

## Polish version of the Brief Negative Symptom Scale (BNSS)

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### Summary

**Aim.** To create a Polish adaptation of the Brief Negative Symptom Scale (BNSS), to assess the internal consistency of the Polish version of the BNSS, and to make correlations between the BNSS scores and the Positive and Negative Syndrome Scale (PANSS) in the group of patients with schizophrenia.

**Methods.** The procedure of Polish adaptation of the assessment form (Scoresheet) of the BNSS, comprising 13 items organized in 6 subscales (anhedonia, lack of proper distress, asociality, avolition, blunted affect, and alogia), as well as the Manual and the Workbook of the scale was carried out. Psychometric tests were performed in 40 patients with paranoid schizophrenia (20 men and 20 women), aged 44±13 years, with illness duration of 17±10 years, and severity of symptoms on the PANSS 56±16 points, receiving unchanged pharmacological treatment in the last three months.

**Results.** The Polish version was accepted by the authors of the scale. The reliability analysis showed high values of the Cronbach's alpha coefficient both for the whole scale (0.97) and for individual subscales (0.74–0.93). The BNSS and its subscales showed a high significant correlation with the total PANSS score and with the PANSS negative symptom subscale, both original and modified.

**Conclusions.** The obtained results indicate good psychometric properties of the Polish version of the BNSS and its possible usefulness in the study of negative symptoms of schizophrenia conducted in Poland.

**Key words:** schizophrenia, negative symptoms, Brief Negative Symptom Scale

## Introduction

Schizophrenia remains one of the most important challenges of modern psychiatry. Thanks to the achievements of pharmacology, especially since the introduction of the second-generation antipsychotics, in many cases it is possible to successfully influence the course of the illness, both the symptoms and the quality of patients' life. However, this significant progress applies mainly to the patients showing dominance of positive (psychotic) symptoms. The occurrence of negative symptoms is still associated with resistance to available therapeutic methods, worse prognosis, lower standard of living and impairment in socio-occupational functioning [1, 2]. At the same time, the heterogeneity of the clinical picture of negative symptoms significantly impedes their reliable and objective assessment, which would make a starting point for the research on potential effective therapeutic methods [3, 4].

The first tools used to assess the presence and severity of symptoms of schizophrenia are now referred to as the first generation scales. In these scales, the assessment of negative symptoms is one of the elements of the overall evaluation of the disease syndrome. The general diagnostic scales include *the Brief Psychiatric Rating Scale* (BPRS) [5] and *the Positive and Negative Syndrome Scale* (PANSS) [6]. Both tools do not account for the influence of the environmental factors, medications and other components of the mental state (for example, depression) on the formation and severity of the deficit symptoms which were mentioned above. Also, inclusion of abstract thinking disorders and stereotypical thinking to the category of negative symptoms of the PANSS is currently a subject of controversy.

The first diagnostic scale referring directly to the negative symptoms was *the Scale for the Assessment of Negative Symptoms* (SANS) constructed by Nancy Andreasen in the early 1980s [7]. To distinguish the primary and the secondary negative symptoms and to take into account the division into deficit and non-deficit schizophrenia, American researchers (Brian Kirkpatrick et al.) developed *the Schedule for the Deficit Syndrome* (SDS) [8].

Due to controversy among the scientific community regarding the clinical picture and categorization of the negative symptoms, the meeting of experts (Consensus Development Conference on Negative Symptoms) took place in 2005 in Rockville. During the meeting, it was agreed that the blunted affect, alogia, social withdrawal, anhedonia, and avolition are considered to be negative symptoms. It was also proposed to create new diagnostic tools describing the aforementioned symptoms and meeting strictly defined constructional criteria. According to them, the scales should be concise and easy to use, possible to be used in various cultural circles, both for clinical and psychological as well as epidemiological research, should assess the symptoms currently considered as negative, without including the manifestations of disorganization (poverty of speech, attention disorders), differentiate the predicted and the experienced aspect of anhedonia and internal experience from behavior [9].

Based on the preceding recommendations, the new scales were produced to assess the negative symptoms, referred to as the second-generation scales. These include two clinical scales – *the Brief Negative Syndrome Scale* (BNSS) [10] and *the Clinical Assessment Interview for Negative Symptoms* (CAINS) [11], as well as two self-as-

assessment scales – *the Motivation and Pleasure Scale – Self Report* (MAP-SR) [12] and *the Self-assessment of Negative Symptoms* (SNS) [13].

*The Brief Negative Symptom Scale* (BNSS), developed in 2011 by Brian Kirkpatrick et al., is currently one of the most commonly used scales in the practice of assessing the negative symptoms of schizophrenia. According to the authors, the absence or deficit of behaviors and subjective experiences that are usually present in people of the same culture and age group should be understood as negative symptoms. The scale evaluates five symptoms for which there is currently a consensus on their character, as negative symptoms – anhedonia, social withdrawal, avolition, blunted affect, and alogia. Also, the sixth subscale was included, describing the absence of proper distress. The BNSS scale documentation includes the Scoresheet, consisting of 13 symptoms and 6 subscales, the Manual and the Workbook.

The examination has a character of an interview, conducted on the basis of a guide which contains, among others, tips and examples of questions. Each position is measured on a seven-point scale (from 0 to 6) with a range defining a symptom as normal (0) to extremely severe (6). The time frame of the assessment was set for a week. The basis of the interview is information obtained from the patient, an important element is also the observation of the patient and, if necessary, data obtained from external informers. The scale includes 13 points organized in 6 subscales: anhedonia (intensity and frequency of feeling pleasure, intensity of expected pleasure), distress (experiencing unpleasant or unstable emotions of various types, such as sadness, depression, anxiety, sorrow, anger), social withdrawal referred to as reduced social activity accompanied by a decreased interest in forming close relationships with others (behavior, internal experience), avolition defined as the disappearance of the will characterized by a decrease in the ability to take action and support it (behavior, internal experience), blunted affect defined as a decrease in the outward expression of emotion (facial and vocal expression, gesticulation), alogia referred to as poverty of speech (quantity of speech, spontaneous elaboration) [10].

In recent years, the BNSS has been translated into Spanish, Italian, German, and Turkish and psychometrically verified for these languages. Mané et al. [14] carried out the adaptation and validation of the Spanish version of the BNSS in 20 patients with schizophrenia, showing both high internal consistency of the scale as well as high compatibility between the assessing researchers. Mucci et al. [15] confirmed these properties by validating the Italian version of the BNSS on a large group of 912 schizophrenic outpatients. Bischof et al. [16] used the German-language version of the BNSS in 75 patients of the University Psychiatric Hospital in Zurich, both in the hospital and the outpatient clinic, confirming its good psychometric properties. In 2016, the Turkish version of the scale was also published [17]. The study performed in 75 schizophrenic patients showed the high reliability of the scale, measured by the Cronbach's alpha coefficient, and its validation showed a significant correlation with the total PANSS score as well as the PANSS subscale of the negative symptoms.

In preparation, there are translations for other languages and their adaptations that have not been yet published. The development of the Polish version of the scale can make another achievement in this field.

The objectives of this work are as follows:

1. Development of the Polish adaptation of all the elements of the BNSS: the assessment form (Scoresheet), the Manual and the Workbook
2. Evaluation of selected psychometric properties of the Polish version of the BNSS, including the internal compliance of the BNSS and the correlation between the BNSS scores and the PANSS scores, in the group of patients with schizophrenia assessed during symptomatic stabilization.

## Methods

The procedure for the development of the Polish version of the BNSS

The Polish version of the *Brief Negative Symptom Scale* (BNSS) has been developed at the Department of Adult Psychiatry, Poznan University of Medical Sciences. After obtaining the consent of the scale's authors (Dr. Brian Kirkpatrick and Dr. Gregory Strauss), the original versions of the assessment form (Scoresheet), the Manual and the Workbook were translated from English into Polish (Dr. Małgorzata Wojtanowska-Bogacka and Dr. Paweł Wójciak, under the supervision of Prof. Janusz Rybakowski). Subsequently, the Polish translation was given to an independent expert (Dr. Magdalena Kosmowska) for the back-translation into English. The resulting back-translation was sent to the authors of the scale who found the presence of 83 points requiring correction. After the points adjustments were made by Prof. Janusz Rybakowski, Polish versions of all three documents of the scale: the assessment form (Scoresheet), the Manual and the Workbook were again sent to the authors of the scale for acceptance.

## Psychometric assessments

### *Participants*

The study involved 40 patients (20 men and 20 women) with a diagnosis of paranoid schizophrenia, according to the ICD-10. The patients were under the care of the outpatient clinic at the Department of Adult Psychiatry, Poznan University of Medical Sciences (20 patients) or were participants of the Self-help Centers in Poznan – “The Green Center” (10 patients) and “The Fountain House” (10 patients). Patients' age was  $44 \pm 13$  years, education years were  $13 \pm 3$  years, and illness duration was  $17 \pm 10$  years. All patients remained in the phase of symptomatic stabilization of the illness, defined as achieving a total PANSS score of maximum 80 points and received unchanged pharmacological treatment in the last three months.

The values of the PANSS (mean  $\pm$  SD) in the studied group of patients were as follows: total score  $56 \pm 16$  points, positive symptoms  $11 \pm 4$  points, negative symptoms  $14 \pm 6$  points, general psychopathology  $25 \pm 6$  points.

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*Methodology of psychometric examinations*

1. The assessment of the negative symptoms was made using the Polish version of the BNSS. The reliability of the scale and the calculation of the discriminant power of individual points of the scale and its subscales were estimated.
2. Evaluation of the correlation of the Polish version of the BNSS with *the Positive and Negative Syndrome Scale* (PANSS) results. This scale divides the symptoms of schizophrenia into three categories: positive symptoms, negative symptoms and general symptoms. The description of negative symptoms includes seven items (blunted affect, emotional withdrawal, poor rapport, passive/apathetic social withdrawal, difficulty in abstract thinking, lack of spontaneity and flow in conversation, stereotyped thinking). Since the abstract thinking and stereotypical thinking belonging to the category of the negative symptoms is currently arousing controversy, the analysis was performed both for the full version (7 items), and the modified version, composed of 5 items (blunted affect, emotional withdrawal, poor rapport, passive/apathetic social withdrawal, lack of spontaneity and flow in conversation).

### Statistical methods

The statistical calculations were made using the Statistica (Stat-Soft Poland), version 12. The level of statistical significance was set at  $p < 0.05$ . The analysis of the reliability of the BNSS was estimated using the Cronbach's alpha coefficient. The reliability assessment was carried out for the entire scale, as well as for the subscales. Also, the correlation of the item (given question) with the overall result was calculated by determining the discriminant power. The validity of the BNSS was assessed by the correlation coefficient between the BNSS subscales and the PANSS (sum of points, negative symptoms – 7 items and negative symptoms – 5 items).

The study received a positive opinion of the Bioethical Committee of the Poznan University of Medical Sciences. All patients were informed about the purpose and the methodology of the examinations and gave their written consent to participate in the study.

### Results

All the documents of the Polish version of the BNSS, i.e., the assessment form (Scoresheet) covering 13 symptoms and six subscales, the manual and the workbook were accepted by the scale's authors (Dr. Brian Kirkpatrick and Dr. Gregory Strauss). These documents are available on the website of the Department of Psychiatry, Poznan University of Medical Sciences at [www.psychiatria.ump.edu.pl](http://www.psychiatria.ump.edu.pl) under the heading of 'Skala BNSS'.

Table 1 gives the means of the results of individual items and BNSS subscales, as well as their reliability (Cronbach's alpha) and discriminant power.

**Table 1. Reliability and discriminant power of the Polish version of the BNSS in the studied group of patients with schizophrenia**

Specification	Mean	SD	$\alpha$ C1	MD1	$\alpha$ C2	MD2
Anhedonia						
1. Intensity of pleasure during activities	1.4	1.3	0.96	0.89	-	0.92
2. Frequency of pleasure during activities	1.7	1.4	0.96	0.87	-	0.91
3. Intensity of expected pleasure from future activities	1.4	1.4	0.97	0.79	-	0.90
Anhedonia – total	4.5	4.0	-	-	0.96	-
Distress						
4. Distress	0.9	1.2	0.97	0.76	-	-
Asociality						
5. Asociality: behavior	1.6	1.5	0.96	0.87	-	0.61
6. Asociality: internal experience	1.3	1.2	0.97	0.71	-	0.61
Asociality – total	3.0	2.4	-	-	0.74	-
Avolition						
7. Avolition: behavior	1.7	1.5	0.96	0.82	-	0.84
8. Avolition: internal experience	1.5	1.5	0.96	0.86	-	0.84
Avolition – total	3.2	2.9	-	-	0.91	-
Blunted affect						
9. Facial expression	1.3	1.2	0.97	0.74	-	0.71
10. Vocal expression	1.2	1.4	0.96	0.85	-	0.95
11. Expressive gestures	1.3	1.5	0.96	0.86	-	0.85
Blunted affect – total	3.8	3.8	-	-	0.91	-
Alogia						
12. Quantity of speech	1.0	1.3	0.97	0.79	-	0.87
13. Spontaneous elaboration	1.1	1.4	0.96	0.85	-	0.87
Alogia – total	2.1	2.7	-	-	0.93	-
BNSS – total	17.4	15.3	0.97	-	-	-

$\alpha$ C1 – Cronbach's alpha for the entire scale;  $\alpha$ C2 – for subscales, MD1 – discriminant power for the entire scale; MD2 – for subscales

In the study group, the mean severity of negative symptoms of schizophrenia measured with the BNSS was  $17.4 \pm 15.3$  points. The Cronbach's alpha coefficient for the entire scale was 0.97, and for individual subscales 0.74–0.93. This coefficient did not change significantly after removing one of the points of the entire scale as well as of the individual subscales. The discriminant power for items within the entire scale were 0.71–0.89 and within the individual subscales 0.61–0.95.

Table 2 shows the correlation of the BNSS subscales with the total PANSS score and with the negative symptoms both original (7 items) and modified (5 items).

Table 2. Correlation of BNSS subscales with the PANSS (total, negative symptoms, negative symptoms modified)

Specification	PANSS – total	PANSS – neg	PANSS – neg modif
Anhedonia	0.56*	0.73	0.77
Distress	0.64	0.71	0.70
Asociality	0.65	0.76	0.78
Avolition	0.67	0.71	0.75
Blunted affect	0.76	0.84	0.86
Alogia	0.75	0.85	0.86
Total	0.86	0.86	0.87

\* Significance of correlation  $p < 0.01$ ; Other correlations have a significance of  $p < 0.001$

As can be seen in the Table 2, the individual BNSS subscales showed a high, significant correlation with the total PANSS score and the subscales of the PANSS negative symptoms, both the original and the modified one. Regarding anhedonia, asociality, avolition, blunted affect, and alogia, the correlation coefficient was slightly higher about the modified PANSS negative symptom scale (5-item), compared to the original 7-item scale.

## Discussion

*The Brief Negative Symptom Scale (BNSS)* is currently the most frequently used scale of the so-called second-generation scales used to measure the negative symptoms of schizophrenia. Its founders have confirmed both its accuracy and high correlation with other scales to measure such symptoms. The main results of the scale are the total sum of the points and the sums of the points of each subscale [18]. The scale measures two main psychopathological dimensions associated with the negative symptoms, namely disorder of motivation (AAA – anhedonia/avolition/asociality) and weakness of expression (EXP), which includes the absence of proper distress, blunted affect and alogia [19]. In a recently published paper [20], its authors demonstrated the usefulness of the BNSS to assess the impact of pharmaceutical drugs on the negative symptoms of schizophrenia. In the study of MIN-101 preparation, they showed that the difference of the effectiveness of the drug with placebo occurred at the higher dose of the drug (64 mg/day) which was not observed at the lower dose (32 mg/day).

The BNSS has already several language adaptations and more of them are being created. The results obtained in this study can be compared to the studies on the Spanish, Italian, German, and Turkish versions of the BNSS, the results of which were published in the years 2014–2016 [14–17]. The mean total BNSS score obtained in the patients evaluated by us (17.4 points) was slightly lower than in the aforementioned studies,



which can be explained by the fact that in our group there were schizophrenic patients in the period of mental state stabilization (total PANSS score of maximum 80 points, on average  $56 \pm 16$  points). The results as to the reliability of the scale were similar to the studies of the other language versions, both regarding high Cronbach's alpha coefficient, as well as the discriminant power of the individual items in the entire BNSS scale and its subscales. The validity of the BNSS has been confirmed by high correlation coefficients with the PANSS scale and its subscales, similar to the Spanish, Italian, Swiss, and Turkish studies [14–17]. This study also evaluated the correlation between BNSS subscales and the 5-item negative symptoms scale of the PANSS, after removing two controversial items (difficulty in abstract thinking and stereotyped thinking), obtaining slightly higher correlation coefficients compared to the original 7-item scale.

In conclusion, it should be stated that the results obtained by us confirm good psychometric properties of the BNSS in the Polish language version. This indicates that the Polish version may be useful in the study of the negative symptoms of schizophrenia conducted in Poland.

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