Author/s:
Peach, N;Alvarez-Jimenez, M;Cropper, SJ;Sun, P;Halpin, E;O'Connell, J;Bendall, S

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Trauma and the content of hallucinations and post-traumatic intrusions in first-episode psychosis

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Title: Trauma and the content of hallucinations and post-traumatic intrusions in first episode psychosis

Authors and affiliations

Natalie Peach[a], Mario Alvarez-Jimenez[b,c], Simon J Cropper[a], Pamela Sun[d], Emma Halpin[b,c], Jessica O'Connell[b,c], and Sarah Bendall[b,c]

[a] School of Psychological Sciences, The University of Melbourne, Grattan Street, Parkville, 3010, Victoria, Australia

[b] Orygen, The National Centre of Excellence in Youth Mental Health, 35 Poplar Road, Parkville, 3052, Victoria, Australia

[c] The Centre for Youth Mental Health, The University of Melbourne, 35 Poplar Road, Parkville, 3052, Victoria, Australia

[d] School of Psychological Sciences, Monash University, Wellington Road, Clayton, 3800, Victoria, Australia

Corresponding author

Dr Sarah Bendall

Orygen, The National Centre of Excellence in Youth Mental Health, 35 Poplar Road, Parkville, 3052, Victoria, Australia

sarah.bendall@orygen.org.au

Ph: +61 421 330 032

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Abstract

Objective. Increasing evidence suggests experiences of childhood trauma may be causally related to the development of hallucinations. Cognitive theories of psychosis suggest post-traumatic intrusions to be a primary mechanism in this relationship. These theories predict that the content of hallucinations will be related to traumatic experiences, however few studies have investigated this. This study examined the relationship between childhood trauma, the content of hallucinations, and the content of posttraumatic intrusions in a sample with first episode psychosis.

Methods. Sixty-six young people aged 15 to 25 experiencing a first episode of psychosis were recruited from an early intervention service. Participants completed assessments of traumatic experiences, hallucination content and posttraumatic intrusion content using a systematic coding frame. The coding frame assessed for three types of relationships between traumatic experiences, the content of hallucinations and of post-traumatic intrusions: direct relationships (hallucination content exactly matching the trauma/intrusion), thematic relationships (hallucinations with the same themes as the trauma/intrusion) and no relationship (hallucination and trauma/intrusion content unrelated).

Results. Of those people who reported trauma and hallucinations (n=36), 22 of these (61%), experienced post-traumatic intrusions, and of these, 16 (73%) experienced hallucinations that were directly or thematically related to their post-traumatic intrusions. Twelve people experienced hallucination content directly related to their trauma, six of whom (50%) also had intrusions relating to the same traumatic event as their hallucinations.

Conclusions: The finding that some people experience hallucinations and post-traumatic intrusions relating to the same traumatic event supports theories proposing a continuum of memory intrusion fragmentation. These results indicate that early intervention services for young people with psychosis should provide assessment and intervention for trauma and PTSD and should consider the impact of past traumatic events on the content of current hallucinatory experience.

Keywords

trauma/psychosis/hallucination/intrusion/schema/content/PTSD

Practitioner Points

- Trauma and post-traumatic stress disorder should be assessed in those experiencing a first episode of psychosis. Interventions for trauma should be offered in early intervention for psychosis services.
- In a notable proportion of people, hallucination content is related to traumatic experiences.

- Clinical assessment and formulation of hallucinations requires consideration of how past traumatic events may be contributing to hallucinatory experience.
- It is important for clinicians to have an understanding of the phenomenological differences between hallucinations and post-traumatic intrusions when conducting clinical assessments with people with co-morbid psychosis and PTSD.

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Title: Trauma and the content of hallucinations and post-traumatic intrusions in first episode psychosis

It has been widely replicated in the literature that many people with psychosis have experienced childhood trauma, and adverse events are increasingly implicated in the aetiology of psychosis (Bendall et al. 2008; Kelleher et al. 2013; Trauelsen et al. 2015; Murray, 2017). As reported in large meta-analyses, childhood trauma has been identified as a risk factor for the development of psychosis (Varese et al. 2012; Matheson et al. 2013). Specific associations between trauma and hallucinations have been demonstrated in both clinical and non-clinical groups (Shevlin et al. 2007; Daalman et al. 2012; Kelleher et al. 2013; Bailey et al., 2018). Relative to the general population, the prevalence of posttraumatic stress disorder (PTSD) in people with psychotic disorders is also greater (Achim et al. 2011; de Bont et al. 2015; Steel et al. 2017), and hallucinations have been shown to occur in people with PTSD (Hamner et al., 2000).

Cognitive-behavioural models accounting for the relationship between trauma and hallucinations emphasise the role of post-traumatic intrusions and trauma-related beliefs and emotion as potential mechanisms (Garety et al., 2001; Morrison, 2001; Morrison et al., 2003; Steel, Fowler & Holmes, 2005; Waters et al., 2006). Post-traumatic intrusions are proposed to occur when increased sensory perceptual memory processing occurs at the time of traumatic events due to arousal and dissociation at the deficit of episodic memory processing (Brewin et al. 1996; Ehlers & Clark, 2000). This leads to poorly contextualised memories that are prone to involuntary recall (Brewin et al. 1996; Ehlers & Clark, 2000). Morrison and colleagues (2003) propose hallucinations to be phenomenologically similar to post-traumatic intrusions. They note both are involuntary sensory-perceptual intrusions that are experienced as occurring presently and are often associated with fear

and threat (Morrison et al. 2003). It has also been theorised that those vulnerable to psychosis may experience trait deficits in contextual integration, leading to increased intrusive experiences (Steel et al., 2005). Models emphasising the role of trauma-related beliefs and emotion propose that trauma-related anomalous perceptual experiences develop into psychotic symptoms via the effect of negative beliefs and emotion and shape their interpretation and content (Garety et al., 2001). A recent study testing these models (and using the current sample) found that both post-traumatic intrusions and trauma-related beliefs mediated the relationship between childhood trauma and hallucination severity, and that post-traumatic intrusions (but not trauma-related beliefs) were independently associated with hallucination severity (XXXX). The extent to which these mechanisms play a role in the aetiology of psychosis from trauma have implications for phenomenological associations between trauma, hallucinations and post-traumatic intrusions.

These models are contingent on the presence of relationships between trauma and hallucination content, which has been investigated in eight studies to date (Corstens & Longden, 2013; Hamner, 1997; Hardy et al., 2005; Jessop, Scott, & Nurcombe, 2008; Mueser & Butler, 1987; Raune, Bebbington, Dunn, & Kuipers, 2006; Read & Argyle, 1999; Scott, Nurcombe, Sheridan, & McFarland, 2007). Whilst all studies employed the general methodology of matching themes of hallucinatory experiences to experiences of trauma and all reported some relationship between these phenomena, the quality and method of assessment of trauma and hallucination content varied. In the most methodologically robust study, the authors developed a comprehensive coding frame specifically designed for systematic investigation of trauma and hallucination content (Hardy et al., 2005). They found that of 75 people with non-affective psychosis, 55% had experienced childhood trauma; of these, 13% had hallucinations with content directly representative of their trauma (e.g., trauma involving a gun with subsequent visual hallucinations of a gun), 45% had hallucination content thematically related to their trauma (e.g., a humiliating trauma and subsequent hallucinations with themes of humiliation), and 43% had no identifiable association between their hallucinations and trauma. These findings were interpreted such that direct associations were indicative of a potential role of post-traumatic intrusions, while thematic associations indicated support for beliefs and emotion as key mechanisms. The findings suggest that the intrusions and beliefs models of hallucinations are supported in sub-groups of individuals, and there are also individuals who have experienced childhood trauma where neither of these models hold (e.g., where a person has experienced trauma and has hallucinations of indistinct, chattering voices). A key limitation of this study however, was the examination of one traumatic event and one hallucination only, which participants appraised to be the most salient or distressing. This raises further questions. Firstly, it is not known whether a single individual may experience multiple post-traumatic processes that lead to hallucinations (and also hallucinations that are not associated with trauma). Secondly, the impact of post-traumatic intrusions on the experience of hallucinations with direct associations to trauma remains unclear. Post-traumatic intrusions may also be conceptualised as an anomalous perceptual

experience within trauma-related beliefs and emotion models of psychosis (e.g. Garety et al., 2001). It is not known however whether multiple types of content relationships exist between posttraumatic intrusions and hallucinations.

The aims of this study are to:

1. Determine whether those with first episode psychosis and trauma have more than one type of relationship (direct, thematic or no relationship) between their trauma and the content of their hallucinations.
2. Determine whether those with post-traumatic intrusions have direct content relationships between trauma and hallucinations relating to the same traumatic event. Further, whether those with post-traumatic intrusions also have hallucinations with thematic and no relationship to their intrusions.

Method

Participants

Participants were recruited for this study from XXXX, a public mental health service for young people aged 15 to 25 years living in XXXX Australia. XXXX is a specialised clinical program providing early intervention and treatment for young people experiencing a first episode of psychosis. Seventy young people were recruited to the study, however four completed less than 50% of the overall assessment. The final sample size was 66.

Participants were included for the study if they had a DSM-IV diagnosis of schizophrenia, schizophreniform disorder, schizoaffective disorder, delusional disorder, psychotic disorder not otherwise specified, or an affective disorder with psychotic features. Exclusion criteria were insufficient proficiency in the English language and/or presence of an intellectual disability (IQ<70).

Demographic and clinical data for the sample are shown in Table 1.

[TABLE 1 ABOUT HERE]

Measures

The Structured Clinical Interview for DSM-IV Axis I Disorders - Patient Edition (SCID-I; First et al. 2001) is a semi-structured interview for the diagnosis of DSM-IV Axis I disorders. The SCID-I was used to establish participants' primary diagnosis.

The Positive and Negative Syndrome Scale (PANSS; Kay et al. 1987) is a 30-item semi-structured interview assessing the presence of positive and negative symptoms of psychosis as well as general psychopathological symptoms over the last two weeks. Items are scored on a 7- point scale (1 = absent to 7 = extreme).

The Childhood Trauma Questionnaire- Short Form (CTQ; Bernstein et al., 2003) is a 28-item, self-report inventory that was utilised to identify the presence of childhood trauma. Items are scored on a five-point Likert scale for five subscales of abuse (physical, emotional and sexual) and neglect (physical and emotional). Probing questions were utilised to obtain further details of experiences of childhood trauma. Severity of childhood trauma was rated overall and for each subscale. Childhood trauma was rated as present if the participant scored in the moderate or severe range for at least one subtype of trauma.

The Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995) is a gold-standard semi-structured assessment of PTSD diagnostic criteria, and symptom severity and clusters (intrusive re-experiencing, avoidance/numbing, and hyperarousal). Symptom severity is measured according to frequency and intensity on a five-point Likert scale (0 to 4) in the past four weeks. Post-traumatic intrusions were determined to be present if the participant had frequency scores of 1 and intensity scores of 2 on any of the items on the re-experiencing subscale (B1 to B5). To identify the experience of trauma, the CAPS contains the Life Events Checklist (LEC), a yes/no checklist of a number of traumatic experiences that one may encounter in their life. Based on the available extant literature, items were added to the Life Events Checklist to capture experiences now commonly understood as childhood trauma, for example bullying or having a close carer, parent or relative experience severe mental illness or substance use.

Procedure

Participants or their parent/guardian (for those under 18 years) provided informed consent to participate in the study. The assessment comprised demographic information, clinician-administered interviews (SCID-IV, PANSS, and CAPS), and the self-report questionnaire (CTQ). Hallucinations and post-traumatic intrusions that had occurred since engagement with the XXXX service (in the last two years) were used in the analysis of the content. The SCID-IV assesses lifetime symptoms of psychosis however the CAPS and PANNS were adapted so that the content of symptoms present since service engagement could be captured. In order to elicit as much detail as possible of the content of traumas, post-traumatic intrusions and hallucinations, probing questions were added to the relevant sections of the CAPS (for trauma and post-traumatic intrusions) and the SCID-IV and PANSS (for hallucinations); e.g., “What happened?” “Who else was involved?” “What were you

seeing/hearing/feeling at the time?" "Have you had this experience since you started coming to XXXX?". Participants were asked to describe up to five of each of these experiences/symptoms. The CAPS and PANNS were also administered in a standardised way in order to inform diagnostic assessment.

Coding the Content of Trauma, Post-Traumatic Intrusions and Hallucinations

A modified version of Hardy et al.'s (2005) coding frame for examining phenomenological associations between trauma and hallucinations was used. The current study's version was designed to measure direct and thematic associations between the content of 1) trauma and hallucinations, and 2) post-traumatic intrusions and hallucinations. For every participant, up to five of each of these experiences/symptoms were included in the coding and analysis.

Ratings

Ratings for **direct** associations were made according to whether there was a literal correspondence between the content of the hallucination and trauma/post-traumatic intrusion. For example, where a person who had been verbally abused by being told "you're a failure" by the abuser, and subsequently hears voices saying "you're a failure".

Ratings for **thematic** associations were made according to whether there was congruence between the hallucination and the trauma/post-traumatic intrusion on the ratings on the four themes used by Hardy et al. (2005):

Threat ratings were made if the trauma/intrusion/hallucination involved the participant receiving physical injury, witnessing someone else being injured or killed, or thinking that they or someone else may be injured or killed.

Humiliation ratings were made if the trauma/intrusion/hallucination involved the experience of social devaluation in relation to self or others, in at least one of the following three ways: interpersonally (e.g., relationship breakdowns involving failure or rejection); socially (e.g., a close family member committing a serious crime); or personally (e.g., rape, public reprimands by authority figures).

Culpability ratings were made if the person indicated that they felt responsible for the trauma, or if their symptoms reflect the belief that they are at fault for something occurring.

Intrusiveness ratings were made if traumas/symptoms involved interference, attempted control, or intent to harm the participant by others.

Descriptions

Descriptions of Traumatic Events

Up to five traumatic experiences were recorded for each participant. The experience of traumatic events was ascertained using the CTQ (for detecting childhood abuse and neglect) and the adapted list of traumatic experiences based on the LEC (e.g., bullying, accidents, natural disasters). Experiences of childhood abuse and neglect that scored in the moderate to severe range on the CTQ were included in the coding and analysis. For traumatic experiences that were recorded as present on the adapted LEC, those that met PTSD Criterion A for a traumatic event on the CAPS were also included.

Descriptions of Post-Traumatic Intrusions and Hallucinations

The content of up to five post-traumatic intrusions and up to five hallucinations were recorded for each participant.

Procedure for Coding

The interviewers entered descriptions of 1) traumas, 2) post-traumatic intrusions, and 3) hallucinations onto separate coding sheets so that raters were blind to any associations between these phenomena within participants. Two raters (EH and NP) read the descriptions and first rated each trauma, post-traumatic intrusion and hallucination according to the four themes (threat, humiliation, intrusiveness, culpability). Following this, participants' (1) trauma and hallucinations, and (2) post-traumatic intrusions and hallucinations were matched according to participant identification and raters assessed whether associations were direct ('present' or 'absent'), or thematic (rating 'present' or 'absent' on each of the four themes). To establish interrater reliability, data from 15 randomly selected participants (containing 112 separate descriptions of traumatic events, intrusions and hallucinations) were rated by the two raters. Percentage agreement at the description level was very high: 100% agreement for indicating presence/absence of direct associations; 96% agreement for threat ratings; 96% for humiliation ratings; 100% for culpability ratings; and 97% for intrusiveness ratings.

Results

Rates of Childhood Trauma

Forty-four people (67% of the entire sample) reported the experience of childhood trauma. Thirty-five people (53%) met criteria for childhood abuse or neglect measured by the CTQ. An additional nine participants who had scored below the CTQ threshold described trauma that met PTSD Criterion A during the CAPS interview. Four of these were non-victimisation trauma, and five were victimisation trauma that was under-reported on the CTQ self-report. Twenty-seven percent of the sample met diagnostic criteria for PTSD.

Rates of childhood victimisation trauma by type on the CTQ, and scores on key clinical measures are shown in Table 2.

[TABLE 2 ABOUT HERE]

Of the 44 people who experienced childhood trauma, 36 (82%) experienced hallucinations, and 24 (55%) experienced post-traumatic intrusions in the last two years. Twenty-two (92%) of those with post-traumatic intrusions also experienced hallucinations. Mean number of traumas, hallucinations and post-traumatic intrusions among those with childhood trauma are shown in Table 3.

[TABLE 3 ABOUT HERE]

Number and type of content relationships between trauma and hallucinations within the group with trauma and hallucinations (n=36)

Of the 36 people who experienced trauma and hallucinations, 28 (78%) experienced at least one hallucination that was related to their trauma (directly or thematically). Twelve (33%) experienced at least one hallucination that was directly related to their trauma, 24 (67%) experienced at least one hallucination thematically related to their trauma, and 29 (81%) experienced at least one hallucination with no content relationship to their trauma. Eight people (22%) only experienced hallucinations with content unrelated to their trauma.

The extent to which participants experienced multiple, overlapping types of relationships between the content of their hallucinations and their traumatic experiences is illustrated in Figure 1. The figure shows the proportions of people who experienced at least one of five possible reported hallucinations with direct, thematic and no content relationship to their traumatic experiences, and shows proportions of people who experienced hallucinations with multiple types of these relationships.

[FIGURE 1 ABOUT HERE]

Content Associations Between Trauma, Post-Traumatic Intrusions and Hallucinations

Of the 36 people who experienced trauma and hallucinations, 22 (61%) experienced post-traumatic intrusions. Of these 22 people, 16 (73%) experienced at least one hallucination that was related to their post-traumatic intrusions (directly or thematically). Six people (27%) only experienced hallucinations with content unrelated to their post-traumatic intrusions. Six people (27%) experienced at least one hallucination directly related to their post-traumatic intrusions, 12 (55%) experienced at

least one hallucination thematically related to their post-traumatic intrusions, and 16 (73%) experienced at least one hallucination with no content relationship to their post-traumatic intrusions.

The extent to which participants experienced multiple, overlapping types of relationships between the content of their hallucinations and the content of their post-traumatic intrusions is illustrated in Figure 2. The figure shows the proportions of people who experienced at least one of five possible hallucinations with direct, thematic, and no content relationships to their post-traumatic intrusions, and shows proportions of people who experienced hallucinations with multiple types of these relationships.

[FIGURE 2 ABOUT HERE]

Of the 12 people who experienced hallucinations directly related to their traumatic experiences, eight (67%) experienced post-traumatic intrusions, and six (50%) had intrusions relating to the same traumatic event as their hallucinations.

Examples of post-traumatic intrusions and hallucinations with direct, thematic and/or no content relationship in people with childhood trauma are shown in Table 4.

[TABLE 4 ABOUT HERE]

Of the 36 people with trauma and hallucinations, a total of 222 thematic relationships were identified (between hallucinations and trauma, and hallucinations and post-traumatic intrusions). Of these 222 relationships, percentages for each of the four themes were: 39.2% threat, 32.4% humiliation, 3.6% culpability and 24.8% intrusiveness.

Discussion

Rates of childhood trauma (67%) and PTSD (27%) in the present study are consistent with previous studies of individuals with psychosis (Bonoldi et al. 2013; Hardy et al. 2016) and are notably higher than rates in the general population (Kessler et al. 2005).

This study aimed to explore phenomenological relationships between trauma, hallucinations and post-traumatic intrusions. The first main finding was that of those who experienced trauma and hallucinations, most (67%) experienced multiple types of content relationships (combinations of direct, thematic and no relationship) between their trauma and hallucinations. This suggests that more than one post-traumatic process (i.e., post-traumatic intrusions and trauma-related beliefs) can occur within individuals and potentially give rise to the variety of content relationships observed between trauma and hallucinations. This is in line with well-supported cognitive theories of PTSD (e.g., Ehlers & Clark, 2000), that explain the aetiology of PTSD in terms of co-occurring memory -related

processes (intrusive re-experiencing of trauma) and processes concerning the appraisal of trauma and its sequelae (post-traumatic cognitions and trauma-related beliefs).

The proportion of people in this study who experienced direct (33%) and thematic (67%) relationships between their trauma and hallucinations is in line with the results from the one other study to date that systematically and comprehensively defined and assessed trauma and hallucination content as the primary research aim (Hardy et al., 2005). The results of both studies found more thematic than direct relationships between trauma and hallucinations, indicating that trauma-related beliefs and negative emotion resulting from trauma may play a key role in the development and experience of hallucinations for a large proportion of those who experienced trauma.

The finding that hallucinations with no content relationship to traumatic experiences were the most common type of hallucination in the study (81%) is important and is also in line with Hardy et al.'s (2005) findings. Currently, prominent theories of trauma and psychosis do not incorporate hallucinations with no content relationship. However, recent work has considered the impact of emotion regulation as a psychological mechanism in the relationship between trauma and psychosis. Hardy (2017) theorises that habitual deficits in emotion regulation (characterised by oscillations between hyperarousal and dissociation) leave one vulnerable to intrusive hallucinatory experiences. This is supported by literature noting the mediating role of affect regulation and dissociation in the relationship between trauma and psychosis (e.g. Hardy et al., 2016; Perona-Garcelan et al., 2012). It is possible that emotion regulation deficits following trauma lead to the generation of novel hallucination content, however this requires empirical research. This is reflected within the hypervigilance sub-type of hallucinations proposed by McCarthy Jones and colleagues (2014).

Hallucinations that do not appear related in content to trauma could also be explained within the stress-vulnerability model of psychosis whereby the immediate stress of a post-traumatic intrusion may elicit hallucinations with content unrelated to the trauma (Zubin & Spring, 1977). It also possible that trauma does not exert any etiological influence on the experience of hallucinations or the content of hallucinations. Alternatively, trauma may not serve as a psychological mechanism for the experience of hallucinations for a sub-group of individuals only.

Our results show that individuals can have post traumatic intrusions and hallucinations of the same traumatic event. This provides support for a continuum of a memory intrusion fragmentation, with hallucinations suggesting more fragmentation (Hardy, 2017). This also suggests that for some individuals, memory intrusions are a dynamic process whereby the level of fragmentation can differ with reference to the one traumatic experience. The finding that two individuals experienced direct hallucinations and no post traumatic intrusions of one trauma and post traumatic intrusions and no hallucinations of another trauma also lends support to the continuum theory as two different trauma experiences may have led to different types of memory encoding which lead to different levels of fragmentation. The number of participants in the study who had both hallucinations and post traumatic intrusions with identical trauma content are a small proportion of the whole sample in the

study (6 of 66 = 9%). They are however, an important sub-group, not only because they support theories of the relationship between post-traumatic intrusions and hallucinations, but also because they may constitute the kind of sub-group that is increasingly being looked for in psychosis research and to which precision medicine could be applied. It may be that evidence-based treatments for PTSD will reduce these specific hallucinations more effectively in this group than in those with PTSD and hallucinations with no direct trauma content relationship (Brand, McEnery, Rossell, Bendall, & Thomas, 2018). Whilst research of this specificity does not yet exist, small psychological intervention studies have reported improvements in PTSD symptoms including intrusions, and auditory hallucinations in those with psychotic disorders (Keen, Hunter, & Peters, 2017; Paulik, Steel, & Arntz, 2019).

A limitation worthy to note is that the negative themes present in hallucinations may not necessarily have their origins in traumatic experiences. Given that this study used a clinical sample, the content of hallucinations is likely to be distressing, and the limited number of commonly experienced negative themes present in distressing hallucinations (e.g., threat, humiliation, intrusiveness) are likely to overlap with the themes of trauma. This does not mean that the thematic content of the hallucinations necessarily came from the trauma. A further limitation of the study is potential bias during the content rating process. In order to identify direct links, raters were not blind to participant identification. When conducting the thematic analysis, raters analysed traumatic experiences and hallucination content separately. Only one of the two raters however was an independent third person who had not conducted any participant interviews.

There are important clinical implications that come from these findings. Firstly, the high rates of childhood trauma and PTSD found in this study echo previous calls for routine assessment of childhood trauma and PTSD in clinical services for young people with first episode psychosis (Bendall et al. 2012; Bendall et al. 2013; Hardy, 2017; National Institute for Health and Care Excellence (NICE), 2014). This means that clinicians should have sufficient training in conducting trauma and PTSD assessments and be able to offer the appropriate psycho-education and support for clients affected by these issues (Bendall et al. 2018; Gairns et al. 2015; Galletly et al., 2016; National Institute for Health and Care Excellence (NICE), 2014; Tong et al. 2017). Secondly, the notable proportion of people with hallucination content related in some way to traumatic experiences suggests that clinical assessment and formulation of hallucinations requires consideration of how past traumatic events may be contributing to hallucinatory experience. Finally, therapeutic interventions that target both trauma symptoms and hallucinations can be utilised to better understand the mechanisms through which trauma can lead to and influence the content of psychotic symptoms including hallucinations (Brand, Rossell, Bendall, & Thomas, 2017).

In summary, the current study demonstrated that in a group with first episode psychosis, hallucination content can be related to traumatic experiences and post-traumatic intrusions in multiple

ways, suggesting that multiple post-traumatic processes may be implicated in the aetiology and maintenance of hallucinations in those with trauma.

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Table 1

Demographic and diagnostic information for sample (*n* = 66).

Descriptive		
Age (years)	*M* = 20.18, *SD* = 2.69	
Time in specialist early psychosis treatment (months)	*M* = 11.15, *SD* = 7.40	
	n	Percentage (%)
Born in Australia	59	89.4
Gender identification		
Male	28	42.4
Female	36	54.5
Transgender	2	3.0
Ethnicity		
Caucasian	46	69.7
Asian	4	6.1
African	3	4.5
Aboriginal or Torres Strait Islander	3	4.5
Other	10	15.2
Years of completed education		
Year 9 or below	8	12.1
Year 10	8	12.1
Year 11	15	22.7
Year 12	35	53.0
Occupational status		
Not working/studying	25	37.9
Part-time work/study	22	33.3
Full-time work/study	19	28.8
Primary diagnosis		
Schizophrenia/Schizophreniform disorder	17	25.8
Schizoaffective disorder	19	28.8
Psychotic disorder NOS	9	13.6
Brief psychotic disorder	2	3.0
Delusional disorder	2	3.0
Substance-induced psychotic disorder	6	9.1
Bipolar I disorder with psychotic features	10	15.2

Major depressive disorder with psychotic features	1	1.5
Personality disorder		
Borderline personality disorder	5	7.6
Medication use in last 6 months		
Antipsychotic	40	60.6
Antidepressant	12	18.2
Mood stabilizer	3	4.5
Other	1	1.5
No medication	10	15.2
Family history of mental illness		
Present	39	59.1
None	15	22.7
Unknown	12	18.2
First degree relative with severe mental illness	8	12.1

Table 2

Frequency of childhood trauma by type and scores on psychosis and trauma measures (n = 66)

Trauma Subtype (CTQ)	***n* (%)**
Emotional Abuse	23 (34.8)
Physical Abuse	12 (18.2)
Sexual Abuse	16 (24.2)
Emotional Neglect	16 (24.2)
Physical Neglect	16 (24.2)
Any Trauma	35 (53.0)
Polytraumatisation*	21 (31.8)

Measure	***M* (SD)**	***Range***
CTQ Emotional Abuse	11.35 (5.55)	5-25
CTQ Physical Abuse	7.53 (3.46)	5-19
CTQ Sexual Abuse	7.42 (5.00)	5-25
CTQ Emotional Neglect	7.32 (5.14)	5-25
CTQ Physical Neglect	6.15 (3.80)	5-22
CTQ Total	46.77 (18.58)	25-108
PANSS-Positive	11.73 (4.02)	7-22
PANSS-Negative	11.61 (4.40)	7-25
PANSS-General	26.03 (6.97)	16-47
PANSS-Total	49.64 (13.09)	31-86
CAPS-Intrusions	5.58 (8.36)	0-35
CAPS-Avoidance	10.42 (12.40)	0-43
CAPS-Hyperarousal	7.55 (8.87)	0-29
CAPS Total	23.55 (26.52)	0-91
PTCI	113.42 (49.04)	36-221

*Note. *More than one trauma type reported.*

CTQ = Childhood Trauma Questionnaire;

PANSS = Positive and Negative Syndrome

Scale; CAPS = Clinician Administered PTSD Scale; PTCI = Post-Traumatic Cognitions Inventory.

Table 3

Number of traumas, hallucinations and post-traumatic intrusions experienced by those with childhood trauma (n = 44)

	Mean (SD)	Range
Traumas	3.36 (1.38)	1-5
Hallucinations	2.84 (1.84)	0-5
Post-Traumatic Intrusions	0.95 (1.10)	0-4

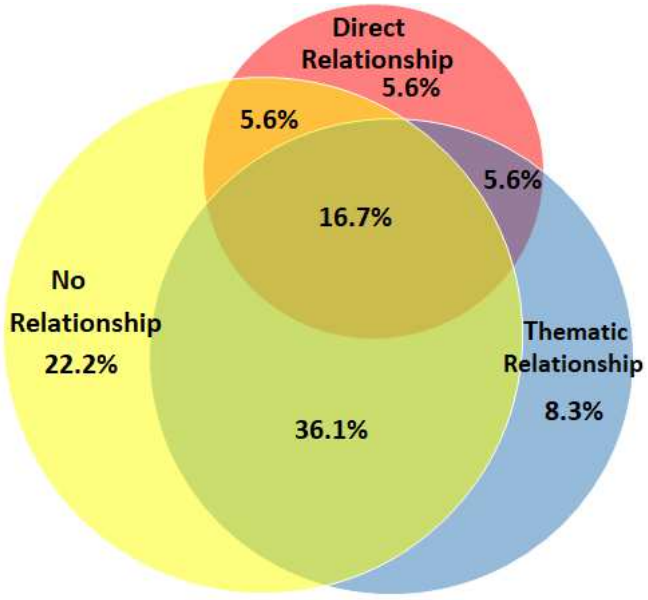

Figure 1. Proportions of people with childhood trauma and hallucinations (n = 36) whose hallucination content was directly, thematically, and/or not related to their trauma.

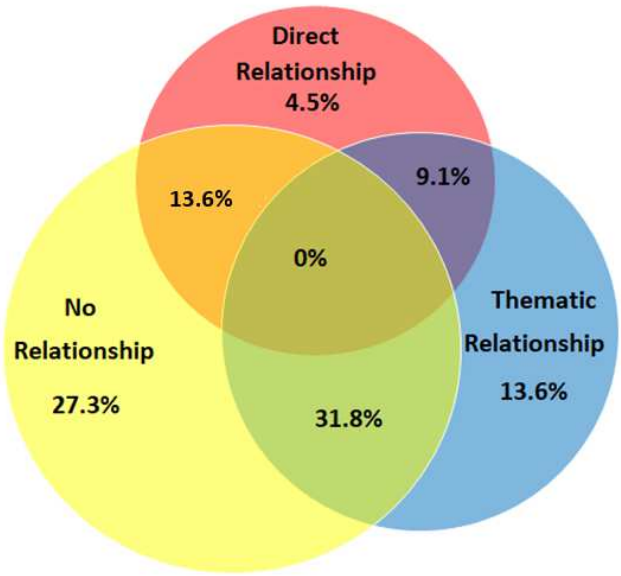

Figure 2. Proportions of people with childhood trauma, hallucinations and post-traumatic intrusions (n = 22) whose hallucination content was directly, thematically, and/or not related to their post-traumatic intrusions.

Table 4.

Examples of Post-Traumatic Intrusions and Hallucinations with Direct, Thematic and/or No Content Relationship in People with Childhood Trauma

Participant	Trauma	Post-Traumatic Intrusion	Hallucination Type		
			Direct	Thematic	None
1	When I was 13, my mum's friend took me to a hotel room where a man was waiting for us. Mum's friend went into the other room and the man pushed me up against the wall and touched me and **fingered my vagina**.	I sometimes have flashbacks of being in the hotel room. I see and hear everything that was happening when I was in there – the man's face, him pushing me up against the wall and **fingering my vagina.**	I feel like there are hands touching me all over and **touching my vagina**.	----	----
2	My mother's ex-boyfriend was often out of control with alcohol and drugs. Was very physically abusive towards her – I witnessed this all the time. I was scared he would hurt me too.	I've had flashbacks of times when mum's ex-boyfriend beat her up. I felt like I was there and it was happening all over again.	----	I hear three voices, all males, telling me to hurt myself	----

3	I was in a very bad relationship with my ex-partner for a year. He controlled everything I did. He would often threaten me and my family. He would force me to do things I didn't want to do, for example to have sex with him, or eat when I didn't want to eat.	I have memories come into my head of things that my ex-partner did when he forced me to do things I didn't want to, for example have sex with him. I get very upset when this happens.	----	----	I hear voices, different random voices usually of people I know just saying random things, for example hearing my brother calling my name.
4	Dad was always drunk when I was growing up – he would **beat me up all the time.** He hit, kicked and strangled me.	**Images of my dad** are always there in my mind – **physically attacking** me and beating me up.	I have continual **visions of a man who looks almost identical to my father** – same height, hair colour, eye colour, and the face is almost exactly the same. The man that I see **attacks and hurts people** around me.	The man that I see tells me to hurt and kill myself.	----
5	When I lived in student accommodation I was sexually	I have nightmares of the sexual assaults where it	----	I hear a male voice saying "hurt yourself"	I hear mumbling voices, it was hard to make out

	assaulted by a total of 6 different guys on a few different occasions. There was a lot of drug use going on and a lot of stuff like this was happening there. I had taken drugs too each time so it's hard to remember details.	feels like I'm reliving it again in my dreams.			what they were saying
6	Dad often punished me physically, very badly. He used different things like belts, anything that would hurt me. He always yelled at me and called me '**useless**' and '**ugly**' and told me I'd never amount to anything.	I have a lot of nightmares and bad memories that won't go away of Dad belting me, and yelling at me, calling me **useless.**	I hear lots of voices in my head, yelling at me. Sometimes some of them sound a bit like my dad, they tell me that I'm **ugly**. I had to stop working because they criticised everything I did – I was just trying to work and they would be yelling "What the hell are you doing, you're **useless**" at me.	----	The voices that I hear scream my name over and over.
7	My mother was very physically abusive. She hit me, slapped me, pulled my hair	----	I hear three male voices, always critical and negative. They say **"you're**	The voices say "Go kill yourself" and other things like "Go walk in front of	The voices snicker and cackle and tell me stories about death and murder.

whenever I did the slightest thing wrong and made me feel horrible for doing it. She called me names like “stupid”, “useless”, **“hopeless”, “pathetic”.**		**pathetic”, “you’re hopeless”.**	that car”.