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Turkish Validity and Reliability of the Salutogenesis Health Indicator Scale in Adolescents

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ABSTRACT
Objective: The aim of this study is to determine the validity and relability of the Salutogenesis Health Indicator Scale in adolescents in Türkiye. **Materials and Methods:** The study was conducted using a methodological design. The sample included 705 students in grades 7, 8, and 9. The Adolescent Salutogenesis Health Indicator Scale was used in the study. Number, percentage, confirmatory and explanatory factor analysis, cronbach alpha and test-retest reliability coefficients were used to evaluate the data. **Results:** The Kaiser-Meyer-Olkin value was 0.945. This value indicates that the sample size is sufficient for the analysis. Bartlett's test of sphericity value indicated that the data set was suitable for factor analysis (BS=3351.25, p<0.001), the model shows an acceptable fit. A unidimensional model was obtained by factor analysis. Since the model fit indices $\chi 2/df<3$, the model shows an acceptable fit. Cronbach's alpha value was 0.90 and the test-retest coefficient was 0.98(p<0.001). **Conclusion:** It has been determined that the Salutogenesis Health Indicator Scale in Adolescents is a valid and reliable measurement tool for the adolescents in Türkiye. The scale is short, understandable and easy to use.
Keywords: Adolescent, Reliability and Validity, Salutogenesis.

Adölesanlarda Salutogenez Sağlık Göstergesi Ölçeği'nin Türkçe Geçerlilik ve Güvenilirliği

ÖZ
Amaç: Bu çalışmanın amacı Adölesanlarda Salutogenez Sağlık Göstergesi Ölçeği'nin Türkçe geçerlik ve güvenirliğinin yapılmasıdır. **Gereç ve Yöntem:** Araştırma metodolojik tasarımdır. Örneklemi 7, 8 ve 9. sınıfa giden 705 öğrenci oluşturmuştur. Araştırmada Adölesanlarda Salutogenez Sağlık Göstergesi ölçeği kullanılmıştır. Verilerin değerlendirilmesinde sayı, yüzde, açıklayıcı ve doğrulayıcı faktör analizi, cronbach ve test- tekrar test güvenirlik katsayıları kullanılmıştır. **Bulgular:** Kaiser-Meier Olkin değeri 0.945 bulunmuştur. Bartlett Küresellik testi değeri, veri setinin faktör analizi için uygun olduğunu göstermiştir (BS=3351.25, p<0.001). Faktör analizi ile tek boyutlu model elde edilmiştir. Model uyum indeksleri $\chi 2/sd<3$ olduğu için model kabul edilebilir bir uyumu göstermektedir. Cronbach alfa değeri 0.90, test retest katsayısı 0.98'dir (p<0.001). **Sonuç:** Adölesanlar'da Salutogenez Sağlık Göstergesi ölçeğinin Türk adölesanları için geçerli ve güvenilir bir ölçüm aracı olduğu belirlenmiştir. Ölçek kısa, anlaşılır ve kullanımı kolaydır.
Anahtar Kelimeler: Adölesan, Güvenilirlilik ve Geçerlilik, Salutogenez.

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INTRODUCTION

Salutogenesis was proposed by Antonovsky in the 90's as a theory to guide health promotion (Antonovsky, 1996) and is derived from the words "saluto" (health) and genesis (source), meaning the source of health (Antonovsky, 1979). It has shifted the focus from medicine (care and treatment) to public health (prevention, protection and promotion and improving the health of the population (Eriksson & Lindström, 2008). The Salutogenesis health model aims to create positive health rather than focus on disease (Antonovsky, 1979). One tool used to measure positive health based on the Salutogenesis model is the Salutogenic Health Indicator Scale (SHIS).

SHIS, developed by Bringsén et al. (2009) addresses the physical, mental and social dimensions of well being holistically, but does not rule out disease, as it may prevent people from achieving their goals. SHIS was first used on hospital personnel. In the first study, a two-factor structure of the scale consisting of 12 items was revealed, but in the subsequent studies it was determined that the scale was unidimensional (Bringsén et al., 2009).

Lindström et al. (2018) also showed in their study with hospital staff that SHIS has a high validity in promoting health in the workplace. The study confirmed the psychometric properties of the SHIS in an adolescents and revealed the unidimensional structure of the scale (Garmy et al., 2017). In 2014, Warne et al. adapted the Positive Health Scale, a shorter version of the SHIS, to measure adolescents' health. The Salutogenesis model provides a positive paradigm approach to promoting well-being amongst adolescents. It fits into the 'glass half full' approach that is becoming increasingly evident in policy and practice. It is positive by definition because it questions what constitutes health rather than focusing solely on finding solutions to prevent or alleviate disease (Antonovsky, 1987). SHIS has the capacity to determine the salutogenic approach underlying health-improving resources. The short 12-item structure of the scale allows it to be used in community-based research on holistic health (Hult & Valimaki, 2023).

Although there is theoretical knowledge about the use of the Salutogenesis model in our country and the Family Sense of Coherence Scale, which was developed by Antonovsky and Soruani (1998) to measure the sense of coherence that forms the basis of the Salutogenesis model and whose Turkish validity and reliability was done by Çeçen (2007), there is no available measurement tool for adolescents. In this context, there is a need for a scale that uses the Salutogenesis model in adolescents.

This study aimed to test the reliability and validity of SHIS in Turkish adolescents. The research question was: "Is the SHIS the reliable and valid measurement instrument for Turkish adolescents?".

MATERIALS AND METHODS

Study type

The research conducted was of methodological type.

Study group

The population of the research consisted of 10.364 adolescents who were 7th, 8th and 9th grade students studying in a province in Türkiye during the 2017-2018 academic year. The sample size consisted of 705 students. Factor analysis is one of the analyses requiring a large sample. For sample size; 300 participants are considered as 'good', 500 participants as 'very good' and 1.000 participants as 'excellent' (Comrey & Lee, 2016). The sample size of this study can be considered as 'very good'. Amongst the schools located in the city centre, 8 junior schools and 4 high schools were selected by random selection method. By randomly selecting students, data collection tools were applied to 169 students for the second time three weeks later for test-retest. The average age of participants in the research was 14.23±0.84, 54.6% were male and 36.5% had mothers with primary school education, 29.8% had fathers with junior school education and 84.7% had a medium family income.

Dependent and independent variables

The independent variables of this research are gender, mothers and fathers' education and family income. The dependent variable is SHIS.

Procedures

The sociodemographic characteristics form and the SHIS were used to collect data. SHIS-Adolescent was developed by Bringsén et al. (2009) to determine health status. The scale consists of 12 items and also has 2 sub-scales. Adolescents are asked to take into consideration the last 4 weeks of their lives when answering the scale items. Scale items are scored as a 6-point Likert. Positively scored items are placed to the left of the health continuum line, and the negative items are placed to the right side. The SHIS was developed from a sample of 790 healthcare professionals to define positive health and measure individuals' health from a salutogenic perspective. Cronbach alpha values of 0.84 and 0.90 were obtained. It's validity and reliablity were conducted by Garmy et al. (2017) in amongst Swedish adolescents aged 13-15. The scale is one-dimensional. Higher scores indicate better salutogenic health. Cronbach's alpha value was found to be 0.9315 (Garmy et al., 2017).

Validity

Scope (content) validity

Language and content validity were performed using the translation-back-translation method. The scale was translated into Turkish by three experts who are fluent in Turkish and English. The scale was then back-translated into English by three different experts. The opinions of 10 experts at doctoral level working in different specialities in nursing were taken. Kendall's Coefficient of Agreement (Wa) was found to be compatible. For the semantic integrity and

language simplicity of the scale items, a preliminary application was made to 10 adolescent junior school students. The scale was given it's final version in line with the suggestions (Alpar 2020; Landis & Koch, 1977).

Construction(factor) validity

Exploratory Factor Analysis/Principal Components Analysis (EFA) and Confirmatory Factor Analysis (CFA) were used for construction validity. The suitability of the data was examined with the Kaiser-Meyer-Olkin (KMO) value and the Bartlett Sphericity Test (BS). The KMO value determines whether the sample size is sufficient for factor analysis. BS also shows whether the data has a multivariate normal distribution (Alpar, 2020, 2021; Çokluk et al., 2012; Tavşancıl, 2018).

Scale reliability

Internal consistency

As the value of the Cronbach Alpha Coefficient increases, it is assumed that the scale items are consistent with each other and consist of items examining the elements of the same feature (Alpar, 2020).

Test-retest

This is seen in cases where the same test is repeated. The test-retest coefficient is expected to be above 0.80 (Alpar, 2020).

Application of data collection tools

In order to determine the clarity of the questions and the application time before research, a preliminary application was done with 10 students from a school included in the sample. No changes were made to the form. Pre-application data was not included in the research. The response time of the scale varied between 3 and 5 minutes. Test-retest application was carried out with 169 students with an interval of 15 days.

Statistical analysis

Data were analyzed using SPSS v.22 and LISREL 8.54 programmes. Appropriate descriptive statistics of the data included in the study were calculated. CFA was performed with multivariate Mardia Kurtosis Normality Test, Variance Inflation Factor (VIF), KMO test, BS test, MINRES Factor analysis and Maximum Likelihood Estimation technique. The following programmes were used to evaluate suitability of the model; Chi-square(χ^2), p value, degree of freedom(Sd), Chi-square/degree of freedom(χ2/d>), Root Mean Square Error of Approximation(RMSA), Comparative Fit Index(CFI),Goodness of Fit Index(GFI), Adjusted Goodness of Fit Adjusted Goodness of Fit Index(AGFI), Standardised Root Mean Residual(SRMR) and Normed Fit Index(NFI). Cronbach's alpha α and test retest coefficients were calculated. $p<0.05$ was taken for statistical significance (Alpar, 2021; Cangur & Ercan, 2015; Çokluk et al., 2012; Landis & Koch, 1977; Tabachnick & Fidell, 2013; Tavşancıl, 2018;).

Ethical considerations

The Ethic committee approval from Non-Interventional Health Research Ethical Committee of a State University
(Approval No. 2017/151). Institutional permission were obtained from Provincial Directorate of National Education and Governorship (E.20486347). Since the students were under the age of 18, written consent was obtained from their parents. Permission was received via e-mail to adapt ASGÖ to Turkish. The study was conducted in accordance with the principles of the Declaration of Helsinki.

RESULTS

Validity

Scope validity

The results of the experts' evaluations were analysed using the Kendall W test (Wa =0.083, p =0.437).

Structure validity

A one-dimensional model was obtained with MINRES Factor analysis and the variance explanation rate of this factor was found to be 47.75%. KMO test statistic was calculated as 0.945 and BS test statistic was calculated as Chi-square=3351.25 $p<0.001$.

When the fit index values of the model were examined the following was found; χ2 is 118.30, p value <0.001, df value is 49, χ2/df value is 2.41, RMSEA value is 0.045, SRMR value is 0.027, CFI value is 0.99, NFI value is 0.99, GFI value is 0.97 value is 0.97 and AGFI value is 0.96 (Table 1). The path diagram of the model is presented in Figure 1.

Tablo 1. SHIS model conformity index (n=705).

χ2	**P**	**Df**	**χ2/df**	**RMSEA**
118.30	0.001	49	2.41	0.045
SRMR	**CFI**	**NFI**	**GFI**	**AGFI**
0.027	0.99	0.99	0.97	0.96

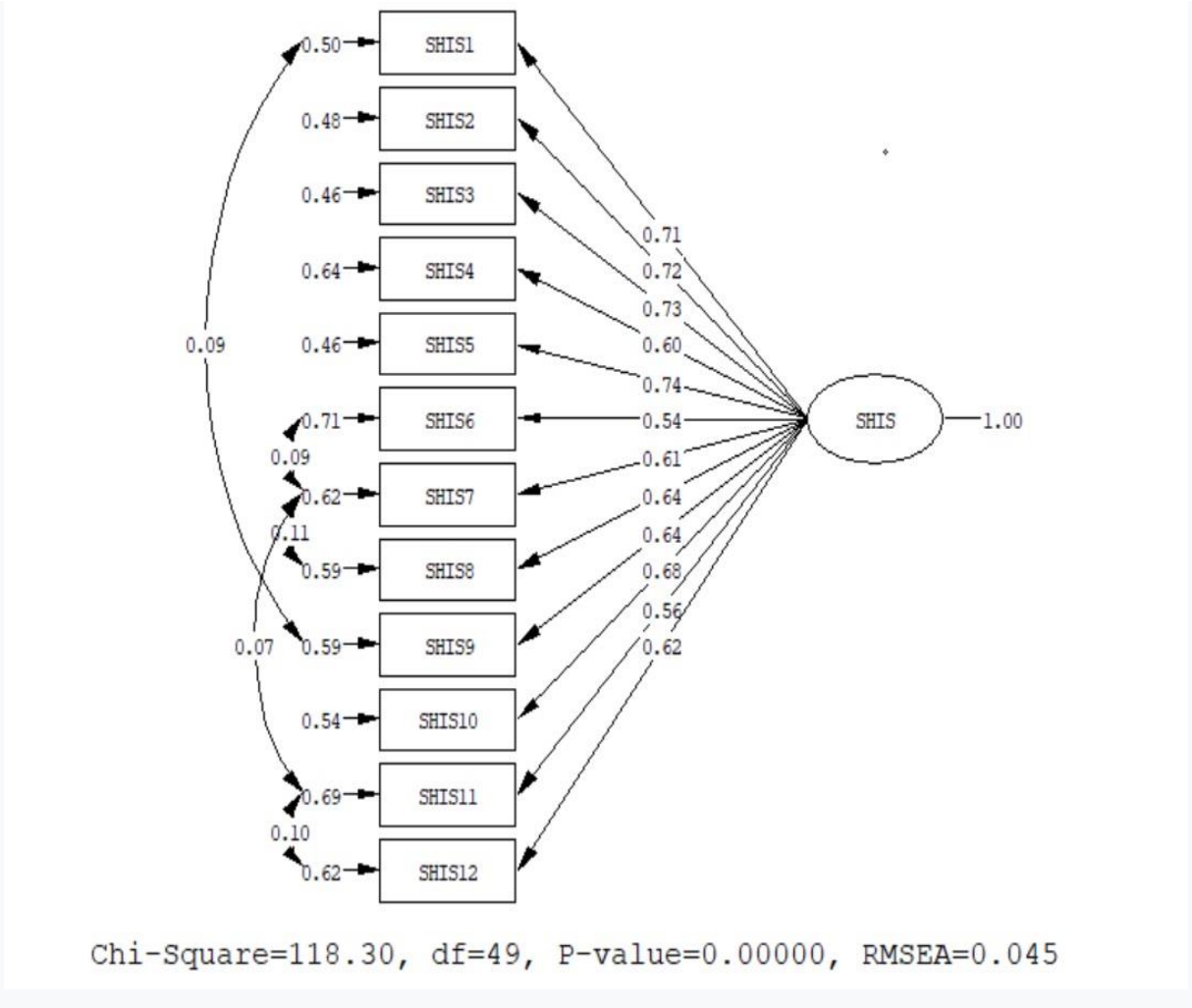

Figure 1. Standardised solution of the path diagram of the conceptual model.

In Figure 2, the t-values of the path coefficients as a result of the hypothesis test are given on the diagram. All items have a positive significant effect on the scale. Indicators that have a significant effect on the scale can be listed as SHIS5, SHIS3, SHIS2, SHIS1, SHIS10, SHIS8, SHIS9, SHIS12, SHIS7, SHIS4, SHIS11 and SHIS6 according to their effect levels. As each indicator score increases, the SHIS total scale score also increases. The most important and largest effect on the scale belongs to SHIS5 (b5=0.74 t=21.94>1.96). It can be said that as the level of concentrating easily (SHIS5) increases, the SHIS scale score also increases. When the entire model is evaluated, the first 3 items that contribute the most are SHIS5 (b5=0.74 t=21.94>1.96), SHIS3 (b3=0.73 t=21.77>1.96) and SHIS2 (b2=0.72 t=21.32>1.96). The least contributing items are found to be SHIS6 (b6=0.54 t=14.61>1.96), SHIS11 (b11=0.56 t=15.35>1.96) and SHIS4 (b4=0.60 t=16.68>1.96). In this model there are significant relationships between SHIS7 and SHIS6, SHIS8, SHIS11, SHIS1 and SHIS9, and also SHIS11 and SHIS12.

Reliability

Internal consistency analysis

Cronbach's α was found to be 0.90.

Test-retest analysis

The test-retest coefficient of SHIS was found to be 0.98($p<0.001$).

DISCUSSION

Validity

Scope validity

When the evaluation catagories of the scale are not symmetrical and there are more than two raters, the Kendall W Good Agreement Coefficient is used. Kendall W value was used to evaluate the opinions of 10 experts in this study. When the Kendall W value is in the range of 0.81-1.00, it is assumed that there is a very good level of fit (Alpar, 2021). In this study, the experts who evaluated the SHIS reached a consensus on the scale items (Kendall W= 0.083 p= 0.437).

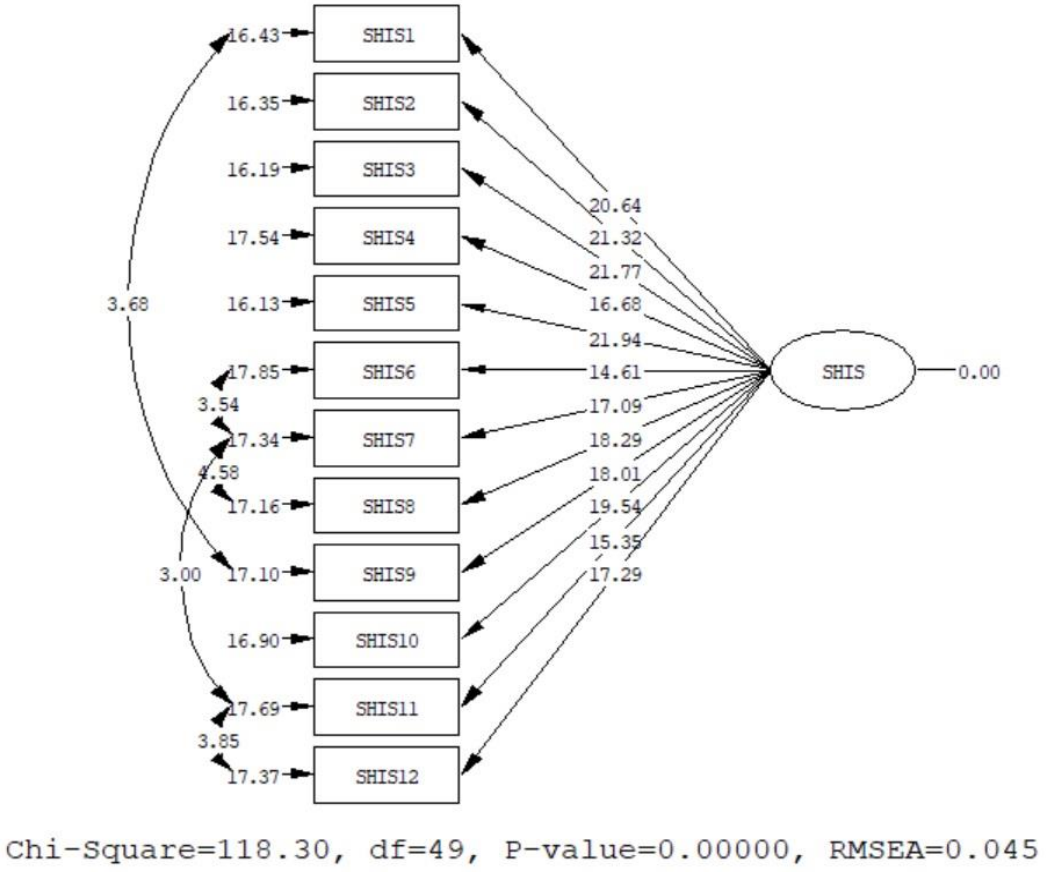

Figure 2. t values of the path diagram of the conceptual model.

Structure validity

Structure validity is the degree to which a test measures a characteristic that cannot be measured directly. One of the methods used to evaluate structure validity is factor analysis (Alpar, 2020 Alpar, 2021). KMO is used to determine suitability for factor analysis and KMO value varies between 0-1. The KMO value is expected to be greater than 0.80, and a value of 0.90-1.00 is considered very good for a sample adequacy (Alpar, 2021). In this research, the sample was considered sufficient for analysis as the KMO value was found to be high at 0.945. Garmy et.al. conducted a validity and reliability study of SHIS in adolescents and found the KMO value to be 0.95 (Garmy et.al., 2017). The sample size was found to be sufficient for both studies.

The BS test value is required to be below 0.50 (Çokluk et al., 2012; Tavşancıl, 2018). In this study it is assumed that the data is suitable for factor analysis if the BS test value is less than 0.05. Garmy et.al found the BS test value to be $p<0.001$ (Garmy et.al., 2017). The results of these two studies support each other.

In this study, MINRES Factor analysis revealed that the scale is one-dimensional and the variance explanation rate of this factor was 47.75%. In one-dimensional scales, the factor required to explain at least 40% of the total variance (Alpar, 2020). Therefore, the explained variance is sufficient. Garmy et.al (2007) conducted a validity and reliability study of the SHIS in an adolescent sample (13-15 years old) and found that SHIS was unidimensional and the explained variance was 66.9%. In an adult sample, as a result of principal component analysis, SHIS was found to be two-dimensional (Bringsén et al., 2009). The interpretation of this difference in scale size could be that it represents the differences between adults and adolescents. Additionally, methodological differences in adaptations in adult and adolescent samples may also explain this result. Bringsén et al. (2009) used principal component analysis with varimix rotation based on the Pearson correlation matrix and used the eigenvalue>1 rule to determine the number of dimensions. This study, as with Garmy et al. (2017) used factor analysis in the validity and reliability study conducted on an adolescent sample. While factor analysis is preferred when a theoretical solution that is original and uncontaminated by error variable is desired, and when an evaluation based on the underlying structures that expect to produce scores on the observed variables of the study is desired, principal component analysis is used when it is simply desired to present an empirical summary of the data set (Tabachnick & Fidell, 2013).

In confirmatory factor analysis, whether the model structure is compatible with the data is determined with the help of fit indice (Çokluk et al., 2012). Although the model obtained from this study was not found to be significant (Chi-square=118.30 df=49 p<0.001), when other model fit indices were examined, the model showed an acceptable fit as $\chi 2$ /df <3 (Cangur & Ercan, 2015). Since RMSEA<0.05 and SRMR<0.05 and CFI; NFI; GFI; AGFI indices are close to 1, it can be said that the model has a good fit (Table 1).

According to the results of this study, all items of the scale were found to have a positive significant effect on the scale. The items that affects the scale most is ASQ5(I could concentrate easily) and the item that affects the least is ASQ6 (I had many ideas, I was creative) (Figure 1-2).

Reliability

Internal consistency analysis

The higher the Cronbach's alpha value, the more consistent the scale items are with each other. The generally accepted value is expected to be 0.60 and above (Alpar, 2020, 2021). This study produced Cronbach's alpha 0.90 and therefore it can be said that SHIS has high reliability. Similarly, while the Cronbach alpha value was 0.93 in the adaptation of SHIS for adolescents, the alpha value was found to be between 0.84 and 0.92 in the adaptation for the adult sample (Bringsén et al.. 2009; Garmy et al., 2017). Acccording to this result, the scale adapted to different samples was found to have high reliability and in this context, it is clear that SHIS shows similar characteristics in both groups.

Test- retest reliability

The test-retest reliability coefficient of this study was 0.98 and therefore it can be said that the adaptation of SHIS into Turkish is reliable. In the study that adapted the SHIS to adolescents, the item-level test-retest reliability Kappa value was found to be between 0.53 and 0.79, while in the adaptation to the adult sample, the reliability coefficents were found to be between 0.44 and 0.67 (Bringsén et al., 2009; Garmy et al., 2017). As a result of both studies, it can be said that the scales are compatible at a moderate level.

Validity and reliability results of SHIS show that the Turkish form of the short and one-dimensional scale can be used to determine the Salutogenic health of adolescents in Türkiye. The acceptability of SHIS as an assessment tool in adolescents was supported in the literature by a similar methodological study by Garmy et al. (2017).

Study Limitations and Strengths

The findings of the research can be generalised to the students with whom the study was conducted. It was assumed that students answered the scale questions sincerely. SHIS is a valid and reliable measurement tool for Turkish adolescents studying in the 7th, 8th and 9th grade of junior and high schools.

CONCLUSION

It was concluded that SHIS is a valid and reliable measurement tool that can be used with Turkish adolescents. It is thought that this scale will contribute to improving the health of adolescents by being used to evaluate their health status.

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Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

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Ethical Approval

Institution: Non-Interventional Health Research Ethical Committee of a State University
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