

Reliability and Validity of the Schedule for Deficit Syndrome in Schizophrenia

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SUMMARY

Objective: The Schedule for Deficit Syndrome (SDS) is an instrument for categorizing schizophrenic patients as those with and without deficit syndrome. This schedule has been translated and adapted into the Turkish language in order to study its reliability and validity.

Method: 30 male schizophrenic patients were included in the study. The patients had been ill for a long period of time and the course was continuous. The patients were assessed by two different raters using the SDS as a means of testing its reliability. A third rater assessed the same group of patients using the BPRS to test the validity of the SDS.

Results: The raters using the SDS demonstrated good inter-rater reliability for the categorization of patients with and without deficit syndrome, as well as for rating global severity (kappa: 0.88-0.93) and individual negative symptoms (kappa: 0.51-0.61). The schedule was also found to have a high validity for both categorization and measuring individual negative symptoms. (U: 60.0, P: 0.03).

Conclusion: The results demonstrated that the Turkish version of the SDS would be a reliable and valid instrument that could be used in the study of schizophrenia.

Key Words: Schizophrenia, deficit syndrome, the schedule for the deficit syndrome, reliability, validity

INTRODUCTION

Schizophrenia is a psychosis with onset at young age, in which the individual lives in a world of his own isolated from interpersonal relationships and realities and characterized by major disturbances in thought, affection and behavior (Öztürk, 1990; Arkonaç, 1996).

In 1896, Emil Kraepelin proposed the separation of the psychoses into two major groups: degenerative (dementia praecox) and non-degenerative (manic depressive psychosis) psychoses, thus laying the foundation for psychiatric classification (Andreasen and Akiskal, 1983; Aker and Erkoç, 1998).

The diagnosis of schizophrenia is only possible by exact definition and classification of its signs and symptoms. Symptoms unique to schizophrenia can be categorized into two broad groups, namely positive and negative symptoms. Positive symptoms include delusions, hallucinations, thought disorders, disorganized speech and behaviors. Negative symptoms are limitations in density and range of affect (affective flattening), poverty in the content and fluency of thoughts and speech (alogia), difficulty or absence of the initiation of goal-directed behaviors, lack of willpower (avolition), and an inability to experience pleasure and express interest (anhedonia) (Andreasen and Olsen, 1982; Andreasen et al., 1993; Andreasen and Carpenter, 1993; Andreade 1994; Öztürk, 1990; Arkonç, 1996; Aker and Erkoç, 1998).

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Commemoration: We commemorate with respect and gratitude our deceased teacher Assoc. Prof. Oğuz Arkonaç who has familiarized us with the concept of the Deficit Syndrome in schizophrenia, has contributed to the adaptation of the Schedule into Turkish and has broadened our horizons in our training in psychiatry.

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Evaluation of negative symptoms is quite difficult. They are not specific and can emerge as the result of factors such as the positive symptoms, drug side effects, depression, and social withdrawal. The most appropriate method of evaluation is monitoring whether the negative symptoms persist for a certain period of time after other probable factors have been adequately (Andreasen, 1989; Carpenter et al., 1991; Aker and Erkoç, 1998).

Carpenter et al. (1998) emphasized that the research into negative symptoms should focus on patients with permanent or invariant primary negative symptoms, rather than those with transient and/or secondary negative symptoms. In this context, Carpenter et al. have defined the “deficit syndrome”. In contrast to other hypothetical negative symptom subtypes, deficit syndrome requires the differential diagnosis of negative symptoms. In order to meet the diagnostic criteria of the deficit syndrome, the patients should have negative symptoms thought to be primary in schizophrenia, i.e. those that are not associated with drug side-effect, suspiciousness or depression. Furthermore, the symptoms should be permanent features during periods of relative remission (Carpenter et al., 1998; Kirkpatrick et al., 1989, 1994, 1996, 1998). Deficit syndrome refers to a subtype where the negative symptoms are presumed to form the prominent, primary and consistent characteristics at the basis of the disease. There may be major psychotic symptoms during relative remission periods. Nevertheless, it is often possible to make a diagnosis of “deficit syndrome”. The hallmark of the deficit syndrome is “loss of motivation and interest”. Individuals with deficit syndrome have lost their interest in people and objects, and this curbing of interests is not due to situations like suspiciousness, depression or drug treatment (Kirkpatrick et al., 1993; Buchanan, 1990).

In light of this information, Kirkpatrick et al. developed a measuring tool enabling the classification of schizophrenic patients into groups as deficit and non-deficit syndrome. This measuring instrument is “The Schedule for the Deficit Syndrome (SDS)” (Appendix 1) (Kirkpatrick et al., 1993).

Information obtained from interviews conducted with patients and, if necessary, from other information sources, such as clinicians and family members, has been used while completing this schedule. The classification of deficit/non-deficit

is carried out based on the functionality of the patient during clinical stability periods (relative remission or basic functionality) and the interview focuses on these periods. The interview focuses as much on the occupational and social functionality level of the patient as examining the basic areas of schizophrenic psychopathology.

Open-ended questions are asked to comprehensively assess the functionality of patients (Kirkpatrick et al., 1993). The most valuable responses usually depend on the spontaneous information provided by the patient. The patients may provide socially compatible answers about their emotional range, interests, sense of purpose and social drive. However, these answers may contradict the activities or lack of activities of the patient. Sometimes, information obtained from the other sources may be considered more valuable than that obtained from the interview.

Reliability and validity concepts are the most important statistical criteria that have been used to confirm the results of questionnaires or testing instruments (Şenocak, 1997; Erkoç et al., 1991a, 1991b; Uysal, 1998).

The objective of this study was to investigate the validity and reliability of the Turkish version of the “Schedule for deficit syndrome in patients diagnosed with schizophrenia, and to provide a consistency check by comparing the results of this schedule with the results of the Brief Psychiatric Rating Scale. (BPRS).

METHOD

1. Subjects

Thirty male patients with the diagnosis of schizophrenia according to DSM-IV diagnostic criteria were included in the Reliability and Validity Study of the Schedule for Deficit Syndrome, after being evaluated by 2 raters from Bakırköy Training and Research Hospital for Mental and Neurological Diseases. They were randomly included in the study (1 of every 3 consecutive patients presenting at the outpatient follow-up program or admitted for treatment) All of the 30 patients included in the study are male. Mean values for sociodemographic data were 41.0 years for age, 8.8 years for education, 19.6 years for disease duration, 17.5 years for treatment duration and 4.8 for number of hospitalization.

Table 1. Raters' scoring of negative symptoms.

Score	Rater 1					Rater 2				
	0	1	2	3	4	0	1	2	3	4
Negative symptoms	Number of cases					Number of cases				
Restricted affect	3	17	5	5	0	5	15	8	2	0
Diminished emotinal r.	1	19	8	2	0	1	16	12	1	0
Poverty of speech	7	17	5	1	0	12	14	3	1	0
Curbing of interests	2	16	7	5	0	3	15	11	1	0
Diminished sense of p.	1	12	11	6	0	3	13	11	3	0
Diminished social drive	1	13	9	7	0	3	12	13	2	0

Disease types were undifferentiated in 12 (40%), residual in 10 (33.3%) and paranoid in 8 (26.7%) patients. The course of the disease was chronic in 27 (90%) and episodic in 3 (10%) patients. Twenty-four patients (80%) were single and 5 (16.7%) were divorced. Sixteen patients (53.3%) lived in the same house with their parents, and 12 (40%) had been admitted to the hospital for a long time. Eighteen (60%) patients were unemployed, 8 (26.7%) had never worked and 3 were currently working. Twenty-one 21 patients (70%) were treated with atypical neuroleptics and 8 (26.7%) with typical neuroleptics.

Inclusion Criteria

- Diagnosis of Schizophrenic Disorder according to DSM-IV diagnostic criteria

Exclusion Criteria

- Existence of one of the followings according to history, physical examination, or laboratory tests:

- Neurological disease
- General medical disorder
- Psychoactive substance addiction or abuse

- History of head injury resulted in loss of consciousness

- Mental retardation

2. Measuring Instruments

The patients included in the study underwent,

1. Sociodemographic information form,
2. Schedule for the Deficit Syndrome (SDS),
3. Brief Psychiatric Rating Scale (BPRS) consecutively

Sociodemographic information form

Information from 25 different fields in categories including personal information, history, pre-morbid features, and treatment were obtained. The data was gathered from official records and interviews conducted with patients and their families.

Schedule for Deficit Syndrome (SDS) (Appendix 1)

SDS consists of four basic criteria

Criterion 1

This criterion concerns the negative symptoms and contains 6 negative symptoms. These are: "restricted affect, diminished emotional range, poverty of speech, curbing of interests, diminished sense of purpose, diminished social drive".

- 1. Restricted affect:** Assessed by observing behavior, especially facial expressions, descriptive gestures, and vocal changes.

- 2. Diminished emotional range:** Describes a reduction in intensity and range of subjective emo-

Table 2. Raters' assessments of Deficit Syndrome Criteria.

Score	Rater 1			Rater 2		
	1 (no)	2 (yes)	9 (not applicable)	1 (no)	2 (yes)	9 (not applicable)
Deficit syndrome criteria	Number of patients evaluated			Number of patients evaluated		
DSM-IV schizophrenia diagnosis	0	30	0	0	30	0
2 negative symptoms score >2	16	14	0	14	16	0
Primary negative symptoms	0	14	16	3	13	14
Permanent negative symptoms	0	14	16	1	15	14

tional experience of the patient and an inability to experience pleasure or displeasure in any field of interest.

3. Poverty of speech: Reduction in both the quantity of speech and amount of information conveyed. Represents spontaneously transmitted information rather than a response to a question.

4. Curbing of interests: Lost of interest in the world around the patient; ideas, events and hobbies.

5. Diminished sense of purpose: Defines a deficiency in attaining life objectives, inability to initiate or maintain goal-directed activities.

6. Diminished social drive: Quantitative definition of the interest and initiation of social interaction.

Rater assigns a score between 0 (normal) and 4 (serious deterioration) for all these 6 negative symptoms

- Score 0 indicates that the patient is normal in terms of the evaluated characteristic.

- Score 1 indicates that the patient is probably but not definitely normal or the patient is unusual but still in the normal range in terms of the characteristic..

- Score 2 indicates that the patient is clearly abnormal and out of the normal range in terms of the characteristic .

- Score 3 indicates clear impairment in many aspects of the evaluated characteristic..

- Score 4 indicates that the patient is seriously impaired in all aspects of the evaluated characteristic.

To meet the criteria of the deficit syndrome, the patient should have a score of 2 or higher for minimum of two of the negative symptoms in the first criteria (Kirkpatrick et al., 1989).

Criterion 2

Two or more of the negative symptoms listed above have been present for the preceding 12 months and were always present during periods of clinical stability.

Criterion 3

These negative symptoms are primary, meaning that they are not secondary to factors other than the disease process. Such factors include: “anxiety, drug effect, suspiciousness (and other psychotic symptoms) and depression”. Two view points will be very useful in determining whether the symptoms are primary or secondary. These are “longitudinal observation and empirical manipulation”.

Criterion 4

Patient must be diagnosed as schizophrenia according to DSM-IV criteria.

Following the assessment of the schedule, each patient undergoes a global rating for deficit/non-deficit categorization and a global severity scoring from 0 to 4.

a. Global categorization: An answer for the question “Whether the evaluated patient globally

Table 3. Global Deficit Syndrome Classification assessments of the raters.

Classification	Rater 1		Rater 2	
	Frequency	Percent	Frequency	Percent
2.00 (deficit)	14	46.7	13	43.3
3.00 (non-deficit)	16	53.3	17	56.7
Total	30	100.0	30	100.0

meet the deficit syndrome diagnostic criteria (deficit) or not (non-deficit)?" is searched. On the SDS scoresheet (appendix), score 2 represents deficit and score 3 represents non-deficit categorization.

b. Global severity: The patients were globally assessed regarding the severity of deficit syndrome using a scale range of 0-4.

0. Significant deficit features are not present. (Deficit functioning implies a primary, enduring feature of the patient's relative remission).

1. A questionable presence of deficit functioning, or if present of questionable significance. (The deficit syndrome is not considered present when this score is given).

2. A moderate degree of deficit functioning in relation to many areas, or a severe decrease in relation to some areas (The deficit syndrome is considered present when a score of 2 or higher is given).

3. A severe degree of deficit functioning in relation to many areas, or a very severe decrease in relation to some areas.

4. A severe degree of deficit functioning in relation to all areas, or a very severe decrease in relation to most areas.

Two raters (S.Ç and T.O) following the guidelines of the SDS instructions assessed the patients. The SDS was used while the patients were not in marked psychotic exacerbation periods.

The interviews were conducted while both raters were present, but their assessments were made separately, according to the SDS scoresheet. Information about the permanent features of functioning of patients between episodes was gathered from other information sources (family members and/or clinicians who cared long-term for patients). The raters did not share their findings with each other

until the assessments were completed.

Brief Psychiatric Rating Scale (BPRS)

A third rater (T.A) administered "Brief Psychiatric Rating Scale" to each patient to assess the validity of the SDS. The BPRS was originally developed by J.E. Overall and D.R. Gorham in 1962 and was subsequently improved by Lukoff et al. in 1993. The improved version of the scale was translated into Turkish by Kaplan et al. (Translators: İncila Kaplan,; Mehmet Akif Sayılğan,; Nilgün Tanrıverdi,; Senar Yıldız).

The BPRS measures the severity of psychotic symptoms and some depressive mood symptoms in schizophrenia and in other psychotic disorders. The scale consists of 24 items. The rater administered the schedule considering the condition of the patient within the last month and scores between 1 and 7 were given. The scores regarding a particular feature were interpreted as follows: 1- not present; 2- very mild; 3- mild; 4- moderate; 5- moderately severe; 6- severe; 7- extremely severe.

3. Application path

The SDS was originally developed by Kirkpatrick et al. (1993). The schedule was designed to assess deficit syndrome in schizophrenic patients (Kirkpatrick et al., 1989, 1993).

The original form of the schedule was requested from Kirkpatrick so that we could translate it into Turkish and conduct a reliability and validity study. The schedule was first translated into Turkish by rater 1. The translated schedule was then re-translated into English by Rater 2, who never saw the original form of the schedule. At this stage, both the Turkish translation and the English retranslation were assessed by a third rater. After the suggested corrections were made, the Eng-

Table 4. Correlations among negative symptoms for the raters.

	Restricted affect		Diminished emotional range		Poverty of speech		Curbing of interest		Diminished sense of purpose		Diminished social drive	
	1. rater	2. rater	1. rater	2. rater	1. rater	2. rater	1. rater	2. rater	1. rater	2. rater	1. rater	2. rater
Restricted affect	1.000	1.000										
Diminished emotional range	.493**	.503**	1.000	1.000								
Poverty of speech	.441*	.639**	.22**	.606**	1.000	1.000						
Curbing of interests	.465**	.620**	.716**	.551**	.575**	.607**	1.000	1.000				
Diminished sense of purpose	.394*	.509*	.607**	.451*	.390*	.370*	.419*	.403*	1.000	1.000		
Diminished social drive	.501**	.344	.443*	.434*	.400*	.434*	.432*	.429*	.534**	.273	1.000	1.000

*Correlation is significant at 0.05 level, **Correlation is significant at 0.01 level.

lish retranslated form of the schedule was sent to Kirkpatrick. Corrections suggested by Kirkpatrick were made by the raters.

At this stage, rater 1 went to The Maryland Psychiatric Research Center, USA and studied the administration and assessment of the schedule with schizophrenic patients, under the supervision of Kirkpatrick, for 6 weeks. Videotape records of SDS interviews conducted with schizophrenic patients and Kirkpatrick's score ratings were brought to Turkey. The raters of the present study watched these tapes, score ratings were made, and the results were compared with Kirkpatrick's ratings and discussed in order to reach a consensus.

Next, the schedule was administered by rater 1 to 3 schizophrenic patients who were being followed-up at the Bakırköy Training and Research Hospital for Mental and Neurological Diseases. Critical analysis of the schedule's administration process and assessments were then conducted by rater 1 and rater 2. The raters then agreed that they were ready to begin the validity and reliability study.

4. Statistical analyses

SPSS 10.0 and STATA statistics programs were used for the reliability analyses of the SDS. In the analysis of the data, the following tests were used:

Cronbach's Alpha test for internal consistency of the schedule items; Mann-Whitney U test for validity of global assessments; Spearman correlation coefficient for the correlations; unweighted kappa coefficient for inter-rater reliability; Mann-Whitney U test and Spearman correlation coefficient for the validity analysis of the SDS.

FINDINGS

1. Assessment results of the Schedule for Deficit Syndrome (SDS)

a. Negative symptoms

Rater 1 most frequently scored 0 for the negative symptom, poverty of speech ($n = 7$; 23.3%), meaning normal, and most frequently scored 3 for the negative symptom, diminished social drive ($n = 7$; 23.3%), meaning overt impairment. Rater 2 also most frequently scored 0 for the negative symptom, poverty of speech ($n = 12$; 40%), and most frequently scored 3 for the negative symptom, diminished sense of purpose ($n = 3$; 10%),

b. Deficit syndrome criteria

Both raters agreed on the diagnosis of the patients. Rater 1 scored 14 patients (46.7%) 2 or above on at least 2 negative symptoms. He decided that these negative symptoms were primary and permanent. The scores of negative symptoms of

Table 5. Reliability results among raters.

Negative symptoms	Kappa	Z	P	Consensus
Restricted affect	0.512	4.29	0.000	85%
Diminished emotional range	0.581	4.16	0.000	91%
Poverty of speech	0.514	4.17	0.000	87%
Curbing of interests	0.554	4.59	0.000	87%
Diminished sense of purpose	0.523	4.16	0.000	85%
Diminished social drive	0.615	5.10	0.000	88%

the remaining 16 patients (53.3%) was less than 2. Rater 2 scored 16 patients (53.3%) 2 or above on at least 2 negative symptoms. He decided that these symptoms were primary in 13 patients, secondary in 3 patients, permanent in 15 patients, and transient in 1 patient. The scores for negative symptoms of the remaining 14 patients (46.7%) was less than 2

c. Classification

Both raters classified patients as deficit/non-deficit and evaluated them in terms of global severity according their SDS assessment results. Rater 1 classified 14 of the 30 patients as having deficit syndrome and 16 as non-deficit, whereas rater 2 classified 13 as having deficit syndrome and 17 as non-deficit patients.

Both raters agreed on 29 of the 30 patients and only disagreed on 1 patient. Their consensus rate in global assessment was 96.6%

Rater 1 scored 16 patients 1, 11 patients 2, and 3 patients 3 for global severity, whereas rater 2 scored 17 patients 1, 11 patients 2, and 3 patients 3. Neither of the raters gave any patient a score of 4. The inter-rater consensus rate was 93.3%.

2. Results of Brief Psychiatric Rating Scale (BPRS) assessment

Rater 3 conducted the BPRS assessments of the positive symptoms, which showed suspiciousness scores for 9 patients (30%), delusion scores for 6 patients (20%), abnormal thought scores for 16 patients (53.3%), and abnormal behavior scores for 5 patients (16.7%) that were 5 or above (moderately severe to extremely severe). The assessment

of negative symptoms indicated that blunted affect scores of 14 patients (46.7%), self care negligence scores of 6 patients (20.0%), emotional withdrawal scores of 2 patients (6.75), and disorientation scores of 2 patients (6.7%) were 5 or above. This means that almost half of the patients had positive and negative symptoms at the same time.

3. Validity calculations of SDS

a. Reliability of schedule items (internal consistency)

Cronbach's-alpha method was used to analyze the internal consistency of SDS negative symptom items and alpha values were obtained regarding the assessments of both raters. The internal reliability coefficient regarding the assessments of the 6 negative items was 0.85 for both raters.

b. Assessment of the correlations between negative symptoms

Correlations between 6 negative symptoms regarding the internal reliability of the SDS were measured using the Spearman Correlation method. The most significant correlation found by rater 1 was for curbing of interests and diminished emotional range ($r = 0.716$; $P < 0.001$). The most significant correlation found by rater 2 was for poverty of speech and restricted affect ($r = 0.639$; $P < 0.01$)

Inter-rater reliability

I. In terms of negative symptoms

To determine whether or not an inter-rater consensus for SDS negative symptom items existed and to calculate the inter-rater reliability coef-

Table 6a. Inter-rater reliability.

Global assessment	2. Rater Deficit non-deficit		Total	Kappa	Z	P	Consensus %
1. Rater							
Deficit	13	1	14				
Non-deficit		16	16	0.933	5.120	0.000	96.6
Total	13	17	30				
Global severity	2. Rater		Total	Kappa	Z	P	Consensus %
	1	2	3				
1. Rater							
1		16	16				
2	1	10	11	0.880	5.889	0.000	93.3
3		1	2				
Total	17	11	2				

ficient, weighted kappa analysis was conducted. The reliability coefficient (kappa) among the raters for negative symptoms was between 0.51-0.61. The consensus rate was between 85% and 91%. The highest inter-rater reliability was for the diminished social drive item

II. In terms of classification

Unweighted kappa analysis was performed to determine the rate of reliability of SDS global assessments (deficit syndrome/non-deficit) of the 2 raters. The inter-rater reliability coefficient for global assessment was 0.93. The consensus rate was 96.6% (Table 6 a and b).

The inter-rater reliability coefficient for global severity was 0.88 and the consensus rate was 93.3%.

4. SDS Validity Estimations

Validity estimations for SDS were carried out between the SDS evaluations of rater 1 and BPRS evaluations of rater 3. The total scores of items 13, 14, 16, 17 and 18 (neglected self-care, disorientation, blunted affection, emotional withdrawal, motor slowing) assumed to evaluate the negative symptoms of schizophrenia of BPRS were used for validity estimations.

Table 6b. Inter-rater reliability of global assessments.

	Global assessment deficit	(Rater 2) non-deficit	Total
1. Rater			
Deficit	13	1	14
Non-deficit		16	16
Total	13	17	30
Kappa	Z	P	Consensus %
0.933	5.120	0.000	96.6

Table 7. Inter-rater reliability of global severity.

	Global severity (Rater 2)			Total
	1.00	2.00	3.00	
1. Rater				
1.00	16	–	–	16
2.00	1	10	–	11
3.00	–	1	2	3
Total	17	11	2	30
Kappa	Z	P		Total %
0.880	5.889	0.000		93.3

a. Validity in terms of global categorization

These analyses were made in order to determine whether there was a difference between deficit and non-deficit patient groups determined as a result of the global evaluation carried out by rater 1 in terms of the total score of the negative items obtained from the BPRS evaluation of rater 3. Because the number of patients in each group was under 30, instead of using t-test for comparison, its non-parametric version Mann-Whitney U was preferred. As a result, there was a significant difference between deficit and non-deficit groups in terms of the total score of BPRS negative items. The total score of the deficit group was significantly higher than the non-deficit group ($U = 60.0$; $p < 0.05$) (Table 8).

b. Intra-validity in terms of global categorization

In order to determine whether there is a difference between the categories (deficit/non-deficit)

assessed as a result of the global evaluation of the raters in terms of scores of 6 different negative symptoms and consequently to appreciate the effect of each negative symptom on the category and thus to obtain a new finding about the inner validity of the schedule, Mann-Whitney U test was used. There was a significant difference between the groups categorized as deficit and non-deficit by the two raters in terms of all negative symptoms. The most significant difference found by rater 1 was about “diminished sense of purpose” ($U = 23.5$; $p < 0.001$). The most significant difference found by rater 2 was about the “diminished emotional range” symptom ($U = 28.0$; $p < 0.001$) (Table 9).

c. Correlations between the SDS negative symptom items and BPRS negative symptom items

As a result of this analysis, it is noteworthy that blunted affection showed marked correlations with

Table 8. Validity of SDS global assessment.

Global Assessment	N	Mean	Standard Deviation	Mann Whitney U	P
BPRS negative symptoms total score					
Deficit	14	13.142	2.348		
Non-deficit	16	10.812	2.762	60.0	0.030
Total	30				

Table 9. Differences in categories found by the raters (deficit/non-deficit).

	1. Rater			2. Rater		
	U	z	P	U	z	P
Negative Symptoms						
Restricted affect	42.0	-3.23	.001	41.0	-3.15	.002
Diminished emotional range	30.0	-3.99	.000	28.0	-3.89	.000
Poverty of speech	60.0	-2.4	.016	35.5	-3.43	.001
Curbing of interests	37.0	-3.41	.001	33.0	-3.57	.000
Diminished sense of purpose	23.5	-3.92	.000	41.0	-3.12	.002
Diminished social drive	29.0	-3.67	.000	36.0	-3.37	.001

5 of the 6 negative symptoms of SDS and that the most marked correlation was between “curbing of interests and blunted affection” ($r = 0.65$; $p < 0.01$); and emotional withdrawal did not show correlation with any of the SDS items (Table 10).

d. Correlation between total score of SDS negative symptoms and total score of BPRS negative symptoms

As a result of this analysis, there was a moderate positive correlation ($r = 0.62$; $p < 0.01$) (Table 11).

DISCUSSION AND RESULT

Thirty male schizophrenic patients with a mean age of 41.3 years, mean education of 8.8 years, mean disease duration of 19.6 years, mean treatment duration of 17.5 years and mean hospitalization period of 4.8 years were included in this study of reliability and validity analysis of the Schedule for the Deficit Syndrome (SDS) in schizophrenia. The long duration of the disease and treatment period seems to be a limitation of our study. It would be wise to also apply the schedule in new patient groups.

Percentage of consensus among the 2 raters carrying out the SDS evaluations was 96.6% (Table 3). As a result of reliability analyses of SDS, the coefficient of internal reliability between the negative symptom items (cronbach alpha) was 0.85 for both raters.

As a result of the reliability analyses between the raters in terms of SDS, there was a consensus of 85% between the two raters for each negative symptom. When the negative symptoms were analyzed individually, the weighted Kappa values were as follows: restricted affect, 0.51; diminished emotional range, 0.58; poverty of speech, 0.51; curbing of interests, 0.55; diminished sense of purpose, 0.52 and diminished social drive, 0.61 (Table 7). These results are lower than those in the reliability study of Kirkpatrick et al. except for “diminished social drive” values. In that study, Kappa values were as follows: restricted affect, 0.74; diminished emotional range, 0.68; poverty of speech, 0.69; curbing of interests, 0.66; diminished sense of purpose, 0.69; and diminished social drive, 0.60. It is natural to observe a high compliance among the developers of the schedule, but our study also revealed that the Turkish version of the SDS had quite a high reliability by 2 raters, in terms of negative symptoms. In addition, Kirkpatrick et al. have accepted “diminished social drive” as the proxy of the entire schedule (Carpenter et al. 1988). Additionally, in the present study, the highest interrater reliability was for the diminished social drive item.

The consensus rate of the 2 raters regarding SDS global categorization (deficit/non-deficit) was 96%. Both raters agreed on 29 of 30 patients and only disagreed on 1 patient. The unweighted kappa value for global categorization was 0.93.

Table 10. Correlations between negative SDS items and negative BPRS.

	Self care negligence	Disorientation	Blunted affect	Emotional withdrawal	Motor slowing
Restricted affect	-.087	.462*	.437*	.162	.400
Diminished emotional range	-.097	-.089	.374*	.159	.097
Poverty of speech	.093	.425*	.410*	.248	.375
Curbing of interests	.360*	.485**	.653**	.331	.178
Diminished sense of purpose	-.032	-.229	.359*	.393	.462*
Diminished social drive	-.147	-.247	.180	.304	.475**

*Correlation is significant at 0.05 level, **Correlation is significant at 0.01 level.

This value was higher than the value (0.73) found by Kirkpatrick et al. (Table 7). The consensus rate regarding global severity was 93% and the kappa value was 0.88 (Table 8). This value was higher than the value (0.72) found by Kirkpatrick et al. as well (Carpenter et al., 1998).

These results reveal that the Turkish version of the SDS showed moderate reliability in terms of negative symptoms and very high reliability in terms of global categorization and global severity among the investigators. Revision of the section about the negative symptoms with a more intense and detailed mutual evaluation and efforts to increase the consensus will turn this schedule into a very highly reliable instrument for future research.

For the validity assessments of the SDS among the deficit and non-deficit patient groups defined by rater 1, the differences regarding BPRS scores between the groups was analyzed and the total BPRS scores of the patients in the deficit group was found to be significantly higher than the patients in the non-deficit group ($U = 60.0$, $P = 0.03$)

(Table 9).

The assessment of the correlations between SDS negative symptoms and BPRS negative items resulted in moderate positive correlations. The affective flattening item of the BPRS demonstrated a correlation with 5 out of 6 negative symptoms of the SDS. The highest correlation was between affective flattening and curbing of interests ($r = 0.653$, $P < 0.01$) (Table 10). There was no correlation between “emotional withdrawal” which is a BPRS item and any one of the SDS symptoms.

These findings suggest that negative symptoms determined by the SDS can be similarly determined by the BPRS items affective flattening,,, disorientation and motor slowing. The emotional withdrawal item was thought to have no contribution in this aspect. When the correlation between total score of SDS negative symptoms and the total score of BPRS negative items were examined, these two variables were shown to have a moderate, positive correlation ($r = 0.653$, $P < 0.01$) (Table 11).

Results about the validity study demonstrate

Table 11. Correlation between SDS negative symptom score and BPRS negative items total score.

	SDS negative symptoms total score	BPRS negative items total score
SDS negative symptoms total score	1.000	0.623**
BPRS negative items total score	0.623**	1.000

**Correlation is significant at 0.01 level.

that SDS is a valid instrument both for negative symptoms and for global categorization.

When the coefficients of reliability of SDS among the investigators were examined, the reliability of global categorization was noted to be higher in comparison with the negative symptom items. When the results are analyzed in terms of the validity concept, the correlations between the negative symptoms in SDS and the negative items in BPRS are seen not to be strong. Therefore, the negative symptoms in SDS were added up and a score was obtained, the correlation between this score and the total score of the items presumed to

evaluate the negative symptoms in BPRS was analyzed, resulting in a moderate positive correlation.

With these results, it would enhance the reliability to add a separate score to the schedule in the form of "total score of negative symptoms" in addition to the 6 negative symptoms evaluated with the SDS and to assess whether this sum is above a certain score.

In conclusion, the Schedule for the Deficit Syndrome (SDS) which has been adapted to Turkish and analyzed for reliability and validity seems to be a reliable and valid instrument to be used in studies on schizophrenia in our country.

REFERENCES

- Aker T, Erkoç Ş (1998) Şizofrenide belirti ve bulgular, Şizofreni, cilt 1, Erkoç Ş ve Oral T (Ed), İstanbul, Okyanus yayın, p. 22-40.
- Andreasen NC, Akiskal HS (1983) The specificity of Bleulerian and Schneiderian symptoms: a critical reevaluation. *Psychiatr Clin North America*, 6:41-54.
- Andreasen NC (1994) Positive and negative symptoms of schizophrenia; past, present and future. *Acta Psychiatr. Scand. Suppl.* 1994, 384: 51-59.
- Andreasen NC, Carpenter WT (1993) Diagnosis and classification of schizophrenia. *Schizophrenia Bulletin*, special report, 25-40.
- Andreasen NC, Flaum M, Miller D (1993) Positive and negative symptoms: assessment and pathophysiology, IX. World Psychiatry Congress.
- Andreasen NC, Olsen S (1982) Negative and positive schizophrenia. *Arch Gen Psychiatry*, 39:789-794.
- Andreasen NC (1989) Neural mechanisms of negative symptoms. *Br J Psychiatry*, 155 (suppl 7): 93-98.
- Arkonaç O (1996) Psikotik Bozukluklar ve Tedavileri, İstanbul, Nobel Tıp Kitabevleri Ltd. Şti. p. 160-187.
- Arkonaç O (1997) Defisit Sendrom, 33. Ulusal Psikiyatri Kongresi, Antalya, Bildiri Özet Kitabı, p. 279-284.
- Aydemir Ö, Köroğlu E (2000) Psikiyatride Kullanılan Klinik Ölçekler, Ankara, Hekimler Yayın Birliği, p. 43.
- Buchanan RW, Kirkpatrick B, Heinrichs DW et al. (1990) Clinical correlates of the deficit syndrome of schizophrenia. *Am J Psychiatry*, 147: 290-294.
- Carpenter WT Jr, Heinrichs DW, Wagman AMI (1988) Deficit and non-deficit forms of schizophrenia. *Am J Psychiatry*, 145: 578-583.
- Carpenter WT, Buchanan RW, Kirkpatrick B (1991) The concept of the negative symptoms of schizophrenia. *Progress in psychiatry series number 28*, David Spiegel ed. APP, Washington DC: 3-20.
- Carpenter WT (1992) The negative symptom challenge. *Arch Gen Psychiatry*, 49: 236-237.
- Erkoç Ş, Arkonaç O, Ataklı C, Özmen E (1991) Negatif Semptomları Değerlendirme Ölçeğinin Güvenirliği ve Geçerliliği *Düşünen Adam*, 4 (2) :16-19.
- Erkoç Ş, Arkonaç O, Ataklı C, Özmen E (1991) Pozitif Semptomları Değerlendirme Ölçeğinin Güvenirliği ve Geçerliliği *Düşünen Adam*, 4 (2) :20-24.
- Kirkpatrick B, Buchanan RW, Mc Kenney PD et al. (1989) The Schedule for the Deficit Syndrome: An instrument for research in schizophrenia. *Psychiatry Research*, 30:119-123.
- Kirkpatrick B, Buchanan RW, Alphs LD et al. (1993) The Schedule for the Deficit Syndrome 1993 version, Maryland Psychiatric Research Center, USA.
- Kirkpatrick B, Buchanan RW, Breier Alan et al. (1994) Depressive symptoms and the Deficit Syndrome of Schizophrenia. *Journal of Nervous and Mental Diseases*, 182 ;8: 452-455.
- Kirkpatrick B, Ram R, Bromet E (1996) The Deficit Syndrome in the Suffolk County Mental Health Project. *Schizophrenia Research*, 22:119-126.
- Kirkpatrick B, Ram R, Amador XF et al. (1998) Summer birth and the Deficit Syndrome of Schizophrenia. *Am J Psychiatry*, 155:1221-1226.
- Lukoff D, Nuechthreien KH, Vertura J et al. (1993) Brief Psychiatric Rating Scale (BPRS) Version 3.0, Expanded Version. UCLA Department of Psychiatry and Biobehavioral Sciences, West Los Angeles Medical Center, Los Angeles.
- Öztürk O (1990) Ruh Sağlığı ve Bozuklukları, 3. Basım, İstanbul, Evrim Basım-Yayın- Dağıtım, p.165-197.
- Şenocak M (1997) Biyoistatistik, İstanbul, İÜ Cerrahpaşa Tıp Fak. Vakfı, p.213-216.
- Uysal Ö (1998) Güvenilirlik ve Geçerlik Analizi, Bir Uygulama, Yayınlanmamış Yüksek Lisans Tezi, İstanbul.

SCHEDULE FOR THE DEFICIT SYNDROME (SDS) SCORESHEET

Patient's name (initials) : _____
 Evaluator's name (initials) : _____
 Date entry date .

	Intensity					Primary			Resident		
						No	Yes	NA*	No	Yes	NA*
Restricted affect	0	1	2	3	4	1	2	9	1	2	9
Diminished emotional range	0	1	2	3	4	1	2	9	1	2	9
Poverty of speech	0	1	2	3	4	1	2	9	1	2	9
Curbing of interests	0	1	2	3	4	1	2	9	1	2	9
Diminished sense of purpose	0	1	2	3	4	1	2	9	1	2	9
Diminished social drive	0	1	2	3	4	1	2	9	1	2	9

II. Deficit Syndrome Criteria:

III. Categorization

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