Associations between Trauma, Dissociation, Adult Attachment and Proneness to Hallucinations

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Background: Childhood adversity, dissociation and adult attachment have all been implicated in the development of hallucinations or 'voice-hearing'. Testing psychological models in relation to subclinical phenomena, such as proneness to hallucinations in non-clinical samples, provides a convenient methodology to develop understanding of the processes and mechanisms underlying clinical symptoms. **Aims:** This paper investigates the relative contribution of childhood adversity, dissociation and adult attachment in explaining hallucination proneness in a non-clinical sample. **Methods:** Students and staff with no previous contact with secondary care at the University of Manchester were recruited. Participants completed a series of self-report measures: the Launay–Slade Hallucination Scale (LSHS), the Relationship Scale Questionnaire (RSQ), the Childhood Trauma Questionnaire (CTQ), the Dissociative Experiences Schedule (DES II) and the Positive and Negative Affect Schedule (PANAS).

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Results: As hypothesized, insecure attachment, childhood adversity and dissociative symptoms were correlated with hallucination proneness. Multiple regression analysis, controlling for confounds of age and negative affect, indicated that the RSQ, CTQ and DES II predicted hallucination proneness. Only DES II and RSQ avoidant attachment were significant independent predictors in the final model. **Conclusions:** This study provides further evidence to support the idea that attachment and dissociation are important psychological mechanisms involved in voice-hearing proneness. Further testing is required with a clinical population.

Keywords: hallucinations, psychosis, trauma, dissociation, attachment

Introduction

Hallucinations are traditionally a hallmark of psychosis and are defined as perceptions without external stimulation (Laroi, 2012). However, hallucinations can be characteristic of many psychological problems and are also documented in the general population (Johns et al., 2004). The psychosis continuum hypothesis suggests that symptoms of psychosis, such as hallucinations, occur on a continuum whereby diagnosed individuals show more severe or distressing symptoms, but the factors explaining the development of psychotic phenomena are the same across the continuum (van Os et al., 2000). Previous research using hallucination proneness questionnaires such as the Launay–Slade Hallucination Scale (LSHS; Bentall and Slade, 1985b) also identify the similarities between proneness scores in factor analysis of clinical samples (Levitan et al., 1996) and non-clinical samples (Waters et al., 2003), offering further support for the psychosis continuum hypothesis.

Recent research has begun to focus on understanding the factors predicting hallucination development in both clinical and non-clinical samples (Johns, 2005). One such factor that is well documented as playing a causal role is childhood adversity (Daalman et al., 2012; Larkin and Read, 2008). However, the mechanisms via which trauma leads to the development of hallucinations are less well understood.

One potentially promising candidate mechanism is dissociation. Dissociation is generally defined as the disruption in the 'normal integration of consciousness, memory, identity, emotion, perception, body representation, motor control, and behaviour' (American Psychiatric Association, 2013, p. 291). Hallucinations are hypothesized to be dissociated components of the self or 'compartmentalized' trauma-related intrusive memories that are experienced and/or interpreted as external and current rather than internal and memory-based, possibly as a result of biased source monitoring/reality discrimination (Longden et al., 2016). There is robust evidence of associations between hallucinations and dissociation in both clinical and non-clinical samples (Pilton et al., 2015) and some evidence to suggest that dissociation may mediate the relationship between childhood adversity and hallucinations (Perona-Garcelan et al., 2012; Varese et al., 2012).

Insecure attachment is another potentially important factor in explaining the association between childhood trauma and vulnerability to hallucinations. Bowlby (1969) argued that childhood adversity leads to the development of insecure attachment patterns, which perpetuate into adulthood and increase vulnerability to psychopathology. There are different types of insecure attachment styles. Insecure attachment in adulthood is commonly conceptualized in terms of the dimensions of anxiety and avoidance (Mikulincer and Shaver, 2012). Individuals with an anxious attachment style tend to fear rejection, yet their cravings for closeness may inadvertently drive others away. Those with avoidant attachment may feel uncomfortable

with closeness in relationships and seek to maintain emotional distance. There is evidence of associations between hallucinatory experiences and insecure attachment patterns in both clinical and non-clinical samples (Korver-Nieberg et al., 2015). There is also more recent evidence to suggest that insecure anxious attachment mediates the association between childhood trauma and a number of dimensions of voice-hearing, including voice-related distress (Pilton et al., 2016).

Although there is evidence that both dissociation and insecure attachment may be important in explaining the relationship between childhood adversity and hallucinatory experiences, as yet research has not empirically investigated the relative contribution of trauma, dissociation and insecure attachment to explaining hallucinations within a single framework. In this paper, we present a preliminary exploration of hypothesized relationships between childhood adversity, dissociation, insecure attachment and proneness to hallucinations within a non-clinical sample. We tested the following hypotheses:

(i)   Childhood adversity will be positively correlated with hallucination proneness.
(ii) Dissociative symptoms will be positively correlated with hallucination proneness.
(iii) Insecure attachment styles will be positively correlated with hallucination proneness: those scoring higher on measures of anxious and avoidant attachment will report higher hallucination proneness scores.
(iv) Together, childhood adversities, dissociative symptoms and insecure attachment styles will predict hallucination proneness.

Method

Participants

Participants were 123 staff and students recruited by poster advertisements placed across a university campus and via a university-based recruitment system where undergraduate psychology students gain course credits for participating in research. Inclusion criteria were: English-speaking, 18 years old or older, and self-reported normal or corrected vision. Exclusion criteria included: self-reported current or previous contact with secondary care psychiatric services and hearing impairment. All inclusion and exclusion criteria were assessed via an online self-report, pre-screening questionnaire.

Measures

Participants completed five self-report questionnaires. Hallucination proneness was assessed using the Launay–Slade Hallucination Scale (LSHS; Bentall and Slade, 1985b). This 12-item scale developed from Launay and Slade's (1981) original questionnaire assesses non-clinical populations' auditory and visual experiences, vivid mental events and religious-themed hallucinations. The questionnaire has high test–retest reliability with evidence of improved reliability in measuring constructs captured in the original questionnaire (Bentall and Slade, 1985b). Cronbach's alpha scores obtained in this study for the LSHS showed good internal consistency ($\alpha = 0.80$).

History of childhood adversity was assessed using the short form Childhood Trauma Questionnaire (CTQ; Bernstein et al., 2003). The CTQ consists of 28 items with subscales measuring: emotional abuse, physical abuse, sexual abuse, emotional neglect and physical

neglect. This questionnaire has shown high construct and discriminant validity in non-clinical samples (Bernstein et al., 2003). Internal consistency of the CTQ total score in this study was excellent ($\alpha = 0.90$) with subscale alphas all above 0.7.

The Dissociative Experiences Schedule II (DES II; Carlson and Putnam, 1993) was used to measure dissociative symptoms and consists of 28 items in total with three subscales: amnesia, depersonalization/derealization and absorption. In this study, DES II total scores had excellent internal consistency ($\alpha = 0.93$) with subscales alphas all above 0.7.

The Relationship Scales Questionnaire (RSQ; Griffin and Bartholomew, 1994) was used to measure attachment styles and participants' feelings about close relationships over 30 items. Two subscales of insecure anxious and insecure avoidance were used based upon the two factor model proposed by Simpson et al. (1992). Analyses of Cronbach's alpha scores in this study identified good internal consistency of the anxiety measure ($\alpha = 0.84$) and avoidance measure ($\alpha = 0.66$).

In order to control for negative affect, participants completed the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988), which contains 10 items assessing negative affect. It has shown high reliability and validity within non-clinical samples with demographic subgroup consistency (Crawford and Henry, 2004). Good internal consistency for the negative affect subscale ($\alpha = 0.86$) was apparent within this study. Ethnicity, age and gender information was collected within the online pre-screen.

Procedure

Participants first completed an online pre-screen questionnaire to measure inclusion and exclusion criteria and demographic variables. Those deemed eligible were invited to attend a face-to-face testing session, during which participants completed questionnaires as follows: LSHS, RSQ, CTQ, PANAS and DES II.

Statistical analysis

IBM SPSS Statistics 22 was used for all analyses. Upon checking normality of questionnaire responses the majority of measures were skewed and transformations were unsuccessful. Spearman's correlations were conducted to identify significant correlations between RSQ, CTQ and DES II with hallucination proneness (LSHS). To assess the relationships of childhood adversity, dissociative symptoms and attachment styles collectively, a multiple regression was carried out with bootstrapping.

The DES-II includes a voice-hearing item (item 27), therefore in order to avoid the potential problem of confounding, we carried out all analyses with the DES both with and without this item. As the significance of all of the results was unaffected, we report findings for the complete measure in this paper.

Results

Sample characteristics

Demographic characteristics are shown in Table 1. The majority of the sample was female, White British, psychology students with an average age of 22 years.

Table 1. Sample characteristics

	n (%)
Gender	
Female	87 (69.0%)
Ethnicity	
White British	59 (47.9%)
Other White background	16 (13.0%)
Asian	38 (30.9%)
Other	10 (8.1%)
	Mean (*SD*)
Age (years)	22 (5.10)
LSHS total scores	14.76 (7.85)
CTQ total scores	36.02 (11.21)
DES II total scores	46.63 (34.86)
RSQ anxiety scores	2.31 (0.94)
RSQ avoidance scores	2.83 (0.67)
PANAS negative scores	17.56 (7.09)

Childhood adversity, dissociation, attachment and hallucination proneness

As hypothesized, the CTQ and DES II were significantly positively correlated with the LSHS (see Table 2). These effects were largely replicated with subscales on these measures, with the exception of the physical and sexual abuse subscales of the CTQ. As further predicted, both anxious and avoidant attachment on the RSQ were positively correlated with the LSHS (see Table 2).

Confounding variables

Negative affect on the PANAS was positively correlated with LSHS (r (127) = 0.290, $p = 0.001$). There was no evidence of any gender or ethnic group differences on LSHS scores, but age of participants was negatively correlated to LSHS scores (r (123) = -0.296, $p = 0.001$), suggesting that younger participants scored higher on hallucination proneness.

Multiple regression predicting hallucination proneness

CTQ, DES II total scores and attachment anxious and avoidant scales were all included as predictors in the regression model. We entered total CTQ and DES II scores into the regression as opposed to individual subscale scores, because (with the exception of emotional abuse) total scores were stronger univariate correlates of LSHS. As negative affect and age were shown to have significant relationships to LSHS, these variables were also included in the model. There was evidence that the variables significantly predicted LSHS (F (6,106) = 15.20, $p < 0.001$) with an adjusted R^2 of 0.432. However, as shown in Table 3, only DES II total and attachment avoidance were significant independent predictors in the model.

Table 2. Correlational analyses between hallucination proneness, childhood adversity, dissociative symptoms and attachment scores.

	LSHS	CTQ	CTQ EA	CTQ PA	CTQ SA	CTQ EN	CTQ PN	DES II	DES II (1)	DES II (2)	DES II (3)	RSQ (1)	RSQ (2)
LSHS													
CTQ	.414*												
CTQ EA	.290*	.771*											
CTQ PA	.081	.406*	.303*										
CTQ SA	.155	.265*	.170	.317*									
CTQ EN	.360*	.856*	.593*	.211*	.162								
CTQ PN	.355*	.537*	.267*	.077	−.055	.474*							
DES II	.624*	.488*	.403*	.249*	.146	.330*	.275*						
DES II (1)	.477*	.366*	.273	.264*	.117	.201*	.202*	.836*					
DES II (2)	.544*	.338*	.351*	.133	.023	.225*	.171	.682*	.514*				
DES II (3)	.577*	.459*	.393*	.207*	.121	.307*	.261*	.941*	.779*	.584*			
RSQ (1)	.295*	.410*	.366*	.164	.262*	.285*	.149	.304*	.258*	.240*	.238*		
RSQ (2)	.456*	.463*	.374	.214*	.087	.374*	.299*	.488*	.495*	.402*	.457*	.351*	

LSHS = 1. LSHS total, 2. CTQ EA = CTQ emotional abuse, 3. CTQ PA = CTQ physical abuse, 4. CTQ SA = CTQ sexual abuse, 5. CTQ EN = CTQ emotional neglect, 6. CTQ PN = CTQ physical neglect, 7. DES II = DES II total, 8. DES II (1) = DES II amnesia, 9. DES II (2) = DES II depersonalization/derealization, 10. DES II (3) = DES II absorption, 11. RSQ (1) = RSQ anxious attachment, 12. RSQ (2) = RSQ avoidant attachment.
*Significance at $p < 0.05$.

Table 3. Multiple regression coefficients for childhood adversity, dissociative symptoms and attachment scores to hallucination proneness, including confounds of negative affect and age

	B	SE b	95% confidence intervals Lower	Upper
CTQ total	.007	.099	−.179	.211
DES II total	.117	.021	.075	.160
Anxious attachment	.428	.799	−1.089	2.049
Avoidant attachment	2.351	1.142	.107	4.441
Age	−.207	.105	−.453	−.048
Negative affect	.001	.102	−.205	.206

Discussion

This study aimed to assess the relationship between childhood adversity, dissociative symptoms, and adult attachment styles and their relative contribution to hallucination proneness. In accordance with our hypothesis, correlational analyses showed that those who reported more adverse childhood events were more prone to hallucinations. This supports previous research showing positive relationships between childhood trauma and hallucination prevalence (Janssen et al., 2004). There were, however, no significant associations between either sexual or physical abuse and hallucination proneness scores. These negative findings may be attributed to the relatively low levels of abuse in the sample and the consequent lack of variance in the data.

In accordance with our hypothesis, participants with higher reported dissociation scores were also more prone to hallucinatory experiences. All of the DES subscales were correlated with hallucination proneness and dissociation, which were also strong significant independent predictors of hallucination proneness. This study adds further support to the body of literature demonstrating associations between dissociation and voices (Pilton et al., 2015). In support of our hypothesis, those with higher scores on insecure attachment anxiety and avoidant scales were also more prone to hallucinations. Previous research has also highlighted associations between insecure attachment and hallucinatory phenomenon in both clinical and non-clinical samples (Korver-Nieberg et al., 2015). This study additionally suggests that attachment avoidance is a significant independent predictor of hallucination proneness when other potentially important predictor or confounding variables are controlled.

The collective role of trauma, dissociation and attachment in hallucination proneness, suggests that these factors may play a role in explaining the phenomenon and may also have implications for understanding voice-hearing in clinical samples. We have recently developed a model: the Cognitive Attachment model of Voices (CAV), which proposes that experiences of trauma in childhood increases vulnerability to voices by leading to the disruption of the attachment system and the development of subsequent dissociative states in response to stress (see Berry and Bucci, 2016; Berry et al., 2017). Although our model needs to be the subject to further empirical test in clinical samples, findings reported here are in line with hypothesized mechanisms.

There are a number of limitations within this research which must be taken into consideration in interpreting findings. Firstly, participants were self-selected students who are less likely to

be representative of the general population. The high incidence of psychology students within the sample may also increase their prior knowledge of testing materials, in turn increasing their social desirability biases within responses (Nederhof, 1985). Secondly, there were also particular limitations inherent to the measures used. Using the Launay–Slade Hallucination Scale allowed for the assessment of current hallucinatory experiences, but does not permit elaboration on previous frequency and severity of hallucinatory experiences. The Childhood Trauma Questionnaire does not measure experiences of adult interpersonal trauma and may also be an important predictor of voice-hearing. Thirdly, this study was correlational, not testing hallucination development over time. This limits claims of causality and the direction of findings. Finally, although we controlled for a number of potentially important confounds, we did not control for paranoia, which commonly co-occurs alongside voice-hearing.

Bearing these limitations in mind, findings from this study highlight further support for the potentially important role of attachment and dissociation in understanding voice-hearing phenomena. These associations now need to be explored in clinical samples where people are more likely to experience distressing voices and report previous trauma.

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References

American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th edition). Arlington, VA: American Psychiatric Association. doi: 10.1176/appi.books.9780890425596

Bentall, R. P. and Slade, P. D. (1985b). Reliability of a scale measuring disposition towards hallucination: a brief report. *Personality and Individual Differences*, 6, 527–529. doi: 10.1016/0191-8869(85)90151-5

Bernstein, D. P., Stein, J. A., Newcomb, M. D., Walker, E., Pogge, D., Ahluvalia, T., Stokes, J., Handelsman, L., Medrano, M., Desmond, D. and Zule, W. (2003). Development and validation of brief screening version of the childhood trauma questionnaire. *Child Abuse and Neglect*, 27, 169–190. doi: 10.1016/S0145-2134(02)00541-0

Berry, K. and Bucci, S. (2016). What does attachment theory tell us about working with distressing voices? *Psychosis*, 8, 60–71. doi: 10.1080/17522439.2015.1070370

Berry, K., Varese, F. and Bucci, S. (2017). Cognitive Attachment Model of Voices: evidence base and future implications. *Frontiers in Psychiatry*, 8, 1–13. doi: 10.3389/fpsyt.2017.00111

Bowlby, J. (1969). *Attachment and Loss* v. 3. New York: Basic Books.

Carlson, E. B. and Putnam, F. W. (1993). An update on the Dissociative Experiences Scale. *Dissociation: Progress in the Dissociative Disorders*, 6, 16–27.

Crawford, J. R. and Henry, J. D. (2004). The Positive and Negative Affect Schedule (PANAS): construct validity, measurement properties and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*, *43*, 245–265. doi: 10.1348/0144665031752934

Daalman, K., Diederen, K. M., Derks, E. M., van Lutterveld, R., Kahn, R. S. and Sommer, I. E. (2012). Childhood trauma and auditory verbal hallucinations. *Psychological Medicine*, *42*, 2475–2484. doi: 10.1017/S0033291712000761

Griffin, D. W. and Bartholomew, K. (1994). Models of the self and others: fundamental dimensions underlying measures of adult attachment. *Journal of Personality and Social Psychology*, *67*, 430–445. doi: 10.1037/0022-3514.67.3.430

Janssen, I., Krabbendam, L., Bak, M., Hanssen, M., Vollebergh, W., de Graaf, R. and van Os, J. (2004). Childhood abuse as a risk factor for psychotic experiences. *Acta Psychiatrica Scandinavia*, *109*, 38–45. doi: 10.1046/j.0001-690x.2003.00217.x

Johns, L. C. (2005). Hallucinations in the general population. *Current Psychiatry Reports*, *7*, 162–167. doi: 10.1111/sjop.12236

Johns, L. C., Cannon, M., Singleton, N., Murray, R. M., Farrell, M., Brugha, T., Bebbington, P., Jenkins, R. and Meltzer, H. (2004). Prevalence and correlates of self-reported psychotic symptoms in the British population. *British Journal of Psychiatry*, *185*, 298–305. doi: 10.1192/bjp.185.4.298

Korver-Nieberg, N., Berry, K., Meijer, C., de Haan, L. and Ponizovsky, A. M. (2015). Associations between attachment and psychopathology dimensions in a large sample of patients with psychosis. *Psychiatry Research*, *228*, 83–88. doi: 10.1016/j.psychres.2015.04.018

Larkin, W. and Read, J. (2008). Childhood trauma and psychosis: evidence, pathways and implications. *Journal of Postgraduate Medicine*, *54*, 287–293. doi: 10.4103/0022-3859.41437

Laroi, F. (2012). How do auditory verbal hallucinations in patients differ from those in non-patients? *Frontiers in Human Neuroscience*, *6*, 1–9. doi: 10.3389/fnhum.2012.00025

Launay, G. and Slade, P. (1981). The measurement of hallucinatory predisposition in male and female prisoners. *Personality and Individual Differences*, *2*, 221–234. doi: 10.1016/0191-8869(81)90027-1

Levitan, C., Ward, P. B., Catts, S. V. and Hemsley, D. R. (1996). Predisposition toward auditory hallucinations: the utility of the Launay-Slade Hallucination Scale in psychiatric patients. *Personality and Individual Differences*, *21*, 287–289. doi: 10.1016/0191-8869(96)00052-9

Longden, E., House, A. O. and Waterman, M. G. (2016). Associations between non-auditory hallucinations, dissociation and childhood adversity in first episode psychosis. *Journal of Trauma and Dissociation*, *17*, 545–560. doi: 10.1080/15299732.2016.1155193

Mikulincer, M. and Shaver, P. R. (2012). An attachment perspective on psychopathology. *World Psychiatry*, *11*, 11–15. doi: 10.1016/j.wpsyc.2012.01.003

Nederhof, A. J. (1985). Methods of coping with social desirability bias: a review. *European Jourrnal of Social Psychology*, *15*, 263–280. doi: 10.1002/ejsp.2420150303

Perona-Garcelan, S., Carrascoso-Lopez, F., Garcia-Montes, J. M., Ductor-Recuerda, M. J., Jimenes, A. M. L., Vallina-Fernandez, O., Perez-Alvarez, M. and Gomez-Gomez, T. (2012). Dissociative experiences as mediators between childhood trauma and auditory hallucinations. *Journal of Traumatic Stress*, *25*, 323–329. doi: 10.1002/jts.21693

Pilton, M., Varese, F., Berry, K. and Bucci, S. (2015). The relationship between dissociation and voices: a systematic literature review and meta-analysis. *Clinical Psychology Review*, *40*, 138–155. doi: 10.1016/j.cpr.2015.06.004

Pilton, M., Bucci, S., McManus, J., Hayward, M., Emsley, R. and Berry, K. (2016). Does insecure attachment mediate the relationship between trauma and voice-hearing in psychosis? *Psychiatry Research*, *246*, 776–782.

Simpson, J. A., Rholes, W. S. and Nelligan, J. S. (1992). Support seeking and support giving within couples in an anxiety-provoking situation: the role of attachment styles. *Journal of Personality and Social Psychology*, *62*, 434–446. doi: 10.1037/0022-3514.62.3.434

Varese, F., Barkus, E. and Bentall, R. P. (2012). Dissociation mediates the relationship between childhood trauma and hallucination-proneness. *Psychological Medicine*, *42*, 1025–1036. doi: 10.1017/s0033291711001826

van Os, J., Hanssen, M., Nijl, R. V. and Ravelli, A. (2000). Strauss (1969) revisited: a psychosis continuum in the general population? *Schizophrenia Research, 45*, 11–20. doi: 10.1016/s0920-9964(99)00224-8

Waters, F. A., Badcock, J. C. and Mayberry, M. T. (2003). Revision of the factor structure of the Launay-Slade hallucination scale (LSHS). *Personality and Individual Differences*, *35*, 1351–1357. doi: 10.1016/s0191-8869(02)00354-9

Watson, D., Clark, L. A. and Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology*, *54*, 1063–1070. doi: 10.1037/0022-3514.54.6.1063