

THE BRIEF PSYCHIATRIC RATING SCALE IN POSITIVE AND NEGATIVE SUBTYPES OF SCHIZOPHRENIA

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SUMMARY

Usefulness of the Brief Psychiatric Rating Scale (BPRS) in distinguishing positive and negative subtypes of schizophrenia is presented. Ninety five schizophrenic patients were assessed on BPRS. Significant differences emerged between positive and negative subtypes of schizophrenia on items like emotional withdrawal, guilt feelings, tension, hallucinatory behaviour, motor retardation, blunted affect and excitement. Discriminant function equation generated by these items had a high rate of prediction of group membership either to positive or negative schizophrenia group. Principal components analysis of BPRS scores yielded factors which favour categorization of patients in positive, negative subtypes. The study provides support for classification of schizophrenia into these subtypes.

Introduction

The search for discrete subtypes of schizophrenia has been going on ever since the introduction and description of the term schizophrenia by Bleuler (1950). In recent years, the division of schizophrenia into positive and negative subtypes has gained popularity and has been the focus of research attention of many workers (Strauss et al. 1974, Crow 1980, Andreasen & Olsen 1982).

It is generally agreed that hallucinations, delusions and formal thought disorder represent positive symptoms. Affective blunting, poverty of speech, avolition, apathy and asociality are considered to be negative symptoms. Issues pertaining to the definitions and quantification of positive symptoms have largely been resolved with the advent of operationalized criteria and structured diagnostic interview schedules (Wing et al. 1974, Spitzer & Endicott

1977). However, the same cannot be said of negative symptoms. Some recent reviews have highlighted the problems associated with the distinction of schizophrenia into positive and negative subtypes and conceptual and methodological issues in adequate assessment of negative symptoms (Andreasen 1985, Sommers 1985).

Studies of Angrist et al. (1980); Lindenmayer et al. (1984) and Opler et al. (1984) which deal with the assessment of negative symptoms in schizophrenia have utilized items from established though non-specific psychiatric rating scales like the Brief Psychiatric Rating Scale, BPRS (Overall and Gorham 1962). Recognition of the need for a rating scale to measure negative symptoms reliably and specifically, spurred many investigators to develop such scales and some in use are by Andreasen (1981), Lewine et al. (1983), Kochler & Sauer (1984).

The Scale for the Assessment of

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Negative Symptoms, SANS (Andreasen 1981) has been shown to be a reliable scale with good internal consistency by its originator as well as by a few workers from India (Andreasen 1982, Mathai et al. 1984).

The BPRS (Overall & Gorham 1962) is an established instrument with proven reliability and usefulness in psychiatric research. On face value, there is considerable resemblance between BPRS and SANS in respect of certain "negative" symptoms like emotional withdrawal, blunted affect and motor retardation. There is some common ground between BPRS and the Scale for the Assessment of Positive Symptoms-SAPS (Andreasen 1984) in as much that both these scales measure delusions, hallucinations and thought disorder. Moreover, as BPRS has arbitrarily been used in the study of positive and negative schizophrenia by Lindemayer et al. 1984 and Opler et al. 1984, the need to explore the relationship between BPRS and SANS and SAPS vis-a-vis positive and negative subtypes of schizophrenia was felt by us.

The present work, therefore, was undertaken to study the usefulness of BPRS (Overall & Gorham 1962) in distinguishing positive and negative subtypes of schizophrenia. This is a cross-sectional study in which assessments of BPRS, SANS and SAPS were carried out by investigators who were unaware of the subtyping of the patients. Multivariate analyses have been employed to ascertain the usefulness and discrimination power of BPRS in the identification of positive and negative subtypes.

Material and Methods

The details of the setting of the study, procedure of the patient selection, criteria for subtyping of patients into various subtypes and methodology have been described in details elsewhere (Kulhara et al. 1986a, Kulhara et al. 1986b). Therefore, only a brief description is provided here.

Consultant colleagues in the department were requested to refer to the research team patients with a clinical diagnosis of schizophrenia.

One of us (P. K.) interviewed the patients using the 9th version of the Present State Examination, PSE (Wing et al. 1974). On the basis of the PSE interviews P. K. rated the patients on the Scale for Assessment of Positive Symptoms, SAPS (Andreasen 1984).

Two of us (S. K. M. and A. A.) rated the patients on an 18 item version of BPRS (Overall & Gorham 1962). These two assessors were blind to the subtyping of the schizophrenic patients.

Patients were also rated on the Scale for the Assessment of Negative Symptoms, SANS (Andreasen 1981). The procedure adopted for the assessment of negative symptoms has been described in our earlier work (Kulhara et al. 1986b).

Using the criteria of Andreasen and Olsen (1982), the patients were categorized into positive, negative and mixed subtypes.

Students 't' test was employed to assess the degree of significance of differences of BPRS scores in positive, negative and mixed groups. A Standard Discriminant Function Analysis and Principal Components Analysis with varimax rotation were performed. Inter-rater reliability of BPRS assessments was done by Pearson's Product Moment Co-efficient method. The PSE data were analysed at the Institute of Psychiatry, Denmark Hill, London, U. K. according to CATEGO Programme.

Results

112 patients with a clinical diagnosis of schizophrenia were referred to the research team. Assessments on PSE, SANS, SAPS and BPRS were completed in 95 of these patients. In others, because of non-availability of raters, all assessments could not be done.

The study sample thus comprised of 95 patients, 50 males and 45 females. The mean age of the study sample was 27.1 years (SD 7.5 years). 42 patients were treated on outpatient basis only, but 53 patients were hospitalized at the time of evaluations. For 84 patients it was their first episode of illness though 11 patients had been ill before. 36 patients had been ill for less than 6 months and 59 patients had been ill for more than 6 months.

Analysis of the PSE data according to CATEGO Programme revealed that of the 95 patients, 65 patients were categorized as class 'S' schizophrenia, 15 were in class 'O', 8 in class 'P', 4 patients were classified as class 'D' and 3 patients were categorized as class 'M'. The percentage agreement between clinical diagnosis and CATEGO diagnosis of schizophrenia (classes S and O combined together) was observed to be good (84% agreement). This observation lends support and credibility to the clinical diagnosis.

The inter-rater reliability of BPRS was carried out in a group of 15 schizophrenic patients. For the scale as a whole, the inter-rater reliability was observed to be good ($r = 0.62, p < 0.05$). The inter-rater reliability of various items of BPRS ranged from 0.44 to 0.94 the highest inter-rater reliability was for excitement ($r = 0.94$) and the lowest was for mannerism and posturing ($r = 0.44$). All 'r' values were significant ($p < 0.05$).

Categorization into positive, negative and mixed subtypes was done according to the criteria of Andreasen and Olsen (1982). There were 28 positive, 24 negative and 43 mixed schizophrenics in the study cohort. Comparisons of BPRS scores among the 3 subtypes were done. These results are shown in Table 1. On items like emotional withdrawal, guilt feeling, tension, hallucinatory behaviour, motor retardation, blunted affect and excitement, significant

differences emerged between positive and negative subtypes. Comparison between negative and mixed subtypes yielded significant differences on items like emotional withdrawal, guilt feeling, mannerism and posturing, grandiosity, hostility, suspiciousness, hallucinatory behaviour and motor retardation. The positive and mixed groups differed significantly on items like tension, blunted affect and excitement. For total score on BPRS, no significant differences were observed among the three groups.

For generating a discriminant function equation, only positive and negative subtypes and 7 variables of BPRS in which significant differences emerged between these two groups were considered (Table 1). Two discriminant functions were identified. The co-efficient and constant scores for the two discriminant functions are shown in Table 2. The 'F' ratio obtained was 53.437 which is significant ($p < 0.001$ at $df 7, 50$). This indicates significant differences among the group means for all seven variables taken together.

Using the constant and co-efficient scores of Discriminant Function 1, evaluation of classification function of each observation was carried out. Correct allocation of group membership of a particular case either to positive or negative group was observed to be good. 22 of the 28 positive subtype group remained in the positive group. 20 of the 24 negative subtype patients remained in the negative group. This indicates that the seven variables of BPRS which were studied, have a good discriminating power (χ^2 with Yates Corrections = 17.41 at $df 1, p < 0.001$) (See Table 3).

Principal components analysis yielded 6 factors which explain about 68% of total variance. Factor 1 which explains about 10% of total variance has large positive loading on conceptual disorganization, grandiosity and disorientation. Factor 2 has large positive loading on somatic concern,

Table 1
Comparison of BPRS in the three subtypes of schizophrenia

BPRS Item	Subtype of schizophrenia						't' ratios		
	Positive (n = 28)		Negative (n = 24)		Mixed (n = 43)		P:N	N:M	P:M
	\bar{X}	SD	\bar{X}	SD	\bar{X}	SD			
1. Somatic concern	1.14	1.40	1.42	1.70	1.41	1.75	0.65	0.03	0.68
2. Anxiety statements	1.46	1.29	1.08	1.28	1.46	1.48	1.06	1.06	0.0
3. Emotional withdrawal	1.42	1.59	2.75	1.39	1.81	1.48	3.18**	2.56**	0.94**
4. Conceptual dis- organization	2.03	2.30	1.41	1.46	1.69	1.71	1.14	0.67	0.71
5. Guilt feelings	0.42	1.08	0	0	0.30	0.73	1.91*	1.99*	0.32
6. Tension	1.21	1.58	0.58	0.86	0.67	1.00	1.75*	0.37	1.76*
7. Mannerisms	1.46	1.76	1.88	1.76	0.86	1.33	0.87	2.68**	1.63
8. Grandiosity	0.50	1.14	0.12	0.59	0.65	1.19	1.45	2.02*	0.53
9. Depressive mood	0.64	0.97	0.79	1.07	0.76	1.11	0.53	0.10	0.47
10. Hostility	1.35	1.56	0.83	1.51	1.79	1.62	1.11	2.38**	1.13
11. Suspiciousness	3.21	2.12	2.41	1.97	3.51	2.02	1.40	2.16*	0.60
12. Hallucinatory behaviour	2.53	2.14	0.79	1.47	2.60	2.10	3.36**	3.73**	0.13
13. Motor retardation	0.89	1.11	2.79	1.82	1.25	1.22	4.64**	4.13**	1.25
14. Un-cooperativeness	1.57	1.69	1.12	1.33	1.04	1.32	1.06	0.23	1.47
15. Unusual thought	1.32	1.79	1.0	1.44	1.58	1.85	0.70	1.32	0.58
16. Blunted affect	1.35	1.28	2.54	1.73	2.02	1.71	2.85**	1.15	1.77*
17. Excitement	0.92	1.41	0.37	0.85	0.44	0.99	1.67**	0.35	1.69*
18. Disorientation	0.10	0.55	0.08	0.39	0.09	0.36	0.14	0.10	0.09

* p < 0.05

** p < 0.01

N = Negative subtype

P = Positive subtype

M = Mixed subtype.

Table 2
Co-efficient and constant scores of BPRS variables for discriminant functions

BPRS variable	Co-efficient for function I	Co-efficient for function II
1. Emotional withdrawal	0.393	0.580
2. Guilt feeling	0.164	-0.439
3. Tension	0.591	0.565
4. Hallucinatory behaviour	0.657	0.217
5. Motor retardation	0.242	0.995
6. Blunted affect	0.837	0.925
7. Excitement	0.678	0.946
Constant	-2.500	-3.673

Mahalanobis $D^2 = 32.891$

'F' ratios at df 7.50 = 53.437 (p < 0.001).

Table 3
Classification according to discriminant
function analysis

Original subtype	Number classified into + ve subtype	Number classified into - ve subtype	Total
Positive subtype	22	6	28
Negative subtype	4	20	24

Correct group membership prediction approximately 80%.

withdrawal, motor retardation and blunted affect and also large negative loading on hostility, suspiciousness and excitement. Factor IV has large positive loading on emotional withdrawal along with hostility, un-cooperativeness and excitement. It also has a large negative loading on guilt feeling. This factor explains about 11% of total variance. Factor V explains about 9% of variance and is comprised of items like

Table 4
Principal components analysis of BPRS scores

BPRS Variable	Factor					
	I	II	III	IV	V	VI
1. Somatic concern	0.188	<u>0.622</u>	0.095	-0.207	0.073	0.249
2. Anxiety statement	0.047	<u>0.786</u>	-0.041	0.114	0.026	-0.004
3. Emotional withdrawal	-0.078	0.173	<u>0.639</u>	<u>0.539</u>	-0.085	-0.109
4. Conceptual disorganization	<u>0.541</u>	<u>-0.305</u>	-0.084	0.110	0.183	<u>-0.486</u>
5. Guilt feeling	-0.035	0.237	0.006	<u>-0.399</u>	0.143	<u>-0.608</u>
6. Tension	<u>0.486</u>	<u>0.464</u>	-0.176	0.091	0.115	<u>-0.300</u>
7. Mannerism	-0.021	-0.047	0.145	0.212	-0.057	<u>-0.718</u>
8. Grandiosity	<u>0.737</u>	-0.192	-0.151	0.226	0.066	0.060
9. Depressive mood	-0.201	<u>0.765</u>	-0.112	-0.027	0.134	-0.028
10. Hostility	0.146	0.146	<u>-0.340</u>	<u>0.679</u>	0.065	-0.052
11. Suspiciousness	-0.286	0.144	<u>-0.331</u>	0.257	<u>0.646</u>	0.234
12. Hallucinatory behaviour	0.051	-0.013	-0.042	-0.186	<u>0.817</u>	-0.106
13. Motor retardation	-0.109	0.052	<u>0.842</u>	-0.096	-0.212	0.060
14. Un-cooperativeness	0.00	-0.124	0.025	<u>0.754</u>	0.023	-0.128
15. Unusual thought	0.282	<u>0.337</u>	0.064	0.198	<u>0.608</u>	-0.070
16. Blunted affect	0.005	-0.235	<u>0.795</u>	-0.142	0.094	-0.026
17. Excitement	0.271	-0.004	<u>-0.405</u>	<u>0.351</u>	-0.008	<u>-0.613</u>
18. Disorientation	<u>0.637</u>	0.257	<u>0.033</u>	-0.165	-0.059	-0.008
% Variance explained	10.22	15.31	12.54	10.99	9.03	9.84
% Cumulative variance		25.53	38.07	49.06	58.09	67.93

anxiety statements, depression, tension and unusual thoughts but also has large negative loading on conceptual disorganization. Factor II accounts for about 15% of variance. Factor III which explains about 12% of total variance is a bipolar factor having large positive loading on emotional

suspiciousness, hallucinatory behaviour and unusual thoughts. Factor VI is a unipolar factor with large negative loading on conceptual disorganization, guilt feeling, tension, mannerism and excitement. The results of principal components analysis are shown in Table 4.

Discussion

BPRS (Overall & Gorham 1962) was initially developed for evaluating therapeutic efficacy in psychopharmacological research though in recent years, it has also been used for identifying phenomenological types in psychiatric patients (Overall & Hollister 1982). The present work assesses this aspect of BPRS further in relation to positive and negative subtyping of schizophrenia.

The negative symptoms (emotional withdrawal, blunted affect and motor retardation) found significant by us have traditionally been regarded as defect symptoms (Andreasen 1982) and have also been found to be prominent features of negative subtype in other clinical studies (Lindenmayer et al. 1984; Opler et al. 1984). There is a striking resemblance between global rating of certain subscales of SANS viz., affective flattening, avolition-apathy and anhedonia-sociality and BPRS items of blunted affect, motor retardation and emotional withdrawal. Andreasen (1982) has shown negative symptoms to have good internal consistency which is supported by our finding of a similar constellation of negative symptoms on BPRS - a scale different from SANS.

Studies by Lindenmayer et al. (1984) and Opler et al. (1984) which employed BPRS for this subtyping having referred to some items as criterion symptom for the positive cluster. In a study of acute schizophrenic patients, conceptual disorganization, grandiosity and suspiciousness were noted to be significantly different in positive and negative subtypes by Lindenmayer et al. (1984), whilst in a study of chronic schizophrenic patients by Opler et al. (1984), hallucinatory behaviour, excitement and hostility were also found to differentiate between these two groups in addition to the three symptoms mentioned earlier. The positive cluster of our study is different from the study of acute patients of Lindenmayer

et al. (1984) and only partly similar to the positive cluster of the study of chronic patients by Opler et al. (1984). Moreover, tension and guilt feeling, which have discriminatory value in our study, have not been reported to be so in any earlier work. Methodological differences can account for some of the differences. The present study has employed criteria of Andreasen and Olsen (1982) for positive-negative subtyping and there is no assumption that certain BPRS items indicate positive or negative subtype. In the studies mentioned earlier by Lindenmayer et al. (1984) and Opler et al. (1984), this subtyping was dependant on "a prior" assumption about certain BPRS items indicating positive or negative dimension. Duration of illness which was either short or long in these two studies could have also influenced the results. Our sample had both acute and chronic patients.

The differences in positive cluster seen also suggest that unlike negative subtype which appears to be homogenous, the positive subtype is perhaps a heterogenous entity having more than one symptom complex. This suggestion is consistent with the finding of Andreasen and Olsen (1982) who found low internal consistency for the positive subtype. We have no convincing argument why items of tension and guilt feeling should cluster in positive symptoms except that these probably reflect positive affect, unlike emotional emptiness which is regarded as typical of negative subtype.

The results of discriminant function and principal components analysis further enhance the utility of BPRS in this subtyping. The discriminant function equation has a high rate (80%) of correct group assignment. This indicates that the seven variables of BPRS tested have high discriminating value. However, because of the cross-sectional nature of the study, predictive validity of BPRS in distinguishing these subtypes of schizophrenia cannot be

ascertained. This would require further research.

Principal components analysis resulted in the emergence of six factors, factors I & V are prototypes of positive subtypes and factors III and IV depict profiles of negative subtype. These factors are similar to those described by Overall and Hollister (1982) on the basis of BPRS and by some workers on the basis of SAPS and SANS (Andreasen & Olsen 1982; Kulhara et al. 1986b). Two interesting features of the factor structure of the present work are (i) factor II has positive loading on unusual thought, tension, somatic concern, depressive mood and anxiety statement and no significant contribution of emotional withdrawal and blunted affect suggesting that positive affect like anxiety, tension and depressed mood are independent of negative affect like emotional withdrawal and blunted affect and (ii) two syndromes of emotional withdrawal are identified. One characterized by blunted affect and retardation and the other by hostility, un-cooperativeness and excitement. Both these have negative loading on depressive mood. These two factorial types are in keeping with clinically observed phenomenological types of emotionally withdrawn schizophrenics.

The present study does not resolve many issues concerning the validation of the concept of negative symptoms construct. However, the present investigation does contribute to this validation process by demonstrating that BPRS differentiates reasonably accurately positive and negative subtypes against criteria for this subtyping derived from some other source.

This study shows that BPRS which was not devised for measuring positive and negative dimensions of schizophrenia, nonetheless, is a useful instrument in discerning these dimensions. Simplicity of administration, brevity and established reliability of BPRS can be used for the identification of

the positive and negative subtypes of schizophrenia.

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