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How psychotic are individuals with non-psychotic disorders?

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Abstract *Background* The objective of this study was to compare, using a self-report questionnaire, the dimensions of psychosis across different patient groups in a community mental health service (CMHS) and in non-patients in the general population. *Methods* The Community Assessment of Psychic Experiences (CAPE) is a 40-item self-report instrument with positive, negative and depressive symptom dimensions. Seven hundred and sixty-two patients and 647 subjects in the general population filled in the CAPE. In 555 of the 762 patients, a DSM-IV diagnosis was made. The following DSM-IV categories were used in the analyses: 1. Schizophrenia and Other Psychotic Disorders ($n = 72$), 2. Mood Disorders ($n = 214$), 3. Anxiety Disorders ($n = 129$). The patient and non-patient groups were compared on the three dimensions of the CAPE using multivariate regression analysis. *Results* The patient groups scored significantly higher on the positive, negative and depressive dimensions than the non-patients. Patients with psychotic disorders had the greatest difference in positive psychosis items compared to non-patients ($\beta = 0.94$, 95% CI: 0.7–1.18), whereas patients with mood and anxiety disorders had the highest depressive symptom

scores, and positive symptom scores that were intermediate to that of non-patients and patients with psychotic disorders (mood disorders: $\beta = 0.53$, 95% CI: 0.39–0.68; anxiety disorders: $\beta = 0.22$, 95% CI: 0.04–0.39). The CAPE distress score adjusted for the corresponding frequency score was not significantly different between the patient groups, but compared to the general population, patient status did contribute significantly to the level of distress. *Discussion* Patients with anxiety and mood disorders had elevated scores on positive psychosis items, indicating that expression of psychosis in non-psychotic disorders is common. The finding of elevated scores of the patient groups on all three dimensions compared to non-patients suggests that the psychopathology associated with psychotic disorders varies quantitatively across DSM-IV categories.

Key words psychosis – mood disorder – anxiety disorder – continuum – symptoms

Introduction

The operational definition of psychosis plays a major role in guiding research questions. Over the last decades, the dichotomous definition of psychosis has been contested and evidence favouring a continuum view has accumulated (Strauss 1969; Claridge 1997; Peters et al. 1999; Stefanis et al. 2002; Verdoux and van Os 2002). The continuum of psychosis is defined as a distribution on which non-psychotic affective disorders and affective psychosis constitute an intermediate point that connect normal psychological experiences and psychotic disorders (Crow 1998; Van Os et al. 2000; Van Os et al. 2001). In the dimensional approach, the question becomes not whether an individual has a particular psychotic disorder, but instead to what degree the person has the experience, measured on several dimensions. Studies with the purpose of identifying the symptom dimensions of psychosis, either in individuals with schizophrenia or with schizotypal traits, have typically yielded three-fac-

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tor solutions, namely: 1) positive symptoms, 2) negative symptoms, and 3) conceptual disorganisation or social impairment (Liddle 1987; Venables and Rector 2000; Vollema and Hoijtink 2000).

Affective symptoms have been relatively neglected in these studies in spite of these symptoms being very prevalent in schizophrenia (Hirsch 1991; Taylor 1992; Van Os et al. 1999a). There may even be some degree of aetiological continuity between affective disorder and schizophrenia, as indicators of risk tend to overlap between both disorders with quantitative rather than qualitative differences in effect sizes (Van Os et al. 1999a). In accordance with this, evidence was presented that individuals with elevated levels of anxiety and depression report positive psychotic symptom scores that are intermediate to those of non-patients and psychosis cases (Van Os et al. 1999b). Similarly, in a recent study among primary care patients, patients who experienced psychotic symptoms were far more likely to have non-psychotic affective disorders than patients without psychotic symptoms (Olfson et al. 2002).

The aim of the present paper was to study the continuum of psychosis in patients with anxiety disorder, mood disorder and psychotic disorder on the one hand, and in non-patients from the general population on the other. To this end, a recently developed instrument was used, the Community Assessment of Psychic Experiences (CAPE) (Stefanis et al. 2002; <http://www.cape42.homestead.com/>). This questionnaire was developed in order to measure attenuated psychotic experiences in the affective and non-affective domains. The CAPE measures frequency of as well as distress associated with these experiences. Previous research with the CAPE has shown a three-factor structure of positive, negative and depressive factors in a large and representative sample of young men (Stefanis et al. 2002). The present study was carried out in the general population and a community mental health centre. It was hypothesised that the three dimensions of psychosis would vary quantitatively across diagnostic groups. Specifically, for the negative and positive dimensions, we expected increasing severity from normality through anxiety and depression to clinical psychosis, whereas for the depressive dimension it was hypothesised that the highest scores would be found in the mood disorders group, with intermediate scores in both other patient groups. In addition, we carried out within-group comparisons in order to assess to what degree the three groups had different levels of symptom contrasts. For example, we hypothesised that in the psychotic disorder group the scores on the positive dimension would be significantly higher than the score of the depressive dimension, whereas the reverse was hypothesised to hold for the depression group.

Subjects and methods

■ Procedure and Sample

The Continuum of Mental Disorders Study (COMED study) consists of a family study in the general population in the city of Sittard, The Netherlands, and in a Community Mental Health Service (CMHS) in Maastricht, The Netherlands. In order to recruit a general population sample, subjects of the municipality of Sittard aged 36–65 years randomly received a letter in which they were asked to participate in the COMED study. The mailing sampling frame comprised 2287 females and 2302 males. The subjects were randomly selected from the gender strata “female” and “male” combined with the age strata “36–45”, “46–55” and “56–65” years. The response rate was around 8–10%. Then, a snowball sampling procedure was used: the participants were asked to invite their family members (i.e. mother/father, sister/brother, spouse, children, spouse’s family, etc.) to take part in the study. The age range of the total general population sample was 18–70 years. The sampling procedure in the CMHS was carried out sending letters to all patients of the department for the treatment of severe mental illness and the department for the treatment of depression and anxiety disorders. The response rate was 40.7% (762 out of 1873 patients returned the questionnaire).

A total of 647 subjects in the general population and 762 patients of the CMHS filled in the CAPE. A psychiatrist or psychologist made in 555 out of the 762 patients a DSM-IV diagnosis at the end of the intake procedure or during treatment. Only the following DSM-IV categories were used in the analyses, because they represented the most prevalent and diagnostically relevant groups: 1. Schizophrenia and Other Psychotic Disorders ($n = 72$), 2. Mood Disorders ($n = 214$), 3. Anxiety Disorders ($n = 129$), yielding a sample size of 415. The CMHS registers per patient maximally two DSM-IV axis 1 disorders. In this study, persons with two diagnoses were assigned to the diagnosis group with the lowest number (1. Schizophrenia, 2. Mood, 3. Anxiety) to skew assignment hierarchically to the psychosis diagnosis group.

■ Instrument

The CAPE is a 40-item self-report instrument and is mainly based on the 21-item Peters et al. Delusions Inventory (PDI-21) (Peters et al. 1999). The PDI was developed to measure delusional ideation in the general population on a dimensional scale. The PDI is derived from the Present State Examination (PSE, 9th edition; Wing et al. 1974). Peters and co-workers (1999) toned down the PSE items, by adding “as if” to the questions to ensure the acceptability of the scale in the general population. In addition, questions are styled in a “Do you ever feel/think”-fashion in order to study continuous experiences during lifetime. The PDI enquires firstly about the presence of a delusional ideation (measured with dichotomised answer categories: “Yes” or “No”) and secondly the three dimensions of the delusional experience, namely distress, preoccupation and conviction (measured on a 5-point ordinal scale from 1 to 5; “not at all distressing” – “very distressing”; “hardly ever think about it” – “think about it all the time”; “don’t believe it’s true” – “believe it’s absolutely true”).

Some modifications and additions were implemented to the PDI to construct the CAPE (Stefanis et al. 2002). Firstly, items on religious delusions were omitted because of concerns that it might confuse religious subjects. Secondly, some items that subjects in previous studies had reported to be ambiguous were omitted or rephrased (Verdoux et al. 1998). Thirdly, two items on auditory hallucinations were added. Fourthly, 14 negative and eight depressive symptom items were added to the PDI. The negative symptom items were derived from the SANS (Andreasen 1989), and an instrument of subjective experience of negative symptoms, the SENS (Selten et al. 1998). As it is difficult to discriminate between negative and depressive symptoms, items of depressive symptoms that are most specific for depression, i.e. cognitive symptoms of depression (e.g. sadness, pessimism, hopelessness, feeling a failure, feeling guilty) (Kibel et al. 1993), were added to the PDI. Finally, the CAPE was reduced to two dimensional scales. The first scale scores the frequency of the experience (measured on a

4-point scale from “never”, “sometimes”, “often” to “nearly always”, to avoid “ticking the middle box” bias) and the second scale scores the degree of distress (measured on a 4-point scale from “not distressed”, “a bit distressed”, “quite distressed” to “very distressed”). This reduction in dimensions of the psychotic experience was introduced as previous research with the PDI-21 in a large general population sample (Verdoux et al. 1998) had shown that individuals failed to fill in consistently all the dimensional scales of each symptom.

The CAPE provides an overall score and a total score per dimension by adding up the number of positive answers to the frequency question, and it provides a distress score by adding up the scores of the distress questions.

■ Analyses

All analyses were carried out with Stata version 7 (StataCorp 2001). In order to account for partial non-response, scores were weighted for the number of valid answers per dimension, and in order to remove scale difference, CAPE positive, negative and depression scores were expressed as units standard deviation (standardised scores).

Associations between the three dimensions were assessed by performing correlation analyses for all combinations of the three dimensions of the CAPE.

In order to test for associations between dimensions of the CAPE and diagnostic group, multivariate multiple regression analysis was carried out (Stata MVREG procedure). Multivariate multiple regression differs from ordinary multiple regression in that several dependent variables (in this case CAPE positive, negative and depressive dimension scores) are jointly regressed on the same independent variables (in this case diagnostic group, i. e. non-patients, anxiety disorder, mood disorder, and psychosis). The advantage of using multivariate multiple regression analysis is that the between-equation covariances are estimated, so that coefficients across equations can be tested with the Wald test. For example, multivariate multiple regression analysis allowed us to directly test the null hypothesis that the coefficient of the regression of the CAPE negative dimension on mood disorder did not differ from the coefficient of the regression of the CAPE negative dimension on psychotic disorders. In order to assess the effect of possible confounding variables, the multivariate analyses were adjusted for the following a priori chosen covariates: gender, single marital status (defined as single, divorced or widow/widower), educational level (9 levels) and age (in years). All conditions for applying multivariate multiple regression analyses were met.

In addition, we carried out within-group comparisons in order to assess to what degree the three groups had different levels of symptom contrasts. For example, we tested in the psychotic disorder group whether the scores on the positive dimension were significantly higher than the score on the depressive dimension.

The associations between degree of distress and diagnostic group were analysed for each of the three CAPE distress scores separately. These analyses were adjusted for the corresponding frequency score. Again, contrasts between diagnostic groups were assessed with the Wald test.

Results

■ Demographic variables

A total of 415 patients with a known DSM-IV diagnosis and a total of 647 subjects from the general population (hereafter: non-patients) were included in the analyses. In the patient groups 36.8% were male, whereas in the non-patients this proportion was 38.4% ($\chi^2 = 0.3$, $df = 1$, $p = 0.6$). The mean age of the patients was 40.5 years ($SD = 12.3$) and the mean age of the non-patients was 46.5 years ($SD = 12.1$) ($t = 7.6$, $df = 1011$, $p = 0.00$). The non-patients had a significantly higher educational level than the patients ($t = 8.3$, $df = 1046$, $p = 0.00$). Of the non-patients, 21.5% were single, compared to 49% of the patients ($\chi^2 = 84.4$, $df = 1$, $p = 0.00$).

■ Between-group comparisons

The negative and depressive dimensions were highly correlated ($r = 0.81$). The positive dimension correlated moderately high with the negative and depressive symptom dimension: 0.63 and 0.63, respectively.

The three patient groups scored significantly higher than the non-patient group on all three dimensions of the CAPE (Table 1). On the positive dimension, the score of the anxiety disorder and mood disorder groups was intermediate to the score of the psychotic disorder and the non-patient groups. The mood disorder group displayed a significantly higher positive dimension score than the anxiety disorder group (Wald test: $F(1,971) = 9.7$; $p = 0.002$).

On the negative dimension, the mood disorder group had the highest score and this score differed significantly from the score in the psychotic disorder group (Wald test: $F(1,971) = 9.0$; $p = 0.003$) and in the anxiety disorder group (Wald test: $F(1,971) = 9.7$; $p = 0.002$). The psychotic disorder and the anxiety disorder groups did not differ with regard to the negative dimension (Wald test: $F(1,971) = 0.24$; $p = 0.63$).

Compared to the psychotic disorder group, the level of depressive symptoms was higher in the mood disorder group (Wald test: $F(1,971) = 19.7$; $p = 0.00$) and in the anxiety disorder group (Wald test: $F(1,971) = 9.04$; $p = 0.003$). No significant difference was found between

Table 1 The regression coefficients (β) of the diagnosis groups for the standardised weighted positive, negative and depressive dimensions of the CAPE in contrast to the non-patients, adjusted for the covariates gender, single marital status, educational level and age

Diagnosis groups	Standardised weighted positive symptom (β)	95% CI	Standardised weighted negative symptom (β)	95% CI	Standardised weighted depressive symptom (β)	95% CI
Non-patients = reference	0	–	0	–	0	–
Schizophrenia	0.94	0.7–1.18	0.61	0.36–0.85	0.46	0.23–0.69
Mood disorders	0.53	0.39–0.68	1.0	0.85–1.15	1.01	0.87–1.15
Anxiety disorders	0.22	0.04–0.39	0.67	0.49–0.86	0.86	0.69–1.03

the mood disorder group and the anxiety disorder group (Wald test: $F(1,971) = 2.3$; $p = 0.13$).

■ Within-group comparisons

In the psychotic disorder group, the score on the negative dimension was significantly higher than the score on the depressive dimension (Table 2). In the anxiety disorder group, the reverse was true. Only the mood disorder group displayed no difference between the negative and depressive dimensions.

The psychotic disorders patients displayed significantly more positive than depressive symptoms. Both the depressive and anxiety disorder group showed significantly more depressive than positive symptoms (Table 2).

In the depressive and anxiety groups, negative symptoms were robustly more present than positive symptoms, contrary to the schizophrenia group that showed more positive than negative symptoms (Table 2).

■ Distress and frequency

The positive, negative and depressive dimensions correlated highly with the corresponding distress scores ($r = 0.82, 0.88$ and 0.90 , respectively). The relationship was positive and linear and suggested a dose-response pattern. After adjustment for the corresponding frequency score, there was a significant association between each diagnostic group and level of distress for all three CAPE dimensions. However, no differences in level of distress were found between patient groups for any of the dimensions (Table 3).

Discussion

Patients with clinically assessed DSM-IV anxiety and mood disorders had elevated scores on the positive dimension, suggesting that these non-psychotic disorders have intermediate values for the continuous psychosis phenotype. This indicates that there are quantitative differences between psychotic and non-psychotic affective disorder, consistent with previous findings on the relationship between affective and psychotic disorder (Crow 1990; Peters et al. 1999; Verdoux et al. 1999).

In addition, the findings suggest that the psychosis phenotype may not only include variation in positive and negative symptomatology, but also in the affective domain. The patients with psychotic disorders had an intermediate score on the depressive dimension compared to non-patients and the anxiety and depression group. Evidence from other studies suggests that affective disorder may not only be phenotypically, but also aetiologically related to psychotic disorder. Thus, developmental, perinatal, neuroradiological, familial and social risk factors also show quantitative, in addition to qualitative, variation between affective and psychotic disorders (Bebbington et al. 1993; Elkis et al. 1995; Van Os et al. 1998). It follows from this aetiological overlap that individuals who have a tendency to develop affective symptoms may also be more prone to develop psychotic symptoms. In clinical practice, this within-person continuity can be taken to indicate that the target for treatment should be symptom dimensions instead of diagnostic categories.

In general, the within-group analyses corroborated the hypothesis that patients had the highest score on the dimension of the CAPE that was most characteristic of

Table 2 The regression coefficients (β) per diagnostic group for the standardised weighted positive (PSY), negative (NEG) and depressive (DEP) dimensions in comparison to the non-patients and the within-group comparisons for the three dimensions

Diagnosis groups	DEP (β)	NEG (β)	PSY (β)	Wald test DEP vs. NEG	p	Wald test DEP vs. PSY	p	Wald test NEG vs. PSY	p
Schizophrenia	0.58	0.74	1.22	$F(1,1055) = 4.3$	0.04	$F(1,1055) = 43.8$	0.00	$F(1,1055) = 23.0$	0.00
Mood disorders	1.17	1.10	0.68	$F(1,1055) = 2.5$	0.12	$F(1,1055) = 65.4$	0.00	$F(1,1055) = 43.2$	0.00
Anxiety disorders	1.04	0.89	0.49	$F(1,1055) = 6.5$	0.01	$F(1,1055) = 53.0$	0.00	$F(1,1055) = 25.7$	0.00

Table 3 The associations (β) between degree of distress and diagnostic group in comparison to the non-patients, adjusted for the corresponding standardised weighted frequency score

Diagnostic group in comparison with non-patients	Degree of distress PSY ^a (β)	p	Degree of distress NEG ^b (β)	p	Degree of distress DEP ^c (β)	p
Schizophrenia (Sc)	0.37	0.00	0.14	0.02	0.11	0.046
Mood disorders (M)	0.31	0.00	0.24	0.00	0.18	0.00
Anxiety disorders (A)	0.29	0.00	0.26	0.00	0.16	0.00
Frequency score	0.79	0.00	0.82	0.00	0.88	0.00
Wald test Sc vs. M	$F(1,1055) = 0.7$	0.40	$F(1,1052) = 2.3$	0.13	$F(1,1045) = 1.2$	0.27
Wald test Sc vs. A	$F(1,1055) = 0.8$	0.36	$F(1,1052) = 2.9$	0.09	$F(1,1045) = 0.4$	0.51
Wald test M vs. A	$F(1,1055) = 0.03$	0.86	$F(1,1052) = 0.1$	0.71	$F(1,1045) = 0.3$	0.62

^a PSY = standardised weighted positive dimension; ^b NEG = standardised weighted negative dimension; ^c DEP = standardised weighted depressive dimension

their DSM-IV diagnosis. For example, the psychotic disorder group showed significantly more negative than depressive symptoms, and more positive than depressive and negative symptoms. This provides further support for our previous findings that the dimensions of the CAPE have sufficient discriminant validity (Stefanis et al. 2002). Contrary to our expectation, however, the results indicated that in the mood disorder group the level of negative symptoms matched the level of depressive symptoms, in contrast to the significant difference between both dimensions that were found in the other patient groups. This raises the question whether the CAPE provides sufficient discriminatory power between negative and depressive dimensions in patients who suffer from depression. In the study by Stefanis et al. (2002), a three-factor model with separate depressive and negative dimensions provided a better fit to the data than a two-factor model, in which the depressive symptoms were not distinct from the negative symptoms. In mood disorder, however, the negative and depressive dimensions, as measured with the CAPE, may show substantial overlap.

In line with the findings of Stefanis et al. (2002), the distress caused by the attenuated positive, negative and depressive symptoms is largely mediated by the frequency of the symptoms and independent of being assigned to a specific diagnostic group. Yet, compared to the general population, patient status did contribute significantly to the level of distress, independent of symptom frequency. This finding is in accordance with current hypotheses that the distress associated with the experience of symptoms is a major determinant of the development of clinical disorder and need for care (Freeman and Garety 1999; Garety et al. 2001).

■ Limitations

The results should be viewed in the light of several limitations. Firstly, the mood disorder group in this study may have included a small (psychotic depression is rare and often treated in hospital) proportion of patients with affective psychosis, for example depressive disorder with psychotic symptoms. This may have led to increased levels of positive psychotic symptoms in this group. However, this does not discard our interpretation of the findings, as we hypothesised that the psychosis continuum varies from normality through non-psychotic affective disorder and affective psychosis to non-affective psychosis.

Secondly, comorbidity in patient groups was not accounted for in this study. It is well known that patients with psychotic disorders may have a (post-psychotic) depressive episode and patients with anxiety disorders often have a dual diagnosis of mood disorder (Birchwood et al. 2000; Zimmerman et al. 2000; Nemeroff 2002). In this study, patients with a dual diagnosis were assigned to the diagnosis group that constituted the most severe disorder. Thus, mood and anxiety disorders

in patients with a psychotic disorder would have been assigned to the psychosis diagnosis group and the anxiety disorder patient with mood disorder was assigned to the mood diagnosis group. This reduction of the data to discrete diagnostic categories was necessary to study the difference between different diagnostic groups, but it is clear that this is not the actual phenotypic manifestation of psychiatric disorders. The issue of comorbidity in fact highlights the need to describe psychopathology along several dimensions simultaneously.

Thirdly, the current data are based on an outpatient sample. Therefore, the results cannot be generalised to inpatients whose disorders presumably constitute the most severe end of the psychosis continuum. Future studies using the CAPE in residential patients are necessary.

Fourthly, the findings are based on self-report. This may result in less reliable data, especially in the case of psychotic symptoms. Therefore, replication with interview data is necessary.

Fifthly, trained clinicians at the CMHS made in 73% of the patients a DSM-IV diagnosis. The diagnoses were, however, not based on standard structured psychiatric interviews, like the SCID or the OPCRIT. Still, these diagnoses are valid because they represent daily practice at most outpatient services and should provide ample contrast between the broad diagnostic categories used in this study.

Finally, the response rate of the patients was around 40%. Unfortunately, no information is available concerning the non-responders, but the observed frequency distribution of diagnoses was anticipated, indicating that selection bias according to diagnostic group may be small. Even if selection bias had operated, however, this is unlikely to have affected the validity of our findings.

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