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Consistency of symptomatic dimensions of schizophrenia in a 12 year follow-up study

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Summary:

Aim. The aim of the study was to identify syndromes measured by the BPRS – E scale and to analyse changes in their consistency over the course of a 12 years prospective study.
Material/method. A group of 80 patients with diagnosis of schizophrenia was followed up in 1, 3, 7 and 12 years after their first psychiatric hospitalisation. Their psychopathological status was investigated with the BPRS – E scale.
Results. Four syndromes were found: positive, negative, depressive and that of excitement. However, at the following time points, consistency of these syndromes varied. The most consistent syndrome was the negative one. Four of ten symptoms connected with this syndrome, namely: motor retardation, blunted affect, uncooperativeness and emotional withdrawal, were present within it at every follow-up. In the case of the excitement syndrome two symptoms (hostility and tension) were present at all follow-up time points. None of the symptoms included in the depressive and positive syndromes were consistently present within these syndromes over the period of twelve years.
Conclusion. In the analysis of the symptoms of patients suffering from schizophrenia four factors were identified: negative, excitement, depressive and positive. Of the four factors, the most consistent over the period of twelve years was the negative factor.

schizophrenia/ symptomatic dimensions/ integrity analysis

INTRODUCTION

The term "schizophrenia", created by E. Bleuler in 1911 [1], became one of the fundamental diagnostic categories in 20th century psychiatry. Basically, since the beginning of its existence it was known to encompass an array of various disorders. Bleuler himself wrote about a "schizophrenia group". He identified four basic types of schizophrenia: paranoid, hebephrenic, catatonic and simple. These differed in symptoms, the course and the outcome of the disease, i.e. prognosis. This division, though significant and to some extent still up-to-date, has over the years become subject to criticism. Results of clinical observations indicated growing prevalence of the paranoid type. At the same time researchers noted the heterogeneous course and symptoms associated with this form of schizophrenia. The answer to those observations came with the dichotomous division of schizophrenic disorders into two subtypes: I – with prevailing positive symptoms, and II – with prevailing negative symptoms. This division was proposed by English researcher Timothy Crow in 1980 [2]. It was met with a considerable response. New tools were invented to assess those new dimensions: Positive and Negative Syndrome Scale (PANSS) [3], Scale for the Assessment of Positive Symptoms

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(SAPS) [4], Scale for the Assessment of Negative Symptoms (SANS) [5], and existing instruments were modified – e.g. Brief Psychiatric Rating Scale (BPRS) [6].

In the case of the instrument used in this study – BPRS – similarly to other instruments, additional dimensions of psychopathology in schizophrenia were included over time. In the introduction we will discuss only those studies which employed the extended version of the scale (BPRS-E), created by Lukoff et al. in 1986.

In 1993, Van der Does et al. [7] in a study carried out on 65 people with a recent diagnosis of schizophrenia found four symptom dimensions: negative, positive, disorganisation and depression. Dingemans et al. [8] in a diagnostically diversified group of patients (n=150) singled out several syndromes: positive, negative, depressive, manic and disorientation. Burger et al. [9] run a study on 165 homeless people with various diagnoses (schizophrenia, bipolar affective disorder, recurring depression, atypical psychoses, hallucinatory-delusional disorders). He also found five syndromes (thought disorders, withdrawal, anxiety/depression, hostility/suspiciousness and excitement). Ventura et al. [10] examined a group of 114 psychotic patients, mostly young adults, with diagnoses of schizophrenic disorders. Comparing his own results to those from previous research he indicated a four-dimensional model as more coherent and appropriate from a practical point of view. The four dimensions he found were named: positive, negative, depressive and manic. Ruggeri et al. [11], in her study of a group of 404 schizophrenia-diagnosed people from five European countries, also found a four-dimensional model consisting of such dimensions as: manic/excitement, depression/anxiety, positive and negative. A substantial paper concerning both the analysis of psychopathological dimensions of the BPRS and their stability over time (4 studies in one year, n=1440, various diagnoses) was submitted by Velligan et al. in 2005 [12]. The results of their study also support a four-dimensional model (dimensions: excitement, depression/anxiety, positive, negative).

A significant feature of the studies which were carried out and published to date is either the lack of stability/consistency analysis of particular dimensions/syndromes in time, or a relatively short time of observation. In two studies where such an observation took place, i.e. Velligan's [12] and van der Does' [7], it was respectively 12 and 15 months.

OBJECTIVE

Based on the analysis of the psychopathological assessment in subsequent follow-up studies, two research goals were formulated:

Identification of symptom dimensions in schizophrenia over a twelve year follow-up period.

Evaluation of the consistency of selected dimensions over the period of twelve years.

MATERIAL AND METHOD

The subjects

A group of 80 people with first episode of schizophrenia was selected based on the following criteria: a) they were admitted to a psychiatric hospital for the first time, b) they had the diagnosis of schizophrenia according to the then-used DSM-III classification (re-diagnosed in the 12-year follow-up in accordance with DSM-IV [13]), c) they were living with their families in Kraków, d) additional exclusion criteria were: psycho-organic disorders and psychoactive substance dependence. The group was examined during the first hospitalization (both upon the admittance and discharge from hospital) as well as in one, three, seven and twelve years after their first hospitalizations. Analyses comprised the results of the 4 assessment points: a year from the first hospitalization 77 persons were evaluated (K1), in three years – 74 (K3), in seven years – 71 (K7) and in twelve years – 72 (K12) (Tab.1 – *next page*).

The average age of the subjects was 27.2 years, and despite the fact that at the first hospitalisation the subjects' age spanned from 18 to 44 years most of them fell ill before they turned 30 years of age.

The instrument

The Brief Psychiatric Rating Scale (BPRS) was constructed in 1960 by Gorham and Overall [14]. The original version described 16 symptoms. The modification of 1972 assessed 18 symptoms. In

Table 1. Sample composition – demographic predictors at the beginning of the study between-group comparisons estimated with Mann-Whitney U-test – statistically non-significant between-group comparisons estimated with Chi-square test – statistically non-significant

Demographic predictors	Categories	K1 (n=77)	K3 (n=74)	K7 (n=71)	K12 (n=72)
** [1] Sex	1. female 2. male	45 (58%) 32 (42%)	42 (56%) 32 (44%)	43 (65%) 28 (35%)	42 (58%) 30 (42%)
* [2] Age of patient at first hospitalisation	range mean age	18 through 44 27.2	18 through 44 27	18 through 43 27.4	18 through 44 27.2
* [3] Marital status before first hospitalisation	1. married 2. divorced 3. single	27 (35%) 0 (0%) 50 (65%)	25 (34%) 0 (0%) 49 (66%)	24 (34%) 0 (0%) 47 (66%)	25 (35%) 0 (0%) 47 (65%)
* [4] Educational level at first hospitalisation	1. higher 2. secondary 3. basic vocational 4. primary	30 (39%) 30 (39%) 13 (17%) 4 (5%)	28 (37%) 29 (40%) 13 (18%) 4 (5%)	27 (38%) 28 (39%) 14 (20%) 2 (3%)	25 (35%) 31 (43%) 13 (18%) 3 (4 %)

*between-group comparisons estimated with Mann-Whitney U-test – statistically non-significant

**between-group comparisons estimated with Chi-square test – statistically non-significant

our study we used the newest adaptation of the scale named BPRS-E [6]. It includes 24 symptoms assessed on a scale from 1 to 7.

Statistical Analyses

To analyse the data exploratory factor analysis was used. The basic analysis was conducted on all assessments altogether, which enabled to identify a four-factor structure of syndromes. In the next step, the data from every follow-up were separately analysed, in order to determine whether the factorial structure is confirmed by the results obtained at every one of the follow-ups. A premise of the factors being orthogonal was made, therefore the varimax rotation was used.

RESULTS

In the overall analysis based on the data from the four time points: one year (K1), three years (K3), seven years (K7) and twelve years (K12) since the first hospitalisation the symptoms assessed with the BPRS formed four symptom dimensions: negative, positive, depressive and excitement. The criterion of assigning an item (symptom) to a given factor was the value of factor loading equal or exceeding 0.50. The results are shown in Tab. 2.

Table 2. Results of factor analysis of all assessments conducted at four time points over twelve years

	Negative factor	Excitement factor	Depressive factor	Positive factor
Somatic concern	0.13	0.39	**0.56**	0.01
Anxiety	0.25	0.14	**0.66**	0.36
Depression	0.37	0.00	**0.72**	0.10
Guilt	0.05	0.14	**0.70**	0.15
Hostility	0.20	**0.53**	0.26	0.26
Suspiciousness	0.34	0.36	0.16	**0.54**
Unusual thought content	0.28	0.20	0.16	**0.81**
Grandiosity	-0.04	0.26	-0.08	**0.51**
Hallucinations	0.11	-0.13	0.06	**0.80**
Disorientation	**0.57**	-0.07	0.10	0.15
Conceptual disorganisation	**0.56**	0.15	0.08	0.31
Tension	0.35	**0.56**	0.20	0.28

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Motor retardation	**0.59**	-0.20	0.24	-0.05
Blunted affect	**0.75**	-0.03	0.31	0.12
Excitement	0.41	**0.62**	0.24	0.09
Mannerisms and posturing	**0.58**	0.14	0.05	-0.04
Uncooperativeness	**0.62**	0.24	-0.02	0.03
Emotional withdrawal	**0.78**	0.04	0.07	0.13
Suicidality	-0.04	-0.15	**0.72**	-0.07
Self-neglect	**0.65**	0.20	-0.05	0.21
Bizarre behaviour	**0.54**	0.17	0.10	0.21
Elated mood	-0.13	**0.64**	-0.13	-0.05
Motor hyperactivity	0.08	**0.78**	-0.04	0.07
Distractibility	**0.63**	0.23	0.05	0.18
Expl,Var	4.76	2.74	2.72	2.45
Prp,Totl	0.20	0.11	0.11	0.10

In every column the symptoms included in a given factor are marked by grey background. The "negative" dimension comprised of the following symptoms: disorientation, conceptual disorganization, motor retardation, blunted affect, mannerisms and posturing, uncooperativeness, emotional withdrawal, self-neglect, bizarre behaviour, distractibility. The "excitement" syndrome included: hostility, tension, excitement, elated mood, motor hyperactivity. The "depressive" syndrome was composed of: somatic concern, anxiety, depression, guilt, suicidality. The "positive" dimension comprised: suspiciousness, unusual thought content, grandiosity, hallucinations.

To compare the factorial structures observed at every follow-up with the structure of the overall analysis of all measurements, a series of factor analyses was conducted, separately for every time point. The factorial values of all symptoms in a given time point are presented in Tab. 3.

The bolded results indicate these symptoms which fell within the same factor as in the overall analysis, the other symptoms shown were included in a given factor in the overall analysis but did not reach the cutoff value in a particular time point.

To sum up the results, among the four indicated symptom factors: negative, excitement, depressive and positive, the most consistent over the years turned out to be the negative factor. Of the ten symptoms assigned to the negative factor at no time point did their number drop below seven. Four of them: motor retardation, blunted affect, uncooperativeness and emotional withdrawal were present within this syndrome at every follow–up. In the case of the excitement syndrome two symptoms were present in all follow–ups: hostility and tension. None of the symptoms included in the depressive and positive syndromes were consistently present within these syndromes in all follow-ups.

Table 3. Results of factor analysis of assessments at specific time points

	altogether	K-1	K-3	K-7	K-12
Negative factor					
Disorientation	**0.57**	**0.78**	**0.72**	0.09	**0.65**
Conceptual disorganisation	**0.56**	**0.78**	0.37	0.33	0.41
Motor retardation	**0.59**	**0.69**	**0.72**	**0.80**	**0.58**
Blunted affect	**0.75**	**0.61**	**0.60**	**0.78**	**0.78**
Mannerisms and posturing	**0.58**	**-**	-0.03	**0.86**	**0.65**
Uncooperativeness	**0.62**	**0.56**	**0.59**	**0.53**	**0.70**

(table continued on next page)

Emotional withdrawal	**0.78**	**0.68**	**0.60**	**0.75**	**0.78**
Self-neglect	**0.65**	0.35	**0.50**	**0.53**	**0.58**
Bizarre behaviour	**0.54**	-0.10	**0.54**	**0.74**	0.38
Distractibility	**0.63**	**0.72**	**0.77**	0.25	0.37
Excitement factor					
Hostility	**0.53**	**0.51**	**0.77**	**0.74**	**0.70**
Tension	**0.56**	**0.63**	**0.57**	**0.62**	**0.74**
Excitement	**0.62**	**0.77**	**0.55**	0.26	**0.74**
Elated mood	**0.64**	**0.51**	-0.05	-0.10	**0.62**
Motor hyperactivity	**0.78**	**0.68**	0.11	0.26	**0.79**
Depressive factor					
Somatic concern	**0.56**	0.28	0.41	**0.60**	**0.59**
Anxiety	**0.66**	**0.73**	0.30	**0.71**	**0.67**
Depression	**0.72**	0.38	**0.59**	**0.72**	**0.68**
Guilt	**0.70**	0.33	**0.61**	0.47	**0.77**
Suicidality	**0.72**	0.49	0.04	**0.73**	**0.73**
Positive factor					
Suspiciousness	**0.54**	0.39	-0.04	-0.07	0.38
Unusual thought content	**0.81**	0.31	0.05	-0.14	**0.74**
Grandiosity	**0.51**	**0.61**	0.26	-0.21	0.32
Hallucinations	**0.80**	-0.01	-0.04	-0.09	**0.75**

DISCUSSION

Considering the first goal of this paper, which is the assessment of the dimensions measured with BPRS-E, we can state that the results obtained in our study are convergent with the results of the majority of studies up to date. Similarly as in van der Does' [7], Ventura's [10], Ruggeri [11], and Velligan's [12] studies, the four-factor model turned out to be the most appropriate. From the statistical point of view, an attempt to introduce a five-factor model in our study effected in weak factors including only two or three symptoms. The summarised results of the studies on dimensions in the BPRS conducted to date are presented in the Tab. 4.

Five-factor models were also less consistent and less clear from a clinical vantage point. It should be emphasised, that the studies indicating a five-factor model of symptoms by Dingemans [8] and Burger [9] were run on diagnostically heterogenic groups of patients, what could result in obtaining a more complicated symptom structure.

The other goal of this paper, the assessment of the consistency of the found symptom dimensions over time, should be considered in relation to the studies by Van der Does [7] and Velligan [12]. Both studies were conducted in relatively short periods of time. Van der Does et al. [7] assessed a group of 65 persons with a diagnosis of schizophrenia at three time points dur-

Table 4. Review of selected studies – overall results

Analysed psychopathological symptoms	Van der Does four factor model (1993)	Dingemans (1995)	Burger (1997)	Ventura 24-item model (2000)	Velligan Obligue rotation (2005)	Velligan Varimax rotation (2005)	Cechnicki i wsp, (2009)
Depression / Anxiety / Affect							
Depression	**0.61**	**0.86**	**0.79**	**0.75**	**0.79**	**0.79**	**0.72**

(table continued on next page)

Anxiety		**0.75**	**0.77**	**0.62**	**0.79**	**0.79**	**0.66**
Guilt	**0.69**	**0.64**	**0.71**	**0.58**	**0.71**	**0.71**	**0.70**
Somatic concern		0.41	**0.58**	0.30	**0.52**	**0.52**	**0.56**
Hostility			0.08	0.03	**0.56**	**0.57**	
Tension			0.22	0.25	0.16	0.19	
Suicidality	**0.73**	**0.71**	**0.57**	**0.61**	**0.68**	**0.67**	**0.72**
Psychotic symptoms/ Thought disorders							
Unusual thought content	**0.85**	**0.79**	**0.88**	**0.65**	**0.86**	**0.83**	**0.81**
Hallucinations	**0.65**	**0.61**	**0.73**	**0.51**	**0.75**	**0.74**	**0.80**
Conceptual disorganisation		**0.54**	**0.53**	0.34	0.42	0.34	
Suspiciousness	**0.86**	**0.72**	0.36	0.48	**0.61**	**0.56**	**0.54**
Grandiosity		**0.61**	**0.85**	**0.24**	**0.60**	**0.61**	**0.51**
Bizarre behaviour		**0.66**	0.47	**0.67**	**0.53**	0.46	
Disorientation			0.16	**0.52**	0.31	0.25	
Negative symptoms or Withdrawal/Motor retardation							
Blunted affect	**0.70**	**0.82**	**0.85**	**0.77**	**0.80**	**0.78**	**0.75**
Motor retardation	**0.85**	**0.86**	**0.76**	**0.70**	**0.71**	**0.69**	**0.59**
Emotional withdrawal	**0.85**	**0.88**	**0.84**	**0.66**	**0.81**	**0.82**	**0.78**
Uncooperativeness		0.43	0.15	0.38	0.41	0.45	**0.62**
Mannerisms and posturing			0.20	0.37	0.23	0.24	**0.58**
Disorientation			**0.63**	0.22	0.41	0.40	**0.57**
Self-neglect	0.43	**0.47**	0.42	0.41	0.28	0.25	**0.65**
Conceptual disorganisation							**0.56**
Bizarre behaviour							**0.54**
Distractibility							**0.63**
Hostility/ Suspiciousness							
Hostility			**0.88**				
Suspiciousness			**0.50**				
Uncooperativeness			**0.72**				
Grandiosity			-0.11				
Excitement							
Excitement	**0.79**	**0.76**	**0.78**	**0.77**	**0.77**	**0.75**	**0.62**
Tension	**0.52**	**0.71**	**0.77**	0.35	**0.60**	**0.63**	**0.56**
Mannerisms and posturing	**0.61**		**79**		0.47	0.47	
Conceptual disorganisation	**0.58**	**0.55**	0.20	0.11	**0.57**	**0.55**	
Bizarre behaviour	**0.66**		0.20		0.45	0.41	
Elated mood	**0.65**	0.34	0.27	**0.77**	0.42	0.39	**0.64**
Distractibility	**0.74**	0.42	0.37	**0.69**	0.49	0.48	
Motor hyperactivity	**0.76**	**0.71**	**0.66**	**0.87**	**0.80**	**0.80**	**0.78**
Hostility	**0.65**		-0.16	0.45	0.15	0.15	**0.53**
Grandiosity			0.00	0.41	0.30	0.22	

ing fifteen months. The fact that the number of subjects dropped from 65 at the beginning to 45 at the third evaluation seems to be important for the reliability of their study. Velligan et al. [12] took even a shorter observation period – 12 months and four assessments with three month intervals. Their numerous group of subjects (1441 at the beginning of the study, 1099 at the end) was considerably varied in terms of diagnosis. The subjects diagnosed with schizophrenia comprised 1/3 (441 people) of the whole group. The results obtained in those two stud-

ies are divergent. Velligan et al. [12] found that the factors they identified are stable over time. The findings of van der Does et al. [7], similarly to this study's results, exhibited low consistency of the positive factor over time. This factor, comprising three symptoms in our study (unusual thought content, hallucinations and suspiciousness) became dispersed at the second follow-up. Based on such observations, Van der Does concluded that the structure of symptoms, and consequently, the consistency of factors depend on the phase of the illness. Velligan, in his polemic with Van der Does, pointed out small number of subjects and concluded that it could significantly influence the weak consistency of the symptom factors. The results of our study, which are corroborative of van der Does' while obtained from a greater number of subjects and over a longer period of time, necessitate rethinking the character of the symptoms associated with schizophrenic disorders. Perhaps, we should refer back to an aged but still interesting etio-epigenetic concept of Tadeusz Bilikiewicz [15]. According to it, the syndromes of positive symptoms are temporary (third etio-epigenetic level) whereas underneath is a more stable syndrome of negative symptoms which make the "core of the disorder."

Considering the remaining two factors, noteworthy is the relatively high consistency of the excitement factor throughout the period of 12 years. Two of the symptoms which make it up - hostility and tension – were present at all assessment time points. When comparing this result with those of other researchers it should be noted that tension is a symptom present at a statistically significant level in almost all studies referred to in this paper. As far as hostility is concerned, the results of the studies are ambiguous. On one hand is Van der Does' research, where hostility constitutes a significant element of the excitement factor, or Burger's study, in which he singles out a separate fifth factor named hostility/suspiciousness including also hostility as a symptom. On the other hand, the remaining cited studies do not show this symptom as a statistically significant component of the excitement factor. However, it does emerge in Velligan's study as an element of the depressive factor. It is our conviction that the results we obtained are understandable from the clinical point of view. One of the aspects of suffering from a schizophrenic psychosis is the feeling of aversion and hostility from the people around. This feeling can result either from real experience of patients or from the projective defence mechanisms they employ. The results of our study show the permanent character of this phenomenon in time, as well as its connection with the feeling of inner tension. They are corroborated by clinical experience and may allow to better understand and help people with such disorders.

CONCLUSIONS

In the analysis of the symptoms of patients suffering from schizophrenia four factors were identified: negative, excitement, depressive and positive.

Of the four factors, the most consistent over the period of twelve years was the negative factor.

From among the symptoms making up the excitement syndrome hostility and tension appeared within this syndrome at all follow-ups.

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