Turkish Adaptation, Validity, and Reliability Study of Shitsu-Taikan-Sho (Alexisomia) Scale

Muhammed Hakan Aksu⬤, Nur Nihal Baltacı⬤, İrem Ekmekçi Ertek⬤, Behcet Coşar⬤

Department of Psychiatry, Gazi University Faculty of Medicine, Ankara, Turkey

ABSTRACT

Background: The Shitsu-Taikan-Sho (Alexisomia) Scale is a self-report scale for measuring alexisomia, defined as the difficulty in awareness and expression of somatic emotions or feelings. The scale is available in Japanese and Finnish versions. This research aims to examine the psychometric properties of the Turkish version of the Shitsu-Taikan-Sho (Alexisomia) Scale.

Methods: The study sample consists of 320 patients who applied to the outpatient clinic of consultation-liaison psychiatry. Participants completed the Sociodemographic Information Form, the Turkish version of the Shitsu-Taikan-Sho (Alexisomia) Scale, and the Toronto Alexithymia Scale. Internal consistency and test-retest reliability were used for reliability analyses. Exploratory factor analysis, confirmatory factor analysis, and co-validity analyses were used for validity analyses.

Results: According to the exploratory factor analysis results, a 3-factor, 18-item model for the Turkish version of the Shitsu-Taikan-Sho (Alexisomia) Scale explained 48.3% of the variance (Kaiser-Meyer-Olkin = 0.866; χ^2 = 1535.3, $P < .001$). Confirmatory factor analysis results indicated a good fit (χ^2 = 234.893; SD = 132; χ^2/SD = 1.779; CFI = 0.927; GFI = 0.923; RMSEA = 0.049). In the co-validity analysis, a significant correlation was found between Toronto Alexithymia Scale-20 and Turkish version of the Shitsu-Taikan-Sho (Alexisomia) Scale (r = 0.556, $P < .001$). Cronbach's alpha coefficient was 0.825 for the total score, 0.711 for lack of health management based on bodily emotions, 0.794 for difficulty in describing bodily emotions, and 0.775 for over adaptation. The interclass correlation coefficient between the 2 measures of Turkish version of the Shitsu-Taikan-Sho (Alexisomia) Scale was 0.883 ($P < .001$).

Conclusion: The Turkish adaptation of the Shitsu-Taikan-Sho (Alexisomia) Scale demonstrated adequate psychometric properties. It is an appropriate scale for evaluating the concept of alexisomia in the population of consultation-liaison psychiatry.

INTRODUCTION

Alexisomia is a clinical concept that refers to the characteristics of having difficulty in awareness and expression of bodily (somatic) emotions or feelings.[1,2] In Japanese, the term "alexisomia" refers to a lack of body awareness or an inability to perceive and feel physical sensations. This concept is described as "shitsu-taikan-sho," where "shitsu" means deficiency, "taikan" refers to somatic feelings and sensations, and "sho" refers to a condition or symptom.[3] Ikemi[4] first proposed this concept in 1979 as a characteristic observed in patients with psychosomatic diseases.

The concept of alexithymia has played a significant role in the evolution of alexisomia. During his research on alexithymia in 1977, Ikemi[5] has discovered that patients with psychosomatic diseases had difficulty with describing not only their emotions but also their bodily sensations. As a result of his observations, Ikemi and colleagues[6] concluded that the majority of the modern diseases, particularly those affecting adults, result from a lack of awareness of bodily emotions, balanced with dietary habits and physical activity, which are the basis of body homeostasis.

Ikemi and Ikemi[7] say that "in many cases of 'alexithymia,' where there is an observed difficulty in the awareness and expression of feelings, there also seems to be a difficulty in the awareness and expression of bodily feelings. We have tentatively coined the term 'alexisomia' to designate this condition, where certain persons have difficulties in expressing how their bodies feel." After alexisomia emerged as a separate concept from alexithymia, it was believed to play a more significant role in the development of psychosomatic diseases.[3]

According to Oka, Ikemi's term "bodily emotions" is interchangeable with interception, which refers to the

physiological state of the entire body.[3,8] Therefore, alexisomia can be defined as impaired interoceptive awareness.[3]

Prior studies have suggested that alexithymia is associated with impaired interoception in this context.[9,10] Moreover, deterioration is not restricted to just 1 area.[11,12] Brewer et al[12] suggested that alexithymia is characterized with a general failure of interoception. On the other hand, some studies have reached a contradictory conclusion that alexithymia is associated with enhanced interoception and bodily sensation.[13-15] According to the available research, the relationship between interoceptive awareness and alexithymia is currently contradictory. Alexisomia appears to be associated with alexithymia and interoceptive awareness. Consequently, we hope that the concept of alexisomia, which refers to impaired interoceptive awareness, will contribute to future studies of the Turkish language.

Early observational studies in Japan, where the concept of alexisomia originated, revealed that patients with psychosomatic disorders exhibit alexisomatic characteristics.[3] Due to inconsistencies in the definition of alexisomia and differences in measurement methods between studies, it became necessary to develop standardized methods for defining and assessing alexisomia. Prior to the development of the Shitsu-Taikan-Sho Scale (STSS) in 2012, there was no specific self-report scale to evaluate alexisomia.[3]

Arimura et al[16] developed the STSS in 2012, based on Ikemi's concept of alexisomia. In the validity and reliability study, they determined a 23-item, 3-factor structure.[16]

Alexisomia is a characteristic of psychosomatic patients and is more likely to manifest in the presence of chronic psychological stress.[17] The aim of this research is to examine the Turkish validity and reliability characteristics of the STSS for evaluating alexisomia in a consultation-liaison psychiatry sample.

MATERIALS AND METHODS

Participants and Procedure

Turkish Adaptation of the Scale: The translation and adaptation of the STSS into Turkish was planned in accordance with the established procedures.[18] To adapt

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MAIN POINTS

- Alexisomia is a term used to describe the difficulty in expressing and recognizing bodily emotions and feelings.
- The Shitsu-Taikan-Sho (Alexisomia) Scale is a self-report scale measuring alexisomia.
- The Turkish version of the Shitsu-Taikan-Sho (Alexisomia) Scale is an appropriate tool for assessing the concept of alexisomia in the consultation-liaison psychiatry population.

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the STSS into Turkish, first of all, an email was sent to Takakazu Oka, a member of the original scale's development team and the necessary permission for the Turkish adaptation of the scale was obtained. Utilizing the method of translation and retranslation, 3 expert translators independently translated the scale from Japanese to Turkish. The translation commission then compared the Japanese and Turkish scale forms, which comprised 2 native Turkish-speaking professionals who were fluent in written and spoken Japanese, and 2 psychiatrists who were native Turkish speakers. The scale was then evaluated in terms of meaning and grammar, and the Turkish form was derived by making the required adjustments. The Japanese reverse translation of the scale was then carried out by a separate expert. After conducting translation and back-translation investigations, the research team compared the original Japanese scale to its Turkish and Japanese translations to generate the final version of the scale. Finally, Takakazu Oka's input on the English back translation was received (see Supplementary Table 1).

Sample Size: According to Nunnally's article, which suggested a rate of at least 10 participants per item, it was decided that the sample size should be at least 230.[19] And indeed, 285 participants, the sample size employed by Säilynkangas and Nousiainen[20] in their study of the Finnish adaption of the original scale, were deemed the bare minimum. Due to the self-reporting nature of the assessment instruments, at least 100 additional participants were added to the study.

Participants: The study comprised patients who applied to the consultation-liaison psychiatry outpatient clinic for various reasons. Participants who met the inclusion criteria of being between the ages of 18 and 65, Turkish-literate, and willing to take part in the study were included. After inclusion, subjects were evaluated using a Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5)-focused diagnostic interview. Patients with psychotic disorder, schizophrenia, bipolar affective disorder, dementia, mental retardation, and active suicidal ideation were excluded from the study. A written informed consent was obtained from the participants to confirm their participation in the study.

Data collection was performed between March and May of 2022. The participants completed the Sociodemographic Information Form, the Toronto Alexithymia Scale (TAS), and the Turkish version of the Shitsu-Taikan-Sho Scale (STSS-TR) following the preliminary interview.

Four hundred people participated in the study. Eighty individuals were excluded from the study because they did not respond adequately and appropriately to the scales. The study sample consisted of 320 participants who filled out the scales completely. In order to determine test–retest reliability, the STSS-TR was administered again 2 weeks later to 30 people from the nonclinical sample.

Instruments

Sociodemographic Information Form: The researchers created a questionnaire including the gender, age, marital status, educational status, physical conditions, and mental histories of the participants.

Turkish Version of the Shitsu-Taikan-Sho Scale

The STSS is a 23-item 5-point Likert-style self-report scale (1=not at all, 5=absolutely true) evaluating alexisomia. A 23-item, 3-dimensional scale was obtained by Oka et al.[3] These 3 subscales were determined to be difficulty in describing bodily emotions (DIB), over adaptation (OA), and the lack of health management based on bodily emotions (LHM). Difficulty in describing bodily emotions is the inability to recognize body stimuli required for body homeostasis and sensations to reduce allostatic load; OA is ignoring body signals due to prioritizing meeting social demands; LHM is habits associated with managing health daily.[3] Internal consistency (α=0.70-0.84) and test-retest reliability (r=0.71-0.81) of the total score and subscales of the scale were shown.[16]

Toronto Alexithymia Scale-20

It is a Likert-type self-assessment scale consisting of 20 items scored between 1 and 5. Toronto Alexithymia Scale-20 has 3 dimensions, difficulty describing feelings (DDF), difficulty identifying feeling (DIF), and externally-oriented thinking (EOT). It was developed by Bagby et al in 1994.[21] Turkish adaptation was performed by Güleç et al[22] in 2009. The total scale Cronbach's alpha value was 0.78, and the subscales were between 0.57 and 0.80.[22]

Ethical Committee Approval

Ethical approval was obtained by the Ethics Committee of Gazi University (Date: November 23, 2021, no: 2021/1223).

Data Analysis

The data for the demographic characteristics of the sample and the scores obtained from the scales were analyzed with the Kolmogorov-Smirnov test in terms of normal distribution, and descriptive statistics were used. Descriptive values are stated as number (n), percentage (%), mean, and standard deviation (SD). Cronbach's alpha coefficient was used to evaluate the internal consistency reliability of the total score of STSS-TR and each subscale score. We also calculated the Cronbach alpha coefficient appearing when each item was deleted to check if it caused an increase in any condition. Exploratory factor analysis (EFA) was used to evaluate the construct validity to search for an alternative factor structure to the 3-factor structure of the original scale. Principal component analysis and oblimin rotation method were used in the EFA process. Sample adequacy was assessed with the Kaiser-Meyer-Olkin (KMO) sampling adequacy measure. Confirmatory factor analysis (CFA) was performed to reveal whether the structure determined as a result of EFA was confirmed or not. Since the data for the co-validation of the STSS-TR showed normal distribution, the TAS was evaluated by examining the Pearson correlation coefficient. For test-retest reliability, STSS-TR was readministered to 30 participants from the nonclinical sample 2 weeks later. The interclass correlation coefficient was calculated to measure the test-retest reliability of STSS-TR. Statistical analyses were performed using Statistical Package for Social Sciences version 21.0 (IBM SPSS Corp.; Armonk, NY, USA) and SPSS Amos 28, and the significance value was accepted as $P < .05$.

RESULTS

Sociodemographic Characteristics

Three hundred twenty individuals participated in the study. It was determined that 60.3% (n=193) of the participants were female, 55.9% (n=127) were single, and their mean age was 36.32 ± 14.90 years. Education levels of 47.5% (n=152) were high school and below, 52.5% (n=168) were university or higher. According to the DSM-5, 37.8% (n=121) of the subjects had a psychiatric disorder (Table 1). Psychiatric diagnoses, from most common to least common, were categorized as depressive disorders, anxiety disorders, obsessive-compulsive disorders, somatic symptom disorders, and dissociative disorders. Some

Table 1. Sociodemographic Characteristics of the Participants

	n	%
Gender		
Female	193	60.3
Male	127	39.7
Marital status		
Single	179	55.9
Married	141	44.1
Education		
High school and below	152	47.5
University and above	168	52.5
Employment status		
Employed	206	64.4
Unemployed	114	35.6
Comorbid physical diseases		
Yes	235	73.5
No	85	26.5
Psychiatric disease		
Yes	121	37.8
No	199	62.2
	Mean	Standard Deviation
Age	36.32	14.90

Table 2. Cronbach's Alpha Values and Test-Retest Results of the Scale and Subscales of STSS-TR

	Cronbach's Alpha Coefficient	Interclass Correlation Coefficient
LHM	0.711	0.876
DIB	0.794	0.854
OA	0.775	0.878
STSS	0.828	0.883

DIB, difficulty in describing bodily emotions; LHM, lack of health management based on bodily emotions; OA, over adaptation; STSS, Shitsu-Taikan-Sho Scale; STSS-TR, Turkish version of the Shitsu-Taikan-Sho (Alexisomia) Scale.

participants did not meet diagnostic criteria, exhibited subthreshold mental symptoms, and were admitted for various reasons to the CLP (Consultation-Liaison Psychiatry) unit. The most frequent physical conditions observed in the participants were endocrine (Diabetes Mellitus, Thyroid Diseases, Obesity), cardiological (Hypertension, Cardiac Arrhythmia, Palpitations), neurological (Epilepsy, Vertigo, Multiple Sclerosis, Movement Disorders, Migraine and Other Headache Syndromes), pain related (Pain, Not Elsewhere Classified), rheumatological (Fibromyalgia, Rheumatoid Arthritis, Ankylosing Spondylitis), oncological (Malignant Neoplasms: Breast, Stomach, Lung, and Others), dermatological (Dermatitis, Urticaria, Anaphylaxis, Vitiligo), chest diseases (Asthma), gastroenterology (Nausea, Abdominal Pain, Irritable Bowel Syndrome), gynecological (Infertility), and urological (Psychogenic Impotence, Infertility), respectively.

Reliability and Validity Analyses

Internal Consistency: The Cronbach's alpha coefficient of the SSTS-TR for the whole scale is 0.825. The Cronbach's alpha coefficient for the subscales is 0.711 for the LHM subscale, 0.794 for the DIB subscale, and 0.775 for the OA subscale (Table 2). The correlation coefficient between the subscales and scale total score was 0.523 and 0.857 (Table 3). Item-total score correlation coefficients were found to be between 0.202 and 0.567 (Table 4).

Test-Retest Reliability: The STSS-TR was retested on 30 nonclinical participants 2 weeks after the first testing. The interclass correlation coefficient between the 2 measurements was 0.883 ($P < .001$) for the STSS-TR. The correlation coefficient between the 2 applications for the subscales was determined as 0.876 ($P < .001$) for the LHM subscale, 0.854 ($P < .001$) for the DIB subscale, and 0.878 ($P < .001$) for the OA subscale (Table 2).

Exploratory Factor Analysis

The data collected from the total STSS-TR scores (KMO = 0.869; $\chi^2 = 1980.3$, $P < .001$) were appropriate for factor analysis of the sample (n = 320). When EFA was performed on the polychoric correlation matrix, 5 factors with an eigenvalue above 1 were determined. Since the factor distribution for STSS-TR, a 23-item scale, was not considered reasonable due to the number and content of the items, the scree plot was examined, and it was planned to accept a 3-factor structure since the value before the elbow was 3. In addition, 5 scale items were eliminated

Table 3. Correlations Related to Data Obtained from STSS-TR and TAS-20

		LHM	DIB	OA	STSS	DIF	DDF	EOT	TAS-20
LHM	r	1							
	P	-							
DIB	r	0.205	1						
	P	<.001	-						
OA	r	0.118	0.561	1					
	P	.035	<.001	-					
STSS	r	0.523	0.857	0.791	1				
	P	<.001	<.001	<.001	-				
DIF	r	0.361	0.593	0.276	0.569	1			
	P	<.001	<.001	<.001	<.001	-			
DDF	r	0.274	0.504	0.240	0.475	0.691	1		
	P	<.001	<.001	<.001	<.001	<.001	-		
EOT	r	0.165	0.177	0.056	0.179	0.237	0.262	1	
	P	.002	.001	.081	.001	<.001	<.001	-	
TAS-20	r	0.360	0.579	0.263	0.556	0.902	0.839	0.555	1
	P	<.001	<.001	<.001	<.001	<.001	<.001	<.001	-

DDF, difficulty describing feelings; DIB, difficulty in describing bodily emotions; DIF, difficulty identifying feeling; EOT, externally-oriented thinking; LHM, lack of health management based on bodily emotions; OA, over adaptation; STSS, Shitsu-Taikan-Sho Scale; STSS-TR, Turkish version of the Shitsu-Taikan-Sho (Alexisomia) Scale.

Table 4. Reliability Data of the Alexisomia Scale and Factor Loads of the Items

	Factor Loading	Mean ± SD	Item-Total Correlation	Cronbach's Alpha If Item Deleted
2. I am careful about my physical condition	0.544	2.45 ± 1.20	0.269	0.827
4. I try to relax myself by slowing my pace	0.424	2.89 ± 1.24	0.220	0.829
9. I am careful about my diet	0.521	2.91 ± 1.33	0.294	0.826
16. I try to exercise as much as possible	0.473	3.43 ± 1.35	0.306	0.826
21. I feel calm when I take deep breaths	0.447	2.87 ± 1.32	0.202	0.831
5. Although I think it is comfortable, people around me say it is necessary to relax and unwind	0.512	2.73 ± 1.39	0.400	0.821
10. I don't think I am tired, but people ask me if I am	0.523	2.43 ± 1.34	0.381	0.822
14. People tell me that I look tense even if I don't think I am	0.583	2.72 ± 1.37	0.567	0.811
18. People tell me that I will ruin my health even if I feel fine	0.437	2.21 ± 1.33	0.534	0.813
19. I can't tell if I am tense or not	0.401	2.23 ± 1.34	0.504	0.815
22. I don't rest even if I want to	0.395	2.75 ± 1.47	0.534	0.813
23. I don't know how to manage my physical/health condition	0.491	2.73 ± 1.42	0.510	0.814
6. I don't want to rest even if I am tired	0.540	2.22 ± 1.32	0.451	0.818
7. Even if I have a fever. I work without rest (e.g. housework, schoolwork, or occupation)	0.583	2.23 ± 1.33	0.479	0.816
13. I don't rest even if my physical condition is bad	0.625	2.09 ± 1.27	0.562	0.812
15. I don't feel tired	0.531	2.10 ± 1.25	0.524	0.814
17. I don't care about my own health/physical condition when I work	0.385	2.81 ± 1.40	0.433	0.819
20. I prioritize my work (housework, schoolwork, or profession) even if I am sleepy	0.381	2.66 ± 1.42	0.322	0.825

SD, standard deviation.

due to variables such as a factor load of less than 0.30 and low item-total correlations (see supplementary Table 1). The data obtained from the 18-item STSS-TR total scores (KMO = 0.866; χ^2 = 1535.3, P < .001) were suitable for factor analysis. The 3-factor structure was confirmed when the EFA was repeated. The 3-factor structure explains 48.3% of the total variance related to the scale score (Table 5).

Confirmatory Factor Analysis

Following the EFA for the STSS, a CFA was performed to determine whether or not the determined structure was confirmed. Figure 1 shows the CFA model of the STSS. As a consequence of CFA, a 3-factor structure was obtained, and it was observed that it had good fit values (χ^2 = 234.893; SD = 132; χ^2/SD = 1.779; CFI = 0.927; GFI = 0.923; RMSEA = 0.049; NFI = 0.902; IFI = 0.928; TLI = 0.925; SRMR = 0.090; AGFI = 0.900).

Concurrent Validity Analysis

In the co-validity analysis, STSS-TR and TAS-20 were applied. The correlation coefficient between the total scores of the 2 scales was statistically significant (r = 0.556, P < .001). In addition, the correlation between the subscales of both scales was examined. Statistically significant correlations

were found in all relationships except the correlation between the TAS-20 EOT subscale and the STSS OA subscale (Table 3).

DISCUSSION

In this study, validity and reliability analysis of the Turkish form of the STSS developed by Arimura and colleagues was performed on a sample of patients applying to a consultation-liaison psychiatry outpatient clinic.

- Because the STSS was developed in Japan and in Japanese, it is unclear whether its items are compatible with Turkish culture and whether its subscales include comparable items. In order to answer these questions, it was determined that conducting an EFA and subsequently a CFA would be preferable. Consequently, according to Orcan, even if a CFA model applied alone to any dataset demonstrates conformity, this does not indicate that this model is the most accurate model in reality.[23]

The factor structure of the scale was analyzed with EFA. It was determined that the factor loads of the original 5 items on the scale were less than 0.30. After deleting these items, the EFA revealed that the 3-factor, 18-item structure explained 48.30% of the variance. Similar to the

Table 5. STSS-TR Exploratory Factor Analysis Results

	OA	LHM	DIB
7. Even if I have a fever. I work without rest (e.g. housework, schoolwork, or occupation)	0.778	0.022	0.051
6. I don't want to rest even if I am tired	0.751	−0.016	0.041
13. I don't rest even if my physical condition is bad	0.751	0.025	−0.084
15. I don't feel tired	0.678	0.017	−0.108
20. I prioritize my work (housework, schoolwork or profession) even if I am sleepy	0.589	−0.202	−0.058
17. I don't care about my own health/physical condition when I work	0.314	0.083	−0.305
2. I am careful about my physical condition	−0.155	0.725	−0.128
9. I am careful about my diet	−0.066	0.714	−0.086
21. I feel calm when I take deep breaths	−0.002	0.674	0.082
16. I try to exercise as much as possible	−0.060	0.672	−0.118
4. I try to relax myself by slowing my pace	0.257	0.583	0.259
10. I don't think I am tired. but people ask me if I am	−0.061	−0.134	−0.748
5. Although I think it is comfortable. people around me say it is necessary to relax and unwind	−0.021	−0.126	−0.728
14. People tell me that I look tense even if I don't think I am	0.107	0.030	−0.711
23. I don't know how to manage my physical/health condition	0.003	0.212	−0.640
19. I can't tell if I am tense or not	0.145	0.186	−0.508
18. People tell me that I will ruin my health even if I feel fine	0.324	0.055	−0.453
22. I don't rest even if I want to	0.315	0.152	−0.390
Eigenvalue	4.882	2.302	1.510
Explained variance (%)	27.122	12.789	8.391
Cumulative (%)	27.122	39.912	48.303

DIB, difficulty in describing bodily emotions; LHM, lack of health management based on bodily emotions; OA, over adaptation; STSS-TR, Turkish version of the Shitsu-Taikan-Sho (Alexisomia) Scale.

original study, a 3-factor structure was identified.[16] The Finnish adaptation study performed by Säilynkangas and Nousiainen[20] revealed a 2-factor structure. Changes in factor structure may be attributable to cultural variations between societies.

Lack of health management based on bodily emotions is a subscale that measures the deficiency in health behaviors related to physical sensations. Based on psychometric analyses, item 8 (I notice that my physical condition is bad before I get sick) and item 11 (I feel relaxed when I take a bath) were removed from LHM based on psychometric analyses. When we look at the Finnish adaptation study, we have noticed that the term "Finnish bath" was used instead of "bath." There may be cultural variations in ways of relaxation. In our culture, "Turkish bath" refers to a different way of taking bath apart from daily showering. Because of the fact that these 3 terms contain a culturally insensitive phrase and a reference to a widespread behavior that do not reflect each other completely. Also, we chose it as the Turkish equivalent of the word "bath." Therefore, psychometric tests may not have worked well.

Despite the fact that item 8 is a valuable indicator of LHM, it was eliminated due to its low factor load and correlation coefficient. Item 8 might have been understood by the participants as a definite scenario instead of a subjective

assessment. However, we believe that item 2 (I am careful about my physical condition) measures similar situations well and has good psychometric values.

Difficulty in describing bodily emotions measures the difficulty of describing bodily feelings. Item 1 (People tell me that I am overworking even if I don't feel so) and item 12 (I don't feel full when I eat) were eliminated from DIB based on psychometric analyses. Item 1 highlights the importance of work culture in Japanese culture. This phrase may not have a widespread counterpart in Turkish culture. In addition, the participants do not reflect a sample of exclusively employed individuals. The expression in item 12 can make participants think of gluttony and control difficulties. Hence, psychometric tests may have not worked well.

Over adaptation is the condition of ignoring bodily cues in order to prioritize social demands. Item 3 (I prioritize work (including housework and schoolwork) even if I know that rests are necessary) focuses similarly on employee behavior in the workplace, as does Item 1. Psychometric tests such as factor loading and correlation coefficient may have failed for identical reasons.

In addition to the fact that both STSS-TR and STSS had a 3-factor structure, some differences in the distribution of items belonging to the subscales have emerged. Item 23 (I
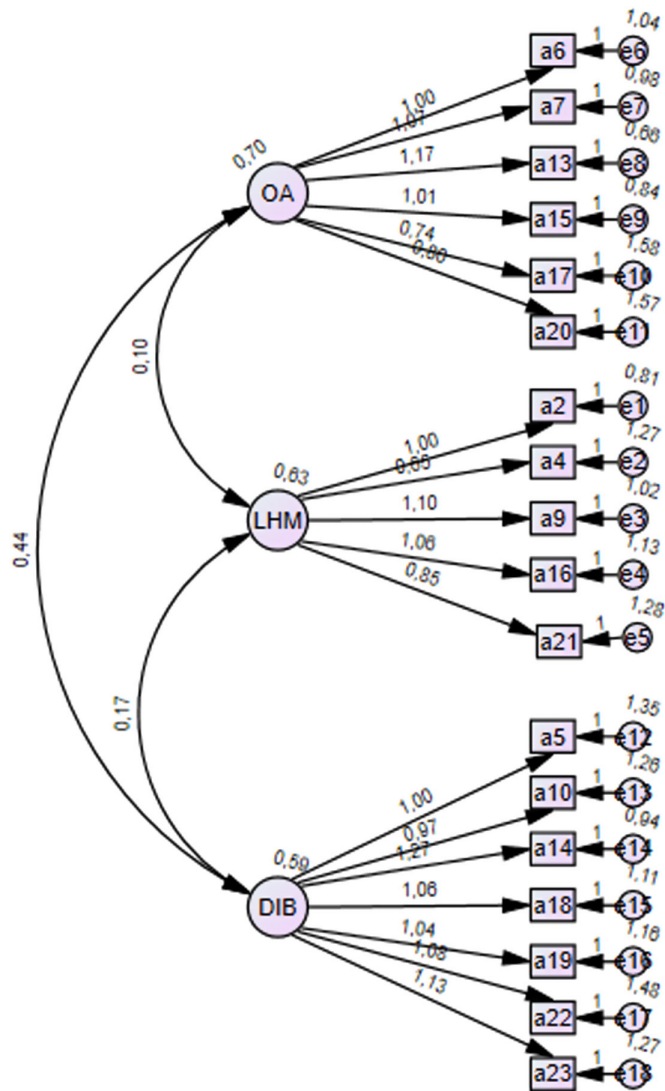
Figure 1. Confirmatory factor analysis path diagram for three factor model and standardized factor loadings of Turkish version.

don't know how to manage my physical/health condition) of the original LHM and item 22 (I don't rest even if I want to) of the original OA were found in the factor that contains predominantly the DIB items. Item 6 (I don't want to rest even if I am tired) and item 15 (I don't feel tired) of the original DIB were found in the factor that contains predominantly the OA items (see Supplementary Table 1). However, the names of the subscales were preserved in the Turkish version, even if they did not contain the same items as the original scale. This situation can be thought as acceptable for a number of reasons. It is reasonable to shift items 22 and 23 to the DIB because it makes sense for these coping strategies to originate from the DIB. It is conceivable that a person's incapacity to regulate their health and rest, even if they desire to rest, is a result of their inability to verbalize their physiological sensations. In addition, it is reasonable to include items 6 and 15 in OA, as these behaviors may potentially be a result of

OA. As a result of prioritizing social obligations over body signals, individuals may have difficulty sensing exhaustion.

The changes in the structure of the STSS and its subscales that resulted from the removal or replacement of items are thought to be tolerable. These variations appear to be due to cultural differences and sample characteristics.

Confirmatory factor analysis was conducted to confirm the structure obtained through explanatory factor analysis. There is no clear requirement for determining the sample size for CFA.[24] However, according to Nunnally,[19] our sample size is sufficient because it meets the requirement of having 10 participants per item. Confirmatory factor analysis was conducted for the 3-factor structure obtained with EFA. In accordance with the recommendations of the literature in this regard, multiple fit indices were used, and χ^2, comparative fit index (CFI), root mean square error of approximation (RMSEA), goodness-of-fit index (GFI), normed fit index (NFI), incremental fit Index (IFI), Tucker-Lewis Index (TLI), standardized root mean square residual (SRMR), and adjusted goodness-of-fit index (AGFI) values were analyzed.[25] According to Ilhan and Cetin,[26] GFI and CFI values that fall within the range of 0.90-0.95 are classified as acceptable fit indexes. A RMSEA value of 0.05 or less indicates good fit, a value between 0.05 and 0.08 indicates acceptable fit.[27] Similarly, the NFI, IFI, TLI, SRMR, and AGFI values obtained in this study indicated an acceptable fit.[26] Based on this information, it can be said that the model obtained using CFA with the data from our study has a good fit.

Correlations between the TAS-20 and STSS-TR were used for the concurrent validity analysis. Statistically significant correlations were found in all scales except for the correlation between the OA and EOT subscales. Similar results were obtained in the study in which Arimura and colleagues developed the scale and also in the Finnish adaptation study. A correlation between OA and EOT could not be shown in both study.[16,20] The questions in the OA subscale ask about an individual's habit of prioritizing social obligations and external pressures over their own physical well-being, even if they are experiencing symptoms such as fatigue, ill feeling, sleepiness, or a desire to rest. This results in ignoring the warning signals the body is sending.[3] The connection between EOT, DIF, and DDF is weaker than the connection between DIF and DDF, which is consistent with our findings.[28] Furthermore, while the other 2 components (DIF and DDF) are thought to be closely related to emotional difficulties, EOT, which measures an individual's emotional values and preferences, is thought to be more related to variations in emotional expression that are influenced by cultural attitudes toward emotional expression.[29] From an alternative perspective, EOT is not classified as an emotional incapacity but rather as a cognitive approach that minimizes the relevance of emotions.[30] In summary, OA appears to be associated with emotional regulation and is explained by ignoring physical

signals. On the other hand, EOT emphasizes a thinking style rather than an emotional deficit. It appears that OA and EOT shed light on different areas, which may explain why there is no correlation between them.

Although there are significant correlations between the STSS-TR and TAS-20 scales and subscales, it was emphasized that the correlation coefficient in the co-validation analyses should be greater than 0.50. Hence, the correlation coefficients between DIF and DIB, DIF and DDF, DIF and STSS-TR, DIB and TAS-20, and STSS-TR and TAS-20 satisfy this criteria. According to Arimura et al.[16] the strongest correlation was found between the DIB and DIF ($r=0.450$) and also between the STSS and TAS-20 ($r=0.450$). The strongest associations ($r=0.400$) were reported between DIF and DIB in the Finnish study.[20] Our findings revealed stronger and more significant co-validation correlations between both measures compared to earlier validity and reliability research. Hence, the co-validity analyses conducted in our study are acceptable.

The Cronbach alpha coefficient was between 0.711 and 0.828 for the total score and subscales in the internal consistency analyses conducted for reliability. In the original study, the internal consistency coefficient was between 0.70 and 0.84 for the total scale and subscales.[16] In the Finnish study, the Cronbach alpha coefficient was 0.84 for the total score and 0.76 and 0.80 for the DIB and OA subscales, respectively.[20] The Cronbach alpha values of our study were found to be highly reliable and consistent with those of other investigations.

Test–retest correlations were evaluated to demonstrate the reliability of the Turkish adaptation of the Shitsu-Taikan-Sho (Alexisomia) Scale using a different method. High intra-class correlation coefficients showed high reliability over time and were determined for the total score and the subscales.

The sample is composed of patients who applied to the consultation-liaison psychiatry clinic, which may include a range of diagnostic samples. In addition, the study design did not specify whether the patients were newly diagnosed or receiving treatment. In addition, since this study was performed on a specific clinical sample; the data cannot be generalized to a population. It would be prudent to evaluate the scale using larger sample sizes and population-based studies in future research.

This research is essential for determining the intercultural diversity of the concept of alexisomia, which emphasizes impaired interoceptive awareness and expression of somatic emotions or feelings. This study demonstrated the validity and reliability of the STSS-TR for assessing the characteristics of alexisomia in patients applying for consultation-liaison psychiatry.

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Supplementary Table 1. Shitsu-Taikan-Sho Scale, Turkish-English translation of Shitsu-Taikan-Sho Scale Turkish Version, and distribution of items to subscales following exploratory factor analysis.

	Original Form*	Turkish-English Translation	Excluded After Exploratory Factor Analysis	After Exploratory Factor Analysis
LHM	2, 4, 8, 9, 11, 16, 21, 23	2, 4, 8, 9, 11, 16, 21, 23	8, 11	2, 4, 9, 16, 21
	2. I am careful about my physical condition 4. I try to do something for a change of pace 8. I notice that my physical condition is bad before I get sick 9. I am careful about my diet 11. I feel relaxed when I take a bath 16. I try to exercise moderately 21. I feel calm when I take deep breaths 23. I don't know how to manage my physical condition	2. I am careful about my physical condition 4. I try to relax myself by slowing my pace 8. I notice that my physical condition is bad before I get sick 9. I am careful about my diet 11. I feel relaxed when I take a bath 16. I try to exercise as much as possible 21. I feel calm when I take deep breaths 23. I don't know how to manage my physical/health condition	8. I notice that my physical condition is bad before I get sick 11. I feel relaxed when I take a bath	2. I am careful about my physical condition 4. I try to relax myself by slowing my pace 9. I am careful about my diet 16. I try to exercise as much as possible 21. I feel calm when I take deep breaths
DIB	1, 5, 6, 10, 12, 14, 15, 18, 19	1, 5, 6, 10, 12, 14, 15, 18, 19	1, 12	5, 10, 14, 18, 19, 22, 23
	1. People tell me that I am overworking even if I don't feel so 5. People tell me that I should relax even if I feel that I am 6. I don't want to rest even if I am tired 10. I don't think I am tired, but people ask me if I am 12. I don't feel full when I eat 14. People tell me that I look tense even if I don't think I am 15. I don't feel tired 18. People tell me that I will ruin my health even if I feel fine 19. I can't tell if I am tense or not	1. People tell me that I am overworking even if I don't feel so 5. Although I think it is comfortable, people around me say it is necessary to relax and unwind 6. I don't want to rest even if I am tired 10. I don't think I am tired, but people ask me if I am 12. I don't feel full when I eat 14. People tell me that I look tense even if I don't think I am 15. I don't feel tired 18. People tell me that I will ruin my health even if I feel fine 19. I can't tell if I am tense or not	1. People tell me that I am overworking even if I don't feel so 12. I don't feel full when I eat	5. Although I think it is comfortable, people around me say it is necessary to relax and unwind 10. I don't think I am tired, but people ask me if I am 14. People tell me that I look tense even if I don't think I am 18. People tell me that I will ruin my health even if I feel fine 19. I can't tell if I am tense or not 22. I don't rest even if I want to 23. I don't know how to manage my physical/health condition
OA	3, 7, 13, 17, 20, 22	3, 7, 13, 17, 20, 22	3	6, 7, 13, 15, 17, 20
	3. I prioritize work (including housework and schoolwork) even if I know that rests are necessary 7. I work (including housework and schoolwork) even if I have fever 13. I don't rest even if my physical condition is bad 17. I don't care about my own health/physical condition when I work (including housework and schoolwork) 20. I prioritize my work (including housework and schoolwork) over sleep 22. I don't rest even if I want to	3. I prioritize work even if I know that rests are necessary 7. Even if I have a fever, I work without rest (e.g. housework, schoolwork, occupation) 13. I don't rest even if my physical condition is bad 17. I don't care about my own health/physical condition when I work 20. I prioritize my work (housework, schoolwork, profession) even if I am sleepy 22. I don't rest even if I want to	3. I prioritize work (including housework and schoolwork) even if I know that rests are necessary	6. I don't want to rest even if I am tired 7. Even if I have a fever, I work without rest (e.g. housework, schoolwork, occupation) 13. I don't rest even if my physical condition is bad 15. I don't feel tired 17. I don't care about my own health/physical condition when I work 20. I prioritize my work (housework, schoolwork, profession) even if I am sleepy

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DIB, difficulty in describing bodily emotions; OA: overadaptation; LHM, lack of health management based on bodily emotions