Available online at www.sciencedirect.com
ScienceDirect
Comprehensive Psychiatry 49 (2008) 544–550
Comprehensive PSYCHIATRY
www.elsevier.com/locate/comppsych

The relationship between dysphoria and proneness to hallucination and delusions among young adults

Matteo Cella[a,b,*], Andrew Cooper[c], Simon O. Dymond[a], Phil Reed[a]

[a]*Department of Psychology, Swansea University, Singleton Park, Swansea SA2 0HX, United Kingdom*
[b]*School of Medicine, Swansea University, Singleton Park, Swansea SA2 0HX, United Kingdom*
[c]*Department of Psychology, Goldsmiths, University of London, London SE14 GNW, United Kingdom*

Abstract

Previous research suggests that measures of dysphoria relate to positive schizophrenic symptoms. These relationships have rarely been studied within the dimensionality of psychopathology framework. The present study examined the relationship between 3 distinct aspects of dysphoria (depression and state and trait anxiety) and delusion and hallucination proneness in a nonclinical sample of young adults. A total of 472 participants were assessed on measures of dysphoria and delusion and hallucination proneness. Correlation analyses revealed significant associations between both anxiety and depression and hallucination and delusion proneness, suggesting that the association between dysphoria and positive symptoms is also present at a nonclinical level. Partial correlations, and hierarchical regression models, suggest an independent contribution of depression, over anxiety, in influencing hallucination and delusional proneness. The results are discussed in the framework of the cognitive account of schizophrenia and the dimensional model of psychopathology.

1. Introduction

Andreasen and Olsen [1] characterized 2 different schizophrenic subtypes: those with positive and negative symptoms. Positive symptoms are characterized by prominent delusions, hallucinations, formal thought disorders, and bizarre behaviors; negative symptoms, by affective flattening, alogia, avolition, anhedonia, and attentional impairment. Following this, the development of rating scales using factor analytic techniques has created considerable interest in the development of characteristic subtypes of schizophrenia. Liddle [2] proposed a model with 3 factors: psychomotor poverty (poverty of speech, lack of spontaneous movement, and various aspects of blunting of affect), disorganization (inappropriate affect, poverty of content of speech, and disturbances of the form of thought), and reality distortion (particular types of delusions and hallucinations). Although some studies supported the 3 factors proposed by Liddle [2,3], other studies only partially replicated this structure. These studies confirmed the negative dimension but suggested that the positive dimension presented a more complex structure, with at least 2 independent factors [4]. Other factor analytic studies [5-8], as well as clinical observations [9], supported the possible independence of delusions and hallucinations as separate dimensions within the previously identified unitary category of positive symptoms. Delusion and hallucination proneness are thus seen as key facets within the framework of the positive symptoms of schizophrenia.

A recent review considering the link between emotion and delusion and hallucination proneness highlighted the extent to which emotion and emotion regulation can influence the onset, development, and content of delusional and hallucinatory symptoms [10]. In particular, the role of dysphoric features seems to have an impact on delusions and hallucinations [11-13]. Starcevic [14] defines dysphoria as negative (unpleasant) and complex emotional states characterized by intense discontent and/or unhappiness and accompanied by an inner tension or a "driven" feeling to resort to some action to alleviate discontent or unhappiness. In the psychiatric literature, the term *dysphoria* is often used to refer to a feeling of unpleasantness or discomfort, a mood of general dissatisfaction and restlessness occurring in

* Corresponding author.
E-mail address: m.cella@swansea.ac.uk (M. Cella).

0010-440X/$ – see front matter © 2008 Elsevier Inc. All rights reserved.
doi:10.1016/j.comppsych.2008.02.011

depression and anxiety [15]. Despite being a common and a widely used concept, dysphoria is still operationalized using a diverse array of measurement tools, although it is usually conceived as a combination of anxious and depressive features [11,16]. Dysphoric features have been increasingly recognized as important contributors to the psychopathology of schizophrenia, with an average of 25% comorbidity with depression [17,18] and 11% with anxiety disorders [19,20]. The comorbidity of dysphoria and schizophrenia is known to influence clinical course of relapse [21], hospitalization [22], and social and cognitive functioning [23,24]. In addition to dysphoria, other factors related to both depression and anxiety, such as neuroticism and low self-esteem, have been proposed as risk factors for psychosis [25].

Research has often associated depression with negative symptoms [26] and anxiety with positive symptoms [27]. However, a study specifically designed to investigate the effects of dysphoria on negative symptoms [28] reported positive correlations in the change over time between dysphoria and positive symptoms, rather than with negative symptoms. This finding has been further replicated, suggesting that dysphoria in schizophrenia tends to be more frequently associated with positive, rather than with negative, symptoms, regardless of diagnostic subtype or symptom type [29,30]. This provides evidence of the independence of negative symptoms and dysphoria and suggests that the level of positive symptoms and level of dysphoria mutually influence one another [30,31].

There are a growing number of studies that consider psychosis as a continuum from normal functioning to abnormal functioning or psychosis [32-34]. There is a consistent body of evidence indicating that psychotic signs are present in healthy people to a certain extent [33]. Verdoux and coworkers [35] found that 16% of a nonclinical population reported that they had experienced hallucinations during their lifetime, whereas Tien [36] reported a percentage between 4% and 25% of the total population having hallucinations at some life stage. In a younger sample, Pulton et al [37] observed up to 20% of subjects endorsing positive items on a screening tool for delusional ideation.

Investigating psychosis-like experiences in nonclinical populations may provide a fruitful approach to elucidate psychological mechanisms underlying the psychosis phenotype in a large-scale sample [38]. This approach may help in the formation of a wider theoretical framework to be tested in smaller and more specific samples. Several recent studies have begun to examine how either delusion or hallucination proneness relate to dysphoria in nonclinical samples. For example, Allen et al [16] found that anxiety, but not depression, was strongly and positively associated with hallucination proneness. Paulik et al [39] found that both anxiety and depression were significantly and positively related to hallucination proneness when examining bivariate relationships; however, when examining partial correlations, anxiety retained significant relationships with hallucination proneness, whereas depression did not. Thus, it would seem that anxiety has tended to have a stronger positive relationship with both nonclinical and clinical positive symptoms than depression.

The aim of the current study was to examine relationships between both anxiety and depression and delusion and hallucination proneness in a nonclinical population. Although a number of studies have advanced our understanding of how dysphoria relates to positive schizophrenic symptoms, almost all the research in this area has focused on restricted clinical samples. Moreover, the heterogeneity of the results provided from clinical samples might be influenced by drug treatments, history of mental illness, and variability in age and sex. As highlighted in the review by Freeman and Garety [10], the predisposition to dysphoric symptoms may play an important role in the development of specific delusional content and predispose susceptible individuals to particular forms of hallucination. As such, it is particularly important to examine nonclinical samples before the development of clinical schizophrenic symptoms and how depression and anxiety may interact to predict hallucination and delusion proneness.

Based on the previous research, it was expected that anxiety and depression will have positive relationships with hallucination and delusion proneness. In particular, the role of emotional context has been found to be of primary importance in predicting the persistence of positive symptoms [40]. Whereas other studies have already provided some evidence of the positive relationship between hallucination proneness and dysphoria in nonclinical samples, the relation between dysphoria and delusion proneness is new to this study. In addition, the use of different assessment instruments to previous research will contribute to establishing the reliability and the consistency of the findings, as well as highlighting the importance of specific subdimensions. Although previous studies have shown that different measures of dysphoria independently relate to hallucination and delusion, it might be expected that these measures of dysphoria also interact to predict hallucination and delusion proneness. In this study, we will test for interactions between measures of anxiety and depression in predicting hallucination and delusion proneness. We expect that participants highest on both anxiety and depression measures will show greater levels of hallucination and delusion proneness, relative to participants who are high on depression or anxiety only.

2. Method

2.1. Participants

Four hundred seventy two individuals participated in this study, 165 men (35%) and 307 women (65%). The mean age of the participants was 19.91 years (SD, 1.85) for women and 21.22 years (SD, 2.30) for men. All participants were

undergraduate students recruited from Swansea University. Participants had to be aged between 18 and 30 years to participate in the study and were excluded if they had a lifetime diagnosis of a psychiatric condition or were currently receiving any psychoactive drug. This study was reviewed and approved by the Department of Psychology, Swansea University Ethics Committee. Written informed consent was obtained from all participants before their entry in the study.

2.2. Positive symptoms measures

2.2.1. Peters et al Delusion Inventory

The Peters et al Delusion Inventory (PDI) measures delusional ideation in healthy populations [41]. The PDI uses 21 yes or no response questions. If a "yes" response is made to a question, follow-up questions on a 5-point Likert scale are assessed regarding the quality of the experience, with separate scales for distress, preoccupation, and conviction. The PDI-21 provides a number of separate scores: the yes/no score, a distress score, a preoccupation score, a conviction score, and a total score. In the current study, only the PDI total score was used. The PDI total score can range from 0 to 336. The 21-item version has been used reliably in a large body of research [42,43].

2.2.2. Launay-Slade Hallucination Scale

Hallucination proneness was assessed using a modified version of the Launay-Slade Hallucination Scale (LSHS) [44,45]. The participants were explicitly asked not to report experiences when under the influence of alcohol or narcotic substances. The 15 LSHS items are scored on a 5-point Likert scale from 0 ("certainly does not apply to me") to 4 ("certainly applies to me").

2.3. Dysphoria measures

2.3.1. Beck Depression Inventory-II

The Beck Depression Inventory-II (BDI-II) is a self-report questionnaire assessing depression over the past fortnight [46]. The scale consists of 21 items assessing symptoms relating to physical concerns, such as sleep disturbance and loss of weight, emotional state, hopelessness, sorrow, motivation, willingness to work, and cognitive aspects, such as concentration and self evaluation. Each item presents 4 sentences ranging from neutral (0) to a maximum level of severity (3), and the subject chooses one according to his/her experience during the previous fortnight. The BDI total score is the sum of the points across the items.

2.3.2. Spielberger State and Trait Anxiety

The State-Trait Anxiety Inventory (STAI-T-S) assesses both trait and state anxiety [47]. Both instruments are self-report rating measures of the affective, cognitive, and physiological manifestations of anxiety in terms of current experience (ie, state anxiety) and long-standing patterns (ie, trait anxiety). The STAI-T and STAI-S have 20 items each, scored on a scale of 1 ("almost never") to 4 ("almost always").

2.4. Data analysis

The interactions between anxiety and depression measures in predicting hallucination and delusion proneness were tested using a moderated hierarchical regression approach. Before analysis, all variables were centered to help reduce multicolinearity. This involves subtracting the mean from each individual score, creating variables with means centered on 0. In the first step of each hierarchical model, the 2 relevant main effect variables (either STAI-T or STAI-S and the BDI) were entered. In the second step, the relevant interaction term was entered. An interaction was inferred when the interaction term was a significant predictor, and there was a significant ΔR^2 in the second step.

3. Results

3.1. Descriptive statistics

Table 1 presents the mean scores and SDs for each of the questionnaire measures used in the study. Independent samples t tests found no significant differences between men and women for each of the questionnaire measures. Reliability scores as measured by Cronbach α for the instruments used ranged between .77 and .89.

3.2. Relations between the PDI, LSHS, STAI, and BDI

Table 2 shows the relations between the PDI, the LSHS, the BDI, and the STAI. Table 2 shows that all bivariate relationships between the variables were positive and significant. The BDI, STAI-T, and STAI-S had large positive correlations with the PDI and LSHS. When comparing the bivariate correlations, the BDI had a significantly stronger positive correlation with the PDI when compared with the STAI-T ($z = 4.20$; $P < .001$) and the STAI-S ($z = 5.06$; $P < .001$). The BDI also had a significantly stronger positive correlation with the LSHS when compared with the STAI-T ($z = 3.70$; $P < .001$) and the STAI-S ($z = 4.32$; $P < .001$). To control for the relatively large amount of shared variance between the measures of dysphoria, semipartial correlations were calculated. First, the BDI was correlated with the PDI ($r = 0.38$; $P < .001$; n = 472) and LSHS ($r = 0.34$; $P < .001$; n = 472), controlling for STAI-T and STAI-S. The relation-

Table 1
Means and SDs for all measures for men and women

	Men	Women
LSHS	15.61 (12.1)	16.74 (11.55)
PDI	46.45 (36.63)	48.45 (35.71)
STAI-T	39.1 (10.34)	40.64 (10.65)
STAI-S	35.33 (11.80)	36.77 (10.76)
BDI	7.22 (7.43)	8.39 (7.48)

Table 2
Correlations between the PDI, LSHS, BDI, and STAI

	PDI	LSHS	BDI	STAI-T	STAI-S
PDI	1				
LSHS	0.60 *	1			
BDI	0.58 *	0.51 *	1		
STAI-T	0.44 *	0.38 *	0.62 *	1	
STAI-S	0.39 *	0.34 *	0.53 *	0.70 *	1

* $P < .001$.

ship between the BDI, PDI, and LSHS remained significant and positive. The STAI-T was correlated with the PDI (r = 0.07; $P > .05$; n = 472) and LSHS (r = 0.04; $P > .05$; n = 472), controlling for the BDI and STAI-S. The STAI-T had small and nonsignificant correlations with both the PDI and the LSHS. The STAI-S also had small and nonsignificant correlations with both the PDI (r = 0.05; $P > .05$; n = 472) and the LSHS (r = 0.04; $P > .05$; n = 472) when controlling for STAI-T and the BDI.

Four hierarchical multiple regression models were calculated to examine how the STAI-T and STAI-S moderate the relationship between the BDI and the PDI and LSHS. A summary of the 4 models is presented in Table 3. This table shows the R^2 and ΔR^2 values for the second step in each model, as well as the standardized β values for each interaction term.

The first model examined how STAI-T moderated the relationship between the BDI and the PDI. In this case, both of the main effect variables and the interaction term were significant predictors of the PDI, and the ΔR^2 value for the second step was significant. Fig. 1 shows the significant interaction between the BDI and the STAI-T predicting scores on the PDI. As can be seen, at low and medium levels of the BDI, there was little difference in PDI scores across low, medium, and high levels of the STAI-T. At high levels of the BDI, however, high scorers on the STAI-T tended to have higher PDI scores when compared with those in the medium level of the STAI-T, who, in turn, tended to have higher PDI scores than the low-level STAI-T scorers. In the second model tested, the STAI-S and BDI interaction term was not a significant predictor of the PDI score, and there was no significant ΔR^2 value from the first to the second step.

Table 3
Summary of the moderated hierarchical regressions of the PDI and LSHS on the BDI and STAI

Measure	BDI × STAI-T	BDI × STAI-S
PDI		
R^2	0.37 *	0.35 *
ΔR^2	0.02 *	0.01
b	0.15 *	0.05
LSHS		
R^2	0.26 *	0.26 *
ΔR^2	0.00	0.01
b	−0.01	−0.02

* $P < .001$.

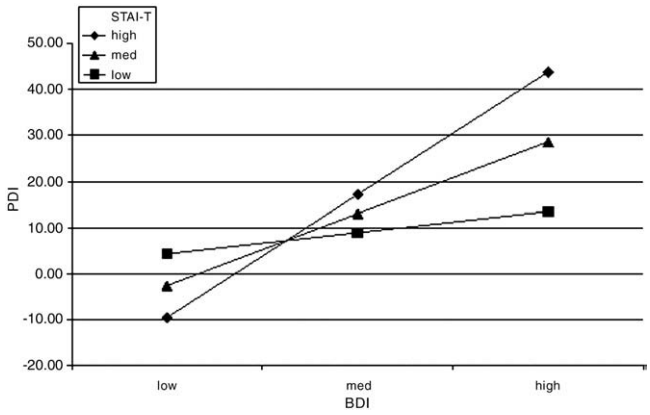

Fig. 1. Relationship between BDI and PDI, moderated by the STAI-T.

In the third model tested, the interaction between BDI and STAI-T was tested in predicting the total LSHS score. Table 3 shows that there was no significant interaction, and there was no significant ΔR^2 value from the first to the second step. In the final model, the interaction between the BDI and STAI-S was tested. Table 3 again shows that the interaction term was not a significant predictor of the LSHS, and there was no significant ΔR^2 value from the first to the second step.

4. Discussion

The present study examined how dysphoria relates to positive symptoms by examining how anxiety and depression relate to delusion and hallucination proneness in a nonclinical sample. Consistent with previous research, there were strong positive correlations between measures of both anxiety and depression and delusion and hallucination proneness [16,39]. However, when controlling for depression, the relationships between anxiety and delusion and hallucination proneness were nonsignificant, whereas, when controlling for anxiety, the relationships between depression and delusion and hallucination proneness remained significant and positive. Further, there was an interaction between anxiety and depression in predicting delusion proneness. There was relatively little difference in PDI scores across low, medium, and high groups on the STAI-T for those individuals low or medium on the BDI; however, there were relatively larger differences in PDI scores across low, medium, and high groups on the STAI-T for those individuals high on the BDI. Those individuals with both high STAI-T and BDI scores tended to have the highest PDI scores.

These findings provide further evidence for the potential contribution of dysphoria as a risk factor for the development of positive schizophrenic symptoms. In particular, our

findings highlight the potential significance of depression in predicting symptom risk and onset, although the association between depression and positive symptoms found in this study is not new [29,31,48]. Overall, the results obtained suggest that anxiety and depression may contribute in a different manner to hallucination and delusion proneness in nonclinical individuals. However, it should be noted that, although the instruments used to assess delusion and hallucination proneness are designed for psychosis risk screening, various studies have shown how these symptoms can also be related to other syndromes, such as affective disorders and substance abuse [49,50].

Unlike previous studies conducted with nonclinical samples, we found depression to be a better predictor of hallucination and delusion proneness than anxiety [16,27,39]. One potential explanation for this difference could be in the different assessment instruments used to measure anxiety and depression. Previous studies have used a state measure of depression, anxiety, and stress, namely the Depression Anxiety Stress Scales [16,39,51]. In the current study, we used both trait and state measures of anxiety. This may explain some differences in the findings compared with those in the previous studies. Certainly, the findings in the current study highlight the potential importance of mood-related factors in positive schizophrenic symptoms. Previous studies have identified the relevance of mood in relation to auditory hallucinations, in particular, depression as measured by the BDI [52-54]. Birchwood et al [54] found that individuals who reported hearing voices, as well as those reporting severe depression scores, were characterized by intense feelings of subordination, suggesting that hallucinations become highly distressing when associated with beliefs about subordination. Similarly, van der Gaag et al [55] found a similar attributional bias in beliefs that the voices in auditory hallucinations come from powerful authoritarian figures, and the subject hallucinating was inferior to them. The subordination to the voices has been found to be an important factor in consolidating hallucinations, and the primary question about what is guiding an individual's automatic tendency to feel subordinate is still under debate.

A similar line of research has been conducted on delusions, prompting speculation about the role of self-esteem in establishing and maintaining delusional ideation [56,57]. Low self-esteem and self-esteem instability have been found to be consistently associated with persecutory delusional ideation, as well as depression [58]. Individuals with low and unstable self-esteem were found to experience more depression when facing daily hassles [59] and show more problems in psychological functioning [60]. Thus, attributional biases in information processing seem to similarly influence the formation and maintenance of both delusions and hallucinations. This bias has been noted in nonclinical population and clinical reports. The attributional biases leading to subordination and low self-esteem are concepts closely linked to depression and, given their active role in influencing positive symptoms, should be considered in models explaining the genesis of positive symptoms.

Although cross-sectional studies of the kind reported here are important, longitudinal studies examining how emotion regulation processes relate to risk for positive symptoms over time and controlled emotion manipulation studies in clinical and nonclinical contexts will be crucial in further developing this area. On this topic, a recent review identified the management of dysphoria as one of the main factors cognitive behavioral therapies should address to tackle positive symptoms [61]. In particular, the issue of causality or the identification of early premorbid signs leading to psychosis risk should warrant more consideration in the future. It remains unclear whether dysphoria is an actual antecedent of delusion and hallucination or if it is a reaction to psychotic experiences.

In conclusion, the current study supported previous research by demonstrating positive links between measures of anxiety and depression and delusion and hallucination proneness in a nonclinical sample. Unlike in previous research, the data proposed show that depression was more strongly related to delusion and hallucination proneness when compared with anxiety. We also demonstrated that measures of anxiety and depression interacted significantly to predict delusion proneness. By showing the influence of depression on delusion and hallucination proneness, this study provides support for the idea that factors related to the emotional context play a crucial role in the formation and maintenance of positive symptoms and that they should be addressed in psychosis prevention and early intervention [10].

References

[1] Andreasen NC, Olsen S. Negative vs. positive schizophrenia: definition and validation. Arch Gen Psychiatry 1982;39:789-94.
[2] Liddle PF. The symptoms of chronic schizophrenia: a re-examination of the positive-negative dichotomy. Br J Psychiatr 1987; 151:145-51.
[3] Peralta V, de Leon J, Cuesta MJ. Are there more than two syndromes in schizophrenia? A critique of the positive-negative dichotomy. Br J Psychiatry 1992;161:335-43.
[4] Vazquez-Barquero JL, Lastra I, Nunez MJC, Castanedo SH, Dunn G. Patterns of positive and negative symptoms in first episode schizophrenia. Br J Psychiatry 1996;168:693-701.
[5] Keefe RS, Harvey PD, Lenzenweger MF, Davidson M, Apter SH, Schmeidler J, et al. Empirical assessment of the factorial structure of clinical symptoms in schizophrenia: negative symptoms. Psychiatr Res 1992;44:153-65.
[6] Marengo J, Harrow M, Herbener ES, Sands J. A prospective longitudinal 10-year study of schizophrenia's three major factors and depression. Psychiatry Res 2000;97:61-77.
[7] Peralta V, Cuesta MJ, de Leon J. An empirical analysis of latent structure underlying schizophrenic symptoms: a four syndrome model. Biol Psychiatry 1994;36:726-36.
[8] Toomey R, Kremen WS, Simpson JC, Samson JA, Seidman LJ, Lyons MJ, et al. Revisiting the factor structure for positive and negative

symptoms: evidence from a large heterogeneous group of psychiatric patients. Am J Psychiatry 1997;154:371-7.
[9] Strauss J, Carpenter WT, Bartko J. The diagnosis and understanding of schizophrenia: III. Speculations on the processes that underlie schizophrenic symptoms and signs. Schizophr Bull 1974;1: 61-9.
[10] Freeman D, Garety P. Connecting neurosis and psychosis: the direct influence of emotion on delusions and hallucinations. Behav Res Ther 2003;41:923-47.
[11] Guillem F, Pampoulova T, Stip E, Lalonde P, Todorov C. The relationship between symptom dimensions and dysphoria in schizophrenia. Schizophr Res 2005;75:83-96.
[12] Stedman TL. Stedman's Medical Dictionary. 26th ed. Baltimore: Williams and Wilkins; 1995.
[13] Taber CW. Taber's Cyclopedic Medical Dictionary. 18th ed. Philadelphia: Davis; 1997.
[14] Starcevic V. Dysphoric about dysphoria: towards a greater conceptual clarity of the term. Australas Psychiatry 2007;15(1):9-13.
[15] Sadock BJ, Sadock VA. Kaplan & Sadock's comprehensive textbook of psychiatry. 7th ed. Philadelphia: Lippincott & Wilkins; 2000.
[16] Allen P, Freeman D, McGuire P, Garety P, Kuipers E, Fowler D, et al. The prediction of hallucinatory predisposition in non-clinical individuals: examining the contribution of emotion and reasoning. Br J Clin Psychol 2005;44:127-32.
[17] Bressan RA, Chaves AC, Pilowsky LS, Shirakawa I, Mari JJ. Depressive episodes in stable schizophrenia: critical evaluation of the DSM-IV and ICD-110 diagnostic criteria. Psychiatry Res 2004; 117:47-56.
[18] Siris SG. Depression in the course of schizophrenia. In: Hwang MY, Bermanzohn PC, editors. Schizophrenia and comorbid conditions. Washington, DC: American Psychiatric Press; 2001. p. 31-56.
[19] Braga RJ, Petrides G, Figueira I. Anxiety disorders in schizophrenia. Compr Psychiatry 2004;45:460-8.
[20] Goodwin RD, Amador ZF, Malaspina D, Yale SA, Goetz RR, Gorman JM. Anxiety and substance use comorbidity among inpatients with schizophrenia. Schizophr Res 2003;61:89-95.
[21] Sands JR, Harrow M. Depression during the longitudinal course of schizophrenia. Schizophr Bull 1999;25:157-71.
[22] Addington D, Addington J. Attempted suicide and depression in schizophrenia. Acta Psychiatrica Scandinavica 1992;85:288-91.
[23] Hafner H, Loffler W, Maurer K, Hambrecht M, der Heiden W. Depression, negative symptoms, social stagnation and social decline in the early course of schizophrenia. Acta Psychiatr Scand 1999;100: 105-18.
[24] Holthausen EA, Wiersma D, Knegtering RH, Van den Bosch RJ. Psychopathology and cognition in schizophrenia spectrum disorders: the role of depressive symptoms. Schizophr Res 1999;39:65-71.
[25] Krabbendam L, Janssen I, Bak M, Bijl VR, Graaf R, van Os J. Neuroticism and low self-esteem as risk factors for psychosis. Soc Psychiatry Psychiatr Epodemiol 2002;37:1-6.
[26] Ciompi L. Affect logic: an integrative model of the psyche and its relation to schizophrenia. Br J Psychiatry 1994;164:51-5.
[27] Zubin J. Negative symptoms: are they indigenous to schizophrenia? Schizophr Bull 1985;11:461-70.
[28] Norman RMG, Malla AK. Dysphoric mood and symptomatology in schizophrenia. Psychol Med 1991;21:897-903.
[29] Sax KW, Strakowski SM, Keck PE, Upadhyaya VH, West SA, McElroy SL. Relationships among negative, positive, and depressive symptoms in schizophrenia and psychotic depression. Br J Psychiatry 1996;168s:68-71.
[30] Lysaker PH, Bell MP, Bioty SM, Zito WS. The frequency of associations between positive and negative symptoms and dysphoria in schizophrenia. Compr Psychiatry 1995;36:113-7.
[31] Nakaya M, Ohmori K, Komahashi T, Suwa H. Depressive symptoms in acute schizophrenic inpatients. Schizophr Res 1997;25:131-9.
[32] Schizotypy CG. Implications for illness and health. Oxford: Oxford University Press; 1997.
[33] Johns LC, van Os J. The continuity of psychotic experiences in the general population. Clin Psychol Rev 2001;21:1125-41.
[34] Verdoux H, van Os J. Psychotic symptoms in non-clinical populations and the continuum of psychosis. Schizophr Res 2002;54:59-65.
[35] Verdoux H, Maurice-Tison S, Gay B, van Os J, Salamon R, Bourgeois M. A survey of delusional ideation in primary care patients. Psychol Med 1998;28:127-34.
[36] Tien A. Distribution of hallucinations in the population. Soc Psychiatry Psychiatr Epidemiol 1991;21:287-92.
[37] Pulton R, Caspi A, Moffitt T, Cannon M, Murray R, Harrington H. Children's self-reported psychotic symptoms and adult schizophreniform disorder. Arch Gen Psychiatry 2000;57:1053-8.
[38] Bak M, Myin-Germeys I, Hanssen M, Bijl R, Vollebergh W, Delespaul P, et al. When does experience of psychosis result in a need for care? A prospective general population study. Schizophr Bull 2003;29:349-58.
[39] Paulik G, Bafcock J, Maybery M. The multifactorial structure of the predisposition to hallucinate and associations with anxiety, depression and stress. Pers Individ Dif 2006;41:1067-76.
[40] Hanssen M, Bak M, Bijl R, Vollebergh W, van Os J. The incidence and outcome of subclinical psychotic experiences in the general population. Br J Clin Psychol 2005;44(Pt 2):181-91.
[41] Peters ER, Garety PA. The Peters et al. delusions inventory (PDI): new forms for the 21-item version. Schizoph Res 1996;18:118-9.
[42] Larøi F, Marczewski P, Van der Linden M. Further evidence of the multi-dimensionality of hallucinatory predisposition: factor structure of a modified version of the Launay-Slade hallucinations scale in a normal sample. Eur Psychiatry 2004;19:15-20.
[43] Lawewnce E, Peters E. Reasoning in believers in the paranormal. J Nerv Ment Dis 2004;192:727-33.
[44] Launay G, Slade P. The measurement of hallucinatory predisposition in male and female prisoners. Pers Individ Dif 1981;2:221-34.
[45] Peters E, Joseph S, Day S, Garety P. Measuring delusional ideation: the 21-item Peters et al. Delusions Inventory (PDI). Schizophr Bull 2004;30: 1005-22.
[46] Beck AT, Steer RA, Brown GK. BDI-II Manual. San Antonio, TX: The Psychological Corporation; 1996.
[47] Spielberger CD, Gorsuch R, Lushene R, Vagg PR, Jacobs GA. Manual for the State–Trait Anxiety Inventory: STAI. Palo Alto: Consulting Psychologists Press; 1983.
[48] Norman RMG, Malla AK, Cortese L, Diaz F. Aspects of dysphoria and symptoms of schizophrenia. Psychol Med 1998;28:1433-41.
[49] Verdoux H, van Os J, Maurice-Tison S, Gay B, Salamon R, Bourgeois ML. Increased occurrence of depression in psychosis-prone subjects: a follow-up study in primary care settings. Compr Psychiatr 1999;40(6):462-8.
[50] Stefanis NC, Delespaul P, Henquet C, Bakoula C, Stefanis CN, van Os J. Early adolescent cannabis exposure and positive and negative dimensions of psychosis. Addiction 2004;99:1333-41.
[51] Lovibond PF, Lovibond SH. The structure of negative emotional states: comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. Behav Res Ther 1995;13:335-43.
[52] Bentall RP, Kinderman P, Kaney S. The self, attributional processes and abnormal beliefs: towards a model of persecutory delusions. Behav Res Ther 1994;32:331-41.
[53] Birchwood M. Pathways to emotional dysfunction in first-episode psychosis. Br J Psychiatry 2003;182:373-5.
[54] Birchwood M, Iqbal Z, Upthegrove R. Psychological pathways to depression in schizophrenia. Eur Arch Psychiatry Clin Neurosci 2005; 225:202-12.
[55] van der Gaag M, Hageman MC, Birchwood M. Evidence for a cognitive model of auditory hallucinations. J Nerv Ment Dis 2003;191:542-5.
[56] Bentall RP, Corcoran R, Howard R, Blackwood N, Kinderman P. Persecutory delusions: a review and theoretical integration. Clin Psychol Rev 2001;21:1143-92.
[57] Freeman D, Garety PA, Kuipers E. Persecutory delusions: developing the understanding of belief maintenance and emotional distress. Psychol Med 2001;31:1293-306.

[58] Green C, Garety PA, Freeman D, Fowler D, Bebbington P, Dunn G, et al. Content and affect in persecutory delusions. Br J Clin Psychol 2006; 45:561-77.

[59] Kernis MH, Whisenhunt CR, Waschull SB, Greenier KD, Berry AJ, Herlocker CE, et al. Multiple facets of self-esteem and their relations to depressive symptoms. Pers Soc Psychol Bull 1998;24:657-68.

[60] Paradise AW, Kernis MH. Self-esteem and psychological well-being: implications of fragile self-esteem. J Soc Clin Psych 2002;21:345-61.

[61] Kuipers E, Garety P, Fowler D, Freeman D, Dunn G, Bebbington P. Cognitive, emotional, and social processes in psychosis: refining cognitive behavioural therapy for persistent positive symptoms. Schizophr Bull 2006;32(Suppl 1):S24-S31.