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Research Article/Research Article

The Turkish Form of the Misophonia Scale Validity and Reliability Test Study

Validity and Reliability Testing Study of the Turkish Version of the Misophonia Scale

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ABSTRACT Misophonia is a state of decreased voice tolerance to certain sounds that triggers severe emotional or physiological responses. Individuals with misophonia may feel disgust, anxiety, anger towards specific sounds such as chewing food, lip smacking, breathing, etc.

There is no consensus on the prevalence, assessment and management of misophonia. One of the biggest obstacles to misophonia research is the scarcity of psychometrically robust assessment tools. The aim of this study is to evaluate the Misophonia Questionnaire (Misophonia Questionnaire; Wu et al., 2014). To meet the need for a measurement tool for clinical and population-based assessments of misophonia by making its Turkish adaptation. The research was carried out with 638 undergraduate students aged between 18-26 at Baÿkent University. Exploratory *(N* = 420) and confirmatory factor analysis *(N* = 218) were applied within the scope of construct validity, and internal consistency and discriminant validity tests were performed. Internal consistency, split-half and test-retest methods were used for reliability. In the exploratory factor analysis, it was observed that the scale had a three-factor structure: *misophonia symptoms, misophonia emotions and behaviors - avoidance and internalization, misophonia feelings and behaviors - aggression and externalization* . In the confirmatory factor analysis, the fit indices for the three-factor structure were found to be within acceptable limits. As a result of discriminant validity, it was seen that those with clinical misophonia had a higher mean in all factors than those without. The Cronbach Alpha internal consistency coefficient for the whole scale was .89 (for the factors .79, .85 and .83, respectively), the halving reliability coefficient was .83 (.86, .87 and .81 for the factors), and the test-retest reliability coefficient was found to be . It was found to be .78. With this study, the Misophonia Scale, which can be used to evaluate misophonia in the general sample, has been translated into Turkish. As a result of the psychometric analyzes, data supporting the validity and reliability of the Misop

Keywords: Misophonia scale, validity, reliability

ABSTRACT

Misophonia is a disorder where individuals experience decreased tolerance to certain sounds that trigger intense emotional or physiological responses in them. People with misophonia can feel disgust, anger, anxiety, and they may experience anger outbursts when exposed to certain sounds that are insignificant to other people, such as chewing, lip-smacking, and breathing. There is no consensus on the prevalence, assessment, and management of misophonia. A major barrier to the research on misophonia is the lack of robust psychometric assessment tools. This study aims to meet the need for a measurement tool for clinical and population-based evaluations intended for misophonia by adapting the Misophonia Questionnaire (Wu et al., 2014) to Turkish. The research was carried out on 638 undergraduate students at Baskent University, from 18 to 26 years of age. Exploratory factor analysis was conducted on 420 participants (73% female, 27% male) and confirmatory factor analysis was conducted on 218 participants (62% female, 38% male). The statistical reliability was evaluated using the internal consistency coefficient, split half, and test-retest methods. In the Misophonia Questionnaire, misophonia was explained by the following three subscale factors: *misophonia symptoms, misophonia emotions and behaviors-avoidance and internalization, and misophonia emotions and behaviors-aggression and externalization.* These were used in the exploratory factor analysis. The confirmatory factor analysis found that the fit indexes were within acceptable limits. With the discriminant validity, the participants with clinical misophonia were observed to have a higher mean in all factors than those without. The internal consistency coefficient of the scale was calculated at .89, and for the three subscale factors mentioned earlier were .79, .85, and .83, respectively. The calculated test-retest reliability coefficient was .78, which applied to 75 participants. The split-half reliability coefficient was .83 (for each subscale factor, was .86, .87, and .81, respectively). With this study, the Misophonia Questionnaire, which can be used to evaluate misophonia in the general population, was adapted into Turkish. From the psychometric analysis, data supporting the validity and reliability of the Misophonia Scale were obtained.

Keywords: Misophonia Questionnaire, validity, reliability

EXTENDED ABSTRACT

Misophonia, defined as an abnormally strong reaction to a sound with a specific pattern and/or meaning to an individual (Jastreboff & Jastreboff, 2014), is a phenomenon that has not been given enough attention in the literature until recent years. Studies on misophonia consist mostly of case reports; thus, studies with large populations are necessary to understand this phenomenon. Measurement tools have been developed in the international literature in recent years to better understand the nature of misophonia.

There are a variety of scales evaluating misophonia, such as the Amsterdam Misophonia Questionnaire (A-MISO-S; Schröder et al., 2013), Misophonia Questionnaire (MQ) (Wu et al., 2014) and MisoQuest (Siepsiak et al., 2020). However, there is no valid and reliable Turkish measurement tool to evaluate the symptoms and effects of misophonia. Therefore, the aim of the current study is to adapt the MQ (Wu et al., 2014) into Turkish.

Method

The items of the MQ were translated into Turkish by a native translator. Whether the items gave the same meaning in different cultures was checked by the researchers. Lastly, the translations were checked by two linguists. After the necessary adjustments were made, the final version of the scale was created. The research was carried out on 638 undergraduate students at Baskent University, from 18 to 26 years of age. Exploratory factor analysis was

conducted on 420 participants (73% female, 27% male) and confirmatory factor analysis was conducted on 218 participants (62% female, 38% male).

The MQ contains 17 items. The original scale consists of three parts: “misophonia symptoms,” “misophonia emotions and behaviors,” and “misophonia severity.” The items are scored from 0 (not at all true) to 4 (always true). The misophonia symptom factor consists of seven specific sounds that often cause annoyance in individuals. The misophonia emotions and behaviors factor evaluates negative feelings and behaviors developing against misophonia symptoms. Misophonia severity, the last part of the scale, gives information about the severity of misophonia and is not included in the factor structure and scoring. In this section, the participant is asked to score sensitive sounds on a scale from 1 (minimal) to 15 (very severe), according to the degree that it affects their daily life. Scores of seven and above indicate clinically significant misophonia (Wu et al., 2014). The 17 items from section 1 and 2 are included in the scoring of the scale.

Results

While the original of the MQ was explained with two factors, based on the results of the exploratory factor analysis, the Turkish adaptation of the scale was explained with three factors —by the number of eigenvalues greater than 1, Horn’s (1965) parallel analysis and screen plot methods. The second original factor, misophonia emotions and behaviors is explained with two sub-factors. To discuss and confirm the accuracy of this factor, it was discussed with the author of the original scale, Dr. Wu. The final version of the scale was formed by renaming the factors. The first factor was named as “misophonia symptom,” the second factor “misophonia emotions and behaviors—avoidance and internalization,” the third factor “misophonia emotions and behaviors—aggression and externalization.” The principal component analysis and direct oblimin rotation methods were used to determine the structural validity of the MQ. According to the exploratory factor analysis results, the Bartlett’s test statistic for sphericity was obtained—(ÿ2 = 2948.28 df = 136 p < .001)—and the Kaiser-Meyer-Olkin coefficient was .89, so it was found to be sufficient (Alpar, 2017).

The percentage of variance for the first, second and third factors were 37.13%, 10.83%, and 7.56%, respectively, with a total variance of 55.2%. According to the confirmatory factor analysis, it was observed that the fit indexes of the model were within acceptable limits: ÿ2 / df = 2.23, Root Mean Square Error of Approximation (RMSEA) = .07, Comparative Fit Index (CFI) = .91, Goodness of Fit Index (GFI) = .88, and Adjustment Goodness of Fit Index (AGFI) = .84 (Özdamar, 2017). Regarding the discriminant validity, clinical misophonia was observed to have a higher mean in all factors than those without.

Based on the results of the reliability analysis of the MQ, the internal consistency coefficient was calculated as .89, and for each of the three factors was .79, .85, and .83 respectively. The split-half reliability coefficient was calculated as .83 (for each subscale factor, it was .86, .87, and .81, respectively) and the test-retest correlation coefficient as .78.

Discussion

The factor structure of the Turkish version of the MQ is different from the original scale. After reaching a consensus with original scale's author, it was deemed that the construct validity of the scale met the desired criteria in a three-factor structure—using explanatory and confirmatory factor analysis methods. The internal consistency coefficient of the scale was found to be high. Overall, the results of the study indicate that the Turkish version of the MQ has adequate reliability and validity values for a Turkish sample. It is presented as a practical, valid, and reliable measurement tool that can be used in large population studies on misophonia in the Turkish setting.

Misophonia is an abnormally strong response to a specific and/or meaningful sound (Jastreboff & Jastreboff, 2014). The term misophonia was coined in the early 2000s by combining the Greek words “miso” (hate) and “phonia” (sound) to describe a group of patients who differed from other patients in terms of reduced sound tolerance problem (Jastreboff & Jastreboff, 2001; 2014). Individuals with misophonia are often sensitive to sounds that are considered insignificant by other people, such as popping gum, chewing and cracking sounds, breathing, whistling, lip smacking, pencil clicking (Cavanna & Seri, 2015). Individuals may feel different emotions such as disgust, anxiety and mild anger as a result of their extreme sensitivity to sounds, and sometimes they may experience tantrums. This situation causes the behavior of avoiding the triggering sound (Brout et al., 2018). The severity of misophonia varies from person to person, and as its severity increases, it negatively affects the quality of life of people (Jager et al., 2020a). The negative effects of misophonia on people's social life, school life, family and work life have been shown in many studies (Rouw and Erfanian, 2018; Sanchez and da Silva, 2018; Schröder et al., 2017).

Until recent years, evaluation and treatment reports in the form of case reports have been published in the literature, and more recently, studies with larger samples have been planned in order to better understand the nature of misophonia, to evaluate and manage misophonia (eg, Jager et al., 2020a; Rouw and Erfanian, 2018). These studies, which will be conducted in a large sample, are important in order to better understand the development of misophonia, other disorders associated with misophonia, how certain factors modulate the severity of the misophonic response, and ultimately to develop management/treatment protocols. Standard measurement tools that measure misophonia are necessary in the planning of these scientific studies. Despite the existence of measurement tools whose validity and reliability are supported in the international literature, the lack of psychometrically robust assessment tools is cited as the biggest obstacle to the investigation and treatment of misophonia (Rosenthal et al., 2021).

There is no standard assessment tool in Turkey, studies on misophonia are still published in the form of case reports. A standard assessment tool will contribute to the dissemination of research on misophonia and the creation of a common literature in Turkey. In addition, a standard Turkish measurement tool was used to evaluate misophonia in clinical use and to measure the effectiveness of the intervention.

It is also important in terms of evidence-based practice. In 2018, when this study was planned, it was determined that the only measurement tool with psychometric evaluations in the international literature was the Misophonia Questionnaire-MQ; Wu et al., 2014. Therefore, in this study, it was aimed to translate this scale into our language and to test the psychometric properties of the Turkish version. With this adapted measurement tool, professionals who want to evaluate misophonia in Turkey and examine the effectiveness of misophonia treatment will be able to use the Misophonia Scale, which is a standard measurement tool, as well as clinical observation and interview forms, and thus have an objective tool for evaluation and follow-up. It is thought that with the adaptation of the scale to Turkish, scientific studies on misophonia will increase in our country.

Characteristics and Mechanism of Misophonia

Abnormal reactions to certain sounds in misophonia in different situations and conditions are independent of the hearing of individuals and mostly the intensity and other physical characteristics of the sound. Responses to sound depend more on the context in which the sound occurs, past experiences, and the patient's psychological profile (Jastreboff & Jastreboff, 2001; Jastreboff & Jastreboff, 2003; Schröder et al., 2013). Although the etiology is not fully known, the fact that this complaint has also been reported in the families of individuals with misophonia in some studies in the literature suggests that there may be a genetic transmission (Rouw and Erfanian, 2018; Sanchez and da Silva, 2018). In the literature, the age of onset is shown as childhood and adolescence (Edelstein et al., 2013; Sanchez and da Silva, 2018; Schröder et al., 2013).

It is stated that the limbic system and autonomic nervous system play a primary role in adverse reactions to sound, while other systems in the brain are involved in the process secondarily. It is thought that the auditory system functions normally in individuals who develop such reactions to sound, but the functional connections between the auditory system, the limbic system and the autonomic nervous system increase (Jastreboff & Jastreboff, 2014).
It is still debated whether misophonia is a potentially inducible physiological condition, a symptomatic indicator of an underlying psychiatric disorder, or a separate symptom that can be seen together with other psychiatric disorders (Cavanna and Seri, 2015). Although it is not included in current diagnostic criteria such as DSM-5 and ICD-10, Schröder et al. (2013) reported that misophonia should be evaluated in a separate psychiatric disease group and presented some diagnostic criteria regarding this.

is a mystery. In Turkey, Öz (2016) stated that misophonia should be considered as a separate psychiatric condition and developed various diagnostic criteria for misophonia in his research. However, some psychiatrists have evaluated misophonia as a symptom of different psychiatric problems such as obsessive compulsive disorder, generalized anxiety disorder or schizotypal personality disorder rather than a separate condition (Ferreira et al., 2013). Jastreboff and Jastreboff (2014), on the other hand, reported that very few of the patients with misophonia they examined under the sound tolerance problem had psychiatric problems, and that most of these patients recovered without the need for a psychiatric intervention with the application of certain versions of voice therapy and counseling approaches. Although it has been reported that different methods such as Tinnitus Reeducation Therapy (Jastreboff & Jastreboff, 2014), Oppositional Conditioning (Dozier, 2015), Cognitive Behavioral Therapy (Jager et al., 2020b; Schröder et al., 2017) are effective in the management of misophonia, a consensus has been reached. There is no established sta

Evaluation of Misophonia

Misophonia has not been a frequently evaluated concept until recently. One of the reasons why misophonia, for which academic interest has been low until recent years, has not been adequately researched in the international literature is that individuals seeking treatment apply to many different fields such as otology, audiology, psychiatry, psychology and neurology (Jastreboff & Jastreboff, 2014). In Turkey, it is unclear whether misophonic individuals perceive their misophonia as a problem and to which units they refer.

With the increasing interest in the concept in the international arena, some measurement tools have been developed to evaluate misophonia. Among these tools are Amsterdam Misophonia Questionnaire (A-MISO-S; Schröder et al., 2013), Misophonia Questionnaire (MQ; Wu et al., 2014), MisoQuest (Siepsiak et al., 2020), The Duke Misophonia Questi onnaire (DMQ; Rosenthal et al., 2021); Misophonia Response Scale (Dibb et al., 2021). The A-MISO-S is the first tool to assess misophonia, created by adapting the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS; Goodman et al., 1989) items to misophonia. When the current research was planned, the only measurement tool available apart from the Misophonia Scale (Wu et al., 2014) was the A-MISO-S (Schröder et al., 2013), and its psychometric properties were not presented at the time this tool was developed, and its validity and reliability were tested later (Naylor). et al., 2020). The development of these scales has enabled the concept to be better understood by disseminating the researches.

In order to evaluate misophonia symptoms in Turkey, a comprehensive misophonia symptom list was created for the first time in a thesis study in the field of psychiatry, and this list was named the “Misophonia Interview Scale” (Öz, 2016). A Turkish screening scale for differentiating misophonia and other sound tolerance problems (hyperacusis, phonophobia) was prepared in a doctoral thesis study conducted in the field of audiology (Alluÿoÿlu, 2020). Considering that the lack of a measurement tool that rapidly evaluates misophonia in our country, whose validity and reliability has been tested, is an important deficiency for clinical applications and population-based studies, the aim of this study is to adapt the Misophonia Scale developed by Wu et al. (2014) into Turkish. This scale was developed to evaluate the symptoms of misophonia and the emotions and behaviors that occur during exposure to triggering sound. The original scale consists of three parts: *misophonia symptoms, misophonia feelings and behaviors ,* and *misophonia severity .* In the misophonia symptoms section, there are seven specific sounds that people with misophonia are often disturbed by, such as mouth smacking and paper rustling, and it is questioned how sensitive people are to these sounds compared to other people. In the misophonia emotions and behaviors section, negative emotions and behaviors developed against misophonia symptoms are evaluated (eg, "you have violent thoughts, you feel anxious and distressed"). In this section, which consists of 10 questions that include expressions of emotion and behavior, individuals are asked to what extent they develop the emotions and behaviors defined in the items when they encounter a disturbing sound. The severity of misophonia section was created by adapting the items of the National Institute of Mental Health Global Obsessive-Com pulsive Scale; Murphy et al., 1982; cited in Wu et al., 2014 to misophonia. In this section, the number and degree of sensitive voices and how much these voices interfere wit

In the analyzes carried out by Wu et al. (2014) to determine the factor structure of the scale , it was seen that it has a two-factor structure: *misophonia symptoms* and *misophonia emotions and behaviors .* Again, in analyzes for construct validity, the Misophonia Scale's relationship with the Adult Sensory Questionnai re-ASQ (Adult Sensory Questionnai re-ASQ; Kinnealey & Oliver, 2002, cited by Wu et al., 2014) was moderate; the relationship with visual sensitivity, olfactory sensitivity and tactile sensitivity was found to be low as expected. The internal consistency coefficient of the scale was found to be .86 for misophonia symptoms and misophonia emotion and behavior factors, and .89 for the whole scale.

The only adaptation study of the scale other than Turkish is the Chinese culture adaptation (Zhou et al., 2017). In the adaptation study, the items were translated from English to Chinese and translated and back-translated by bilinguals. The internal consistency coefficient was .89 for misophonia symptoms and misophonia emotions and behaviors factor; reported as .90 for the entire scale. However, no additional psychometric results were presented in this study. Within the scope of this study, it was aimed to adapt the Misophonia Scale into Turkish.

Method

Participants

The Misophonia Scale was applied to 638 undergraduate students between the ages of 18-26 at Baÿkent University. Since the number of students in the faculties was not equal, weighting was made and students from each faculty participated in the study in line with the determined number. 15% *(N* = 99) of respondents were Law School, 6% *(N* = 39)
Faculty of Dentistry, 22% *(N* = 138) were students of Faculty of Education, 30% *(N* = 189) were students of Faculty of Engineering, 27% *(N* = 173) were students of Faculty of Health Sciences. 26% *(N* = 165) of the students were in the 1st grade, 21% in the 2nd grade *(N* = 133 students) 38% *(N* = 244) in the 3rd grade, 15% *(N* = 96) 4 She continues to class.

A data set of 420 participants was used for explanatory factor analysis from this sample. 73% *(N* =307) of the participants in this group were female and 27% *(N* =113) were male students. The mean age of the students is 20.9 and the standard deviation is 1.6.

A second data consisting of 218 students was used for confirmatory factor analysis. Of the participants in this part of the study, 62% *(N* = 135) were female and 38% *(N* = 83) were male students. The mean age of the students was 20.6 and the standard deviation was 2.4.

Data Collection Tool

Misophonia Scale The

Misophonia Scale, developed by Wu et al. (2014), measures misophonia symptoms and emotions and behaviors developed in exposure to triggering sound.
The original scale consists of two factors in total. Misophonia symptoms, which is the first factor in which the presence of misophonia symptoms is questioned, *consists* of seven statements. The items range from “absolutely not true” (0) to “always true” (4).

has a response category. The second factor, which measures the emotions and behaviors that occur as a result of exposure to the triggering sound, named *misophonia emotions and behaviors* , consists of 10 questions. These items have a 5-point Likert-type response category ranging from “never” (0) to “always” (4). The scored part of the scale is made by considering the answers given to a total of 17 statements in these two factors. There is no reverse item in the scale and the total score ranges from 0 to 68. As the scale score increases, it should be considered that the frequency of misophonia symptoms and the negative emotions and behaviors that the person develops against it increase.

The statements in the last part of the scale give information about the severity of misophonia and are not included in the factor structure and scoring. The person is asked to choose the number and degree of sensitive sounds and how much they interfere with their daily life from a scale ranging from "1 to 15". Markings of 7 and above in this section represent clinically significant misophonia (Wu et al., 2014).

In order

to make the Turkish adaptation of the **Transaction** Misophonia Scale, the person who developed the scale in 2018, Dr. With permission from Monica S. Wu. The items in the scale were translated into Turkish by a translator and the status of each item giving the same meaning as the original language was examined by the researchers. The translation was checked by two linguists and necessary corrections were made as a result of the feedback given. After the translation process was completed, the content of the items was evaluated by a specialist psychologist and an audiologist.

Before the application, the Turkish Misophonia Scale was administered to five university students in order to examine the intelligibility of the items. As a result of the answers from the students, it was seen that more than one marking was made on the scale in the fourth part of the scale. For this reason, corrections were made on how to mark on the directive and the final version of the scale was created (See Appendix 1). The number of students in the faculties determined for the study was requested in writing from the Registrar's Office.

The scale was applied in the form of paper and pencil by going to the classrooms.

This study was approved by the Medical and Health Sciences Research and Ethics Committee of Baÿkent University (Project No: KA18/412).

Data analysis

Item-total score correlations were calculated for the item analysis of the Misophonia Scale. The construct validity of the scale was examined with exploratory and confirmatory factor analyses.

is not. The suitability of the sample for the exploratory factor analysis in the misophonia scale was tested with the Kaiser-Meyer-Olkin (KMO) sample adequacy measure. Principal component method and direct oblimin rotation method were used in exploratory factor analysis. Eigenvalue criterion (Kaiser's criterion) and Horn's parallel analysis methods were used to determine the number of factors.

Confirmatory factor analysis was used to test the suitability of the determined factor structures. Based on the factor structure that emerged in the exploratory factor analysis, a first-level three-factor confirmatory factor analysis model was created. In evaluating the model's goodness of fit, the ratio of the chi-square value to the degree of freedom, the mean square root of errors (Root Mean Square Error of Approximation - RMSEA), the comparative fit index (CFI), the goodness of fit index (Goodness of Fit Index) - GFI) were tested with the adjusted Goodness of Fit Index (AGFI) measures.

In the internal consistency validity, the relationships between the total score of the scale and its factors were examined with the Pear final correlation coefficient. In the discriminant validity analysis, Kolmogorov-Smirnov test and Levene test were used to examine the suitability of the total score and factors of the scale with normal distribution and the homogeneity of variances, and were examined with the *t* test in independent groups.

In the reliability analyzes of the scale, the Cronbach's alpha coefficient, which is the measure of the internal consistency of the items, was calculated. As another reliability test method, the split-half reliability coefficient was examined within the scope of the split-half method. For test-retest reliability, the scale was reapplied to 75 people with 14-day intervals under the same conditions, and its reliability was examined with the test-retest reliability coefficient. Statistical analyzes were performed using IBM SPSS version 25.0 and IBM SPSS AMOS version 25.0 package programs.

Results

Item Analysis

Within the scope of the item analysis of the scale, the correlations of each item with the total score were examined. The correlation coefficients obtained vary between .35 and .67. In addition, the Cronbach's alpha coefficients obtained when any item was removed from the scale range from .87 to .89, and the item was not removed from the scale because it was smaller than the calculated alpha coefficient.

While the item *"you become physically aggressive"* among the items in the scale has the lowest item average with .73; *"Eating sounds (eg, chewing, swallowing, mouth slurping, slurping)"* item has the highest item average with 2.55.

Validity Analysis

Exploratory Factor Analysis

For the exploratory factor analysis of the scale, the adequacy of the sample and the suitability of the analysis were tested first. The fact that it was found to be significant by Bartlett's test of sphericity (2948.28, sd=136, $p < .001$) and the Kaiser-Meyer-Olkin (KMO) coefficient as .89 showed the suitability of the sample. When the diagonal values of the inverse of the correlation matrix of the misophonia scale were examined, no multicollinearity was observed between the variables.

As a result of principal component analysis, three factors with eigenvalues greater than 1 were obtained. When evaluated with Horn's (1965) parallel analysis method, three factors were observed that were greater than the mean value of the eigenvalues calculated on the scale, based on the correlation matrix. The total variance explanation percentage of the scale with three factors was calculated as 55.2%.

The three factors that emerged when the direct oblimin rotation process was applied were named according to their contents. Accordingly, the first factor was found to be misophonia symptoms. One of the factors of the original scale, "misophonia emotions and behaviors", was divided into two in the factor analysis, and thus a three-factor structure emerged in the Turkish form. The second factor was misophonia emotions and behaviors – avoidance and internalization, and the third factor was misophonia emotions and behaviors – aggression and externalization. The variance explanation percentages of these factors were obtained as 37.13%, 10.83% and 7.56%, respectively. It was observed that the factor loads of the items in all factors ranged from .32 to .83. Information about the factors and the factor loads obtained are presented in Table 1.

Table 1.

Item Descriptive Statistics, Explanatory Factor Analysis Results of the Misophonia Scale and Distribution of Factor Loads of the Substances

Materials	Location.	SS Factor 1 Factor 2 Factor 3		Partner variance	adjusted Matter Total correlation coefficients
Misophonia Symptoms (Eigenvalue: 6.31; Explained variance: 37.13%, Cronbach Alpha= .79)					
1. Eating sounds (eg: chewing, swallowing, smacking, slurping).	2.55	1.34	.66	.44	.49
2. Repeated clicks (for example: hitting the table with a pencil, tapping the floor with the foot).	2.32	1.27	.68	.50	.52
3. Rustling (for example: plastic or paper rustling).	1.88	1.27	.65	.47	.51
4. Noises that people make through the nose (for example: inhaling, exhaling, sniffing).	2.16	1.33	.74	.57	.52
5. Noises that people make in the throat (eg: throat clearing, coughing).	2.18	1.32	.74	.55	.48
6. Some vowels and/or consonants (for example: the “k” sound).	.94	1.16	.60	.37	.35
7. Ambient sounds (eg: clock ticking, refrigerator humming).	1.90	1.37	.32	.27	.44
Misophonia Emotions and Behaviors – Avoidance and Internalization (Eigenvalue: 1.84; Explained variance: 10.83%, Cronbach Alpha= .85)					
1. You leave your current location to go to a place where the disturbing sound(s) can no longer be heard?	2.17	1.09	.74	.55	.59
2. Do you consciously avoid certain situations, places, objects and/or people associated with that sound because of the thought that there may be disturbing sound(s)?	1.96	1.11	.71	.51	.61
3. Do you cover your ears?	1.35	1.26	.73	.54	.51

4. Are you worried or distressed?	1.74	1.29	.76	.59	.61
5. Are you sad or depressed?	1.18	1.21	.74	.57	.61
6. Are you nervous?	2.19	1.24	.58	.41	.64
Misophonia Emotions and Behaviors – Aggression and Externalization (Eigenvalue: 1.29; Explained variance: 7.56%, Cronbach Alpha= .83)					
1. Do you have violent thoughts?	1.20	1.29	.80	.65	.56
2. Are you angry?	2.17	1.25	.54	.42	.67
3. Do you become physically aggressive?	.73	1.03	.83	.69	.51
4. Are you verbally aggressive?	1.37	1.24	.78	.61	.52

Confirmatory Factor Analysis

As a result of the confirmatory factor analysis, when the fit indices of the three-factor model obtained in the exploratory factor analysis were examined, its value was 285.34 (sd=116, *p* <.001), and the value used to evaluate the goodness of fit of the model was divided by the degree of freedom, and the result was 2.46. The fit indices values are as follows: RMSEA=.08, CFI=.89, GFI=.87 and AGFI=.82. When the modification indices were examined in the model, the covariances of the error terms of the 4th and 5th items in the second factor were corrected. After this correction, it was observed that the fit indices of the model were better (sd=2.23, RMSEA=.07, CFI=.91, GFI=.88 and AGFI=.84).

One, two and three factor models were also tested with confirmatory factor analysis and compared based on chi-square difference tests. The results obtained are presented in Table 2. When the results were examined, it was found that the fit of the three-factor structure to the data was quite good compared to the other two models.

Table 2.

Comparison of One-Factor, Two-Factor and Three-Factor Models in Confirmatory Factor Analysis Fit Index Results (N= 218)

	ÿ2 (sd)	ÿ2 /sd	RMSEA	CFI	GFI	AGFI
First Level Single Factor Model*	424.34 (118)	3.60	.11	.80	.79	.73
First Level Two Factor Model*	347.81 (117)	2.97	.09	.85	.83	.77
First Level Three Factor Model*	255.94 (115)	2.23	.07	.91	.88	.84

Note. ÿ2 / sd: Ratio of chi-square value to degrees of freedom, RMSEA: Root mean square of approximate errors, CFI: Comparative index of fit, GFI: Goodness of fit index, AGFI: Adjusted goodness of fit index. *Covariance correction between 4th and 5th items in the second factor

Internal Consistency and Distinctive Validity

Search the total score of the Misophonia Scale and the factors of the scale for internal consistency analysis. The relationships between them were examined. Obtained results are presented in Table 3.

Table 3.

The Total Score of the Misophonia Scale and the Mean, Standard Deviation Values of the Factors and the Relationship Between them (N= 218)

	Location.	SS	1	2	3	4
1- Misophone Toplam	32.88	13.56	·	.88*	.89*	.79*
2- Misophonia Symptoms	14.16	6.02		·	.66*	.53*
3- Misophonia Emotions and Behaviors – Avoidance and Internalization	12.54	5.56			·	.61*
4- Misophonia Emotions and Behaviors – Aggression and Externalization	6.19	4.17				·

*p<.001

As seen in Table 3, all correlations are significant. The relations of the factors with the total score range between .79 and .89, and the relations between the factors vary between .53 and .66.

Information on clinically significant misophonia not included in the scale's scoring

When the data analyzes regarding the question in the fourth part of the study were examined, the rate of those who marked 7 or more in the sample of 218 people was found to be 38% *(N* = 83). Based on this cut-off score, the total score of the scale and the scores of the factors of those with misophonia compared to those without misophonia were analyzed with the independent samples t-test. The results obtained are presented in Table 4.

Table 4.

Mean, Standard Deviation and Test Statistics of the Scale Total Scores and Factors of Individuals with and Without Misophonia According to the Misophonia Scale

		N	Location.	SS	t
Misophones Toplam	Without Misophonia	135	28.07	12.00	-7.49*
	Misophonis Olan	83	40.71	12.27	
Misophonia Symptoms	Without Misophonia	135	12.48	5.50	-5.59*
	Misophonis Olan	83	16.88	5.86	
Misophonia Emotions and Behaviors – Avoidance and Internalization	Without Misophonia	135	10.59	5.04	-7.31*
	Misophonis Olan	83	15.70	4.95	
Misophonia Emotions and Behaviors – Aggression and Externalization	Without Misophonia	135	4.99	3.91	-5.78*
	Misophonis Olan	83	8.13	3.87	

*p< .001

According to the results presented in Table 4, it is seen that those with misophonia have higher scores than those without. All differences between groups were statistically significant. it is valid.

Reliability Analysis

Within the scope of reliability analyzes for the Misophonia Scale, the Cronbach Alpha coefficient for the internal consistency of the measurement was .89 for the whole scale, .79 for misophonia symptoms, .85 for misophonia emotions and behaviors – avoidance and internalization, and misophonia emotions and behaviors – aggression and externalization. It was calculated as When the split-half method was used, the reliability coefficients obtained were .83 for the whole scale and .86, .87 and .81 for each factor. Finally, the reliability analysis of the scale was examined with the test-retest method. The scale was re-administered 14 days after the first application of the scale to 75 people, and the test-retest reliability coefficient was calculated as .78 after two applications.

Argument

In this study, the Turkish adaptation of the Misophonia Scale developed by Wu et al. (2014) was made in order to evaluate misophonia, which is frequently examined at the level of case studies in the literature and which is needed as a measurement tool for population-based studies. As a result of the study, data supporting that the Misophonia Scale is a valid and reliable measurement tool were reached.

As a result of the item analysis of the scale, it was seen that the contribution of the item-total correlation coefficients to the Misophonia Scale was sufficient. When the Cronbach's alpha coefficients obtained by removing any item from the scale were examined, it was observed that the original item structure of the scale was preserved because results were smaller than the total internal consistency coefficient of the scale.

In the exploratory factor analysis, it was seen that the scale was better explained by the three-factor structure, unlike the original structure. In the factor analysis conducted by Wu et al. (2014) for the original scale, the existence of a third factor was mentioned when the eigenvalue and parallel analysis method were taken into account. The authors emphasized that although the scale is better explained by the two-factor structure, it tends to have a three-factor structure. In order to discuss the accuracy of the three-factor structure that emerged in this study, Dr. When Wu was contacted, he stated that the three-factor structure of the scale was appropriate and the factors were renamed and the final version of the scale was created. warn-

Seven items in the misophonia symptoms factor, which is the first factor of the scale, are the same as in the original study. However, items in the misophonia emotions and behaviors factor were loaded on two separate factors, unlike the original scale. Four items in this factor were loaded on a separate factor, thus forming the third factor under the name of misophonia, emotions and behaviors-aggression and externalization.
While the variance explained for misophonia symptoms in the original scale was 38%, it was similarly 37.13% in this study. While the rate of variance explained by the dual factor structure of the original scale was 52.50%, it was 47.96% in this study. The variance explained by the three-factor structure increases to 55.52%. This finding shows that the adapted scale was adequately explained with a three-factor structure.

The confirmatory factor analysis conducted for the Turkish version of the scale also gave sufficient results for the three-factor structure. Since the fit indices were found to be acceptable and close to acceptable in confirmatory factor analysis, the three-factor structure was confirmed by confirmatory factor analysis. In addition, when the three-factor structure was compared with both the single and the two-factor structure in the original scale, the three-factor structure was supported.

In the current study, it is thought that the fact that individuals' aggressive and externalizing responses (eg, being physically aggressive, verbally aggressive, having violent thoughts) are better explained under a separate factor as a result of the triggering sound may be a result of cultural differences. Although the feeling of anger is universal, the expression of this emotion at the level of aggression may differ between cultures. For example, in Far Eastern societies where social cohesion is important and assertiveness is low, there is a tendency to hide anger and express it less openly compared to Western cultures where individuality is prominent (Liu, 2014). The display of direct physical aggression among students is less allowed (Fuji hara et al., 1999). Studies in which this scale will be examined in different samples and cross-cultural studies on anger expression in Turkey will contribute to a better understanding of this factor structure.

Wu et al. (2014) gave a score of 7 and above from the question in the last part of the scale as the cut-off point for clinically significant misophonia. In this study, using this cut-off score for discriminant validity, the scale and factor scores of individuals who were below and above the said score were compared. The sum of misophonia and symptoms of misophonia in those with clinically significant misophonia compared to those without,

The fact that misophonia feelings and behaviors-avoidance and internalization, misophonia emotions and behaviors-aggression and externalization factors had a higher average was accepted as evidence for the discriminant validity of the scale.

In the study, internal consistency, split-half and test-retest methods were used to examine the reliability of the scale. The Cronbach alpha internal consistency coefficient was found to be .89, and the results are consistent with the results of the original scale (Wu et al., 2014) and the results of the Chinese adaptation study (Zhou et al., 2017). The high internal consistency coefficient in the current study, along with a halving reliability coefficient of .83 and a test-retest correlation coefficient of .78, support that the Turkish version of the Misophonia Scale is a reliable measurement tool.

In the misophonia symptoms factor, the lowest score was .52 in the original study (Wu et al., 2014), and .70 in the Chinese study (Zhou et al., 2017), similar to the item “some voiced or silent sounds”. In both studies, the most frequently disturbed sound was repetitive sounds, while the second highest score belonged to eating sounds. In this study, the highest score belongs to the eating sounds first and then to the repetitive sounds.
In case studies (Edelstein et al., 2013; Tunç & Baÿbuÿ, 2017) and some large sample studies (Jager et al, 2020a; Schröder et al., 2013), the biggest triggers for individuals with misophonia are eating, chewing, and smacking sound. appears to be. Although the results show parallelism, the rate of discomfort for these two items in this study is quite high compared to other studies using the same scale. It is estimated that the possible reason for this may be related to the incidence of misophonia in the Turkish sample. Although the prevalence of misophonia is not fully known in the literature, Wu et al. (2014) expressed clinically significant misophonia in university students as 19.9% and Zhou et al. (2017) as .16.6% when evaluated with the Misophonia Scale; In the current study, this rate was found to be 38% with the same scale.

Jastreboff and Jastreboff (2014) estimate the rate of clinically significant misophonia, which they predict from the data of individuals with sound tolerance problems, to be approximately 3.2%. Although this single assessment in the last section, which was not included in the Misophonia Scale scoring, seems to yield higher results, in any case, misophonia was detected at a higher rate in the Turkish sample than in the literature. The higher symptom rates detected by the Misophonia Scale may be due to the higher number of individuals with misophonia in the Turkish sample. Another explanation may be that the way individuals express their discomfort is culturally different. Öz (2016) Turkish sample-

Although he found the misophonia rate to be 7.7 in his study, misophonia was evaluated according to the diagnostic criteria developed by the researcher. Despite the increase in studies on misophonia, it is stated that there is a generalization and comparison problem between research results due to the difference in evaluating misophonia (Siepsiak et al., 2020). Therefore, more studies are needed to confirm the results.
is.

In the original article (Wu et al., 2014), the clinically significant misophonia cut-off point was set with reference to the National Institute of Mental Health Global Obsessive-Compulsive Scale, and its effectiveness was not evaluated according to clinical diagnostic criteria. Diagnostic criteria have been developed for misophonia in studies conducted both in the international literature (Schröder et al., 2013) and in Turkey (Öz, 2016). In future studies, it may be recommended to examine the effectiveness of the cut-off point by applying the scale to individuals diagnosed with misophonia according to clinical diagnostic criteria. In addition, since there were no individuals diagnosed with misophonia in this study, its criterion-related validity could be examined by an expert on people who were clinically diagnosed with misophonia in future studies.

There are some limitations of the research. The validity and reliability test of this scale, as in the original version (Wu et al., 2014), was conducted only with university students, and its generalizability is limited. It is thought that it would be appropriate to test the scale in a larger sample of all ages and education levels in future studies. Since there is no other Turkish measurement tool that measures misophonia, an examination of its convergent validity could not be made in this study. The fact that the relationship between the Misophonia Scale and other measurement tools evaluating the structures related to misophonia was not evaluated in this study is among the limitations. In future studies, additional findings for validity can be obtained by examining the relationship of the Misophonia Scale with the measurement tools that measure misophonia or problems related to misophonia.

As a result, results supporting that the Misophonia Scale is a valid and reliable measurement tool in evaluating misophonia have been reached. This scale will contribute to the dissemination of population-based studies that will provide a better understanding of misophonia in our country and to the evaluation of misophonia in the clinical setting.

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I 1

MISOPHONIA SCALE

Instructions: Please rate the following statements that apply to you, from 0 to 4, with 0 being “Absolutely not true” and 4 “Always true”.

0	1	2	3	4
Definitely not true	Rarely true	Sometimes true	Often true	Anytime TRUE

1. Compared to other people, I am sensitive to the following sounds: Eating

1	sounds (eg: chewing, swallowing, smacking, slurping).	0	1	2	3	4	
2	Repetitive clicking (for example: pen tapping on table, foot tapping on the floor).	0	1	2	3	4	
3	Rustling (for example: plastic or paper rustling).	0	1	2	3	4	
4	Noises that people make through the nose (for example: inhaling, exhaling, sniffing). Noises that people make in the throat (for example: throat clearing,	0	1	2	3	4	
5	coughing).	0	1	2	3	4	
6	Some vowels and/or consonants (for example: the “k” sound).	0	1	2	3	4	
7	Ambient sounds (eg: clock ticking, refrigerator humming).	0	1	2	3	4	
8	Other: _____						

Instructions: If you have given a score of “1-Rarely true” or higher for any of the above statements, please continue to the section below and rate the following statements from 0 “Never” to 4 “Always”.

0	1	2	3	4
Never	Rarely	Sometime	Often	Anytime

2. When you become aware of the disturbing sound, how often because of

1	**that sound;** Do you leave your location to go to a place where the disturbing sound(s) can no longer be heard?	0	1	2	3	4
2	Do you consciously avoid certain situations, places, objects, and/or people associated with that sound, with the thought that there may be disturbing sound(s)?	0	1	2	3	4
3	Do you cover your ears?	0	1	2	3	4
4	Are you worried or distressed?	0	1	2	3	4
5	Are you sad or depressed?	0	1	2	3	4
6	Are you nervous?	0	1	2	3	4

3. When you become aware of the disturbing sound, how often because of that sound;

1	Do you have violent thoughts?	0	1	2	3	4
2	Are you angry?	0	1	2	3	4
3	Do you become physically aggressive?	0	1	2	3	4
4	Do you become verbally aggressive?	0	1	2	3	4
5	Other: _____					

Instructions: Please determine the degree of your sensitivity to sound by ticking only one of the scales given below, from 1 (at least) to 15 (very loud). When marking, please answer by considering the number and degree of the sounds you are sensitive to and how much they interfere with your daily life.

4. If you do not have any sound sensitivity, please tick here.

1. **Minimal or very slight sound sensitivity within the normal range.** I spend a little time dealing with and being affected by my sensitivity to sound. It does not affect my daily activities at all or almost at all.

4. **Slight degree of sound sensitivity.** It is the 6th sensitivity to sound, noticed by me and someone else, that affects my life mildly at level 5, that I can deal with or be affected by for a short time. Easily tolerated by others.

7. **Moderate sound sensitivity.** It is the 8th sensitivity of sound that seriously affects my life and I consciously put a lot of energy into dealing with it or not being affected by it. I need some help from others in my daily activities.

10.High degree of sound sensitivity. What hinders me is the sensitivity to sound, which turns my daily activities into an "active 11th challenge". I can spend all my time dealing with or being affected by sound sensitivity. others in my daily activities.
needs a lot of help.

13.Very high sound sensitivity. It is sensitivity to sound that completely blocks me and requires close supervision for my activities such as eating and sleeping. Because of this 15th reason, I find it difficult to carry out my daily activities.