# The evolution of insight, paranoia and depression during early schizophrenia

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## ABSTRACT

**Background.** How insight, paranoia and depression evolve in relation to each other during and after the first episode of schizophrenia is poorly understood but of clinical importance.

**Method.** Serial assessments over 18 months were made using multiple instruments in a consecutive sample of 257 patients with first episode DSM-IV non-affective psychosis. Repeated measures of paranoia, insight, depression and self-esteem were analysed using structural equation modelling, to examine the direction of relationships over time after controlling for confounds.

**Results.** Depression was predicted directly by greater insight, particularly at baseline, and by greater paranoia at every stage of follow-up. Neither relationship was mediated by self-esteem, although there was a weak association of lower self-esteem with greater depression and better insight. Paranoia was not strongly associated with insight. Duration of untreated psychosis and substance use at baseline predicted depression at 18 months.

**Conclusions.** In first-episode psychosis, good insight predicts depression. Subsequently, paranoia is the strongest predictor. Neither effect is mediated by low self-esteem. Effective treatment of positive symptoms is important in preventing and treating low mood in early schizophrenia.

## INTRODUCTION

The first episode of schizophrenia and its resolution are likely to form a critical period affecting future course (e.g. Bleuler, 1972; Wyatt, 1991; Birchwood *et al.* 1998; Wiersama *et al.* 1998). Examining how key symptoms evolve during these early stages may reveal more about their relationships than later, when chronicity and secondary processes can obscure the picture. We wished to examine the inter-relationship over the first 18 months between three clinically important aspects of phenomenology: insight, paranoia and depression. This is best done in a longitudinal, repeated measures design using a large sample of acutely psychotic subjects in or near their first episode.

The literature on the relationships between insight, paranoia and depression is conflicting. In this study paranoia denotes the severity of delusions and suspiciousness. Depression refers to the depressive component of psychopathology identified repeatedly in factor analytical studies of schizophrenia and related psychoses (e.g. Lindenmayer *et al.* 1994; Marder *et al.* 1997; White *et al.* 1997; Drake *et al.* 2003).

An association between reduced insight and worse positive symptoms is reported frequently in cross-sectional studies large enough to detect weak to moderate correlations, with samples over 80 (e.g. Amador *et al.* 1994; Dickerson *et al.* 1997; Carroll *et al.* 1999). Smaller studies typically find inconsistent or absent relationships (e.g. Kemp & Lambert, 1995; Sanz *et al.* 1998;

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Smith *et al.* 1998, 2000). It is assumed from a clinical perspective that reduction of positive symptoms over time leads to an increase in insight but the evidence for this from large longitudinal studies of recovery from psychosis is inconsistent – though different studies measure different aspects of insight and positive symptoms. McEvoy *et al.* (1989) found change in insight was not associated with change in global psychopathology. Carroll *et al.* (1999) also found no association of changes in insight with changes in positive symptoms, but Weiler *et al.* (2000) reported that improvement in overall psychotic symptoms correlated with improvement in overall insight. Two small studies found that only aspects of retrospective insight were associated with positive or total symptoms (Smith *et al.* 1998; Kemp & Lambert, 1995).

The association between paranoia and depression is also unclear. Several different theories of psychological processes predict that better insight emerges as psychosis improves, leading to the onset of depression. This underpins the ICD-10 diagnosis of 'post-psychotic' depression. This is a logical consequence of basic psychodynamic accounts of insight and delusions; or labelling theory (Warner *et al.* 1989), according to which the patients lose self-esteem by labelling themselves as psychotic. However, depressive symptoms may be worse during first episodes than at later stages (Addington *et al.* 1998). After first episodes of schizophrenia, mean levels of depressive symptoms show little change after 3 months but show evidence of variable, sometimes substantial resolution after 1 year (House *et al.* 1987; Addington *et al.* 1998). Green *et al.* (1990) showed that depressive symptoms started more often at the same time as relapse into psychosis than at resolution, though they occurred at any phase of relapse or recovery. When present during a psychotic episode depressive symptoms often persist after resolution of psychosis (Hirsch & Jolley, 1989). Birchwood *et al.* (2000) examined depressive symptoms occurring after psychosis had receded and found a weak overall association with recurrence of psychosis, but the pattern was complex.

The third mooted association is that between insight and depression. There is good evidence for a cross-sectional association between better insight and depressive symptoms (e.g. Amador *et al.* 1994; Sanz *et al.* 1998). Carroll *et al.* (1999) found an increase in insight correlated with an increase in depressed mood during an educative programme after treatment for acute illness. Smith *et al.* (1998) also found depression increased as awareness of illness improved. In contrast, Kemp & Lambert (1995) found that the association between insight and depression symptoms on admission disappeared by the time of follow-up 3 to 6 weeks later. Iqbal *et al.* (2000) followed patients up after psychosis and compared 26 who developed depression (but no psychosis) with others. They found they had better insight only during the depressive episode, but poor self appraisal even beforehand.

In view of the conflicting evidence in this clinically important area we set out to test related hypotheses in a large sample of individuals with first-episode schizophrenia and related psychoses, recruited for a trial of cognitive-behavioural therapy (Lewis *et al.* 2002) and assessed serially over 18 months follow-up, using statistical modelling techniques to investigate the relationships between symptoms. The following hypotheses were tested: (*i*) greater paranoia is associated with less insight; (*ii*) greater insight is associated with greater depression; (*iii*) the relationship between increased insight and increased depression is entirely mediated by reduced self-esteem; and (*iv*) other observed relationships, such as between paranoia and depression, are explained by these primary relationships.

Paranoia was measured using the severity of delusions and suspiciousness and was chosen because of the theoretical importance of its relationships to insight and self-esteem. The broad construct of 'positive symptoms' would make interpretation of relationships with other variables difficult. For instance, the relationships of grandiosity and persecutory delusions to self-esteem, or to depression, are likely to differ.

## METHOD

### Sample

Patients were recruited from consecutive acute day and in-patient admissions from a catchment population of 2·3 million. Assessments were performed within 14 days of admission, by a different rater at each of three trial centres.

Inclusion criteria were: (*i*) first admission for psychosis; (*ii*) meeting DSM-IV criteria for schizophreniform disorder, schizophrenia, schizoaffective disorder, delusional disorder or psychosis not-otherwise-specified; (*iii*) minimum 4 week history of positive psychotic symptoms; and (*iv*) substance abuse not judged to be the major cause of the psychosis.

## Assessments

Demographic details and data about substance use were recorded at baseline. Duration of untreated positive symptoms (DUP) was assessed from multiple informants using an algorithm (Drake *et al.* 2000). DSM-IV diagnoses were assigned with a central supervisor (S.W.L). Assessments relevant to the current hypothesis were undertaken at baseline, 6 weeks, 12 weeks and 18 months.

### Paranoia

Two scales were used for the assessment of paranoia: (*i*) the Positive and Negative Symptom Scale for schizophrenia (PANSS) (Kay *et al.* 1987), Delusion item and Suspiciousness item (raters ($N=3$) showed intra-class correlation coefficients (ICCs) for scores on the items of 0·80 and 0·86; and (*ii*) the Delusion Scale (DS) from the Psychotic Symptom Rating Scales (PSYRATS), a well-validated, cognitively oriented measure of delusions and their impact (Haddock *et al.* 1999), (ICCs for the relevant items ranged from 0·96 to 0·61).

Cronbach's alpha for the paranoia items ranged from 0·76 to 0·92 at different stages. They were selected, *a priori* on the basis of the hypotheses, as representative of paranoia.

### Insight

Insight was assessed by: (*i*) the Birchwood Insight Scale (BIS) (Birchwood *et al.* 1994) an 8-item self-report questionnaire; and (*ii*) the Insight item from PANSS, scored on a seven point scale (ICCs 0·48 and 0·58) (these values are not high and reflect on the reliability of the overall variable). However, the reliability of the BIS was far higher in a similar population (Birchwood *et al.* 1994) and the PANSS item was combined with the eight BIS items, so the effect of the PANSS item on the reliability of the overall insight scale was limited. Both the PANSS item and BIS cover insight into illness, symptoms and treatment, but one is an objective and the other a subjective measure.

### Depression factor

A depression factor was derived using four items on the PANSS: (*i*) anxiety; (*ii*) depression; (*iii*) guilt; (*iv*) avolition. ICCs for these items were 0·70 to 0·93. These items were selected, on the basis of a previous series of factor analyses of the PANSS in this group of patients, as best representing an underlying factor (Drake *et al.* 2003). Cronbach's alpha ranged from 0·56 to 0·75 at different stages of follow-up. A specific depression scale was not included in the parent trial (Lewis *et al.* 2002). A measure based on the PANSS depression factor is closer to the broad scope of a depression scale total than the PANSS depressed mood item alone.

### Self-esteem

Self-esteem was assessed with the Rosenberg Self-esteem Scale (Rosenberg, 1965), a 10 item self-completion scale.

## Statistical analysis

For step 1, single measures of paranoia, insight and depression were derived using factor analysis. For step 2, these measures were used in an analysis based on repeated regressions, to examine the longitudinal relationship of these variables with each other and to assess the effect of potential confounders. For step 3, structural equation modelling was undertaken, using fewer variables.

### Step 1: *derivation of depression, paranoia and insight factors*

Factor analysis was performed using SPSS 9.0. Separate factor scores were extracted using the *a priori* defined items listed above: for paranoia, insight and depression. At each stage of follow-up, for each type of factor, a single factor solution was fitted using maximum likelihood. In all cases single factor solutions were clearly best, based on scree plots; marked breaks always occurred between first and second factors.

### Step 2: *multiple regression against depression, paranoia and insight factors*

In the first analysis, the baseline depression factor was the dependent variable. The paranoia and insight factors and self-esteem score were

entered simultaneously as independent variables. The following baseline variables were added: sex, normalized measures of age, years of full-time education and duration of untreated psychosis before admission (DUP), ethnicity, status as a daily drug/alcohol user at baseline, diagnosis, trial treatment condition (routine care, CBT or supportive counselling).

A regression against depression factor scores at 6 weeks was then performed, with all the baseline factor scores and demographic variables, as well as the scores for insight, paranoia and self-esteem at 6 weeks, as independent variables. This was repeated for depression at the next two stages, in each case with the same baseline demographic and trial measures; paranoia, insight and self-esteem at the same stage; and the same variables from the previous stage. The same process was then repeated for paranoia, insight and self-esteem instead of depression.

### Step 3: Structural equation modelling of depression, paranoia, insight and self-esteem

The longitudinal relationships of the four variables – depression, insight, paranoia and self-esteem – were further analysed using structural equation modelling, with the *Mx 1.50* program (Neale *et al.* 1999) and full information maximum-likelihood. This procedure made use of all available data, including those from subjects with incomplete assessments. The individual data for baseline, 6 weeks, 3 and 18 months were analysed jointly for a 'complete' model. Means were allowed to vary freely in this model. For each stage, the four variables from the same stage all covaried with one another, unconstrained. All the variables were also connected with all of the variables in the preceding and succeeding timepoints, but the directions of the relationships were constrained such that the variables in each timepoint determined the variables in the next. This gave a sequence of stages with temporal direction and no 'sleeper' effects (that would have skipped any intervening stage) but otherwise saturated: each stage determined the next. The goodness-of-fit of the overall model was measured using $\chi^2$.

This complete model was compared to an 'autocorrelation' model where baseline variables all covaried, and only the same variables for each of the stages were connected by temporally directed associations (i.e. depression to depression, without cross-lagging between one variable and a different variable at a successive timepoint); but the stages after baseline had no associations between simultaneous variables.

A further model was derived by more exploratory methods. All associations between stages were kept, but associations within stages, among contemporaneous variables, were removed backward and stepwise, lowest correlation first, until the model's overall fit was significantly worsened. To determine the direction of each of the remaining associations, the fit of the model with a given variable constrained to determine another was compared to the original model in which the two variables were simply correlated. The model with the same two variables related in the opposite direction was also compared and the model with the best-fit ($\chi^2$) selected. This was repeated for each association giving an overall exploratory analysis of the simultaneous relationships involved, given the assumption that variables were autocorrelated but were not cross-lagged.

## RESULTS
### Sample

A total of 257 first-episode patients were recruited from 299 eligible admissions, with 42 patients not consenting to take part. Sample characteristics are in Table 1. Follow-up assessments were completed in 77% of cases at 6 weeks, 72% at 3 months and 72% at 18 months. Patients who dropped out had very similar baseline characteristics to those who completed follow-up (Table 1). Only those who dropped out at 18 months are shown but they closely resemble those without complete data at earlier stages. At 18 months patients who remained in follow-up were rediagnosed: 95% remained in the spectrum of diagnoses meeting the entry criteria.

### Multiple regression against insight, depression and paranoia factors

At baseline the more educated were more depressed (Table 2). Patients with longer duration of untreated psychosis (DUP) and those who abused substances at baseline had more depression at final interview. Those who had psychotherapy had more insight at 3 months than those who had routine care ($P = 0.06$).

Table 1. *Character of the sample by 18-month follow-up*

|  | Followed-up (N = 185) | Dropped out (N = 72) |
|---|---|---|
| Sex: male, N (%) | 127 (68) | 56 (71) |
| Age at onset, median (years) | 26·9 | 25·5 |
| Education, median (years) | 11 | 11 |
| Diagnosis, N (%) |  |  |
| Schizophreniform disorder | 73 (40) | 30 (42) |
| Schizophrenia | 61 (33) | 28 (39) |
| Schizo-affective disorder | 25 (14) | 7 (10) |
| Delusional disorder | 16 (9) | 5 (7) |
| Psychosis NOS | 10 (5) | 2 (3) |
| Ethnicity, N (%) |  |  |
| White | 167 (90) | 58 (81) |
| African-Caribbean | 13 (7) | 6 (8) |
| South Asian | 3 (2) | 4 (6) |
| Other | 2 (1) | 4 (6) |
| Daily drug or alcohol ab(use), N (%) | 32 (17) | 9 (13) |
| Baseline scores, mean (S.D.) |  |  |
| Rosenberg Self-Esteem Scale | 27·33 (4·82) | 27·30 (5·40) |
| Birchwood Insight Scale | 9·66 (4·10) | 9·16 (4·34) |
| PANSS |  |  |
| Insight item | 4·58 (1·31) | 4·41 (1·49) |
| Depression item | 3·34 (1·46) | 3·53 (1·49) |
| Suspiciousness item | 4·58 (1·31) | 4·41 (1·49) |
| Total | 87·22 (17·06) | 89·44 (19·84) |

## Structural equation modelling

The fit of the 'autocorrelation' model was worse than that of the 'complete' model (difference in $\chi^2 = 418·0$, difference in df = 54, $P < 0·001$), showing that the variables are not just related at baseline. In the 'complete' model the cross-lagged associations (between different variables at different times) were weak: different variables had little effect on each other over time compared to their simultaneous associations. Only four cross-lagged associations significantly impaired the fit of the model if removed (correlations between 0·11 and 0·22). Autocorrelations between the same variables at succeeding stages (e.g. depression to depression) ranged from 0·23 to 0·50.

The exploratory model was constructed to clarify the strongest associations between contemporaneous variables, and their directions (Fig. 1). By design this model did not fit significantly worse than the complete model (difference in $\chi^2 = 12·5$, in df = 7).

A consistent pattern was seen at each stage. Removing all the relationships between paranoia and insight did not significantly worsen the model's fit. Better insight directly predicted more depression, and was frequently associated with lower self-esteem: the associations were strongest at baseline (correlations, 0·37 for self-esteem and 0·43 for depression). Depression and low self-esteem were associated. Greater paranoia always predicted greater depression (correlations 0·29 to 0·53). Where paranoia and self-esteem were related, greater paranoia was related to lower self-esteem.

## Specific models

To test further the basic hypotheses four models were fitted using *Mx*: of insight, self-esteem, paranoia and depression at each stage of follow-up (baseline, 6 weeks and so on), using only those patients with complete data at that stage. In each model all variables covaried freely, as a standard against which to judge the following modifications.

When the association between insight and paranoia was removed the fit did not deteriorate significantly at any stage, and Akaike's Information Criterion (AIC, a measure of parsimony; Neale *et al.* 1999) improved. Thus, there was no evidence that paranoia determines insight. When insight and depression's association was removed AIC worsened at each stage; and at all stages but 3 months $\chi^2$ was significantly worse. Specifying insight to determine depression did not alter the fit from the standard models. Insight was clearly related to, and could determine, depression. Finally, depression and paranoia's association was removed. At each stage the model's fit was significantly worse than the standard, suggesting paranoia was related to depression. Specifying the association's direction did not alter fit.

## DISCUSSION

Data from a large, representative cohort of incident cases of schizophrenia spectrum psychoses were used to test a series of hypotheses about how important symptom variables might relate to one another in early schizophrenia. Structural equation modelling (SEM) was used, which exploits the large amounts of data from repeated, systematized observations made longitudinally. As used here, it allows a quantitative study of the direction of relationships between key symptoms in the early course of psychosis.

Table 2. *Associations of insight and depression* (*partial correlations from linear regressions*)

| | Baseline | Follow-up | | |
| --- | --- | --- | --- | --- |
| | | 6 weeks | 3 months | 18 months |
| Insight | SE −0·44<br>P −0·16<br>D 0·26 | Baseline IS 0·47<br>P −0·23<br>D 0·23 | 6 week IS 0·50<br>SE −0·27<br>Ed 0·21 | 3 month IS 0·30 |
| Depression | Ed 0·20<br>SE −0·17<br>P 0·25<br>IS 0·26 | Baseline D 0·40<br>SE −0·24<br>P 0·47<br>IS 0·23 | 6 week D 0·32<br>SE −0·38<br>P 0·28 | 3 month D 0·24<br>SE −0·34<br>P 0·28<br>SA 0·30<br>DUP 0·26 |

SE, Self-esteem; P, paranoia; D, depression; Ed, education; IS, insight; SA, substance abuse; DUP, duration of untreated psychosis. Only those associations with $t$ test $P$ values $<0·05$ (uncorrected for multiple comparisons) are included.



FIG. 1. Associations of insight (IS), depression (D), self-esteem (SE) and paranoia (P) over time. Associations ($+$, positive; $-$, negative) indicated by arrows: line weight proportional to partial correlation calculated from structural equation modelling ($\longrightarrow$, correlation 0·10; $\Longrightarrow$, correlation 0·25; $\blacktriangleright$, correlation 0·40). Associations between the same variables at successive times are omitted for clarity.

The first hypothesis was that severity of paranoid delusions would be directly related to reduced insight. Despite having strong face validity and showing some relationship in conventional regression analyses, these two constructs were shown not to have a direct relationship using SEM, which adjusted for confounds. The hypothesis that insight was associated with depression was confirmed, with the likely direction of causation being that increasing insight leads to depression (Fig. 1).

Furthermore, both good insight and depression were associated with low self-esteem, but which of these variables determined the others was not clear. In particular, the link between insight and depression was not just mediated by low self-esteem. Finally, paranoia was shown to be strongly related to depression and appeared to cause it.

The parsimonious assumption that these models were similar at different stages during the first 18 months of illness was broadly

supported. The lack of strong associations between different variables over time showed that although variables display strong consistency (in terms of moderate autocorrelation and stable mean scores) and affect each other in the short-term, they do not have great influence on each other over a matter of weeks and months. That is, they quickly achieve a dynamic equilibrium. Insight at admission lowers mood at the time but it does not directly influence depression later in the episode, for instance. The baseline variables of longer duration of untreated psychosis and substance use predicted depression at 18 months.

In terms of methodological constraints, cases were diagnosed by clinically trained raters without using a structured interview. However, the large proportion rediagnosed at follow-up with diagnoses in the same spectrum suggests there were few inappropriate patients. Eighty-seven per cent of eligible patients entered the study, delimiting the degree of bias due to non-ascertainment. The statistical models depend on deriving common factors for various PANSS and PSYRATS items, and it is important to ask what these factors represent. The depression factor items had reasonable consistency in a detailed longitudinal analysis of the PANSS (Drake *et al.* 2003) and are similar to the items used for subscales in other work in the area, as discussed. A specific scale for depression in schizophrenia was not available in the original trial. The PANSS items used for the paranoia factor were also internally consistent (Drake *et al.* 2003). The insight factor used was chosen to combine objective and subjective assessments from the PANSS and BIS respectively. One advantage of deriving factors rather than using subscales is that the items included are not assumed to contribute equally to the total score, so if one item is unrelated to the underlying construct it will contribute little to the factor.

The high correlation of paranoia and depression might give cause for concern about these factors' independence. However, the differences in associations for these two variables with self-esteem and insight and the consistent way paranoia determines depression in the 'exploratory' model suggest that our results reflect a real and close association between these separate variables.

## Implications

These findings have theoretical implications for cognitive models of symptom formation in psychosis. The classical idea of resolving psychosis leading to better insight, which in turn is the main cause of emerging depression as a result of reduced self-esteem, was clearly rejected. The present analyses argue against the idea that psychotic defence mechanisms directly lead to paranoia and poor insight as a consequence of preserving self-esteem and protecting against depression (e.g. Lyon *et al.* 1994; Amador & Kronengold, 1998). It is still possible that these variables are related in a complex and non-linear way, for example as recently suggested in Bentall *et al.* 2001. These kinds of relationships would not be detected by the present assessments or described by our statistical models. There is some evidence for a shift in the processes that underlie depression over time: insight seems to have a great impact at baseline (consistent with Kemp & Lambert, 1995), but the reduction of this impact suggests a process of adjustment may take place with time and recovery from psychosis. That this recovery in mood takes many weeks is consistent with other longitudinal data (Addington *et al.* 1998) but casts doubt on the ICD-10 notion of 'post-psychotic' depression.

There are also clinical implications. Given that paranoia was unrelated to overall insight, it seems that reducing suspiciousness and delusions is not an effective way to try to improve global insight, though treatment may improve insight independently of positive symptoms. However, it seems treatment of paranoia, or delusions, is an important method of reducing depression at any stage. The impact of insight on depression is most marked in the acute stage of illness. These differences in processes at different times suggest that efficacy of specific treatment approaches is likely to be stage dependent. This would explain why, for instance, antidepressants are independently effective in 'post-psychotic' depression but not during acute exacerbations of illness (Levinson *et al.* 1999).

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