, factors that may positively influence it are good social support, good quality of life, less stigmatization and discrimination, and good self-esteem.⁸⁶ However, research on BPD patients in this area is lacking.

As for the timing of therapeutic interventions, Cavelti et al suggest that the period of adolescence and young adulthood, when BPD and psychotic features usually first appear, represents a critical window of opportunity for early treatment intervention to prevent the progress of severe mental disorders in the future.⁶⁷

Discussion and Future Directions

This review aimed to summarise the causes, phenomenology, severity, and treatment of hallucinations and other psychotic symptoms in BPD. We also assessed evidence against the long-standing concept that psychotic signs in BPD are different and less severe than in psychotic disorders.

Firstly, it was established that a significant number of BPD patients experiences various kinds of hallucinations - auditory, visual hallucinations, even olfactory and tactile. Other psychotic symptoms (such as ideas of reference, delusions, thought insertion) were also reported. The inclusion of psychotic symptoms in BPD classifications seems therefore highly relevant. In many cases, they are pervasive and intensify under pressure, the same way that positive symptoms in psychotic disorders increase. Thus, the term “hallucination-like experiences” as defined by the DSM (2013) could be replaced simply by “hallucinations”.² Labels such as “pseudo-hallucinations” or “quasi-psychotic” may add to

the stigma already experienced by BPD patients and should be avoided. Qualitative analysis of auditory hallucinations could also help understand the nature of these symptoms and might help differentiate the groups of patients with specific treatment needs. This has already been attempted in the study of Yee et al, but whether this differentiation correlates with different clinical approaches and treatment strategies is yet to be seen.²⁷

There is much to be explored other in psychotic symptoms connected to BPD. Given their expected interrelatedness, the role of childhood adversity and dissociation in the development of psychotic symptoms in BPD needs to be clarified. While there is robust evidence of an indirect relationship between childhood adversity and delusions and hallucinations in psychotic disorder,^{87,88} findings in BPD discovered co-occurrence of higher dissociation and hallucination; however, the exact relationship is still unclear even less so when other psychotic symptoms are concerned.^{15,17,23,24,26,68} As for contributing factors to hallucinations in BPD, loneliness was associated with hallucinations in many psychiatric disorders, with an exceptionally high prevalence in hallucinating patients with BPD. Therefore, therapy aimed to reduce loneliness (such as family therapy) should also positively impact hallucinations. However, not enough studies have been conducted in this area. Even though the social deafferentation study was described in schizophrenia, another study suggests that the mechanisms may be similar in other disorders.⁸⁹

Considering the schizotypal concept, SPQ scores for the cognitive-perceptual, interpersonal, and disorganization clusters were higher in patients with BPD and hallucinations, and results for the cognitive-perceptual subgroups were particularly prominent. BPD and schizotypal personality disorder may be more similar than previously thought. Thus, for this group of patients, treatment of schizotypy tendency should begin with exploring interventions related to psychotic disorders, such as antipsychotic medications, cognitive behavioral therapy, and non-invasive brain stimulation.⁹⁰ Still, no amiable results are currently available for this research area.

It is also apparent that hallucination in BPD patients has a significant negative impact on patients' well-being. They were also associated with higher depression and anxiety scores and more severe psychopathology. Evidence suggests that psychotic symptoms could be considered a severity indicator of BPD. However, since a significant number of patients experiences this and yet, the clinical picture of BPD varies, more precise criteria on psychotic symptoms as an indicator should go hand-in-hand with their recognition. For this, however, the evidence is not robust enough. When planning treatment, clinicians should consider that individuals with BPD and psychotic symptoms are at greater risk for adverse outcomes, such as more frequent hospitalizations, self-harm, or suicide attempts.

BPD patients can experience hallucinations or even delusions similar to schizophrenia. Patients with BPD had higher scores in Psychotic Symptoms Rating Scales (PSYRATS) in the amount and degree of malicious content and distress from auditory verbal hallucinations, compared to patients with schizophrenia.²⁶ Whether this happens due to more emotional or childhood trauma, or simply because many schizophrenia patients are already treated by antipsychotic medication in antipsychotic doses, that is difficult to determine.

The amount of evidence comparing psychotic symptoms in BPD and schizophrenia is still lacking in some areas. Most findings describe auditory verbal hallucination as the most common psychotic symptom, both in BPD and schizophrenia.²⁰ Complex visual-tactile and olfactory hallucinations were also experienced in patients with BPD,²⁸ but their comparison to psychosis is unclear. These hallucinations are less commonly experienced by psychotic patients as well (for example, the lifetime prevalence of hallucination was 64–80% auditory, 23–31% visual, 9–19% tactile, and 6–10% olfactory. Past month prevalence was 23–27% auditory, 5–8% visual, 4–7% tactile, and 2% olfactory according to a study by McCarthy et al)⁹¹ and can be present in other diseases - neurological, ophthalmological, etc.⁹² Considering comorbidities (esp. dissociative states, epilepsy, substance abuse etc.) might also help in identifying physiology of hallucinations in general. However, this does not oppose the fact that hallucinations in BPD and psychotic disorders share more similarities than differences.

Since psychotic symptoms also occur in BPD and its onset may happen at the same age as the onset of schizophrenia,^{57–59} careful diagnosis should be conducted to avoid serious mistakes. However, it may be a false dichotomy to assume that these patients have either BPD or psychosis, and they may have both. As with depression and bipolar disorder, psychotic symptoms may indicate a more severe disorder, especially if negative symptoms and disorganized thoughts are present (less common in patients with BPD). Diminishing psychotic symptoms in patients with BPD may also lead to their stigmatization and inaccessibility of proper care. Evidence that young people with both first-

episode psychosis and co-occurring BPD have insufficient access to standard treatments, including the recommended prescription of antipsychotic medication, has already been presented.⁸¹

Few studies examined the neural correlations of psychotic symptoms in BPD.^{93,94} To this date, no randomized controlled trial has examined the efficacy of antipsychotic medication or psychological interventions for auditory verbal hallucinations or any other psychotic symptom in BPD.⁷⁶ The first randomized controlled trial on aripiprazole in young people with BPD and auditory verbal hallucinations is underway.⁹⁵ Since negative beliefs about hallucinated voices^{96,97} and self-image⁹⁸ contribute to emotional distress in BPD, hallucinations themselves could become targets for psychological interventions such as cognitive behavioural therapy or narrative-based self-experience interventions (Thomas et al 2014, Fielding-Smith et al 2015).^{99,100}

Future research should not be concerned with such spurious categorical distinctions. Instead, studies should recognize both the dimensional and dynamic nature of psychopathology and the evolving phenotypes throughout the transition from childhood to adulthood by adopting a Clinical staging approach. Such an approach needs to include measures of personality pathology to address the etiological factors and treatment options for psychotic symptoms in BPD.^{101,102} Furthermore, more focused comparative studies concerning specific phenomena on both BPD and schizophrenia could help better understand both conditions.

Conclusions

Psychotic symptoms in BPD are common and phenomenologically similar to those experienced by schizophrenia spectrum disorders. Despite their prevalence in BPD patients, knowledge of the characteristics and severity of hallucinations is limited, especially in modalities other than auditory. The relationship between hallucinations and depression, anxiety, suicidality, schizotypy, and loneliness has been discovered but requires more exploration. Recognition of hallucinations and psychotic symptoms in general in patients with BPD instead of diminishing and overlooking them is essential in the clinical assessment and can be useful in predicting complications during treatment.

Disclosure

All authors declare that the research was conducted without any commercial or financial relationships that could be construed as potential conflicts of interest.

References

1. Black DW, Blum N, Pföhl B, Hale N. Suicidal behavior in borderline personality disorder: prevalence risk factors, prediction and prevention. *J Personality Disord.* 2004;18:226–239.
2. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Washington, DC: American Psychiatric Association; 2013.
3. Knight RP. Borderline states. *Bull Menninger Clin.* 1953;17:1–12.
4. Kernberg O. Borderline personality organization. *J Am Psychoanal Assoc.* 1967;15(3):641–685.
5. Zandersen M, Henriksen MG, Parnas J. A recurrent question: what is borderline? *J Personal Disord.* 2019;33:341–369.
6. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 3 ed. Washington, DC: American Psychiatric Association; 1980.
7. Decker HS. *The Making of DSM-IIIJ: A Diagnostic Manual's Conquest of American Psychiatry*. New York, NY: Oxford University Press; 2013.
8. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 4 ed. Arlington, VA: American Psychiatric Publishing; 1994.
9. World Health Organization. *The ICD-10 Classification of Mental and Behavioural Disorders: Clinical Descriptions and Diagnostic Guidelines*. Geneva: World Health Organization; 1992.
10. World Health Organization. *International Statistical Classification of Diseases and Related Health Problems*. 11. World Health Organization; 2019.
11. Zanarini MC, Gunderson JG, Frankenburg FR. Cognitive features of borderline personality disorder. *Am J Psychiatry.* 1990;147:57–63.
12. Pope HG. The validity of DSM-III borderline personality disorder: a phenomenologic, family history, treatment response, and long-term follow-up study. *Arch Gen Psychiatry.* 1983;40:23.
13. Chopra HD, Beatson JA. Psychotic symptoms in borderline personality disorder. *Am J Psychiatry.* 1986;143:1605–1607.
14. Links PS, Steiner M, Mitton J. Characteristics of psychosis in borderline personality disorder. *Psychopathology.* 1989;22:188–193.
15. Kingdon DG, Ashcroft K, Bhandari B, et al. Schizophrenia and borderline personality disorder: similarities and differences in the experience of auditory hallucinations, paranoia, and childhood trauma. *J Nerv Ment Dis.* 2010;198:399–403.
16. Merrett Z, Rossell SL, Castle DJ. Comparing the experience of voices in borderline personality disorder with the experience of voices in a psychotic disorder: a systematic review. *Aust N Z J Psychiatry.* 2016;50:640–648.

17. Niemantsverdriet MBA, Slotema CW, Blom JD, et al. Hallucinations in borderline personality disorder: prevalence, characteristics and associations with comorbid symptoms and disorders. *Sci Rep*. 2017;7:13920.
18. Lindley SE, Carlson E, Sheikh J. Psychotic symptoms in posttraumatic stress disorder. *CNS Spectr*. 2000;5:52–57.
19. Larøi F, Sommer IE, Blom JD, et al. The characteristic features of auditory verbal hallucinations in clinical and non-clinical groups: state-of-the-art overview and future directions. *Schizophr Bull*. 2012;38:724–733.
20. Slotema CW, Daalman K, Blom JD, Diederens KJM, Hoek HW, Sommer IEC. Auditory verbal hallucinations in patients with borderline personality disorder are similar to those with schizophrenia. *Psychol Med*. 2012;42:1873–1878.
21. Schroeder K, Fisher HL, Schaefer I. Psychotic symptoms in patients with borderline personality disorder: prevalence and clinical management. *Curr Opin Psychiatry*. 2013;26:113–119.
22. Beatson J, Broadbear JH, Duncan C, Bourton D, Rao S. Avoiding misdiagnosis when auditory verbal hallucinations are present in borderline personality disorder. *J Nerv Ment Dis*. 2019;207:1048–1055.
23. D'Agostino A, Rossi Monti M, Starcevic V. Psychotic symptoms in borderline personality disorder: an update. *Curr Opin Psychiatry*. 2018;1:12.
24. Slotema CW, Blom JD, Niemantsverdriet MBA, Deen M, Sommer IEC. Comorbid diagnosis of psychotic disorders in borderline personality disorder: prevalence and influence on outcome. *Front Psychiatry*. 2018;9:84.
25. Pearse LJ, Dibben C, Ziauddeen H, Denman C, McKenna PJ. A study of psychotic symptoms in borderline personality disorder. *J Nerv Ment Dis*. 2014;202:368–371.
26. Tschoeke S, Steinert T, Flammer E, Uhlmann C. Similarities and differences in borderline personality disorder and schizophrenia with voice hearing. *J Nerv Ment Dis*. 2014;202:544–549.
27. Yee L, Korner AJ, McSwiggan S, Meares RA, Stevenson J. Persistent hallucinosis in borderline personality disorder. *Compr Psychiatry*. 2005;46:147–154.
28. Slotema CW, Bayrak H, Linszen MMJ, Deen M, Sommer IEC. Hallucinations in patients with borderline personality disorder: characteristics, severity, and relationship with schizotypy and loneliness. *Acta Psychiatr Scand*. 2019;139:434–442.
29. Rom O, Reznick AZ. The Stress Reaction: a Historical Perspective. *Adv Exp Med Biol*. 2016;905:1–4.
30. Howes OD, Murray RM. Schizophrenia: an integrated sociodevelopmental-cognitive model. *Lancet*. 2014;383(9929):1677–1687.
31. Glaser J-P, Van Os J, Thewissen V, Myin-Germeys I. Psychotic reactivity in borderline personality disorder. *Acta Psychiatr Scand*. 2010;121:125–134.
32. Daalman K, Diederens KM, Derks EM, van Lutterveld R, Kahn RS, Sommer IE. Childhood trauma and auditory verbal hallucinations. *Psychol Med*. 2012;42:2475–2484.
33. Varese F, Barkus E, Bental RP. Dissociation mediates the relationship between childhood trauma and hallucination-proneness. *Psychol Med*. 2012;42:1025–1036.
34. Whitfield CL, Dube SR, Felitti VJ, Anda RF. Adverse childhood experiences and hallucinations. *Child Abuse Negl*. 2005;29:797–810.
35. De Jong Gierveld J, Kamphuis FH. The development of a Rasch-type loneliness-scale. *App Psychol Meas*. 1985;9:289–299.
36. Mushtaq R, Shoib S, Shah T, Mushtaq S. Relationship between loneliness, psychiatric disorders and physical health? A review on the psychological aspects of loneliness. *J Clin Diagn Res*. 2014;8:WE01–4.
37. Hoffman RE. A social deafferentation hypothesis for induction of active schizophrenia. *Schiz Bull*. 2007;33:1066–1070.
38. Hoffman RE. Auditory verbal hallucinations, speech perception neurocircuitry, and the social deafferentation hypothesis. *Clin EEG Neurosci*. 2008;39:87–90.
39. Epley N, Akalis S, Waytz A, Cacioppo JT. Creating social connection through inferential reproduction: loneliness and perceived agency in gadgets, gods, and greyhounds. *Psychol Sci*. 2008;19:114–120.
40. Tan HY, Ang YG. First-episode psychosis in the military: a comparative study of prodromal symptoms. *Aust N Z J Psychiatry*. 2001;35:512–519.
41. Nayani TH, David AS. The auditory hallucination: a phenomenological survey. *Psychol Med*. 1996;26:177–189.
42. Da Rocha MB, Rhodes S, Vasipoulou E, Hutton P. Loneliness in psychosis: a meta-analytic review. *Schizophr Bull*. 2017;44:114–125.
43. Meltzer H, Bebbington P, Dennis MS, Jenkins R, McManus S, Brugha TS. Feelings of loneliness among adults with mental disorder. *Soc Psychiatry Psychiatr Epidemiol*. 2013;48:5–13.
44. Stain HJ, Galletly CA, Clark S, et al. Understanding the social costs of psychosis: the experience of adults affected by psychosis identified within the second Australian National Survey of Psychosis. *Aust N Z J Psychiatry*. 2012;46:879–889.
45. Klonsky ED. What is emptiness? Clarifying the 7th criterion for borderline personality disorder. *J Pers Dis*. 2008;22:418–426.
46. Lieke L, Bungert M, Thome J, Hauschild S, Gescher DM, Schmahl C. Loneliness, social networks, and social functioning in borderline personality disorder. *Pers Dis*. 2017;8:349–356.
47. Zanarini MC, Frankenburg FR, Reich BD, Silk KR, Hudson JI, McSweeney LB. The subsyndromal phenomenology of borderline personality disorder: a 10-year follow-up study. *Am J Psychiatry*. 2007;164:929–935.
48. Modenato D. The concept of schizotypy — a computational anatomy perspective. *Schizophrenia Research*. 2015;2(2):89–892.
49. George A, Soloff PH. Schizotypal symptoms in patients with borderline personality disorders. *Am J Psychiatry*. 1986;143:212–215.
50. Kavoussi RJ, Siever LJ. Overlap between borderline and schizotypal personality disorders. *Compr Psychiatry*. 1992;33:7–12.
51. van Riel L, Ingenhoven TJM, van Dam QD, et al. Borderline or schizotypal? Differential psychodynamic assessment in severe personality disorders. *J Psychiatr Practice*. 2017;23:101–113.
52. Raine A. The SPQ: a Scale for the Assessment of Schizotypal Personality Based on DSM-III-R Criteria. *Schizophr Bull*. 1991;17(4):555–564.
53. Vollema MG, Sitskoorn MM, Appels MC, Kahn RS. Does the Schizotypal Personality Questionnaire reflect the biological-genetic vulnerability to schizophrenia? *Schizophr Res*. 2002;1:39–45.
54. Sommer IE, Daalman K, Rietkerk T, et al. Healthy individuals with auditory verbal hallucinations; who are they? Psychiatric assessments of a selected sample of 103 subjects. *Schizophr Bull*. 2010;36:633–641.
55. Hummelen B, Pedersen G, Karterud S. Some suggestions for the DSM-5 schizotypal personality disorder construct. *Compr Psychiatry*. 2012;53:341–349.
56. Zanarini MC, Frankenburg FR, Dubo ED, et al. Axis II comorbidity of borderline personality disorder. *Compr Psychiatry*. 1998;39:296–302.

57. Chanen AM, McCutcheon L. Prevention and early intervention for borderline personality disorder: current status and recent evidence. *Br J Psychiatry*. 2013;202:s24–s29.
58. Sharp C, Wall K. Personality pathology grows up: adolescence as a sensitive period. *Curr Opin Psychol*. 2018;21:111–116.
59. McGorry PD, Purcell R, Goldstone S, Amminger GP. Age of onset and timing of treatment for mental and substance use disorders: implications for preventive intervention strategies and models of care. *Curr Opin Psychiatry*. 2011;24:301–306.
60. Winsper C, Wolke D, Scott J, Sharp C, Thompson A, Marwaha S. Psychopathological outcomes of adolescent borderline personality disorder symptoms. *Aust N Z J Psychiatry*. 2020;54:308–317.
61. Paust T, Theodoridou A, Muller M, et al. Borderline personality pathology in an at-risk mental state sample. *Front Psychiatry*. 2019;10:838.
62. Ryan J, Graham A, Nelson B, Yung A. Borderline personality pathology in young people at ultra-high risk of developing a psychotic disorder: borderline personality pathology. *Early Interv Psychiatry*. 2017;11:208–214.
63. Schultze-Lutter F, Klosterkötter J, Michel C, Winkler K, Ruhrmann S. Personality disorders and accentuations in at-risk persons with and without conversion to first-episode psychosis: personality disorders and psychosis risk. *Early Interv Psychiatry*. 2012;6:389–398.
64. Thompson A, Nelson B, Bechdolf A, et al. Borderline personality features and development of psychosis in an 'Ultra High Risk' (UHR) population: a case control study: borderline personality and psychosis risk. *Early Interv Psychiatry*. 2012;6:247–255.
65. Caspi A, Houts RM, Belsky DW, et al. The p factor: one general psychopathology factor in the structure of psychiatric disorders? *Clin Psychol Sci*. 2014;2:119–137.
66. Sharp C, Vanwoerden S, Wall K. Adolescence as a sensitive period for the development of personality disorder. *Psychiatr Clin North Am*. 2018;41:669–683.
67. Cavelti M, Thompson K, Chanen AM, Kaess M. Psychotic symptoms in borderline personality disorder: developmental aspects. *Current Opinion in Psychology*. 2021;37:26–31.
68. Thompson KN, Cavelti M, Chanen AM. Psychotic symptoms in adolescents with borderline personality disorder features. *Eur Child Adolesc Psychiatry*. 2019;28:985–992.
69. Cavelti M, Thompson KN, Hulbert C, et al. Exploratory comparison of auditory verbal hallucinations and other psychotic symptoms among youth with borderline personality disorder or schizophrenia spectrum disorder. *Early Interv Psychiatry*. 2019;13:1252–1262.
70. Zandersen M, Parnas J. Identity disturbance, feelings of emptiness, and the boundaries of the schizophrenia spectrum. *Schizophr Bull*. 2019;45:106–113.
71. Bachmann S. Epidemiology of Suicide and the Psychiatric Perspective. *Int J Environ Res Public Health*. 2018;15(7):1425.
72. Kelleher I, Ramsay H, DeVlyder J. Psychotic experiences and suicide attempt risk in common mental disorders and borderline personality disorder. *Acta Psychiatr Scand*. 2017;135:212–218.
73. Slotema CW, Niemantsverdriet MB, Blom JD, et al. Suicidality and hospitalisation in patients with borderline personality disorder who experience auditory verbal hallucinations. *Eur Psychiatry*. 2017;41:47–52.
74. Schroeder K, Schätzle A, Kowohl P, Leske L, Huber CG, Schafer I. Prevalence and phenomenology of psychotic-like symptoms in borderline personality disorders – associations with suicide attempts and use of psychiatric inpatient treatment. *Psychother Psychosom Med Psychol*. 2018;68:516–524.
75. Furnes D, Gjestad R, Mehlum L, et al. Personality disorder: what predicts acute psychiatric readmissions? *J Personal Disord*. 2019;1:1–13.
76. Slotema CW, Blom JD, Niemantsverdriet MBA, Sommer IEC. Auditory verbal hallucinations in borderline personality disorder and the efficacy of antipsychotics: a systematic review. *Front Psychiatry*. 2018;9:347.
77. Pope HG, Jonas JM, Hudson JI, Cohen BM, Tohen M. An empirical study of psychosis in borderline personality disorder. *Am J Psychiatry*. 1985;142:1285–1290.
78. Nishizono-Maher A, Ikuta N, Ogiso Y, Moriya N, Miyake Y, Minakawa K. Psychotic symptoms in depression and borderline personality disorder. *J Affect Disord*. 1993;28:279–285.
79. Miller FT, Abrams T, Dulit R, Fyer M. Psychotic symptoms in patients with borderline personality disorder and concurrent axis I disorder. *Hosp Community Psychiatry*. 1993;44:59–61.
80. Benvenuti A, Rucci P, Ravani L, et al. Psychotic features in borderline patients: is there a connection to mood dysregulation? *Bipolar Disord*. 2005;7:338–343.
81. Francey SM, Jovev M, Phassoulitis C, Cotton SM, Chanen AM. Does co-occurring borderline personality disorder influences acute-phase treatment for first-episode psychosis? *Early Interv Psychiatry*. 2018;12:1166–1172.
82. Hepworth CR, Ashcroft K, Kingdon D. Auditory hallucinations: a comparison of beliefs about voices in individuals with schizophrenia and borderline personality disorder: auditory hallucinations. *Clin Psychol Psychother*. 2013;20:239–245.
83. Ingenhoven T, Lafay P, Rinne T, Passchier J, Duivenvoorden H. Effectiveness of pharmacotherapy for severe personality disorders: meta-analyses of randomized controlled trials. *J Clin Psychiatry*. 2010;71:14–25.
84. Ingenhoven TJ, Duivenvoorden HJ. Differential effectiveness of antipsychotics in borderline personality disorder: meta-analyses of placebo-controlled, randomized clinical trials on symptomatic outcome domains. *J Clin Psychopharmacol*. 2011;31:489–496.
85. Lieb K, Völm B, Rucker G, Timmer A, Stoffers JM. Pharmacotherapy for borderline personality disorder: Cochrane systematic review of randomised trials. *Br J Psychiatry*. 2010;196:4–12.
86. Lim MH, Gleeson JFM, Alvarez-Jimenez M, Penn DL. Loneliness in psychosis: a systematic review. *Soc Psychiatry Psychiatr Epidemiol*. 2018;53:221–238.
87. Longden E, Branitsky A, Moskowitz A, Berry K, Bucci S, Varese F. The relationship between dissociation and symptoms of psychosis: a meta-analysis. *Schizophr Bull*. 2020;1:sbaa037.
88. Stanton KJ, Denietolis B, Goodwin BJ, Dvir Y. Childhood trauma and psychosis. *Child Adolesc Psychiatry Clin N Am*. 2020;29:115–129.
89. El Haj M, Jarri R, Larøi F, Antoine P. Hallucinations, loneliness, and social isolation in Alzheimer's disease. *Cogn Neuropsychiatry*. 2016;21:1–13.
90. Sommer IEC, Slotema CW, Daskalakis ZJ, Derks EM, Blom JD, van der Gaag M. The treatment of hallucinations in schizophrenia spectrum disorders. *Schizophr Bull*. 2012;38:704–714.
91. McCarthy-Jones S, Smailes D, Corvin A, et al. Occurrence and co-occurrence of hallucinations by modality in schizophrenia-spectrum disorders. *Psychiatry Res*. 2017;252:154–160.

92. Waters F, Fernyhough C. Hallucinations: a Systematic Review of Points of Similarity and Difference Across Diagnostic Classes. *Schizophr Bull.* 2017;43(1):32–43.
93. Niemantsverdriet MBA, Slotema CW, van der Veen FM, et al. Sensory processing deficiencies in patients with borderline personality disorder who experience auditory verbal hallucinations. *Psychiatry Res.* 2019;281:112545.
94. Davies G, Hayward M, Evans S, Mason O. A systematic review of structural MRI investigations within borderline personality disorder: identification of key psychological variables of interest going forward. *Psychiatry Res.* 2020;286:112864.
95. Chanen AM, Betts J, Jackson H, et al. Aripiprazole compared with placebo for auditory verbal hallucinations in youth with borderline personality disorder: protocol for the VERBATIM randomized controlled trial. *Early Interv Psychiatry.* 2019;13(6):1373–1381.
96. Slotema CW, Blom JD, Deen M, et al. Negative beliefs about voices in patients with borderline personality disorder are associated with distress: a plea for cognitive-behavioural therapy? *Psychopathology.* 2017;50:255–261.
97. Cavelti M, Thompson KN, Hulbert C, et al. Preliminary evidence for the cognitive model of auditory verbal hallucinations in youth with borderline personality disorder. *Front Psychiatry.* 2019b;10:292.
98. Cavelti M, Thompson KN, Hulbert C, et al. Testing the interpersonal-cognitive model of auditory verbal hallucinations in youths with either early-stage borderline personality disorder or first-episode schizophrenia Spectrum disorder. *Psychopathology.* 2020;1:1–13.
99. Thomas N, Hayward M, Peters E, et al. Psychological therapies for auditory hallucinations (Voices): current status and key directions for future research. *Schizophr Bull.* 2014;40:S202–S212.
100. Fielding-Smith SF, Hayward M, Strauss C, Fowler D, Paulik G, Thomas N: bringing the “self” into focus: conceptualising the role of self-experience for understanding and working with distressing voices. *Front Psychol.* 2015;6:1129.
101. Chanen AM, Berk M, Thompson KN. Integrating early intervention for borderline personality disorder and mood disorders. *Harv Rev Psychiatry.* 2016;24:330–341.
102. Hutsebaut J, Videler AC, Verheul R, Van Alphen SPJ. Managing borderline personality disorder from a life course perspective: clinical staging and health management. *Personal Disord.* 2019;10:309–316.

Neuropsychiatric Disease and Treatment

Dovepress

Publish your work in this journal

Neuropsychiatric Disease and Treatment is an international, peer-reviewed journal of clinical therapeutics and pharmacology focusing on concise rapid reporting of clinical or pre-clinical studies on a range of neuropsychiatric and neurological disorders. This journal is indexed on PubMed Central, the ‘PsycINFO’ database and CAS, and is the official journal of The International Neuropsychiatric Association (INA). The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/neuropsychiatric-disease-and-treatment-journal>