Cukurova Medical Journal
ÇUKUROVA ÜNİVERSİTESİ TIP FAKÜLTESİ

Cukurova Med J 2025;50(3):565-578
DOI: 10.17826/cumj. 1699413

Psychometric properties of the Turkish version of the Self-Harm Screening Inventory (SHSI-TR)

Kendine Zarar Verme Tarama Envanteri Türkçe versiyonunun (KZVTE) psikometrik özellikleri

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Abstract

Purpose: This study was conducted to adapt the Self-Harm Screening Inventory, the most up-to-date self-report instrument, into Turkish and to examine its psychometric properties in a Turkish sample.

Materials and Methods: This study included 571 adolescents and examined the psychometric properties of the Self-Harm Screening Inventory-Turkish Form (SHSI-TR) scale via classical test theory (CTT) and item response theory (IRT). During the analysis process, a graded response model (GRM) was applied to analyze the factor structure and item properties of the SHSI-TR items. Additionally, the criterion validity of the scale was assessed by examining its relationship with the Symptom Control List-90-Revised (SCL-90-R) and the Suicide Rumination Scale (SRS).

Results: The Cronbach's alpha internal consistency coefficient of the SHSI-TR was .72. The Guttman two-half reliability coefficient was .73. The SHSI-TR was also positively correlated with the SCL-90-R subscales of somatization (r = .12, p < .05), interpersonal sensitivity (r = .17, p < .01), depression (r = .26, p < .01), anxiety (r = .22, p < .01), and psychoticism (r = .22, p < .01).

Conclusion: In conclusion, the GRM results demonstrated that the items of the SHSI-TR possess strong measurement properties. The scale represents a unidimensional structure in terms of content validity and statistical consistency. The obtained factor loadings and item parameters support the validity and reliability of the SHSI-TR as a measurement tool capable of distinguishing individuals' levels of self-harm.

Keywords: Nonsuicidal self-injury, self-harm, adolescents, item response theory

Öz

Amaç: Bu çalışma, en güncel öz bildirim envanteri olan Kendine Zarar Verme Tarama Envanterini (KZVTE) Türkçeye uyarlamak ve ölçeğin psikometrik özelliklerini değerlendirmek amacıyla gerçekleştirilmiştir.

Gereç ve Yöntem: Bu çalışma 571 ergenin katılımıyla gerçekleştirilmiştir. Klasik test teorisi ve öğe (madde) tepki teorisi yaklaşımları kullanılarak KZVTE-Türkçe (KZVTE-TR) formunun psikometrik özellikleri incelenmiştir. İstatistiksel analiz sürecinde KZVTE-TR maddelerinin faktör yapısı ve özellikleri dereceli tepki modeliyle değerlendirilmiştir. Ayrıca envanterin kriter geçerliliği, Belirti Kontrol Listesi-90-Revize (SCL-90-R) ve İntihar Ruminasyon Ölçeği (İRÖ) ile ilişkileriyle değerlendirilmiştir.

Bulgular: Çalışmamızda, KZVTE-TR'nin Cronbach alfa iç tutarlılık katsayısı .72 olarak bulunmuştur. KZVTE-TR'nin Guttman iki yarım güvenilirlik katsayısı ise .73 olarak hesaplanmıştır. KZVTE-TR; SCL-90-R'nin somatizasyon (r = .12, p < .05), kişilerarası duyarlık (r = .17, p < .01), depresyon (r = .26, p < .01), anksiyete (r = .22, p < .01) ve psikotizm (r = .22, p < .01) alt ölçekleriyle olumlu yönde anlamlı ilişkiler göstermiştir.

Sonuç: Dereceli tepki analizinin sonuçları, KZVTE-TR maddelerinin güçlük indekslerinin ölçme kalitesine sahip olduğunu göstermektedir. Bununla birlikte KZVTE-TR, içerik geçerliliği ve iç tutarlılıkta tek boyutlu bir yapı sergilemektedir. Çalışmamızda elde edilen faktör yükleme ve madde parametreleri, gençlerin kendine zarar verme düzeylerini ayırt edebilen bir ölçme aracı olarak KZVTE-TR'nin geçerliğini ve güvenilirliğini desteklemektedir.

Anahtar kelimeler: Kendine zarar verme davranışı, kendini yaralama davranışı, ergenler, öge (madde) tepki teorisi

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Received: 14.05.2025 Accepted: 06.08.2025

INTRODUCTION

Nonsuicidal self-injury (NSSI) is characterized as the deliberate, direct, self-inflicted destruction of body tissue without suicidal intent. For purposes not socially sanctioned, it includes behaviors such as cutting, burning, biting, and scratching the skin[1]. NSSI behavior is relatively common among youth and in early adulthood[2]. There is a consensus that NSSI begins in early adolescence, with a main age of onset of 12 years. This behavior occurs between the ages of 12 and 14, and its prevalence is highest among adolescents[3].

Studies have shown that almost 10–23% of adolescents reported NSSI behavior[4]. The prevalence among hospitalized adolescents in clinical populations is almost 30–50%[5]. The development of NSSI from adolescence to early adulthood is lower. However, approximately 20% of adolescents continue with this behavior for more than five years, and it typically becomes a maladaptive and chronic behavior that is carried into adulthood[3].

The epidemic of NSSI in Turkey is currently frightening; 21.4% of young people have reported experiencing self-injury[6,7]. This rate exceeds those of other countries, such as the United States (14%), China (17%), and the United Kingdom (10%) [8]. In adolescents and children, NSSI rates are unclear because of the absence of NSSI measurements in all large-scale epidemiological studies. Early evidence suggests that NSSI rates among adolescents are increasing[9]. As NSSI activities are often concealed and individuals may not want to disclose such activities, the prevalence rate is likely to be higher. Additionally, as 60% of adolescents who suffer from NSSI are likely to persist with the activity, this indicates how severe the case is.

The International Classification of Diseases, 11th Revision (ICD-11)[10] definition of NSSI is "Intentional self-inflicted injury to the body, most commonly cutting, scraping, burning, biting, or hitting, with the expectation that the injury will lead to only minor physical harm." The most common methods are cutting, banging or hitting, severe scratching, carving, and scraping[11]. Several methods have been reported, ranging from an average of 4.3 methods[11,12]. While the ICD-11 does not currently classify NSSI into separate sections such as NSSI disorder, in the ICD-11, NSSI symptoms are highlighted under the Section on Personality Disorders.

NSSI disorder (NSSID) is 'a new diagnosis' that entered section 3 of the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) in 2013 as a condition for Further Study[13]. The DSM-5 NSSID criterion A defines the nature and frequency of self-harming behavior as "self-inflicted acts such as cutting, burning, or hitting intended to cause moderate physical damage to the body (e.g., bruising, bleeding, or pain) occurring on five or more days over the past year." The DSM-5 NSSID criterion D excludes "socially sanctioned behavior such as tattooing or body piercing, as well as self-inflicted damage enacted in a cultural or religious context. Common and mild behaviors such as nail biting and scab picking are also excluded." NSSI is independent of cultural and religious behaviors or personal preferences regarding appearance, and a restrictive statement indicates that mild or minor behaviors common in the community are not considered NSSI[14].

The diagnosis of NSSID indicates that NSSI is not limited to borderline personality disorder traits in adolescents. In two studies of clinical adolescents with NSSID, 51.7%[12] and 20.5%[11] met the criteria for borderline personality disorder. Although NSSI is frequently observed in individuals with borderline personality disorder traits, considering the common association of NSSI with other psychiatric disorders in the absence of borderline traits, a separate diagnosis has become necessary. However, another option would be to add NSSI as a specifier for other disorders (e.g., major depressive disorder with NSSI). However, this approach assumes the presence of psychiatric comorbidities, which is not always the case. Research has demonstrated that NSSID is associated with a range of internalizing (e.g., anxiety and mood disorders), externalizing, and personality disorders and can even occur in the absence of any psychiatric diagnosis[15].

Lloyd-Richardson et al.[16] reported that 27.7% of an adolescent community sample reported NSSI behavior. However, fewer than 5% of the adolescents engaged in NSSI behaviors more than five times a year. In a community sample of 3,097 Swedish adolescents, Zetterqvist et al.[17] reported that 6.7% met the DSM-5 NSSID A criteria. Among those who met the NSSID criteria, 73.7% had performed NSSI 11 times or more during the previous year, and 26.3%

had done so 5–10 times. More girls than boys had performed NSSI five or more times in this study of community adolescents[18]. In a comprehensive study with a large sample of adolescent inpatients, Muehlenkamp et al.[19] identified three groups. An NSSI frequency of ≥ 25 days represented the most severe group, whereas a frequency of 5–24 days represented a group with relatively less overall pathology than did the low-frequency (1–4 days) group. Compared with low-frequency or minor NSSI, NSSID tends to be associated with greater psychopathology, as well as more psychiatric hospitalizations, suicidal ideation, and suicide attempts[16].

Negative feelings and thoughts (e.g., anxiety, depression, anger, self-criticism, distress) and the expectation that these negative feelings and thoughts will be alleviated, a positive mood will be created, and social or relational problems will decrease; that is, the use of NSSI as a means of emotion regulation is described in the DSM-5 NSSID B and C criteria. People engage in NSSI for various reasons, including Nock and Prinstein's[20] four-function model, which identifies automatic negative reinforcement, automatic positive reinforcement, social negative reinforcement, and social positive reinforcement as the processes. Alternatively, Jacobson and Batejan's adapted integrative model assumes that biological, psychological, and environmental influences interact with one another and lead people to resort to "self-harm" as a way of coping with stress. Edmondson and team[21] meta-analyzed 152 studies to identify motives for self-harm, such as controlling emotional distress, seeking attention, expressing distress, and punishing oneself. Hooley and Franklin[22] investigated self-harm deeply, with a specific focus on perceived benefits and the reasons for not indulging in them.

Individuals who regularly engage in NSSI and use multiple NSSI methods to cause more physical harm are more likely to experience higher levels of psychological problems, including the presence of several psychiatric disorders, high-risk behaviors, and suicidal thoughts[23]. Studies have also shown that the number of suicide attempts is high among individuals with NSSID[24]. Therefore, suicide risk is high in individuals with recurrent NSSI[25]. Approximately 70% of adolescents with a history of recurrent NSSI have attempted suicide, which is concerning[24]. Suicidal behaviors affect millions of adolescents every year and are a public health issue that requires intervention and attention. One of the leading causes of death, suicide, killed an estimated 4,000 adolescents (15–24 years old) in 2002[26]. More recently, in 2021, suicide was the third leading cause of death among U.S. high school youth aged 14–18 years, with 1.952 suicide-related deaths, resulting in a rate of 9.0 per 100,000 youths[27].

NSSI, initiated deliberately without suicidal intent, can lead to suicide attempts in the long term. Individuals who engage in NSSI also use NSSI behavior as a coping mechanism to escape negative emotions and stressful social interactions. Additionally, they experience negative reinforcement (e.g., a reduction in anger or grief) and habituation to pain from self-injury, a trend linked to suicidal behavior[28]. Thus, early detection, prevention, and intervention in NSSI among adolescents are paramount.

There is a significant correlation between NSSI and depression, anxiety disorders, and borderline personality disorder[29]. Several individuals with NSSIDs in clinical and community samples with recurrent NSSIs also had psychiatric comorbidities. Mood disorders commonly cooccur, with 70–80% of major depressive disorders occurring. Anxiety disorders are also commonly reported (70–90%), as is posttraumatic stress disorder (PTSD), with rates of 25–30%[11].

However, low-frequency NSSI in youth can also be observed in many psychopathologies. If NSSID is not included in any of the categories of Depressive Disorders, Anxiety Disorders, Trauma- and Stressor-Related Disorders, or OCD and Related Disorders in later stages or if it is included but youths with NSSI do not meet the NSSID diagnostic criteria, the inclusion of NSSI as a specifier may be considered. In this case, NSSI, which is one of the main symptoms of personality disorders, can also be specified in many other psychopathologies.

Over the past three decades, a wide variety of tools have been developed to assess self-harming behaviors. One valid self-report measure is the Self-Harm Inventory (SHI)[30], which is the first and most widely used measure for assessing self-harm behaviors. The Intentional Self-Harm Inventory (ISHI) is another popular measurement tool developed for NSSI[31]. It consists of 17 items that focus on the overt behavioral aspects of NSSI. It inquires about the respondent's lifetime history of

NSSI behaviors, including the method, frequency, and duration of such behaviors.

Many scales developed to assess NSSI today have been developed in Western cultures and generally use samples of young adults, with validity and reliability analyses conducted on these groups[32]. In particular, items such as "reckless driving" or "unsafe sexual intercourse", which are included in some scales, such as the SHI, may not be culturally appropriate for adolescent samples in our country.

Furthermore, these behaviors are considered indirect self-injuries and are not included in the DSM-5 definition of NSSI. Young people who engage in such risky behaviors generally do not intend to harm themselves. Another limitation of existing scales is that they do not directly reflect observable behaviors, and some items focus on indirect areas such as interpersonal relationships, religious beliefs, or occupational functioning. Finally, the fact that most existing measures were developed in Western societies may result in insufficient reflection of cultural sensitivities specific to Asian countries in assessments.

Considering that there may be meaningful differences between Asian and Western cultures in terms of the emergence, functions, and expression of NSSI behaviors, there is an important need to develop culturally valid measurement tools that include items reflecting NSSI specific to Eastern societies. However, it is important to translate a valid and reliable scale for assessing NSSI in adolescents into Turkish to facilitate future scientific research. In this context, this study aimed to adapt the most recent self-report instrument, the Self-Harm Screening Inventory, into Turkish and to examine its psychometric properties.

To date, no brief, psychometrically validated, and culturally appropriate Turkish-language screening instrument exists to assess nonsuicidal self-injury among adolescents via classical test theory (CTT) and item response theory (IRT) frameworks. In this context, translating a valid and reliable self-report tool into Turkish is considered an important step toward facilitating future research and clinical assessments in this area. Accordingly, the present study aimed to adapt the recently developed Self-Harm Screening Inventory (SHSI) into Turkish and evaluate its psychometric properties via both CTT and IRT approaches.

MATERIALS AND METHODS

Participants

An exploratory quantitative research design guided the cross-sectional sampling method used to recruit adolescents from schools in Mersin, Turkey. A convenience sampling approach was used. Potential participants attending public schools in Mersin were invited to participate in the study. Written informed consent was obtained from the parents or legal guardians, and the participants also provided written assent. Considering the recommendations of Tabachnick et al.[33] for calculating the sample size based on the number of scale items, 619 adolescents who agreed to participate in the study were included. After invalid data was checked, the number of participants decreased to 571.

To be included in the study, participants were required to (a) be between the ages of 13 and 18, (b) be of Turkish nationality, (c) be currently enrolled in a public school in Mersin, (d) have sufficient literacy in Turkish to complete self-report questionnaires, and (e) provide both parental/legal guardian consent and personal assent. Adolescents who did not meet the criteria were excluded.

The final sample consisted of 571 adolescents aged between 13 and 18 years ($M = 15.31$, $SD = 1.46$), all of whom were enrolled in schools in Mersin Province. Among them, 331 (58%) were female, and 240 (42%) were male.

Procedure

Ethical approval for this study was granted by the Toros University Social Science Institute (approval number: 2024/90). Data collection was carried out between December 2024 and March 2025, in accordance with the principles outlined in the Declaration of Helsinki.

The adaptation process of the Self-Harm Screening Inventory (SHSI) into Turkish (SHSI-TR) was conducted in accordance with internationally recognized guidelines for the cross-cultural adaptation of measurement instruments. Permission to adapt the scale was obtained from the original developers prior to this study.

First, two independent researchers and two language experts with advanced proficiency in English translated the inventory into Turkish. The translations were then reviewed and synthesized into

a single, consensus version. This preliminary Turkish version was subsequently examined by a content and language expert with a PhD in English translation and interpreting. The expert evaluated the text in terms of conceptual equivalence, linguistic clarity, and cultural appropriateness, and necessary revisions were made to create a prefinal version of the scale.

A back-translation procedure was conducted to ensure content validity and equivalence with the original instrument. A bilingual language expert who was unfamiliar with the original scale retranslated the Turkish version back into English. The back-translated version was then compared with the original English version to evaluate semantic consistency and clarity. No significant discrepancies were observed.

Finally, the Turkish version and back-translated text were submitted to the original developers for review. Upon receiving their approval regarding the linguistic and conceptual fidelity of the adaptation, the final version of the SHSI-TR was established. Prior to data collection, final approval was obtained from the scale developers for the use of the Turkish version.

Measures

Self-Harm Screening Inventory (SHSI)

The Self-Harm Screening Inventory (SHSI)[34] is a self-report tool developed to assess self-harming behaviors in adolescents. The SHSI consists of 10 binary (yes/no) items that address self-harming behaviors in the past year. To assess NSSI in adolescents, the definition of NSSI is as follows: "Nonsuicidal self-injury refers to intentional self-harm behaviors without the intent to die." The participants were asked to select "yes" if they had engaged in self-harming behavior at least once and "no" if not. In the original inventory study, the Cronbach's alpha internal consistency coefficient was .79. In this study, the Cronbach's alpha internal consistency coefficient for the Turkish version of the scale (SHSI-TR) was .72.

Suicide Rumination Scale (SRS)

The Suicide Rumination Scale (SRS) is a self-reported measure developed by Rogers and colleagues[35] to assess individuals' repetitive and intrusive mental preoccupations with suicidal thoughts. The scale aims to measure how frequently an individual mentally focuses on suicidal thoughts during such episodes and the extent to which they are unable to suppress these thoughts. In the original study of the scale, confirmatory analyses revealed that the scale exhibited a single-factor structure and that the general factor explained a large portion of the variance in the two-factor model (ω = .975; ECV = .86). These findings indicate that the total SRS score reliably represents a unidimensional structure. The scale has high internal consistency, with McDonald's omega values reported between .91 and .98 in various samples[35]. The Turkish version adapted by Erdem et al.[36] showed good internal consistency in this study (α = .89). In this study, the Cronbach's alpha internal consistency coefficient was .66.

Symptom Checklist-90-Revised (SCL-90-R)

The Symptom Checklist-90 (SCL-90) was developed by Derogatis[37]. The SCL is a 90-item self-report scale frequently used to screen for various psychiatric symptoms. The Symptom Checklist-90-Revised (SCL-90-R) is a revised version of this questionnaire. The total score obtained from the scale indicates the frequency of an individual's symptoms. The Turkish adaptation of the SCL-90-R was conducted in three studies[38]. The scale consists of nine factors: "anxiety," "depression," "obsessive–compulsive," "somatization," "interpersonal sensitivity," "hostility," "phobic anxiety," "paranoid ideation," and "psychoticism." In this study, the Cronbach's alpha internal consistency coefficient of the SCL-90-R was .84.

Statistical analysis

Analyses were performed using R 4.2.2. The significance level was .05 for all analyses. Classical test theory (CTT) and item response theory (IRT) approaches were employed to investigate the psychometric properties of the SHSI-TR. In the analysis process, the Graded Response Model (GRM) was first applied to analyze the factor structure and item features of the SHSI-TR items. The analyses were done through the mirt package[39]. Discriminative (a) and threshold (b) parameters were estimated for each item; additionally, factor loadings and explained common variances were calculated. The model fit was considered based on the number of iterations and log-likelihood values.

In addition, the criterion validity of the scale was examined by examining its connection with the SCL-90-R [37] and the Suicide Rumination Scale[35]. For this purpose, Pearson correlation coefficients were calculated between the total score of the SHSI-TR

scale and these criterion measures. These experiments ascertained whether the scale was measured consistently with equivalent constructs[40]. In addition, discriminant validity was evaluated by conducting ROC (Receiver Operating Characteristic) analyses. The ability of the SHSI-TR total score to distinguish individuals who exceeded clinical thresholds on the subscales of the SCL-90-R was assessed using AUC (Area Under the Curve) values. Finally, descriptive statistics were calculated for the scale. The mean, standard deviation, skewness, and kurtosis values were obtained for each item in this context. These statistics were calculated to assess the normality of item distributions and identify any outliers. Finally, item reliability was examined. For this purpose, Cronbach's alpha coefficient and Guttmann's two-half reliability were calculated for the SHSI-TR items.

RESULTS

This section presents descriptive statistics related to the scores obtained from the scales used in the study (see Table 1).

Table 1. Descriptive statistics related to the scores obtained from the scales

Variable	Mean	Std.	Skewness	Kurtosis
SHSI-TR	13.57	1.888	-1.040	1.237
SRS	20.88	6.114	1.162	1.459
SCL-90-R				
Somatization	20.02	4.228	-0.556	1.835
Obsessive-Compulsive	17.09	3.824	-1.050	1.183
Interpersonal Sensitivity	14.32	2.604	-1.237	1.348
Depression	26.41	4.866	-2.088	1.275
Anxiety	12.57	2.965	-1.450	1.337
Hostility	4.92	1.601	-0.585	0.635
Phobic Anxiety	9.57	2.427	-0.386	0.837
Paranoid Ideation	4.51	1.607	0.449	-0.126
Psychoticism	6.47	1.958	-0.642	1.243

SHSI-TR: Self-Harm Screening Inventory Turkish Form; SRS: Suicide Rumination Scale; SCL-90-R: Symptom Checklist-90-Revised; *p<.05; **p<.01

The mean, standard deviation, skewness, and kurtosis values obtained from the SHSI-TR, SRS, and SCL-90-R subscales are presented in Table 1. For SHSI-TR, the mean was 13.57, the standard deviation was 1.888, the skewness was -1.040, and the kurtosis was 1.237. The mean score for the SRS was 20.88, the standard deviation was 6.114, the skewness value was 1.162, and the kurtosis value was 1.459. For the SCL-90-R subscales, the highest average score was 26.41 for depression, and the lowest was 4.51 for the Paranoid Ideation subscale. Other values for the subscales are as follows: somatization (mean = 20.02, SD = 4.228, skewness = -0.556, kurtosis = 1.835), obsessive-compulsive (mean = 17.09, SD = 3.824, skewness = -1.050, kurtosis = 1.183), interpersonal sensitivity (mean = 14.32, SD = 2.604, *r* = -1.237, standardization = 1.348), anxiety (mean = 12.57, SD = 2.965, *r* = -1.450, standardization = 1.337), hostility (mean = 4.92, SD = 1.601, *r* = -0.859, *B* = 0.635), phobic anxiety (Mean = 9.57, SD = 2.427, *r* = -0.386, *B* = 0.837), paranoid thinking (Mean = 4.51, SD = 1.607, *r* = 0.449, *B* = -0.126), and psychoticism (Mean = 6.47, SD = 1.958, *r* = -0.642, *B* = 1.243).

Item Response Theory (IRT) analysis

Item response theory (IRT)-based analyses were conducted to evaluate the psychometric properties of the SHSI-TR. Because the scale items have a binary response format (0 = no, 1 = yes), the graded response model (GRM) applicable in the mirt package was used in the analyses; when applied to two-category data, the model operates similarly to the 2-parameter logistic model (2PL)[41]. The model converged after 151 iterations with a log-likelihood value of –3033.256. This value indicates that the model fits the data adequately. Below, the factor loadings for each item, the explained common variance values, and the discriminability (a) and difficulty (d) parameters calculated within the GRM framework are presented (Table 2).

Table 2. Factor loadings, discriminative power, and difficulty parameters of SHSI-TR items according to the graded response model.

Item	λ	h^2	a	d
I1	0.436	0.1897	0.824	1.104
I2	0.313	0.0983	0.562	0.711
I3	0.429	0.1839	0.808	0.294
I4	0.426	0.1818	0.802	1.563
I5	0.387	0.1499	0.715	1.274
I6	0.451	0.2032	0.860	1.648
I7	0.940	0.8830	4.675	1.987
I8	0.419	0.1757	0.786	1.451
I9	0.861	0.7405	2.875	1.560
I10	0.429	0.1842	0.809	1.704

A review of the model summary revealed that the factor loadings for the items ranged from .313--.940. In particular, items I7 (.940) and I9 (.861) had high factor loadings and strongly represented the latent structure. The lowest factor loading was observed for item I2 (.313), whereas the remaining items exhibited moderate factor loadings, thereby supporting the scale's construct validity. The variance explained (SS loadings) was 2.99, and the variance ratio was 29.9%. This ratio is considered acceptable for psychological measurement tools[40].

When the item parameters were evaluated, the discrimination coefficients (a) ranged from 0.562 (I2) to 4.675 (I7). Items I1, I3, I4, I5, I6, I8, and I10 had discrimination values above 0.70 and were sensitive to latent traits. I7 (a = 4.675) and I9 (a = 2.875) have very high discriminative values. These high values indicate that these items strongly predict the latent trait; however, such high values should be evaluated carefully, as they may result from a response distribution skewed toward the extremes. The difficulty parameters ($d_ı$) ranged from 0.294 (I3) to 1.987 (I7). The I3 item, which has a low difficulty level, is more easily endorsed by individuals with lower self-harm tendencies; in contrast, items such as I7 and I10 are endorsed by individuals with higher risk levels.

In conclusion, the GRM results demonstrated that the items of the SHSI-TR possess strong measurement properties. The scale represents a unidimensional structure in terms of content validity and statistical consistency. The obtained factor loadings and item parameters support the validity and reliability of the SHSI-TR as a measurement tool capable of distinguishing individuals' levels of self-harm.

Correlations between variables

Table 3 presents the Pearson correlation coefficients calculated between the SHSI-TR, SRS, and SCL-90-R subscales. This analysis was conducted to evaluate the validity of the SHSI-TR criteria. A positive and significant relationship was found between SHSI-TR scores and SRS scores (r=.32, p < .01). This finding indicates that the SHSI-TR is related to self-efficacy perceptions regarding self-harm behavior, supporting its construct validity. SHSI-TR was found to be positively correlated with the SCL-90-R subscales of somatization (r = .12, p < .05), ınterpersonal sensitivity (r = .17, p < .01), depression (r = .26, p < .01), anxiety (r = .22, p < .01), and psychoticism (r = .22, p < .*0*1) of the SCL-90-R subscales. These relationships indicate that the SHSI-TR is significantly associated with psychopathological symptoms and support the scale's criterion validity in terms of adequate external validity. The significance of the correlations obtained with mood-related symptoms, such as depression and anxiety, suggests that self-harm tendencies are associated with such psychological processes. These results suggest that the SHSI-TR has consistent relationships with scales assumed to measure similar constructs and is a valid measurement tool

Reliability

In addition to the validity findings obtained, reliability analyses regarding the scale's internal consistency were also conducted. In this context, Cronbach's alpha internal consistency coefficient and Guttman's two-half reliability coefficient were calculated for the

SHSI-TR. Furthermore, each item's contribution to the scale's overall reliability was evaluated via the alpha values obtained when the item was deleted and the item-total correlations. The relevant findings are presented in Table 4. As a result of the analysis, the Cronbach's alpha internal consistency coefficient of the SHSI-TR was found to be .72. The Guttman two-half reliability coefficient was found to be .73 (see Table 4).

Table 3. Correlation matrix related to research variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1.SHSI-TR	1										
2.SRS	.32**	1									
3.Somatization	.12**	.04	1								
4.Obsessive-Compulsive	.10*	.10**	.47**	1							
5.Interpersonal Sensitivity	.17**	.08*	.39**	.44**	1						
6.Depression	.33**	.18**	.38**	.47**	.40**	1					
7.Anxiety	.26**	.20**	.41**	.46**	.41**	.47**	1				
8.Hostility	.10**	.05	.30**	.37**	.24**	.45**	.30**	1			
9.Phobic Anxiety	.11**	.06	.37**	.31**	.30**	.38**	.30**	.30**	1		
10.Paranoid Ideation	.04	.03	.16**	.17**	.16**	.19**	.12**	.13**	.11*	1	
11.Psychoticism	.22**	.10*	.36**	.37**	.32**	.39**	.41**	.27**	.27**	.12**	1

Note: SHSI-TR: Self-Harm Screening Inventory Turkish Form; SRS: Suicide Rumination Scale; *p<.05; **p<.01

Table 4. Findings related to SHSI-TR's reliability analysis

Item	Cronbach alfa	Guttman split-half	Cronbach alfa if item deleted	Corrected item-total correlation
SHSI-TR	.72	.73		
I1			0.683	0.356
I2			0.703	0.249
I3			0.688	0.335
I4			0.682	0.361
I5			0.691	0.308
I6			0.682	0.364
I7			0.663	0.461
I8			0.674	0.412
I9			0.682	0.363
I10			0.669	0.449

SHSI-TR: Self-Harm Screening Inventory Turkish Form

Discriminant validity

To evaluate the discriminant validity of the SHSI-TR, a series of ROC analyses were conducted using each subscale of the SCL-90-R as the reference Criterion (see Table 5). The ability of the total score to differentiate between individuals who met or did not meet the clinical threshold was assessed by examining the area under the curve (AUC) values.

The results showed that the scale had a strong discriminant validity for the Depression subscale, with an AUC of 0.740 (p = .000; 95% CI = 0.655–0.825), indicating a good level of accuracy in distinguishing individuals with depressive symptoms. Similarly, the Anxiety subscale yielded a statistically significant AUC of 0.624 (p = .000; 95% CI = 0.564–0.684), suggesting a moderate discriminative capacity (see Fig. 1).

On the other hand, the AUC values for the Somatization (AUC = 0.536, p = .157), Obsessive-Compulsive (AUC = 0.502, p = .937), Interpersonal Sensitivity (AUC = 0.532, p = .225), and Phobic Anxiety (AUC = 0.525, p = .319) subscales were not statistically significant. These findings indicate that the total score of the developed scale does not effectively distinguish individuals with these specific symptom patterns.

Moreover, no ROC analyses could be performed for the Hostility, Paranoid Ideation, and Psychoticism subscales due to the absence of any participants scoring above the clinical cut-off on these dimensions. This lack of data suggests that these symptom domains were not adequately represented within the sample, limiting the ability to assess the scale's discriminant validity in these areas. In summary, the SHSI-TR demonstrates acceptable discriminant validity for depression and anxiety symptoms.

Table 5. Discriminant validity results

Subscale	AUC	p	95% CI (Lower)	95% CI (Upper)
Depression	0.740	0.000	0.655	0.825
Anxiety	0.624	0.000	0.564	0.684
Somatization	0.536	0.157	0.485	0.587
Obsessive-Compulsive	0.502	0.937	0.452	0.552
Interpersonal Sensitivity	0.532	0.225	0.480	0.583
Phobic Anxiety	0.525	0.319	0.476	0.574

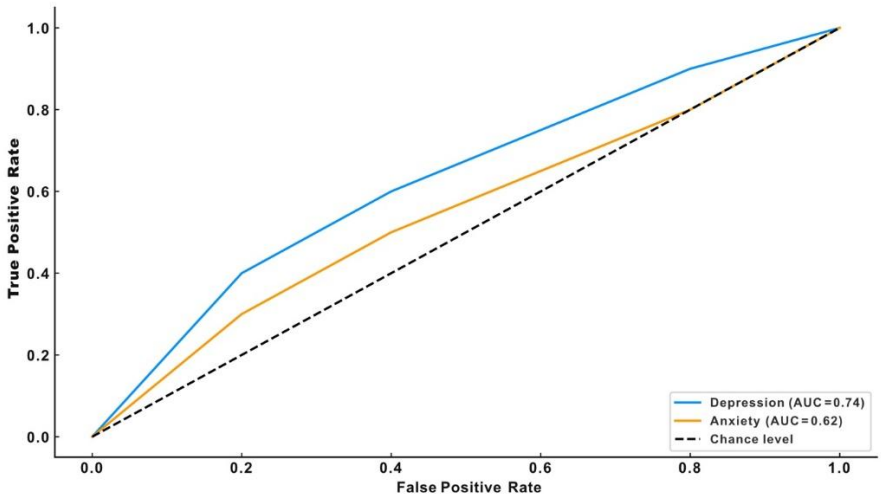

Fig. 1. ROC analysis results for anxiety and depression

DISCUSSION

Within the scope of this study, the Self-Harm Screening Inventory (SHSI) developed by Kim and colleagues[34] to assess self-harm behaviors was translated into Turkish, and its psychometric properties were examined. The SHSI-TR is a short, structured self-report scale designed to quickly and reliably identify nonsuicidal self-injury (NSSI) behaviors in adolescents. It is important to adapt the scale to our culture for future studies on this topic in our country.

The SHSI-TR includes a question about indirect self-harming behavior, such as drug overdosing, along with nine questions about NSSI behaviors that cause moderate physical harm defined in the DSM-5 NSSID A criteria. Pill overdosing is quite common among young people. The reason is considered indirect is that the DSM-5 definition of NSSI requires it to result directly in bleeding, bruising, or pain. However, the adverse consequences of pill overdosing are not usually immediate. Although drug overdosing is considered suicidal behavior, most young people report that their intention is self-harm rather than suicide[42]. This suggests that traditionally defined "indirect" self-harming behaviors may have some directly harmful intentions in common with NSSI. Direct and indirect forms of self-injury often co-occur[43]. Except for drug overdosing, the SHSI-TR does not include items related to indirect self-harming behaviors such as "reckless driving", "unsafe sexual intercourse", "problematic overexercise", and "disordered eating". The remaining nine items in the SHSI-TR assess direct NSSI behaviors as defined in DSM-5 NSSID Criterion A.

DSM-5 NSSID Criterion A concerns the frequency and duration of NSSI. More specifically, to meet the criterion of "intentional self-inflicted damage,"[13] must have occurred on five or more days over the past year. This threshold was based on the idea that five or more acts of NSSI provided evidence of a repetitive problem[44]. The SHSI-TR includes the statement "at least once in the last year" in relation to the NSSI. However, considering the findings and reasons mentioned in the introduction section, i.e., taking into account the importance of NSSI frequency, a statement inquiring about the frequency of the behavior could be added to the screening inventory in line with the literature. This frequency question could be included below the scale. The statement we suggest is "If you answered yes to one or more of the above items, how often did you engage in this behavior or behavior in the past year? The following answers indicate the total number of days on which self-harming behavior occurred in the previous year. a) 1-5 b) 5-10 c) 10-25 d) More than 25". Therefore, the frequency question will enable the evaluation of psychiatric disorders or psychosocial factors related to NSSID or, more generally, to NSSI (see Supplementary Material).

In addition to the frequency of NSSI, the SHSI-TR also includes the most common NSSI methods observed in youth. For example, the most common NSSI methods, such as cutting, banging or hitting, severe scratching, carving, and scraping[11,12] are included in the SHSI-TR. In other words, the SHSI-TR allows for the evaluation of different NSSI methods or the average number of NSSI methods.

The construct validity of the SHSI-TR was evaluated via both classical test theory and item response theory (IRT) approaches; it was found that factor loadings were moderate and supported a unidimensional structure. GRM analyses conducted within the MIM framework revealed that the discriminant validity coefficients of the items were generally moderate-to-high. Moreover, the difficulty parameters were distributed in a manner capable of distinguishing individuals with varying levels of self-harm tendencies. These results indicate that the SHSI-TR items adequately reflect the targeted latent trait and possess strong psychometric measurement properties. The internal consistency coefficient (.70) and split-half reliability coefficient (.73) of the SHSI-TR indicate that the scale possesses adequate reliability.

Regarding criterion validity, the moderate positive correlation (r=.32) between SHSI-TR scores and the SRS indicates that the scale is meaningfully related to an instrument measuring similar constructs. This finding is consistent with the relationships found for the Inventory of Self-Harm Statements (ISAS) developed by Klonsky and Glenn[45]. Additionally, the significant relationships between SHSI-TR scores and SCL-90-R subscales, particularly depression (r = .26), anxiety (r = .22), and psychoticism (r = .22), confirm the relationships reported in the literature between NSSI behaviors and psychopathologies[28,46].

In the present study, the relationship between SHSI-TR total scores and depression symptoms (r = .26)

was similar to the relationships reported by Whitlock and colleagues[47] (r = .30–.38). This finding supports the hypothesis that NSSI may be used as a coping strategy for emotional distress[21,48]. Similarly, the relationship observed with anxiety symptoms (r=.22) supports models suggesting that NSSI may function as a coping mechanism in anxiety management[1,22]. In our study, the potential of the SHSI-TR to determine prevalence rates among Turkish adolescents is also important. Previous studies on the prevalence of NSSI in Turkey have shown that 21.4% of adolescents have experienced such behaviors[6]. This rate is higher than the prevalence rates reported in other countries (United States 14%, China 17%, United Kingdom 10%)[8]. The availability of a culturally adapted, short, and effective screening tool such as the SHSI-TR could facilitate the early identification of at-risk adolescents and the development of appropriate intervention programs.

The SHSI-TR measures different NSSI methods and their frequency of use in youths with different psychopathologies, such as NSSID, major depressive disorder, dysthymia/persistent depressive disorder, anxiety disorders such as generalized or social anxiety disorder, trauma-related disorders such as post-traumatic stress disorder, borderline personality traits or other personality disorders, eating disorders such as bulimia nervosa, and neurodevelopmental and disruptive behavior disorders such as ADHD and conduct disorders. Moreover, considering the challenges of adapting scales developed in Western societies to Eastern cultures[32], successfully adapting the SHSI to Turkish culture is a significant achievement. Owing to the SHSI's structure, which includes more universal items related to NSSI behaviors.

Given the strong association between NSSID in adolescence and suicide attempts[24], the use of the SHSI-TR in clinical settings is particularly important. The scale's short format allows for rapid screening, which provides a critical advantage in the early identification of at-risk adolescents. Considering that 70% of adolescents who regularly engage in NSSI have attempted suicide[24], the SHSI-TR is expected to be an important tool in planning preventive interventions. Preliminary recognition of NSSID is likely to facilitate the planning of interventions for NSSI. Specific interventions for NSSI are now being developed[49]. However, much more needs to be done. Given the link between NSSI and suicide risk, treating NSSI may increase suicide prevention efforts, which provides a powerful incentive to focus research attention on this area in a timely way.

The IRT analysis results indicate that the scale items can distinguish between different severity levels of NSSI behavior. In particular, the high difficulty parameters of items I6 and I4 highlight their potential to identify individuals at serious risk of self-harm. This feature is valuable for determining risk levels in clinical assessments. Similarly, Baker[50] emphasized that the ability of scales based on item response theory to distinguish between different levels of characteristics is critical in clinical assessments.

When the SHSI-TR is compared with the original Korean version of the SHSI developed by Kim et al.[34], both versions demonstrate strong psychometric characteristics. The original scale reported a Cronbach's alpha of .79 and high test–retest reliability over a four-week interval (r = .79), indicating temporal stability[34]. Confirmatory factor analysis supported a unidimensional structure with excellent fit indices (RMSEA = .053, CFI = .981, TLI = .975). Similarly, the SHSI-TR also reflected a unidimensional structure, with factor loadings ranging from .313-.940 and a Cronbach's alpha of .72. Although slightly lower, the internal consistency of the Turkish version remains within acceptable thresholds. Notably, item I7 in the SHSI-TR demonstrated particularly high discriminative power (λ = .940, a = 4.675), whereas item I2 showed a relatively lower loading (λ = .313), possibly due to linguistic or cultural nuances in how certain behaviors are interpreted in the Turkish context. These findings suggest that while the SHSI-TR retains the theoretical and structural integrity of the original version, cultural and linguistic differences may influence item performance, underscoring the importance of culturally sensitive adaptation procedures[51].

Our study also has several limitations. First, the fact that the sample consisted only of high school students in one province limits the generalizability of the findings. Second, the use of self-report instruments to screen for NSSI behaviors may lead to social desirability bias. Future studies should consider using multiple assessment methods (e.g., clinical interviews, parent reports) and working with more extensive and diverse samples. Additionally, assessing the test–retest reliability of the SHSI-TR and its predictive validity through longer-term follow-up studies could be important objectives for future research. Furthermore, examining the discriminative validity of the SHSI-TR in clinical and nonclinical

samples would be valuable for evaluating the scale's diagnostic potential. Finally, the relatively low internal consistency (α = .66) observed for the Turkish version of the Suicide Rumination Scale (SRS) should be noted as a limitation. This may be due to age-related comprehension issues, translation nuances, or cultural stigma surrounding the expression of suicidal ideation in Turkish adolescents. Future research should re-examine the SRS across developmental and cultural subgroups to improve its reliability.

Considering that NSSI behaviors are more prevalent in Turkey than in other countries and that a significant proportion of adolescents exhibiting these behaviors attempt suicide, the importance of short, practical, and psychometrically robust screening tools such as the SHSI-TR becomes even more apparent. The short format of the scale enables rapid screening in schools, contributing to the early identification of at-risk adolescents, and in clinical settings, it facilitates the evaluation of psychiatric disorders or psychosocial factors related to NSSI, allowing for the planning of interventions for NSSI.

However, considering the current study's limitations, some recommendations can be made. Future research examining the psychometric properties of the SHSI-TR in different regions and with more diverse samples (clinical and nonclinical) would increase the generalizability of the scale. Evaluating the test–retest reliability of the SHSI-TR is important for determining the consistency of the measurement tool over time. Designing longitudinal studies to examine the predictive validity of the SHSI-TR may reveal its potential for use in early intervention programs. Examining the relationships between the SHSI-TR and other self-harm scales already adapted into Turkish may provide additional evidence for the scale's convergent validity. Comparing SHSI-TR results with those of multiple assessment methods, such as clinical interviews and parent reports, may help overcome the limitations of self-report instruments.

Furthermore, conducting cutoff point studies to determine the sensitivity and specificity values of the SHSI-TR may improve its diagnostic accuracy as a screening tool. Furthermore, the use of the SHSI-TR to evaluate the effectiveness of prevention and intervention programs developed for self-harm behaviors will increase the scale's practical value. Integrating SHSI-TR into digital platforms may facilitate large-scale screenings and risk assessments in regions with limited healthcare services.

In conclusion, the Turkish version of the SHSI-TR emerges as a culturally appropriate measurement tool that can be used confidently to assess self-harm behaviors. The widespread use of this scale has the potential to significantly contribute to the early detection of self-harm behaviors among adolescents in Turkey and the development of intervention programs accordingly.

Author Contributions: Concept/Design : OY, LT, CY; Data acquisition: OY, CY; Data analysis and interpretation: OY; Drafting manuscript: OY, CY; Critical revision of manuscript: LT; Final approval and accountability: OY, LT, CY; Technical or material support: -; Supervision: LT; Securing funding (if available): n/a.
Ethical Approval: This study was conducted in accordance with the permission obtained from the ethics committee of a Toros University (2024/90).
All participants and one of their guardians completed an informed voluntary consent form. Subjects participated voluntarily and were free to withdraw at any time.
Peer-review: Externally peer-reviewed.
Conflict of Interest: The authors declare no competing interests.
Financial Disclosure: This research did not receive support from any funding agency/industry.
Acknowledgement: We would like to express our sincere appreciation to all the participants who generously shared their time and provided valuable insights for this study. We also extend our gratitude to the school principals for their support in facilitating the data collection process.

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