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Comprehensive Psychiatry 47 (2006) 384–388

Comprehensive PSYCHIATRY

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Four symptom dimensions in outpatients with schizophrenia

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Abstract

Objective: The aim of this study was to assess the dimensional structure of the Positive and Negative Symptoms Scale (PANSS) to identify the psychopathological profiles of outpatients with schizophrenia.

Method: Two hundred and thirty-one persons with schizophrenia (*DSM-IV* criteria) were randomly selected from a register that included all patients under treatment in 5 mental health care centers in Spain. Patients were evaluated with a sociodemographic and clinical questionnaire, the PANSS, the Disability Assessment Scale short version, and the Global Assessment Functioning Scale. A principal component analysis with oblimin rotation was used to examine the factor structure of the PANSS. Different statistical analyses were done to compare the resulting factors with clinical, disability, and social functioning variables.

Results: Mean age of patients included was 39.6 years and approximately 65% were male. Four principal components, each of them with eigenvalues greater than 1.5, accounted for 56.22% of the variance. After oblimin rotation, these factors were identified as the Negative (32.48%), Excitement (11.29%), Affective (7.45%), and Positive (5.01%) components. Significant positive correlation between age and the negative dimension was found. Also, we observed significant negative correlations between global assessment functioning and negative and positive dimensions. Total disability was significantly positively related to all dimensions.

Conclusion: Positive and negative dimensions are common in all principal component analysis results, but we also found affective and excitement dimensions. The present finding suggests that further investigation of symptom dimensions may help to improve symptom-specific treatments; future research should focus on the design of new treatment programs considering these results.

Keywords: Schizophrenia; Principal component analysis; Psychopathology; Positive and Negative Syndrome Scale (PANSS)

1. Introduction

Schizophrenia is a heterogeneous illness. There is no specific clinical description for schizophrenia; on the contrary, its classification by symptoms is still controversial.

The clinical subtypes described by Kraepelin [1] at the beginning of the last century are still in use. However, in the last 3 decades, new models describing up to 5 symptom dimensions in schizophrenia have been proposed. Crow [2] suggested the existence of 2 different pathological processes, type 1 and type 2, that could coexist in the same patient. The first type refers to the productive symptoms of the disorder (hallucinations, delusions, and thought disorders) and the second to the deficit syndrome (blunted affect, social withdrawal, poverty of speech).

The Positive and Negative Syndrome Scale (PANSS) is one of the most common instruments used in the assessment of symptoms in schizophrenia. The scale classifies symptoms in 3 subscales: positive, negative, and general [3]. However, later analysis also detected different associations of symptoms in more than 3 factors. Strauss et al [4] described 3 clinical dimensions: positive, negative, and relational. Liddle [5] and Peralta et al [6] described a syndromic trifactorial model consisting of the presence-absence of hallucinations or/and delusions (or positive),

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0010-440X/$ – see front matter © 2006 Elsevier Inc. All rights reserved.
doi:10.1016/j.comppsych.2006.01.005

thought and behavioral disorganization, and negative symptoms. Kay and Sevy [7] suggested a 4-syndrome dimension model: negative, positive, depressive, and emotional. Lindenmayer et al [8] added to this model a new dimension, which was named cognitive.

Despite the diversity of symptom components in each syndrome dimension, there are 2 findings replicated in all symptom dimension studies:

- The immutability of the positive and negative syndrome dimensions [9].
- Syndromes are not mutually exclusive [7]. This could indicate that the clinical manifestations of schizophrenia are indicative of different pathological processes, which could be more or less disturbed in the different schizophrenia syndromes.

The aim of this study was to assess the dimensional structure of the PANSS in a Spanish sample to identify the psychopathological profiles of outpatients with schizophrenia.

2. Material and methods

2.1. Sample

Two hundred and thirty-one persons with schizophrenia were randomly selected from a register that included all patients under treatment in 5 mental health care centers belonging to the Sant Joan de Déu–Mental Health Services Network; all of them were under pharmacological treatment for psychosis. They represent different sociodemographic groups from the city of Barcelona and its surroundings.

Inclusion criteria were (*a*) primary diagnosis of schizophrenia (*DSM-IV* criteria); (*b*) age between 18 and 65 years; (*c*) living in the catchment area of the participating MHCC; and (*d*) having done at least 1 outpatient visit during the 6 months before the beginning of the study. Patients with a diagnosis of mental retardation or neurological disorder were excluded [10]. All diagnoses of schizophrenia were reviewed by one of the investigators, and doubtful cases were confirmed by a second psychiatrist.

All selected individuals received a complete description of the study from their psychiatrist and provided their written informed consent to participate voluntarily in the study which was previously approved by the Sant Joan de Déu–Mental Health Services Ethics Committee and Review Board.

2.2. Assessment

All patients were evaluated with a sociodemographic and clinical questionnaire, the PANSS (Spanish version) [11], the Disability Assessment Scale short version (DAS-sv) [12,13], and the Global Assessment Functioning (GAF) Scale [14,15], which were administered by the treating psychiatrist.

2.3. Data analysis

A principal component analysis (PCA) with oblimin rotation was used to examine the factor structure of the PANSS. We have used oblimin direct rotation with a δ value of 0, because we assumed an interrelation between items of the PANSS. Principal component analysis for 3, 4, and 5 symptom dimensions was conducted. As the 4-dimensional model presented a higher clinical consistency, we decided to only analyze this one.

Cronbach's α was estimated for each of the components to determine internal consistency.

The association of the 4 factors that resulted from the PCA with the clinical and outcome variables was analyzed. For the continuous variables, age, age at onset, years since onset, GAF, and total DAS Pearson's correlation coefficients were calculated. Student *t* test was used for the analysis of sex differences, and analysis of variance was used for educational background.

All statistical analyses were calculated with SPSS for Windows 10.0 (SPSS, Chicago, Ill) [16].

3. Results

Table 1 shows the characteristics of the patients included in the study. Approximately 65% of the sample were male, mean age of the sample was 39.6 (11.97) years, and 57.7% of the sample had an average educational background (between 5 and 12 years of education). Most subjects were single (66.8%), whereas only 20.9% were living with their partner or were married. A total of 48.6% of the sample were living with their parents, followed by 26.4% who were living with their own family. Subjects receiving some kind of pension accounted for a total of 67.3% of the sample, and only 8.6% were working at the time of the assessment. Patients had been admitted to a hospital a mean number of 3.52 times, although 17.1% of the sample had never been hospitalized.

The evaluation was completed for 219 patients or 94.8% of the total sample. There were no differences in any of the sociodemographic variables shown in Table 1 between the people who answered the questionnaire and those who did not. Table 2 shows the PANSS mean scores.

Four principal components, with eigenvalues greater than 1.5, accounted for 56.22% of the variance. After oblimin rotation, these factors were identified as Negative, Excitement, Affective, and Positive components in decreasing order of relative importance. Table 3 shows the components of each of the 4 factors.

The calculation of internal consistency using Cronbach's α showed good reliability coefficients. The Negative

Table 1
Descriptive statistics (N = 219)

	Mean (SD)	Range (min-max)
Age	39.64 (11.97)	18.9-67.5
Age at onset	23.12 (7.31)	5.45-57
Years since onset	16.52 (10.13)	1.43-48.2
Number of hospitalizations	3.52 (4.07)	0-25
GAF	43.45 (13.11)	15-85
Total DAS	10.92 (4.38)	1-20

component gave a reliability of $\alpha = .92$; the Excitement component, $\alpha = .77$; the Depression component, $\alpha = .72$; and the Positive component, $\alpha = .84$.

Principal component analyses for the 3 and 5 symptom dimensions were also conducted. All components of the 3-dimensional model had an eigenvalue greater than 1.5, accounting for 51.22% of the variance. The analyses revealed that the Negative component had the greatest amount of variance (32.48%). The Positive component was the second and the Depression component third. The last PCA conducted revealed 5 components with eigenvalues greater than 1, accounting for 60.46% of the variance; the components in decreasing order of relative importance were as follows: Negative, Hostility, Depression, Positive, and Good functioning. As the 4-dimensional model presented a higher clinical consistency, we decided to only analyze this one.

We only found significant positive correlation between age ($r = 0.167$, $P < .014$) and years since onset ($r = 0.141$, $P < .037$) and the negative dimension. Also, significant negative correlations between GAF and negative ($r = -0.467$, $P < .000$) and positive ($r = -0.417$, $P < .000$) dimensions were found. Total disability was significantly positively related to all dimensions: Negative ($r = 0.632$, $P < .000$), Excitement ($r = 0.240$, $P < .000$), Affective ($r = 0.203$, $P < .003$), and Positive ($r = 0.395$, $P < .000$). No significant relations were found between the 4 factors and the rest of the clinical and sociodemographic variables.

Table 2
Positive and Negative Symptoms Scale items descriptive statistics (N = 219)

Items	Mean (SD)	Range (min-max)
P1: Delusions	2.88 (1.61)	1-7
P2: Conceptual Disorganization	2.83 (1.49)	1-7
P3: Hallucinatory Behavior	2.39 (1.61)	1-7
P4: Excitement	1.97 (1.09)	1-5
P5: Grandiosity	1.51 (0.99)	1-6
P6: Suspiciousness	2.93 (1.41)	1-7
P7: Hostility	1.87 (1.19)	1-6
N1: Blunted Affect	3.73 (1.57)	1-7
N2: Emotional Withdrawal	3.78 (1.57)	1-7
N3: Poor Rapport	3.68 (1.64)	1-7
N4: Passive/Apathetic Withdrawal	4.36 (1.63)	1-7
N5: Difficulty in Abstract Thinking	3.95 (1.96)	1-7
N6: Lack of Spontaneity	3.40 (1.72)	1-7
N7: Stereotyped Thinking	3.32 (1.46)	1-7
PG1: Somatic Concern	2.18 (1.45)	1-7
PG2: Anxiety	2.93 (1.33)	1-7
PG3: Guilt Feelings	1.49 (0.92)	1-6
PG4: Tension	2.23 (1.15)	1-6
PG5: Mannerism and Posturing	1.86 (1.18)	1-6
PG6: Depression	2.35 (1.36)	1-7
PG7: Motor Retardation	2.24 (1.33)	1-7
PG8: Uncooperativeness	2.11 (1.39)	1-7
PG9: Unusual Thought Content	2.44 (1.46)	1-7
PG10: Disorientation	1.39 (0.88)	1-6
PG11: Poor Attention	2.39 (1.30)	1-7
PG12: Lack of Judgment and Insight	3.58 (1.77)	1-7
PG13: Disturbances of Volition	3.08 (1.60)	1-6
PG14: Poor Impulse Control	2.11 (1.40)	1-7
PG15: Preoccupation	2.71 (1.40)	1-7
PG16: Active Social Withdrawal	3.69 (1.75)	1-7

Table 3
Four-component PCA of PANSS items

Items	I	II	III	IV
Negative (eigenvalue = 9.74; % of total variance = 32.48)				
N1: Blunted Affect	0.84	−0	0.07	−0
N2: Emotional Withdrawal	0.92	0	−0.1	−0
N3: Poor Rapport	0.91	0	−0.1	0.01
N4: Passive/Apathetic Withdrawal	0.86	−0	−0.1	−0.1
N5: Difficulty in Abstract Thinking	0.7	0.12	0.02	0.07
N6: Lack of Spontaneity	0.91	0.01	−0.1	−0.1
N7: Stereotyped Thinking	0.68	0.16	0.12	0.12
PG5: Mannerisms and Posturing	0.34	0.05	0.12	0.17
PG7: Motor Retardation	0.56	−0.4	0.19	0.06
PG13: Disturbances of Volition	0.5	0.08	0.28	0.16
PG16: Active Social Withdrawal	0.75	0.14	−0	−0.1
Excitement (eigenvalue = 3.39; % of total variance = 11.29)				
P4: Excitement	−0	0.5	0.4	0.12
P6: Suspiciousness	0.17	0.45	0	0.34
P7: Hostility	0.1	0.75	0.11	0.08
PG8: Uncooperativeness	0.27	0.54	−0.1	0.12
PG14: Poor Impulse Control	0.06	0.55	0.43	0.1
Affective (eigenvalue = 2.23; % of total variance = 7.45)				
PG1: Somatic Concern	0.05	−0.2	0.52	0.16
PG2: Anxiety	−0.1	0.13	0.75	0.07
PG3: Guilt Feelings	−0.1	0.08	0.58	−0.2
PG4: Tension	0.19	0.35	0.67	−0.2
PG6: Depression	−0	−0.4	0.54	0.12
PG15: Preoccupation	0.16	−0.1	0.65	0.18
Positive (eigenvalue = 1.5; % of total variance = 5.01)				
P1: Delusions	−0.1	0.08	0.01	0.84
P2: Conceptual Disorganization	0.31	0.1	0.09	0.58
P3: Hallucinatory Behavior	−0.1	−0.1	0.02	0.81
P5: Grandiosity	−0.3	0.35	−0.1	0.43
PG9: Unusual Thought Content	0.12	0.25	0.12	0.57
PG10: Disorientation	0.28	−0.2	−0	0.5
PG11: Poor Attention	0.37	0.15	0.15	0.41
PG12: Lack of Judgment and Insight	0.3	0.37	−0.1	0.41

4. Discussion

The main objective of our study was to analyze the factorial structure of the PANSS in outpatients with schizophrenia. We have conducted different PCAs and the one that shows a higher clinical and statistical strength is the 4-factor model. Although Peralta et al [17], Dollfus and Everitt [18] and Loas et al [19] among others have found 4 dimensions in the PCA of the PANSS, Kay and Sevy's results are the most similar to ours [7] except for some specific items. There are 2 items that correspond to different dimensions in Kay and Sevy's study compared to ours. These are Tension (PG4), which belongs to the Excited component, and Poor Attention (PG11), which belongs to the Negative component, whereas in our study they belong to the Depression and Positive factors, respectively, although the last has a component loading very close to both dimensions. The items Difficulty in Abstract Thinking

(N5) and Conceptual Disorganization (P2) belonged to a group of symptoms that did not fit in the 4 main components of Kay and Sevy's study, but had a component loading very close to the Negative and Positive components, respectively, as in our results. The items Stereotyped Thinking (N7), Suspiciousness (P6), and Disorientation (PG10) also belong to this group of symptoms, but their component loadings are not close to our results.

The Negative factor explained most of the variance of the PCA, as in Kay and Sevy's study [7]. The chronic characteristics of our sample (mean number of years since onset >15), the fact that pharmacological treatments are most effective for positive symptoms [20-22], and the novelty of psychosocial interventions could explain the higher severity of negative symptomatology and also the positive correlation with GAF and DAS. This could be predictable as negative symptoms, as assessed by PANSS, includes evaluation of social functioning [23,24]. These results point to the need of stressing on psychosocial and pharmacological interventions addressed to negative symptoms, especially for patients with longer duration of illness, where negative symptoms are more prominent.

Our second component in relative order of importance was the excitement factor, which was composed of behavioral items instead of the more classical thought disorder items. We could hypothesize that the positive component of the PANSS could be split into a behavioral positive component or excitement component and a thought positive component that coincides with our fourth factor. Other PCAs [6,7,9,17,19] have resulted in a higher loading of the positive factor than the loading of our positive component, but patients in those studies were institutionalized or were recruited during acute psychotic episodes. Although our sample is composed of community patients, positive symptoms (behavioral and thought) have enough weight to be grouped into 2 different factors.

The affective component includes depressive and anxiety symptoms and is similar to the depressive factor resulting from other PCA in other studies [8]. When studying a 5-dimensional model in our sample, the only difference is that the affective component is split into the depressive and anxiety components, with the 3 other remaining components as in the 4-factor model. This result shows that mood symptoms are important enough to result in 1 dimension and so should be taken into account in clinical practice [25-29].

Comparing these results with other studies, we do not find a disorganized or cognitive component. Because of the long course of illness of our patients, the cognitive deterioration could be equally affecting all the psychopathological dimensions; it therefore does not have enough discriminative power to become a dimension itself.

Independently of the symptom dimension, greater symptom severity was related in our study with higher disability. These results are consistent with previous findings [30] and could indicate that treatments that improve symptoms will have an impact on the level of patient disability.

The constant finding of a negative and a positive factor [2,9] suggests the existence of a pathological process underlying this symptomatology, common in all populations. Neuroimaging, historical, and biological correlates should also be studied to identify those processes that could be underlying each of the 4 dimensions.

When analyzing the results, we should acknowledge that our sample is representative of outpatients with schizophrenia, but not all the population of patients with the disorder. Patients assessed in the study had a mean number of years since onset higher than 15; it is then possible that results will differ from those obtained for first-episode samples or for subjects with fewer years since onset. Also, patients who had an acute psychotic episode were not assessed during the attack, but when clinical stability was achieved. This fact has a clear implication on the PANSS scores, and positive symptomatology was less prominent than negative symptoms. Finally, we have not included a standardized diagnostic instrument as the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID) in our study, although the fact that all diagnoses were reviewed and a second psychiatrist evaluated the doubtful cases assures a high reliability of the assessment.

One of the implications of our results is that the study of different dimensions of schizophrenia symptoms may help to improve symptom-specific treatments. Also, defining subtypes of symptoms of schizophrenia from a standardized measure instead of clinical criteria could benefit symptom dimension identification of subjects. This standardized identification will favor the design of treatment programs, which could address specific patient needs where appropriate treatments could be available. For example, patients with mostly negative symptoms could benefit from specific rehabilitation programs or from the adjustment of antipsychotic medication regimes.

Future research should focus on the design of new programs considering these results.

Acknowledgments

This project has received financial help from the Spanish "Fondo de Investigaciones Sanitarias" (FIS 97/1275), the Spanish Health Services Research Network RIRAG (G03/061) ("Red de Investigación de Resultados Aplicados a la Gestión en Discapacidad y Salud Mental"), and Marató de TV3 (013610).

References

[1] Kraepelin E. Dementia praecox and paraphrenia. Huntington (NY): Robert E. Krieger Publishing; 1919.
[2] Crow TJ. Molecular pathology of schizophrenia: more than one disease process? BMJ 1980;280(6207):66-8.
[3] Kay SR, Fiszbein A, Opler LA. The Positive and Negative Syndrome Scale (PANSS) for schizophrenia. Schizophr Bull 1987; 13(2):261-76.

[4] Strauss JS, Carpenter Jr WT, Bartko JJ. The diagnosis and understanding of schizophrenia: Part III. Speculations on the processes that underlie schizophrenic symptoms and signs. Schizophr Bull 1974;(11):61-9.
[5] Liddle PF. The symptoms of chronic schizophrenia. A re-examination of the positive-negative dichotomy. Br J Psychiatry 1987;151:145-51.
[6] Peralta V, de Leon J, Cuesta MJ. Are there more than two syndromes in schizophrenia? A critique of the positive-negative dichotomy. Br J Psychiatry 1992;161:335-43.
[7] Kay SR, Sevy S. Pyramidical model of schizophrenia. Schizophr Bull 1990;16(3):537-45.
[8] Lindenmayer JP, Bernstein-Hyman R, Grochowski S. Five-factor model of schizophrenia. Initial validation. J Nerv Ment Dis 1994; 182(11):631-8.
[9] Nakaya M, Suwa H, Ohmori K. Latent structures underlying schizophrenic symptoms: a five-dimensional model. Schizophr Res 1999;39(1):39-50.
[10] Ochoa S, Haro JM, Autonell J, Pendas A, Teba F, Marquez M. Met and unmet needs of schizophrenia patients in a Spanish sample. Schizophr Bull 2003;29(2):201-10.
[11] Peralta V, Cuesta MJ. Validación de la escala de los síndromes positivo y negativo (PANSS) en una muestra de esquizofrénicos españoles. Actas Luso-Esp Neurol Psiquiatr 1994;22(4):171-7.
[12] Sartorius N, Jablensky A, Korten A, Ernberg G, Anker M, Cooper JE, et al. Early manifestations and first-contact incidence of schizophrenia in different cultures. A preliminary report on the initial evaluation phase of the WHO Collaborative Study on determinants of outcome of severe mental disorders. Psychol Med 1986;16(4):909-28.
[13] World Health Organization. ICD-10: International Classification of Diseases, Mental and Behaviour Disorders. 10th ed. Geneva: Switzerland; 1992.
[14] Endicott J, Spitzer RL, Fleiss JL, Cohen J. The Global Assessment Scale. A procedure for measuring overall severity of psychiatric disturbance. Arch Gen Psychiatry 1976;33(6):766-71.
[15] American Psychiatric Association. DSM-IV-TR. Diagnostic and statistical manual of mental disorders. Washington: APA; 2000.
[16] SPSS for Windows. Chicago, Ill: SPSS Inc; 2002.
[17] Peralta V, Cuesta MJ, de Leon J. An empirical analysis of latent structures underlying schizophrenic symptoms: a four-syndrome model. Biol Psychiatry 1994;36(11):726-36.
[18] Dollfus S, Everitt B. Symptom structure in schizophrenia: two-, three- or four-factor models? Psychopathology 1998;31(3):120-30.
[19] Loas G, Noisette C, Legrand A, Delahousse J. A four-dimensional model of chronic schizophrenia based on the factorial structure of the Positive and Negative Syndrome Scale (PANSS). A study of a group of 153 chronic schizophrenic patients and comparison with the factorial structure of the BPRS. Encephale 1997;23(1):10-8.
[20] Feldman PD, Kaiser CJ, Kennedy JS, Sutton VK, Tran PV, Tollefson GD, et al. Comparison of risperidone and olanzapine in the control of negative symptoms of chronic schizophrenia and related psychotic disorders in patients aged 50 to 65 years. J Clin Psychiatry 2003; 64(9):998-1004.
[21] Miller AL. Combination treatments for schizophrenia. CNS Spectr 2004;9(9 Suppl 9):19-23.
[22] Rueter LE, Ballard ME, Gallagher KB, Basso AM, Curzon P, Kohlhaas KL. Chronic low dose risperidone and clozapine alleviate positive but not negative symptoms in the rat neonatal ventral hippocampal lesion model of schizophrenia. Psychopharmacology (Berl) 2004;176(3-4):312-9.
[23] Addington J, Addington D. Neurocognitive and social functioning in schizophrenia. Schizophr Bull 1999;25(1):173-82.
[24] Dickinson D, Coursey RD. Independence and overlap among neurocognitive correlates of community functioning in schizophrenia. Schizophr Res 2002;56(1-2):161-70.
[25] Muller MJ, Kienzle B, Dahmen N. Depression, emotional blunting, and akinesia in schizophrenia overlap and differentiation. Eur J Health Econ 2002;3(Suppl 2):s99-s103.
[26] Kelly DL, Shim JC, Feldman SM, Yu Y, Conley RR. Lifetime psychiatric symptoms in persons with schizophrenia who died by suicide compared to other means of death. J Psychiatr Res 2004;38(5): 531-6.
[27] Kontaxakis V, Havaki-Kontaxaki B, Margariti M, Stamouli S, Kollias C, Christodoulou G. Suicidal ideation in inpatients with acute schizophrenia. Can J Psychiatry 2004;49(7):476-9.
[28] Hofer A, Kemmler G, Eder U, Edlinger M, Hummer M, Fleischhacker WW. Quality of life in schizophrenia: the impact of psychopathology, attitude toward medication, and side effects. J Clin Psychiatry 2004;65(7):932-9.
[29] Serretti A, Mandelli L, Lattuada E, Smeraldi E. Depressive syndrome in major psychoses: a study on 1351 subjects. Psychiatry Res 2004;127(1-2):85-99.
[30] Ertugrul A, Ulug B. The influence of neurocognitive deficits and symptoms on disability in schizophrenia. Acta Psychiatr Scand 2002;105(3):196-201.