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Disorder**

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A cross-sectional study of Auditory Verbal Hallucinations experienced by people with a diagnosis of Borderline Personality Disorder

Running head: Auditory Verbal Hallucinations in the context of Borderline Personality Disorder

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Title: A cross-sectional study of Auditory Verbal Hallucinations experienced by people with a diagnosis of Borderline Personality Disorder

Background: The presence of auditory verbal hallucinations (AVH) does not currently feature in the main diagnostic criteria for Borderline Personality Disorder (BPD). However, there is accumulating evidence that a high proportion of BPD patients report longstanding and frequent AVH which constitute a significant risk factor for suicide plans and attempts, and hospitalisation.

Aim: This study addressed questions about the validity and phenomenology of AVH in the context of BPD. The longer-term aim is to facilitate the development and translation of treatment approaches to address the unmet need of this population.

Method: This was a cross-sectional study, combining phenomenological and psychological assessments administered in person and online. We explored the experiences of 48 patients with a diagnosis of BPD who were hearing AVH.

Results: Participants gave 'consistent' reports on the measure of AVH phenomenology, suggesting that these experiences were legitimate. Similar to AVH in a psychosis context, AVH were experienced as distressing and appraised as persecutory. AVH were found to be weakly associated with BPD symptoms. AVH were also rated highly as a treatment priority by the majority of participants.

Conclusion: The findings suggest that AVH is a legitimate and distressing symptom of BPD and a treatment priority for some patients. The relative independence of AVH from other BPD symptoms and emotional states suggests that psychological treatment may need to be targeted specifically at the symptom of AVH. This treatment could be adapted from Cognitive Behaviour Therapy, the

psychological intervention that is recommended for the treatment of AVH in the context of psychosis.

Key practitioner messages:

- Auditory Verbal Hallucinations (AVH) are a legitimate and distressing symptom of Borderline Personality Disorder (BPD) and a treatment priority for some patients.
- The relative independence of AVH from other BPD symptoms and emotional states suggests that psychological treatment may need to be targeted specifically at the symptom of AVH.
- Psychological treatment of AVH in the context of BPD could be adapted from Cognitive Behaviour Therapy.

Keywords: Auditory verbal hallucinations, hearing voices, Borderline Personality Disorder, Cognitive Behaviour Therapy

Introduction

Borderline Personality Disorder (BPD) affects 1–3% of the general population (Lenzenweger, Lane, Loranger, & Kessler, 2007). Patients given a diagnosis of BPD characteristically experience emotional instability, repeated self-injury, suicidal tendencies, reactive aggression and high rates of comorbid mental disorders (Leichsenring et al., 2011). BPD markedly affects employment, and in combination with high use of mental health care, results in high societal costs (van Asselt, Dirksen, Arntz, & Severens, 2007).

The presence of auditory verbal hallucinations (AVH) does not currently feature in the main diagnostic criteria for BPD (e.g., Diagnostic and Statistical Manual of mental disorders - fifth edition [DSM-5; American Psychiatric Association, 2013]). However, there is accumulating evidence that a high proportion of BPD patients (50–90%) report longstanding and frequent AVH (Kingdon et al., 2010; Yee, Korner, McSwiggan, Meares, & Stevenson, 2005). AVH, defined as an auditory or speech experience in the absence of an actual stimulus (David, 2004), have typically been studied in the context of psychosis, where these experiences often involve hearing one or more AVH. These AVH are typically negative and critical in content and may comprise commands to harm oneself or others (McCarthy-Jones, 2014). When experienced in the context of BPD, AVH constitute a significant risk factor for suicide plans and attempts, and hospitalisation (Miller, Abrams, Dulit, & Fyer, 1993; Slotema et al., 2016).

Studies directly comparing the experiences of AVH in the contexts of psychosis and BPD have found no differences in terms of perceived location (Kingdon et al., 2010; Slotema et al., 2012; Tschoeke, Steinert, Flammer, & Uhlmann, 2014), content (including negativity - Kingdon et al., 2010; Slotema et al., 2012), frequency or duration (Kingdon et al., 2010; Slotema et al., 2012) or emotional impact (Slotema et al., 2012).

Despite these recent advances, the nature and legitimacy of AVH in the context of BPD is still being questioned (Merrett, Rossell, & Castle, 2016). Questions that have repeatedly arisen over past decades in relation to the experience of AVH in BPD include: 1) to what extent are the AVH experienced by patients with BPD 'true' hallucinations in the sense of those described in the context of psychosis; and 2) to what extent do these experiences reflect 'malingering' on the part of the patient (Yee et al., 2005)? Where AVH are accepted as a legitimate experience, some authors purport that AVH in the context of BPD are qualitatively different to those experienced in the context of psychosis (Zanarini et al., 2013). Furthermore, the body of research exploring AVH phenomenology in the context of BPD remains small (Merrett et al., 2016; Niemantsverdriet et al., 2017), and lags behind developments in the psychosis literature, in which comprehensive quantitative approaches and analytic methods have been applied in order to further characterise the nature of these experiences. These studies have suggested the presence of different AVH 'subtypes' (McCarthy-Jones et al., 2012, 2014; Stephane, Thuras, Nasrallah & Georgopoulos, 2003), which may reflect different underlying cognitive and neural mechanisms (Jones, 2010; McCarthy-Jones, 2012). There have been calls for the clear characterization of AVH phenomenology within individual studies so that these features can be applied to neuroimaging data (Allen et al., 2012). Similarly, it has been suggested that the application of these approaches to populations other than psychosis is critical for developing understanding of trans-diagnostic mechanisms of AVH (Waters & Fernyhough, 2017; Davies, et al., 2020). The present study drew upon neuroimaging and phenomenological methods to address these gaps in the literature and inform discussions about the validity and phenomenological profile of AVH in the context of BPD.

A range of evidence-based intervention options exist for the treatment of distressing AVH occurring in the context of psychosis – including antipsychotic medication and cognitive behavioural therapy (CBT; National Collaborating Centre for Mental Health, 2014). However, these

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approaches are not currently recommended for patients experiencing AVH in the context of BPD (National Collaborating Centre for Mental Health, 2009). A further aim of this study was to explore the relevance of the cognitive model of voices (Birchwood & Chadwick, 1997) to AVH in the context of BPD. Studies have suggested that beliefs about self and AVH, and associated behavioural and emotional responses to AVH do not differ across psychosis and BPD contexts (e.g., Hepworth, Ashcroft & Kingdon, 2013). If these findings can be corroborated, CBT may also be an appropriate treatment for distressing AVH in the context of BPD.

Questions about the validity and phenomenology of AVH in the context of BPD hinder the development and translation of treatment approaches to address the unmet need of this population. To address these questions, we conducted: (1) a comprehensive examination of the phenomenological and cognitive behavioural mechanisms of AVH in BPD; and (2) a neuroimaging-based exploration of the neural networks operating in real-time during an AVH episode. Here we focus on (1) and examine the experiences of a group of BPD patients who reported hearing AVH; the neuroimaging-based exploration will be published elsewhere.

Methods

Design and participants

This was a cross-sectional study, combining neuroimaging methods and phenomenological and psychological assessments administered in person and online. Findings from the neuroimaging part of the study will be reported in a separate paper. Patients with a diagnosis of BPD were recruited from the mental health services of two Trusts within the UK National Health Service (NHS) - Sussex

Partnership NHS Foundation Trust (including the Sussex Voices Clinic

<https://www.sussexpartnership.nhs.uk/sussex-voices-clinic>) and Kent & Medway NHS & Social Care

Partnership Trust.

Inclusion criteria required participants to: be aged 18-65; be right-handed; be fluent in speaking and reading English; have normal to corrected vision and normal hearing (no clinical deafness or hearing impairment); have received a clinician-administered diagnosis of Borderline Personality Disorder; have heard AVH in the past week; and have been experiencing persisting AVH for the past 6 months.

Exclusion criteria included: criteria related to the neuroimaging - being afraid of small, closed spaces or loud noises, non-removable metal in or on their body; pregnancy; having a diagnosed neurological or neurodegenerative disorder; and meeting DSM-5 diagnostic criteria for Schizophrenia or Schizoaffective Disorder.

Presence of both BPD and Schizophrenia/Schizoaffective disorder were confirmed during screening using the Borderline Personality Disorder section of the Structured Clinical Interview for DSM-5 Personality Disorders (SCID-5-PD) (First et al., 2016), and the Schizophrenia Spectrum or Other Psychotic Disorders section of the Structured Clinical Interview for DSM-5 (SCID-5) (First et al., 2016). The presence and duration of AVH were confirmed using participant responses to observer rated questions derived from the Structured Clinical Interview for DSM-5 (SCID-5).

Ethics and consent process

Ethical approval was obtained from South Central Berkshire 'B' Research Ethics Committee via the National Research Ethics System ID: 234904. The study sponsor was Sussex Partnership NHS Foundation Trust. The study was also approved by the Brighton and Sussex Medical School Research

Governance and Ethics Committee. All data acquisition methods used were in accordance with international, national, and institutional guidelines. All participants gave informed consent following Declaration of Helsinki guidelines.

Measures

Beliefs About Voices Questionnaire-Revised (BAVQ-R; Chadwick, Lees, & Birchwood, 2000) – a 35-item self-report questionnaire measures beliefs about the malevolence, benevolence and omnipotence of voices, alongside behavioural and emotional responses to voices. A recent factor analytic study (Strauss et al., 2018) identified four subscales: two relating to beliefs about voices (persecutory and benevolent), and two relating to responses to voices (resistance and engagement). The measure shows good internal consistency and validity within a psychosis context (Chadwick et al., 2000).

Brief Core Schema Scales (BCSS; Fowler et al., 2006) - a 24-item self-report questionnaire assessing both negative and positive schemas about self and others. This measure consists of four subscales: 'negative self-schema', 'positive self-schema', 'negative other-schema' and 'positive other-schema'. The measure shows good internal consistency, test-retest reliability and validity within a psychotic population (Fowler et al., 2006; Smith et al., 2006).

Brief Symptom Impact Scale - a 10-item measure of impact of AVH relative to other symptoms. This aimed to identify whether AVH should be a treatment priority. The questionnaire contains items corresponding to the nine diagnostic criteria for BPD (e.g. identify disturbance, impulsivity, etc.) alongside one item relating to AVH. Participants ranked these ten in order of their current negative impact (in terms of distress and/or ability to function) where 1 = '*generally affects me most*' and 10 = '*generally affects me least*'.

Childhood Trauma Questionnaire–Short Form (CTQ-F; Bernstein & Fink 1998) - a 28-item self-report questionnaire with strong internal consistency and test–retest reliability. Factor analytic studies have indicated the presence of five subscales: emotional abuse, physical abuse, sexual abuse, emotional neglect and physical neglect.

Computerized binary scale of auditory speech hallucinations (cbSASH; Stephane, Pellizzer, Roberts, & McClannan, 2006) – a 159 computerised assessment providing a fine-grained assessment of AVH phenomenology along with measures of the reliability and consistency of the patient report. The reliability and consistency subscales have demonstrated good convergent validity with similar measures, and the phenomenology and reliability subscales have demonstrated high internal consistency (internal consistency does not apply for the consistency subscale). Furthermore, the phenomenology subscale has high test-retest reliability (Stephane et al., 2006).

Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5; Blevins, Weathers, Davis, Witte, & Domino, 2015) - a 20-item self-report measure that assesses the presence and severity of PTSD symptoms. The PCL-5 has been demonstrated to exhibit strong internal consistency ($\alpha=.94$), test-retest reliability ($r = .82$), and convergent ($r_s = .74$ to $.85$) and discriminant ($r_s = .31$ to $.60$) validity (Blevins et al., 2015).

State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) - a commonly used measure of trait and state anxiety, comprising 20 items for assessing trait anxiety and 20 for state anxiety. Internal consistency coefficients for the scale have ranged from $.86$ to $.95$; test-retest reliability coefficients have ranged from $.65$ to $.75$ over a 2-month interval (Spielberger et al., 1983).

The Positive and Negative Syndrome Scale (PANSS) for Schizophrenia - Positive Syndrome subscale (PANSS-P; Kay, Fiszbein, & Opler, 1987) - is one of the most commonly used clinician-rated scales to assess for the presence and severity of positive symptoms. The PANSS scales have demonstrated excellent internal consistency (coefficient alpha and split-half reliability) and consistency over time (test-retest reliability) while still being sensitive to change.

The Psychotic Symptoms Rating Scale – Auditory Hallucinations (PSYRATS-AVH; Haddock et al., 1999) - an 11-item semi-structured interview measuring the various psychological dimensions of hallucinations. A factor analytic study (Woodward et al., 2014) identified that PSYRATS-AVH comprises four subscales: 'distress', 'frequency', 'attribution' and 'loudness'. Studies have indicated generally strong interrater reliability of the PSYRATS and adequate test-retest reliability (Drake, Haddock, Tarrier, Bentall, & Lewis, 2007; Haddock et al., 1999) alongside good internal consistency of the individual subscales (Woodward et al., 2014).

Zanarini Rating Scale for Borderline Personality Disorder: Self-report Version (ZAN-BPD: SRV; Zanarini, Weingeroff, Frankenburg, & Fitzmaurice, 2015) - a nine-item self-report measure assessing the severity of BPD symptoms over the past week. It consists of a five-level set of anchored rating point for each of the nine criteria for BPD found in the DSM-5. This scale has demonstrated good convergent validity with interview-based measures, good internal consistency and excellent test-retest reliability (Zanarini et al., 2015).

Procedure

The study involved three separate assessment phases, which took approximately five and a half hours in total. In phase 1a participants completed a series of clinical outcome measures (observer rated and self-report) during a face-to-face meeting with a researcher. Phase 1b involved the

completion of self-report clinical outcome measures online, with remote assistance offered as necessary. In phases 2 and 3, participants attended a scanning centre to complete an experimental task (signal detection task) and neuroimaging procedures.

Statistical analysis

Descriptive summaries were conducted for the participant characteristics in terms of mean (μ), standard deviation (SD), median, 25th/75th percentile, interquartile range, minimum and maximum for continuous data, and count (n) and percentage (%) for categorical data. Pearson correlations (ρ_n) were used to explore relationships between pairs of measures. Statistical tests were significant if $p < 0.05$. As these analyses are exploratory, and we do not intend to recommend direct changes to clinical practice based on our results, there will be no adjustment for multiple testing. All analyses were calculated with SPSS V25. Missing data was summarised but not treated.

Results

Participant Data and Characteristics

A total of 52 BPD patients participated in the study. Three participants withdrew before taking part in the first phases and so did not provide any data. Forty-eight participants took part in phases 1a and 1b. In terms of data completeness: participant characteristics were available for all 48 participants; for individual clinical measures, the level of completeness ranged from 62% to 92% and can be deduced from Tables 1-3.

Patients were mainly white British (66%) females (81%) with an average age of 34yrs (SD=10.9; range 19 to 56). Almost two-thirds (65%) were single. Over half (54%) were not working due to long term sickness or disability, 15% were unemployed, 10% were not working for other reasons (e.g., student, retired, looking after family) and 21% were in paid full-time employment. Just under a third (31%) left school at 16 or under, 16% left school at 17/18, a third (33%) went to college and 1 in 5 (20%) went to university. The majority of participants had experienced childhood trauma in the form of Emotional Abuse (94%), Physical Abuse (63%), Sexual Abuse (67%), Emotional Neglect (85%) and Physical Neglect (71%) (see Table 1 for a summary of the measures). These high levels of reported trauma were in line with expectations. All but two participants (a total of 96%) reported experiencing PTSD.

Participant baseline clinical scores

A descriptive summary of baseline clinical scores for positive symptoms, anxiety and BPD symptomatology (Zan-BPD) are shown in Table 1. PANSS Positive Syndrome subscale scores had a mean $\mu=13.8$ (SD=3.5; range 7-24). Mean state anxiety was $\mu=57.6$ (SD=10.9; range 26-75) and mean trait anxiety was $\mu=66.4$ (SD=7.7; range 47-78). The mean Zan-BPD total was $\mu=17.5$ (SD=6.8; range 3-29); affect levels tended to be in the medium to high range $\mu=7.2$ (SD=2.3; range 2-11), mean cognition was mid-range $\mu=4.2$ (SD=2.2; range 0-8). Impulsivity and interpersonal scores were both at the lower end of the scale: $\mu=2.8$ (SD=2.1; range 0-8) and $\mu=3.3$ (SD=2.0; range 0-7), respectively.

AVH experiences

The cbSASH was used to explore the extent to which patients' AVH experiences were atypical. Total scores ranged from 0 to 30 where >7 indicates malingering. Two (4.4%) patients were deemed to be

malingering (both with scores of 8). Forty-six (93.9%) participants gave a 'consistent' report of their AVH experiences (i.e., not considered to be malingering).

Table 2 displays the percentage of patients who reported experiencing selected items from the cbSASH phenomenology subscale. Most participants reported hearing more than one AVH (56%) which was unfamiliar (31% reported familiarity) and attributed the cause of this experience to having a mental health problem (69%). The location of AVHs was perceived to be both inside (51%) and outside of the head (49%). AVH often talked about the participant (93%) and told them what to do (78%), including commands to self-harm (76%). The participants responded by talking back to AVH (69%) and engaging in reciprocal conversations (60%) but complied with AVH commands infrequently (29%).

Table 3 displays the dimensions of AVH experienced by the group of BPD patients. The average level of AVH distress was in the medium-high range ($\mu=14.5$, $SD=3.5$), whilst frequency ($\mu=6.1$, $SD=3.0$), attribution ($\mu=4.0$, $SD=1.9$), loudness ($\mu=2.5$, $SD=1.1$) and the total ($\mu=27.0$, $SD=7.1$) were just above the mid-range. The strength of the relationship between AVH distress and BPD symptomatology was also explored. Our findings indicated statistically significant weak relationships between AVH distress and the following: ZAN-BPD Affect ($\rho_{38}=0.38$; $p=0.02$), ZAN-BPD Impulsivity ($\rho_{38}=0.32$; $p=0.05$) and the Zan-BPD total ($\rho_{38}=0.28$; $p=0.08$). There were also weak correlations between AVH distress and the other co-occurring conditions that were measured: STAI-state anxiety ($\rho_{29}=-0.22$; $p=0.254$), STAI-trait anxiety ($\rho_{29}=-0.16$; $p=0.396$) and PCL-5 PTSD ($\rho_{38}=0.27$; $p=0.107$).

Cognitive behavioural mechanisms

Participants tended to hold more persecutory beliefs ($\mu=16.0$ $SD=7.6$) about their AVH compared to relatively lower levels of beliefs about AVH benevolence ($\mu=3.3$, $SD=4.3$) (Table 3). In terms of

responses to AVH, patients experienced higher levels of emotional resistance to their AVH, and lower levels of emotional engagement (BAVQ scores were $\mu=17.5$, $SD=6.9$ and $\mu=2.6$, $SD=4.5$, respectively).

Scores on the BCSS (Table 3) indicated that patients tended to have a higher degree of belief in the negative descriptions of themselves compared to the positive characteristics presented (BCSS scores were $\mu=14.4$, $SD=7.0$ and $\mu=11.6$, $SD=9.2$, respectively). Patients also reported higher levels of negative characteristics in other people ($\mu=12.2$, $SD=8.8$) and were less likely to endorse positive attributes in others ($\mu=8.9$, $SD=5.8$).

Associations between the range of AVH characteristics (PSYRATS-AVH sub-scores) and behavioural responses (BAVQ and BCSS sub-scores) were explored to gain a better understanding of potential distress-maintenance patterns (Table 4). Inspection of the relationships between AVH distress and the different dimensions of beliefs about AVH revealed a strong positive correlation with persecutory beliefs ($\rho_{277}=0.67$; $p<0.001$) and a weak positive relationship with resistance ($\rho_{277}=0.45$; $p=0.019$). There was a strong relationship between believing AVH were persecutory and resisting the AVH ($\rho_{333}=0.75$; $p<0.001$). Believing the AVH were benevolent was strongly correlated with engagement with AVH ($\rho_{333}=0.83$; $p<0.001$). However, there was no evidence to suggest that either beliefs about AVH benevolence, engagement with AVH or any of the domains of the BCSS were associated with AVH distress.

Priority of and targeting of treatment for AVH

Using the BSIS, participants were asked to rank their symptoms, which included AVH, in order of impact. Overall, 'hearing a voice/voices that others could not hear' was ranked 4th highest of the 10 symptoms, behind feelings of moodiness, emptiness and angry feelings or acts. AVH were seen as a

top priority for treatment by 17% of patients who ranked AVH first; over a third (35%) ranked AVH among the top 3 symptoms. Figure 1 displays the percentages of participants who ranked symptoms in their top 5; AVH was ranked in the top 5 by more than two-thirds (69%) of participants.

Discussion

This study was an exploration of the phenomenological and psychological profile of AVH for patients with BPD. With a better understanding of the legitimacy of AVH, how this experience relates to other symptoms of BPD and the cognitive behavioural mechanisms of AVH, further consideration can be given as to how the treatment needs of this population can be met. If BPD patients report being distressed by AVH in ways that are similar to psychosis patients, then arguments can be made to explore the translation of the range of evidence-based intervention options.

The participants within this study tended to be relatively young females who were not in a relationship, and over half were not working due to long term sickness or disability. The majority of participants had experienced significant childhood trauma and almost all reported emotional abuse, PTSD and high levels of anxiety. In these respects, the participants seemed to be typical of patients given a diagnosis of BPD. This conclusion was corroborated by the profile of high scores on the ZAN-BPD. The low scores on PANSS suggested that participants were not experiencing the positive symptoms of psychosis beyond AVH, consistent with the appropriate application of the exclusion criteria.

With regard to AVH, participants gave 'consistent' reports on the cbSASH measure of phenomenology, suggesting that these experiences were legitimate. Participants reported multiple AVH which talked to them and issued commands (including self-harm), and responses included talking back and non-compliance. Despite the contents of the cbSASH not being directly comparable

with a recent phenomenological survey of primarily psychosis patients (McCarthy-Jones et al. (2014), some comparisons are possible. In this respect, the AVH of the BPD patients seem to differ in terms of number (more likely to be a single AVH) and familiarity (less likely to be the AVH of a known person). Similarity was most evident in relation to the high volume of commands and the perceived location of AVH (both inside and outside of the head).

With regard to AVH characteristics and distress (measured by PSYRATS), scores were marginally lower within the current study, when compared to a large sample of psychosis patients (Craig et al., 2018). The opposite was the case for appraisals of AVH (using the BAVQ-R), as AVH were appraised in the current study as persecutory to a degree that was marginally higher in comparison to a recently completed trial involving psychosis patients (Hayward et al., 2021). Appraisals of self differed more markedly as participants within the current study reported higher scores for both negative and positive appraisals, in comparison to the Hayward et al. (2021) psychosis sample. This pattern of some variation was evident when associations were explored between the characteristics, distress and beliefs about AVH, and beliefs about self. Consistent with psychosis samples (Mawson et al., 2010), significant associations were found between persecutory beliefs about AVH and AVH distress, and resistance to AVH and AVH distress. However, contrary to findings from a transdiagnostic sample (Cole et al., 2017), no associations were found between beliefs about self and AVH distress. Studies exploring associations between beliefs about self and AVH within specific diagnostic groups have foregrounded associations with depression (e.g., Calveti et al., 2020; Fannon et al., 2009; Peters et al., 2012). The role of beliefs about self in the maintenance of AVH distress should be a focus of future research,

The exploration of associations between AVH and BPD symptoms and AVH and anxiety generated only weak associations, suggesting that AVH may be somewhat independent from the affective symptoms that are characteristic of this patient group.

Final consideration was given to the perceived impact of AVH and the priority afforded by participants to the treatment of AVH. Consistent with the high level of distress reported on PSYRATS, AVH were rated highly in terms of impact. Somewhat surprisingly, AVH were also rated highly as a treatment priority by the majority of participants. Indeed, a higher priority was afforded to AVH in comparison to some of the other symptoms which are typically the focus of intervention, e.g., self-harm and unstable relationships. NICE (2009) foreground the 'autonomy and choice' of BPD patients and encourage the consideration of different treatment options. Requests by patients for a focus upon the treatment of AVH may be perceived as atypical but should none-the-less be respected.

This study has limitations in several respects. Firstly, despite being larger than many existing studies in the literature, the sample was relatively small and was not adequately powered to detect all statistically meaningful findings. Secondly, there was a considerable amount of missing data for some variables, which may have been attributable to the study's ambitious focus upon multiple research questions. Thirdly, the correlational nature of the analyses does not facilitate exploration of the causal relationship between variables. Finally, the absence of a comparison group with a psychosis diagnosis prevented direct comparisons of AVH across diagnoses.

The findings from this study suggest that AVH is a legitimate and distressing symptom of BPD and a treatment priority for some patients. The relative independence of AVH from other BPD symptoms and emotional states suggests that psychological treatment may need to be targeted specifically at the symptom of AVH. Single-symptom forms of evidence-based CBT are showing promise in the treatment of AVH in the context of psychosis (Lincoln & Peters, 2019). These interventions focus primarily upon the re-evaluation of persecutory beliefs about AVH – a variable which this study found to be prominent and associated with AVH distress for BPD patients. CBT for AVH in the context of psychosis additionally focuses upon variables which this study found were less relevant to

AVH in the context of BPD (e.g., beliefs about self – Hazell et al., 2018). Furthermore, variants of CBT for AVH are targeting relational variables (e.g., Hayward et al., 2017) which may be pertinent to BPD patients but were not assessed within this study. These differences suggest that: 1) an adequately powered comparison of AVH in the context of psychosis and BPD is required; and 2) CBT for AVH may benefit from being adapted prior to evaluation with BPD patients.

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Data availability statement:

The data that support the findings of this study are available on request from the corresponding author, MH.

Conflicts of interest:

None

Ethical statement:

The authors have abided by the Ethical Principles of Psychologists and Code of Conduct as set out by the BABCP and BPS. In accordance with the UK Policy Framework for Health and Social Care Research (2017), NHS Research Ethics Committee approval was not required. The study was registered with an NHS Audit team in 2015.

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Accepted Article

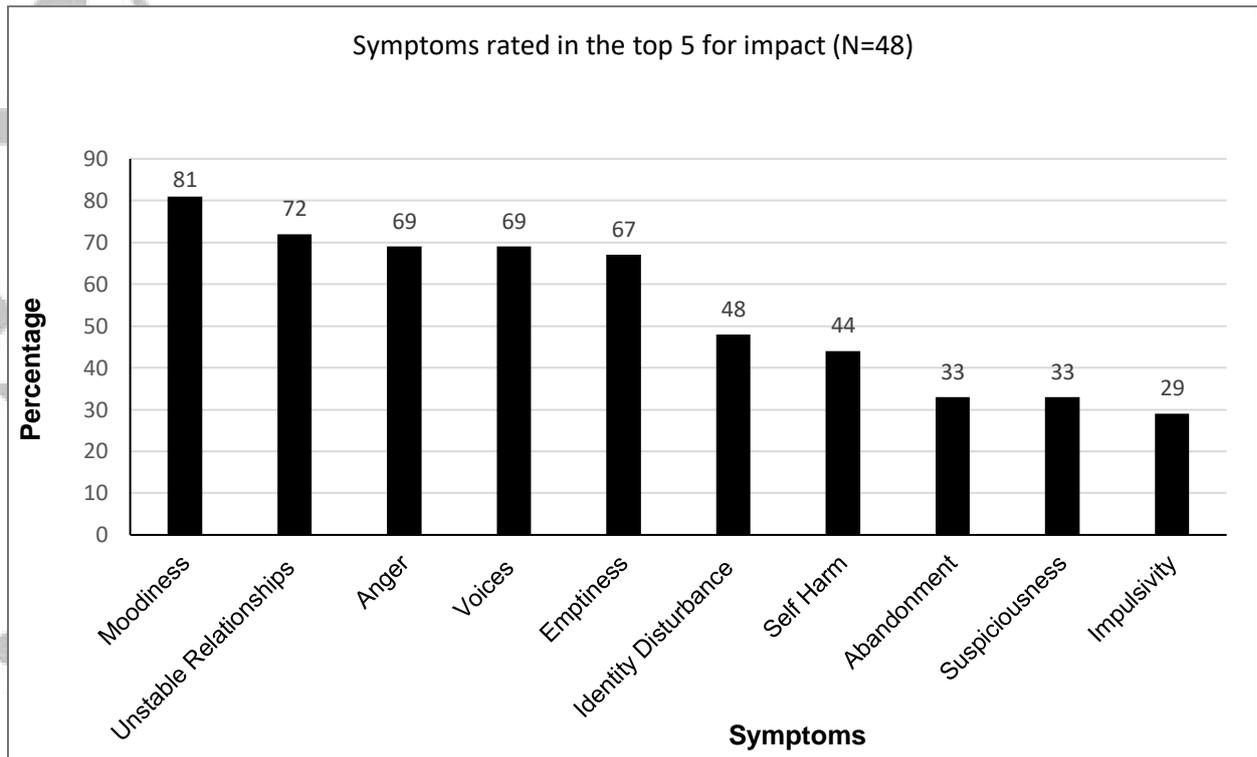


Figure 1 BSIS ratings for impact of symptoms

Notes: Participants were asked to rate 10 symptoms in order of impact. Every time a symptom appeared in a top 5 it was counted. The figure displays the proportion of participants for whom the symptom appeared in the top 5.

Accepted

Table 1 Baseline BPD participant clinical characteristics

Clinical measures	Possible Range of scores	Count (N)	Mean	Standard Deviation (SD)	Minimum	Maximum
CTQ Emotional Abuse	5-25	48	18.1 ^a	5.54	5	25
CTQ Emotional Neglect	5-25	48	15.9 ^b	4.85	5	25
CTQ Physical Abuse	5-25	48	10.5 ^b	5.47	5	25
CTQ Physical Neglect	5-25	48	10.7 ^b	5.11	5	24
CTQ Sexual Abuse	5-25	48	13.7 ^a	8.23	5	25
PANSS Positive	7-49	41	13.8	3.5	7	24
PCL-5 PTSD	0-80	48	53.5	12.7	18	77
STAI State Anxiety	20-80	35	57.6	10.9	26	75
STAI Trait Anxiety	20-80	35	66.4	7.7	47	78
ZAN-BPD Affect	0-12	48	7.2	2.3	2	11
ZAN-BPD Cognition	0-8	48	4.2	2.2	0	8
ZAN-BPD Impulsivity	0-8	48	2.8	2.1	0	8
ZAN-BPD Interpersonal	0-8	48	3.3	2.0	0	7
ZAN-BPD TOTAL	0-36	48	17.5	6.8	3	29

Notes: scales are Childhood Trauma Questionnaire–Short Form (CTQ-F), Positive and Negative Syndrome Scale (PANSS), Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5), State-Trait Anxiety Inventory (STAI), Zanerini Rating Scale for Borderline Personality Disorder: (ZAN-BPD); a=severe b=moderate

Table 2 Selected items from the computerized binary scale of auditory speech hallucinations (cbSASH) assessment of AVH Phenomenology (N=45)

Items	Percentage %
"The voices talk to me"	93.3
"The topics of the voices are related to me"	77.8
"The voices tell me what to do"	77.8
"The voices order me to hurt myself"	75.6
"I talk back to the voices	68.9
"I hear voices because I have a mental health problem"	68.9
"I talk to the voices and they answer me back. We can have a two-way conversation"	60.0
"The voices I hear are real"	57.8
"I hear more than one voice"	55.6
"Voices Sound like Men"	53.3
"The voices talk between themselves"	52.3
"Voices sound like they're coming from inside my head"	51.1
"Voices sound like they're coming from outside my head"	48.9
"Voices Sound like Women"	37.8
"The voices order me to hurt others	33.3
"The voices sound like the voices of people I know"	31.1
"I hear one voice only"	28.9
"I do what the voices tell me to do"	28.9
"Whenever things around me look unreal, I hear voices"	23.1
"Cannot make out gender"	22.2
"I hear voices more when I drink alcohol or use drugs"	13.3

Table 3 Dimensions of AVH

Clinical Measure	Possible Range	Count (N)	Mean	Standard Deviation (SD)	Min	Max
PSYRATS						
Distress	0-20	39	14.5	3.5	8	20
Frequency	0-12	39	6.05	3.0	0	11
Attribution	0-8	38	4.03	1.9	2	8
Loudness	0-4	44	2.5	1.1	0	4
Total	0-44	33	27.0	7.1	12	40
BAVQ						
Persecutory	0-27	33	16.0	7.6	0	27
Benevolence	0-15	33	3.3	4.3	0	15
Resistance	0-27	32	17.5	6.9	0	27
Engagement	0-18	32	2.6	4.5	0	18
BCSS						
Negative Self	0-24	33	14.4	7.0	0	24
Positive Self	0-24	33	11.6	9.2	0	42
Negative Other	0-24	33	12.2	8.8	0	42
Positive Other	0-24	33	8.9	5.8	0	24

Notes: scales are Psychotic Rating Scales – Auditory Hallucinations (PSYRATS), Beliefs About Voices (BAVQ), Brief Core Schema Scales (BCSS)

Table 4 Correlations to explore distress-maintenance models of auditory verbal hallucinations

	PSYRATS DISTRESS	PSYRATS Attribution	PSYRATS Loudness	PSYRATS Frequency	PSYRATS Total	BAVQ-R Persecutory Beliefs	BAVQ-R Benevolence Beliefs	BAVQ-R Resistance	BAVQ-R Engagement	BCSS Negative Self	BCSS Positive Self	BCSS Negative Other	BCSS Positive Other
PSYRATS DISTRESS	1	0.044	.407*	.538**	.863**	.670**	-0.154	.449*	-0.135	0.159	0.288	0.317	0.308
PSYRATS Attribution	0.044	1	0.076	0.064	.355*	-0.027	-0.05	0.034	0.124	0.055	0.058	0.057	-0.037
PSYRATS Loudness	.407*	0.076	1	.500**	.675**	0.354	-0.019	0.259	-0.068	0.143	0.101	0.101	0.186
PSYRATS Frequency	.538**	0.064	.500**	1	.824**	0.302	0.004	-0.045	-0.097	-0.197	-0.049	-0.137	-0.071
PSYRATS Total	.863**	.355*	.675**	.824**	1	.526*	-0.156	0.251	-0.137	0.036	0.138	0.11	0.136
BAVQ-R Persecutory Beliefs	.670**	-0.027	0.354	0.302	.526*	1	0.211	.752**	0.337	0.336	0.267	0.241	0.312
BAVQ-R Benevolence Beliefs	-0.154	-0.05	-0.019	0.004	-0.156	0.211	1	0.228	.825**	0.188	.348*	0.142	0.206
BAVQ-R Resistance	.449*	0.034	0.259	-0.045	0.251	.752**	0.228	1	0.193	0.287	0.242	0.232	0.289
BAVQ-R Engagement	-0.135	0.124	-0.068	-0.097	-0.137	0.337	.825**	0.193	1	0.316	0.278	0.165	0.171
BCSS Negative Self	0.159	0.055	0.143	-0.197	0.036	0.336	0.188	0.287	0.316	1	.476**	.625**	.452**
BCSS Positive Self	0.288	0.058	0.101	-0.049	0.138	0.267	.348*	0.242	0.278	.476**	1	.604**	.863**
BCSS Negative Other	0.317	0.057	0.101	-0.137	0.11	0.241	0.142	0.232	0.165	.625**	.604**	1	.536**
BCSS Positive Other	0.308	-0.037	0.186	-0.071	0.136	0.312	0.206	0.289	0.171	.452**	.863**	.536**	1

Notes: Highlighted cells indicate significant correlations at the ** 0.01 level(2-tailed) and * 0.05 level (2-tailed). Correlation interpretation: .0 to .3=negligible; .3 to .5 weak; .5 to .7 moderate; .7 to .9 strong; .9 to 1.0 very strong. Pairwise counts ranged between N=26 and 44. Measures are Psychotic Rating Scales – Auditory Hallucinations (PSYRATS), Beliefs About Voices (BAVQ), Brief Core Schema Scales (BCSS)