METHODOLOGY

Validity and reliability study of the Turkish version of the Salutogenic Health Indicator Scale

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Funding information
This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

Abstract

Aims: The aim of this study was to assess the validity and reliability of the Salutogenic Health Indicator Scale (SHIS) among a sample of Turkish university students.

Methods: This study was conducted with 291 university students. The SHIS was evaluated in terms of language equivalence, validity and the reliability. Content validity was assessed with the content validity index (CVI). Construct validity was determined by confirmatory factor analysis (CFA). A Cronbach's alpha reliability coefficient was used for the analysis of internal consistency, a Pearson's correlation coefficient was used for parallel form reliability, and the intraclass correlation coefficient (ICC) was used for the test–retest technique.

Results: The CVI of the SHIS was between 0.80 and 1.00. When the results of the CFA were examined, the factor loadings of all items were above 0.50. A statistically significant moderate positive correlation was found between the SHIS and the Sense of Coherence (SOC) scores for parallel form reliability ($r = 0.489$). Within the scope of the test–retest analysis, an $ICC = 0.762$ was determined ($p < 0.001$).

Conclusion: The findings obtained from this validity and reliability study carried out on a sample of Turkish university students showed that the SHIS was both valid and reliable.

KEYWORDS
health, reliability, salutogenic, validity, well-being

Summary statement

What is already known about this topic?

- In recent years, as awareness of the impact of stress on human life has grown, the significance of the salutogenesis concept has increased, resulting in an upsurge in related studies.
- Several studies have shown the robust psychometric properties and validity of the Salutogenic Health Indicator Scale (SHIS).

- SHIS, being a semantic type of scale, sets it apart from other measurement scales in the literature that assess positive health and salutogenic health due to its structure.

What this paper adds?

- The results of this adaptation study, which was carried out on a sample of Turkish university students, showed that the SHIS is a valid and reliable tool for measuring health in Turkish culture.

The implications of this paper:

- A culturally and developmentally appropriate, valid and reliable tool can enable individuals to recognize health indicators, resources and coping skills.
- SHIS can be utilized by healthcare professionals, particularly nurses responsible for patient care, researchers, educators and university students. It proves valuable in conducting comprehensive evaluations of health, positive health and well-being care, as well as in the planning, development and evaluation of suitable intervention programmes.

1 | INTRODUCTION

In the mid-1970s, Antonovsky conducted studies on various forms of health status, questioned how individuals could stay healthy in stressful situations and ultimately introduced the salutogenic model (Antonovsky, 1996). Unlike the traditional pathogenic model, which focuses on pathogenic factors, the salutogenic model focuses on factors that contribute to health and well-being (Lindström & Eriksson, 2006; Vinje et al., 2016). Moreover, the model deals mainly with the correlation between health, stress and coping skills (Álvarez et al., 2021). In recent years, the concept of salutogenesis has gained more importance, and the number of related studies has increased as awareness of the effect of stress on people's lives has grown (Aci & Kutlu, 2022; Kananikandeh et al., 2022; Ward et al., 2014).

In the literature, several tools have been identified for measuring salutogenic health (Becker et al., 2008, 2009; Van Vliet et al., 2021). Various studies have demonstrated the robust psychometric properties and validity of the Salutogenic Health Indicator Scale (SHIS) (Hult & Valimaki, 2023; Nilsson Lindström et al., 2018). Nilsson Lindström et al. (2018) conducted cognitive interviews to assess the validity of the SHIS, and the results indicated its high validity from a qualitative perspective. Hult and Valimaki (2023) conducted a validation study on the SHIS, finding strong evidence of its reliability and structural validity in assessing salutogenic factors, as well as measuring health, positive health and well-being. Furthermore, in the literature, there are previous studies that utilized SHIS as a measurement tool in various populations (Ahlstrand et al., 2022; Persson et al., 2018).

In this study, the sample group consists of university students, who are defined as young individuals by the World Health Organization (WHO) and focuses on this age group in the context of

adolescent health (WHO, 2020). This developmental phase is characterized by various physiological changes as well as cognitive, emotional and behavioural transformations. Several studies investigating physical development have demonstrated that adolescents with higher levels of sense of coherence (SOC) tend to report a healthier lifestyle, improved quality of life and overall well-being (Braun-Lewensohn et al., 2017; Warne et al., 2017). A healthy lifestyle is associated with factors such as engaging in physical activity and exercise while also encompassing behaviours like smoking, alcohol consumption and dietary habits. Furthermore, adolescence is characterized by a progression towards independence, wherein individuals encounter complex social, emotional and cognitive processes as they navigate away from familial dependency (Molcho et al., 2007). Stress factors during this period include anxiety, anger, the externalization of psychological distress (such as depression) and challenging life events like child abuse, academic pressure, school or peer-related stress, in addition to typical stressors associated with daily life and familial conflicts (Braun-Lewensohn et al., 2017; Padilla-Moledo et al., 2015, 2016). Thus, there is a need to assess the health, positive health outcomes and well-being of the university students included in the sample group from a salutogenic perspective.

The practical aspects of the SHIS, such as its availability and accessibility, have been emphasized in the study conducted by Bringsén et al. (2009). Additionally, SHIS is a semantic type of scale based on its structure. Tools like the Salutogenic Wellness Promotion Scale (SWPS) or the My Positive Health (MPH) dialogue instrument, which measure positive health, are Likert-type scales (Becker et al., 2008, 2009; Van Vliet et al., 2021). Semantic scales demonstrate competitive or higher validity and reliability compared to numerical rating scales due to their ability to measure and differentiate the foundations and psychological structures in natural language

(Kjell et al., 2019). Moreover, because they are based on natural language and measure psychological structures, semantic measurements have the potential to complement and expand traditional rating scales (Kjell et al., 2019).

In conclusion, the motivation for translating the SHIS in this study can be justified based on its robust psychometric properties, comprehensive assessment of salutogenic factors and practical considerations supported by relevant literature (Bringsén et al., 2009; Hult & Valimaki, 2023; Nilsson Lindström et al., 2018; Persson et al., 2018). In this context, the aim of this study was to assess the validity and reliability of the SHIS, which was developed by Bringsén et al. (2009), among a sample of Turkish university students in terms of its ability to account for psychosocial dimensions, capacities and health resources.

2 | METHODS

2.1 | Design

This study was conducted as a methodological research to evaluate the validity and reliability of SHIS in Turkey.

2.2 | Sample and setting

The study population consisted of nursing students studying at the Department of Nursing at State University between April 2022 and May 2022. The size of the population to which factor analysis was applied was determined according to specifications by Comrey and Lee (1992). As indicated by Comrey and Lee (1992), a population of 300 nursing students was considered to be sufficient for determining the validity and reliability of the SHIS (Comrey & Lee, 1992; Erdoğan et al., 2014). Convenience sampling was used to recruit participants for the study. The inclusion criteria for the study were as follows: (1) actively studying in the nursing department and (2) agreement to participate in the study. Nine students who did not have a good command of the Turkish language and thus did not successfully respond to the items on the SHIS were excluded from the study. Thus, the final research sample comprised 291 students.

The researchers informed the participating nursing students that their participation was completely voluntary, provided them with a full explanation of the purpose of the study and received their informed consent before proceeding further. The data collected from the participants were derived from face-to-face interviews, lasting approximately 15–20 min, scheduled during their free time.

2.3 | Instruments

The data were collected via the following instruments: the Socio-Demographic Data Collection Form, the SHIS and the Sense of Coherence (SOC) Scale.

2.3.1 | Socio-Demographic Data Collection Form

This form was developed by researchers based upon a literature review (Aci & Kutlu, 2022; Garmy et al., 2017). The form consisted of five questions about age, gender, marital status, income level and place of residence.

2.3.2 | SHIS

This scale, developed by Bringsén et al. (2009), comprises 12 items aimed at generating a salutogenic and holistic perspective while assessing health via health indicators. The SHIS evaluates the opinions of respondents in the previous 4 weeks. The scale is structured such that positive statements lie on one side of the scale and negative statements on the other. Respondents indicate which side of the scale best reflects their views. The scale consists of two factors, namely, Intrapersonal Characteristics (IPC) and Interactive Function (IAF). The IPC subscale includes the following items: Tension (0.71), Illness (0.80), Energy Experience (0.81), Energy Level (0.77), Physical Function (0.76), State of Morale (0.66) and Sleep (0.65). The IAF subscale encompasses the following items: Expression of Feelings (0.81), Concentration (0.47), Creativity (0.66), Resolution (0.78) and Social Capacity (0.65). The SHIS questionnaire contains specific questions related to each item. Each question is given a score ranging from 1 to 6. A total score between 12 and 72 is obtained by summing the scores for all questions. Higher scores indicate better salutogenic health (Bringsén et al., 2009).

2.3.3 | SOC Scale

Developed by Antonovsky (1987), the SOC Scale is a self-assessment scale consisting of 13 items, each rated from 1 to 7. The scale allows the use of subscale scores and generates a total score. A high total score indicates a high sense of coherence. In reliability studies of the original version of the SOC, the internal consistency coefficients were calculated as 0.62 for 'meaningfulness', 0.54 for 'manageability', 0.57 for 'comprehensibility' and 0.69 for the overall scale (Antonovsky, 1987). The SOC was translated into Turkish by Scherler and Lajunen (1997). In a cross-cultural study by Scherler and Lajunen (1997) on a sample of 152 Turkish university students, it was determined, via confirmatory factor analysis (CFA), that the SOC had a three-factor structure (meaningfulness, manageability, comprehensibility). In their study, the internal consistency coefficients for each subscale were calculated as 0.67 for 'meaningfulness', 0.57 for 'manageability' and 0.60 for 'comprehensibility'. The internal consistency coefficient for the overall scale was determined to be 0.80 (Scherler & Lajunen, 1997).

2.4 | Data analysis

First, a validity study of the SHIS was conducted, after which a reliability study was performed (Table 1). The reliability analyses were

TABLE 1 Statistical methods used in examining validity and reliability of the SHIS.

Validity	Language validity	Translation from Swedish to Turkish Back-translation from Turkish to Swedish
	Content validity	Taking expert opinions (5 experts) Calculation of content validity index (CVI) using the Davis technique
	Construct validity	Confirmatory factor analysis (CFA)
Reliability	Internal consistency analysis	Calculation of Cronbach's alpha reliability coefficient
	Parallel form reliability	Pearson's correlation analysis
	Test–retest method	Pearson's correlation analysis

carried out using SPSS 26.0, and CFA was conducted using AMOS 22.0 software. In all statistical analyses in the study, the level of significance was established as $p < 0.05$.

2.4.1 | Validity analysis

The process employed to adapt the SHIS for the Turkish context and to conduct the validity study involved three stages:

1. Language validity
2. Content validity
3. Construct validity

For language validity, the SHIS was translated into Turkish by a translator fluent in the Swedish language. Afterwards, the SHIS was examined by a faculty member specialized in the relevant field as well as by a Turkish language and literature expert. The translation appropriate for each item was adopted. In the next step, the scale was translated back into Swedish by another expert both fluent in Swedish and proficient in Turkish. After this process was completed, the similarities and differences between the back-translated and original scale were compared. More precisely, the goal was to determine whether semantic shifts occurred during the translations and to reach a consensus concerning inconsistencies. In the last stage, a pilot test was conducted on a group of 30 people, the goal of which was to determine whether the items were understood. After these procedures were accomplished, the final version of the scale was obtained.

The Davis (1992) technique was used for content validity. The items on the final version of the SHIS, as recommended by five experts in the field of health as a result of language equivalence, were evaluated at four levels: (4) 'The item is appropriate', (3) 'The item should be slightly revised', (2) 'The item should be considerably revised', and (1) 'The item is not appropriate'. The experts who participated in the study, including Turkish academics living in Sweden, were contacted through social media groups.

In the Turkish adaptation of the SHIS, CFA was used to verify the compatibility of the factors for the purpose of construct validity. The CFA goodness-of-fit index was evaluated using χ^2/sd, GFI, AGFI, NFI, NNFI (TLI), CFI, RMSEA and SRMR (Schermelleh-Engel et al., 2003).

2.4.2 | Reliability analysis

Reliability analysis was carried out in three stages:

1. Internal consistency analysis
2. Parallel form reliability
3. Test–retest method

Cronbach's alpha reliability coefficients were calculated for the internal consistency analysis. Test–retest analysis was performed between the two measurements for time invariance. Two weeks after the SHIS was tested, it was tested again on 50 students. Parallel form reliability was conducted to assess the stability of the scale. For this measurement, the correlation between the SHIS total score and the SOC total score was examined with a Pearson's correlation coefficient. More specifically, a Pearson's correlation coefficient was used to measure the invariance of the scale over two time periods. The coefficient for both tests varies between -1 and $+1$. If the coefficient is close to -1 or $+1$, a close relationship is considered to exist between the two variables (approaching -1 indicates an inverse fit).

2.5 | Ethical considerations

Permission was obtained from the author of the scale. Approval was obtained from Ankara Medipol University Ethics Committee (Number: E-81477236-604.01.01-667, Decision number: 100) to conduct the study. Institutional permission (Number: E-45149639-300-42606, Date: 07.03.2022) was obtained from Bandırma Onyedi Eylül University Faculty of Health Sciences Department of Nursing section. Both written and verbal informed consent were obtained from the nursing students before their participation in the study.

3 | RESULTS

The analytical findings are presented below under three sub-sections: socio-demographic characteristics, validity findings and reliability findings.

3.1 | Socio-demographic characteristics

The average age of the participants was 20.66 ± 1.66, 83.3% of whom were female, 98.9% were single, 51.6% had an income equal to their expenses, 44.1% lived in a state dormitory and 30.6% lived at home with their parents (Table 2).

3.2 | Validity findings

3.2.1 | Language validity

The translation–back-translation method was used to confirm the language validity of the SHIS. Each item of the scale was examined individually by the researchers as well as with three people who knew Swedish and Turkish. Both the original and translated scale items were compared. Inappropriate items were evaluated again. The Turkish translation of the scale and the Swedish text of the original scale were assessed in terms of meaning, and, ultimately, language validity was confirmed.

3.2.2 | Content validity

When the expert opinions and content validity results regarding the SHIS were examined, it was found that the content validity index (CVI) of the items was between 0.80 and 1.00, higher than the standard level (0.80 and above).

3.2.3 | CFA

The measurement model established to confirm the appropriateness of structuring the scale with 12 items and two subscales, as in the original version of the scale, was analysed by CFA. It was observed from the analytical results that the scale did not show a sufficient fit. However, three modifications were made to the model that provided the largest conceptually appropriate chi-square reduction suggested by AMOS (Durak Batıgün et al., 2018; İlhan & Çetin, 2014; Yılmaz & Varol, 2015). The model's fit index had a value below 3 ($\chi^2 = 2.95$) after the modifications (Table 3). When the CFA results for the SHIS were examined, it was observed that the fit indices of the whole model were good or at an acceptable level (Schermelleh-Engel et al., 2003). Figure 1 shows the structure of the confirmed measurement model.

When the CFA results for the SHIS were examined, it was observed that the factor loadings of all items were above 0.50. According to the CFA results, the factor loadings of the items in the 'intrapersonal characteristics' subscale ranged between 0.56 and 0.82, and the factor loadings of the items in the 'interactive function' subscale ranged between 0.50 and 0.79 (Table 4). Also, Figure 1 shows the factor loadings of the scale.

3.3 | Reliability findings

3.3.1 | Internal consistency

It was seen that the SHIS ($\alpha = 0.91$), the intrapersonal characteristics subscale ($\alpha = 0.88$) and the interactive function subscale ($\alpha = 0.81$) were all highly reliable (Table 5).

The item-total correlation coefficients, which were employed to examine the correlation between the scores obtained from the test items of the SHIS and the total score of the test, are shown in Table 6. It was determined that the item-total correlation in the SHIS was below 0.30 and that no item decreased the Cronbach's alpha coefficient (Table 6).

3.3.2 | Parallel form reliability

For the parallel form reliability of the SHIS, the correlations between the SOC and SHIS scores used in the study were examined. The Cronbach's alpha (α) value of the SOC was found to be 0.71. Statistically significant correlations were found between the SHIS total score and the subscale mean scores and the SOC total score and the subscale mean scores ($p < 0.01$) (Table 7).

A statistically significant moderate positive correlation was found between the SHIS scores and SOC scores ($p < 0.01$). There was a

TABLE 2 Distribution of the socio-demographic characteristics of the participants ($n = 281$).

	Mean	SD
Age	20.66	1.66
	Number	Per cent
Gender		
Male	47	16.7
Female	234	83.3
Marital status		
Single	278	98.9
Married	3	1.1
Income status		
Income less than expenses	104	37.0
Income more than expenses	32	11.4
Income equal to expenses	145	51.6
Place of residence		
State dormitory	124	44.1
Home with parents	86	30.6
Home with friends	28	10.0
Home alone	13	4.6
Private dormitory	30	10.7

Abbreviation: SD, standard deviation.

Fit index	Fit index values of the model	Good fit values	Acceptable fit
x^2/SD	2.95	≤3	4–5
GFI	0.91	≥0.90	0.89–0.85
AGFI	0.86	≥0.90	0.89–0.85
IFI	0.97	≥0.95	0.94–0.90
TLI (NNFI)	0.94	≥0.95	0.94–0.90
CFI	0.95	≥0.95	0.94–0.90
RMSEA	0.07	≤0.05	0.06–0.08
SRMR	0.04	≤0.05	0.06–0.08

TABLE 3 Fit index values and good fit values of the SHIS's measurement model (n = 281).

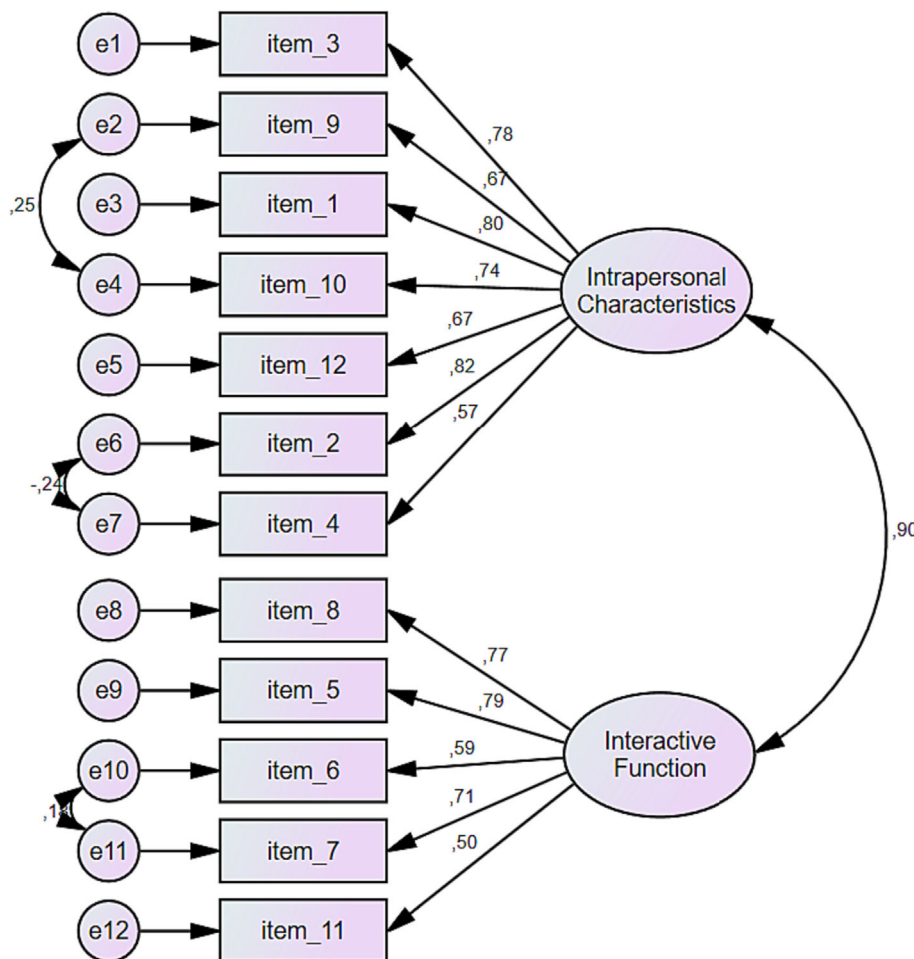Abbreviations: SD, standard deviation; SSEQ, Stroke Self-Efficacy Questionnaire.

FIGURE 1 Confirmatory factor analysis of the SHIS.

statistically significant moderate positive correlation between the SHIS scores and the scores of the 'comprehensibility' and 'meaningfulness' subscales and a statistically significant weak positive correlation between the SHIS scores and the scores of the 'manageability' subscale (p < 0.01) (Table 7).

A statistically significant moderate positive correlation was found between the scores of the intrapersonal characteristics subscale and the SOC scores (p < 0.01). There was a statistically significant moderate positive correlation between the scores of the intrapersonal characteristics subscale and the scores of the 'comprehensibility' and

'meaningfulness' subscales. Statistically significant weak positive correlations were found between the scores of the intrapersonal characteristics subscale and the 'manageability' subscale scores (p < 0.01) (Table 7).

A statistically significant moderate positive correlation was found between the scores of the interactive function subscale and the SOC scores (p < 0.01). There was a statistically significant moderate positive correlation between the interactive function subscale scores and the scores of the 'comprehensibility' and 'meaningfulness' subscales. Statistically significant weak positive correlations were found

between the interactive function subscale scores and the 'manageability' subscale scores ($p < 0.01$) (Table 7).

3.3.3 | Test–retest method

The SHIS was administered to 53 subjects 2 weeks later for test–retest analysis. Table 8 shows the correlation between the scores obtained from the first and second administrations to evaluate the time invariance of the scale among the 53 participants. Accordingly, the ICC was found to be 0.762 ($p < 0.001$).

4 | DISCUSSION

This study was conducted to evaluate the validity and reliability of the SHIS, developed by Bringsén et al. (2009), in the Turkish context. In the study, first, the language equivalence of the SHIS with its original version was provided by using the translation–back-translation method. The Turkish translation of the scale and the Swedish text of the original scale were evaluated in terms of meaning, and language validity was ensured. After the language equivalence, the content validity of the scale using the Davis (1992) technique, construct validity using CFA, calculation of internal consistency coefficients and the determination of reliability and parallel form reliability through the test–retest method were examined.

Content validity is carried out to evaluate whether an overall scale and its subscales measure what is desired and whether it expresses different concepts (Yeşilyurt & Çapraz, 2018). Expert opinions were sought to calculate the content validity of the SHIS in the present study. The quality and number of experts (between 5 and 40) are of great importance for obtaining objective results in the calculations of content validity. Additionally, numerous techniques can be employed to determine content validity. Among them, the Davis (1992) technique rates items, according to expert opinions, as (a) 'appropriate', (b) 'should be slightly revised', (c) 'should be considerably reviewed' and (d) 'not appropriate'—that is, on a 4-point scale. In this technique, the number of experts who mark (a) and (b) options is divided by the total number of experts to obtain the 'content validity index' for the item in question, and a value of 0.80 is considered the criterion for acceptance instead of comparing it with a statistical criterion (Yurdagül, 2005). In this study, the CVI of the items was found to be between 0.85 and 1.00, which was higher than the standard level (0.80 and above). These values showed that the content validity of the scale was sufficient.

The measurement model established to confirm the appropriateness of structuring the scale with 12 items and two subscales, as in the original scale, was analysed by CFA. The analytical results demonstrated that the model did not have an adequate fit. However, after three conceptually appropriate modifications to the model suggested by AMOS, all model fit indices were found to be good or at an acceptable level (Durak Batıgün et al., 2018; İlhan & Çetin, 2014;

TABLE 4 Factor loading values of SHIS items after CFA ($n = 281$).

Item	Intrapersonal characteristics	Interactive function
item_4	0.56	
item_2	0.82	
item_12	0.67	
item_10	0.74	
item_1	0.80	
item_9	0.66	
item_3	0.78	
item_11		0.50
item_7		0.71
item_6		0.59
item_5		0.79
item_8		0.77

TABLE 6 Cronbach's alpha values when item was deleted from the SHIS ($n = 281$).

Items	Item-total correlations	Cronbach's alpha when item was deleted
item_1	0.71	0.90
item_2	0.73	0.90
item_3	0.69	0.90
item_4	0.49	0.91
item_5	0.73	0.90
item_6	0.54	0.91
item_7	0.66	0.90
item_8	0.72	0.90
item_9	0.67	0.90
item_10	0.72	0.90
item_11	0.47	0.91
item_12	0.66	0.90

TABLE 5 Reliability analysis results of the SHIS ($n = 281$).

	Number of items	Cronbach's alpha (α)	Level of reliability
Salutogenic Health Indicator Scale (SHIS)	12	0.91	Highly reliable
Intrapersonal characteristics	7	0.88	Highly reliable
Interactive function	5	0.81	Highly reliable

TABLE 7   Correlation analysis between SOC and its subscales and the SHIS and its subscales ($n = 281$).

Scale		Salutogenic Health Indicator Scale	Intrapersonal characteristics	Interactive function
Sense of Coherence	r	0.48**	0.51**	0.53**
	p	<0.001	<0.001	<0.001
Comprehensibility	r	0.49**	0.53**	0.54**
	p	<0.001	<0.001	<0.001
Manageability	r	0.24**	0.24**	0.26**
	p	<0.001	<0.001	<0.001
Meaningfulness	r	0.38**	0.40**	0.41**
	p	<0.001	<0.001	<0.001

Abbreviation: r, Pearson's correlation coefficient.
**$p < 0.01$.

	ICC	Reference	p
Salutogenic Health Indicator Scale (SHIS)	0.762	<0.40 = weak 0.40–0.59 = moderate 0.60–0.74 = strong >0.74 = very strong	0.000*

TABLE 8   Intraclass correlation coefficient (ICC) between test–retest scores of the SHIS ($n = 281$).

*$p < 0.001$.

Yılmaz & Varol, 2015). If the fit indices were to yield bad results as a result of the model estimation, more modifications would be required to improve model fit, provided that the theoretical structure was adhered to such that the correlations between the variables could be better predicted (Aytaç & Öngen, 2012).

When the item factor loading values of the SHIS were examined, it was observed that the factor loadings of all items were above 0.50. The correlation of the items with the factors was explained by the factor loading value. Although there is no definite limit on the minimum value that an item must reach in order to enter any factor, 0.30 or 0.40 is generally recommended (Burns & Grove, 2001; Stevens, 1996). No item was removed from the scale because all items had factor loadings of more than 0.50. In general, a loading value between 0.30 and 0.59 is considered medium, whereas those ≥0.60 are considered high (Büyüköztürk, 2002). In this study, only two items had a medium factor loading (between 0.50 and 0.56), while the others had a high factor loading (between 0.66 and 0.82). These values were found to be sufficient as an indicator of the construct validity of the scale.

The internal consistency coefficient of the SHIS was evaluated with Cronbach's alpha values. In the literature, it is stated that the Cronbach's alpha value should be 0.70 or above for the scale to be considered reliable (Toygar & Kırlıoğlu, 2020). It was observed that the SHIS ($\alpha = 0.91$), its intrapersonal characteristics subscale ($\alpha = 0.88$) and its interactive function subscale ($\alpha = 0.81$) were all highly reliable. Similarly, the Cronbach's alpha reliability coefficient was determined to be 0.92 in the original study of the scale developed by Bringsén et al. (2009). Also, in a psychometric study conducted by Garmy et al. (2017) on adolescents in Sweden, the Cronbach's alpha

reliability coefficient of the SHIS was found to be 0.93. This demonstrates that the SHIS has very similar characteristics in both cultures.

In order to evaluate the contribution of the items of the scale to the total score of the scale and thus determine to what extent these items were correlated to the overall scale, item analysis was performed and the item-total score correlation coefficient was evaluated. The acceptable coefficient in item selection is expected to be greater than 0.25 (Erkuş, 2003). In the SHIS, which consists of 12 items, the item-total score correlation coefficients ranged between 0.47 and 0.73. In this study, it was determined that the item-total score correlation coefficients of all items were above 0.47 and no item decreased the Cronbach's alpha coefficient. For this reason, no item was removed from the scale as each item was sufficiently reliable.

For the reliability of the scale, the parallel form method was applied. Accordingly, the inter-correlations of the SOC and its subscales and the SHIS and its subscales were examined. A statistically significant moderate positive correlation was found between the scores of the SHIS and its intrapersonal characteristics and interactive function subscales and the scores of the SOC and its comprehensibility and meaningfulness subscales. There were statistically significant low-level positive correlations between the SHIS scores and the scores of its intrapersonal characteristics and interactive function subscales and the scores of SOC's manageability subscale. This may be because, despite the similarities between the SHIS and SOC definitions of health, the SHIS differs from the SOC in terms of the number and content of health-related dimensions (Bringsén et al., 2009). As part of the healthy development of a 'living' theory or model, there have been publications criticizing scales based on this model (Eriksson & Contu, 2022). Flensborg-Madsen et al. (2005a)

systematically reviewed more than 50 scientific publications published with the SOC-29 or SOC-13 scales. According to this study, they concluded that there was no strong relationship between SOC and physical health and that the SOC measured by these scales was a strong predictor of psychological health (Flensborg-Madsen et al., 2005a). However, Eriksson and Contu (2022), in their article evaluating the criticisms of the scales, state that the separation of the concept of SOC into physical and mental components significantly breaks away from Antonovsky's basic concept of 'orientation to life'. They argue that this separation also reinforces the physical health/mental health distinction, which is strongly opposed in modern healthcare (Eriksson & Contu, 2022). Flensborg-Madsen et al. (2005b) also criticized the scale for including a concept of predictability. In their study, they stated that it is a false assumption that a person achieves a high SOC, if his/her life seems predictable (Flensborg-Madsen et al., 2005b). They stated that people whose lives are mostly unpredictable have a high ability to cope with stimuli throughout their lives, so they are very strong people and have a high SOC (Flensborg-Madsen et al., 2005b). Despite these criticisms, Eriksson and Contu (2022) argue that the lack of predictability is not necessarily unhealthy; instead, unpredictability can provide the initiative, energy and positive attitude to survive in the first place (Eriksson & Contu, 2022). They report that having some measure of unpredictable experiences is essential for a strong SOC. In addition, they have stated that when predictability is very low or non-existent, there is often little that can be done other than hiding and hoping not to be noticed in the storm of life until the storm subsides (Eriksson & Contu, 2022).

Test–retest correlation, another reliability test, was used to evaluate the time invariance of the scale (Esin, 2015). This test was applied to the same group twice at a certain interval. The correlation between the scores of the first and second applications was calculated (Esin, 2015). The SHIS was applied again to 53 subjects 2 weeks later for test–retest analysis. The correlation between the scores obtained from the first and second applications was determined by the ICC. According to Barrett (2001), acceptable levels of ICC are as follows: weak <0.40; medium 0.40–0.59; good 0.60–0.74; and very good >0.74. In this study, the ICC was 0.76. It was thus determined that agreement between the answers given by the participants to the questions was very good. Similarly, in a study by Garmy et al. (2017), the ICC was 0.89. This may suggest that the SHIS has similar characteristics in both cultures.

4.1 | Limitations

The study was conducted with university students in Turkey. The results of the study cannot therefore be generalized to other age groups or different cultures. The fact that the scale contains a small number of items can be both an advantage and a disadvantage, as stated in both the original study of the scale and the validity and reliability study performed on adolescents (Bringsén et al., 2009; Garmy et al., 2017). It may be an advantage in terms of preventing participants from experiencing boredom and attention problems while answering the questions, thereby leading to more reliable answers (Bringsén et al., 2009; Garmy et al., 2017). The disadvantage is that a small number of items cannot cover all aspects of health and therefore risks losing potentially important information (Streiner & Norman, 2008).

5 | CONCLUSION AND IMPLICATIONS FOR PRACTICE

The results of this adaptation study, which was carried out on a sample of Turkish university students, showed that the SHIS is a valid and reliable tool for measuring health in Turkish culture. The efficacy of salutogenic-based interventions implemented by nurses can serve as a comprehensive assessment tool for evaluating health, positive health and well-being care within studies involving university students. Moreover, given the demanding work schedules of nurses, effective time management becomes crucial. In light of this situation, concerns may arise regarding the practicality of using scales that necessitate lengthy responses. Hence, the structure of the SHIS can effectively enhance motivation for both healthcare professionals, particularly nurses, and the individuals being evaluated, thereby promoting their active engagement in the evaluation process.

Some suggestions can be made within the framework of the findings obtained from the validity and reliability studies of the SHIS. First, in order to determine the concurrent validity of the scale, the correlations between the SHIS and scales with proven validity and reliability that assess various aspects of physical and psychological health and may be associated with the salutogenic model could be examined. In addition, the sample on which the validity and reliability studies of the scale were carried out consisted of university students. Therefore, studies on different samples are extremely important for determining the validity and reliability of the scale. Finally, conducting studies in which this scale will be used will contribute significantly to the reliability and validity of the SHIS.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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