

TRAUMA, METACOGNITION AND PREDISPOSITION TO HALLUCINATIONS IN NON-PATIENTS

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Abstract. Romme and Escher (1989) reported that 70% of voice hearers began to hear voices following a traumatic event. This study was therefore designed to examine the effects of trauma on predisposition to auditory and visual hallucinations in the general population. The study also examined the role of beliefs about voices and metacognitive beliefs about thoughts in predisposition to hallucinations, and tested the specific hypothesis that dissociative experiences would predict predisposition to auditory hallucinations. Sixty-four non-clinical subjects were asked to complete questionnaires assessing interpretations of voices, predisposition to hallucinations, metacognitive beliefs, PTSD symptomatology, experience of trauma, trauma-related cognitions and dissociative experiences. The study found an association between trauma-related measures (negative cognitions about the world and all dissociation variables) and predisposition to both auditory and visual hallucinations. It was found that participants who had experienced certain specific life events scored significantly higher on predisposition to auditory hallucinations (bereavement, physical assault and emotional abuse) and on predisposition to visual hallucinations (bullying). Multiple regression analyses demonstrated that both metacognitive beliefs and dissociative processes explained significant proportions of the variance in predisposition to both auditory and visual hallucinations. These results suggest an association between trauma and predisposition to auditory hallucinations. The theoretical and clinical implications of the findings are discussed.

Keywords: Hallucinations, trauma, psychosis, metacognition, dissociation.

Introduction

Auditory hallucinations can be a normal psychological phenomenon and there is a long tradition of viewing hallucinations as being on a continuum with normal functioning (Strauss, 1969). Studies assessing the prevalence of auditory hallucinations in college students have consistently found that a large minority (37–39%) report experiencing them (Posey & Losch, 1983; Barrett & Etheridge, 1992), and that these experiences were unre-

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lated to incipient psychopathology. Surveys of hallucinatory experiences suggest that 10–25% of the general population have had such experiences at least once (Slade & Bentall, 1988) and that the annual incidence rate is 4–5% (Tien, 1991).

Metacognition and hallucinations

Recently, researchers have used highly predisposed non-psychiatric subjects to make inferences about the mechanisms underlying clinical symptoms. For example, Morrison, Wells and Nothard (2000) adapted the Launay-Slade Hallucination Scale (LSHS) to measure predisposition to auditory and visual hallucinations and examined the relationship between metacognition and predisposition in a non-psychiatric population. They found that positive beliefs about unusual perceptual experiences were the best predictor of predisposition to auditory and visual hallucinations. Following Wells and Matthews (1994) S-REF model, which suggests that metacognitive beliefs represent a generic vulnerability factor for psychological dysfunction, recent work in relation to hallucinations has shown that patients experiencing auditory hallucinations scored higher on metacognitive beliefs concerning both positive beliefs about worry and negative beliefs about uncontrollability and danger associated with thoughts (Baker & Morrison, 1998), and Morrison et al. (2000) found that subjects highly predisposed to hallucination scored significantly higher on cognitive self-consciousness and negative beliefs about uncontrollability and danger associated with thoughts than those with a low predisposition. Chadwick and Birchwood (1994) have demonstrated that beliefs about voices are meaningfully related to their emotional and behavioural consequences, and Morrison et al. (2000) have suggested that it may be the development of negative beliefs about hallucinations that underlies the transition from normal to pathological hallucinatory experiences. In a recent study (Morrison, Wells, & Nothard, 2002), it was found that positive beliefs about voices were significantly associated with predisposition to auditory hallucinations, and negative interpretations of voices were associated with endorsing the item assessing troublesome voices.

Trauma and hallucinations

Various studies have demonstrated a high incidence of trauma in the lifetimes of patients with severe mental illness (e.g. Mueser et al. (1998) found a 98% incidence of trauma). Patients with severe mental illness who have been exposed to traumatic events tend to have been multiply traumatized, with exposure to an average of 3.5 different types of trauma (Mueser et al., 1998). A significant proportion of a large sample of people with first episode psychosis reported experience of trauma (68.5%), with 44.8% having experienced more than one trauma (Neria, Bromet, Sievers, Lavelle, & Fochtmann, 2002).

A recent review of studies concluded that patients with schizophrenia have a high incidence of childhood sexual abuse or physical abuse, and that such experiences are likely to be associated with the development of psychosis (Read, 1997). Many studies report rates of childhood sexual and physical abuse in people with a diagnosis of schizophrenia or other psychotic disorders. For example, 27 of 61 inpatients with a chronic psychosis reported childhood sexual or physical abuse (Goff, Brotman, Kindlon, Waites, & Amico, 1991), and 56% of patients admitted for first episode psychosis reported childhood sexual abuse (Greenfield, Strakowski, Tohen, Bateson, & Kolbrener, 1994).

Despite an abundance of research into the links between trauma and psychosis, there is a scarcity of literature relating to the relationship between trauma and the manifestation of specific psychotic symptoms, such as auditory hallucinations. Romme and Escher (1989) reported that 70% of voice hearers began to “hear voices” following a traumatic event. In a cohort study, Honig et al. (1998) compared the form and content of chronic auditory hallucinations in patients with schizophrenia, patients with dissociative disorder, and non-patient voice-hearers. In the majority of patients the onset of auditory hallucinations was preceded by either a traumatic event or an event that activated a memory of an earlier trauma. Read and Argyle (1999) examined the relationship between three positive symptoms of schizophrenia (hallucinations, delusions, and thought disorder) and childhood physical and sexual abuse among psychiatric inpatients. They found 17 of the 22 patients with an abuse history exhibited one or more of these three symptoms and that half of the symptoms for which content was recorded appeared to be related to the abuse.

Dissociation and hallucinations

Although theoretical explanations for the common links between trauma and psychosis are sparse, several authors have suggested a link between dissociation and psychosis. Allen, Coyne and Console (1997) further suggest that trauma-induced dissociation and dissociative detachment renders individuals vulnerable to psychotic experience. They argue that dissociative detachment undermines the individual’s grounding in the outer world, thereby hampering reality-testing and rendering the individual with post-traumatic symptoms “vulnerable to the nightmarish inner world” (p. 332). They develop their formulation by suggesting that severe dissociative detachment renders individuals vulnerable to psychosis because it also robs them of internal anchors – the sense of being connected to one’s body, a sense of self or identity, and one’s own actions. The result may not only be impaired reality-testing but also severe confusion, disorganization, and disorientation. Famularo, Kinscherff and Fenton (1992) have proposed that hallucinations are frequently part of the presentation of dissociative processes that often occur when a person has been severely sexually or physically abused. Startup (1999) has also noted that the traits and experiences that are seen as defining both the schizophrenic and the dissociative disorders have been found to be present in continuously variable, non-pathological forms in the general population. In a recent study of 224 non-patients, Startup (1999) found moderately large correlations between the Dissociative Experiences Scale (DES) and both the Cognitive Disorganization and the Unusual Experiences subscales of the Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE) and that these correlations were hardly affected when items with overlapping content were excluded. Hierarchical multiple regression analyses showed that the measures of abuse accounted for small but significant proportions of the variance in both the DES and the Unusual Experiences subscale, but large proportions of the covariation between the measures of dissociative experiences and schizotypy remained unexplained. Merckelbach, Rassin and Muris (2000) report that the association between dissociation and schizotypy has been repeatedly found both in clinical and non-clinical samples, and found that this association could not be accounted for by fantasy proneness.

Therefore, it would appear that there may be a relationship between the experience of trauma and the development of psychotic symptoms, such as auditory hallucinations, in both clinical and non-clinical samples. Recently, it has been suggested that dissociative processes

and metacognitive beliefs may contribute to the development of psychosis in response to traumatic life events (Morrison, Frame, & Larkin, in press), in that traumatic life events may contribute to psychotic experiences that evolve as coping or survival strategies as a result of positive beliefs about unusual experiences. In this study, it is hypothesized that predisposition to auditory and visual hallucinations in the general population will be associated with the experience of a trauma and post-traumatic symptomatology (particularly dissociation), and that these will contribute independently of metacognitive beliefs about thoughts and voices.

Method

Subjects

Sixty-four subjects participated in the study; all subjects were undergraduate students and warehouse operatives who volunteered to participate in the study. No financial incentive was offered. The mean age of the group was 21 ($SD = 6.9$; range 18–59 years). The male:female ratio of the sample was 8:56.

Materials

Metacognitions Questionnaire (MCQ: Cartwright-Hatton & Wells, 1997). This scale measures metacognitive beliefs using 65 items. The questionnaire generates scores for the following five sub-scales: Positive beliefs about worry (typical items include “Worrying helps me to get things sorted out in my mind” and “Worrying helps me cope”); Negative beliefs about the controllability of thoughts and corresponding danger (typical items include “Worrying is dangerous for me” and “I cannot ignore my worrying thoughts”); Cognitive confidence (typical items include “I have a poor memory” and “I have difficulty knowing if I have actually done something, or just imagined it”); Negative beliefs about thoughts in general, including responsibility, punishment and superstition (typical items include “Not being able to control my thoughts is a sign of weakness” and “If I did not control a worrying thought, and then it happened, it would be my fault”); Cognitive self-consciousness (typical items include “I think a lot about my thoughts” and “I pay close attention to the way my mind works”). Items are scored from 1 to 4, whereby 1 = do not agree, 2 = agree slightly, 3 = agree moderately, and 4 = agree very much. Subscales exhibited good internal consistency (alphas ranged between 0.72 and 0.89) and test-retest reliability (coefficients ranged between 0.76–0.94).

Revised Hallucination Scale (RHS). A 24-item questionnaire based upon the revised Launay Slade Hallucination Scale (see Launay & Slade, 1981; Morrison et al., 2002). It has three empirically-derived subscales measuring predisposition to visual hallucination, predisposition to auditory hallucinations, and vividness of imaginary and daydreaming. The items are endorsed using a 4-point scale to measure frequency (1 = never, 2 = sometimes, 3 = often, 4 = almost always).

Interpretation of Voices Inventory (IVI; Morrison et al., 2002). This scale measures how an individual would interpret auditory hallucinations were they to experience them. It consists of 26 items, and comprises 3 subscales that assess metaphysical beliefs, positive beliefs

and interpretations of loss of control. The questionnaire is worded hypothetically (If I were to hear sounds or voices that other people could not hear, I would probably think that . . .) and items were scored on a 4-point scale to measure conviction (1 = not at all, 2 = somewhat, 3 = moderately so, 4 = very much).

Dissociative Experiences Scale (DES; Carlson & Putnam, 1993). A 28-item questionnaire that measures the frequency with which individuals experience a wide variety of dissociative phenomena. There are three subscales that measure amnesic dissociation, absorption and imaginative involvement, and depersonalization. Participants respond to each item by indicating, in units of 10% (0%–100%), the percentage of time they had experienced each instance.

Trauma Measure (designed by the authors). Designed to measure the type, frequency and severity of trauma experienced. The measure consists of 16 items, 13 of which detail different types of traumatic experience. Participants indicate which of the events they have experienced by way of a tick (yes or no). The remaining items relate to the frequency of the event (once, more than once), when the event occurred, and the subjective severity of the experience (related on a scale of 10–100%, where 0% = not at all, and 100% = could not be more so).

PTSD Symptom Scale – Self Report (PSS-SR; Foa, Riggs, Dancy, & Rothbaum, 1993). A self-report instrument used to measure severity of PTSD symptoms. It consists of 17 items, each comprising 2 sub-scales: frequency and distress, relating to events during the past week. Participants indicate how frequently they have had these experiences using a 4-point scale (0 = not at all, 1 = once per week/a little bit/once in a while, 2 = 2–4 times per week/somewhat/half the time, 3 = 5 times per week/very much/almost always), and how distressing this has been using a 4-point scale, whereby 0 = not at all and 3 = very distressing. The sub-scales showed satisfactory internal consistency, high test-retest reliability, and good concurrent validity.

Post-traumatic Cognitions Inventory (PTCI; Ehlers, Clark, Tolin, & Orsillo, 1999). A 36-item measure designed to assess trauma-related thoughts and beliefs. The questionnaire generates scores for the following 3 sub-scales: (1) Negative cognitions about self; (2) Negative cognitions about the world; (3) Self-blame. Participants indicate how much they agree or disagree with each statement using a 7-point rating scale (1 = totally disagree, 2 = disagree very much, 3 = disagree slightly, 4 = neutral, 5 = agree slightly, 6 = agree very much, 7 = totally agree). The 3 factors showed excellent internal consistency and good test-retest reliability.

Procedure

Subjects completed the questionnaires in the order listed above and returned them to the research assistant. The total battery of questionnaires took approximately 40 minutes to complete.

Data analysis

The data were examined for normality using visual inspection and analysis of skewness. Several of the variables were not normally distributed, but were found to be normalizable

using square root transformation (vivid imagery/daydreaming, post-traumatic stress frequency, post-traumatic stress distress, positive beliefs about worry, self-blame) or logarithmic transformations (PTCI total, negative cognitions about self, IVI positive, visual hallucinations). However, certain variables were not normalizable (IVI metaphysical and IVI control). Parametric statistical analyses were performed using these transformed variables.

Results

Effects of trauma on predisposition to hallucinations

In order to examine the hypothesis that predisposition to auditory hallucinations is associated with the experience of a traumatic event, Pearson's correlation coefficients were performed between trauma-related measures (PTSD symptoms, post-traumatic beliefs, dissociation, time since trauma and intensity of traumatic experience) with predisposition to auditory and visual hallucinations. The correlations can be seen in Table 1.

An additional analysis was performed to examine the effect of single versus multiple trauma on the predisposition to auditory and visual hallucinations. A one-way analysis of variance showed that predisposition to auditory hallucinations was significantly higher in those who reported multiple trauma, in comparison with those reporting single trauma ($F(1, 59) = 9.43, p < .005$). There was no significant effect of frequency of trauma on predisposition to visual hallucinations ($F(1, 59) = 0.91$, non-significant).

In order to investigate the relationship between specific interpersonal traumatic life events and predisposition to auditory and visual hallucinations, a series of one-way analyses of variance was conducted using predisposition to auditory and visual hallucination as the dependent variables and the specific interpersonal life events as the grouping factor. The results of the analyses of variance are shown in Table 2. It can be seen that there are several results that reach statistical significance; however, if a Bonferroni correction were applied

Table 1. Correlation coefficients for association between predisposition to hallucinations and PTSD symptoms, post-traumatic beliefs, and dissociation variables

Variable	Correlation with predisposition to	
	Auditory hallucinations	Visual hallucinations
PSS frequency	0.34**	0.17
PSS distress	0.18	0.03
PTCI: Negative cognitions about the world	0.26*	0.25*
Negative cognitions about self	0.12	0.14
Self-blame	-0.06	0.30**
PTCI total	0.14	0.24*
Amnesic dissociation	0.61***	0.41**
Absorption	0.61***	0.55***
Depersonalization	0.54***	0.57***
Dissociation (DES total)	0.71***	0.57***
Intensity of traumatic experience	0.25*	0.12
Time since traumatic experience	0.04	0.01

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Table 2. Analyses of variance for specific interpersonal life events

Interpersonal life event (ratio experienced: not)	Experienced	Not experienced	<i>F</i>	<i>df</i>	Sig of <i>F</i>
	Mean (<i>SD</i>)	Mean (<i>SD</i>)			
Auditory hallucinations:					
Bereavement (39:23)	7.22 (1.69)	6.35 (1.53)	4.04	1, 58	0.05
Emotional abuse (25:37)	7.60 (1.71)	6.37 (1.46)	8.98	1, 58	0.004
Bullying (32:29)	7.10 (1.78)	6.57 (1.50)	1.48	1, 57	n.s.
Physical assault (14:49)	7.71 (1.90)	6.59 (1.52)	5.17	1, 59	0.03
Sexual assault (11:51)	6.73 (1.74)	6.92 (1.66)	0.12	1, 58	n.s.
Visual hallucinations:					
Bereavement (39:23)	10.10 (2.50)	9.73 (3.06)	0.49	1, 60	n.s.
Emotional abuse (25:37)	10.60 (2.69)	9.54 (2.66)	2.80	1, 60	0.09
Bullying (32:29)	10.69 (2.61)	9.14 (2.66)	7.01	1, 59	0.01
Physical assault (14:49)	10.79 (3.29)	9.69 (2.48)	1.61	1, 61	n.s.
Sexual assault (11:51)	10.27 (3.29)	9.90 (2.59)	0.08	1, 60	n.s.

to account for multiple comparisons, only the result for the effect of emotional abuse on auditory hallucinations would remain significant.

Relationships between dissociation, interpretations of voices, metacognition, and predisposition to hallucination

In order to compare the relative contributions of different predictors of predisposition to hallucination, a series of regression analyses was conducted using two of the subscales of the RHS as the dependent variables and positive beliefs about voices (for auditory hallucinations), the relevant MCQ subscales (selected on the basis of zero-order correlations) and the DES subscales as predictor variables.

Auditory hallucinations. Using predisposition to auditory hallucinations as the dependent variable, a multiple regression analysis was performed using the predictor variables mentioned above. The independent variables included in the analysis were the metacognitive beliefs and positive beliefs about voices variables in step 1, and the dissociation variables on step 2. The results of the correlation matrix for the variables are shown in Table 3 and the results of the final multiple regression equation are shown in Table 4.

The multiple *R* was 0.68 and significant ($F(6, 53) = 7.63, p < .001$). The adjusted R^2 was

Table 3. Correlation matrix

Variable	2	3	4	5	6	7	8	9	10
1. Visual hallucinations	.59***	.19	.42***	.44***	.11	.34**	.41***	.55***	.57***
2. Auditory hallucinations	–	.20	.32**	.35**	.09	.04	.61***	.61***	.54***
3. Positive beliefs about worry	–	–	.49***	.32**	.46***	.29**	.31**	.43***	.35**
4. Negative beliefs about uncontrollability and danger	–	–	–	.34**	.49***	.46***	.45***	.60***	.49***
5. Cognitive confidence	–	–	–	–	.25*	–.06	.38***	.36**	.38***
6. Negative beliefs (S, P, R)	–	–	–	–	–	.19	.23*	.28**	.24*
7. Cognitive self-consciousness	–	–	–	–	–	–	.12	.29**	.33**
8. Amnesic dissociation	–	–	–	–	–	–	–	.69***	.63***
9. Absorption and imaginative involvement	–	–	–	–	–	–	–	–	.60***
10. Depersonalization	–	–	–	–	–	–	–	–	–

Note: Correlations significant at *** $p < .001$; ** $p < .01$; * $p < .05$

Table 4. Multiple regression summary statistics for predisposition to auditory hallucinations

Variable	Beta	Partial <i>r</i>	<i>F</i>	Sig. Of <i>F</i>
Negative beliefs about uncontrollability and danger	-0.14	-.14	1.08	n.s.
Cognitive confidence	0.07	.09	0.43	n.s.
Positive beliefs about voices	-0.6	-.07	0.23	n.s.
Amnesic dissociation	0.26	.23	2.92	n.s.
Absorption and imaginative involvement	0.40	.32	6.13	0.02
Depersonalization	0.19	.18	1.81	n.s.

0.40 indicating that a large amount of the variance was accounted for by these predictor variables. On step 1, with the metacognitive beliefs and beliefs about voices variables entered, the multiple R was 0.41 and significant, and the adjusted R^2 was 0.12. On the final step, when the dissociation variables were entered, the increment in R^2 was 0.30 and significant ($F(3, 53) = 9.79, p < .001$).

Visual hallucinations. In order to investigate the links between dissociation, metacognition and predisposition to visual hallucinations, a multiple regression analysis was performed using the logarithmically transformed predisposition to visual hallucinations score as the dependent variable. The independent variables used in the analysis were the MCQ subscales of negative beliefs about uncontrollability and danger, cognitive confidence and cognitive self-consciousness in step 1, and the dissociation variables on step 2. The results of the correlation matrix for the variables are shown in Table 3 and the results of the final multiple regression equation are shown in Table 5.

The multiple R was 0.68 and significant ($F(6, 56) = 8.20, p < .001$). The adjusted R^2 was .42 indicating that a large amount of the variance was accounted for by these predictor variables. On step 1, with the metacognitive belief variables entered, the multiple R was 0.60 and significant, and the adjusted R^2 was 0.33. On the final step, when the dissociation variables were entered, the increment in R^2 was 0.11 and significant ($F(3, 56) = 3.7, p < .05$).

Discussion

The results of the present study suggest an association between trauma-related measures (negative cognitions about the world and all dissociation variables) and predisposition to

Table 5. Multiple regression summary statistics for predisposition to visual hallucinations

Variable	Beta	Partial <i>r</i>	<i>F</i>	Sig. Of <i>F</i>
Negative beliefs about uncontrollability and danger	-0.03	-0.03	0.04	n.s.
Cognitive confidence	0.29	0.32	6.43	0.08
Cognitive self-consciousness	0.21	0.23	3.24	0.01
Amnesic dissociation	-0.09	-0.08	0.37	n.s.
Absorption and imaginative involvement	0.29	0.25	3.58	0.06
Depersonalization	0.28	0.25	3.86	0.05

both auditory and visual hallucinations (although it is important to note that dissociation is a complex phenomenon and not always related to trauma). In addition, frequency of PTSD symptoms and the experience of multiple traumas were related to predisposition to auditory hallucinations and self-blame was related to predisposition to visual hallucinations. These findings are consistent with previous research demonstrating the onset of auditory hallucinations following a traumatic event (Romme & Escher, 1989; Honig et al., 1998) and incidence of trauma in psychotic patients (e.g. Mueser et al., 1998), and suggest that trauma is related to visual hallucinations as well. In addition, this study identifies links between specific life events and predisposition to auditory hallucinations. Similar to findings of Reese (1971) and Grimby (1993) who reported incidence of hallucinations in non-clinical samples following the loss of a spouse, it was found that predisposition to auditory hallucinations was significantly related to bereavement. Furthermore, the present data indicate that predisposition to auditory hallucinations is higher in individuals who have experienced multiple traumas. It also appears that people who have experienced bullying are more predisposed to visual hallucinations. The failure to find a relationship between distress associated with PTSD symptoms and the predisposition to hallucinations is probably due to the non-pathological nature of such predisposition and the fact that it was a non-patient sample.

Consistent with the suggestion that positive beliefs about hallucinations and metacognitive beliefs about thoughts are implicated in predisposition to hallucination (Morrison et al., 2000), the pattern of results obtained demonstrated an association between positive beliefs about voices and metacognitive beliefs (negative beliefs about controllability and danger of thoughts and cognitive confidence) with predisposition to auditory hallucinations. This is also consistent with the heuristic model of Morrison, Haddock and Tarrrier (1995), which suggests that metacognition is involved in the development and maintenance of auditory hallucinations. However, in contrast to Morrison et al. (2000), who found positive beliefs about hallucination to be the best predictor of predisposition to auditory hallucinations, absorption and imaginative involvement was found to explain more of the variance in predisposition (inclusion of the dissociation variables contributed an additional 40% of variance explained). This finding is in keeping with previous suggestions of a strong relation between hallucinations and dissociative processes (e.g. Allen et al., 1997; Famularo et al., 1992; Startup, 1999). It is possible that absorption and imaginative involvement is an acquired metacognitive skill, and that this contributes to the development of auditory hallucinations, as would be suggested by Wells and Matthews (1994) S-REF model. The finding that predisposition to visual hallucinations was predicted by cognitive self-consciousness replicates the finding of Morrison et al. (2000). In addition, the contribution of depersonalization to the variance in visual hallucinations confirms the involvement of dissociative processes. Therefore, it appears that both dissociative and metacognitive factors are associated with predisposition to hallucinations, consistent with the predictions of Morrison et al. (in press) that psychotic experiences may emerge as a coping strategy for trauma because of positive beliefs about unusual experiences.

The clinical implications of this study must be considered with caution, as the participants were from a non-clinical population. However, if predisposition to auditory hallucinations in non-clinical samples is associated with specific life events (bereavement and emotional abuse) and dissociation, then psychotic patients should clearly be assessed for histories of trauma, as suggested by Read (1997). Particular attention should be given to links between trauma history and the content of hallucinations. Furthermore, if similar processes are

involved in the development and maintenance of auditory hallucinations in psychotic patients, then meta-cognitive beliefs and beliefs about voices should be assessed and the modification of such beliefs may result in improvements.

There are a number of methodological limitations with this study that could be improved in future research. The study was conducted in an analogue population, limiting the generalizability to clinical populations; also, the sample was predominantly female, so the findings may be affected by gender differences. The small number of people who endorsed the more severe traumatic life events (such as sexual abuse) meant that such factors could not be satisfactorily investigated in this study; a larger sample size would be desirable to allow additional analyses and increased statistical power. The study is also cross-sectional in nature, making it difficult to infer the direction of causality. Another methodological limitation concerns the trauma measure, which was not examined for reliability and validity, and did not provide definitions for the traumatic events. However, the pattern of results obtained for the trauma measure are consistent with those of the trauma-related self-report scales that are known to possess good internal consistency and test-retest reliability. Future research could also examine the occurrence of auditory hallucinations in clinical samples with histories of specific interpersonal trauma (such as physical abuse or sexual abuse), in order to shed further light on any possible associations. In particular, studies could examine the relationship between dissociative processes and auditory/visual hallucinations in order to better understand the mechanism responsible for the relationship between trauma and psychosis.

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