A comparison of hallucinatory experiences and their appraisals in those with and without mental illness

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A B S T R A C T

Few studies have compared the content and appraisal of hallucinatory experiences (HE) by people with psychosis and those without. This study compared the characteristics of HE, and their appraisals, in individuals with psychotic disorder, non-psychotic mental disorder and no disorder in the general population. Participants ($n = 253$) aged between 30–33 years who reported HE were recruited from a birth cohort and assessed for lifetime diagnoses of mental disorders. They were allocated to groups based on their diagnosis and their HE were rated to assess their form, content and associated appraisals. Compared to those with no mental disorder, participants with a psychotic disorder had almost twelve times the odds of appraising their HE as distressing and dangerous and nine times the odds of experiencing recurrent HE. Those with a non-psychotic disorder had more than twice the odds of recurrent HE compared to those with no disorder. Overall, HE showed more similarities than differences across the diagnostic groups. Negative appraisals of HE and their recurrence differentiated clinical from non-clinical populations. Screening for HE and assessment of their associated appraisals is essential in those seeking care for mental health difficulties. Interventions aimed at modifying maladaptive appraisals can assist in reducing hallucination related distress.

1. Introduction

Hallucinatory experiences (HE) occur across a range of psycho-pathological and neurological disorders and also in the general population. To date few studies have compared the attributes and appraisals of HE in different diagnostic groups. Exploration of the specific characteristics of HE across these different contexts can inform identification of "hallucination signatures" differentiating experiences requiring treatment from those that don't (Larøi et al., 2012). In relation to HE, key determinants for care may include negative emotional affect, their interpretation, and maladaptive appraisals (Johns et al., 2014).

Studies comparing clinical versus non-clinical HE have examined differences and similarities between these two groups in terms of age of onset, duration, frequency, emotional content, distress and controllability (Baumeister et al., 2017; Daalman et al., 2011; Honig et al., 1998; Leudar et al., 1997; Líndal et al., 1994; Peters et al., 2016, 2017; Waters and Fernyhough, 2017). Compared to those without psychosis,

persons meeting criteria for psychotic disorder were more likely to have an older age of onset (late adolescence), HE of longer duration and greater frequency, and reduced control over the experience. Waters & Fernyhough (2017) conducted a systematic review of 43 studies examining similarities and differences in HE between clinical and non-clinical groups. The main identified differences were non-clinical groups were more likely to experience positive voices and interpret their HE as positive.

Studies have also examined the role of (maladaptive) appraisals. Distress associated with HE and need for care are strongly influenced by the manner in which HE are appraised. While some HE involve critical and abusive voices which are undoubtedly negative, it has been proposed that maladaptive appraisals are the source of distress rather than the HE *per se* (Chadwick and Birchwood, 1994; Peters et al., 2012). Consequently, some hallucination content is not necessarily objectively "negative" or "positive" but rather appraised as such. This is consistent with cognitive models of the development of psychosis which propose

perceiving voices as having malevolent intent (Birchwood and Chadwick, 1997) and as personally significant and uncontrollable (Garety et al., 2001) results in a need for care. These cognitive processes are synergistically entwined with negative emotions and maladaptive coping styles further exacerbating distress and impairment caused by HE (Johns et al., 2014; Smith et al., 2006).

A small number of studies (Brett et al., 2014; Gaynor et al., 2013; Langer et al., 2015; Morrison et al., 2004) have explored differences in appraisals of HE between those living with and without psychosis. Those with sub-clinical psychotic experiences were more likely to appraise their experiences as benign, positive, and controllable (Brett et al., 2007), have less hallucination-related distress (Gaynor et al., 2013), and lower levels of negative beliefs about HE (Morrison et al., 2004). By contrast, participants with psychosis had more anxiety associated with their HE (Langer et al., 2015), higher levels of negative interpretations and threat based appraisals (Gaynor et al., 2013), and perceived them as personalised and caused by an external agency (Brett et al., 2007).

Selection of study samples is a key limitation of previous comparative studies. Recruitment of non-clinical participants from special interest groups of voice hearers or people interested in supernatural phenomena may result in participants being more likely to perceive HE positively or have peers who positively influence appraisals of HE. Similarly, recruitment of participants with a psychotic disorder relies on those who are help seeking and receiving mental health care. Consequently, there have been few, if any, comparisons of HE amongst those with and without mental illness recruited from the general population.

1.1. Aims of the study

We aimed to compare HE and their appraisals in three groups: people with a psychotic disorder, individuals with a non-psychotic mental disorder, and those with no disorder. Based on previous findings, we predicted that HE in those with a mental disorder (psychotic or non-psychotic) would be more likely to be (1) recurrent, (2) more distressing and (3) appraised as being more negative and threatening than HE in those who did not have a mental illness.

2. Methods

2.1. Participants

Participants were 253 individuals aged 30–33 years from the Mater-University of Queensland Study of Pregnancy (MUSP), a birth cohort study of mothers and their offspring who received antenatal care at the Mater Misericordiae Mothers' Hospital, a major public hospital in Brisbane, Australia, between 1981 and 1984 (Najman et al., 2015). Participants were selected at age 30–33 years on the basis of (i) having reported HE during one of the data collection phases (as measured by a positive response to questions regarding auditory or visual HE on the Youth Self-Report (Achenbach, 1991) when they were 14 years and/or the Young Adult Self-Report (Achenbach, 1997) when they were 21 years, or having reported HE on the CIDI at 30 years) or (ii) if they met the CIDI criteria for a diagnosis of a psychotic disorder at one of the data collection phases (Connell et al., 2016). These participants were approached for a study assessing emotional wellbeing and quality of life in adulthood of those who experienced HE as adolescents (see Connell et al., 2016). Of the 952 participants interviewed for the study, 253 (31% males and 69% females) met criteria for experiencing life time HE as assessed by clinicians using the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I). Of these, 43 (17.0%; 19 males, 24 females) did not meet criteria for any life time mental disorder, 16 (6.3%; 7 males, 9 females) were diagnosed with a psychotic disorder, and 194 (76.7%; 53 males, 141 females) received a diagnosis of a non-psychotic mental disorder.

2.2. Measures

The SCID-I is a semi-structured interview used to establish lifetime diagnoses of DSM-IV Axis I disorders and can be used to provide symptom ratings as either absent, subthreshold, or threshold. The B module assesses psychotic and associated symptoms and has questions examining HE in auditory, visual, tactile and olfactory modalities. The B module assesses psychotic and associated symptoms and has specific questions examining HE in auditory, visual, tactile and olfactory modalities. For example, to assess lifetime experience of auditory hallucinations the participant is asked "Did you ever hear things that other people couldn't, such as noises, or the voice of people whispering or talking?" In order to meet the criteria for a HE, the individual needed to be clearly awake, not intoxicated, and certain they are experiencing a sensory perception in the absence of external stimuli (those HE attributed to a medical condition were also excluded).

The AANEX is a semi structured interview and inventory with demonstrated reliability for measuring psychotic experiences (Brett et al., 2007). It has been adapted for use in the present study to assess a range of characteristics pertaining to HE (See Appendix A for details of the AANEX). Variables assessed for reported lifetime HE were: number of modalities, recurrence, duration, age of onset, and the content of the hallucination involving a deceased family member.[1] The characteristics pertaining to appraisals of the hallucination experienced most often and/or for longest duration were: perceived controllability, external agency, whether the hallucination was perceived as positive, framework of interpretation, dangerousness, distress, negative affect, and negative valence. These domains were rated using a Likert scale with scores ranging from 1–3 with one indicating minimal to no disturbance and three indicating a moderate to strong disturbance or degree of difficulty in each of the domains associated with the HE. The external agency variable assessed if HE were a result of something external to the individual or if they were a result of a change within the person. The interpretive framework of the experience was rated based on the predominant explanatory context (e.g. supernatural, spiritual). For those who reported multiple HE, ratings were made on the hallucination that was experienced most often, or if there were HE experienced with equal frequency, then the longest in duration. Each participant received only one score on each variable. Scoring was guided by the instructions in the AANEX scoring manual (Brett et al., 2007).

2.3. Procedure

Participants completed either a face-to-face or phone administered clinical interview. Interviews were administered by clinical psychologists and clinical psychology registrars with experience and training in interviewing those with psychotic disorders. Raters undertook training in administration of the SCID and were required to meet criteria of 95% diagnostic agreement with SCID training interviews before interviewing the MUSP participants. Interviewers were required to participate in regular group meetings with J.S. and M.C. in which ratings were reviewed and complex presentations discussed. All interviews were audio recorded and random audits were undertaken by M.C. to ensure adherence to the protocol and accuracy of ratings made.

Interviewers had instructions to probe participants for full descriptions of HE (e.g. frequency, duration and a detailed account with prompts given to obtain information pertaining to the variables contained in the ratings guide) and information regarding their appraisals of the experience. Reports of HE were transcribed from the audio recordings. MC and RS are both clinical psychologists with expertise in the assessment of psychotic experiences and rated the transcriptions

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[1] This variable was included based upon previous research that identified an association between HE and a situation of mourning in non-clinical populations (Stanghellini et al., 2012)

using the adapted version of the AANEX. Both raters were blind to participants' diagnostic group status. Independent ratings of 20% of the reports were compared with any differences in ratings adjusted according to consensus until a kappa of 0.8 was obtained for all ratings on variables. The remainder of the ratings were conducted by MC.

2.4. Diagnostic groups

Participants were allocated to groups based on their diagnosis. Participants who received a diagnosis of a psychotic disorder (schizophrenia, schizoaffective disorder, substance induced psychotic disorder and psychotic disorder NOS) comprised the 'psychotic disorder' group. Those who received a diagnosis of any other Axis I mental disorder were allocated to the 'non-psychotic mental disorder' group. Participants who did not receive a diagnosis were assigned to the 'no disorder' group.

2.5. Statistical analyses

Correlations among the AANEX items were assessed using a polychoric correlation, the preferred technique for categorical or likert-scale variables (West et al., 1995). We first calculated the matrix of polychoric correlations among all possible appraisal characteristics. The correlations clearly showed a strong association between the variables dangerousness, distress, negative affect and negative valence which all had correlations of > 0.9 while none of the other variables were strongly associated. Negative affect and negative valence were excluded from the regression analyses as they had levels with null scores and we combined distress and dangerousness into one variable due to the multicollinearity of these variables.

A chi-squared test of independence was performed to examine the relationship between the HE variables and diagnostic group. Significant differences between those with a psychotic disorder, a non-psychotic mental disorder and no disorder in the HE variables were then analysed using univariable multinomial logistic regression to assess the relationship between HE variables and diagnostic group membership using "no disorder" as the reference group. We then ran a multivariate multinomial regression model including all significant HE variables from univariate analyses, adjusting for gender, and using a backwards elimination strategy whereby non-significant variables were removed one at a time. This left the variables *recurrence of HE, duration* and *distress/dangerousness* in the final regression model.

3. Results

As shown in Table 1, there were significant differences between the experiences of the HE in the three diagnostic groups involving the recurrence and duration of the HE and the way in which the HE were appraised. Using the chi squared test of independence, those with psychotic disorder were more likely to experience HE recurrently, for longer duration and appraise the HE negatively compared to those in the other groups (Table 1). There were also similarities in the characteristics of the HE experienced in the three groups. The total number of modalities in which HE occurred and age of onset did not differ between groups. Although participants with no disorder had higher rates of HE with content involving a deceased family member (39.5%) than those with a clinical diagnosis (18.7% for psychotic disorder and 23.2% for a non-psychotic mental disorder), this did not reach significance. The majority of participants in the no disorder or non-psychotic disorder groups interpreted their HE as supernatural experiences.

Compared to those with no diagnosis, participants diagnosed with psychotic disorder were significantly more likely to experience their HE recurrently and appraise their HE as being dangerous and distressing (Tables 2 and 3). In the multivariate gender adjusted analyses, participants with a psychotic disorder had almost 12 times the odds of experiencing the HE as moderate-strongly distressing or dangerous

compared to those HE experienced by individuals with no life time diagnosis of a mental disorder (OR, 11.75; 95% CI, 1.18–117.08). Compared with participants with no diagnosis, those with psychotic disorder had 9 times the odds (OR, 9.58; 95% CI, 1.00–91.44), and those with a non-psychotic disorder had more than twice the odds (OR, 2.52; 95% CI, 1.10–5.73) of experiencing recurrent HE (five or more times).

4. Discussion

This is the first study to conduct a detailed phenomenological comparison of hallucinations and their appraisals in different diagnostic groups recruited from a general community population sample. Furthermore, this is the first study to compare hallucinations in people with no disorder, a psychotic disorder and non-psychotic mental disorder. Consistent with previous research (Brett et al., 2007; Daalman et al., 2011; Honig et al., 1998) and the proposed hypotheses, we found those with a psychotic disorder were more likely to experience recurrent HE, of longer duration, and were more likely to appraise HE negatively and experience high levels of distress compared to those without a mental disorder. Unlike previous studies, there was no difference in age of onset and level of control between the three groups. The majority of people who did not have a mental illness experienced HE on less than five occasions in their life time. Further, no participant in the psychotic disorder group appraised their HE as positive and similarly, none had HE with an absence of negative affect and negative valence. Most of those with no disorder or a non-psychotic disorder reported no or minimal distress. Overall, the large majority of the two non-psychosis groups showed an absence of negative appraisal and although they may not have reported the experience as positive, it could be considered slightly/mildly negative or neutral at worst.

These findings extend existing knowledge on HE experienced in the general population. Previous reports of a greater balance of positive than negative voices in non-clinical participants (Daalman et al., 2011; Honig et al., 1998) were not directly supported as the only participants to appraise their HE as positive were a small minority in the no disorder and non-psychotic disorder groups. However, the absence of positive appraisal does not imply the experiences were negative overall indicating that these experiences may sometimes be more complex and not neatly divided into positive or negative categories. Recruitment from the general community rather than defined self-selected populations such as voice hearers and clairvoyant groups who might be more inclined to experience their HE positively may also explain the lower frequency of positive ratings of HE. Other novel findings included the overwhelming majority of HE in all groups were interpreted as supernatural phenomena, and the majority of HE reported by those without a psychotic disorder were visual. This supports an earlier observation that other modalities of HE may be as common as voices in non-clinical groups (Waters and Fernyhough, 2017), a theoretical explanation for which is still lacking. The interpretation of most HE as supernatural is an interesting finding that can be best understood through a cultural anthropology framework. Supernatural beliefs are common in the general population and are considered to be universal across cultures (Cassaniti and Luhrmann, 2011). Anomalous experiences such as HE are perceived through a complex interplay of bodily sensation, expectation, personal factors and cultural contexts (Cassaniti and Luhrmann, 2014).

Diagnosis of a psychotic disorder being associated with higher levels of threat based appraisals and negative affect is consistent with previous studies (Daalman et al., 2011; Gaynor et al., 2013; Honig et al., 1998; Morrison et al., 2004). Maladaptive appraisals were associated with higher levels of negative affect and distress and a diagnosis of a psychotic disorder. Cognitive theories propose information processing biases such as the jumping to conclusions, personalising appraisals, and an attentional bias towards threat based stimuli are implicated in distress associated with HE (Underwood et al., 2016).

Table 1
Associations[a] between diagnostic groups and descriptions and appraisals of hallucinations.

Hallucination variables[b]		No disorder n (%)	Psychotic disorder n (%)	Non-psychotic disorder n (%)	χ^2	P
Number of modalities all hallucinations experienced in	1	29(67.4)	4(25.0)	97(50.3)		
	2	10(23.3)	9(56.2)	60(31.1)		
	3	3 (7.0)	2(12.5)	30(15.5)		
	4	1 (2.3)	1 (6.3)	6 (3.1)	10.88	0.09
Recurrence (number of lifetime hallucinations)	Once	16(37.2)	1 (6.2)	37(19.1)		
	2–4 times	11(25.6)	2(12.5)	54(27.8)		
	5 or more times	16(37.2)	13(81.3)	103(53.1)	**13.05**	**0.01**
Duration of longest hallucination	< 3 s	14(32.6)	1 (6.2)	49(25.3)		
	3–60 s	23(53.5)	4(25.0)	106(54.6)		
	>1 min	6(13.9)	11(68.8)	39(20.1)	**23.04**	**<0.01**
Age of first hallucination	<12 years old	8(18.6)	4(25.0)	68(35.1)		
	12–21 years old	18(41.9)	4(25.0)	47(24.2)		
	>21 years old	17(39.5)	8(50.0)	79(40.7)	7.63	0.11
Deceased family member in content of hallucination	No	26(60.5)	13(81.2)	149(76.8)		
	Yes	17(39.5)	3(18.7)	45(23.2)	5.35	0.07
Modality of most prominent hallucination	Auditory	10(28.2)	11(68.8)	55(28.3)		
	Visual	24(55.8)	3(18.8)	110(56.7)		
	Tactile	9(21.0)	2(12.4)	18 (9.3)		
	Olfactory	0	0	11 (5.7)	**20.31**	**<0.01**
Multimodal (were any hallucinations in >1 modality)	No	36(83.7)	11(68.7)	150(77.3)		
	Yes	7(16.3)	5(31.2)	44(22.68)	1.66	0.44
Perceived controllability	Total control	0	0	0		
	Moderate-small degree of control	2 (4.7)	0	6 (3.1)		
	Minimal-no control	41(95.3)	16(100.0)	188(96.9)	0.84	0.66
External agency (was the hallucination perceived as externally caused?)	Entirely due to internal factors	0	0	1 (0.5)		
	Balance of internal- external factors	8(18.6)	3(18.7)	22(11.3)		
	Mostly-entirely due to external factors	35(81.4)	13(81.3)	171(88.1)	2.40	0.66
Was the most prominent hallucination positive?	No	32(74.4)	16(100.0)	156(80.4)		
	Yes	11(25.6)	0	38(19.6)	4.91	0.09
Framework of interpretation of most prominent hallucination	Biological	1 (2.3)	0	8 (4.1)		
	Psychological	1 (2.3)	4(25.0)	17 (8.8)		
	Drug related	0	2(12.5)	1 (0.5)		
	No interpretation	4 (9.3)	0	21(10.8)		
	Spiritual	3 (7.0)	2(12.5)	13 (6.7)		
	Supernatural	33(76.7)	7(43.8)	129(66.5)		
	Normalising	1 (2.3)	0	3 (1.5)		
	Other people	0	1 (6.3)	2 (1.0)	**35.14**	**<0.01**
Perceived dangerousness of most prominent hallucination	Completely harmless	15(34.9)	1 (6.2)	54(27.8)		
	Slight-mildly dangerous or harmful	23(53.5)	7(43.8)	104(53.6)		
	Moderate-strongly dangerous or harmful	5(11.6)	8(50.0)	36(18.6)	**12.89**	**0.01**
Distress associated with the most prominent hallucination	No distress at all	14(32.6)	1 (6.2)	49(25.3)		
	Slight-mild distress	20(46.5)	4(25.0)	95(49.0)		
	Moderate-overwhelming distress	9(20.9)	11(68.8)	50(25.7)	**15.71**	**<0.01**
Negative affect associated with most prominent hallucination	No negative feelings	15(34.8)	0	48(24.7)		
	Slight-mild negative feelings	19(44.2)	6(37.5)	94(48.5)		
	Moderate-strong negative feelings	9(20.9)	10(62.5)	52(26.8)	**13.83**	**<0.01**
Negative valence (overall negative appraisal of the most prominent hallucination)	Not negative at all	13(30.2)	0	47(24.2)		
	Slightly-mildly negative	22(51.2)	5(31.2)	91(46.9)		
	Moderately-strongly negative	8(18.6)	11(68.8)	56(28.9)	**15.65**	**<0.01**

[a] Associations were assessed using chi squared test of independence.
[b] See Appendix A for detailed information as to how the hallucinations were rated for each of the variables.

4.1. Strengths and limitations

Strengths of this study include recruitment of participants from a birth cohort and use of clinically defined criteria for HE assessed by trained clinical psychologists. Limitations include the low number of participants in the psychotic disorder group (n = 16) reducing power to detect significant differences. This has increased the risk of type II errors, the reporting of null findings when a difference does exist. Also ratings were based on transcriptions of audio recordings of the interviews so there may have been instances where follow up questions to gather more information to ensure correct ratings were not possible. Furthermore, appraisal ratings were based only on the most frequent or longest hallucination therefore excluding the range of different HE a person may experience in their lifetime. Additionally, the sample were

Table 2
Univariable multinomial associations between diagnostic groups and hallucinations [expressed in OR with 95% Confidence Intervals (CI)].

Hallucination variables		Non-psychotic disorder/No disorder HYPERLINK \l "tb2fn1" [a]		Psychotic Disorder/No Disorder[a]	
		OR (95% CI)	*p*	OR (95% CI)	*p*
Duration	< 3 s	(ref)			
	3–60 s	1.32 (0.62–2.76)	0.47	2.44 (0.24–24.04)	0.45
	>1 min	1.86 (0.65–5.28)	0.25	**25.67 (2.68–245.84)**	**<0.01**
Recurrence of hallucinations	once	(ref)			
	2–4 times	2.12 (0.86–5.09)	0.09	2.91 (0.23–36.16)	0.41
	5 or more times	**2.78 (1.26–6.12)**	**0.01**	**13.00 (1.51–111.46)**	**0.02**
Distress/dangerousness	None	(ref)			
	Slight-mild	1.10 (0.49–2.47)	0.81	1.91 (0.19–19.20)	0.58
	Moderate-strong	1.60 (0.61–4.21)	0.34	**13.44 (1.45–124.86)**	**0.02**

[a] The reference group was no disorder.

all young adults. We were unable to accurately obtain specific age of onset information and therefore used broad categories which may have undermined our ability to replicate the findings of previous studies regarding earlier age of onset for non-clinical HE. Some phenomenological aspects of the HE may be a reflection of the diagnostic categories (psychotic disorder, non-psychotic mental disorder and no disorder) in which the participants were grouped. For example participants who experience recurrent hallucinations of longer duration would be more likely to meet diagnostic criteria for psychotic disorder. However, the novel findings of differences in the appraisal of the HE are not part of the diagnostic criteria of psychosis or any other disorder. Finally, this study did not consider the influence of cultural norms on appraisals (Luhrmann et al., 2015).

4.2. Clinical implications

There are important clinical implications arising from these findings. Threat based appraisals and negative affect were more likely to occur in those with a diagnosis of a psychotic disorder but were also present in some who did not have a diagnosable mental illness. Psychological interventions that target maladaptive appraisals and build strategies for affect regulation can play an important role in reducing the distress associated with HE regardless of diagnosis (Garety et al., 2001; Garwood et al., 2015; Morrison et al., 2004; Van Rossum et al., 2011). Such interventions may help those individuals who are experiencing HE to manage them more effectively and thus prevent further distress. This may reduce the pharmacotherapy prescribed to some individuals with a concurrent reduction in iatrogenic harm and improved psychological strategies to manage these experiences.

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Declaration of interest

None.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2019.01.079.

Appendix A. MUSP hallucinations ratings guide (incorporating AANEX—CAR)

Variables for lifetime hallucinations

1. Number of modalities
Total number of modalities in which participant has experienced hallucinations

2. Recurrence
Total number of times hallucinations experienced

3 = 5 times and over
2 = 2–4 times
1 = once

3. Duration
Length of longest experience

3 = > 1 min
2 = 3–60 s
1 = <3 s

4. Age of first hallucination

3 = >21 years

Table 3
Multivariable multinomial associations between diagnostic groups and hallucinations adjusted for gender [expressed in OR with 95% Confidence Intervals (CI)].

Hallucination variables		Non-psychotic disorder/No disorder[a]		Psychotic disorder/No disorder[a]	
		OR (95% CI)	*p*	OR (95% CI)	*p*
Duration	< 3 s	(ref)			
	3–60 s	1.23 (0.57–2.68)	0.60	1.75 (0.16–8.51)	0.64
	>1 min	1.55 (0.5–4.73)	0.45	10.37 (0.96–111.61	0.05
Recurrence of hallucinations	Once	(ref)			
	2–4 times	2.0 (0.82–4.92)	0.13	2.84 (0.21–38.92)	0.43
	5 or more times	**2.52 (1.1–5.73)**	**0.03**	**9.58 (1.00–91.44)**	**0.05**
Distress/dangerousness	None	(ref)			
(Ref no distress/dangerousness)	Slight-mild	1.06 (0.45–2.49)	0.89	2.16 (0.20–23.56)	0.52
	Moderate-strong	1.58 (0.58–4.31)	0.36	**11.75 (1.18–117.08)**	**0.04**

[a] The reference group was no disorder.

2 = 12–21 years
1 = <12 years

5. Hallucinations associated with a deceased family member?

Has the participant ever experienced hallucinations such as seeing or hearing a deceased family member or having a hallucination in conjunction with their death?

Yes/no

Rules for rating appraisals of multiple hallucinations

- One set of scores on each variable below is given for each participant.
- If there are >1 hallucinations, choose the one with the *highest frequency*. If there are hallucinations of equal frequency, choose the one with the *longest duration*.
- If hallucinations combine positive and negative experiences, choose the most *predominant*.

If participant reports experiencing high levels of distress, negative affect, etc. at the time of the hallucination but has since revised their appraisal, base ratings on the appraisals made at the time of the experience.

6. Modality of hallucination

○ Auditory
○ Visual
○ Tactile
○ Olfactory

7. Multimodal

Did the experience involve >1 modality?
Yes/no

8. Perceived controllability

This factor reflects the degree of control the individual perceived that they had over whether the experience occurred or not. E.g., whether the individual deliberately elicited the experience or could stop it

3 = Minimal—no control over experience
2 = Moderate—small degree of control
1 = Entirely within the person's control (may have deliberately elicited the experience, can stop it when desired)

9. External agency

Does the person view the experience(s) as essentially having been caused by something internal i.e. changes within them, or something external i.e. changes outside of them?

3 = Mostly—entirely attributed to external source
2 = Predominantly internal—balance of internal and external factors
1 = Entirely due to internal factors

10. Is the experience perceived as positive?

Participant is asked if they would regard the hallucination as generally positive (e.g. pleasant, constructive or beneficial)?
Yes/no

11. Framework of interpretation

Predominant explanatory framework

Biological: For interpretations in terms of illness, disorder, or any material, internal attribution of cause: e.g. 'something wrong'; 'my neurological system'; 'my brain unbalancing'.

Psychological: For interpretations in terms of mental processes, or any nonmaterial, internal attribution of cause, with the exclusion of spiritual or religious processes: e.g. 'It's to do with me detaching from that situation'; 'it's just a mind fuck I got into'; 'It's my mind playing tricks on me'.

Drug related: For interpretations that cite the use of drugs as being relevant: e.g. 'It might be to do with my having taken so many drugs over the last 7 years'; 'I think having those experiences on drugs made me more likely to see these things'.

No interpretation: When no interpretation is offered at all, or the person says: 'I didn't know' or 'I wasn't sure what it was'.

Spiritual: For interpretations in terms of spiritual or religious processes, where the experiences are seen as having an intrinsic spiritual value of some kind*: e.g. 'It was an awakening experience'.

Supernatural: For interpretations in terms of non-material entities or forces: e.g. 'I could feel the hands of invisible beings on my back'.

Normalising: For interpretations in terms of the normal, natural range of human capacities, experiences or processes. e.g. 'I just thought they were like episodes of ESP …you know…'cos probably in our lifetime we have quite a few of those…so it's no big deal, everybody probably has…'.

Other people: For interpretations in terms of other people causing the experiences/ i.e. paranoid/conspiracy interpretations.

*nb: where 'spiritual' is defined as: transcending material reality; to do with some higher order or force; to do with the search for meaning in life or self-actualisation.

12. Dangerousness

Does the person view the experience(s) as potentially or actually dangerous or harmful?

3 = Moderately—strongly dangerous or harmful
2 = Slight—mildly dangerous or harmful
1 = Completely harmless

13. Distress

This is rated on the basis of probes enquiring about how upset, worried or fearful the person had been in response to the experience

3 = High—overwhelming degree of distress
2 = Slight—moderate distress
1 = No distress at all

14. Negative affect

This is rated on the basis of probes enquiring about 'bad feelings' or unpleasant emotions pertaining to the experience

3 = Moderate—strong negative feelings
2 = Slight—mild negative feelings
1 = No negative feelings at all

15. Negative valence

These scores should be derived from the information given in response to the 'Framework of Interpretation' probes, and the specific probes.

Does the person perceive the experience to be negative overall?

3 = Moderately—strongly negative
2 = Slightly—mildly negative
1 = Not negative at all

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