

The Assessment of Auditory Hallucinations and Delusions: The Reliability and Validity of the Turkish Version of Psychotic Symptom Rating Scales (PSYRATS)



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SUMMARY

Objective: The aim of this study is to examine the reliability and validity of the Turkish version of PSYRATS Auditory Hallucinations (AHS) and Delusion Scales (DS).

Method: A total of 85 inpatients and outpatients who were diagnosed with schizophrenia according to the DSM-IV-TR criteria, were on antipsychotic medication, did not have organic, mental, or physical deficits that would prevent participation in the study, did not exhibit substance or alcohol abuse or dependency, and were aged between 18-65 years were included in the sample. The PSYRATS scales were translated and corrected by the authors. The PSYRATS scales were administered with a one-week interval to 57 patients and test-retest reliability was examined. In order to test concurrent validity, The PANSS was administered to 85 patients and the SAPS to 71 patients.

Results: The Cronbach Alpha coefficient was found to be 0.79 for the AHS and 0.80 for the DS. Item-total correlations ranged between 0.59 and 0.98 and between 0.66 and 0.93, respectively. Test-retest reliability ranged between 0.68 and 0.89 for hallucinations and between 0.61 and 0.76 for delusions ($p<0.01$). A highly significant correlation was found between the PANSS and the SAPS supported concurrent validity ($p<0.01$). For both scales, a three-factor structure accounted for more than 90% of the variance. The results were supported by original study findings.

Conclusion: The PSYRATS Auditory Hallucination and Delusion Scales were found to be reliable and valid measures to assess psychotic symptoms in Turkish patients with schizophrenia.

Key Words: PSYRATS, auditory hallucination, delusion, reliability, validity, scale

INTRODUCTION

Hallucinations and delusions are the main symptoms of psychotic disorders. Hallucinations can affect the senses of sound, sight, smell, taste, and touch but the most common is auditory hallucinations, which occur in 60-70% of patients diagnosed with schizophrenia (Carpenter & Buchanan 1995, Işık & Işık 2008, Köroğlu 2009, Mete 1998, Mete 2003, Stefan et al. 2002). The content of auditory hallucinations generally includes voices in the second person who use statements such as “you are a ...”. On the other hand, the auditory hallucinations identified by Schneider include voices discussing or making

comments about the patient’s behaviors in the third person (she/he will... or she/he is...). The voices can command the patient to harm herself/himself or others (Carpenter and Buchanan 1995, Mete 1998, Mete 2003, Stefan et al. 2002). The voices can be heard from inside or outside the patient’s head. These voices can be either easily understood or incomprehensible, and can be loud or quiet. The voices can sound friendly, praise the patient, and give good advice; in this case, they are described as “benevolent voices”. However, “malevolent voices” that criticize the patient and commands her/him to harm oneself or others are frequently reported (Lindenmayer & Khan 2006).

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These voices are generally perceived as different from one's own thoughts. Typical auditory hallucinations in schizophrenia are hearing voices of two or more people who are talking to each other or voices that constantly comment on the patient's thoughts or acts (Köroğlu 2009). In most cases, the patients respond to these voices as if someone was actually talking to them. In other words, they establish a personal relationship with these voices and they frequently think that the voices cannot be stopped or controlled (Beck & Rector 2000, Beck et al. 2009). Patients may engage in harmful behaviors against others or themselves by carrying out the commands of the voices (Işık & Işık 2008) and as a result, they may feel hopeless, worthless, and desperate because of the voices (Beck & Rector 2000).

Delusions, which are among the other symptoms of psychotic disorders, are stable and faulty personal thoughts that one does not give up believing in despite contrary evidence. This belief is not a product of the person's culture or subculture (Stefan et al. 2002). Delusions can also be described according to their content (e.g. persecution or grandiose delusions). They may or may not be associated with hallucinations (Stefan et al. 2002).

In the examination of psychotic symptoms, determining various dimensions of hallucinations and delusions as well as their presence or severity is very important in means of evaluating disease prognosis and the effect of treatments on symptoms since hallucinations and delusions have numerous features. There are a limited number of scales that have been developed for evaluating psychotic symptoms and have Turkish standardization. The Scale for the Assessment of Positive Symptoms (SAPS) and the Positive and Negative Syndrome Scale (PANSS) are the most commonly used scales for evaluating psychotic disorders in Turkey (Erkoç et al. 1991, Kostakoğlu et al. 1999). Both scales evaluate psychotic symptoms in means of their frequency, severity, and effect on one's functionality. The scales are rated according to an overall evaluation of the effects of each symptom instead of evaluating the different features of hallucinations and delusions individually. Another scale that has Turkish standardization is the Revised Beliefs about Voices Questionnaire (BAVQ-R). Although this scale separately evaluates characteristics including the level of believing in voices, the perceived strength of voices, and the controllability of voices, it only assesses hallucinations (Aker et al. 2003).

In Western studies, another commonly used scale that evaluates psychotic symptoms is the Psychotic Symptom Rating Scales (PSYRATS) that was developed by Haddock et al. (1999). This scale is frequently used in studies that evaluate treatment effectiveness in psychotic patients since the multidimensional structure of the scale enables one to evaluate the different features of psychotic symptoms in a detailed way

(Ruddle, Mason, & Wykes 2011). PSYRATS evaluates hallucinations and delusions in means of one's beliefs about the location and re-origin of voices, conviction of delusion, and disruption to life caused by beliefs, as well as frequency of, duration of, and amount of distress caused by psychotic symptoms. Therefore, the main difference between PSYRATS and other scales is that PSYRATS enables one to separately rate the physical, emotional, and cognitive characteristics of the symptoms instead of making a single evaluation. In this way, it is possible to observe changes in every characteristic separately during treatment, and to determine the effects of treatment on various dimensions in treatment effectiveness studies.

It has been assumed that patients with psychotic disorders such as schizophrenia do not benefit from therapy; however, in recent years, this assumption has been questioned due to the increase in treatment options (Aker 2003, Kuipers et al. 2006). On the other hand, researchers are not only interested in whether treatments decrease symptoms or not, but also investigate which symptoms are decreased more easily or more rapidly. Furthermore, the differences between the effects of different treatments options (e.g. different medications and psychotherapy methods) are one of most popular research topics (Schneider et al. 2011). In order to determine the dimensions that change first after treatment, which dimensions change later, the differences between treatment effects, or the effect mechanisms of treatments, multidimensional measurement tools are needed. Multidimensional scales such as PSYRATS help answer these research questions. For example, Schneider et al. (2011) used the PSYRATS scales and reported that auditory hallucinations do not decrease unless the thoughts that voices cannot be controlled and that voices come from the outside diminish. Due to its multidimensional structure, the scale is more sensitive to change and therefore is used frequently in treatment effectiveness studies (Ruddle, Mason & Wykes 2011).

In the literature, there are a number of studies that examine the validity and reliability of the scale. Haddock et al. (1999), who developed the scales, evaluated their validity and reliability in 71 chronic patients diagnosed with paranoid schizophrenia and schizoaffective disorder and found that the inter-rater reliability, concurrent validity (with the Psychiatric Assessment Scale), and construct validity of the scales were very high. In the study, it was found that the Auditory Hallucinations scale had three factors, including emotional characteristics, physical characteristics, and cognitive interpretation; whereas the Delusions Scale had two factors including cognitive interpretation and emotional characteristics (Haddock et al. 1999).

Drake et al. (2007) examined the validity and reliability of the scales via administering the PSYRATS and the PANSS

to a larger sample consisting of 257 patients presenting with acute first episodes of psychotic disorders. In the study, it was found that the test-retest reliability, internal consistency, and concurrent validity tested with the PANSS of the PSYRATS were good. Results of the factor analysis confirmed the factor structure revealed by Haddock et al. (1999) despite a number of differences in content. According to this, the distress and negative content dimensions of the Hallucinations Scale were loaded on emotional characteristics; frequency and duration dimensions loaded on physical characteristics; whereas conviction, location, control, and disruption dimensions loaded on another factor (cognitive interpretation). In the Delusions Scale, frequency, duration, conviction, and disruption dimensions loaded on the cognitive interpretation factor and the amount of distress and intensity loaded on emotional characteristics (Drake et al. 2007).

In a study by Steel et al. (2007), concurrent validity of PSYRATS was tested using the PANSS and the SAPS and it was found that the PSYRATS auditory hallucination and delusion scores showed statistically significant correlations with other scales. Similar to the findings of Haddock et al. (1999), the factor analysis revealed a two-factor structure for the delusions scale, however, inconsistent with other studies, a four-factor structure was found for the auditory hallucinations scale. In the study by Steel et al. (2007), the factor identified as “cognitive interpretation” in previous studies was separated into two factors.

The PSYRATS scales have been translated into many languages and have been tested for validity and reliability in various cultures (e.g. France, Korea, Spain, and Germany). The French version was tested with 103 outpatients who were diagnosed with schizophrenia and schizoaffective disorder, and 75 of these patients were evaluated using the PANSS. Although the results pertaining to reliability and concurrent validity are in parallel with previous studies, in this study, four factors of the Auditory Hallucinations scale (emotional characteristics, cognitive interpretation, disruption, and physical characteristics) explained 72% of the variance whereas two factors of the Delusions scale (cognitive interpretation and distress) explained 63% of the variance (Favrod et al. 2012). The German version of the scale was administered to 200 inpatients, and its concurrent validity was tested using the PANSS. Although the coefficient was found to be very low compared to other studies (0.27 with the PANSS delusion scale and 0.29 with the PANSS hallucination scale), there were statistically significant relationships between the two scales. In parallel with previous studies, the factor analysis revealed a two-factor structure for the PSYRATS delusions scale, while the PSYRATS auditory hallucinations scale had a four-factor structure that explained approximately 76% of the total variance. The factors were named as emotional characteristics, physical characteristics, cognitive interpretation, and

control characteristics (Kronmüller et al. 2011). The control factor was not observed in Haddock et al.’s (1999) and Drake et al.’s (2007) studies, and it only received loadings from the control sub-dimension of the scale.

The aim of the present study is to introduce the Turkish version of the PSYRATS, which is a commonly used measure in both descriptive and treatment efficiency studies due to its multidimensional structure and sensitivity to change, and to test the validity and reliability of the PSYRATS scales in the Turkish population.

METHOD

Sample

The sample of this study consisted of outpatients at the Bakırköy Research and Training Hospital for Psychiatric and Neurological Disorders, Center for Psychotic Disorders and Güngören Community Mental Health Center, and both inpatients and outpatients at the Yedikule Surp Pırgiç Armenian Hospital who received treatment between August 2012 and January 2014. A total of 85 patients (25 female and 60 male) who were diagnosed with schizophrenia according to the DSM-IV-TR criteria, had treatment-resistant hallucinations and/or delusions even though they received antipsychotic medication for at least one year, did not have an organic mental disorder, mental retardation, or physical impairment that would prevent one from participating in the study, and did not exhibit substance or alcohol abuse or dependency were included in the sample. Some patients in the sample group were being treated with typical antipsychotics (e.g. Haloperidol, Clopixon), while others were taking new generation antipsychotics (e.g. Risperidone, Olanzapine, Quetiapine). The socio-demographic characteristics of the sample are provided in Table 1.

Instruments

The Demographic Information Form was used for collecting patient data on sociodemographic characteristics. In order to evaluate concurrent validity, the SAPS and the PANSS were used in addition to PSYRATS.

PSYRATS (The Psychotic Symptom Rating Scales): PSYRATS consist of a semi-structured interview form and a scoring chart that were developed by Haddock et al. (1999) in order to evaluate auditory hallucinations and delusions. PSYRATS are filled out by clinicians during interviews and are regarded as two separate scales.

The auditory hallucinations scale includes 11 items, which are frequency, duration, location, loudness, beliefs about origin, amount of negative content, degree of negative content, amount of distress, intensity of distress, disruption of life,

Table 1. Socio-demographic characteristics of the participants

	n	%
Treatment modality		
Outpatient (residual symptoms)	75	88.2
Inpatient	10	11.8
Acute exacerbation	6	7.08
Residual symptoms	4	4.72
Gender		
Female	25	29.4
Male	60	70.6
Education status		
Elementary school	38	44.7
Middle school	19	22.4
High school	22	25.9
University	6	7.0
	X	s.d.
Age (years)	37.14	9.39
The duration of illness (years)	14.82	8.09
Number of hospitalizations		
None	8	9.4
1-2 stays	41	48.2
3 stays and more	36	42.4

and control. For example, in order to assess frequency, the patient is asked the following question: “How often have you heard your voices over the last week? Thinking about the last week, what has it been like?” e.g. every day, all day long etc.” The items are scored from 0 to 4, where 0 corresponds to “there were no voices” or to “Voices not present or present less than once a week”; 1, “Voices occur at least once a week”; 2, “Voices occur at least once a day”; 3, “Voices occur at least once an hour”; and 4, “Voices occur continuously or almost continuously i.e., stop for only a few seconds or minutes”.

The delusions scale includes six items, which are amount of preoccupation, duration of preoccupation, conviction, amount of distress, intensity of distress, and disruption of life. For example, in order to evaluate conviction, the patient is asked the following: “At the moment, do you have any doubts about any of your beliefs, for example do you sometimes wonder whether they are real or not?” (each belief or conviction is examined), “How much do you believe in ...? Can you estimate this on a scale from 0 - 100, where 100 means that you are totally convinced by your beliefs and 0 being that you are not convinced at all?”. The items are scored from 0 to 4, where 0 corresponds to “not convinced at all”; 1 “Very little conviction in reality of beliefs, less than 10%”; 2 “Some doubts relating to conviction in beliefs, between 10-49%”; 3 “Conviction in belief is very strong, between 50 - 99%”; and 4 “Conviction is 100%”.

All of the subscale items are scored from 0 (e.g. there are no voices) to 4 (e.g. the voices are heard non-stop). Only the control item is reverse scored (0 indicates that control is higher). Scores of the Auditory Hallucinations Scale range from 0 to 44, while scores of the Delusions Scale range from 0 to 24. Higher scores indicate worsening of symptoms.

PANSS (The Positive and Negative Syndrome Scale): The PANSS was developed by Kay et al. (1987) in order to evaluate the positive and negative symptoms of schizophrenia and general psychopathology. It contains a total of 30 items and three subscales. According to the severity of symptoms, each item involves an intensity rating that ranges between 1 (does not exist) and 7 (very intense). The scale was adapted to Turkish by Kostakoglu et al. (1999). With regard to internal consistency, the Cronbach alpha coefficients are similar to those in the original study (0.75, 0.77, and 0.71; respectively). Inter-rater reliability correlation coefficients of the subscales are 0.97, 0.96, and 0.91, respectively. In construct validity, the correlation between subscales was found to be -0.41, which indicated that the positive and negative subscales measured different symptom clusters. In this study, only the Positive Syndrome subscale was used. This subscale includes seven items and scores range from 7 to 49. Also, the hallucination and delusion items of the Positive Syndrome Subscale were used independently in statistical analyses.

SAPS (The Scale for the Assessment of Positive Symptoms): The scale was developed by Andreasen (1982) and was adapted to Turkish by Erkoç et al. (1991). The SAPS is a clinician-rated scale that evaluates the level, distribution, and intensity of positive symptoms. It contains four subscales (hallucinations, delusions, bizarre behaviors, and positive formal thought disorder) and a total of 34 items. Each item receives a score that ranges between 0 (does not exist) and 5 (intense) and provides a 6-point Likert type measurement. Items numbered 1-7 are in the hallucinations subscale, 8-20 in delusions, 21-25 in bizarre behaviors, and 26-34 in positive formal thought disorders. In statistical analyses, the Hallucinations and Delusions subscales and the total score were taken into account. The highest total score is 170, while hallucinations are evaluated on the basis of 35 and delusions on the basis of 65 points.

Procedure

The first author completed a training program provided by Gillian Haddock on the administration and evaluation of the PSYRATS scales. Permission was granted from G. Haddock in order to adapt PSYRATS to the Turkish population. The scale was translated into Turkish by the first and third authors of the study and was edited by the second author. In the translation, it was prioritized that the questions in the interview chart were as brief, clear, and understandable as

possible, and that they are organized in a way that does not cause defensiveness.

**85 patients who met the inclusion criteria were referred to the researchers by psychiatrists. All patients in the sample were receiving routine follow-ups by psychiatrists with diagnosis of schizophrenia for at least one year; therefore, diagnostic evaluations were not carried out. Informed consent was obtained from the patients and their families. Interview charts were scored during interviews with the patients and each interview took approximately 20-40 minutes.

In order to examine test-retest reliability, the PSYRATS scales were administered to 57 patients with a one-week interval. In the relevant literature, it was reported that PANSS is the most commonly used measurement in the evaluation of concurrent validity. Thus, PSYRATS and PANSS were administered to 85 patients, and 71 of them completed the SAPS. Since some patients get bored during the extra time needed for administering SAPS, the scale was not administered to 14 patients.

Statistical Analysis

For statistical analysis, SPSS 17.0 software was used. The frequency and percentage values of the demographic characteristics were calculated and their arithmetic means and standard deviations were determined. In order to test for concurrent validity and test-retest reliability, the Pearson correlation coefficients were calculated. Construct validity was examined via exploratory factor analysis. Also, internal consistency was evaluated using Cronbach alpha, and item total correlation coefficients were calculated with item analysis.

RESULTS

Mean scores and standard deviations of the scales are given in Table 2.

Findings on Reliability

In order to test for reliability, the Cronbach alpha internal consistency coefficient and test-retest reliability coefficients were calculated. The findings are shown in table 3.

Internal Consistency

The Cronbach alpha internal consistency coefficient of the 11-item Auditory Hallucinations Scale was found to be 0.79, indicating high reliability. The correlations between items and, between items and the total score ranged from 0.59 to 0.98. For the 6-item Delusions Scale, the Cronbach alpha coefficient was found to be 0.80, indicating high reliability. The correlations between items and, between items and the total score ranged from 0.66 to 0.93. The alpha value decreased when items were removed from the scale; therefore, it was

Table 2. Mean scale scores and standard deviations

	X	SD	N
PSYRATS auditory hallucinations	20.70	15.71	85
PSYRATS delusions	16.13	6.83	85
PANSS hallucinations	3.82	2.16	85
PANSS delusions	4.82	1.64	85
PANSS Total	22.32	7.11	85
SAPS Hallucinations	9.17	7.34	71
SAPS delusions	14.63	10.63	71
SAPS Total	31.80	21.37	71

Table 3. Distribution of internal consistency and test-retest reliability values according to items

	Scale alpha when item is excluded	Test-retest reliability
PSYRATS auditory hallucinations scale		
1 frequency	0.770	0.85*
2 duration	0.767	0.86*
3 location	0.771	0.72*
4 loudness	0.776	0.76*
5 beliefs about origin	0.772	0.69*
6 amount of negative content	0.766	0.86*
7 degree of negative content	0.765	0.85*
8 amount of distress	0.765	0.86*
9 intensity of distress	0.766	0.87*
10 disruption in life	0.767	0.89*
11 control	0.767	0.84*
PSYRATS delusions scale		
1 amount of preoccupation	0.768	0.63*
2 duration of preoccupation	0.767	0.61*
3 conviction	0.770	0.64*
4 amount of distress	0.765	0.69*
5 intensity of distress	0.765	0.74*
6 disruption in life	0.774	0.62*

*p<0.01

decided to not to exclude any items from the scale (p<0.01). The alpha values that were calculated when an item was excluded from the scale are given in Table 3.

Test-retest Reliability

The PSYRATS scales were administered with a one-week interval. The Pearson correlation coefficients for the Auditory Hallucinations Scale ranged from 0.68 to 0.89 and from 0.61 to 0.76 for the Delusions Scale (p<0.01). According to this, the test-retest reliability of the scales was accepted to be high (see Table 3).

Findings on Validity

Concurrent validity

Auditory hallucinations scale: The relationship of PSYRATS Auditory Hallucinations Scale to PANSS hallucination and SAPS hallucination scores was examined with Pearson correlation analysis, and it was found that there were high and positive relationships between them ($p < 0.01$). According to this, the correlation coefficients were determined to be 0.83 with the PANSS hallucination score and 0.70 with the SAPS hallucination score ($p < 0.01$).

Delusions scale: The relationship of PSYRATS Delusions Scale to PANSS delusion and SAPS delusion scores was examined with Pearson correlation analysis, and it was found that there were high and positive relationships between them ($p < 0.01$). According to this, the correlation coefficients were determined to be 0.76 with the PANSS delusion score and 0.51 with the SAPS delusion score ($p < 0.01$).

Construct validity

In order to examine the construct validity of the scale, exploratory factor analysis was conducted. In Table 4, factor

loadings obtained after the varimax rotation of both scales, eigenvalues, and cumulative variances are presented.

Auditory hallucinations scale: First, Kaiser-Meyer Olkin and Bartlett's test results were calculated. Since the KMO value was found to be 0.94, it was decided to conduct factor analysis with a sample including 85 patients, and it was observed that the variables were more than suitable for factor analysis. Since result of Bartlett's test was statistically significant ($p = 0.000$), it was understood that this variable had a multidimensional construct. One factor with an eigenvalue higher than 1 was found as a result of the principal components factor analysis. This single factor explained 83.5% of total variance. Nevertheless, it was thought that a scale that measures separate characteristics cannot be explained with a single factor. When it was limited to two factors, it explained 87.73% of total variance, but the items were loaded on more than one factor, and these loadings were very close to each other. In parallel to the original study, when the number of factors was limited to three, these three factors explained 90.95% of total variance, and the construct of the scale was accepted to be very good. As a result of varimax rotation, loudness, negative content, distress, and disruption loaded on one factor; frequency, duration, and control loaded on

Table 4. Factor loadings of PSYRATS items after varimax rotation

PSYRATS auditory hallucinations	1 st factor emotional characteristics	2 nd factor physical characteristics	3 rd factor cognitive interpretation
1 frequency		0.856	
2 duration		0.756	
3 location			0.817
4 loudness	0.757		
5 beliefs about origin			0.684
6 amount of negative content	0.734		
7 degree of negative content	0.758		
8 amount of distress	0.689		
9 intensity of distress	0.706		
10 disruption of life	0.646	0.590	
11 control		0.698	0.462
Eigenvalue	10.021	0.506	0.387
Cumulative variance %	83.51	87.73	90.95
PSYRATS delusions	1 st factor emotional characteristics	2 nd factor physical characteristics	3 rd factor cognitive interpretation
1 amount of preoccupation		0.814	
2 duration of preoccupation		0.770	
3 conviction			0.765
4 amount of distress	0.830		
5 amount of distress	0.809		
6 disruption in life			0.721
Eigenvalue	4.883	0.444	0.301
Cumulative variance %	81.38	88.77	93.79

another; and location and beliefs loaded on yet another factor. Similar to the factors in the original study, the factors were named as emotional characteristics, physical characteristics, and cognitive interpretation, respectively.

Delusions scale: The KMO value was found to be 0.88, and it was decided that a sample of 85 patients was suitable for factor analysis and that the variables were also suitable. Since result of Bartlett's test was statistically significant ($p=0.000$), it was understood that this variable had a multidimensional construct. One factor with an eigenvalue higher than 1 was found as a result of the principal components factor analysis. This single factor explained 83.12% of total variance. However, it was thought that a scale that measures separate characteristics cannot be explained with a single factor. In parallel to the original study, when the number of factors was limited to two, these two factors explained 89.61% of total variance, but the factor loadings were too close to each other. When the number of factors was limited to three and varimax rotation was done, the amount and intensity of distress loaded on one factor; the amount and duration of preoccupation loaded on another; and conviction and disruption loaded on yet another factor. These three factors explained 93.79% of total variance. Similar to the factors in the original study, the factors were named as emotional characteristics, physical characteristics, and cognitive interpretation, respectively.

DISCUSSION

The purpose of the present study was to translate the PSYRATS scales into Turkish and to test their validity and reliability in Turkish schizophrenia patients. For this purpose, the PSYRATS scales were examined in terms of test-retest reliability, internal consistency and item total correlations, concurrent validity (evaluated via correlations to PANSS and SAPS), and construct validity (evaluated via the determination of factor structure).

The internal consistency and item total correlation of the PSYRATS auditory hallucinations scale (0.79; 0.59 - 0.98; respectively) and delusions scale (0.80; 0.66 - 0.93; respectively) were very high. These correlation coefficients are higher than those obtained by Drake et al. (2007), who administered the scale in its original language and to a larger sample. For test-retest reliability, the coefficients obtained in this study (0.68 - 0.89 for the auditory hallucinations scale items and 0.61 - 0.76 for the delusions scale items) are similar to those found by Drake et al. (2007), and the values related to the auditory hallucinations scale is slightly higher than that of Drake et al.'s. These findings show that the scale's reliability is high in the Turkish population.

There were high correlations between the PSYRATS auditory hallucinations scale and the PANSS hallucination ($r = 0.83$)

and SAPS hallucination scales ($r = 0.70$). It was determined that the PSYRATS delusions scale showed high correlation with the PANSS delusion scale ($r = 0.76$), while it was correlated to the SAPS delusion scale at a moderate level ($r = 0.51$). The correlation coefficients found in this study are higher compared to the concurrent validity values determined using the PANSS and the SAPS in previous studies. Regarding the correlations between PSYRATS auditory hallucinations and PANSS hallucination scores, Drake et al. (2007) found a correlation coefficient of 0.81, Steel et al. (2007) 0.47, Kronmüller et al. (2011) 0.29; while Steel et al. (2007) found a correlation value of 0.27 between PSYRATS auditory hallucinations and SAPS hallucination scores. Regarding the correlations between PSYRATS delusions and PANSS delusion scores, Drake et al. (2007) found a correlation coefficient of 0.43, Steel et al. (2007) 0.40, Kronmüller et al. (2011) 0.27; while Steel et al. (2007) found a correlation value of 0.35 between PSYRATS delusions and SAPS delusion scores. Findings of the present study indicate that the Turkish versions of the PSYRATS scales have very high concurrent validity for the schizophrenic sample.

It was determined that the initial single factor structure of the PSYRATS Delusions Scale explained 83.12% of the variance. In parallel to Haddock et al.'s study (1999), it was found that limiting the number of factors to two led to the emergence of two factors that explained 89.61% of total variance. However, it was determined that the factor loadings were too close to each other. When the number of factors was limited to three and varimax rotation was done, the amount and intensity of distress loaded on one factor; the amount and duration of preoccupation loaded on another, and beliefs and disruption loaded on yet another factor. These three factors explained 93.79% of total variance. In the two-factor structure, some dimensions got loadings from two factors; also, the three-factor structure was more valid. Therefore, the structure of the scale can be accepted as a three-factor model for the Turkish population. Similar to those in the hallucinations scale, these factors were named as emotional characteristics, physical characteristics, and cognitive interpretation, respectively. In this study, the emotional characteristics factor in the original study (Haddock et al. 1999) was completely preserved but the items in the cognitive interpretation factor were separated into two parts and formed a third factor.

It was determined that the initial single factor structure of the PSYRATS Auditory Hallucinations Scale explained 83.5% of total variance. When the number of factors was limited to three as in the original study, it was determined that these three factors explained 90.95% of total variance and that this structure was accepted to be very good. As a result of varimax rotation, loudness, negative content, distress, and disruption loaded on one factor; frequency, duration, and control loaded on another; location and beliefs loaded on yet another factor.

Similar to those in Haddock et al.'s study (1999), these factors were named emotional characteristics, physical characteristics, and cognitive interpretation. The major difference between the factor structure revealed in this study and the one in the original study is that the control dimension loaded on the factor named as physical characteristics instead of on the factor named cognitive interpretation. The control dimension evaluates the degree of control one has over voices. For this reason, as in Haddock et al.'s (1999) and Drake et al.'s (2007) studies, it was assumed that the control dimension would be loaded on cognitive interpretation. Nevertheless, this dimension had a high factor loading in the cognitive interpretation factor (0.46). However, its loading in the physical characteristics factor was higher, so it was included in this factor. Furthermore, the auditory delusions scale was accepted to have four factors in a study by Steel et al., which used the scale in its original language, and also in the German version (Kronmüller et al. 2011), and the control dimension did not load on the cognitive interpretation factor; instead, it represented a separate factor. Kronmüller et al. (2011) named this factor as control. In the study which used the French version of the scale (Favrod et al. 2012), the auditory hallucinations scale was explained with four factors while the control dimension loaded on the cognitive interpretation factor as in the original study, but disruption and intensity of voices formed a fourth factor. Most studies that were conducted after the first validity and reliability study of the scale (Haddock et al. 1999) generally did not support this original structure. However, apart from the control dimension, it can be said that this study supported the original factor structure of the auditory hallucinations scale. On the other hand, the factor structures of both scales are not completely identical with those in the original study. The factor structure of the Turkish version of the scales needs to be supported by other studies. For this reason, using total scores instead of factor scores in evaluations would be more convenient.

The findings indicate that the PSYRATS scales are valid and reliable tools for evaluating auditory hallucinations and delusions of schizophrenia in the Turkish sample. Considering the fact that there are only a limited number of standardized scales that evaluate psychotic symptoms in Turkey, it is an important undertaking to adapt these scales to the Turkish sample. In Western studies, the PSYRATS scales are frequently used in both correlational (e.g. Startup et al. 2007) and experimental (e.g. Moritz et al. 2011, Penn et al. 2009, Thomas et al. 2011, Wykes et al. 2005) studies. It would be beneficial to use the scale in the detailed evaluation of psychotic symptoms in clinical interviews, in monitoring the changes in symptoms that result from medication treatment and psychotherapy, and particularly in the evaluation of therapeutic formulations and self-monitoring of symptoms in cognitive behavioral therapy.

This study has a number of limitations. One of the major limitations is that the sample exclusively consisted of schizophrenic patients. It would prove beneficial to test whether the scale is also useful in other psychotic disorders. The sample size is limited for a validity and reliability study. A larger sample size could not be achieved because schizophrenic patients form a difficult group to work with, and the evaluation was based on interviews. Despite the relatively small sample size, the number of patients was sufficient in terms of psychometric requirements. One part of the sample was on typical antipsychotics, while others used new generation medications. The antipsychotic medications used by the patients are not similar because the sample was drawn from different centers, and the disease prognosis of the patients was at different stages. In addition, inpatients and outpatients were represented at different rates in the study, which can affect symptom severity. However, in order to achieve a larger sample, these possible differences were overlooked. Also, the difference between the number of male and female patients can be considered another limitation. Overcoming these limitations pertaining to treatment modality, type of medication, and gender ratio will contribute to obtaining findings that can be generalized.

In conclusion, despite all the above limitations, it can be said that the Turkish versions of the PSYRATS scales are valid and reliable and are useful tools in evaluating the delusions and auditory hallucinations of schizophrenia.

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REFERENCES

- Aker T (2003) Şizofrenide pozitif belirtiler ve bilişsel davranışçı tedavileri. 3P Psikiyatri Psikoloji Psikofarmakoloji Dergisi 11: 59-66.
- Aker T, Yazıcı A, Üstün N et al (2003) Varsanılarla ilgili inançlar ölçeği; güvenilirlik ve geçerlik çalışması. Düşünen Adam Psikiyatri ve Nörolojik Bilimler Dergisi 16: 87-94.
- Beck AT, Rector NA (2000) Cognitive therapy for schizophrenia. A new therapy for the new millenium. Am J Psychother 54: 291-300.
- Beck AT, Rector NA, Stolar NM et al (2009) Schizophrenia: Cognitive Theory, Research and Therapy. The Guilford Press, New York & London.
- Carpenter WT, Buchanan RW (1995) Schizophrenia. Comprehensive Textbook of Psychiatry, sixth edition, HJ Kaplan, BT Sadock (Ed), USA. Williams & Wilkins.
- Drake R, Haddock G, Tarrier N et al (2007) The psychotic symptom rating scales (PSYRATS): their usefulness and properties in first episode psychosis. Schizophr Res 89: 119-22.
- Erkoç Ş, Arkonaç O, Ataklı C et al (1991) Pozitif sendromları değerlendirme ölçeği güvenilirliği ve geçerliliği. Düşünen Adam Psikiyatri ve Nörolojik Bilimler Dergisi 4: 20-4.
- Favrod J, Rexhaj S, Ferrari, P et al (2012) French version validation of the psychotic symptom rating scales (PSYRATS) for outpatients with persistent psychotic symptoms. BMC Psychiatry 12: 1-7.

- Haddock G, McCarron J, Tarrier N et al (1999) Scales to measure dimensions of hallucinations and delusions: the psychotic rating scales (PSYRATS). *Psychol Med* 29: 879-89.
- Işık E, Işık U (2008) Şizofreni. Güncel Klinik Psikiyatri, E Işık, E Taner, U Işık (Ed), Ankara. Asimetrik Paralel Yayıncılık s. 81-115.
- Kay SR, Fiszbein A, Opler LA (1987) The positive and negative syndrome scale (PANSS) for schizophrenia. *Schizophr Bull* 13: 261-76.
- Kostakoğlu AE, Batur S, Tiryaki A et al (1999) Pozitif ve negatif sendrom ölçeğinin (PANSS) Türkçe uyarlamasının geçerlilik ve güvenilirliği. *Türk Psikoloji Dergisi* 14: 23-32.
- Köroğlu E (2009) Klinik Uygulamada Psikiyatri: Tanı ve Tedavi Kılavuzları, Ankara. Hekimler Yayın Birliği.
- Kronmüller KT, von Bocka A, Grupea S et al (2011) Psychometric evaluation of the Psychotic Symptom Rating Scales. *Compr Psychiat* 52: 102-8.
- Kuipers E, Garety P, Fowler D et al (2006) Cognitive, emotional, and social processes in psychosis: Refining cognitive behavioral therapy for persistent positive symptoms. *Schizophr Bull* 32: 24-31.
- Lindenmayer JP, Khan A (2006) Psychopathology. Textbook of Schizophrenia, Lieberman, JA, Stroup TS, Perkins DO (Ed), Washington & London. The American Psychiatric Publishing s. 187-221.
- Mete L (1998) Şizofrenide klinik belirtiler. Şizofreni Dizisi 23-8.
- Mete L (2003) Şizofreni En Uzak Ülke, İstanbul. İletişim Yayınları.
- Moritz S, Kerstan A, Veckenstedt R et al (2011) Further evidence for the efficacy of a metacognitive group training in schizophrenia. *Behav Res Ther* 49: 151-7.
- Penn DL, Meyer PS, Evans E et al (2009) A randomized controlled trial of group cognitive-behavioral therapy vs. enhanced supportive therapy for auditory hallucinations. *Schizophr Res* 109: 52-9.
- Ruddle A, Mason O, Wykes T (2011) A review of hearing voices groups: Evidence and mechanisms of change. *Clin Psychol Rev* 31: 757-66.
- Schneider SD, Jelinek L, Lincoln TM et al (2011) What happened to the voices? A fine-grained analysis of how hallucinations and delusions change under psychiatric treatment. *Psychiat Res* 188:13-7.
- Startup H, Freeman D, Garety PA (2007) Persecutory delusions and catastrophic worry in psychosis: developing the understanding of delusion distress and persistence. *Behav Res Ther* 45: 523-37.
- Steel C, Garety PA, Freeman D et al (2007) The multidimensional measurement of the positive symptoms of psychosis. *Int J Meth Psych Res* 16: 88-96.
- Stefan M, Travis M, Murray MR (2002) An Atlas of Schizophrenia, London. Parthenon Publishing s.16-8.
- Thomas N, Rossel S, Farhall J et al (2011) Cognitive behavioural therapy for auditory hallucinations: Effectiveness and predictors of outcome in a specialist clinic. *Behav Cogn Psychoth* 39: 129-38.
- Wykes T, Hayward P, Thomas N et al (2005) What are the effects of group cognitive behavioral therapy for voices? A randomised controlled trial. *Schizophr Res* 77: 201-10.