# İNTİHARA İLİŞKİN BİLGİ DÜZEYİ ÖLÇEĞİ (İBDÖ)'NİN TÜRKÇE FORMUNUN TÜRK ÜNİVERSİTE ÖĞRENCİLERİNDE GEÇERLİK VE GÜVENİRLİĞİ [1]

# THE TURKISH VERSION OF LITERACY OF SUICIDE SCALE (LOSS): VALIDITY AND RELIABILITY ON A SAMPLE OF TURKISH UNIVERSITY STUDENTS

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**Öz:** İntihar toplumda yaygın olarak görülen önemli halk sağlığı problemi olmasına rağmen, toplumun intihar konusunda yanlış ve yetersiz bilgiye sahip olduğu, bu durumun ise kişinin profesyonel yardım arayışını olumsuz yönde etkilediği bildirilmektedir. Bu araştırma İntihara İlişkin Bilgi Düzeyi Ölçeği (İBDÖ)'nin Türkçe versiyonunun geçerlik ve güvenirliğinin sağlanması amacıyla metadolojik olarak planlandı. Araştırma üniversite öğrencileri ile gerçekleştirildi (n=1100). Ölçek, çeviri-geri çeviri tekniğiyle tercüme edildi. Ölçeğin kapsam geçerliği sınandı. Ölçeğin Türkçe formunun son şekli uygulanabilirlik ve anlaşılabilirlik düzeyi bakımından pilot uygulamayla değerlendirildi. Ölçeğin geçerliği Madde Tepki Kuramı'na göre analiz edildi. Pilot çalışmanın sonunda İBDÖ'nün sınıf içi korelasyon katsayısı 0,87 olarak bulundu(F=7.921, p<0.001).İBDÖ maddelerinin Madde Tepki Kuramı'nın tek boyutluluk varsayımını karşıladığı ve 2 Parametreli Lojistik Modele (2PLM) uyum sağladığı belirlendi. İBDÖ'nin en çok bilgi verdiği yetenek düzeyi Teta (Ө)=1,5 için ölçeğin güvenirliği 0,72 olarak hesaplandı. Öğrencilerin İBDÖ'nden aldıkları toplam puan ortalamalarının 9,96±3,48 olduğu, ölçek maddelerini toplam ölçek üzerinden %36,88 oranında doğru yanıtladıkları saptandı. İBDÖ'nin alt boyut test-tekrar test katsayıları rs=0,55 ile 0,68 arasında (n=100) bulundu (p=0,001). İBDÖ'nin sınıf içi korelasyon katsayısı rs=0,57 ile 0,73 arasında bulundu (p=0,001). Ölçeğin (n=1100) toplam K-R 20 güvenirlik katsayısı 0,61 bulundu. LOSS Türkçe versiyonu intihara ilişkin bilgi düzeyinin kapsamlı bir şekilde değerlendirilmesinde kullanılabilecek yeni bir ölçek olduğu belirlendi. Sonraki çalışmalarda Türk toplumunun intihara ilişkin bilgi düzeyinin değerlendirilmesinde LOSS'tan yararlanılabileceği düşünülmektedir.

**Anahtar Kelimeler:** İntihar, Bilgi, Ölçek Geçerliği, Öğrenci, Güvenirlik

**Abstract:** Despite the fact that the suicide is a crucial public health problem , it is reported that society's literacy level about suicide is low, and that it affects persons' seeking of professional support in a negative way.The current research was planned methodologically with the aim to ensure the validity and reliability of the Turkish version of the Literacy of Suicide Scale (LOSS) The research was conducted on university students (n=1100). The scale was translated by technique of back translation.The content validity of the scale was tested. The final version of the scale's form in Turkish was evaluated in terms of practicality and intelligibility via pilot scheme. The validity of LOSS' Turkish version was analyzedin accordance with the Item Response Theory. At the end of the pilot study, LOSS intraclass correlation coefficient was found as 0.87 (F=7.921, p<0.001). It was identified that the items of LOSS had fulfilled the single subscale assumption of Item Response Theory and that they were compliant with 2 Parametric Logistic Model. The reliability of the scale was calculated as 0.72 for the skill scale -Ө=1.5- which was informed most byLiteracy of Suicide Scale. It was detected that the means of students' total scores on LOSS were9.96±3.48, and that students answered to the scale items correctly by 36.88%. The testretest coefficient of LOSS subscalewas found between rs= 0.55 and 0.68 (p= 0.001). Theintra-class correlation coefficient of LOSS was found between 0.57 and 0.73 (p= 0.001).Total K-R 20 reliability coefficient of the scale was found as 0.61. It was determined that the Turkish version of LOSS is a new available scale to analyze extensivelythe level of knowledge about suicide. It is deemed that LOSS can be exerted in prospective studies to evaluate the Turkish society's level of knowledge regarding to suicide.

**Key Words:** Suicide, Literacy, Scale Validity, Students, Reliability

## INTRODUCTION

Suicide is an important public health problem for Turkey as well. Even Turkey is one of the low ratio countries of suicide, it accelerates rapidly (Şevik et al., 2012: 218-225). The ratio of suicide, which was 1.48 in 100.000 in 1974, increased to 3.62 in 100.000 in 2011.[1] This ratio increased to 3.97 in 100.000 in 2014.[2] Planning preventive strategies gains importance with regard to the increase in ratio of suicide (Emir Öksüz and Bilge, 2014: 407-420).

It is notified that even suicide is an important problem which could be observed commonly, the level of literacy of society on suicide is insufficient and this has a negative affect over individuals to seek professional support (Jorm, 2000: 396-407; Jorm et al., 2003: 1071-79). As a consequence of incorrect and imperfect knowledge of society on suicide, the issue of suicide is perceived as a taboo and warning signals of suicide is neglected. False and imperfect knowledge on suicide affect the attitude of suicidal people's seeking for professional support in a negative way (Calear et al., 2014). False ideas on the reasons of suicide leads to stigmatizing attitudes as well. For instance, it is reported that many people indicate that people who committed suicide are egoist and weak people. Calear et al. (2014) notifies that stigmatizing attitudes and insufficient level of literacy of society on suicide had negative effect on attitudes of seeking support (Calear et al., 2014).

There are many researches abroad on literacy level of both society and health professionals on suicide (Beautrais et al., 2004: 260-265; Chan et al., 2009: 763-769). For instance Calear and his colleagues formulated Literacy of Suicide Scale (LOSS) in order to evaluate literacy level of society and this scale has been used in many researches (Batterham et al., 2013: 407-417; Chan et al., 2013: 1-8; Calear et al., 2014). In Turkey researches on the literacy on suicide is appeared to be insufficient. Additionally there is not any measuring instrument to evaluate literacy level on risk factors, warning signals, treatment and prevention. According to this evaluation, this research aims to adopt Literacy of Suicide Scale on Turkish language.

### Aim And Research Questions

This research aims to adopt Literacy of Suicide Scale – LOSS to Turkish language.

S1. Is Turkish version of Literacy of Suicide Scale (LOSS) a valid measurement tool?

S2. Is Turkish version of Literacy of Suicide Scale (LOSS) a confidential measurement tool?

## METHODS

### Design

The research adopted a methodological design

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[2] Türkiye İstatistik Kurumu (TÜİK) İntihar İstatistikleri, 2014 Erişim Adresi: http:// www.tuik.gov.tr/PreHaberBultenleri. do?id=1862 Erişim tarihi: 29.11.2016

### Participants

Population of research compose of undergraduate students at one state university on 2014-2015 education term. Informed and volunteer university students at undergraduate level, between 18 and 65 years old participated in the research. Sample size was 1100 university students in total.

Sample Size: It is suggested that in order to make factor analysis at studies of both validity and reliability of scale, sample size must be 5-10 times more than number of scale item (Gözüm and Aksayan, 2003: 3-14). It is stated that for sample size, 100 is "weak", 200 is "medium", 300 is "good", 500 is "very good" and 1000 is "excellent" (Comrey and Lee,

1992). Number of students that is included to sample from faculties and vocational schools is determined by the method of stratified sampling.

Sample size for reliability of test-retest: In order to make test-retest evaluation, it is suggested to make at least 30 dual data. In this research, for test-retest application, from same sample group, a second application is done on 100 students 15 days later.

### Measures

Application of sample is done within approximately 5-10 minutes.

**Socio-Demographic Questionnaire (SDQ):** includes questions on students' age, gender, undergraduation department and class information.

**Literacy of Suicide Scale (LOSS):** In gauging the levels of suicide literacy amongst the respondents, a 27-item Literacy of Suicide Scale (LOSS) constructed by Calearet al (2014) was also included in the survey (Calear et al., 2014).

The LOSS assesses the four domains of suicide literacy: (i) signs and symptoms, (ii) causes or the nature of suicidality, (iii) risk factors, and (iv) treatment and prevention. Each of the items on the LOSS is responded

to on a 3-point scale ("True", "False", or "I don't know"), with correct responses allocated a score of 1and incorrect or "I don't know" responses as signed a score of 0. Total scale scores are calculated by summing item scores. Within the scale, who marks item numbers "1, 2, 4, 5, 7, 9, 11, 13, 14, 16, 19, 20, 21, 23, 25, 27" as "FALSE" and item numbers "3, 6, 8, 10, 12, 15, 17, 18, 22, 24, 26" as "TRUE" receives 1 point. Within the scale, one shall gain at least 0 and at most 27 points. Receiving high score signifies that the literacy level towards suicide is high (Calear et al*.,* 2014).

The LOSS has been validated by using Item Response Theory to identify items that had the strongest discrimination of the underlying literacy construct. Analysis of Item Response Theory is determined by bi-parameter logistic model (2PL) that takes account the insufficient separation of all items towards the latent variable of literacy level of suicide, difficulty of each item and how it separates the structure of basic literacy of suicide (Calear et al., 2014.

### Ethical Considerations

A written approval was received from the university presidency where the research is conducted. Ethical committee approval was obtained (2015/29-240). Permission was obtained from the researcher who developed the scale in order to adopt it to Turkish. A voluntary informed consent was received from participants. Aim and benefits of the research were explained. Participants were assured to keep data confidential.

### Procedure

### 1. Bilingual Equivalence of Turkish version of LOSS

*a) Translation-Back Translation:* The LOSS was translated by English translator and interpreters. The Turkish version was then back-translated by a professional English translator (sworn translator and interpreter) blinded in regard to the original English version of the LOSS. The back-translated English version was checked regarding its congruence with the original LOSS. In all phases of the translation, each statement was controlled by a specialist on Turkish language.

*b) Linguistic Equivalence:* The final Turkish questionnaire and scale's English version were applied over 35 students with advanced English studying at the School of Foreign Languages biweekly (firstly scale's English questionnaire, then its Turkish version). Answers given to the LOSS' Turkish and English questionnaires were analysed through Cohen Kappa fit test, Spearman's Rank Correlation ($r_s$) and Pearson correlation coefficient (r).

## 2. Content Validity of Turkish Version of LOSS

Following the conclusion of language translation studies a content validity (expert opinion) study was done. Content validity of the scale is determined by Davis Technique (Davis, 1992). In order to be within the content of test for an item, Content Validity Index (CVI) coefficient must be at least 0.80 (Erefe, 2002: 169-188; Gözüm and Aksayan, 2003: 3-14; Yurdagül, 2005).

Items of the Turkish scale was evaluated by 14 experts. Most of items at the scale was determined as between CVI 0.80 and 1.00. Values of the Content Validity Index Coefficient of Item Number 12, 21, 22 and 25 of the scale were found under 0.80. These items were re-assessed and necessary arrangements were done and the Turkish questionnaire took its final shape.

## 3. Assessment of Applicability and Comprehensiveness of the Scale (Pilot Application)

For applicability and comprehensiveness of each item of the scale (n=30) intraclass correlation coefficient was calculated. Pilot application was done with a group of 30 students in total. From the data obtained from this pilot study, frequency distribution and index values of students' assessment of "I understood", "1" and "I did not understand", "0" for the 27 items were calculated. In this assessment the threshold for the lowest value was accepted as 0.80. In this study, all values were found as 0.80 and higher.

## 4. Test-Retest Reliability

For the test-retest application, a second application was done on 100 students 15 days later. In order to examine test-retest reliability Pearson Correlation Analysis and Intraclass Correlation Coefficient analysis were used. For the internal consistency reliability, Kuder Richardson-20 (KR-20) analysis was done.

## 5. Validity Analysis of The Literacy of Suicide Scale for the Item Response Theory

*a) Item Response Theory and It's Models*: In Item Response Theory, 2 models as two-category and multi-category were defined. Two category models were designated by 3 logistic models which are one parameter, bi-parameter and three-parameters. Students' responses to the scale were compared with the answer key. It is scored as bi-categorical which means if answer is true, 1 point, if its false 0 point were given. As the items were scored by bi-categorical, in order to estimate scale item parameters, IRT models which were developed for bi-categorical scores

were used. In literature generally 1-Parameter Logistic Model (1PLM), 2-Parameter Logistic Model (2PLM) and 3-Parameter Logistic Model (3PLM) IRT models were used for bi-categorical items. One of the common features of these models is used for hypothesis of unidimensionality. In this study before the IRT item parameters were estimated, hypothesis of unidimensionality were checked.

*b) Testing the Hypothesis of Unidimensionality of the Item Response Theory:* Before analysing data set with Item Response Theory, firstly validity of hypothesis should be researched (Çakıcı Eser, 2013: 135-144). It is suggested that in order to apply IRT models, primarily unidemensionality should be tested. In order to test unidimensionality making factor analysis is sufficient (Crocker and Algina, 1986). Testing hypothesis of unidimensionality of the LOSS was analysed by Confirmatory Factor Analysis (CFA). By using this analysis, unidimension model's goodness of fit index is examined. As data does not cover test of normality, through using diagonal weighted least squares (DWLS) measurement model was tested. For the Confirmatory Factor Analysis to analyse LOSS' unidimensional factor structure Lisrel 8.80 program was used.

According to CFA results, model-data fit was analysed by using CFI, RMSEA and NNFI indexes. RMSEA is valued between 0 and 1 and closeness to 0 signifies excellent fit (Bollen and Curran; 2006; Tabachnick and Fidell, 2007). In other fit indexes, CFI and NNFI, 0.95 and over value signify model-data fit (Hu end Bettler, 1999: 1-5).

*c) Analysis of the Fit of Literacy of Suicide Scale (LOSS) on Logistic Models:* To determine which unidimensional IRT models better fit LOSS and for the choice of model, model-data fit was analysed by using BILOG MG Program. Analysis of model-data fit of LOSS was done in two stages. Firstly, for 1PLM, 2PLM and 3PLM, -2log χ values were calculated and it was analysed with which model the data set had a better fit. In order to determine which model better fits, value differences of 2Log Likelihood (-2LL) obtained from three different models was examined by chi-square test. For the estimation of maximum likelihood, negative likelihood value (-2LL) shows value of retreat from the model. For this reason logistic model with low -2LL value is preferred (Embretson and Reise, 2000 ).

*d) Item Parameters of Literacy of Suicide Scale (LOSS) Estimated Based on IRT:* For the analysis of the validity of LOSS, as the

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best model-data fit was obtained from 2PL IRT model, Item Distinction (a) and Item Difficulty (b) were estimated. Item Distinction is defined as the ability to distinct individuals with regard to the issue which aimed to be measured. Item Difficulty demonstrates the item's level of difficulty (providing true answer).

*e) Validity of LOSS, Obtained through Analysis of Item Response Theory:* Validity of Literacy of Suicide Scale was calculated by using Bilog MG program.

**Statistical Analysis**

For statistical analysis, NCSS (Number Cruncher Statistical System) 2007 & PASS (Power Analysis and Sample Size) 2008 Statistical Software (NCSS LLC, Kaysville, Utah, USA) program were used. Study data was assessed through using descriptive statistical methods.

Study on the Literacy of Suicide Scale (LOSS)' effect over the Item Response Theory (IRT) the analysis of data was done in two stages. In the first stage, descriptive analysis was done towards the data set and hypothesis of Item Response Theory was tested. In the second stage, by determining model-data fit, item and test parameters were obtained from the endorsed model. In the first stage STATISTICA and in the second stage BILOGMG 3 programs were used. For the Confirmatory Factor Analysis to analyse the unidimensional factor structure of LOSS, LISREL 8.80 program was used.

**RESULTS**

**Personal Characteristics**

Sample's 58.6 % (n=645) is woman, average of age is 20.52±1.84 years. Research group is mostly compose of Faculty of Education (36.4 %), Faculty of Economics and Administrative Sciences (11.8 %), 31.8 % is 2. grade, 25.7 % is first grade, 25.6 % is third grade students (Table 1).

### Table 1. Sociodemographic Characteristics of Turkish Students, Turkey (N= 1100)

| | | Min – Maks | x̄±SD |
|---|---|---|---|
| | | n | % |
| *Age* | | 18–36 | 20.52±1.84 |
| *Gender* | Female | 645 | 58.6 |
| | Male | 455 | 41.4 |
| | | | |
| *Marital Status* | Single | 1082 | 98.4 |
| | Married | 18 | 1.6 |
| *Maternal Education Level* | Illiterate | 97 | 8.8 |
| | Literate | 70 | 6.4 |
| | Primary school graduate | 557 | 50.6 |
| | Secondary school graduate | 205 | 18.6 |
| | High-school graduate | 122 | 11.1 |
| | Greater than high school | 49 | 4.5 |
| | | | |
| *Father Education Level* | Illiterate | 20 | 1.8 |
| | Literate | 38 | 3.5 |
| | Primary school graduate | 380 | 34.5 |
| | Secondary school graduate | 249 | 22.6 |
| | High-school graduate | 249 | 22.6 |
| | Greater than high school | 164 | 14.9 |

| | | | |
|---|---|---|---|
| *Alma Mater* | Faculty of Science and Letters | 120 | 10.9 |
| | Faculty of Education | 400 | 36.4 |
| | Faculty of Forestry | 64 | 5.8 |
| | Faculty of Economics and Administrative Sciences | 130 | 11.8 |
| | Faculty of Communication | 70 | 6.4 |
| | Faculty of Theology | 83 | 7.5 |
| | Faculty of Engineering and Architecture | 33 | 3.0 |
| | School of Physical Education and Sports | 67 | 6.1 |
| | Faculty of Tourism | 53 | 4.8 |
| | Health High School | 80 | 7.3 |
| *Form* | Freshman year | 283 | 25.7 |
| | 2nd grade | 350 | 31.8 |
| | 3rd grade | 282 | 25.6 |
| | Senior | 185 | 16.8 |
| *Area* | Urban region (city center/ metropolitan) | 683 | 62.1 |
| | Rural/remote(county/town/village) | 417 | 37.9 |

## Results Of Bilingual Equivalence of LOSS

Turkish and English questionnaires of Literacy of Suicide Scale (LOSS) were analysed through Cohen Kappa fit test, Spearman's correlation coefficient and Pearson correlation coefficient. Relation between Turkish and English questionnaires of the scale's total scale and sub-scale score were assessed by Pearson correlation analysis.

— It is determined that items of LOSS' Turkish and English questionnaires fit each other between "medium" and "good" levels. (Cohen Kappa Fit Coefficient: 0.40 - 0.74; p>0.05).

— Fitting of the Turkish and English items of the Literacy of Suicide Scale (LOSS) is evaluated by Spearman's Rank Correlation ($r_s$). It is found that there is statistically significant relation in a positive way on the scores that they gain from

1-3, 5-11, 13, 15-20 and 27th items of both Turkish and English questionnaires ($r_s$= 0.35 - 0.73, p<.01). A statistically significant relation is not found with items 4, 12, 14 and 21 of both Turkish and English questionnaires (p>0.05). Translation of these items (4, 12, 14 and 21st items) were reviewed and necessary changes were made according to suggestions.

— Subscale and total scale scores obtained from scale's Turkish and English versions were evaluated by Pearson Correlation Analysis. A statistically significant relation in a positive way was found between subscale and total scale scores of both questionnaires (subscale r= 0.54-0.75, p<0 .05; total scale 0.72, p= 0.001).

— In summary, a high level of similarity was found between Turkish and English questionnaires after all analysis.

## Content Validity of LOSS

For the content validity, with regard to Literacy of Suicide Scale, experts' highest and lowest scores to items, their averages, and standard deviation and Content Validity Index (CVI) values were calculated. Experts' scores on scale items are between 1 and 4. The lowest average article is the 12th article on the subscale of "Symptoms" with 3.14.

The highest average article is the 17th article on the subscale of "Risk Factors" with 4.00. In this assessment Content Validity Index, the lowest value of threshold was accepted as 0.80. In this study, all values are 0.80 and higher scores.

## Assessment Of Applicability And Comprehensiveness of the LOSS (Pilot Application)

Item Fitting Index for the LOSS was found 0.80 and higher. Intraclass correlation coefficient calculated for LOSS was found 0.87 (F=7.921, p<0.001). According to this value, all items were found understandable by participants and they could be included within the scale.

## Test-Retest Reliability

Between the Scale's subscale test-retest score averages, it is found statistically significant relation in a positive sense (p<0.001) and test-retest correlation coefficient is changed between 0.58 and 0.72. Even K-R 20 validity coefficient is low, scale's total validity scale is found 0.61.

## Validity Analysis of LOSS for the Item Response Theory (IRT)

*Findings that Corresponds Hypothesis of Unidimensionality of the Literacy of Suicide*

*Scale (LOSS):* According to the results of Confirmatory Factor Analysis, model-data fit was assessed by using CFI, GFI, RMSEA and NNFI values (Figure 1).
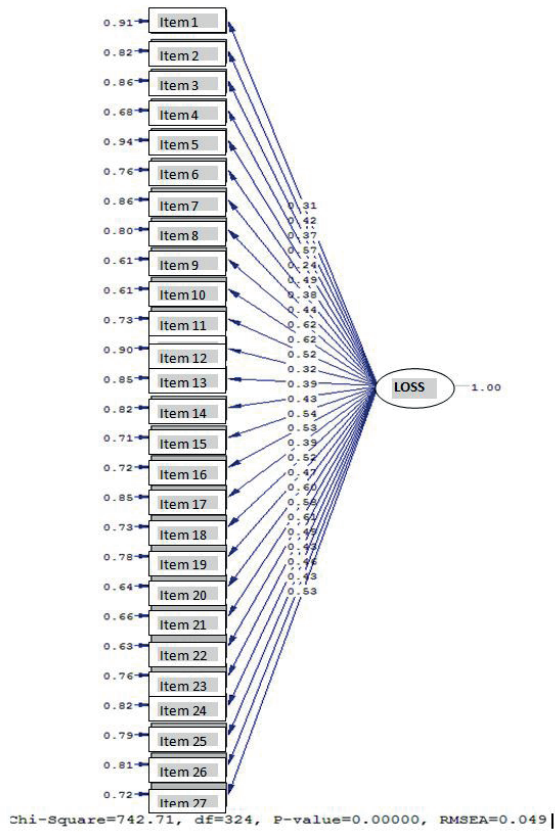


**Fıgure 1. Comfirmatory Factor Analysis Model of Literacy of Suicide Scale (LOSS)**

General goodness of fit was assessed by $\chi^2/sd$ ratio (Division of chi square to degree of freedom) is found 2.29. The obtained $\chi^2/sd$ value, which is less than 3 and close to 2, demonstrates that the general goodness of fit of the model is very good. In addition to this, as another fit index that shows the goodness of fit of model is Root Mean Square Error of Approximation (RMSEA) is found 0.05 that also means model's general fit is very good. In this research, when other important fit indexes that shows model's goodness of fit such as Goodness of Fit Index (GFI), Non- Normed Fit Index (NNFI) and Comparative Fit Index (CFI) are analysed; GFI value is calculated 0.94, NNFI value is 0.95 and CFI value is 0.96. Obtaining GFI, NNFI and CFI goodness of fit indexes as 0.95 and higher shows that general fit of the model is excellent. It is understood that Scale's Turkish version has a very good fit with the unidimensional model. Then model fit analysis were done.

*Analysis of the Fit of Literacy of Suicide Scale (LOSS) on Logistic Models:* Firstly for 1PLM, 2PLM and 3PLM -2log χ values were calculated and which model is fit with the data set was analysed. -2Log Likelihood (-2LL) value differences was compared with chi square table which is on 27 degree of freedom and 0.05 significance level (Table 2).

**Table 2. According to Item Response Theory, Model-Data Fit and -2log χ Values of Literacy of Suicide Scale (LOSS)**

|  | 1PLM (1 Parameter Logistic Model) | 2PLM (2 Parameter Logistic Model ) | 3PLM (3 Parameter Logistic Model) |
|---|---|---|---|
| **-2log Likelihood (-2log χ)** | 37301,2145 | 35295,0732 | 48365,1220 |

In IRT, apart from the model fit to all items, each item's model fit was also analysed. Following this analyse for each item, item-model fit was analysed. In the assessment of item-model goodness of fit 0.05 significance level was adopted. For each item, 1PLM, 2PLM and 3 PLM item-model goodness of fit values were determined (Table 3).

**Table 3. Item-Model Fit Values of Literacy of Suicide Scale (LOSS)**

| 1PLM | | | 2PLM | | | 3PLM | | |
|---|---|---|---|---|---|---|---|---|
| **Ki-Kare** | **sd** | **p** | **Ki-Kare** | **Sd** | **p** | **Ki-Kare** | **sd** | **P** |
| 6,00 | 9 | 0,737 | 5,4 | 9 | 0,799 | 26,8 | 7 | **0,000*** |
| 8,70 | 7 | 0,272 | 10,7 | 7 | 0,153 | 38,3 | 8 | **0,000*** |
| 18,30 | 9 | **0,032*** | 22,1 | 9 | **0,009*** | 79,5 | 7 | **0,000*** |
| 1,90 | 7 | 0,967 | 2,4 | 8 | 0,965 | 162,1 | 8 | **0,000*** |
| 9,30 | 9 | 0,414 | 8,8 | 9 | 0,458 | 17,2 | 8 | **0,028*** |
| 4,80 | 9 | 0,854 | 15,7 | 9 | 0,073 | 110,9 | 7 | **0,000*** |
| 4,50 | 7 | 0,721 | 3,2 | 7 | 0,871 | 144,8 | 9 | **0,000*** |
| 21,10 | 8 | **0,007*** | 14,3 | 8 | 0,074 | 263,6 | 7 | **0,000**** |
| 39,90 | 7 | **0,000*** | 19,1 | 7 | **0,008*** | 158,6 | 8 | **0,000*** |
| 21,50 | 8 | **0,006*** | 16 | 8 | 0,053 | 88,3 | 7 | **0,000*** |
| 4,60 | 8 | 0,799 | 6,4 | 9 | 0,704 | 39,9 | 9 | **0,000*** |
| 5,40 | 8 | 0,719 | 10,9 | 8 | 0,207 | 47,5 | 9 | **0,000*** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 8,40 | 7 | 0,296 | 18,1 | 8 | **0,021*** | 92,3 | 8 | **0,000*** |
| 18,60 | 8 | **0,017*** | 10,3 | 8 | 0,244 | 52,7 | 8 | **0,000*** |
| 17,10 | 9 | **0,048*** | 7,1 | 8 | 0,521 | 41,4 | 7 | **0,000*** |
| 14,10 | 7 | **0,050*** | 10,9 | 7 | 0,143 | 177,8 | 9 | **0,000*** |
| 19,10 | 7 | **0,008*** | 12,9 | 7 | 0,075 | 145,9 | 8 | **0,000*** |
| 34,70 | 9 | **0,000*** | 21,2 | 8 | **0,007*** | 115,3 | 4 | **0,000*** |
| 6,60 | 8 | 0,583 | 3,3 | 8 | 0,918 | 104,8 | 9 | **0,000*** |
| 16,90 | 8 | **0,032*** | 22,5 | 8 | **0,004*** | 7,7 | 8 | 0,462 |
| 30,10 | 7 | **0,000*** | 12,6 | 8 | 0,082 | 170,5 | 8 | **0,000*** |
| 18,30 | 9 | **0,032*** | 12,6 | 9 | 0,180 | 359,8 | 7 | **0,000*** |
| 49,00 | 8 | **0,000*** | 34,3 | 8 | **0,000*** | 28,5 | 8 | **0,000*** |
| 6,90 | 8 | 0,550 | 6,5 | 8 | 0,592 | 163,4 | 8 | **0,000*** |
| 7,70 | 7 | 0,364 | 9,6 | 7 | 0,210 | 148,1 | 9 | **0,000*** |
| 10,90 | 7 | 0,143 | 7 | 7 | 0,426 | 49,7 | 8 | **0,000*** |
| 22,70 | 7 | **0,002*** | 20,8 | 8 | **0,008*** | 30 | 8 | **0,000*** |

| **Number of fit item** | **1PLM** | | **2PLM** | | **3PLM** |
|---|---|---|---|---|---|
| | **13Item** | | **20 Item** | | **1 Item** |

*p< 0,05

When Table 2 is analysed, it is observed that 1PLM model fits with 13 items, 2PLM model fits with 20 items and 3PLM model fits with 1 item. According to this, it is understood that the LOSS items had the best fit with 2PL model. It is decided that both for model-data fit and item-model fit, to estimate the LOSS' item parameters, the most suitable IRT model is 2PL model.

*Item Parameters of Literacy of Suicide Scale (LOSS) Estimated Based on IRT:* It is found that for the LOSS items; b-parameter (threshold) that means item difficulty of the Classical Test Theory was between – 38.300 and 3.919. According to this, the easiest item was Item-03 and the most difficult item was Item-24 (Table 4). Broad range of b-parameter for the LOSS items made it possible to calculate students' literacy level of suicide within a broad capability range.

**Table 4. The 27 İtems İncluded İn The Literacy Of Suicide Scale (LOSS) With Their Literacy Domains, Percentage Of Correct Responses, İtem Discrimination And İtem Difficulty From An Item Response Theory Model (N = 1100)**

| Item Number & Items | Domain | % correct | Item discrimination[a] | Item difficulty[b] |
|---|---|---|---|---|
| 1 Nothing can be done to stop people from making the attempt once they have made up their minds to kill themselves (F)[*] | T/P[a] | 75,8 | 0,377 | -3,124 |
| 2 Nothing can be done to stop people from making the attempt once they have made up their minds to kill themselves (F) | C/N[b] | 29,3 | 0,832 | 1,216 |
| 3 Seeing a psychiatrist or psychologist can help prevent someone from suicide. (T)[**] | T/P | 84,2 | **0,044** | **-38,300** |
| 4 Most people who suicide are psychotic. (F) | R/F[c] | 15,5 | 0,838 | 2,281 |
| 5 Only experts can help people who want to suicide. (F) | T/P | 62,7 | 0,611 | -0,921 |
| 6 There is a strong relationship between alcoholism and suicide. (T) | R/F | 49,0 | 0,018 | 2,285 |

| | | | | | |
|---|---|---|---|---|---|
| 7 | People who talk about suicide rarely commit suicide. (F) | $S^d$ | 16,1 | 0,487 | 3,553 |
| 8 | People who want to attempt suicide can change their mind quickly. (T) | S | 13,5 | 0,758 | 2,700 |
| 9 | Talking about suicide always increases the risk of suicide. (F) | C/N | 16,2 | 0,959 | 2,002 |
| 10 | A person who has made a past suicide attempt is more likely to attempt suicide again than someone who has never attempted. (T) | R/F | 66,5 | 0,234 | -2,971 |
| 11 | Media coverage of suicide will inevitably encourage other people to attempt suicide. (F) | C/N | 27,5 | 0,528 | 1,954 |
| 12 | Not all people who attempt suicide plan their attempt in advance. (T) | S | 27,3 | 0,317 | 3,162 |
| 13 | People who have thoughts about suicide should not tell others about it. (F) | T/P | 45,7 | 0,352 | 0,503 |
| 14 | Very few people have thoughts about suicide. (F) | C/N | 25,0 | 0,911 | 1,408 |
| 15 | People who are anxious or agitated have a higher risk of suicide. (T) | R/F | 60,5 | 0,308 | -1,409 |
| 16 | Most people who suicide are younger than 30. (F) | R/F | 15,6 | 0,919 | 2,117 |
| 17 | Men are more likely to suicide than women. (T) | R/F | 24,7 | 0,565 | 2,105 |
| 18 | People with relationship problems or financial problems have a higher risk of suicide. (T) | R/F | 83,7 | 0,424 | -4,005 |
| 19 | Most people who suicide don't make future plans. (F) | S | 19,6 | 0,723 | 2,151 |
| 20 | If you asked someone directly "Do you feel like killing yourself?" it will likely lead that person to make a suicide attempt. (F) | C/N | 32,3 | 0,827 | 1,028 |
| 21 | A suicidal person will always be suicidal and entertain thoughts of suicide. (F) | C/N | 15,0 | **1,165** | 1,835 |

| 22 | Suicide rarely happens without warning. (T) | S | 43,2 | 0,424 | 0,677 |
|----|---------------------------------------------|-----|------|-------|--------|
| 23 | A person who suicides is mentally ill. (F) | C/N | 50,9 | 1,100 | -0,033 |
| 24 | A time of high suicide risk in depression is at the time when the person begins to improve. (T) | S | 17,7 | 0,405 | **3,919** |
| 25 | Motives and causes of suicide are readily established. (F) | C/N | 15,4 | 0,762 | 2,484 |
| 26 | Most people who attempt suicide fail to kill themselves. (T) | C/N | 29,5 | 0,417 | 2,169 |
| 27 | Those who attempt suicide do so only to manipulate others and attract attention to themselves. (F) | C/N | 33,1 | 0,915 | 0,907 |

*False    **True    aTreatment/Prevention    bCause/Nature    cRisk Factor    dSign

A-parameter (slope) which is item distinction on the classical test theory was between 0.044 and 1.165. According to this, in order to determine students' literacy level on suicide the item with the highest distinction was Item-21 and the item with the lowest distinction was Item-03. When Table 3 is analysed Items 3,6, 10, 12, 15 had the lowest level of distinction and the rest had medium, high and very high levels of distinction.

*Findings of Validity obtained through Analysis of Item Response Theory:* Item information functions and validity values were determined for a group with normal distribution whose arithmetic mean of level of capability is 0 and standard deviation is 0 (Table 5). The most informed level of capability for $\Theta=1.5$ is the validity of the test is calculated as 0.72 for the Literacy of Suicide Scale. A group having normal distribution whose arithmetic mean $\Theta=0$ is calculated 0.68.

**Table 5. Item, Average Knowledge , Standard Errors And Reliability Values of Literacy of Suicide Scale (LOSS)**

| Item | | I (θ=0)* | SE (Standart Error) | r** |
|---|---|---|---|---|
| 1 | Nothing can be done to stop people from making the attempt once they have made up their minds to kill themselves | 0,041 | 4,963 | 0,04 |
| 2 | Nothing can be done to stop people from making the attempt once they have made up their minds to kill themselves | 0,091 | 3,311 | 0,08 |
| 3 | Seeing a psychiatrist or psychologist can help prevent someone from suicide. | 0,029 | 5,842 | 0,03 |
| 4 | Most people who suicide are psychotic. | 0,047 | 4,632 | 0,04 |
| 5 | Only experts can help people who want to suicide. | 0,080 | 3,531 | 0,07 |
| 6 | There is a strong relationship between alcoholism and suicide. | 0,029 | 5,903 | 0,03 |
| 7 | People who talk about suicide rarely commit suicide. | 0,038 | 5,157 | 0,04 |
| 8 | People who want to attempt suicide can change their mind quickly. | 0,094 | 3,263 | 0,09 |
| 9 | Talking about suicide always increases the risk of suicide. | 0,090 | 3,335 | 0,08 |
| 10 | A person who has made a past suicide attempt is more likely to attempt suicide again than someone who has never attempted. | 0,070 | 3,769 | 0,07 |
| 11 | Media coverage of suicide will inevitably encourage other people to attempt suicide. | 0,038 | 5,150 | 0,04 |
| 12 | Not all people who attempt suicide plan their attempt in advance. | 0,051 | 4,450 | 0,05 |
| 13 | People who have thoughts about suicide should not tell others about it. | 0,060 | 4,079 | 0,06 |
| 14 | Very few people have thoughts about suicide. | 0,116 | 2,942 | 0,10 |
| 15 | People who are anxious or agitated have a higher risk of suicide. | 0,079 | 3,569 | 0,07 |
| 16 | Most people who suicide are younger than 30. | 0,078 | 3,574 | 0,07 |
| 17 | Men are more likely to suicide than women. | 0,098 | 3,191 | 0,09 |
| 18 | People with relationship problems or financial problems have a higher risk of suicide. | 0,093 | 3,283 | 0,08 |

| | | | | |
|---|---|---|---|---|
| 19 | Most people who suicide don't make future plans. | 0,058 | 4,152 | 0,05 |
| 20 | If you asked someone directly ''Do you feel like killing yourself?'' it will likely lead that person to make a suicide attempt. | 0,090 | 3,330 | 0,08 |
| 21 | A suicidal person will always be suicidal and entertain thoughts of suicide. | 0,123 | 2,849 | 0,11 |
| 22 | Suicide rarely happens without warning. | 0,097 | 3,219 | 0,09 |
| 23 | A person who suicides is mentally ill. | 0,195 | 2,267 | 0,16 |
| 24 | A time of high suicide risk in depression is at the time when the person begins to improve. | 0,054 | 4,291 | 0,05 |
| 25 | Motives and causes of suicide are readily established. | 0,048 | 4,545 | 0,05 |
| 26 | Most people who attempt suicide fail to kill themselves. | 0,082 | 3,488 | 0,08 |
| 27 | Those who attempt suicide do so only to manipulate others and attract attention to themselves. | 0,123 | 2,851 | 0,11 |
| | **Total** | **2,090** | **0,692** | **0,68** |

\* I ($\theta$=0): *Teta ($\theta$)* = 0  The average knowledge value for each item \*\* Reliability values

## DISCUSSION

In order to translate a scale prepared for a certain culture to different cultures and societies, psycholinguistic and psychometric aspects of the scale must be analysed (Ægisdóttir et al., 2008: 188-219). Accordingly firstly, the LOSS' language and content validity was done. For all scales and subscales of the Scale's Turkish and English questionnaires it is found a high level of positive relation with regard to source language and target language. As a result of assessments, content validity of the Turkish version of the LOSS was found good.

Following the examining of language and content validity, validity analysis on the base of Item Response Theory (ITR) was done. Before passing to Item Response Theory based analysis, firstly items of scales coverage level of unidimensionality hypothesis was examined. In order to determine this, by using Confirmatory Factor Analysis (CFA) goodness of fit of unidimension model was examined. According to the CFA results, model-data fit was assessed by using CFI, GFI, RMSEA and NNFI values. According to the CFA results, to determine the general

goodness of fit of the model $\chi^2/sd$ $\chi^2/sd$ ratio (chi square /degree of freedom) was used and 2.29 was found. The obtained value was less than 3 and close to 2 which means that the general fit of the model is very good (Erkorkmaz et al., 2014: 407-420). As another important fit index that shows the goodness of fit of the model is 0.05 also shows that the general fit of model is very good (Jöreskog and Sörbom, 1999). Other important fit indexes that show the goodness of fit of the model (GFI value is 0.94; NNFI value is 0.95; CFI value is 0.96) were calculated. It is found that LOSS has a very good fit with the unidimensional model and therefore it meets the unidimensionality hypothesis.

When both model-data fit and item-model fit are analysed, it is decided that, the most suitable IRT model for estimation of LOSS' item parameters is 2PL model. Then with the 2PL model, Item Distinction (a) and Item Difficulty (b) parameters were estimated for the LOSS items. Item Distinction is defined as the ability to distinct individuals with regard to the issue which aimed to be measured. Item Difficulty demonstrates the item's level of difficulty (providing true answer) (Koğar, 2015: 147-157).

Baker (2001) indicates that according to the items' distinction parameter values, it can be classified as 0.01- 0.34 is very low; 0.35-0.64 is low; 0.65-1.34 is medium; 1.35-1.69 high; and >1.70 very high distinctive items (Baker, 2001). In this research, a-parameter (slope) which is item distinction was between 0.044 and 1.165 and b-parameter (threshold) that means item difficulty was between – 38.300 and 3.919. According to this, the easiest item was "Item 3" and the most difficult item was "Item 24" and the item with the highest distinction was "Item 21" and the item with the lowest distinction was "Item 3". Additionally it could be stated that Items 3,6, 10, 12, 15 had the lowest level of distinction and the rest had medium, high and very high  levels of distinction. For the assessments of estimation on item difficulty, it is observed that p values of Items 3, 6 and 23 were higher than 0.05. Likewise, Calear et al (2014) determined the distinction level of items of scale with 2PL model of IRT models when they developed the original scale. These values are between 0.398 and 1.564 and the item with the strongest distinction was found Item 14 (Calear, 2014).

Another way of receiving information on the statistical features of items is to analyse item characteristic curves and graphs of function of data. Item characteristic curve is a mathematical statement that correlate a probability of giving true answer with a test's measurement of skills and concerned article's features.

These curves show a function of a skill of a responding level. Item characteristic curve is formed by Theta (Ө) on horizontal plane, considering individuals' level of skills and on vertical place considering probability of giving true answer. The level where Theta value is 0 (Ө=0) represents individuals' average level of skills. Negative theta values shows the lower of the average and positive theta values show higher than the average levels of skills (Embretson and Reise, 2000).

In this research the feature of invariance against the time of the Turkish version of the Literacy of Suicide Scale was found high and time consistency was found sufficient.

With this scale, it is possible to analyse individuals' level of knowledge on the generality of suicide, its symptoms, reasons, risk factors and prevention of suicide. It is suggested that there should be studies on broader age groups to examine Scale's applicability over the society in general.

## SUGGESTION

When the probable effect of misguided or deficient knowledge on professional help-seeking of persons is principally taken into consideration, executing studies which analyze the relationship between professional help-seeking attitude and knowledge level on suicide and to draw on LOSS in these studies can be suggested. Several studies focusing the education programs and strategies to prevent suicide exist at abroad. The inadequacy of studies about this subject is striking in our country. LOSS can be used so as to evaluate the knowledge level of various groups out of university students related to suicide and to advance accordingly strategies to eliminate suicide, and in the studies to improve education programs on resolving lack of information and misinformation about suicide. Hereby, the awareness-raising of society with regard to suicide evidences, symptoms and risk factors may serve to support persons at risk who are suicide inclined to take professional help. It is deemed that the scale can be exerted to identify society's lack of knowledge and misinformation on suicide, and at the consciousness raising activities concerning to suicide. The scale can be managed particularly before and after education studies such as the evaluation of psycho-education studies about risk factors and symptoms of suicide.

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