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ORIGINAL PAPER

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A subscale for negative symptoms from the Comprehensive Psychopathological Rating Scale (CPRS): a comparison with the Schedule for Assessment of Negative Symptoms (SANS)

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Abstract The Comprehensive Psychopathological Rating Scale (CPRS) was used to determine symptomatology in 145 schizophrenic patients. In 40 of these patients the Schedule for Assessment of Negative Symptoms (SANS) was also applied in order to determine which items in the CPRS represent negative schizophrenic symptoms. Of the patients, 115 were drug-free and 30 were treated with major tranquilizers at the time of the rating. A principal component analysis with oblique solution and Varimax rotation grouped the items from CPRS into ten factors. These factors were subsequently correlated to the total scores of the SANS. When a factor showed a positive correlation with the SANS, the individual items within the factor were examined for correlation to both the subscales and the total SANS scores. Of the 33 items, 5 used in the CPRS showed a positive correlation with the SANS and were therefore considered to represent negative symptomatology in schizophrenia. These items were withdrawal, reduced speech, lack of appropriate emotions, slowness of movements and indecision. The items were grouped as a negative symptom subscale in the CPRS.

Key words CPRS · SANS · Negative symptomatology · Schizophrenia

Introduction

The principle of positive and negative behavioural symptoms was described in the late nineteenth century (Jackson 1884). The subgrouping was applied to neurological as well as psychiatric diseases. According to Hughlins-Jackson, negative symptoms were due to loss of normal functions in higher cortical layers, whereas positive symptoms emerged from loss of inhibition.

The two-syndrome hypothesis of schizophrenia, type I and type II, was presented by Crow (1980). The two syndromes were not assumed to be mutually exclusive; instead, they were assumed to have different pathophysiologies. In the same individual, episodes of positive symptoms can be followed by periods of negative symptomatology.

Andreasen and Olsen (1982) subsequently introduced a specific rating scale for the recording of negative symptoms, the Schedule for Assessment of Negative Symptoms (SANS; Andreasen 1983). In 1987 Kay et al. presented a combined rating scale for both positive, negative and general psychopathological symptoms, the Positive and Negative Syndrome Scale for Schizophrenia, (PANSS; Kay et al. 1987).

In 1971 the Swedish Medical Research Council formed a group to study how to evaluate changes in psychiatric disorders with treatment. The work proceeded by constructing a new rating scale covering psychopathological items which were likely to be changed by treatment. This rating scale, the Comprehensive Psychopathological Rating Scale (CPRS; Åsberg et al. 1978) comprises 65 items.

A total of 63 items refer to different psychopathological phenomena, 1 item is a global measure and 1 item takes into account the assumed validity of the rating performed. The CPRS can either be used as a complete scale or used as a pool of items from which subscales can be constructed for different psychiatric syndromes (Bjerkenstedt et al. 1977; Montgomery and Åsberg et al. 1979). The CPRS has been translated into more than 14 different languages and is an important research tool in many countries.

In the present study the CPRS was used to rate schizophrenic symptomatology in 105 patients, the majority of them being first admissions and never treated. The primary aim of the study was to construct a subscale from the CPRS to assess negative schizophrenic symptoms. Comparison was made with a well-established scale for negative symptoms, the SANS, in order to test the external validity of the new subscale.

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Subjects and methods

The study was undertaken on two groups of schizophrenic patients diagnosed according to DSM-III-R. Group A comprised 40 patients (25 males and 15 females; mean age 33.1 years; range 18–53 years). Nine were first admissions and 1 patient had a less-than-2-year duration of the disorder. The remaining 30 patients were in a chronic phase with a more-than-5-year duration of the disorder. At the time of rating, 10 patients had no pharmacological treatment (6 were first admissions and 4 were chronic patients with an acute exacerbation). Of the patients, 21 were treated with classical neuroleptics with a mean daily dose of 280 mg (range 13–1025 mg) of chlorpromazine equivalents (Davis 1974). Seven patients were treated with clozapine, an atypical neuroleptic, with a mean daily dose of 192 mg (range 100–250 mg), and 2 with a combination of clozapine and a classical neuroleptic in an average daily dose of 625 mg (450 and 800 mg; respectively) chlorpromazine equivalents.

Group B comprised 105 patients (75 males and 30 females). The mean age was 27.3 years (range 18–48 years). At the time of rating with the CPRS they were in an acute psychotic phase and were either first admissions and drug-naive (n = 58), or chronic re-

Table 1 Systat principal component analysis of selected items from the Comprehensive Psychopathological Rating Scale (CPRS). Patients with psychotic syndromes (n = 145)

FACTOR	1	2	3	4	5	6	7	8	9	10
Factor 1										
Emotional withdrawal	0,81									
Perplexity	0,68									
Blocking	0,85									
Reduced speach	0,58									
Hallucinatory behaviour	0,56									
Factor 2										
Hypochondriasis		0,51								
Other delusions		0,66								
Pressure of speach		0,74								
Flights of ideas		0,62								
Incoherent speach		0,42								
Perseveration		0,72								
Factor 3										
Feeling controlled			0,67							
Disrupted thoughts			0,62							
Commenting voices			0,80							
Visual hallucinations			0,58							
Factor 4										
Hostility				0,79						
Labile emotional responses				0,75						
Overactivity				0,69						
Factor 5										
Ideas of persecution					0,69					
Delusional mood					0,72					
Factor 6										
Lack of appropriate emotions						0,65				
Slowness of movements						0,66				
Overactivity						-0,49				
Factor 7										
Derealisation							0,59			
Depersonalisation							0,56			
Other auditory hallucinations							0,52			
Other hallucinations							0,82			
Factor 8										
Rituals								0,69		
Indecision								0,46		
Ideas of grandeur								-0,51		
Factor 9										
Lack of initiativ									0,76	
Factor 10										
Apparent sadness										-0,71
Mannerism and posturing										0,50
Eigen values	5,19	3,50	2,48	2,04	1,90	1,67	1,44	1,31	1,20	1,09
Variance	3,48	3,00	2,28	2,71	1,65	1,63	1,99	1,68	1,72	1,67

admitted (n = 47), but they all had been drug-free for at least 2 weeks.

Assessment of symptomatology

In group A schizophrenic symptomatology was assessed from an interview by two psychiatrists, one using the CPRS and the other SANS. Both raters made independent ratings. In group B only the CPRS was used in an interview by one out of four trained raters who between them had an interrater reliability of 0.84 as determined from separate studies (Sjöström 1990; Lindström et al. 1992). Sixteen reported items and 17 observed items were selected from the CPRS as having face validity for positive and negative symptoms in schizophrenic syndromes. Those items were emotional withdrawal, perplexity, blocking, reduced speech, hallucinatory behaviour, hypochondriasis, other delusions, pressure of speech, flight of ideas, incoherent speech, perseveration, feeling controlled, disrupted thoughts, commenting voices, visual hallucinations, hostility, labile emotional responses, overactivity, ideas of persecution, delusional mood, lack of appropriate emotions, slowness of movements, overactivity, derealisation, depersonalisation, other auditory hallucinations, other hallucinations, rituals, indecision, ideas of grandeur, lack of initiative, apparent sadness and mannerism and posturing.

Statistics

A principal component analysis and product moment correlation were used to compare the items selected from the two rating scales. The aim of the principal component analysis is to construct a smaller number of new variables representing principal components (Wilkinson 1989) or factors. The factors reflect a linear combination of the original item scores and are uncorrelated with each other.

The so-called Eigen values of the factors are larger or equal to one according to the rule of Kaiser and describe the variance explained by the factor. The coefficients of the items of a particular factor are called the factor loadings, and if the factors are rotated, the factor loadings are either near zero or near one. A factor loading near zero means that the corresponding item does not load on the particular factor. If the factor loading is near one, the corresponding item loads mainly in that particular factor.

The CPRS ratings for the selected items from patient groups A and B (n = 145) were included in a principal component analysis. Oblique solution and Varimax rotation were chosen. The items were grouped into one of ten factors and given an Eigen value. From patient group A the different factors were correlated with the total scores of SANS, and these factors from CPRS which showed a positive correlation with SANS by use of product moment correlation were considered to contain negative symptoms.

In the next step, each item within the factors which correlated positively with SANS was tested again against total SANS scores. Those CPRS items which showed a significant positive correlation were considered to represent negative symptoms in schizophrenia.

Results

In the first principal component analysis, CPRS ratings from the patient samples A and B (n = 145) were included. The test resulted in ten factors (Table 1). The number of items within each factor ranged from 6 (factor 2) to one (factor 9). In factor 1 the items emotional withdrawal and reduced speech contributed more than 0.50 to the factor. Lack of appropriate emotions and slowness of movements in factor 6 also loaded more than 0.50 to the factor as well as indecision in factor 8.

Table 2 Correlations between separate factors from CPRS and total score of SANS. Patients with psychotic syndromes (n = 40)

CPRS factor	r	P
1	0.4	< 0.01
2	0	n.s.
3	0.26	n.s.
4	–0.05	n.s.
5	–0.06	n.s.
6	0.55	< 0.01
7	–0.01	n.s.
8	0.34	< 0.05
9	0.16	n.s.
10	–0.48	< 0.01

Table 3 Pearson's product moment correlation between scores from individual items from CPRS which constitute factors 1, 6 and 8 (from Table 1) and total SANS scores

	r	P
Factor 1		
Withdrawal	0.36	< 0.05
Perplexity	0.19	n.s.
Blank spells	0.22	n.s.
Reduced speech	0.43	< 0.01
Hallucinatory behaviour	0.10	n.s.
Factor 6		
Lack of appropriate emotions	0.38	< 0.02
Slowness of movements	0.58	< 0.001
Overactivity	–0.18	n.s.
Factor 8		
Rituals	0.20	n.s.
Indecision	0.45	< 0.01
Ideas of grandeur	–0.11	n.s.

Table 2 presents the correlations between the CPRS factors and the total SANS scores for the 40 patients rated with both scales. The results demonstrate a significant correlation between factors 1, 6 and 8 and the SANS, which indicates that these factors include negative symptoms.

Eleven individual items from CPRS (withdrawal, perplexity, blank spells, reduced speech, hallucinatory behaviour, lack of appropriate emotions, slowness of movements, overactivity, rituals, indecision and ideas of grandeur) were finally correlated with the five subscales of the SANS (affective flattening, alogia, avolition/apathy, anhedonia/asociality, attentional impairment) and the total scores of the SANS. The items which significantly correlated positively with at least two subscales and/or the total scores of the SANS were considered as negative symptoms. The results are presented in Table 3. Withdrawal, reduced speech, lack of appropriate emotions, slowness of movements and indecision showed a significant positive correlation with SANS, whereas the other items from factors 1, 6 and 8 showed no significant correlations with the SANS.

Discussion

The present study was undertaken to construct a CPRS subscale for the rating of negative schizophrenic symptoms. The study describes an analysis of symptom ratings in a group of 145 schizophrenic patients using two different statistical methods, principal component analysis and product moment correlations. To construct the CPRS subscale a patient base of 40 individuals was rated with both the SANS and the CPRS. Negative symptoms defined by the CPRS were correlated to rating in the SANS. The analysis suggests the following subset of five CPRS items which should reflect negative symptoms: withdrawal, reduced speech, lack of appropriate emotions, slowness of movements and indecision. We propose that these five items may be used as a CPRS subscale for measuring negative symptoms in patients suffering from a schizophrenic syndrome.

Fenton and McGlashan (1992) tested different systems for assessment of negative symptoms in schizophrenia. Eight rating scales were applied on hospital records from 187 patients retrospectively. The rating scales included Andreasen's SANS (1983), Carpenter et al.'s criteria for the deficit syndrome (1988), Kay et al.'s PANSS (1987), the scale developed by Krawiecka et al. (1977), Crow's modified scale (1980), the negative symptom scale developed by Lewine et al. (1983), Poghue-Geile and Harrow's negative symptom scale (1985), and Abrams and Taylor's emotional blunting scale (1978). High positive correlations were found between the scales when negative symptoms were rated dimensionally. However, concordance was low when the method was used to classify patients as having a negative syndrome or not.

In a previous investigation concerning regional brain glucose metabolism and clinical correlates in schizophrenic patients, Wiesel et al. (1987), using face validity to delineate negative symptoms, suggested four of the five CPRS items specified in the present study to reflect negative symptoms.

At the time of the interview, 30 of the 40 patients rated with the two different scales (CPRS and SANS) were treated with major tranquilizers. Ethical considerations made drug withdrawal impossible. Treatment with major tranquilizers is a confounding factor because extrapyramidal symptoms can mimic negative symptoms. However, no significant differences were found in negative symptomatology between patients treated with major tranquilizers and patients without treatment. The lack of significant differences between treated and untreated patients indicates that the ratings obtained reflect predominantly negative symptoms.

From Crow's (1985) original hypothesis about the occurence of two syndromes in schizophrenia, recent investigations have pointed towards four or more subsyndromes (Kay and Sevy 1990; Peralta et al. 1992; Lindström and von Knorring 1993). Although it is accepted presently that schizophrenia consists of more than a positive and a negative syndrome, it is still of great importance to delineate symptoms which group together and find underlying biological correlates.

The present study indicates by the use of two different statistical methods that the CPRS includes items for negative symptoms which can be separated from other schizophrenic symptoms.

By the use of the CPRS and the SANS we have delineated five symptoms which may be considered as negative. The symptoms are withdrawal, reduced speech, lack of appropriate emotions, slowness of movements and indecision. These five symptoms should represent a CPRS subscale for the assessment of negative symptomatology.

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