

Validity, Reliability, and Factor Structure of the Suicide Crisis Scale in Turkish

ABSTRACT

Objective: In our study, we aimed to adapt the Suicide Crisis Inventory (SCI), which can be used specifically to assess the acute phase of suicide, to the Turkish population by examining its Turkish validity and reliability in a non-clinical sample.

Methods: In this cross-sectional study, a total of 300 university students aged 18-24 years were evaluated online using the Socio-demographic and Clinical Data Form, the SCI, and the Suicide Behavior Questionnaire (SBQ). Criterion validity, discriminative validity, and factor analyses (exploratory and confirmatory) were conducted for the validity of the SCI, and internal consistency and item-total correlations were examined for reliability analyses. Additionally, a linear regression model was constructed to assess the predictive validity of the SCI. The predictive validity of past SCI scores was evaluated using a simple regression model.

Results: When the linear regression model was tested with SCI scores as the independent variable and SBQ scores as the dependent variable [$F(1-298) = 203.625$; $P = .000$], it was found that the independent variable explained 41% of the variance in the dependent variable ($r = 0.637$; $r^2 = 0.406$). SCI scores significantly predicted SBQ scores ($t = 14.270$; $B = 0.047$; $B_{sth} = 0.003$; $\beta = 0.647$; $P = .000$). In the validity analysis, the items removed from the scale could be evaluated for the total score, as they did not belong to any factor as originally specified. When items were removed, the total item reliability was Cronbach's alpha = 0.981.

Conclusion: We believe that the SCI will be a useful tool in assessing short-term suicide risk in a Turkish sample and in conducting scientific research. The SCI was found to be sufficient for use in a Turkish sample for the evaluation of short-term suicide risk, considering some limitations.

Keywords: Reliability, suicide, suicide crisis, suicide risk, validity

Introduction

Every year, 1 million people worldwide lose their lives due to suicide,¹ and in our country, the rate of suicide-related deaths has been increasing over the years,² indicating that suicide is a significant public health issue in our country as well as globally. Understanding, evaluating, and treating suicide remains a subject of interest, and long-term risk factors for prediction have been investigated within certain theories^{3,4} However, there are fewer studies on short-term suicide risk assessment, which is considered an important area by psychiatrists, indicating a significant need for clinicians.⁵

While tools like the Beck Depression Inventory and Beck Hopelessness Scale are commonly used in suicide assessment and have proven effective in predicting suicidal behavior over longer periods,⁶⁻⁸ they are not adequately suited for measuring short-term suicide risk.⁹⁻¹¹ Suicide models have evolved from genetic and demographic approaches to dynamic assessments of the suicide process.¹²⁻¹⁵ The DSM-5 introduced "Suicidal Behavior Disorder" (SBD) in Section 3 to address diagnostic shortcomings, but it lacks warning signs for acute suicide risk.¹⁶ Given that individuals presenting with suicidal thoughts, intentions, or behaviors in



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emergency psychiatry settings are at high risk for long-term suicide,¹⁷⁻¹⁹ evaluating these patients for short-term risk is imperative.

The Suicide Trigger Scale (STS) was developed by Yaseen et al as a tool for short-term suicide risk assessment.^{14,20,21} Their research showed that the STS could predict suicide behavior within 6 months of discharge among high-risk patients.²² Factors such as “desperation” and “ruminative flooding” emerged as significant predictors of future suicide behavior.²³⁻²⁵ Building on this work, the Suicide Crisis Inventory (SCI) was developed to assess short-term suicidal behavior by expanding the scope to include “emotional pain” and “panic with fear of dying.”²⁶⁻²⁸ The SCI demonstrated significant predictive validity for short-term suicidal behavior in high-risk inpatients.²⁹ Recent developments, such as the SCI-2, have further refined our understanding of Suicide Crisis Syndrome (SCS) and its manifestations across different populations.^{30,31}

While suicidal ideation (SI) assessment is crucial, recent research recognizes its limitations in predicting short-term suicidal behavior.^{32,33} The SCI focuses on assessing this acute syndrome to predict short-term suicide risk without directly mentioning the term “suicide” in its items, thereby addressing the gap in assessing psychological processes associated with near-term risk. This makes it a valuable tool for clinicians working with individuals who may not disclose suicidal thoughts but are at risk for suicide attempts. The SCI reveals the short-term suicide risk with its dimensions and factor structure. It aims to understand suicide crisis syndrome by focusing on sudden changes that occur as opposed to long-term risk factors.

In our study, we aimed to adapt the SCI, suitable for the acute phase of suicide, to the Turkish population by assessing its Turkish validity and reliability. First, we aimed to assess the psychometric properties of the SCI in young adults who are active internet users and considered at risk for suicide despite not showing clinical symptoms.

Methods

Necessary permissions for using the Suicide Crisis Inventory (SCI) were obtained from Galynker and colleagues. The scale was translated into Turkish by 3 independent mental health professionals who are proficient in English and whose native language is Turkish, and who are familiar with the terminology in the field of suicide. These translations were reviewed by 2 adult psychiatry and mental health disorders instructors who are proficient in both English and Turkish. Discussions were held on translation alternatives, and suggestions were obtained regarding meaning, cultural appropriateness, and linguistic aspects. The most suitable suggestions were selected and implemented, and necessary adjustments were made to finalize the scale among the alternatives. To assess comprehensibility and suitability for the purpose, the Turkish version was administered to a pilot group of 20 individuals. After completing the scale, participants provided feedback on the comprehensibility and suitability of the language for the field. A back-translation form into English was

created by translating the translation form back into English by an English language professional who is not familiar with the scale. The original form and the back-translation form were evaluated for consistency in terms of meaning by an independent English language professional. No inconsistencies were identified in any item. Data security was ensured through Google Forms. According to the ©2018 Google Privacy Policy, the data of individuals who filled out the survey cannot be viewed by anyone other than the Project Manager (F.F.E.). The data were stored by the responsible researcher in a 2-stage protection system (email and phone system). Google Forms have been used in many studies, and software support was obtained when creating the survey. To ensure data reliability, scale data containing unanswered items and detected retest effects were not included in the evaluation. The study was approved by the Ethics Committee of Erenköy Mental and Neurological Diseases Training and Research Hospital (Approval No: 2; Date: 07.01.2019).

In this cross-sectional study, we obtained responses from a sample of 300 individuals between May and January 2019 through surveys posted on university forums and Facebook pages accessible via the internet. No advertising was used, and individuals had the opportunity to participate in the study by clicking on the relevant page titled “Suicide Crisis Inventory Study.” In validity and reliability studies, it is recommended to have a sample size of at least 300, and this number should be increased to at least 5 times the number of items.^{34,35} Therefore, we recruited 300 participants for our study.

Inclusion criteria were determined as individuals aged between 18 and 24 years with the ability to understand informed consent regardless of suicide risk level and the ability to fill out an online form voluntarily. Exclusion criteria for the study were the absence of any means of communication, homelessness, medical/neurological conditions, inability to understand/ fill out the consent form, and being under the age of 18 years. Data collected 6 months later were used, and the page was closed.

Socio-demographic and Clinical Data Form

This form was prepared by the researchers for this study. Individuals who agreed to participate began filling out the survey after reading and accepting the informed consent form. It was not mandatory to provide first and last names. The first question asked individuals whether they have ever had thoughts, intentions, or attempts of suicide in their lifetime. For those who answered “Yes, I have had such thoughts recently,” after answering all questions, were provided with the center’s contact information and phone number to refer to. Socio-demographic characteristics (age, gender, marital status, socioeconomic status, employment status, history of smoking, alcohol, substance use, if any, history of past suicide attempts, and means) are queried.

Suicide Crisis Inventory

The Suicide Crisis Inventory (SCI) is an expanded version of the previously reported Suicide Trigger Scale (STS-3), consisting of 49 items.²⁵⁻²⁸ To increase reliability, the response range of the Likert scale was expanded from 3 to 5 points. The 49-item SCI consists of 5 subscales: entrapment (13 items), panic dissociation (9 items), rumination flooding (7 items), emotional pain (4 items), and fear of death (3 items). The remaining items contribute to the total SCI score but are not assigned to a subscale. Items are self-rated on a 5-point scale ranging from “not at all=0” to “extremely=4.” Each subscale

MAIN POINTS

- *New tools are needed to assess acute suicide risk.*
- *The SCI is an appropriate measurement method to be used to assess acute suicide risk in a non-clinical population.*
- *The SCI needs to be investigated in a Turkish clinical sample.*

demonstrates good internal consistency in the study sample (entrainment: $\alpha=0.946$; panic dissociation: $\alpha=0.882$; rumination flooding: $\alpha=0.892$; emotional pain: $\alpha=0.878$; fear of death: $\alpha=0.796$).²⁹ In a study evaluating the psychometric properties of SCI, a total of 201 inpatients at high suicide risk were assessed for post-discharge suicidal ideation and suicidal behavior. The total score of SCI predicted short-term suicidal behavior with 64% sensitivity and 88% specificity at the optimal cutoff score (Odds Ratio [OR]: 13, $P=.003$), demonstrating significant predictive validity (Cronbach's alpha 0.97). SCI showed significant predictive validity and meaningful predictiveness for internal consistency and short-term suicidal behavior post-discharge compared with standard suicide determinants (suicidal ideation, depression, state, and anxiety trait).²⁹ Necessary permissions for using the SCI were obtained from Galynker and colleagues. The SCI was translated from English to Turkish by 3 different individuals, and discrepancies in language were compared by an expert psychiatrist to finalize the scale.

Suicide Behavior Questionnaire

The Suicide Behavior Questionnaire (SBQ) was developed by Linehan and colleagues and a Turkish validity and reliability study has been conducted. The scale consists of 4 items and is scored on a Likert scale. The first item pertains to a history of suicide attempts and has 6 options, scored from 0 to 5. The second item relates to suicidal ideation and has 5 options, scored from 0 to 4. The third item concerns suicide threats and is scored as 0 or 1. The fourth item relates to the repeatability of suicide attempts and is scored from 0 to 4. The total score ranges from 0 to 14, with higher scores indicating greater severity of suicidal behavior. Additionally, each item is evaluated separately, assessing 4 different aspects of behavior.^{27,36}

Availability of Data and Materials

The data supporting this study are available at (<https://docs.google.com/forms/d/1Po1X2YJNmewavVYFSAYW7IJXV0Cp1NSxTvnC4deyDQ/edit>) at Google Workspace. Access to data is subject to approval and a data sharing agreement as it contains personal information.

Analysis

For the validation and reliability analyses of the Suicide Crisis Scale, item analysis, oblique rotated principal component analysis, internal consistency analysis, criterion validity, and discriminant validity were conducted. Reliability was calculated via internal consistency analyses (Cronbach's alpha) and item characteristics were determined by means of item difficulties and item discriminations. Item discrimination is the correlation between a single item score and the total score of the respective scale. Thus, discrimination represents the extent to which the single-item score can predict the total score of the scale. Values of $r \geq 0.32$ are considered satisfactory. Construct validity was examined via correlations between the SCI and SBQ. Factorial validity was examined by performing a confirmatory factor analysis. Results on suicidality were determined via regression analyses. All statistical analyses were computed using IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Arming, NY: IBM Corp.

Results

A total of 300 university students with ages ranging from 18 to 24 years (mean age=21.32; standard deviation [SD]=1.744) participated in the online study. Among the participants, 55.3% were female ($n=166$; mean age=21.22; SD=1.813) and 44.7% were male

($n=134$; mean age=21.44; SD=1.652) students. The distribution of demographic characteristics of the participants is shown in Table 1.

The distributions and percentages of personal characteristics related to smoking, alcohol and substance use, and suicidal ideation among the participants are shown in Table 2.

Item Analysis

Before proceeding to the validation and reliability analyses of the SCI consisting of 50 items in its original form, each item in the scale underwent correlation analysis with the total score of the scale. In the initial item analysis, the fifth item containing the statement "Have you been afraid of dying?" ($r=0.125$; $P=.030$) and the 50th item containing the statement "Did you know that these feelings were temporary and would eventually pass while experiencing them?" ($r=-0.060$; $P=.296$) were removed from the scale due to correlation coefficients below $r=0.20$. After removing these items from the scale, the total score of the scale was calculated for the remaining 48 items, and correlation analysis between the remaining items and the total item score was conducted. In the correlation analysis between the remaining 48 items and the total item score, correlation coefficients ranged from [$r=0.460$; $P=.000$ (item 1)] to [$r=0.880$; $P=.000$ (item 44)]. Following the item analysis, factor analysis was conducted with the remaining 48 items.

Table 1. Distribution and Percentages of Participants' Demographic Characteristics

		Male n (%)	Female n (%)
Location/Living Area	City	152 (91.6)	108 (80.6)
	District	14 (8.4)	24 (17.9)
	Village	0 (0)	2 (1.5)
Socioeconomic status	Below the minimum wage	76 (45.8)	69 (51.5)
	10 000-20 000 TL	45 (27.1)	45 (33.6)
	20 000-500 000 TL	23 (13.9)	11 (8.2)
	500 000 TL and above	22 (13.3)	9 (6.7)
Marital status	Single	163 (98.2)	133 (99.3)
	Married	3 (1.8)	1 (0.7)
Children	No	165 (99.4)	133 (99.3)
	Yes	1 (0.6)	1 (0.7)
Siblings	Only child	44 (26.5)	20 (14.9)
	Two siblings	65 (39.2)	57 (42.5)
	Three siblings and more	57 (34.3)	57 (42.5)
Active employment	No	127 (76.5)	99 (73.9)
	Yes	39 (23.5)	35 (26.1)
Occupation	Health sector	18 (10.8)	11 (8.2)
	Engineering/architecture	10 (6)	21 (15.7)
	Education sector	23 (13.9)	18 (13.4)
	Finance and financial affairs	4 (2.4)	2 (1.5)
	Tourism sector	3 (1.8)	6 (4.5)
	Entertainment/culture sector	6 (3.6)	0 (0)
	Advertising, congress, fair and exhibition sector	2 (1.2)	1 (0.7)
	Transportation sector	1 (0.6)	2 (1.5)
	Other	99 (59.6)	73 (54.5)
	Total	166 (100)	134 (100)

TL, Turkish Lira.

Table 2. Distribution and Percentages of Participants' Personal Characteristics Related to Smoking, Alcohol, Substance Use, and Suicidal Thoughts

		Male n (%)	Female n (%)
Smoking	Non-smoker	103 (62.0)	75 (56)
	1-10 cigarettes/day	37 (22.3)	25 (18.7)
	11-20 cigarettes/day	20 (12.0)	25 (18.7)
	>20 cigarettes/day	6 (3.6)	9 (6.7)
Alcohol consumption	Non-drinker	72 (43.4)	58 (43.4)
	Everyday	8 (4.8)	4 (3.0)
	Weekly/monthly	49 (29.5)	40 (29.9)
	Less than monthly	37 (22.3)	32 (23.9)
Substance use	Never used	152 (91.6)	123 (91.8)
	Yes (cannabinoid, bonzai...vs)	12 (7.2)	7 (5.2)
	Yes (cocaine, ecstasy, amphetamine)	1 (0.6)	1 (0.7)
	Yes (inhalants)	0 (0.0)	1 (0.7)
	Yes (other substances)	1 (0.6)	2 (1.5)
Lifetime suicide attempt or ideation	Yes, I've been having these kinds of thoughts lately.	12 (7.2)	19 (14.2)
	Yes, I've had thoughts like this at some point in my life	84 (50.6)	52 (38.8)
	No, even during my worst times I never had thoughts of killing myself.	70 (42.2)	63 (47.0)
How have you had suicidal thoughts or attempts in the past?	With drugs	87 (52.4)	80 (59.7)
	With alcohol or substance	33 (19.9)	12 (9.0)
	With hanging	7 (4.2)	4 (3.0)
	With cutting or piercing tool	1 (0.6)	3 (2.2)
	With a firearm	16 (9.6)	9 (6.7)
	Jumping from a height	0 (0.0)	11 (8.2)
	With poison	21 (12.7)	14 (10.4)
	I have never had suicidal thoughts and attempt	1 (0.6)	1 (0.7)
Is there anyone around you who attempted suicide or died due to suicide?	None	115 (69.3)	92 (68.7)
	1st-degree relative	5 (3.0)	3 (2.2)
	2nd-degree relative	11 (6.6)	13 (9.7)
	Non-relative close person	35 (21.1)	26 (19.4)
Total		166 (100)	134 (100)

Exploratory Factor Analysis

The remaining 48 items of the scale underwent oblique rotated principal component analysis (KMO=0.97; Bartlett Test (1128)=13892.62; $P < .001$). As a result of the analysis, a 5-factor structure explaining 68.20% of the variance with an eigenvalue above 1 was formed. When examining the factor loadings of the statements in the scale, it was determined that items 1 ("Did you wake up tired and unrested?"), 9 ("Did you feel like ordinary things seemed strange or distorted?"), 10 ("Did you worry that a lot of bad things could happen to you?"), 16 ("Have you been afraid for your life?"), 18 ("Did you feel that the world around you was different?"), 26 ("Were you bothered by illogical thoughts?"), 34 ("Did you feel like your thoughts were freezing and would never come in?"), and 37 ("Did you think you would suddenly lose your life due to something like a heart attack or accident?") received loads with less than

0.1 difference in multiple factors. Therefore, items 1, 9, 10, 16, 18, 26, 34, and 37 were removed from the scale, and a second-factor analysis was conducted.

In the second-factor analysis, the remaining 40 items underwent oblique rotated principal component analysis (KMO=0.97; Bartlett Test (780)=12030.320; $P < .001$). As a result of the analysis, a 4-factor structure explaining 69.97% of the variance with an eigenvalue above 1 was formed. When examining the factor loadings of the statements in the scale, it was determined that items 2 ("Did you feel that your thoughts were confused?") and 39 ("Did you have annoying thoughts that you wanted to go away but didn't go away?") received loads with less than 0.1 difference in multiple factors. Therefore, items 2 and 39 were also removed from the scale, and a third-factor analysis was conducted.

In the third-factor analysis, the remaining 38 items underwent oblique rotated principal component analysis (KMO=0.97; Bartlett Test (703)=11366.799; $P < .001$). As a result of the analysis, a 3-factor structure explaining 67.51% of the variance with an eigenvalue above 1 was formed. The findings regarding this structure are shown in Table 3.

When examining the breakpoints in the scree plot graph of the scale, it was determined that a single-factor structure could also be appropriate. Therefore, a fourth-factor analysis was conducted by forcing the scale into a single-factor structure. Oblique rotated principal component analysis with a forced one-factor solution was conducted with 38 items (KMO=0.97; Bartlett Test (703)=11366.799; $P < .001$). As a result of the analysis, a single-factor structure explaining 58.75% of the variance with an eigenvalue above 1 was obtained. The findings regarding this structure are given in Table 4. In addition, the three-factor structure cumulatively explains 67.51% of the variance. Both structures have been shown to be usable.

Internal Consistency

The total internal consistency coefficient of the SCL consisting of 38 items was calculated as Cronbach's alpha (α)=0.981. In the three-factor structure, Cronbach's alpha was found to be α =0.982 for the first factor, α =0.845 for the second factor, and α =0.898 for the third factor. The internal consistency coefficients of the scale are given in Table 5.

Criterion-Related Validity Analysis

To examine the criterion-related validity of the scale, the relationships between SCL and SBQ were investigated. For this purpose, Pearson correlation values between the 2 scales were calculated. The correlation analysis matrix is shown in Table 6.

As a result of the correlation analysis, a significant positive relationship with a high effect size was found between the scores obtained from the SCL and the SBQ. As scores obtained from the SCL increased, scores obtained from the SBQ also increased.

When a linear regression model was tested with scores obtained from the SCL as the independent variable and scores obtained from the SBQ as the dependent variable [$F(1-298)=203.625$; $P=.000$], it was found that the independent variable explained 41% of the variance in the dependent variable ($r=0.637$; $r^2=0.406$). Scores obtained

Table 3. Results of Oblique Rotated Factor Analysis of the Suicide Crisis Inventory

<i>Emotion - Eigenvalue: 22.323; Explained Variance: 58.75%</i>	F1	F2	F3
SCI 44: Hiç kaçış yokmuş gibi hissettiniz mi?	0.902		
SCI 35: Mahvolmuş gibi hissettiniz mi?	0.895		
SCI 30: Kapana kısılmış hissettiniz mi?	0.894		
SCI 41: Duygusal acınızın dayanılmaz olduğunu hissettiniz mi?	0.894		
SCI 13: Hiç çıkış yolu yokmuş gibi hissettiniz mi?	0.885		
SCI 40: Canınızı sıkan düşüncelerin önüne geçmek için gücünüzün olmadığını hissettiniz mi?	0.880		
SCI 48: Acılardan kurtulma arzusunu kontrol etmenin çok zor olduğunu hissettiniz mi?	0.868		
SCI 46: Bir şeyleri iyileştirmek için artık kontrolünüzü kaybettiğinizi hissettiniz mi?	0.865		
SCI 38: İçinizde artık bitmesini istediğiniz bir içsel acı hissettiniz mi?	0.855		
SCI 27: Hiçbir şeyin bir daha normale dönemeyeceği korkusuna kapıldınız mı?	0.854		
SCI 42: Kendinizi hiçbir şeyin asla değişmeyeceğini düşünürken buldunuz mu?	0.846		
SCI 19: İzdırıp verici ve bitmek bilmez duygusal acılar çektiniz mi?	0.842		
SCI 49: Sorularınız için kotken bir çözümün olmadığını hissettiniz mi?	0.840		
SCI 4: Hiç çıkış yokmuş gibi hissettiniz mi?	0.835		
SCI 7: Katlanması çok güç olan içsel acılarınız var mıydı?	0.826		
SCI 29: Değişmekte umutsuzluğa kapıldınız mı?	0.819		
SCI 25: Kontrolü tamamen kaybetmiş gibi hissettiniz mi?	0.811		
SCI 31: Duygusal acıları durdurma arzusu diğer tüm düşüncelerin önüne geçti mi?	0.801		
SCI 12: Umutsuzluğa kapıldınız mı?	0.797		
SCI 43: Korkunç bir şeyler olacaktı gibi hissettiniz mi?	0.782		
SCI 17: Dünyanın üstünüze üstünüze geldiğini hissettiniz mi?	0.776		
SCI 33: Dehşete kapılma duygusunu yaşadınız mı?	0.774		
SCI 11: Endişelerinizin önüne geçmekte zorluk hissettiniz mi?	0.763		
SCI 28: Tarif edemediğiniz duygularınız var mıydı?	0.747		
SCI 21: En kötüsünü beklediniz mi?	0.709		
SCI 6: Daha önce hiç yaşamadığınız olağandışı hisler hissettiniz mi?	0.702		
<i>Somatic - eigenvalue: 1.883; explained variance: 4.955%</i>			
SCI 23: Vücudunuzun bazı kısımlarına bir şeyler oluyormuş gibi hissettiniz mi?		0.899	
SCI 22: Vücudunuzda ya da cildinizde tuhaf şeyler hissettiniz mi?		0.896	
SCI 36: Fiziksel olarak bir şeylerin yanlış gittiğini hissettiniz mi?		0.816	
SCI 20: Aniden fiziksel belirtiler geliştirdiğiniz veya panik atak geçirdiğinizden korktunuz mu?		0.686	
SCI 32: Damarlarınızdan geçen kani hızla akıyormuş gibi hissettiniz mi?		0.555	
<i>Düşünce - eigenvalue: 1.449; explained variance: 3.812%</i>			
SCI 45: Çok fazla düşünmekten kafanızın içi sıkışmış gibi hissettiniz mi?			0.886
SCI 8: Kafanızın çok fazla düşünceden patlayabileceğini düşündünüz mü?			0.823
SCI 47: Kafanızdaki bir suru düşünceden dolayı bas ağırsı başlayacakmış gibi hissettiniz mi?			0.792
SCI 24: Düşüncelerinizin yarıştığını hissettiniz mi?			0.784
SCI 14: Çok fazla düşünceden dolayı düşünme, odaklanma ya da karar verme becerilerinizde kötüleşme oldu mu?			0.769
SCI 15: Kontrol edemediğiniz düşünceleriniz nedeniyle uykuya dalmakta zorlandınız mı?			0.721
SCI 3: Kafanızda bir suru düşünce var mıydı?			0.703

SCI, Suicide Crisis Inventory.

from the SCI significantly predicted scores obtained from the SBQ ($t = 14.270$; $B = 0.047$; $Bstd = 0.003$; $\beta = 0.647$; $P = .000$).

Discriminant Validity

To evaluate the discriminant validity of the SCI, comparisons were made between the mean scores of the top 27% and bottom 27% groups. The mean scores, standard deviations, and results of the independent samples t -test are shown in Table 7.

A significant difference was found between the mean scores of the top 27% and bottom 27% groups of participants on the SCI ($t = -49.268$; $P < .05$). The mean scores of the top 27% group on the SCI ($M = 123.77$) were significantly higher than the mean scores of the bottom 27% group ($M = 24.62$).

Confirmatory Factor Analysis

Confirmatory factor analysis was conducted for both the single-factor and three-factor structures of the SCI. The most commonly used goodness-of-fit indices according to the standard criteria reported by Schermelleh, Engel, and Moosbrugger (2003) are chi-squared (χ^2), χ^2/df , P , RMR, CFI, GFI, AGFI, and RMSEA. Acceptable fit values are typically indicated when the calculated χ^2 value falls within $2 \leq \chi^2/df \leq 3$; P -value is $.01 \leq P \leq .05$; χ^2/df falls within $2 \leq \chi^2/df \leq 3$; RMR is $.05 \leq .10$; CFI is $.95 \leq CFI \leq .97$; GFI is $.90 \leq GFI \leq .95$; AGFI is $.085 \leq AGFI \leq .90$; and RMSEA is $.05 \leq RMSEA \leq .08$. For better fit values, the calculated χ^2 value falls within $0 \leq \chi^2 \leq 2 \text{ SD}$; P -value is $.05 \leq P \leq .01$; χ^2/df falls within $0 \leq \chi^2/df \leq 2$; RMR is $0 \leq .05$; CFI is $.97 \leq CFI \leq 1.0$; GFI is $.95 \leq GFI \leq 1.0$; AGFI is $.090 \leq AGFI \leq 1.0$; and RMSEA is $0 \leq RMSEA \leq .05$.

Table 4. Results of Forced One-Factor Oblique Rotated Factor Analysis of the Suicide Crisis Inventory

<i>Eigen Value: 22.323; Explained Variance: 58.75%</i>	F1
SCI 44: Hiç kaçış yokmuş gibi hissettiniz mi?	.895
SCI 35: Mahvolmuş gibi hissettiniz mi?	.875
SCI 46: Bir şeyleri iyileştirmek için artık kontrolünüzü kaybettiğinizi hissettiniz mi?	.875
SCI 30: Kapana kısılmış hissettiniz mi?	.875
SCI 40: Canınızı sikan düşüncelerin önüne geçmek için gücünüzün olmadığını hissettiniz mi?	.872
SCI 13: Hiç çıkış yolu yokmuş gibi hissettiniz mi?	.867
SCI 41: Duygusal acınızın dayanılmaz olduğunu hissettiniz mi?	.861
SCI 48: Acılardan kurtulma arzusunun kontrol etmenin çok zor olduğunu hissettiniz mi?	.861
SCI 27: Hiçbir şeyin bir daha normale dönemeyeceği korkusuna kapıldınız mı?	.846
SCI 42: Kendinizi hiçbir şeyin asla değişmeyeceğini düşünürken buldunuz mu?	.837
SCI 38: İçinizde artık bitmesini istediğiniz bir içsel acı hissettiniz mi?	.830
SCI 19: İzdırap verici ve bitmek bilmez duygusal acılar çektiniz mi?	.824
SCI 25: Kontrolü tamamen kaybetmiş gibi hissettiniz mi?	.823
SCI 49: Sorunlarınız için kotken bir çözümün olmadığını hissettiniz mi?	.822
SCI 4: Hiç çıkış yokmuş gibi hissettiniz mi?	.816
SCI 7: Katlanması çok güç olan içsel acılarınız var mıydı?	.809
SCI 29: Değişmekte umutsuzluğa kapıldınız mı?	.808
SCI 43: Korkunç bir şeyler olacaktı gibi hissettiniz mi?	.806
SCI 31: Duygusal acıları durdurma arzusu diğer tüm düşüncelerin önüne geçti mi?	.799
SCI 33: Dehşete kapılma duygusunu yaşadınız mı?	.793
SCI 17: Dünyanın üstünüze üstünüze geldiğini hissettiniz mi?	.782
SCI 45: Çok fazla düşünmekten kafanızın içi sıkışmış gibi hissettiniz mi?	.782
SCI 12: Umutsuzluğa kapıldınız mı?	.776
SCI 11: Endişelerinizin önüne geçmekte zorluk hissettiniz mi?	.776
SCI 28: Tarif edemediğiniz duygularınız var mıydı?	.756
SCI 21: En kötüsünü beklediniz mi?	.729
SCI 6: Daha önce hiç yaşamadığınız olağandışı hisler hissettiniz mi?	.714
SCI 8: Kafanızın çok fazla düşünceden patlayabileceğini düşündünüz mü?	.705
SCI 24: Düşüncelerinizin yarıştığını hissettiniz mi?	.686
SCI 14: Çok fazla düşünceden dolayı düşünme, odaklanma ya da karar verme becerilerinizde kötüleşme oldu mu?	.684
SCI 36: Fiziksel olarak bir şeylerin yanlıştığını hissettiniz mi?	.667
SCI 47: Kafanızdaki bir soru düşünceden dolayı bas ağırsı başlayacakmış gibi hissettiniz mi?	.640
SCI 3: Kafanızda bir soru düşünce var mıydı?	.606
SCI 15: Kontrol edemediğiniz düşünceleriniz nedeniyle uykuya dalmakta zorlandınız mı?	.587
SCI 23: Vücudunuzun bazı kişim ya da kısımlarına bir şeyler oluyormuş gibi hissettiniz mi?	.580
SCI 22: Vücudunuzda ya da cildinizde tuhaf şeyler hissettiniz mi?	.567
SCI 20: Aniden fiziksel belirtiler geliştirdiğiniz veya panik atak geçirdiğinizden korktunuz mu?	.536
SCI 32: Damarlarınızdan geçen kani hızla akıyormuş gibi hissettiniz mi?	.463

Table 5. Suicide Crisis Inventory Internal Consistency Coefficients

Suicide Crisis Inventory	Cronbach Alpha	Number of Items
F1: Emotion	.982	26
F2: Somatic	.845	5
F3: Thought	.898	7
Total Item	.981	38

The statistical findings regarding the adequacy of the model for the single-factor structure obtained from confirmatory factor analysis of the SCI are shown in Table 8, and the obtained diagram is shown in Figure 1.

The statistical findings regarding the adequacy of the model for the three-factor structure obtained from confirmatory factor analysis of the SCI are shown in Table 9, and the obtained diagram is shown in Figure 2.

When compared with acceptable fit indices, it was observed that the model established for the single-factor structure of the SCI did not provide adequate fit values. The excluded items from the scale, as specified for the original scale, did not contribute to any factor and were considered in the calculation of the total score. Items 1, 9, 10, 16, 18, 26, 34, and 37 were excluded in the first factor analysis. Item 2 was excluded in the second-factor analysis. Item 39 was excluded in the third-factor analysis. Items 5 and 50 were excluded from the item analysis.

Reliability Analysis

The total item reliability of the SCI, with items 1, 2, 5, 9, 10, 16, 18, 26, 34, 37, 39, and 50 removed, was Cronbach's alpha (α)=0.981. The reliability with these items included was α =0.980. These items can be evaluated for the total score of the scale at the discretion of the researcher but cannot be assessed under the sub-dimensions.

Relationships with Demographic and Clinical Variables

Table 10 presents the mean scores, standard deviations, and results of independent samples *t*-tests for the SCI and SBQ scores according to participants' genders. There was a significant difference in SCI-38 total score averages between participants' genders ($t=2.884$; $P=.004$). The average SCI-38 total scores of females ($M=80.16$) were significantly higher than those of males ($M=67.09$). There was also a significant difference in SCI-38 F1 averages between participants' genders ($t=2.978$; $P=.003$). The average F1 scores of females ($M=56.48$) were significantly higher than those of males ($M=46.19$). Similarly, there was a significant difference in SCI-38 F2 averages between participants' genders ($t=2.309$; $P=.003$). The average F1 scores of females ($M=6.60$) were significantly higher than those of males ($M=5.31$). However, there was no significant difference in SCI-38 F3 averages between participants' genders. There was no significant difference in the Suicide Behavior Questionnaire total score averages between participants' genders.

Table 6. Pearson Correlation Analysis Findings Between the Scores Obtained from the Suicide Crisis Inventory and the Suicide Behavior Questionnaire

	1	2
1. İDÖ_TOTAL	1	
2. SCI-38 TOTAL	.637*	1

İDÖ, İntihar Davranış Ölçeği; SCI, Suicide Crisis Inventory.
* $P < .01$.

Table 7. Suicide Crisis Inventory Means, SDs, and Independent Samples *t*-test Findings for the Upper and Lower 27% Group

27 and Below-Above Subgroup	N	SS	<i>t</i>	<i>P</i>
27 below subgroup	81	13.523	-49.268	.000*
27 above subgroup	81	12.054		

**P* < .05.

Table 11 provides the Pearson correlation analysis findings between participants' scores on the SCI and SBQ, demographic variables, and substance use frequencies. There was no significant relationship found between participants' ages, socioeconomic levels, number of

siblings, scores on the SCI and its subscales, and scores on the SBQ. However, there were significant positive correlations found between participants' frequencies of smoking, alcohol use, substance use, and their scores on the SCI total score and its subscales, as well as their scores on the SBQ. Other variables did not show significant relationships.

Discussion

In this study evaluating the SCI in a Turkish population, the results indicate that it can be used to assess pre-suicidal mental states in individuals who have not yet attempted suicide. Additionally, the findings of this study support the factor structure, reliability, and

Table 8. Values for Goodness-of-Fit Tests for the Single Factor Suicide Crisis Inventory

Measuring Tool	χ^2	SD	χ^2/SD	<i>P</i>	RMR	CFI	GFI	AGFI	RMSEA
Suicide Crisis Inventory	2530.686	665	3.806	.000	.094	.833	.653	.614	.097

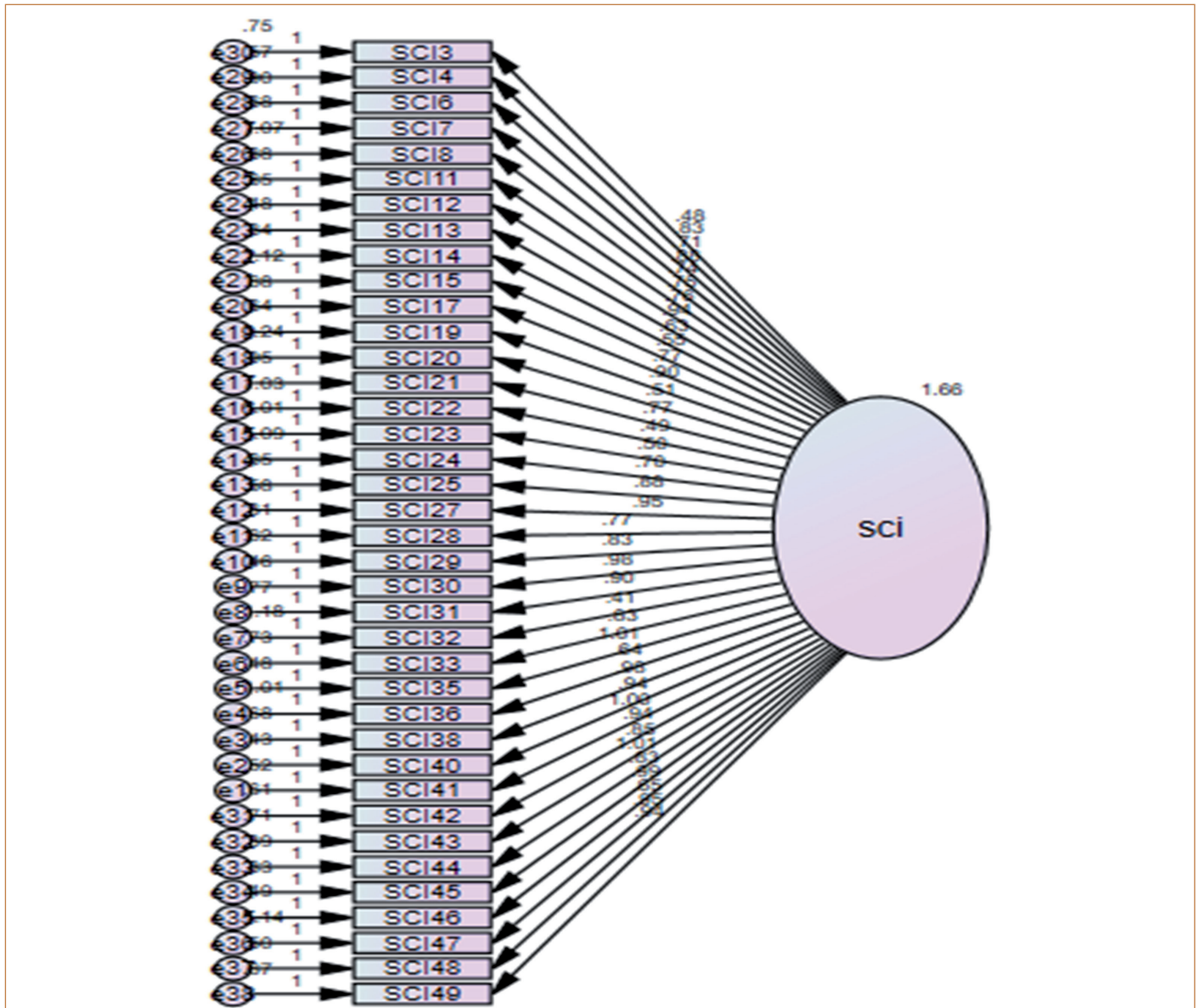


Figure 1. One-dimensional latent structure established by confirmatory factor analysis. SCI, Suicide Crisis Inventory.

Table 9. Values for Goodness-of-Fit Tests for the Three-Factor Suicide Crisis Inventory

Measuring Tool	χ^2	SD	χ^2/SD	P	RMR	CFI	GFI	AGFI	RMSEA
Suicide Crisis Inventory	1840.087	662	2.780	.000	.101	.895	.736	.704	.077

AGFI, Adjusted goodness of fit index; GFI, goodness of fit index; RMSEA, root mean square error of approximation; RMR, root mean square residual; CFI, comparative fit index.

validity of the SCI in a sample without psychiatric illness.³⁷ Overall, this study contributes to the increasing knowledge of SCI as a distinct suicide-specific diagnosis.^{18,38-40} Factorial construct validity was not similarly supported in the validity and reliability study conducted on German forensic cases,⁴¹ and the authors claimed that this was due to the use of forensic samples. The study by Galynker et al (2017) was carried out in a sample of psychiatric patients 29. The fact that we did not use a non-clinical sample in our study may have caused factor structure differences.

The items (1, 2, 26, 34, 39) that did not load on the 5-factor structure in the Turkish version of the SCI also did not load in the original

scale’s factor analysis. Among the removed items, 5, 10, and 16 relate to fear of death, while 9 and 18 relate to panic/disassociation subscales. According to Terror Management Theory, the most basic source of anxiety in humans is death, and individuals create cultures to cope with this anxiety. Through culture, individuals organize and make sense of their lives. Therefore, culture plays a significant role in reducing individuals’ fear of death.⁴¹⁻⁴³ There are studies suggesting that in Turkish culture, it is believed that the deceased are asleep and that they will wake up when they come back to life; thus, there is no belief in eternal extinction, leading to the conclusion that Turks do not have a fear of death.⁴³ We speculate that questions related to fear of death in the SCI may have been evaluated differently due

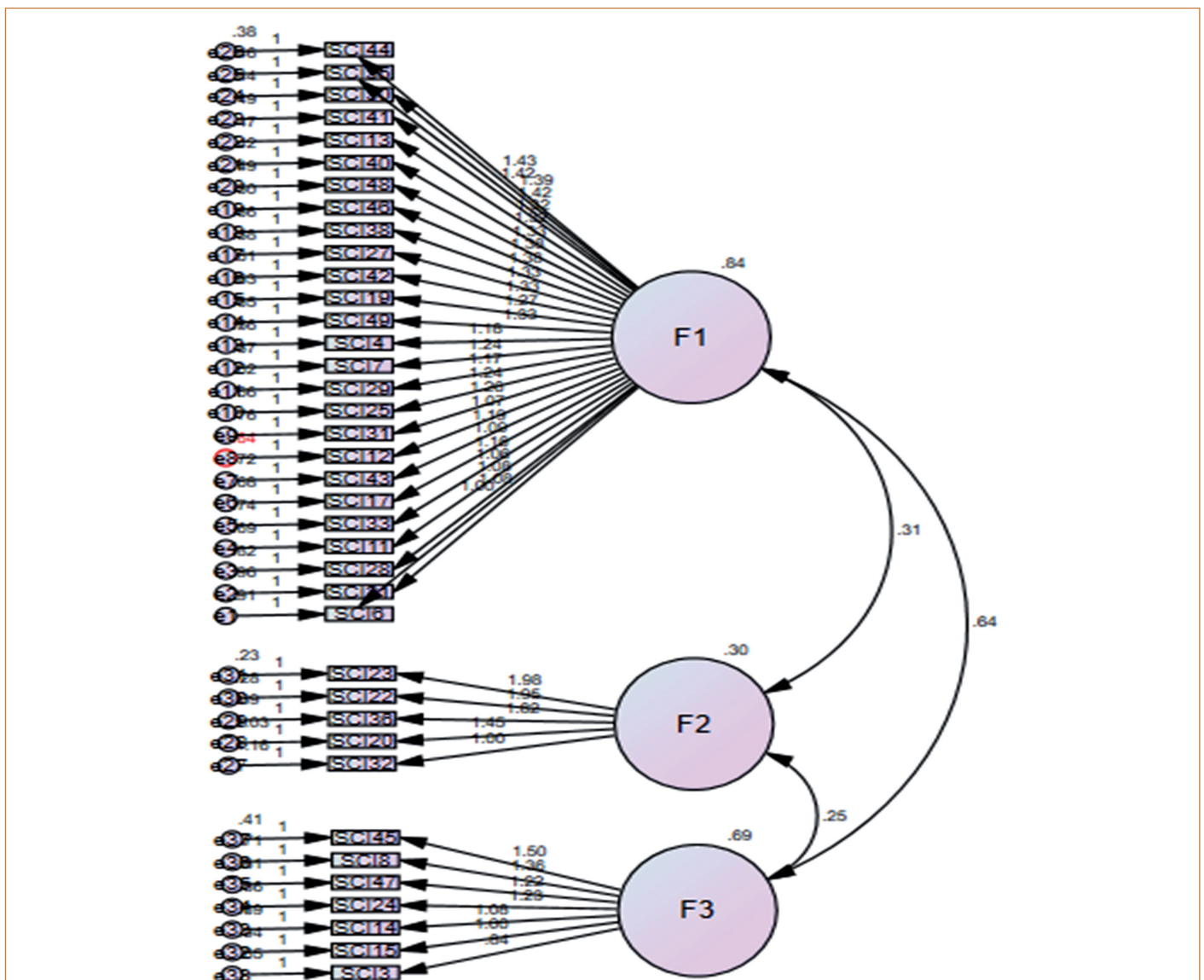


Figure 2. Three-dimensional latent structure established by confirmatory factor analysis. AGFI, Adjusted Goodness of Fit Index; GFI, Goodness of Fit Index; RMSEA, Root Mean Square Error of Approximation; RMR, Root Mean square Residual; CFI, Comparative Fit Index.

Table 10. Average Scores, SDs, and Independent Samples *t*-test Findings Obtained from the Suicide Crisis Inventory (SCI-38) and Suicide Behavior Questionnaire by the Participants According to Gender

	Gender	N	Mean	SS	<i>t</i>	<i>P</i>
SCI-38 TOTAL	Female	166	80.16	38.369	2.884	.004*
	Male	134	67.09	39.856		
F1: Emotion	Female	166	56.48	29.242	2.978	.003*
	Male	134	46.19	30.326		
F2: Somatic	Female	166	6.60	4.922	2.309	.022*
	Male	134	5.31	4.724		
F3: Thought	Female	166	17.08	6.937	1.789	.075
	Male	134	15.59	7.503		
İDÖ TOTAL	Female	166	2.92	2.828	0.186	.852
	Male	134	2.86	3.066		

**P* < .05.

to cultural differences from the original scale. The mean scores of women on the SCI-38 total and F1 and F2 subscales were found to be significantly higher than those of men. However, no significant gender difference was observed in F3 thought factor scores and the total scores of the SBQ. It is known that while women have a higher probability of suicide attempts, men have a higher likelihood of completing suicide.^{44,45} Regarding the F3 thought factor, it can be concluded that there is no gender difference in the rumination subscale, and past suicidal thoughts and attempts are associated with the concept of ruminative thinking independently of gender. Additionally, differences in suicidal thoughts and attempts between men and women are associated with various variables in sociodemographic characteristics.⁴⁶⁻⁴⁸ The history of cigarette and substance use among participants was significantly associated with SCI-38 total and F1, F2, and F3 scores, while the history of alcohol use was associated with SCI-38 total and F1 and F3 scores. Several studies have shown that alcohol and other substance use disorders increase the risk of suicide. Although the relationship between alcohol and substance use and suicidal behavior is strong, it is complex.^{49,50} Research has indicated a linear relationship between alcohol use and the risk of suicidal behavior.⁵¹ The lack of a significant relationship between alcohol use and F2, the body subscale, may be due to the physiological effects of alcohol on the body. Expectations related to alcohol play a crucial role in determining alcohol use and behavior.⁵² These expectations might be assumed to be related to numbing fears or the pain of dying and gaining the courage associated with suicide. Alcohol abuse has been found to be associated with suicidal

Table 11. Pearson Correlation Analysis Findings Between the Participants' Scores from the Suicide Crisis Inventory and Suicide Behavior Questionnaire and Demographic Variables and Substance Use Frequency

	SCI-38 TOTAL	F1: Emotion	F2: Somatic	F3: Thought	İDÖ TOTAL
Age	.015	-.003	.040	.067	-.107
SES	.035	.035	.026	.029	.040
Siblings	-.104	-.100	-.113	-.079	.004
Smoking	.235**	.227**	.193**	.205**	.191**
Alcohol use	.200**	.200**	.076	.212**	.261**
Substance use	.182**	.178**	.167**	.141*	.094

P* < .05. *P* < .01.

behavior.⁵³ Our study did not examine whether smoking, alcohol, and substance use were at the level of addiction. Therefore, it is difficult to make inferences about the relationship between alcohol, substance use, past suicidal behavior, and suicide crisis syndrome. The age group (18-24 years) that formed the study population is particularly at risk in terms of suicide and substance use. It has been shown that over 90% of child and adolescent suicides are caused by a mental disorder, and a significant portion of these individuals are deprived of appropriate health support (including psychiatric consultation) before suicide.^{54,55}

Effective suicide prevention requires a systemic approach that integrates both the community and healthcare services.⁵⁶ Screening of particularly well-known risk groups aims to identify a small number of individuals at risk within a large group (assumed to be at basic risk). While widely used scales such as the Columbia-Suicide Severity Rating Scale (C-SSRS) have demonstrated the predictability of short-term suicidal behavior, they do not classify intent and proximity.⁵⁷ Although a multidimensional scale, it has not been comprehensive in predicting short-term risk. Screening alone is not a comprehensive solution: screening is only one step in the process and cannot replace a comprehensive assessment of suicide risk. Therefore, there is still a need for screening scales for individuals who conceal suicidal intent or avoid opening up about suicidal thoughts. Many authors have described a "flood" of emotional experiences, along with a "desperate need for relief" and an "escape" from overwhelming emotions in patients with pathological narcissism and sudden suicide-related collapse.^{58,59} These emotions can include shame, humiliation, self-loathing, panic, anxiety, and anger. A high-risk patient experiencing these emotions may be reticent or unaware of their internal experience; a distressed patient may currently lack suicidal ideation but still experience mood fluctuations that may turn into a suicide crisis when triggered by a stressor.^{60,61} Therefore, it is indicated that patients at highest risk are both ideationally and proximally at risk.²⁵

Therefore, this reality emphasizes the need for both the CSSRS, which measures SI, and the İKÖ, which measures near-term risk. We believe that using the İKÖ as a tool to assist in the diagnosis of SCS in the Turkish population will significantly contribute to the clinician's accurate risk assessment by assessing near-term suicide risk in a new and nuanced way.

Limitations

The results of this study should be interpreted within its limitations. First, the data were not validated in a clinical patient group. Although the age range considered could be deemed at risk for suicide, the results should be tested in populations of patients presenting to or admitted to hospitals. In addition, in scale validity and reliability studies, it is necessary to reach 5-10 times more participants than the number of samples in the scale. Although our sample size is sufficient in our study, results that can be repeated with a larger number of participants are needed. Another limitation is that forward prediction was not examined in this study. Additionally, we had to try a new three-factor structure instead of the five-factor structure of the scale. We believe that both structures can be used in different demographic groups in the Turkish population, but this needs to be confirmed in future studies. Further studies on suicide risk in different clinical samples may contribute to the use of the scale in the Turkish population by using different factor structures.

Data Availability Statement: The data sets produced and examined during this study can be obtained from the corresponding author, provided the request is reasonable.

Ethics Committee Approval: This study was approved by Ethics Committee of Istanbul Provincial Directorate of Health Erenkoy Mental and Nervous Diseases Training and Research Hospital (Approval No: 2; Date: 07.01.2019).

Informed Consent: Written informed consent was obtained from the patients/patient who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

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