Translation, Cultural Adaptation, and Validation of the "Youth Attitude to Noise Scale" into Turkish (YANS-Tr)

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Abstract

Context: With the changing lifestyle in modern society, the youth has become the target of substantial noise exposure. Both environmental noise and the use of personal electronic devices create a risk for youth's hearing conservation as reported in several studies. **Aims:** This study aims to adapt and validate the Youth Attitude to Noise Scale (YANS), developed by Widén and Erlandsson for use in the Turkish setting. **Settings and Design:** The linguistic adaptation of the YANS into Turkish (YANS-Tr) was conducted with three experts in linguistics. A cross-sectional study was designed for high school students to establish the evidence for the reliability and validity of the scale. **Methods and Material:** 345 high school students participated in the pilot study. The demographic data form developed by the researcher was used to retrieve the information related to participants. Lastly, the 19-item YANS-Tr was delivered to students. **Statistical analysis used:** Exploratory and confirmatory factor analyses were performed for the construct validity. The Cronbach's alpha coefficients were calculated for each dimension and the whole scale. **Results:** Four-dimensional structure was yielded for the YANS-Tr as in the original version of the scale. However, some items (8th, 10th, 18th, and 19th) were loaded under different dimensions. The reliability coefficient of the scale (Cronbach's α = 0.79) was within the acceptable range. The mean overall YANS-Tr score was 2.68. When the mean scores are compared with other countries, Turkey stands higher than Sweden (2.10), close to Serbia (2.76) and Brazil (2.80), and lower than Belgium (3.10) and China (3.46). **Conclusions:** The YANS-Tr is shown to be a valid and reliable assessment tool to evaluate the students' attitude to noise in Turkey.

Keywords: Adolescent, noise, scale adaptation, Youth Attitude to Noise Scale

INTRODUCTION

High level sounds are frequently defined as noise or undesirable sounds that may have negative effects on hearing health. Meanwhile, they can be perceived as entertaining sounds for others.[1] High level sound potentially poses risk to children's, adolescents', and young adults' hearing conservation. Exposure to high level sound or noise can cause loss of outer hair cells in the cochlea, noise-induced hearing loss (NIHL), tinnitus, and noise sensitivity.[2] Risky behavior of tolerating noise among youth may be emanated from their attitude toward the noise.[3]

The attitude toward noise illustrates how people behave when exposed to noise.[3] Continuous or systematic noise exposure may cause permanent damage for later years in life. Related studies showed that the prevalence of NIHL increased among adolescents 12 to 19 years of age.[4] These observations point out the necessity for both raising public awareness of hearing health and taking preventive strategies to avoid permanent damage. At this point, a measurement tool such as the Youth Attitude to Noise Scale (YANS) stands out as the leading approach to evaluating how young people perceive noise, which was originally developed in Swedish by Olsen-Widen and Erlandsson.[5]

Emerging risks to youth's hearing health alerted researchers around the world to investigate the attitude toward noise in different contexts. For this purpose, the YANS was translated

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and adapted to different cultural settings (countries) such as Brazil,[6] the USA,[7] Belgium,[8] China,[9] and Serbia.[10]

The scale consists of 19 five-point Likert-type items scored 1 (totally disagree) to 5 (totally agree).[5] The researcher conducted the confirmatory factor analysis (CFA) and yielded a four-dimensional structure for YANS: (F1) attitudes toward noise associated with youth culture, (F2) attitudes associated with the ability to concentrate in noisy environments, (F3) attitudes concerning day-to-day noises, and (F4) attitudes that influence the sound environment.

In this spirit, this study aims to adapt and validate the YANS for use in the Turkish setting. While occupational noise is regulated by laws around the world, the exposure of babies, children, adolescents, and young adults to noise in daily life also deserves attention. For this, understanding the attitude of young people towards noise in different settings is important. Thus the study aims at providing insights into youth's behavior under noise-induced risky situations in a new cultural setting. Also, it would invoke the self-awareness about negative effects of noise on young people's health.

SUBJECTS AND METHODS

Throughout the current adaptation, the steps listed by the "guide for translating and adapting hearing-related questionnaire" by Hall *et al*. were followed.[11] The guide consists of the following steps: (i) preparation (checking whether an adaption already exists, getting permission from the developers of the scale, (ii) translation (from the source to the target language and from the target language to source language), (iii) review by a panel of experts, (iv) pilot study, and (v) completion of the translation.

This study was approved by the Başkent University Institutional Review Board (Project no: KA18/376) on 27/11/2018 and supported by the Başkent University Research Fund. The permission for translation and cultural adaptation of the scale was obtained from Stephen Widen (on 11/10/2018).

Stage 1: Translation of the YANS into Turkish (YANS-Tr)

The English version of the YANS was translated into Turkish by the researcher. Both the English and the Turkish versions of the scale were included in the *Expert's Evaluation Form*, which was administered to three experts in the Başkent University Linguistics Department independently. For each item, experts were asked to assess if the translation was appropriate and, if not, they were asked to revise the Turkish translation of the item. The experts' scoring (appropriate = 1, not appropriate = 0) was analyzed for the interrater reliability by Kendall's concordance coefficient *W* analysis. At the first iteration, there was no significant agreement among the experts (Kendall's *W* = 0.467, *P* > 0.05; Cohen's kappa = 0.217). By considering the suggestions, the translations of 11 items were revised. The evaluation of the revised form revealed a higher level of agreement among experts' scorings (Kendall's *W* = 0.678, *P* < 0.05; percent of agreement = 89.5).

Consequently, the face and the content validity of the YANS-Tr were evaluated by two expert audiologists in the Audiology Department at Başkent University. They were asked to evaluate the relevance of the translated items with four dimensions given in the original study.[5] According to the experts' evaluation, three items did not fit into the assigned dimensions given in the original scale (F1: items *10* and *18*; F4: item *19*). These might be sourced from the lack of clear-cut distinction between the dimensions.

Lastly, the YANS-Tr was administered to 12 high school students in 9 to 12 grades to check the clarity of items (e.g., Are the statements relevant to your lifestyle? Are you familiar with these leisure time activities (disco, rock concerts)?) and the readability of the form. The students completed the translated scale within 12 to 15 minutes. By considering their suggestions, the final version of the YANS-Tr (see Appendix 1) was formed to be implemented in a larger sample for checking the validity and reliability issues of the scale.

Stage 2: Construct validity evidence for the YANS-Tr

A pilot study was conducted with high school students to assure the construct validity of the YANS-Tr, for which the permission was obtained from the Onikişubat District Directorate of National Education, province of Kahramanmaraş. In total, 345 students (200 female and 145 male) from 9 to 12 grades participated in the study. The age of the participants ranged from 14 to 18 years (mean = 16, SD = 1.16). The administration of the YANS-Tr was completed in 10 to 15 minutes in the actual classrooms.

RESULTS
The exploratory factor analysis results

The exploratory factor analysis (EFA) was conducted to identify the factors underlying the attitude toward noise construct. The collected data from the YANS-Tr were analyzed by the IBM SPSS Statistics 25. The data were first analyzed to check if they satisfy the conditions to conduct the EFA. The univariate normality of items was checked to obtain information about multivariate normality. The skewness and kurtosis values of each item were examined and were found to be in the range of [–3, +3], which indicates that no item was kurtotic.

The Kaiser-Meyer-Olkin measures of sampling adequacy (KMO) and Bartlett's test of sphericity (BTS) values were analyzed to be able to make valid interpretations from the EFA results. Tabachnick and Fidell recommended that the KMO value should be higher than 0.60.[12] The KMO value was calculated as 0.805, which was relatively large, and Bartlett's test statistic was found to be statistically significant (BTS = 1322.6, *P* < 0.001). The anti-image correlations, which should be greater than 0.50,[13] ranged between 0.67 and 0.88.

The calculated communality value of the items ranged between 0.240 and 0.641 as shown in Table 1. Some

Table 1: The EFA results of the YANS-Tr (pattern matrix)

Item No.	Factor 1	Factor 2	Factor 3	Factor 4	Communalities
Item 09	0.783				0.641
Item 04	0.76				0.605
Item 12	0.677	0.326			0.573
Item 15	0.611				0.471
Item 01	0.603				0.406
Item 06	0.566				0.352
Item 08	0.408				0.24
Item 05		0.641			0.476
Item 19		0.603			0.461
Item 02		0.595			0.407
Item 17			0.766		0.631
Item 11			0.681		0.556
Item 14			0.625		0.407
Item 16			0.496		0.266
Item 10	0.366		0.486		0.386
Item 13				0.686	0.532
Item 03				0.68	0.477
Item 18				0.677	0.56
Item 07				0.629	0.398

Notes: Extraction method: principal component analysis. Rotation method: Varimax with Kaiser normalization. EFA, exploratory factor analysis; YANS-Tr, Youth Attitude to Noise Scale into Turkish.

Table 2: The reliability coefficients for the overall YANS-Tr and four dimensions

Factor	Cronbach's alpha coefficient	Number of Items
F1: Attitudes toward noise associated with youth culture	0.777	7
F2: Attitudes associated with the ability to concentrate in noisy environments	0.343	3
F3: Attitudes concerning day-to-day noises	0.635	5
F4: Attitudes that influence the sound environment	0.656	4
Overall YANS-Tr	0.785	19

YANS-Tr, Youth Attitude to Noise Scale into Turkish.

values were found to be less than 0.50. However, these items had high factor loadings (more than 0.30), which yielded a four-factor structural model for the YANS-Tr. This model explained 46.56% of the total variation in high school students' attitudes toward noise.

The internal reliability of the YANS-Tr

The Cronbach's alpha coefficients were calculated for each dimension and the overall scores obtained from the scale are shown in Table 2. The reliability coefficients for the four dimensions ranged between 0.343 and 0.777 and that of the overall YANS-Tr was 0.785 for 19 items. The reliability of the scale is, thus, acceptable.[14]

The confirmatory factor analysis results

The proposed model obtained from the EFA was tested via performing the CFA with the IBM SPSS AMOS 24 package program. In the analysis, the Youth Attitude to Noise was the latent variable with four factors, and 19 items in the YANS-Tr were included as observed variables as shown in Figure 1.

The illustration of the factor loading (by EFA) can be examined by checking the standardized regression weight coefficients in CFA results. These values indicate how well observable variables predict the latent variable and show the location of an item in a group (factor). The standardized regression weight coefficients ranged between 0.285 and 0.755. Two items (items 02 and 05) had lower standardized regression weights (<0.40) when compared to the other items in the YANS-Tr. However, deletion of no item was preferred to keep the structure of the original YANS. Figure 2 illustrates the standardized regression weight coefficients estimates of the YANS-Tr model.

After the revision due to the modification of indices suggested by the CFA results, the fit indices of the model were summarized in Table 3. Tabachnick and Fidell suggested that the ratio of chi-Square and degrees of freedom should be less than 2 to eliminate the potential problems due to the sample size.[12] This ratio was found as 1.627 for the model. For the current model, the root mean square error of approximation value of 0.043 indicated a good model-data
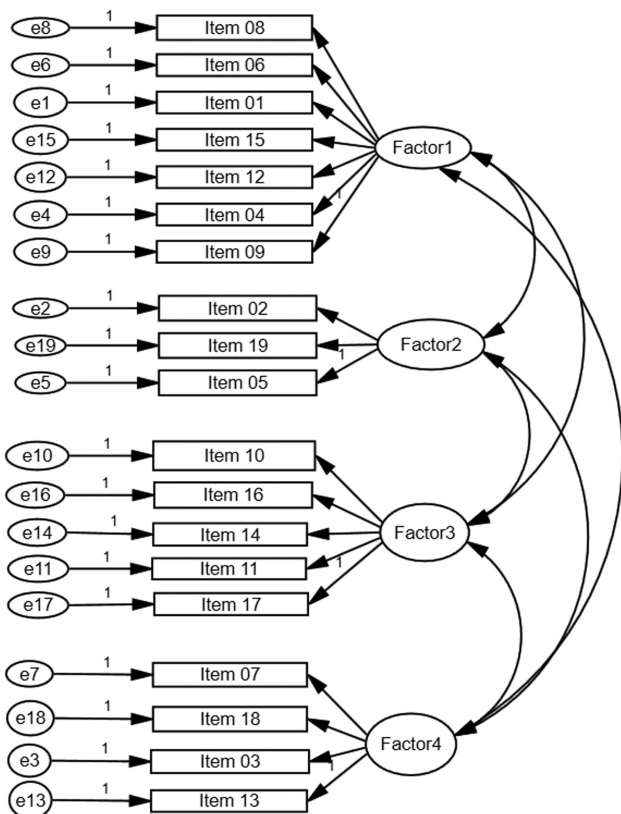
Figure 1: The proposed model of YANS-Tr obtained from EFA results.

fit.[15] The incremental fit index value of 0.932, comparative fit index value of 0.930, and the goodness-of-fit index and adjusted goodness of fit index values being close to 1 indicated a good model fit. As a result, the hypothesized model displays a moderate to a good fit with the observed data.

Previous adaptations of the YANS retained the four-dimensional structure of the original version. However, the factor loadings consisted of different items in each adaptation as shown in Table 4.

Descriptive analysis of YANS-Tr scores

The mean overall YANS-Tr score was found as 2.68 [Table 5]. When the mean scores in each factor are considered, high school students had a more positive attitude when noise is associated with the youth culture. Meanwhile, the lowest mean score observed for F4 implies that students at these ages did not pay much attention to the influence of the noisy environment.

DISCUSSION

Studies implementing or adapting the YANS brought out awareness about how young people's attitude to noise is modified by the changing modern world. In this respect, several studies revealed that the risk of hearing loss is increasing at younger ages. At this point, the YANS offers

a practical tool to investigate young people's behavior and attitudes when they are present in a noisy environment. In the current study, the YANS is translated and culturally adapted into Turkish for use in public health and audiology-related research.

The framework of the YANS-Tr adopted the four-dimensional structure of the original version. After the translation process and the content validity evaluation by experts, the results of the factor analyses were in tandem with the original study except for a few changes. Four items out of 19 were loaded into different dimensions (items 8, 10, 18, and 19). According to the EFA results, the factor loadings of item 10 were higher than 0.30 both at F1 and F3 [see Table 1], suggesting that factors are not completely independent but interrelated. These associations were also displayed in the CFA model [see Figure 2]. This model has a moderate-to-good fit [see Table 3], enabling valid interpretations about attitudes to noise to be made.

The internal reliability of the scale was found to be sufficiently high (Cronbach's alpha = 0.79). However, the reliability coefficient of factor 2 is quite low. The YANS developers created the factors with a varying number of items, which would be problematic for the reliability and validity of the scale. For instance, three items were loaded under F2, whereas F1 was built up with seven items. That might be the reason why F1 explains a higher portion of the variation. For future studies, constructing new items associated with F2 would be helpful to obtain more reliable results. In previous cultural adaptations of the scale,[6,8,9] the reliability of F4 was found relatively low when compared to the current study. Furthermore, the items loaded in F4 vary from one version to the other, which could stem from the cultural differences or the vagueness of some items in the scale. The English and Dutch versions of the YANS consist of the same items for each factor. Meanwhile, three items in the Brazilian Portuguese adaptation,[6] seven items in Chinese,[9] five items in Serbian,[10] and four items in the current adaptation shifted to another factor.

As the items loaded under factors are different in each adaptation, comparisons of factor scores across different cultures would be problematic. Meanwhile, the overall mean scores obtained from the whole scale are comparable. In previous research studies, Chinese youth displayed a more positive attitude to noise (3.46) when compared to youth in Sweden, Brazil, Belgium,[9] and Serbia.[10] In the current study, the overall mean YANS score (2.68) is found as the lowest among these countries after Sweden. Even though this result is promising, Turkish students still have a non-negligible positive attitude to noise.

Overall, the YANS-Tr can be used as a valid and reliable instrument to explore the young people's attitudes to noise by experts in public health and audiology.
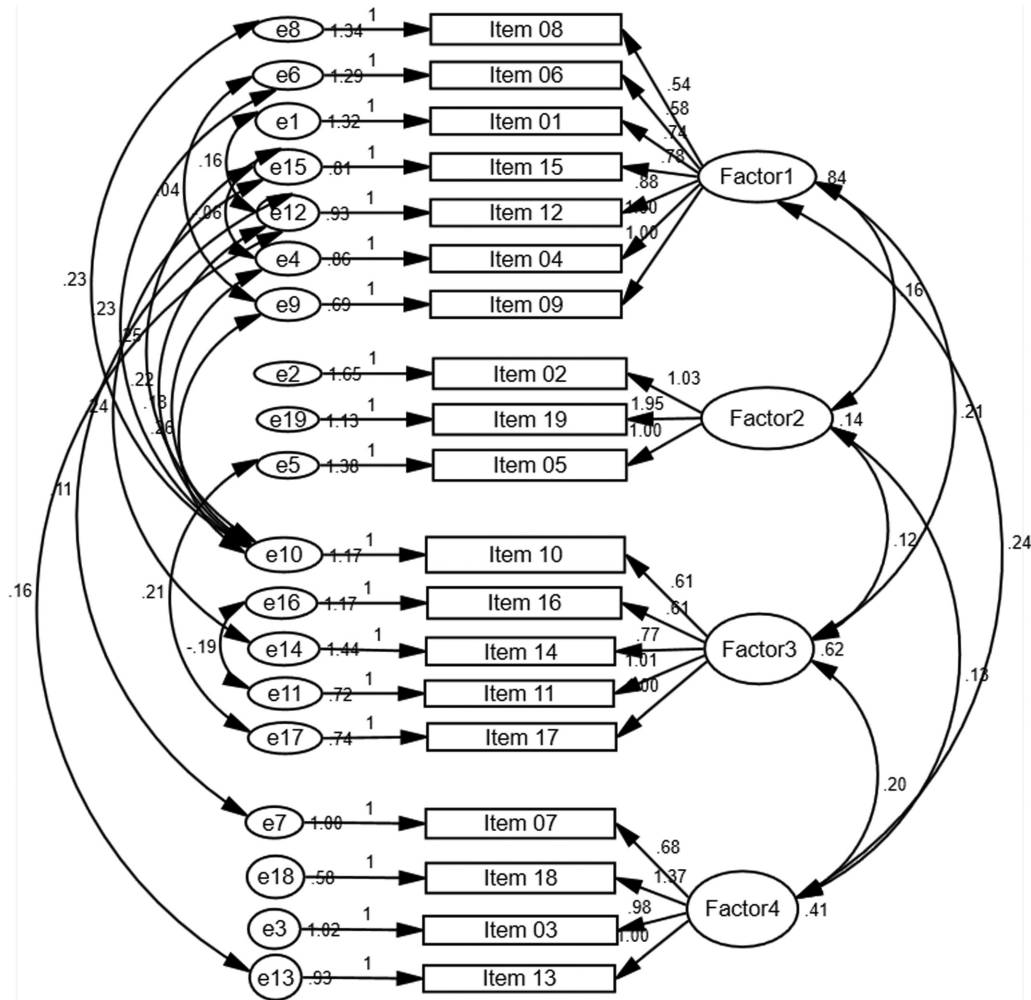
Figure 2: The standardized parameter estimates of the YANS-Tr model

Table 3: The criterion for fit indices and values obtained from the new model of the YANS-Tr

Fit index	Criterion	Value
Chi-square (χ^2)/degrees of freedom (df) (CMIN/df)	Ratio of χ^2 to df <2	1.627
Root mean square residual (RMR)	<0.050	0.078
Root mean square error of approximation (RMSEA)	<0.050	0.043
Parsimony goodness of fit index (PGFI)	higher the better	0.652
Parsimony normed fit index (PNFI)	Higher the better	0.649
Normed fit index (NFI)	>0.90	0.841
Comparative fit index (CFI)	>0.90	0.93
Incremental fit index (IFI)	>0.90	0.932
Relative fit index (RFI)	>0.90	0.794
Tucker-Lewis index (TLI)	>0.90	0.909
Goodness-of-fit index (GFI)	Close to 1	0.939
Adjusted goodness of fit index (AGFI)	Close to 1	0.912

YANS-Tr, Youth Attitude to Noise Scale into Turkish.

Table 4: Comparison of the original and adapted versions of the YANS: factors, loaded items, and reliability coefficients

Adaptation	Factor	Items*	Cronbach's alpha
English[7]	F1	1, 4, 6, 9, 10, 12, 15, 18	0.78
	F2	2, 5, 8	0.72
	F3	11, 14, 16, 17	0.63
	F4	3, 7, 13, 19	0.53
	Overall		0.8
Brazilian Portuguese[6]	F1	1, 4, 9, 10, 12, 15, 18	0.8
	F2	2, 5, 8, **13**	0.49
	F3	11, 14, 16, 17, **19**	0.49
	F4	3, **6**, 7	0.06
	Overall		0.75
Dutch[8]	F1	1, 4, 6, 9, 10, 12, 15, 18	0.73
	F2	2, 5, 8	0.6
	F3	11, 14, 16, 17	0.44
	F4	3, 7, 13, 19	0.27
	Overall		0.71
Chinese[9]	F1	1, 4, 6, **8**, 9, 12	0.67
	F2	2, **7**, **15**, **19**	0.33
	F3	**10**, 11, 17, **18**	0.57
	F4	3, **5**, 13, 14, **16**	0.04
	Overall		0.7
Serbian[10]	F1	1, 4, 9, 12	0.87
	F2	2, 5	0.41
	F3	**8**, **10**, 11, 14, 16, 17	0.31
	F4	3, **6**, 7, 13, **15**, **18**, 19	0.6
	Overall		0.72
Turkish	F1	1, 4, 6, **8**, 9, 12, 15	0.77
	F2	2, 5, **19**	0.34
	F3	**10**, 11, 14, 16, 17	0.64
	F4	3, 7, 13, **18**	0.66
	Overall		0.79

YANS, Youth Attitude to Noise Scale.*Bold numbers show that the item is loaded under a different factor than the original YANS.

Table 5: The mean scores obtained from each dimension and overall YANS-Tr

Dimensions	Mean	SD
F1: Attitudes toward noise associated with youth culture	2.99	0.82
F2: Attitudes associated with the ability concentrate in noisy environments	2.57	0.99
F3: Attitudes concerning day-to-day noises	2.66	0.77
F4: Attitudes that influence the sound environment	2.18	0.81
Overall YANS-Tr	2.68	0.55

YANS-Tr, Youth Attitude to Noise Scale into Turkish.

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Nil.

Conflicts of interest
There are no conflicts of interest.

APPENDIX 1: YANS-TR

(1) Disko, rock konserleri, dans ve spor etkinliklerinde ses düzeyinin genellikle çok yüksek oldugunu düsünüyorum.

(2) Ödev yaparken müzik dinlemek odaklanmama yardımcı olur.

(3) Okul ortamını daha sessiz hale getirmek için bir seyler yapmaya hazırım.

(4) Eger ses seviyesi çok yüksek ise, diskoyu, rock konserini, dans veya spor etkinliklerini terk etmeyi düsünürüm.

(5) Etrafımda çok farklı sesler olsa bile odaklanabilirim.

(6) Disko, rock konserleri, dans ya da spor etkinliklerindeyken kulak tıkacı kullanmanın gereksiz oldugunu düsünürüm.

(7) Ses ortamımı daha konforlu/yasanabilir hale getirmek benim için önemlidir.

(8) Çevremin sessiz olmasından hoslanmıyorum.

(9) Disko, rock konserleri, dans veya spor etkinliklerindeki ses düzeyi benim için sorun degildir.

(10) Gürültü ve yüksek sesler toplumumuzun dogal parçalarıdır.

(11) Trafik gürültüsü benim için rahatsız edici degildir.

(12) Disko, rock konserleri, dans veya spor etkinliklerindeki ses seviyesi azaltılmalıdır.

(13) Sınıf ortamının sessiz ve sakin olması gerektigini düsünüyorum.

(14) Fan, buzdolabı, bilgisayar ve benzeri cihazlardan gelen sesler beni rahatsız etmez.

(15) Ses düzeyinin çok yüksek oldugu aktivitelerden vazgeçmeye hazırım.

(16) Okulumdaki ses seviyesi uygun düzeydedir.

(17) Trafik gürültüsünü dikkate almamak benim için kolaydır.

(18) Toplumdaki ses düzeyleri için daha fazla kural veya düzenleme olmalıdır.

(19) Beni rahatsız eden seslerden kurtulamadıgımda, kendimi çaresiz hissederim.

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