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Regular Article

Reliability and validity of the Turkish form of the Somatosensory Amplification Scale

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Abstract In this study, the authors aimed to investigate the reliability and validity of the Somatosensory Amplification Scale (SSAS) that was developed by Barsky *et al*. in the Turkish population. The study was carried out with 42 patients with Fibromyalgia Syndrome and Asthma Diseases attending to outpatient Physical Therapy and Rehabilitation and Chest Diseases clinics and 86 healthy students from Karadeniz Technical University. SSAS scores were normally distributed, and had acceptable test–retest reliability (*r:* 0.73) and internal consistency (α, 0.62–0.76). Item to scale correlations varied from 0.10 to 0.72, and most were highly significant. Whereas, one item (item 1) in the control group and one item (item 2) in the patients group had low item–total score correlation ($r < 0.15$). Criterion related validity of the SSAS was shown with significant correlation between the Symptom Interpretation Questionnaire, the Toronto Alexithymia Scale and the Symptom Check List 90 Revised somatization subscale. The validity analysis of the scale resulted in a very high significant difference ($P < 0.01$) between the mean SSAS scores of the control and patient's group. Test–retest, internal reliability, and item–total score correlation, discriminating power for specific groups and criterion related validity of the SSAS show that the scale has acceptable reliability and validity for the Turkish population.

Key words reliability, somatization, Somatosensory Amplification Scale, validity.

INTRODUCTION

Barsky *et al*.[1] proposed the idea of somatosensory amplification as a central predisposing factor to explain somatization. According to this hypothesis, somatizing individuals have the tendency to perceive normal physical sensations as unusually intense, noxious and disturbing.[2] It was suggested that this was associated with the process of somatization.[3] Somatosensory amplification has three elements: (i) A bodily hypervigilance to unpleasant bodily sensations; (ii) Selective focusing on certain weak and infrequent bodily sensations; and (iii) Reacting to bodily sensations with affection and cognition, tendency to appraise them more disruptive and threatening than they actually are.[1]

The Somatosensory Amplification Scale (SSAS) is a self-evaluating scale for measuring amplification while somatizing. The developers of the scale demonstrated that the scale had sufficient internal consistency and test–retest reliability.[2] Barsky *et al*.[2] hypothesized that bodily sensations of hypochondriac patients are unduly disturbed, a self-report questionnaire would necessarily have to assess the respondent's sensitivity to mild bodily discomforts but which are not typical symptoms of disease. Somatizing medical outpatients were questioned regarding the uncomfortable but benign sensations they noticed; what sorts of bodily discomforts. Therefore, a large-item pool was established. By eliminating those who were ambiguous, redundant and unreliable, a 5-item scale was derived. This scale was found to have a test–retest reliability of 0.85, and internal consistency of 0.70 (Cronbach's α). Subsequently, a more comprehensive 10-item expanded version of the scale was developed by Barsky *et al*.[2] They established

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the test–retest reliability for the 10-item scale was 0.79, and internal consistency was 0.82 (Cronbach's α). While item to scale correlations varied from between 0.31 and 0.66, and all were highly significant, item to item correlations varied from between not significant (NS) to 0.60; but most were in the range of 0.35 and were highly significant. Barsky *et al*.[2] established in a criterion related validity study that the SSAS was significantly correlated with the Whiteley index (WI), which measures hypochondriac tendencies, and the Somatic Symptom Inventory (SSI) both for the control group and hypochondriac patients group (except for SSI; *r*: 0.60/0.43, 0.44/0.20, respectively). Convergent validity studies reported that the SSAS predicted hypochondriasis and somatization tendencies significantly.[2,4,5] Aronson *et al*.[6] demonstrated that the SSAS was more likely an index of negative emotionality and general distress than a valid measure of somatic sensitivity per se. While Wise and Mann[5] observed that the SSAS was the strongest predictor of neuroticism in male subjects, they failed to establish the same result for female subjects. The SSAS was demonstrated to be the best predictor for depression, anxiety and alexithymia for patients with chronic pain by Kosturek *et al*.[7]

Spinhoven and Does,[8] Barsky and Wyshak,[4] Wise and Mann,[5] Sayar *et al*.[9] and Muramatsu *et al*.[10] utilized the SSAS in their studies. Spinhoven and Does[8] demonstrated that the SSAS was correlated with somatization subscale of the Symptom Check List–90 Revised (SCL-90R) and that the correlation was not dependent on gender, presence of physical illness, and depression scores. Barsky and Wyshak[4] demonstrated that the SSAS was associated with the WI in general hospital outpatients. Wise and Mann[5] observed a relationship between the SSAS and the Toronto Alexithymia Scale (TAS-20) only in female subjects, in their study carried out on 101 psychiatric outpatients. In a study conducted on 100 outpatients with depression investigating the predictors of somatization in patients with depression, Sayar *et al*.[9] established that the SSAS contributed independently to somatization level. Muramatsu *et al*.[10] demonstrated that the SSAS was significantly associated with all somatic symptoms and was a statistically significant predictor of the patient's somatic symptoms and discomfort, while there was no difference in the role of amplification of bodily sensations between the North American and Japanese patients.

This present study aimed to evaluate the Turkish version of SSAS, a potentially beneficial tool in somatization studies. This study investigated validity and reliability of the SSAS on healthy individuals and patients in Turkey.

METHODS

Subjects and procedure

The study was carried out on students of Karadeniz Technical University (KTU), patients diagnosed with fibromyalgia syndrome (FMS) at KTU Medical School Physical Therapy and Rehabilitation (PTR) outpatient clinic, and patients diagnosed with Asthma Disease (AD) at Chest Diseases (CD) outpatient clinic. Of the 128 subjects in the study population, 86 were university students (46 female, 40 male) and 42 were patients (32 female, 10 male). The procedures followed were in accordance with the ethical standards of KTU medical school and with the Helsinki declaration of 1975, as revised in 1983.

First, the scale was translated into Turkish by an investigator who had good command of both languages. It was then translated back into English by a professional translator, in order to check for discrepancies. Consequently, the final version in Turkish was established.

Eligibility criteria were established to be between the ages of 17 and 65 and have sufficient educational background to conduct the tasks given. Subjects were excluded if they had IQ problems, suicidal tendencies, dementia, and a physical disorder which affected their general health or were psychotic. The patients who were diagnosed with FMS (*n*: 20) at PTR outpatient clinic and the patients who were diagnosed with AD (*n*: 22) at CD outpatient clinic were assessed by using the Structured Clinical Interview for DSM-III-R (SCID-I).[11,12] The patients who were diagnosed with mental retardation, dementia, cognitive or psychotic disorders were excluded.

The SSAS scale was given to 42 patients diagnosed with FMS or AD and its relationship with variables such as symptom interpretation, somatization and alexithymia was evaluated. The scale was also given to 86 healthy university students and test–retest process was conducted with an interval of 1 month on the same people. Internal consistency and the correlation between each item and total score were evaluated. The patient group and healthy controls were compared in terms of mean scale scores in order to assess validity and the healthy controls were given the Symptom Interpretation Questionnaire (SIQ), TAS-20 and SCL-90R somatization subscales.

Measures

Somatosensory Amplification Scale

The Somatosensory Amplification Scale is a 10-item scale developed by Barsky *et al*.[2] and its validity and

reliability has been demonstrated. Patients score each item between 1 and 5. Most items describe a physical discomfort which does not indicate a disease. By summing up the scores a total amplification score is obtained.

Toronto Alexithymia Scale

This scale investigates alexithymia, which indicates an individual's lack of emotional awareness. It is a Likert-type 20-item self-report scale with scores ranging from 1 to 5 for each item. It has subscales for difficulty identifying feelings and distinguishing them from bodily sensations (TAS-1), difficulty describing feelings to others (TAS-2), and externally oriented thinking (TAS-3). Higher scores indicate high levels of alexithymia. It was developed by Bagby *et al*.[13] Its adaptation into the Turkish form was shown by Kose *et al*.[14]

Symptom Interpretation Questionnaire

This scale evaluates references individuals make when interpreting common physical symptoms. In total, 13 common physical symptoms along with their degrees of severity are investigated. Each symptom is attributed to three possible explanations: due to a physical illness (somatizing), due to a psychological reason (psychologizing) or as a result of normal stimuli from an individual's environment (normalizing). It was developed by Robbins and Kirmayer.[15] Its validity and reliability into Turkish form were shown by Güleç and Sayar.[16]

Statistics

A total of 86 healthy university students and 42 patients (20 patients diagnosed with FMS at PTR outpatient clinic and 22 patients diagnosed with AD at CD outpatient clinic) were enrolled for the validity and reliability test of the scale. Student's *t*-test was used for measured data and χ^2 test was used for categorical data in making sociodemographic comparisons. The scale was given to the same university students after 1 month to assess test–retest consistency. Total score was assessed by using Spearman and consistency of each item 1 month later was calculated by utilizing Pearson correlation. All subject groups were evaluated by Cronbach's α test for internal consistency; and 0.60 or higher were considered to be acceptable. Acceptable correlation level of 0.15 or higher was set for item–total correlation analysis. Student's *t*-test was used for measuring validity since total scale and subscale scores for the groups in the study were observed to be distributed normally according to Kolmogorov–Smirnov test. The SCL-90R somatization subscale, TAS-20 and SIQ were utilized for criterion dependent validity analysis. The correlation between these scales and the SSAS was evaluated. SPSS 9.0 statistics software (SPSS Inc., Chicago, IL, USA) was used for statistical analyses of the study data.

RESULTS

The sociodemographic characteristics of the groups in the study were as follows. Of the controls, 46 were female and they constituted 53.3% of the group. Age range was between 17 and 23 years, and the mean age was 18.67 ± 1.15 years. The range of educational background for the groups was between 11 and 15 years, with a mean value of 11.05 ± 0.43 years. Of the patient group, 32 were female, constituting 76.2% of the group. Age range was between 17 and 56 years, and the mean age was 38.98 ± 9.33 years. Their range of educational background was between 5 and 15 years, with a mean value of 7.41 ± 3.37 years.

Test–retest reliability for the scale is given in Table 1. The scale was re-given to control group, 86 university students, after an interval of 1 month, and consistency of total score and each item was assessed through Pearson and Spearman correlation. Based on these data, Turkish version of the SSAS was noted to be moderately correlated at a level of 0.73 and established to be consistent. When the items were investigated individually, the lowest *r*-value was established to be 0.51, while the highest was 0.66.

Internal consistency, item–total correlation and α if item deleted, values are given in Table 2. The SSAS Cronbach's α values for the controls, for the patients and for both groups together were calculated to be 0.62, 0.76 and 0.68, respectively. When each item was considered individually for item-total score correlation; it was noted that the correlations for question number 1 for the control group and question number 2 for the patient group were low.

Criterion-related validity scores for the scale are given in Table 3. The controls were given the SIQ, TAS-20 and SCL-90R somatization subscale. The SSAS had the strongest correlation with SCL-90R somatization subscale (*r*: 0.55, $P < 0.001$), while the lowest correlation was observed between SIQ normalization subscale and TAS-3 subscale (*P*: NS).

When the groups were evaluated in terms of SSAS scores, while the mean score for the controls was calculated to be 29.57 ± 5.61, it was 34.77 ± 8.72 for the patient group. The difference in mean scores was observed to be statistically significant (*t*: 2.67, d.f.: 25.62, *P*: 0.013).

Table 1. Somatosensory Amplification Scale test–retest consistency evaluation (results of Pearson and Spearman correlation analyses, Pearson†; *n*: 86)

Item	Correlation
Total score	*r*: 0.73† $P < 0.001$
When someone else coughs, it makes me cough too.	*r*: 0.61 $P < 0.001$
I can't stand smoke, smog, or pollutants in the air.	*r*: 0.59 $P < 0.001$
I am often aware of various things happening within my body.	*r*: 0.66 $P < 0.001$
When I bruise myself, it stays noticeable for a long time.	*r*: 0.62 $P < 0.001$
Sudden loud noises really bother me.	*r*: 0.57 $P < 0.001$
I can sometimes hear my pulse or my heartbeat throbbing in my ear.	*r*: 0.61 $P < 0.001$
I hate to be too hot or too cold.	*r*: 0.51 $P < 0.001$
I am quick to sense the hunger contractions in my stomach.	*r*: 0.62 $P < 0.001$
Even something minor, like an insect bite or a splinter, really bothers me.	*r*: 0.66 $P < 0.001$
I have a low tolerance for pain.	*r*: 0.58 $P < 0.001$

Table 2. Somatosensory Amplification Scale internal consistency evaluation, the impact of each item on the scale and α values if item deleted

	Controls (*n*: 86) α: 0.62		Patients (*n*: 42) α: 0.76		Overall (*n*: 128) α: 0.68	
Item no	Corrected item–total correlation	α if item deleted	Corrected item–total correlation	α if item deleted	Corrected item–total correlation	α if item deleted
SSAS1	0.10	0.63	0.54	0.73	0.33	0.67
SSAS2	0.18	0.64	0.14	0.78	0.23	0.68
SSAS3	0.30	0.60	0.57	0.72	0.42	0.65
SSAS4	0.17	0.63	0.23	0.77	0.25	0.68
SSAS5	0.31	0.59	0.55	0.73	0.39	0.66
SSAS6	0.39	0.58	0.44	0.74	0.42	0.65
SSAS7	0.18	0.62	0.26	0.76	0.19	0.69
SSAS8	0.40	0.60	0.72	0.70	0.51	0.63
SSAS9	0.31	0.59	0.56	0.72	0.37	0.66
SSAS10	0.31	0.60	0.27	0.76	0.35	0.66

DISCUSSION

This present study tested the Somatosensory Amplification Scale for validity and reliability. It was observed that its test–retest consistency, internal consistency, item total correlation, criterion related validity and discriminating power for specific groups validity were observed to be at an acceptable level for the Turkish population.

Test–retest consistency of the 10-item SSAS was evaluated by giving the scale on the same individuals in the control group with an interval of 1 month. There was a positive correlation of 0.73 between the total scores of the two tests. When each item was assessed separately, it was observed that the correlation ranged between 0.51 and 0.69. In their original article where Barsky *et al.*[2] introduced the revised version of SSAS, their control group consisted of 75 patients presenting at a general hospital and the patients had not been diagnosed to be hypochondriacs and the test–retest correlation which they evaluated after an interval of 1–6 weeks was established to be 0.79. Individual item correlation was reported to be ranging between 0.31 and 0.69. Similarly, Speckens *et al.*[17] conducted a study on 124 patients referred to a general hospital, 111 patients presenting at primary care and 194 randomly selected patients who had patient records at the same primary care physician. Their test–retest revealed a correlation of 0.87. Weaker correlation revealed in the present study may be attributed to the control group consisting of healthy students.

Table 3. The correlation between Somatosensory Amplification Scale and Symptom Interpretation Questionnaire subscales, Toronto Alexithymia Scale and its subscales, and Symptom Check List Revised somatization subscale for the control group (*n*: 86)

	Control group	
	r	*P*
SIQ-P	0.25	0.020
SIQ-S	0.24	0.023
SIQ-N	0.01	NS
TAS 1	0.43	<0.001
TAS 2	0.36	0.001
TAS 3	0.09	NS
TAS total	0.42	<0.001
SCL-90R som	0.55	<0.001

N, Normalizing; NS, Not Significant; P, Psychologizing; S, Somatizing; SCL-90R som, Symptom Check List Revised form somatization subscale; SIQ, Symptom Interpretation Questionnaire; TAS, Toronto Alexithymia Scale.

Not having given test–retest to the patient group is one of the limitations of this present study.

To test the reliability of SSAS, internal consistency analysis and item total correlation was evaluated. Cronbach's α coefficient for internal consistency analysis was calculated to be 0.62 for the healthy controls, 0.76 for the patient group and 0.68 overall. Barsky *et al*.[5] had established internal consistency to be 0.82. Speckens *et al*.[17] had reported α coefficient to be 0.77 in their hospital sample, 0.64 in patients in primary care and 0.71 for the general population. Although internal consistency in the present study was not sufficient, it can be considered acceptable. Item total correlations were 0.10–0.40 in the healthy controls, 0.14–0.72 in the patient group and 0.19–0.51 overall. It was also noted that item number 1 in the controls and item number 2 in the patient group did not work well. This finding may possibly suggest that these two items which contain respiratory system information are more confusing for Turkish subjects.

For similar scale validity, the controls were given the SIQ, TAS-20 and SCL-90R somatization subscale. Wise and Mann[5] proposed a relationship between somatization and amplification, independent of depression and anxiety. A positive correlation was reported between the SSAS and SIQ (psychologizing), independent of depression and anxiety in a study carried out by Wise and Mann[18] on 100 psychiatric patients. In a study conducted by Aronson *et al*. (2001) on two separate groups of students, correlations established for the groups regarding somatization were 0.27 ($P < 0.005$) and 0.38 ($P < 0.001$), psychologizing 0.51 ($P < 0.001$) and 0.40 ($P < 0.001$), and normalization 0.14 and 0.31 ($P < 0.001$). In contrast, in this present study the correlations with the SSAS were established to be 0.25 (P: 0.020) with SIQ psychologizing and 0.24 ($P = 0.023$) with SIQ somatization, while no correlation was established with normalization subscale. The correlations with the TAS-20 were calculated to be 0.43 ($P < 0.001$) for identifying feelings subscale (TAS-1) and 0.36 ($P = 0.001$) for describing feelings subscale (TAS-2), while its correlation with total alexithymia score was 0.42 ($P < 0.001$). Wise and Mann[5] demonstrated that the TAS-20 and SSAS scores correlated only in female patients in their study conducted on 101 patients. It was concluded that while alexithymia contributed to cognitive appearance in somatization process, amplification contributed as an emotional factor.[5] Sayar *et al*.,[9] in their study investigating predictors of somatization on 100 patients with depression, calculated the correlation between the SSAS and TAS (total score) to be 0.45 ($P < 0.001$). The correlation between the SCL-90R somatization subscale and SSAS scores was established to be 0.52 ($P < 0.001$), 0.41 ($P < 0.001$) by Wise and Mann,[18] and 0.48 ($P < 0.001$) by Sayar *et al*.[9] Barsky *et al*.[2] evaluated the correlation between the SSAS and SSI, formed by combining SCL-90R somatization subscale and Minnesota Multiphasic Personality Inventory hypochondria subscale form, 0.20 (NS) in a hypochondriac group, and 0.44 ($P < 0.001$) in the control group, consisting of patients. In the present study, the authors established this correlation to be 0.55 ($P < 0.001$). The SSAS Turkish version was established to be sufficiently correlated with similar scale validities.

The difference in mean amplification scores between the controls and the patient group was evaluated for the SSAS validity for discriminating particular groups; and it was noted that mean SSAS score was significantly higher in the patient group. Another constraint of the study was observed to be the fact that the groups were not matched regarding their sociodemographic characteristics, regarding their ages and educational backgrounds.

CONCLUSION

The results have demonstrated that the Somatosensory Amplification Scale was valid both for healthy individuals and patients and reliable for healthy individuals in Turkey. The scale is related with somatization and alexithymia, which is considered to be a part of somatization. It is the authors' opinion that having this scale among the instruments in studies on somatization will facilitate a more thorough approach to the issue.

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