

Symptomatic determinants of insight in schizophrenia spectrum disorders

Lisa Buchy^a, Ivan J. Torres^{a,b}, Peter F. Liddle^c, Todd S. Woodward^{b,d,*}

^aDepartment of Psychology, Simon Fraser University, Burnaby, British Columbia, Canada V5A 1S6

^bDepartment of Research, BC Mental Health and Addiction Service, Riverview Hospital, Coquitlam, British Columbia, Canada V3C 4J2

^cDivision of Psychiatry, Medical School Queen's Medical Centre, University of Nottingham, Nottingham, NG7 2UH England, UK

^dDepartment of Psychiatry, University of British Columbia, Vancouver, British Columbia, Canada V6T 1Z3

Abstract

Impaired insight in schizophrenia spectrum disorders has been linked to several psychopathologic features including positive symptoms, although not all dimensions of psychopathology have been studied and confounds from other symptoms have not been ruled out. In addition, the nature of the association between insight and specific positive symptoms, in particular delusions, remains unclear. The present investigation examined whether, in patients with schizophrenia spectrum disorders insight is associated with specific symptom dimensions including delusional severity. The factor structure was determined from scores of 151 patients rated on the Signs and Symptoms of Psychotic Illness scale. Associations of the Signs and Symptoms of Psychotic Illness insight item with the resulting components and delusions were assessed using regression-based methodology. Principal component analysis revealed 4 orthogonal symptom clusters. Correlational analyses demonstrated that only depression/anxiety and psychomotor excitation were significantly related to insight. Hierarchical regression indicated that delusions explained unique variance in insight over and above depression/anxiety and psychomotor excitation. These results suggest that depression/anxiety is associated with better insight and that psychomotor excitation and delusions are associated with poorer insight.

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1. Introduction

Impaired insight, or unawareness of illness, is a cardinal yet complex clinical feature of schizophrenia that has been linked to some aspects of psychopathology [1]. Impaired insight has been associated with positive [1], disorganized [2], and negative [1] symptoms and inversely associated with depression [1] and anxiety [3]. However, findings are inconsistent [4,5] and studies do not typically use multivariate statistical methodology to explore how the full range of symptoms explains variance in insight scores. Without evaluating and controlling statistically for the full range of schizophrenic symptoms, it is possible that the observed association between a particular symptom and insight could be confounded by the presence of another symptom.

A second question that persists in this literature concerns the extent and nature of association between positive

symptoms and insight. Most studies investigating this relationship have used scales that combine subsets of positive symptoms such as delusions and hallucinations. These investigations have yielded mixed results, with some [6–8], but not all [9,10], reporting associations between global positive symptoms and level of insight. In an effort to more closely examine the positive symptom/insight link, some investigators have studied the association between insight and more specific subsets of positive symptoms, most typically delusions. The rationale for positing a link between poor insight and delusional severity has been generally based on the long-standing psychiatric view that delusions underpin patients' beliefs about their illness [6,11]. This complimentary line of research has revealed that impaired insight is often observed in schizophrenia patients with delusions [3,12–14]. Nonetheless, several studies have produced equivocal results [8,15,16]. Several methodological issues may account for the ambiguity in the literature. Specifically, research on insight in schizophrenia patients with delusions has typically been carried out on small samples, resulting in inadequate statistical power. Moreover, often the influence of other symptom dimensions on insight

* Corresponding author. Department of Psychiatry University of British Columbia, Vancouver, British Columbia, Canada V6T 1Z3. Tel.: +1 604 524 7697; fax: +1 604 822 7756.

E-mail address: toddswoodward@gmail.com (T.S. Woodward).

has not been partialled out, leaving open the possibility that observed associations (or absence of associations) between delusions and insight were due to contributions from other symptom dimensions. For these reasons, the relationship between the delusional aspects of schizophrenia and insight remains unclear. The assessment of insight and delusions on a large sample of schizophrenia patients using multivariate statistical techniques may prove useful to overcome these methodological shortcomings.

The purpose of the present study was 2-fold. The first objective was to evaluate the specific association between core dimensions of psychopathology and insight after controlling for the influence of other symptoms. To obtain empirically derived dimensions of psychopathology, principal component analysis was applied to symptom ratings obtained on a large sample of patients with schizophrenia spectrum disorders. Using the resulting factors, we then evaluated whether level of insight was specifically associated with discrete symptom dimensions. Recent work suggests that the relationship between poor insight and positive symptoms applies preferentially to delusions [3,12–14]; therefore, our second objective was to directly evaluate whether delusions are specifically associated with insight over and above other symptom dimensions.

2. Method

2.1. Patients

Inpatients and outpatients with a *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* diagnosis of schizophrenia spectrum disorders [17] were recruited from successive admissions to Riverview Hospital and the Forensic Psychiatric Institute, Port Coquitlam, and Vancouver General Hospital, Vancouver, British Columbia, Canada. Inclusion criteria were current diagnosis of nonaffective psychosis (schizophrenia, schizoaffective, psychosis not otherwise specified). Participants were excluded if their IQ (as assessed by the Quick Test [18]) was less than 70, if they had a history of primary or acquired brain damage (eg, stroke, encephalitis) or traumatic head injury (eg, with a loss of consciousness for more than 10 minutes), or if they had tested positive for HIV. Patients meeting the inclusion/exclusion criteria and providing written consent were interviewed for assessment of psychotic symptoms.

One hundred fifty-one patients diagnosed with schizophrenia spectrum disorders (schizophrenia, $n = 113$; schizoaffective disorder, $n = 33$; psychosis not otherwise specified, $n = 5$) met the inclusion criteria. The mean age was 36.2 years ($SD = 10.13$), and the mean number of years of education was 12.0 ($SD = 2.33$). The mean number of years since first hospitalization, duration of illness, and age of onset were 11.5 ($SD = 9.54$), 15.1 ($SD = 9.41$), and 20.9 ($SD = 6.43$), respectively. The mean number of previous hospitalizations was 6.3 ($SD = 4.69$). A total of 70% ($n = 106$) of the patients were men, and 30% ($n = 45$)

were women. At the time of testing, 97% of patients were receiving either only typical ($n = 7$) or only atypical ($n = 104$) antipsychotic medications, or both ($n = 31$); and 2 patients were unmedicated. The mean chlorpromazine equivalent was calculated using the well-known formulas defined in Bezchlibnyk-Butler and Jeffries [19] and was found to be 739.8 mg ($SD = 598.74$). Current medication information was unavailable for 7 patients.

2.2. Clinical assessment

Symptom severity was assessed using the Signs and Symptoms of Psychotic Illness (SSPI) rating scale [20]. The SSPI is a 20-item scale administered through semi-standardized interview of 15 direct questions about symptoms and behaviors occurring in the preceding week. The severity of each phenomenon is rated on a scale of 0 to 4 (0, no evidence of pathology; 1, experiences or behavior that are of questionable pathology; 2, phenomena are clearly pathologic but mild; 3, pathology of moderate severity that has a substantial impact on mental functioning; 4, severe psychopathology). Item 20 from the SSPI was used to quantify the degree of clinical insight (Appendix A). The mean SSPI total score indicated that psychotic symptoms were of moderate overall severity. As specified above, we excluded affective psychoses but nonetheless observed that mood symptoms were not uncommon in our sample. Table 1 displays SSPI item ratings for the sample.

2.3. Statistical analysis

To reveal the factor structure of schizophrenia symptoms, a principal component analysis with varimax rotation was

Table 1
Signs and Symptoms of Psychotic Illness ratings of the sample, expressed as percentages

SSPI item	Symptom rating n(%)					Mean (SD)
	0	1	2	3	4	
Anxiety	45.0	23.2	16.6	13.9	1.3	1.0 (1.14)
Depression	64.2	17.9	11.9	6.0	0.0	0.6 (0.92)
Anhedonia	55.6	21.2	11.9	11.3	0.0	0.8 (1.04)
Elation	90.1	5.3	3.3	1.3	0.0	0.2 (0.53)
Insomnia	78.1	8.6	7.3	5.3	0.7	0.4 (0.89)
Somatization	66.2	11.3	19.2	2.6	0.7	0.6 (0.93)
Delusions	16.6	10.6	11.3	39.1	22.5	2.4 (1.38)
Hallucinations	49.0	6.0	5.3	19.2	20.5	1.6 (1.69)
Impaired attention	35.1	13.2	30.5	21.2	0.0	1.4 (1.17)
Disorientation	85.4	10.6	2.6	1.3	0.0	0.2 (0.54)
Overactivity	70.2	7.9	19.2	1.3	1.3	0.6 (0.94)
Underactivity	53.6	21.9	16.6	7.9	0.0	0.8 (0.99)
Flat affect	58.3	13.2	17.2	10.6	0.7	0.8 (1.10)
Inappropriate affect	82.8	12.6	1.3	3.3	0.0	0.3 (0.65)
Pressure of speech	82.8	10.6	5.3	0.7	0.7	0.3 (0.65)
Poverty of speech	70.2	15.2	9.3	5.3	0.0	0.5 (0.87)
Thought form disorder	48.3	10.6	26.5	11.9	2.6	1.1 (1.21)
Peculiar behavior	74.2	14.6	5.3	4.6	1.3	0.4 (0.89)
Hostility	67.5	19.2	6.6	6.6	0.0	0.5 (0.89)
Insight	10.6	19.2	35.8	11.3	23.2	2.2 (1.28)
SSPI total	-	-	-	-	-	16.3 (6.53)

performed on all 151 nineteen-item (excluding insight) SSPI assessments. To interpret the components, we focused on SSPI items with component loadings of 0.45 or greater. Pearson (r) correlations were used to determine which components were significantly associated with insight. Hierarchical regression was used to assess the impact of delusions over and above the components that significantly correlated with insight. All analyses were performed using the Statistical Package for the Social Sciences version 15.0 for Windows (SPSS, Chicago, IL) [21].

3. Results

3.1. Principal component analysis

A scree plot suggested that 4 components should be extracted, and item loadings for these components are listed in Table 2. The first component reflected the negative cluster of schizophrenia symptoms, labeled the *psychomotor poverty* symptom dimension by Liddle [22], and was dominated by high loadings on flat affect, poverty of speech, underactivity, and anhedonia. The second component was similar to the core positive symptoms, and to the symptom clusters designated as *reality distortion and disorganization* by Liddle [22], and was dominated by high loadings on thought form disorder, attentional impairment, delusions,

inappropriate affect, hallucinations, and somatization. Depression/anxiety was represented in the third component and was dominated by high loadings on depression, anxiety, insomnia, and anhedonia. The fourth component reflected psychomotor excitation and was dominated by high loadings on elation, pressure of speech, and overactivity. Disorientation, peculiar behavior, and hostility items did not load on any particular component. The 4-component solution accounted for 45.71% of the total variance.

3.2. Associations between symptom dimensions and insight scores

Correlation of the 4 orthogonal components (psychomotor poverty, reality distortion/disorganization, depression/anxiety, and psychomotor excitation) with insight revealed significant associations with depression/anxiety ($r[149] = -0.27, P < .001$) and psychomotor excitation ($r[149] = 0.23, P < .005$). Psychomotor poverty and reality distortion components did not significantly correlate with insight ($r[149] = 0.13, P = .12$ and $r[149] = 0.07, P = .42$, respectively). Regression analysis demonstrated that, together, the orthogonal depression/anxiety and psychomotor excitation components accounted for 13% of the variance in insight ($F_{2,148} = 10.84, P < .001, R^2 = 0.13$).

3.3. Direct investigation of delusions and insight

Because of the theoretical importance of the association between delusions and insight (ie, impaired insight is considered an integral part of delusions), we directly tested whether or not the delusions item would predict insight over and above depression/anxiety and psychomotor excitation. This analysis was carried out by entering depression/anxiety and psychomotor excitation into a regression equation as a first step and testing the significance of R^2 change when the SSPI item 7 (delusions) was entered into the equation. This analysis resulted in a significant R^2 ($F_{3,147} = 9.84, P < .001, R^2 = 0.17$) when the delusions item was added. The standardized β for the delusions item with insight was .21 ($t[147] = 2.64, P < .01$), and depression/anxiety and psychomotor excitation remained significant when the delusions item was entered into the model.

4. Discussion

Several main findings emerged from our analyses of whether level of insight was associated with severity of psychopathology in patients with schizophrenia spectrum disorders. First, principal component analysis of the SSPI items (excluding the insight item) resulted in a 4-component solution, interpreted as psychomotor poverty, reality distortion/disorganization, depression/anxiety, and psychomotor excitation. Second, a positive association between depression/anxiety and insight and a negative relationship between psychomotor excitation and insight were observed, such that depression/anxiety was associated with better insight

Table 2
Component loadings for the 19 SSPI items

SSPI item	Psychomotor poverty	Reality distortion/disorganization	Depression/anxiety	Psychomotor excitation
Flat affect	.81	-.28	.06	-.15
Poverty of speech	.70	-.42	-.08	-.07
Underactivity	.69	-.11	.06	-.19
Anhedonia	.56	.04	.51	-.14
Thought form disorder	-.13	.64	-.23	.15
Impaired attention	.25	.63	.07	.07
Delusions	-.27	.57	.24	.26
Inappropriate affect	-.19	.53	-.02	-.15
Hallucinations	-.06	.51	.13	.28
Somatization	-.03	.47	.30	.02
Depression	.18	.25	.77	-.07
Anxiety	-.02	.11	.72	.07
Insomnia	-.24	-.16	.51	.16
Elation	-.09	-.10	.14	.76
Pressure of speech	-.13	.12	.02	.74
Overactivity	.10	.08	-.16	.47
Disorientation	.44	.26	-.17	.29
Peculiar behavior	.30	.06	-.06	.15
Hostility	.00	.13	.13	.25
% of variance explained	13.32	12.56	10.28	9.53

All loadings greater than .45 are set in bold font.

and psychomotor excitation (mania) was associated with poorer insight. Finally, delusions explained unique variance in insight over and above depression/anxiety and psychomotor excitation.

4.1. Symptom clusters predicting insight scores

Poor insight was independently associated with the depression/anxiety and psychomotor excitation dimensions, but not with the reality distortion/disorganization or negative symptom dimensions. Higher depression/anxiety was associated with better insight. This finding fits well with a substantial body of evidence that has consistently identified that in patients with schizophrenia, recovery of insight deficits is linked with increased depressive symptomatology [1,2]. The direction of causation among these constructs, however, remains unclear. Results also revealed that increased psychomotor excitation was associated with diminished insight, consistent with 2 other samples [6,23], despite the lack of studies investigating this symptom dimension in schizophrenia. Of note, recent studies have linked poor insight to manic symptoms in bipolar disorder [24]. Thus, the present findings further suggest that the psychomotor excitation syndrome may be tied to impaired awareness of one's mental illness.

Unlike some [6,7], but not all [2,4], previous studies, the current analyses revealed no significant predictive value of negative and reality distortion/disorganization symptom dimensions for insight, suggesting that these symptom dimensions have limited predictive power when the influence of other symptoms is considered. It is also possible that the results were moderated by the mean age of onset of disorder, which in our patient sample is quite young and varied. It has been shown that, in patients with an older age of onset, the relationship between insight and negative symptoms is stronger [1]. A second factor that may have affected the results is that our sample was composed of a mixture of acute and chronic cases, as some patients were recruited while experiencing acute psychotic episodes and others were recruited after inpatient or outpatient stabilization. Because it has been shown that the relationship between insight and positive symptoms is stronger in acute samples [1], it is possible that stronger associations between insight and positive and negative symptomatology might emerge in an older, more acute sample. A final possible explanation for the lack of association between insight and positive symptoms is that the broad category of positive symptoms included a heterogeneous mix of symptoms such as hallucinations and delusions, which is addressed in the next section.

4.2. Delusions predicting insight scores

The current results replicate earlier work reporting a link between increased delusions and diminished insight [3,14] and extends these findings by demonstrating that the delusion-insight relationship is not due to other dimensions

of psychopathology that also may correlate with insight. The observed relationship between poor insight and delusions, both of which reflect separation from reality, suggests that both entities may involve overlapping pathologic processes [11]. Thus, a patient's fallible knowledge about the (seemingly) external world (delusion) as well as about his or her broader condition (poor insight) may in both cases reflect poor knowledge of self. This proposal is consistent with the observation that delusional content (paranoia, grandiosity, referential, passivity experience) frequently makes reference, or more aptly, misreference, to the self. Nevertheless, the findings of the present study suggest that insight deficits cannot be entirely explained vis-à-vis delusions and highlight the complexity of the insight-psychopathology connection.

4.3. Component structure of schizophrenia symptoms

In the current sample, the disorganization and reality distortion syndromes emerged as a unitary construct, and this contrasts with a body of evidence including our own previous work [20,22,25,26]. Table 1 demonstrates that, relative to hallucinations and delusions, thought disorder and inappropriate affect display low pathology and variance. Moderate to severe ratings on thought disorder and inappropriate affect (3 or 4 on the SSPI) were observed in only 14.5% and 3.3% of patients, respectively, and most of the patients (82.8%) were rated 0 on inappropriate affect. This suggests that the variance attributable to the disorganization factor is relatively muted and may be incorporated by the reality distortion cluster when analyzed alongside the full range of SSPI items. Thus, disorganization and reality distortion can collapse into 1 factor in some samples.

4.4. Limitations

A limitation of the present study is that insight, which is likely a multidimensional phenomenon, was incorporated into a single global rating. Thus, the association between symptoms and specific dimensions of insight such as awareness of the need for treatment, current and retrospective insight, and awareness and attribution of specific symptoms [27] remains unknown. Despite this limitation, meta-analytic evidence [1] indicates that both composite and multidimensional measures of insight can be sensitive to psychotic symptom severity. Furthermore, in ascertaining insight through SSPI item 20, several questions are asked that explicitly tap into a variety of dimensions of insight, including patient's understanding of the nature of the illness, and these are incorporated into the single global rating. We have adopted the composite score approach for the present study because it does not intrinsically embrace understanding of the nature of specific psychotic symptoms, thereby justifying our testing of hypotheses regarding association with clusters of symptoms. Clearly, a fruitful next step would be to evaluate the potential association

between components of insight and specific symptoms such as delusions. Another limitation was that the cross-sectional and correlational means of assessing the relationship between symptoms and levels of insight preclude the determination of causal relationships between these variables. Generalizability of these findings across multiple phases of illness remains largely unknown, and longitudinal studies tracking changes in insight and symptoms over time will be needed to test hypotheses related to causation. Finally, it should be noted that our sample comprised voluntary patients who provided informed consent to participate in the study, and as such, may be biased in a manner that discriminated in favor of patients with enhanced insight. Despite potentially excluding patients with the poorest insight (who may not have provided consent), a wide range of insight was observed in our sample (Table 1) and a relationship between insight and various symptom dimensions was still detectable.

4.5. Conclusions and implications

Taken together, these results suggest that in patients with schizophrenia spectrum disorders poor insight into illness is positively related to psychomotor excitation and delusions and is negatively associated with depression and anxiety. A deeper understanding of the clinical correlates and mechanisms underlying insight is important because diminished insight has been closely linked to poorer psychosocial functioning [6] and poor treatment compliance [28]. For example, future studies may explore whether reasoning and cognitive biases, which have been linked to positive symptoms [29,30], are also associated with impaired insight. This may reveal whether patients with impaired insight may benefit from specific psychosocial interventions [31], which target cognitive errors and problem-solving biases.

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Appendix A. Insight item of the SSPI scale

20. Impaired insight

Impairment of the patient's understanding of the nature of the illness. At the less severe levels, the patient accepts that he/she has a mental illness, but has unrealistic ideas that impair the ability to weigh up issues regarding treatment and/or to comprehend the impact of the illness on his/her life. In judging whether or not the patient has unrealistic ideas, the interviewer must allow reasonable scepticism concerning professional intervention and rea-

sonable desire to maintain independence (consistent with his/her cultural values).

0. Realistic view of the nature of the illness.
1. Accepts he/she has mental illness, but has questionably unrealistic ideas that impair the ability to weigh up issues concerning treatment and/or to comprehend the impact on life.
2. Accepts he/she has mental illness, but has clearly unrealistic ideas that impair the ability to weigh up issues concerning treatment and/or to comprehend the impact on life.
3. While accepting that he/she has an illness or impairment, the patient does not accept even implicitly that it is an illness or impairment affecting the mind (eg, patient maintains that problem arises mainly from somatic origins).
4. Denies mental illness and sees any problems as arising entirely from external sources.

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