ISSN: 2083-389X
eISSN: 2084-3127

J Hear Sci, 2023; 13(3): 9–18
DOI: 10.17430/jhs/171438

VALIDITY AND RELIABILITY OF THE SKARZYNSKI TINNITUS SCALE (STS) IN TURKISH

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Contributions:
A Study design/planning
B Data collection/entry
C Data analysis/statistics
D Data interpretation
E Preparation of manuscript
F Literature analysis/search
G Funds collection

Abstract

Introduction: To investigate the validity and reliability of a Turkish version of the Skarzynski Tinnitus Scale (STS) in a Turkish patient group.

Material and methods: The study was conducted on 143 volunteers aged over 18 years who had complained of tinnitus for at least one month. Confirmatory factor analysis (CFA) and exploratory factor analysis (EFA) were used for construct validity. Criterion validity was analysed by a Spearman's bivariate correlation test. Reliability analyses were assessed with Cronbach's alpha internal consistency coefficients and test–retest reliability with McNemar–Bowker and ICC coefficients.

Results: A new three-factor structure was produced using EFA. The factors were similar to the original study except for Item 14. The STS gave similar measures to the tested Tinnitus Handicap Inventory scale. Nearly all item–total correlations were greater than 0.4, indicating good internal consistency. The internal consistencies of the items were 0.86–0.88; in the test–retest reliability analyses of the sub-scales, ICC scores were 0.90–0.96.

Conclusions: The Turkish STS can be used reliably in all adults with a symptom of tinnitus. However, because one item in the new structure of the Turkish version is in a different sub-dimension it may necessary to conduct new validation studies.

Key words: Turkish • THI • reliability • validity • tinnitus • Skarzynski Tinnitus Scale

TRAFNOŚĆ I RZETELNOŚĆ TURECKIEJ WERSJI SKALI SZUMÓW USZNYCH SKARZYNSKIEGO (STS)

Streszczenie

Wstęp: Celem badania była ocena trafności i rzetelności tureckiej wersji językowej Skali Szumów Usznych Skarzynskiego (Skarzynski Tinnitus Scale, STS) w grupie pacjentów tureckich.

Materiał i metody: Badania przeprowadzono na grupie 143 ochotników w wieku powyżej 18 lat, którzy skarżyli się na szumy uszne od przynajmniej 1 miesiąca. Do oceny trafności zastosowano konfirmacyjną analizę czynnikową (CFA) i eksploracyjną analizę czynnikową (EFA). Rzetelność była analizowana za pomocą testu korelacji dwóch zmiennych Spearmana. Oceny analizy rzetelności dokonano za pomocą współczynników wewnętrznej spójności alfa Cronbacha, a rzetelność powtarzalności testu – za pomocą testów McNemara–Bowkera i wewnątrzklasowego współczynnika korelacji (ICC).

Wyniki: Z wykorzystaniem EFA stworzono nową trzyczynnikową strukturę. Zawartość czynników była podobna do badania oryginalnego z wyjątkiem pozycji 14. Wyniki pomiarów wykonanych za pomocą STS były podobne do pomiarów otrzymanych przy użyciu już przetestowanego kwestionariusza Tinnitus Handicap Inventory (THI). Dla prawie wszystkich pozycji całkowite korelacje wynosiły ponad 0,4, co wskazuje na dobrą spójność wewnętrzną STS. Wewnętrzna spójność pozycji wynosiła pomiędzy 0,86 a 0,88. W analizie powtarzalności testu dla podskal wyniki ICC wynosiły pomiędzy 0,90 a 0,96.

Wnioski: Turecka wersja STS jest wiarygodnym testem dla wszystkich dorosłych pacjentów z objawami szumów usznych. Jednak ze względu na to, że jedna pozycja w nowej strukturze potwierdzonej wersji tureckiej jest umieszczona w innym podwymiarze, konieczne może być przeprowadzenie nowych badań walidacyjnych.

Słowa kluczowe: turecki • THI • rzetelność • trafność • szumy uszne • Skala Szumów Usznych Skarzynskiego

Key for abbreviations	
CFA	confirmatory factor analysis
CFI	comparative fit index
CI	confidence interval
df	degree of freedom
EFA	exploratory factor analysis
GFI	goodness-of-fit index
ICC	intraclass correlation coefficient
KMO	Kaiser–Meyer–Olkin (criterion)
LISREL	linear structural relations
RMSEA	root mean square error of approximation
SRMR	standardised root mean square residual
STS	Skarzynski Tinnitus Scale
THI	Tinnitus Handicap Inventory

Introduction

Tinnitus, defined as an individual's perception of sound without any external acoustic stimulus, is a largely subjective complaint and so standardisation of diagnostic and treatment approaches is difficult. Yet standardised methods to determine the effects of tinnitus on patients' lives, social activities, physical/mental health, and to evaluate the results of treatment approaches are required [1,2].

Since tinnitus can have diverse impacts, it should be expected that any questionnaire or scale will be evaluated in a multi-dimensional way. Many tests, questionnaires, and scales have been developed over the years for use in patients with tinnitus [1,3]. Validity and reliability studies have been made in many languages, including Turkish, for the Tinnitus Handicap Inventory (THI), which is one of the most widely used [4–9]. This scale evaluates the emotional, catastrophic, and functional effects of tinnitus. Over the years, the THI has been revised, shortened, and made more accessible [10]. However, it is still controversial whether THI is affected by auditory thresholds [11]. Figueiredo et al. have reported an inconsistency between THI scores and audiometric and psychoacoustic measurements [12]. Caner et al. have claimed that THI does not enable "correct analysis of sub-group complaints" satisfactorily [13]. Because present scales do not fully meet requirements, Skarzynski et al. have developed a new tinnitus scale, the Skarzynski Tinnitus Scale (STS), a short and reliable tool for clinical practice [14]. With the exception of the developmental of the original scale, STS has yet to be validated. For scales to become more widespread, it is important to show cross-validation of scales in different patient populations, cultures, and languages. Our aim in this study was to investigate the validity and reliability of the Turkish version of the STS in a Turkish patient group.

Material and methods

This study was conducted at the Department of Otorhinolaryngology, Ege University Faculty of Medicine, between February and June 2019. Since it has been recommended that the sample size should be at least 5 times and at most 10 times the number of items present in the scale under investigation, we included 143 individuals in this study. Inclusion criteria were: over 18 years old, having a complaint of tinnitus for at least 1 month, and having normal findings on an otoscopic examination. Patients who presented to the outpatient clinic within the study period were consecutively included in the study if they volunteered and gave informed consent. Approval of the Ethics Committee was obtained (Ege University Medical Faculty, Ethical Committee of Non-interventional Clinical Research, date 18.09.2019 and decision #19-9.IT/37).

Data collection tools

Personal information form

This form involved demographic characteristics of the participants, tinnitus-related data (duration, description, severity, persistent or variable, presence of associated illness or event), together with patient and family history.

Audiologic assessment

Following a complete ENT examination, pure tone audiometry was performed in patients volunteering for the study. Thresholds between 0.25 and 8 kHz were tested.

Skarzynski Tinnitus Scale

The scale consists of 14 items and involves sub-scales determining psychological, functional, and coping situations. The items are defined on a 5-point Likert scale ('definitely not', 'rather not', 'neither yes nor no', 'rather yes', and 'definitely yes'). Items 3, 6, and 12 were coded as 0 for definitely yes; 1 for rather yes; 2 for neither yes nor no; 3 for rather not; and 4 for definitely not. The other items were coded as 0 for definitely not; 1 for rather not; 2 for neither yes nor no; 3 for rather yes; and 4 for definitely yes. The patient's total score was divided by 56, the highest total score, and multiplied by 100 to obtain a scale score.

Tinnitus Handicap Inventory

This scale was developed by Newman et al. in 1996 [5]. The answers to the survey's 25 questions consist of either 'yes', 'no', or 'sometimes'. The yes answer was scored as 4, sometimes as 2, and no as 0 (the total scale score was thus between 0 and 100 points). Its Turkish validity and reliability has been studied by Aksoy et al. (2007) [4]. As well as in Turkey, its validity and reliability have been tested in Italy, Denmark, Lithuania, and the Philippines, and the THI scale has been shown to be valid and reliable [15–19].

Turkish translation

Skarzynski prepared Polish and English versions of STS. The English STS was translated into Turkish by three people with good proficiency in English. One was a linguist, and another a translator; both were outside the health field and were not knowledgeable about the subject. The third was a person working in the field of health and was

Table 1. Demographic characteristics and noise-exposure status of the participants (n = 143)

Demographic characteristic	Detailed characteristic	Number	Percent
Sex	female	71	49.7
	male	72	50.3
Marital status	married	97	67.8
	single	46	32.2
Education	primary	62	43.4
	secondary	30	21.0
	higher	51	35.7
Noise level in the living quarters	silent	51	35.7
	little noise	58	40.6
	much noise	34	23.8
Years in the profession	0–15 years	55	38.5
	16–30 years	70	49.0
	≥31 years	18	12.6

familiar with the subject. Then, three people who knew both Turkish and English at an advanced level (including a healthcare professional and an English teacher living abroad) made reverse translations back into English. Audiology graduate students and some tinnitus patients were asked what they understood from the sentences. Based on these assessments, the ideal sentences were selected and the translation completed. The final form is shown in the **Appendix**.

Statistical and psychometric analysis

From the data, descriptive statistics of the mean, standard deviation, frequency, and percentages were derived. The normality assumption was checked separately in the groups by a Shapiro–Wilk test. IBM SPSS Statistics v. 25.0 for Windows (IBM, Armonk, NY) was used for statistical analysis. The significance level was set at 0.05 for all analyses. The LISREL v. 8.72 software package was used for confirmatory factor analysis.

Construct validity was tested by exploratory factor analysis and confirmatory factor analysis. The external validity of the scale was evaluated by the Spearman rho coefficient, whereas the internal consistency by ICC and Cronbach alpha coefficients. Test–retest reliability was tested by ICC and McNemar–Bowker statistics.

Construct validity

Exploratory factor analysis

First, the sample size was evaluated by the Kaiser–Meyer–Olkin (KMO) criterion, and Bartlett's test of sphericity was used to calculate the inter-variable correlations. The KMO criterion was higher than 0.60, and Bartlett's sphericity test was significant, indicating that the data were suitable for factor analysis. Principal component analysis and varimax rotation were used for exploratory factor analysis. The correlation matrix evaluated the suitability of factor analysis from a statistical point of view: values above 0.05 and below 0.70 were considered to indicate general consistency.

Confirmatory factor analysis

LISREL v.8.72 was used for confirmatory factor analysis. LISREL performs Chi-square/df (degrees of freedom), RMSEA (root mean square error of approximation), SRMR (standardised root mean square residual), GFI (goodness-of-fit index), and CFI (comparative fit index) analyses.

Convergent and discriminant validity

To evaluate similar scale validity, the THI and STS scales were simultaneously applied to the patients. Because the data did not conform to a normal distribution, statistical calculations were made using a Spearman's rho-test.

Reliability

ICC coefficients were used to analyse the compatibility of the scale and its sub-dimensions with each other, and the inter-item consistency was analysed by item–total correlations (Cronbach's alpha). The test–retest method was used to determine the stability of the scale over time. The STS scale was re-applied 1 month later to 21 randomly selected participants. In the ordered scales, the reliability of pre–post item consistency was evaluated by McNemar–Bowker.

Results

Demographics and tinnitus

The STS was applied to 143 volunteers aged 18 years to 84 years. The demographic characteristics of the participants, together with their noise exposure, are shown in **Table 1**. Of them, 71 (49.7%) were female, 97 (67.8%) were married, and 62 (43.4%) were primary school graduates. Nearly half (70 or 49.0%), had worked in their professions for between

Table 2. Tinnitus characteristics of the participants (n = 143)

Tinnitus characteristic	Detailed characteristic	Number	Percent
Localisation of the tinnitus	bilateral	47	32.9
	unilateral – right ear	39	27.3
	unilateral – left ear	46	32.2
	head	11	7.7
Periodicity of the tinnitus	periodically	58	40.6
	continually	85	59.4
Variability of the sound	yes	75	52.4
	no	68	47.6
Patient's perception of the tinnitus	buzz, whistle (thin sound)	82	57.3
	wind, murmur, and pressure	38	26.6
	others	23	16.1

Table 3. In the exploratory factor analysis of the STS, three principal components emerged (bold font)

Component	Total	Initial eigenvalues (% of variance)	Cumulative %	Extracted sums of squares loadings			Rotated sums of squares loadings		
				Total	Percent of variance	Cumulative %	Total	Percent of variance	Cumulative %
1	5.601	40.007	40.007	5.601	40.007	**40.007**	3.246	23.187	23.187
2	1.295	9.250	49.257	4.295	9.250	**49.257**	3.126	22.328	45.515
3	1.218	8.701	57.958	1.218	8.701	**57.958**	1.742	12.443	57.958
4	.907	6.481	64.439						
5	.784	5.596	70.035						
6	.730	5.212	75.248						
7	.657	4.696	79.944						
8	.576	4.116	84.060						
9	.520	3.714	87.775						
10	.454	3.239	91.014						
11	.391	2.790	93.804						
12	.354	2.528	96.332						
13	.271	1.937	98.269						
14	.242	1.731	100.000						

16 and 30 years. In terms of background noise, the most common setting, that 58 (40.6%) participants had been living or working in, had little noise. **Table 2** shows that tinnitus was bilaterally present in 47 (32.9%) of the patients, and in 85 patients (59.4%) tinnitus was continuous. There were 75 participants (52.4%) who perceived alterations in the intensity of the sound, whereas 82 (57.3%) of them described tinnitus as a high-pitched sound (buzz or whistle). Almost all patients (97.9%; s = 140) did not use hearing aids.

Construct validity

To assess construct validity, the three-dimensional structure of the original STS was first verified. According to the results of confirmatory factor analysis, a Chi-square/DoF of 1.48 < 5 is ideal, while RMSEA (0.058 < 0.09), SRMR (0.057 < 0.08), and CFI (0.98 < 0.99) are acceptable. However, for the GFI index, the goodness-of-fit value (0.87) was rated incompatible (0.87, which is < 0.90). Thus, it can be concluded that the dimensional structure of the original scale was not confirmed. For this reason, exploratory factor analysis was done to determine the new factor structure for the Turkish STS.

Table 4. Analysis of transformed factor loadings. The important factors are indicated in bold font

Component	Functional subscale	Psychological subscale	Coping subscale
M5	**0.683**	0.187	0.002
M2	**0.652**	0.187	0.295
M14	**0.638**	0.327	0.157
M13	**0.580**	0.411	0.282
M15	**0.557**	0.085	0.441
M11	**0.443**	0.393	0.052
M1	**0.387**	0.349	0.237
M10	0.156	0.805	0.306
M4	0.328	0.691	0.029
M7	0.275	0.662	0.219
M8	0.180	0.578	0.395
M3	0.285	0.096	**0.511**
M6	0.203	0.166	**0.461**
M12	-0.022	0.100	**0.327**

Results of exploratory factor analysis

The principal axis method and varimax rotation were used for exploratory factor analysis. All items that made up the scale were evaluated. The KMO value, which assesses the sufficiency of the sample size, was 0.877. Bartlett's test result was significant at the $p < 0.05$ level. Accordingly, it was concluded that the sample size was sufficient, there were relationships among the variables, and performing a factor analysis was appropriate. The analysis revealed that the scale had a three-factor structure (the variance explained by each factor was 5.60, 1.29, and 1.21, respectively). The total variance explained by its three-factor structure was 58.0%. The first factor explained 40.0% of variance, the second 9.2%, and the third 8.7%.

The factor loading values of the items ranged between 0.33 and 0.81. The results of the principal component analysis are shown in **Table 3**, which indicates that the 14 items in the scale can be explained by three factors. The transformed factor loadings are presented in **Table 4**, where the important groupings are shaded in blue.

The results of the pure tone audiometry tests showed that the right ear average was 26 dB and the left ear average 28 dB. Based on common standards, hearing acuity in the right ear was 83% normal, 11% mild hearing loss, and 4% moderate hearing loss. For the left ear, the corresponding figures were 82% normal, 10% mild hearing loss, 7% moderate hearing loss, and 0.6% severe hearing loss.

Results of confirmatory factor analysis

The new factor structure obtained by EFA was verified. **Figure 1** shows the path diagram from the confirmatory factor analysis for the Skarzynski Tinnitus Scale, and the goodness-of-fit values are presented in **Table 5**. Based on these results, the created model fulfills the criteria for goodness-of-fit. Thus, in terms of exploratory factor analysis, it is possible to say that the hypothetical dimensional

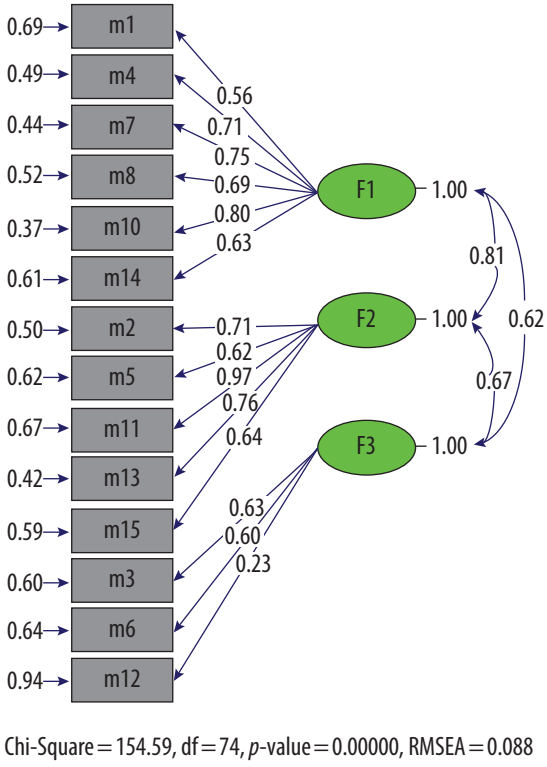

Figure 1. Confirmatory factor analysis path diagram based on the three principal factors (green)

structure of the Turkish version of STS was confirmed (**Table 6**). Almost all items, except item 1, were included in one of the factors. As in the original study, item 1 provided almost similar loadings for two factors (0.387 for factor 1 and 0.349 for factor 2). Even though item 1 provided more loading to Factor 1 (Functional), it was placed in Factor 2 (Psychological), as in the original study, because its content has relationships with emotions. On the

Table 5. Confirmatory factor analysis of goodness-of-fit values

Fit indices	Acceptable fit indices criteria	Goodness-of-fit values	
Chi-square/df	2 < Chi-square/df < 5	154.59/74 = 2.09	acceptable fit
RMSEA	0.05 < RMSEA < 0.09	0.088	acceptable fit
SRMR	SRMR < 0.08	0.069	acceptable fit
GFI	0.90 < GFI < 0.99	0.87	incompatible
CFI	0.90 < CFI < 0.99	0.95	acceptable fit

Table 6. Exploratory factor analysis of goodness-of-fit values

Fit indices	Acceptable fit indices criteria	Goodness-of-fit values	
Chi-square/df	2 < Chi-square/df < 5	109.29/74 = 1.48	good fit
RMSEA	0.05 < RMSEA < 0.09	0.058	acceptable fit
SRMR	SRMR < 0.08	0.057	acceptable fit
GFI	0.90 < GFI < 0.99	0.90	acceptable fit
CFI	0.90 < CFI < 0.99	0.98	acceptable fit

Table 7. Relationships between the STS factors and the total THI score

Convergent validity	STS Functional subscale	STS Psychological subscale	STS Coping subscale	STS Total score
THI score	0.825*	0.868*	0.501*	0.915*

* Spearman's rho

Table 8. Correlations of each item in the scale according to total score

Items	Scale mean if item deleted	Scale variance if item deleted	Corrected item–total correlation	Cronbach's alpha if item deleted
M1	22.2	151.09	0.54	0.87
M2	23.6	143.66	0.62	0.86
M3	24.2	153.44	0.43	0.87
M4	23.1	143.59	0.60	0.86
M5	23.8	147.49	0.50	0.87
M6	23.4	151.86	0.39	0.87
M7	23.1	142.70	0.64	0.86
M8	23.6	145.21	0.59	0.86
M10	23.4	140.63	0.66	0.86
M11	23.4	144.36	0.51	0.87
M12	24.0	161.03	0.61	0.88
M13	23.7	140.85	0.71	0.86
M14	23.5	142.26	0.63	0.86
M15	24.4	148.85	0.56	0.86

Table 9. Reliability of pre–post consistency of the items

Test–retest	McNemar–Bowker
M1pre → M1post	0.2615
M2pre → M2post	0.4060
M3pre → M3post	0.4060
M4pre → M4post	0.1091
M5pre → M5post	0.5018
M6pre → M6post	0.1736
M7pre → M7post	0.2548
M8pre → M8post	0.2381
M10pre → M10post	0.4060
M11pre → M11post	0.2206
M12pre → M12post	0.3916
M13pre → M13post	0.8013
M14pre → M14post	0.1359
M15pre → M15post	0.1991

other hand, item 14 had a significant loading on Factor 1 (0.638), contrary to the original study. The fact that item 14 is within Factor 1 (Functional) despite its relationships with emotions makes interpretation challenging.

We therefore conclude that the contents of factors are similar to the original study except for item 14. If we match the patients' situations in daily life (content analysis of expressions in the items) with the EFA results, we obtain (**Figure 1**) the same sub-scales as in the original study: Functional status sub-scale (F1): items 2, 5, 11, 13, 14, and 15; Psychological status sub-scale (F2): items 1, 4, 7, 8, and 10; Coping sub-scale (F3): items 3, 6, and 12.

Convergent validity

The THI scale was used to test the criterion validity (external validity) of the STS. The two scales were positively correlated to a great extent, and this relationship was statistically significant ($p < 0.001$). Since the scales' relationship did not constitute a non-linear graph, convergent validity was assessed using a Spearman's bivariate correlation. Correlations were also calculated between the STS sub-scales and the total THI score. **Table 7** shows there are strong correlations of THI total score with the Functional and Psychological sub-scales and a moderate correlation with the Coping sub-scale. We conclude that the STS scale provides similar measurements to the tested THI scale.

Reliability

Internal consistency

Internal consistency is a measure of how homogenous (inter-related) the items in a scale or its sub-dimensions are. Internal structural consistency was analysed by calculating item–total correlations. The correlations of all items in the scale according to the total score are presented in **Table 8**. Nearly all item–total correlations were > 0.4, indicating that

Table 10. Reliability of test–retest consistency of the STS and its sub-dimensions

Subscales	Mean ± SD	ICC
Functional		
before	48.6 ± 27.7	0.96
after	43.7 ± 25.5	
Psychological distress		
before	52.6 ± 35.8	0.95
after	51.4 ± 29.4	
Coping		
before	29.3 ± 26.8	0.90
after	26.5 ± 22.4	
STS Global		
before	45.6 ± 25.5	0.95
after	42.2 ± 21.5	

STS had good internal consistency. The highest correlation coefficient was 0.71 (item 13) and the lowest was 0.39 (item 6). If each item was deleted, the internal consistency of the remaining items ranged between 0.86 and 0.88.

Test–retest reliability

To test the reliability of the scale, the test–retest method was used to determine the scale's stability over time. The pre–post consistency of the items was assessed by McNemar–Bowker, and the results are shown in **Table 9**. In terms of subscales, test–retest reliability was assessed using the intraclass correlation coefficient, with scores > 0.70 indicating high reliability. **Table 10** shows the results. ICC was 0.96 (95% CI: 0.91–0.98) for the Functional sub-scale; 0.95 (95% CI: 0.87–0.98) for the Psychological distress subscale; and 0.90 (95% CI: 0.75–0.95) for the Coping subscale. The STS global ICC was 0.95 (95% CI: 0.88–0.98)

Discussion

In this study we aimed to adapt the STS scale to Turkish-speaking patients. With this in mind, the original three-dimensional factor structure of the scale was first tested by CFA. However, since all goodness-of-fit criteria of the model were not fulfilled, the original scale's factor structure could not be verified. Consequently, after translation of the scale into Turkish, EFA was used to investigate a new factor structure. We found that a three-factor structure was also consistent with the Turkish version of STS. However, two items appeared to be different from the original factor structure.

Item 1 loaded two factors in a comparable manner (Functional and Psychological factors). Since this item concerns emotions, it was included as a Psychological factor, as in the original scale's validation. Thus, the only difference between the structures of the original and Turkish versions of the scale relate to item 14. Even though its content is related to emotions, item 14 significantly loads the Functional status factor.

The new factor structure obtained by EFA fulfills all goodness-of-fit criteria in CFA and has therefore been verified. However, because of item 14, the original factor structure of the scale is not verified in a Turkish patient group using the Turkish version of STS. Item 14 is described as "Tinnitus made me angry." So even though there seems to be no problem regarding this item's general structure, the participants might have interpreted it in a different way. Since item 14 appears to be an unexpected factor, it is probably responsible for reducing the total variance explainable by the three factors (58% versus 65.9% in the original study).

Here we used the THI scale to test the criterion validity of the Skarzynski Tinnitus Scale. We found significant positive correlations between the THI scale score and the total and factor STS scores. The Functional and Psychological sub-scales turned out to have strong positive correlations, whereas the coping sub-scale had the weakest correlation. For this reason we conclude that the STS scale and the THI scale make similar measurements.

Reliability was analysed by Cronbach's alpha internal consistency coefficients, item–total correlations, and test–retest ICC coefficients. Cronbach's alpha coefficients indicated internal consistency of the sub-scales, and ICC coefficients showed that each item was similar to the others within the group. In terms of internal consistency, the compatibility between the STS and the items in each subdimension was high. Looking at item–total correlations, when each item was deleted, the internal consistency of the remaining items was high (within the range 0.86–0.88).

In the test–retest reliability analysis, ICC scores were high, between 0.75 and 0.90. The test–retest compatibilities of the Functional and Psychological sub-scales of the STS scale were excellent, although the Coping sub-scale's compatibility was only moderate. This suggests that the scale has significant stability, and provides uniformity over time.

The validity and consistency analyses of our study show close similarity to Skarzynski's original study. In the exploratory factor analysis it was significant, with a score of 0.91 in Skarzynski's original Polish study, and total variance as 65.9%. In our study using KMO it was significant with a score of 0.87, and total variance of 40–58%. The THI scale was used in common with calculations of similar scale validity. In both analyses, there were strong positive correlations between the Functional and Psychological subscales. It had the weakest correlation in the Coping subscale. It was expected that the Coping coefficient would be low, since it has a different structure and varies from person to person. In Skarzynski's study, the average of the items is approximately 2.0, with item 11 having the highest mean score of 2.45. The lowest mean is from item 5 with a score of 1.63. The average of all items was 1.81. In terms of ranking, the highest was item 1 with a mean value of 3.18; the lowest is item 3 with a mean value of 1.16. In Skarzynski's study, the ICC confidence interval was highest for the Psychological and Functional subscales (0.93), while the lowest was for the Coping subscale (0.81). In our study, the ICC was calculated and the similarity of the items in the group with each other was examined: the highest score was for the Functional subscale (0.93), and the lowest for the Coping subscale (0.81). In the ICC confidence interval, the highest was for the Psychological subscale (0.90) and the lowest for the Coping subscale (0.75). The highest value was for Functional subscale (37.8) and the lowest for the Coping subscale (9.90). This can be interpreted as demonstrating good internal consistency and excellent reliability, so that the two studies tend to support each other [14].

Conclusions

We conclude that the Turkish STS scale can be reliably used among all adults with tinnitus. The STS is a practical scale that helps the clinician understand the individual's discomfort level due to tinnitus and its effect on daily life. Because it can be applied in a short time and is easy to understand, STS can be considered a useful tool in clinical practice. However, since we have not been able to validate the original factor structure of the scale, and in the validated Turkish version one item has appeared in a different sub-dimension of the factor structure, new validation studies may be necessary.

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Appendix

SKARZYNSKİ TİNNİTUS ÖLÇEĞİ (STÖ)

İsim: ……..…..

Bitirme tarihi: …… Yaş: …… Cinsiyet ☐ E ☐ K

Kulak çınlaması nedir?

Kulak çınlaması başta tek veya çift taraflı duyulan çeşitli seslerdir. Duyulan sesler dalga, rüzgâr, gıcırtı, vızıltı, ıslık seslerine benzerlik gösterebilir. Duyulan bu sesler sorunu yaşayan kişilerce belirlenmiştir.

Aşağıda kulak çınlamasına ilişkin ifadeler yer almaktadır. Her bir ifadeyi dikkatlice okuyunuz ve geçen hafta boyunca durumunuzla eşleşip eşleşmediğine karar veriniz. Gerekli boşluğa çarpı işareti (x) koyunuz.

		Kesinlikle Hayır	Pek değil	Hem evet hem hayır	Kısmen Evet	Kesinlikle Evet
1	Kulak çınlaması beni rahatsız etti/irrite etti.					
2	Kulak çınlaması yüzünden hiçbir şeye odaklanamadım.					
3	Kulak çınlamasıyla başa çıkabildim.					
4	Kulak çınlaması yüzünden mutsuz oldum.					
5	Kulak çınlaması yüzünden bazı önemli şeyleri hatırlamadığımı hissettim.					
6	Kulak çınlamasına alıştım.					
7	Kulak çınlaması bende sıkıntı/ anksiyete yarattı.					

8	Kulak çınlamasını düşünmeyi durduramadım.
9	Kulak çınlaması dikkatimi dağıttı.
10	Kulak çınlaması beni hep endişelendirdi.
11	Kulak çınlaması yüzünden uyku sıkıntısı çektim
12	Kulak çınlaması duydum fakat dikkatimi ona vermedim.
13	Kulak çınlaması yüzünden gevşeyip rahatlayamadım.
14	Kulak çınlaması beni öfkelendirdi.
15	Kulak çınlaması beni günlük görevlerimden alıkoydu.