

Aspects of dysphoria and symptoms of schizophrenia

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ABSTRACT

Background. In the past it has been postulated that dysphoric emotions may be related to positive and/or negative symptoms in schizophrenia. The results of several recent studies have suggested that composite dysphoria indices are more strongly related to positive than negative symptoms. In the current study we use part correlation techniques to examine the possible unique contributions of two aspects of dysphoria – depression and anxiety – to three syndromes of symptoms (reality distortion, disorganization and psychomotor poverty) within schizophrenia.

Methods. Data were obtained from 60 patients with a DSM-III-R diagnosis of schizophrenia. Symptoms of schizophrenia were assessed using the SAPS and SANS and dysphoria was assessed using both self-report (BDI and BAI) and observer ratings (HRSD and HARS). Assessment of schizophrenia symptoms and ratings of depression and anxiety were completed by different observers. In addition, drug induced extrapyramidal side effects were rated.

Results. Part correlations showed that unique aspects of anxiety (particularly physiological arousal) were correlated with reality distortion while unique aspects of depression (including psychomotor slowing and loss of social interest) were related to psychomotor poverty. At least part of the latter relationship may be due to extrapyramidal side effects of neuroleptic medication.

Conclusions. Although there is considerable overlap between anxiety and depression, it appears that the unique arousing or activating aspects of anxiety are related to the experience of reality distortion symptoms in schizophrenia and the unique slowing and withdrawal aspects of depression are particularly related to psychomotor poverty. Possible reasons for these relationships are discussed.

INTRODUCTION

There is increasing interest in the association of dysphoria with symptoms of schizophrenia. Several authors have suggested a possible overlap between dysphoria and negative symptoms of schizophrenia either because depression contributes to negative symptoms or because it is difficult to distinguish the behavioural manifestations of depression and negative symptoms (Knights & Hirsch, 1981; Sommers, 1985; Zubin, 1985). Several empirical studies have examined the relationship between depression and negative symptoms with mixed conclusions (Craig *et al.* 1985; Prosser *et al.* 1987; Siris *et al.* 1988; Kulhara *et al.* 1989; for a further discussion see Norman & Malla, 1991).

Others have postulated that aversive or dysphoric emotional states increase the likelihood of positive symptoms of schizophrenia. Such suggestions are typically predicated on the assumption that compromised brain function and cognitive adaptability leaves a vulnerable individual more susceptible to being overwhelmed by environmental challenges, which results in an increased probability of dysphoric emotional experiences as well as disorganized or polarized thinking, which in turn leads to positive symptoms (Haracz, 1985; Chadwick, 1992; Ciompi, 1994; Kingdon & Turkington, 1994). Studies of the relationship of dysphoria to positive symptoms have been fewer than for its relationship to negative symptoms.

The first study to examine directly correlations between dysphoria and positive *versus* negative symptoms was that of Norman & Malla (1991). In that study of 95 stabilized schizophrenic outpatients, dysphoria, as assessed by several self-

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report instruments, was found to be significantly related to a cumulative index of positive, but not negative symptoms. In a subsequent longitudinal study Norman & Malla (1994*a, b*) found evidence of a greater likelihood of positive correlations in changes over time between self-reported dysphoria and positive than negative symptoms. Both Lysaker *et al.* (1995) and Nakaya *et al.* (1997) have replicated these latter findings using observer ratings of dysphoria, and Sax *et al.* (1996) have also reported evidence of depression being related to positive symptoms.

The concept of dysphoria includes both depression and anxiety (Stedman, 1995; Taber, 1997) and researchers examining dysphoria in schizophrenia have typically relied only on depression scales or combined depression and anxiety indices (Craig *et al.* 1985; Kulhara, 1989; Lysaker *et al.* 1995; Nakaya *et al.* 1997). Although indices of anxiety and depression have substantial overlap and the usefulness of the distinction between the constructs has been questioned (Watson & Clark, 1984; Feldman, 1993), there is some evidence that these dysphoric states may differ in their cognitive and neural bases and in their behavioural and clinical implications (Dobson, 1985; Greenberg & Beck, 1989; Watson & Kendall, 1989; Berenbaum *et al.* 1990; Clark & Watson, 1991). Of particular importance are differences in the apparent behavioural implications of depression and anxiety. Depression is typically conceived of as resulting in diminution of behaviour and withdrawal, whereas anxiety is usually expected to result in heightened activation and increased likelihood of maladaptive cognition and behaviour (Russell, 1980; Watson & Kendall, 1989). It is not surprising, therefore, that arguments favouring possible overlap of dysphoria with negative symptoms are usually framed in terms of depression (Knights & Hirsch, 1981; Zubin, 1985), while those favouring a dysphoria – positive symptom association usually emphasize feelings of threat and anxiety (Ciompi, 1994; Kingdon & Turkington, 1994). Up to this point, however, there have been no studies examining the relationship of unique aspects of depression and anxiety to symptoms in schizophrenia.

It is also important to note that recent findings have prompted a re-examination of the structure of the symptoms characteristic of schizophrenia.

Considerable empirical support has emerged for Liddle's (1987) suggestion that symptoms of schizophrenia can be conceived of as consisting of at least three syndromes – psychomotor poverty (including poverty of speech, decreased spontaneous movements and blunting of affect); reality distortion (consisting of hallucinations and delusions) and disorganization (thought disorder, inappropriate affect and poverty of content of speech) (Malla *et al.* 1993; Arndt *et al.* 1995; Lenzenweger & Dworkin, 1996). There is evidence that each of these syndromes may be associated with unique patterns of neurophysiological and cognitive dysfunction (Liddle & Morris, 1991; Norman *et al.* 1997).

In the current study we will use part correlations to examine the relationships of unique aspects of depression and anxiety as measured by both self-report and rating scale measures, to each of the three syndromes of symptoms in schizophrenia patients. In addition, given the past suggestion that behavioural criteria for psychomotor poverty or negative symptoms and/or depression may overlap with drug-induced Parkinsonian symptoms (Rifkin *et al.* 1975; Craig *et al.* 1985; Prosser *et al.* 1987), and that antipsychotic drugs may give rise to symptoms of depression (Amanth & Ghadirian, 1980; Galdi, 1983), we will also more systematically examine the relationship of Parkinsonian symptoms and antipsychotic medication dosage with dysphoria and syndromes of schizophrenia.

METHOD

Subjects

This paper does not represent a re-analysis of previously published data relevant to this issue (Norman & Malla, 1991), but rather it is based on a new cohort of subjects. All patients had a DSM-III-R diagnosis of schizophrenia as confirmed by a structured clinical interview (Spitzer *et al.* 1989). They represented a broad range of severity and chronicity of the disorder including both in-patients and out-patients. The patients were recruited from four sources: the in-patient unit of the Department of Psychiatry of London Health Sciences Centre (Victoria Campus); the Community Reintegration and Treatment Programme associated with the same institution and in-patient units of St. Thomas Psychiatric

Hospital in St. Thomas, Ontario and North Bay Psychiatric Hospital in North Bay, Ontario. Data relevant to the current objectives were obtained on 60 patients.

Measures

The Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI) are probably the most widely used and psychometrically validated set of scales for assessing dysphoric moods by self-report in clinical populations (Beck & Steer, 1987, 1990); and the Hamilton Rating Scale for Depression (HRSD) and the Hamilton Anxiety Rating Scale (HARS) are the most widely used set of instruments for carrying out such assessments by observer ratings (Hamilton, 1959, 1960). Although other worthy scales (e.g. Addington *et al.* 1992) are available for assessing depression by observer rating, for current purposes the Hamilton scales have the advantages of offering greater opportunity for comparability to past research (Craig *et al.* 1985; Prosser *et al.* 1987; Nakaya *et al.* 1997) and providing putatively parallel measures of depression and anxiety. For these reasons the Beck and Hamilton scales were used for the assessment of dysphoria.

Symptoms of schizophrenia were assessed using the Scale for the Assessment of Negative Symptoms (SANS) and the Scale for the Assessment of Positive Symptoms (SAPS) (Andreasen, 1983, 1984). Norman *et al.* (1996a) have found the SAPS and SANS to show good convergent validity with and comparable inter-rater reliability to the other widely used scale for rating schizophrenic symptoms, the PANSS (Kay *et al.* 1987); but the former scales more readily allow a detailed assessment of symptoms and the derivation of the three syndromes discussed earlier.

Assessments of drug induced extrapyramidal symptoms were carried out using two widely used instruments, the Simpson Angus Rating Scale (SARS) (Simpson & Angus, 1970) and the Abnormal Involuntary Movements Scale (AIMS) (National Institute of Mental Health, 1974).

Procedure

The data to be reported in this paper were collected in the following fashion. Working in pairs, the four authors completed ratings on

patients on the basis of an interview with each patient, review of relevant case-notes and, when necessary, discussions with clinical staff involved in the care of the patients. Every precaution was taken to ensure that each rater had exactly the same information available at the time of the ratings.

One member of each pair of raters was randomly designated to be the primary interviewer for purposes of carrying out a clinical interview with the second rater observing the interview and having an opportunity to ask any additional questions that he wished for clarification purposes. Each rater reviewed the same clinical records and raters consulted together with clinical staff involved in the care of the patient in order to obtain as complete information as possible. The data being reported in this paper are based on independent ratings made by one member of each pair of raters on the SAPS and SANS and by the other on the HARS and HRSD. Such a procedure avoids biases which might result from having both dysphoria and schizophrenic symptoms rated by the same observer (Prosser *et al.* 1987; Kulhara *et al.* 1989; Sax *et al.* 1996). The patients themselves were asked to complete the Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI) and the SARS and AIMS were completed by one of the two raters.

Derivation of the three syndromes of reality distortion, disorganization and psychomotor poverty from the SAPS and SANS was based on results of an earlier factor analytical study (Malla *et al.* 1993). The sample size of 60 in the current study is inadequate to carry out a reliable exploratory or confirmatory factor analysis of all items on the SAPS and SANS (Tabachnick & Fidell, 1989, Hu & Bentler, 1995). Using the common rule of thumbs of at least five subjects per variable we selected a total of 12 symptom items consisting of the four highest loading items for each of the three factors in Table 1 of Malla *et al.* (1993). These were subjected to a confirmatory factor analysis using EQS software (Bentler, 1995). A maximum likelihood estimation method was utilized and goodness-of-fit assessed using the Comparative Fit Index (CFI) which yielded a value of 0.88 (Robust CFI = 1.00) indicating an acceptable level of support for the three factor solution to the current symptom data. As noted earlier, such a three

factor solution consisting of psychomotor poverty, disorganization and reality distortion has been replicated by several independent groups of investigators.

As a major objective of the current report is to examine possible unique relations of anxiety and depression with symptoms, we elected to score the Hamilton scales using the system advocated by Riskind *et al.* (1987) which has been found to allow greater separation between depression and anxiety.

RESULTS

Characteristics of the sample

Table 1 presents information on the demographic and clinical characteristics of the sample. There was a wide range of ages, approximately two-thirds of the sample were male and the majority were out-patients. Total scores on the

Table 1. *Demographic and clinical characteristics of sample (N = 60)*

Age	
Mean	38.8
Range	22–61
Gender	
Male	41
Female	19
Patient status	
In-patient	20
Out-patient	40
Marital status	
Married	6
Never married	45
Divorced/separated	9
Living circumstances	
Own home or apartment	31
Living with family of birth	21
Boarding or group home	8
Total SAPS	
Mean	19.82
Range	0–67
Total SANS	
Mean	34.87
Range	0–87
BDI	
Mean	12.37
Range	0–39
BAI	
Mean	11.85
Range	0–48
HRSD (Riskind <i>et al.</i> version)	
Mean	6.00
Range	0–21
HARS (Riskind <i>et al.</i> version)	
Mean	6.55
Range	0–32
CPZ equivalence of antipsychotic med.	
Mean	455.17 mg
Range	0–2500 mg

SAPS and SANS, anxiety and depression scales, and the CPZ equivalents of anti-psychotic medication suggest a sample which varies widely in level of symptomatology and dosage of antipsychotic medication being received.

Dysphoria scores and symptoms of schizophrenia

Anxiety and depression were found to be substantially interrelated using either self-report or rating scale methods ($r = 0.67$ and 0.63 , respectively, $P < 0.001$). Such findings are consistent with past reports based on schizophrenic patients and others (Watson & Clark, 1984; Dobson, 1985; Lysaker *et al.* 1995; Norman *et al.* 1996*b*). This is the first study of which we are aware to allow an examination of the correlation between the Beck scales and Hamilton scales in patients with schizophrenia. It is interesting to note that the intercorrelations between the self-report and rating scale scores for both anxiety ($r = 0.63$, $P < 0.001$) and depression ($r = 0.46$, $P < 0.001$) are comparable to those reported in other populations (Beck & Steer, 1991; Sayer *et al.* 1993; Norman *et al.* 1996*b*). For both anxiety and depression we also calculated a composite index by adding the standard score equivalences of the relevant self-report and rating scale indices.

Table 2 shows the bivariate Pearson correlations between each of the indices of dysphoria and the symptoms of schizophrenia. The results replicate earlier findings (Norman & Malla, 1991) on a different sample that individual differences in scores on both self-reported depression and anxiety scales show significant bivariate correlations with total scores on the SAPS, but there is no significant relation to total SANS scores. The data from the current study extend previous findings from self-report indices to rating scale measures of anxiety and depression. Table 2 is also consistent with longitudinal findings that dysphoria scores show significant correlations only with reality distortion and not with either psychomotor poverty or disorganization syndromes (Norman & Malla, 1994*a*).

As indicated earlier, in this study (and more generally in the research literature) significant overlaps are found between scores on scales of anxiety and depression. Semi-partial correlations allow us to examine the extent to which

Table 2. Correlation of dysphoria indices with syndromes in schizophrenia

Dysphoria index	Reality distortion	Disorganization	Psychomotor poverty	Total SAPS	Total SANS
BDI	0.28*	0.10	0.14	0.29*	0.15
HRSD	0.32*	0.06	0.16	0.28*	0.15
Composite depression	0.35**	0.10	0.18	0.34**	0.17
BAI	0.49***	0.03	-0.05	0.44***	-0.04
HARS	0.37**	0.02	-0.09	0.36**	-0.11
Composite anxiety	0.48***	0.03	-0.08	0.44***	-0.09

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

Table 3. Part correlation of anxiety and depression with symptoms of schizophrenia

Dysphoria index	Reality distortion	Disorganization	Psychomotor poverty	Total SAPS	Total SANS
BDI	-0.09	0.12	0.26*	-0.03	0.26*
HRSD	0.11	0.06	0.28*	0.08	0.28*
Composite depression	-0.01	0.11	0.36**	0.01	0.36**
BAI	0.41***	-0.06	-0.22	0.33**	-0.22
HARS	0.22	-0.02	-0.25	0.24	-0.26*
Composite anxiety	0.32**	-0.07	-0.32**	0.29*	-0.32*

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

unique variance of a member of a set of two or more intercorrelated variables predicts variance on another (criterion) variable (Tabachnick & Fidell, 1989; Stevens, 1996). For instance, a part correlation of the BDI with reality distortion symptoms controlling for BAI would estimate the extent to which unique components of the depression measure (i.e. those that are not shared with the BAI) predict level of reality distortion. Table 3 presents part correlations for each of the self-report and rating scale measures of dysphoria (e.g. HRSD) with symptoms of schizophrenia when the complementary self-report or rating scales measure (e.g. HARS) is controlled. The use of such statistical controls to examine anxiety and depression independently has been suggested in the past (Dobson, 1985). As Table 3 shows, the pattern of these part correlations is different from the bivariate correlations presented earlier. The depression measures are found to have a significant part correlation with psychomotor poverty and total SANS score, but not with any other index. On the other hand, the anxiety indices tend to show significant correlations with reality distortion and total SAPS. The HARS positive correlation with reality distortion and total SAPS does not quite reach the traditional two tailed significance criterion ($P = 0.07$), but it is particularly note-

worthy that it shows a significant negative correlation with psychomotor poverty and total SANS score. The part correlations were derived through use of a multiple regression procedure. As would be expected, only the variables showing significant part correlations in Table 3 entered into the regression prediction of the respective symptom measures.

In order to determine more specifically which particular aspects of anxiety and depression were contributing to the significant part correlations in Table 3, we calculated part correlations of each of the BAI items with the reality distortion index while controlling for the total BDI score, and the part correlations of the BDI and HRSD with psychomotor poverty while controlling for total BAI and HARS scores respectively. The individual items on the BAI that showed significant part correlations with reality distortion were reactions of numbness and tingling; heart pounding or racing; feeling terrified; difficulty breathing; and feeling faint. The aspects of depression that were found to correlate with psychomotor poverty (when measures of anxiety were controlled) were the items on the BDI referring to loss of interest in other people and feelings of being punished; and Hamilton items referring to psychomotor retardation and weight loss.

Possible role of medication and drug-induced extrapyramidal symptoms

As indicated earlier, it has been suggested that medications and their side effects may contribute to or mimic dysphoria and/or negative/psychomotor poverty type symptoms. Correlations between chlorpromazine (CPZ) equivalence of medication dosage and the measurements of interest in this study revealed several significant correlations. CPZ equivalence was significantly correlated with reality distortion ($r = 0.25$, $P < 0.05$), disorganization ($r = 0.28$, $P < 0.05$), total SAPS score ($r = 0.39$, $P < 0.01$), and HRSD score ($r = 0.42$, $P < 0.001$). Because of this latter correlation CPZ equivalence was also found to be significantly related to the composite depression index. Such correlations between medication and symptoms (particularly those of psychosis) are quite possibly reflecting the clinical decision to give larger dosages to those patients who are currently showing more florid psychotic symptoms. To examine whether medication could also be contributing to the relationships reported in Table 3, CPZ equivalence was also partialled out, and this was found to have no substantial effect on the pattern of correlations reported, indeed the only effect was to strengthen some of the significant correlations.

With reference to the two indices of extrapyramidal symptoms, SARS (Parkinsonism) and AIMS (tardive dyskinesia), only the SARS showed any significant relationship to the indices of dysphoria or symptoms of schizophrenia. Total SARS score was significantly correlated with only psychomotor poverty ($r = 0.29$, $P < 0.05$) and HRSD ($r = 0.30$, $P < 0.05$). When variance, which could be attributed to total SARS score was also removed, the partial correlations of HRSD with psychomotor poverty and total SANS scores became non-significant ($r = 0.20$ and 0.23 , respectively, $P > 0.05$).

In order to provide a conservative test of the possible importance of all the medication related variables in explaining the relationships presented in Table 3, standard multiple regressions were carried out in which each pair of dysphoria measures (self-report, rating scale or composite) along with CPZ equivalence, SARS and AIMS were entered into the pre-

diction of each of the three syndromes as well as total scores on the SAPS and SANS. Such a procedure allows us to assess which dysphoria indices add to the level of prediction of the symptom complex beyond the predictability afforded by all other predictors. These multiple regressions yielded patterns of relationships similar to those in Table 3. All part correlations that were significant in Table 3 remained significant after CPZ equivalence, SARS and AIMS were jointly controlled for.

DISCUSSION

As indicated in our introduction, past research on dysphoria and symptoms of schizophrenia has either focused only on supposed signs of depression (Craig *et al.* 1985; Kulhara *et al.* 1989) or have examined combinations of anxiety and depression without examining their possible unique relationships (Norman & Malla, 1994*a, b*; Lysaker *et al.* 1995). Such approaches are understandable given the substantial correlations often found between measures of anxiety and depression. The results of the current study, however, demonstrate the potential value of looking at relationships of unique aspects of depression and anxiety with syndromes of schizophrenia.

Our findings of significant zero order correlations between measures of depression and positive symptoms are consistent with several past reports (Norman & Malla, 1991, 1994*a, b*; Lysaker *et al.* 1995; Kakaya *et al.* 1997). These past studies, however, did not explicitly disentangle the independent relationships between symptoms of schizophrenia and the depression and anxiety components of dysphoria. When, in this study, we removed the possible confounding effect of anxiety, we found that depression was more strongly related to negative than positive symptoms and this relationship was based primarily on vegetative signs or behavioural manifestations such as decreased social interest and behavioural and cognitive slowing rather than mood. This latter finding is similar to findings of others who have examined the specific aspects of depression indices which correlate with negative symptoms (Craig *et al.* 1985; Prosser *et al.* 1987; Whiteford *et al.* 1987).

Our finding of anxiety being more strongly related to reality distortion than to other

symptoms of schizophrenia is also consistent with the only two previous reports which examined this issue (Norman & Malla, 1994 *a, b*; Lysaker *et al.* 1995). Part correlations show that the relationships of self-reported anxiety to reality distortion to be independent of variance attributable to depression. The part correlation of the HARS with reality distortion becomes of only borderline significance when variance possibly attributable to HRSD is removed. However, anxiety was clearly not positively related to psychomotor poverty as indicated by a negative correlation. Examination of the individual items on the self-report and rating scale measures of anxiety do converge on the conclusion that it is primarily physiological (particularly autonomic) signs of anxiety that are related to reality distortion.

It is of particular interest to compare our findings to two quite recent papers. Sax *et al.* (1996) found that in a group of first episode (and largely untreated) schizophrenic patients' scores on the conventional HRSD were correlated with aspects of both positive and negative symptoms, but in that study no effort was made to separate aspects of anxiety from the depression measure. Nakaya *et al.* (1997) examined correlations over time between changes in levels of depression and symptoms of schizophrenia. They found that depressive symptoms were more highly related to changes in positive than negative symptoms. When specific aspects of depressive symptoms were examined, they found that only some were related to positive symptoms. Those that did show a relationship to change in positive symptoms were a 'depression-anxiety' factor and 'hypochondriasis', both of which are likely to be even more highly related to anxiety. On the other hand, improvement of negative symptoms were highly related to change in a 'reduced activity' factor. Such findings appear consistent with our conclusion of there being a differential relationship of anxiety and depression to symptoms of schizophrenia.

There are a variety of reasons why one might see positive relations between symptom complexes. One possibility is that such correlations reflect the common influence of a third variable. For instance, in the past it has been suggested that neuroleptic-induced extrapyramidal side effects might be responsible for overlap between negative symptoms/psychomotor poverty and

signs of depression. The results of partialling out variance possibly attributable to such side effects as assessed by the SARS indicate that symptoms of drug induced Parkinsonism are a possible contributor to some aspects of the correlation between depression and psychomotor poverty/negative symptoms, although when variance attributable to all three of CPZ equivalence, SARS and AIMS was removed, the relationship between each of the depression measures and psychomotor poverty remained significant.

Another third variable explanation of the relationship between anxiety and positive symptoms involves the concept of neuroleptic induced dysphoria. This is not a well developed concept, but broadly refers to a general feeling of unwellness causally attributed to neuroleptics. The likelihood of such dysphoria occurring in response to neuroleptics may be influenced by complex combinations of factors including patient characteristics, extrapyramidal symptoms and even symptoms of schizophrenia (Weiden *et al.* 1989). Of potential relevance to the relation between anxiety and positive symptoms is the suggestion that neuroleptic induced dysphoria may be associated with subjective apprehension and motor restlessness (akathisia). Unfortunately, no direct measure of akathisia was included in this study. There are, however, several items on the BAI and HARS which might be expected to be elevated by any akathisia related neuroleptic induced dysphoria. These are BAI items assessing inability to relax, fear of the worst happening, feeling nervous, and shakiness; on the HARS items reflecting apparent tension, somatic muscular signs of anxiety, agitation, and fidgeting and restlessness during the interview. Ancillary analyses showed that these items were not more highly related to reality distortion, disorganization or total SAPS score than other items on the respective scales. Furthermore, when total scores on the BAI and HARS were re-calculated omitting these items, the modified scale totals for BDA and HARS showed the same pattern of significant part correlations as reported in Table 3. While these findings do not support neuroleptic-induced dysphoria as the mediator of the relationship between anxiety and reality distortion, future studies should test further this possibility by including more direct measures of akathisia, although it should also be noted that there is

reason to question the robustness of the relationship of neuroleptic dysphoria to akathisia (Weiden *et al.* 1989).

Correlations between symptom complexes may occur because they are very similar or identical in appearance. Such an explanation is plausible in understanding the correlation between behavioural manifestations of depression and negative symptoms/psychomotor poverty that may even share common underlying pathophysiological mechanisms (Knights & Hirsch, 1981; Prosser *et al.* 1987), but it does not offer a plausible explanation for the correlation between anxiety and reality distortion symptoms. Anxiety symptoms, particularly physiological manifestations of anxiety, are not part of the criterion for the assessment of hallucinations and delusions.

Finally, correlations may reflect the influence of one variable on another. Such a possibility may be particularly germane to the relationship between anxiety and positive symptoms such as reality distortion. The argument has been made that aspects of stress or anxiety and physiologically related states may increase the likelihood of psychotic symptoms occurring (Allen & Agus, 1968; Slade, 1973; Norman & Malla, 1993; Kingdon & Turkington, 1994). While it may seem intuitively appealing that anxiety is more likely to result from rather than cause hallucinations and delusions, studies which examine either the order in which change occurs for anxiety and positive symptoms or assesses the effects of experimental manipulations of aspects of anxiety or salutary effects of reduced environmental tension on symptoms of psychosis suggest that the influence can also occur in the opposite direction (Allen & Agus, 1968; Ciompi, 1994; Malla & Norman, 1994).

It has been suggested that anxiety has more arousing and activating aspects than depression, which is better characterized by withdrawal (Russell, 1980; Dobson, 1985; Watson & Kendall, 1989). Our findings show that these differential aspects of dysphoria may well demonstrate varying relationships with symptoms of schizophrenia. Much work remains to be done before we have a full understanding of the role of dysphoric states in schizophrenia. The relationships are likely to prove complex. There is emerging evidence that individuals with this disorder may vary in the extent to which their

symptoms respond to changes in negative affect (Malla & Norman, 1994; Norman & Malla, 1994a; Docherty, 1996). The contribution of the current study is in showing that the specific nature of the dysphoric emotion is also important in understanding such relationships.

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