

# Construct Validity Study of the Turkish Form of the Short Beck Depression Inventory

Hatice Deniz Ozdemir<sup>1</sup>, Hamdi Nezh Dagdeviren<sup>2</sup>

<sup>1</sup>School of Arts and Social Sciences, Istanbul Esenyurt University, Istanbul, Türkiye. ORCID iD: 0000-0003-3468-2065. [deniz.dozdemir@gmail.com](mailto:deniz.dozdemir@gmail.com) (Corresponding Author)

<sup>2</sup>Department of Family Medicine, Trakya University School of Medicine, Edirne, Türkiye. ORCID iD: 0000-0001-5428-4377

## ABSTRACT

**Aim:** The main purpose of this study is to conduct a structural, and criterion-related validity study of the Short Beck Depression Inventory and to make it available for use by healthcare professionals and individuals conducting research in the field.

**Method:** Designed as a cross-sectional scale adaptation study, this research utilized the 21-item Beck Depression Inventory, the Short Beck Depression Inventory, and the Self-Compassion Scale. Data of the study were collected through Google Forms using extensions transmitted via email and WhatsApp.

**Results:** The mean age of the 178 participants was 21.09±2.12. The statistical findings in the confirmatory factor analysis of the Short Beck Depression Inventory, the  $X^2/DF$  (23.68/13); the ratio was found to be 1.82, Root Mean Square Error of Approximation: 0.068, Standardized Root Mean Square Residual: 0.046, Root Mean Square Residual: 0.027, Normed Fit Index: 0.95, Non-Normed Fit Index: 0.97, Comparative Fit Index: 0.98, Incremental Fit Index: 0.98, Relative Fit Index: 0.93, and Goodness of Fit Index: 0.96. In the criterion-related validity study, a relationship was observed between the Short Beck Depression Inventory and the Beck Depression Inventory and between the Self-Compassion Scale.

**Conclusion:** Upon examining the outcomes of the inventory's confirmatory factor analysis, it was found that all fit indices were within the excellent fit range. The Turkish adaptation of the Short Beck Depression Inventory was concluded to be a highly valid and reliable scale that can be used in clinical settings and research in the adult Turkish population.

**Keywords:** depression, factor analysis, self-compassion

**Date of submission:** 30.03.2024 / **Date of acceptance:** 30.06.2024

**How to cite:** Ozdemir HD, Dagdeviren HN. Construct validity study of the Turkish form of the Short Beck Depression Inventory. Euras J Fam Med 2024;13(2):61-7. doi:10.33880/ejfm.2024130203.

**Conflict of interest:** No conflict of interest was declared by the authors.

**Financial disclosure:** No financial disclosure was declared by the authors.

## Introduction

Depression is the most prevalent psychiatric disorder worldwide and a public health concern. The effects of depression can be long-lasting or recurrent, significantly impacting an individual's ability to perform daily functions and lead a satisfying life (1-3). Defined as a chronic mental disorder encompassing symptoms such as sadness, feelings of emptiness, loss of courage, hopelessness, inertia, unwillingness, restlessness, and low self-esteem, depression can affect anyone (4). Individuals experiencing abuse, significant losses, or other stressful events are more likely to develop depression, underscoring the importance of accurate diagnosis (5).

The World Health Organization's Mental Health Action Plan for 2013-2030 emphasizes the need for appropriate interventions for individuals with depression (3). Measurement tools for depression become crucial in this context. Given the value of time in today's world, short scales are preferred for clinical and research use. Academic studies increasingly focus not only on relationships between two or three variables but also on examining direct and indirect relationships among multiple variables. Therefore, the need of having more reliable, valid, and shorter versions of the scales has grown.

Despite the existence of various depression measurement scales in Turkey, there is a need to expand the reliability and validity studies of the Short Beck Depression Inventory (SBDI), which provides accurate results and is short and reliable. The SBDI is a scale consisting of 7 items that assess psychological qualities such as sadness, pessimism, loss of interest, past failures, self-dislike, self-criticism, and suicidal tendencies (6,7). The main purpose of the current questionnaire is to assess the levels of depression that meet the DSM-5's non-somatic criteria of the major depression diagnosis (8). This study aims to conduct a structural and criterion-related validity study of the SBDI, making it available for healthcare professionals (psychologists, psychological counselors, psychiatrists, social workers, etc.). Additionally, it seeks to demonstrate that it is a scale with a high level of validity that can be used in scientific research.

## Hypotheses of the Study

1. There is a high positive correlation between the SBDI and the Beck Depression Inventory (BDI).
2. The correlation between the SBDI and the Self-Compassion Scale (SCS) is negative.
3. The reliability and validity level of the Turkish version of SBDI is high.

## Methods

Designed as a cross-sectional scale adaptation study, the purpose of this study is to expand the validity and reliability studies of the scale by establishing a connection with the Beck Institute. Permission was obtained from the team that adapted the Beck Depression Screening Inventory to Turkish, as suggested: "Birinci Basamak İçin Beck Depresyon Tarama Ölçeği".

Throughout the study, the assessment of the individuals the scales of the SCS, BDI, and SBDI have been used. The approval of the Ethics for the research was obtained from the Social and Human Sciences Research Ethics Board of Trakya University (Decision no: 01/14 from the meeting held on January 19, 2022). The population was male and female students studying at the Trakya University Faculty of Medicine. A power analysis was not conducted as the plan was to reach the entire population, and data were collected through Google Forms using extensions transmitted via email and WhatsApp. Although the intention was to reach the entire population, the high participation of students in similar studies during the pandemic negatively affected the participation level in the current study. Data collected from 178 medical students were downloaded into Excel and transferred to relevant statistical software programs.

Descriptive statistics, including mean  $\pm$  standard deviation, were initially used for data analysis. The statistical examination of the study was conducted using research software for social sciences and LISREL 8.80. The significance level for statistics was  $p < 0.05$ . For the study of reliability and internal consistency, Cronbach's  $\alpha$  and Split-Half reliability were examined. Criterion-related validity was assessed using the 21-item Beck Depression Inventory

and the Self-Compassion Scale. Relationships between the scales used in the study were analyzed using Spearman's rho correlation. Brief descriptions of the scales used in the study are provided below:

**Short Beck Depression Inventory**

Developed by Beck (6,7), this inventory consists of 7 items, and a maximum score of 21 can be obtained. The test-retest reliability is 0.82, and the internal reliability coefficient is 0.86. The diagnostic cutoff value for the Short Beck Depression Inventory is  $\geq 4$  (9,10). The indication scores of the SBDI change from 0 to 21, and from 0 to 3 means minimal depression, 4 to 6 means mild depression, 7 to 9 means moderate depression and 10 to 21 means severe depression (9-11). The scale, adapted to Turkish as the "Birinci Basamak İçin Beck Depresyon Tarama Ölçeği" in 2005 by Aktürk et al (12), has a Guttman Split-Half coefficient of 0.82, Cronbach's  $\alpha$  of 0.85, Spearman-Brown coefficient of 0.86, and was found to have very high discriminatory power in ROC analysis (12). In our study, Cronbach's  $\alpha$  for the scale was found to be 0.78.

**Beck Depression Inventory**

Developed by Beck to assess the symptoms and severity of depression, The adaptation to the Turkish language, validity, and reliability were conducted by Hisli (13-16). The scale consists of 21 items, each scored between 0 to 3, and the total scores vary between 0 to 63 (17). In the current study, the inventory's Cronbach's  $\alpha$  coefficient was found to be 0.90.

**Self-Compassion Scale**

Developed by Neff, the study to adaptation for the Turkish language, reliability, and validity was conducted by Deniz, Kesici, and Sümer in 2008 (18). The scale comprises a total of 24 items, with an internal consistency of 0.89 and test-retest reliability of 0.83. In our study, the Cronbach's  $\alpha$  coefficient was found to be 0.84.

**Results**

Of the study participants, 116 (65.2%) were female, and 62 (34.8%) were male. The mean age of the 178 participants was  $21.09 \pm 2.12$ . After transferring

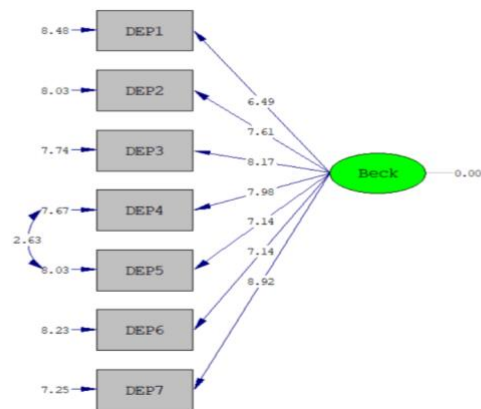
the data to relevant statistical software programs. To find out the suitability and adequacy of the data factor analysis tests were run.

The Kaiser-Meyer-Olkin (KMO) measure of sampling was found to be 0.839, and Bartlett's Test of Sphericity yielded  $\chi^2$  value of 292.01 ( $p < 0.01$ ). These results mean that the data were appropriate for the EFA. The EFA and the Component Matrix findings are presented in Table 1.

**Table 1.** Component matrix and exploratory factor analysis findings

Items	Component Matrix
Depression 7	0.735
Depression 4	0.707
Depression 5	0.684
Depression 3	0.684
Depression 2	0.647
Depression 6	0.636
Depression 1	0.577
Explained Variance	44.727

When examining the Component Matrix and the explained total variance in Table 2, it was observed that the SBDI consists of a single-factor structure. 44.73% of the total variance is explained by this single factor. Furthermore, to test whether this structure is confirmed, a CFA was run for the SBDI. The T-values for the CFA of the SBDI are presented in Figure 1.

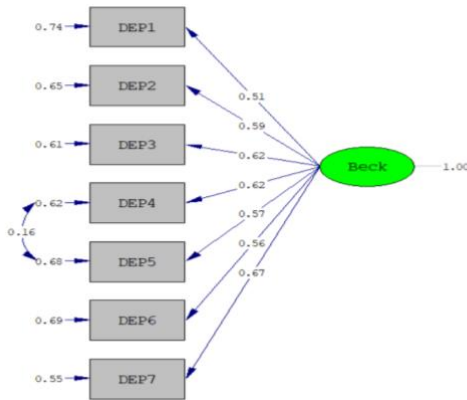


Chi-Square=23.68, df=13, p value=0.03415, Root Mean Square Error of Approximation (RMSEA)=0.068

**Figure 1.** Confirmatory Factor Analysis (CFA) T-Values for Short Beck Depression Inventory

Upon examining Figure 1, it is noted that a modification was made between items 4 and 5. The T-values for the Short Beck Depression Inventory differ

from 6.49 to 8.92. In Figure 2, the standardized path coefficients for the SBDI are presented.



Chi-Square=23.68, df=13, p value=.03415, Root Mean Square Error of Approximation (RMSEA)=0.068

**Figure 2.** Standardized Path Coefficients for Short Beck Depression Inventory

**Table 2.** The fit indices for the CFA of the Short Beck Depression Inventory

X <sup>2</sup>	df	X <sup>2</sup> /df	RMSEA	SRMR	NFI	CFI	NNFI	IFI	RFI	GFI
23.68	13	1.82	0.068	0.046	0.95	0.98	0.97	0.98	0.93	0.96

RMSEA: Root Mean Square Error of Approximation; SRMR: Standardized Root Mean Square Residual; NFI: Normed Fit Index; CFI: Comparative Fit Index; NNFI: Non-Normed Fit Index; IFI: Incremental Fit Index; RFI: Relative Fit Index; GFI: Goodness of Fit Index

In our study, the 21-item BDI and the SCS were used for the criterion-related validity study. The mean scores were as follows: SBDI scores 5.27±3.57; BDI scores 14.93±9.60; and SCS scores 35.22±8.50. The scores for the SBDI were found not to follow a normal distribution. Therefore, relationships between the scales were examined using Spearman's Rho correlation, and the findings are presented in Table 3.

**Table 3.** Correlations between depression inventories and Self-Compassion Scale - Spearman's Rho results

Inventory	1	2
1. Short Beck Depression Inventory	1	
2. Beck Depression Inventory	0.82	1
3. Self-Compassion Scale	-0.60	-0.63

The table above displays the Spearman's Rho correlation coefficients between the SBDI, BDI, and the SCS.

When examining Table 3, the relationship between the Short Beck Depression Inventory and the Beck Depression Inventory was found to be r=0.82; p<0.001, indicating a correlation that is strong and positive. Similarly, the relationship between the SBDI and the Self-Compassion Scale was found to be r=-

0.60; p<0.001, indicating a negative correlation with moderate levels.

Figure -2 shows the standardized path coefficient values of the SBSI. The lowest was found to be between 0.51 and the highest 0.67. Table 2 presents the fit indices for the CFA of the SBDI. After the suggested modification between items 4 and 5, the confirmatory factor analysis (CFA) of the scale yielded the following fit indices:  $\chi^2/DF$  ratio: 1.82; Root Mean Square Error of Approximation (RMSEA): 0.068; Standardized Root Mean Square Residual (SRMR): 0.046; Root Mean Square Residual (RMR): 0.027; Normed Fit Index (NFI): 0.95; Non-Normed Fit Index (NNFI): 0.97; Comparative Fit Index (CFI): 0.98; Incremental Fit Index (IFI): 0.98; Relative Fit Index (RFI): 0.93; and Goodness of Fit Index (GFI): 0.96.

Subsequently, reliability analyses were conducted for the Short Beck Depression Inventory, revealing a Cronbach's  $\alpha$  of 0.78 and a Split-Half reliability of 0.81.

### Discussion

In light of the outcomes of our study on the validity and reliability analysis of the SBDI, the following points can be emphasized:

- Factor Analysis Validity:** The adequacy and suitability of the data for factor analysis were examined, revealing a KMO coefficient of 0.839 and a Bartlett's Test of Sphericity  $\chi^2$  value of 292.01 (p<0.001). These results indicate that the data were appropriate for the EFA, aligning with existing literature (19). The EFA results confirmed a single-factor structure, with this factor explaining 44.73 % of the total variance, a percentage deemed sufficient for unidimensional structures in the literature (20).
- Confirmatory Factor Analysis:** CFA was run to test the one-factor structure. The Short Beck

Depression Inventory demonstrated satisfactory  $t$ -values ranging from 6.49 to 8.92, and standardized path coefficients ranging from 0.51 to 0.67, indicating a moderate level of influence for each item.

3. **Fit Indices:** Fit indices for the CFA demonstrated excellent goodness-of-fit, with  $\chi^2/df$  ratio of 1.82, RMSEA of 0.068, SRMR of 0.046, NFI of 0.95, NNFI of 0.97, CFI of 0.98, IFI of 0.98, RFI of 0.93, and GFI of 0.96. These values confirm the model's good fit, aligning with literature standards for unidimensional structures (21-24).
4. **Reliability Analysis:** The analysis of reliability revealed a Cronbach's  $\alpha$  of 0.78 and a Split-Half reliability of 0.81, indicating good internal consistency.

In the criterion-related validity study, it was found that the scores of the Short Beck Depression Inventory did not adhere to a normal distribution. Relationships between the scales were examined using Spearman's Rho. The relationship between the SBDI and the BDI was found to be  $r=0.82$ ;  $p<0.001$ , aligning with existing literature (19,25). These findings suggest that the 7-item SBDI shares high psychometric properties with the 21-item BDI.

Consistent with the literature, the relationship between the SCBI and the SCS was found to be  $r=0.60$ ;  $p<0.001$  (26,27). These results support the satisfactory criterion-related validity of the scale (28,29).

Reliability analyses for the scale yielded a Cronbach's  $\alpha$  of 0.78 and a split-half reliability of 0.81, consistent with previous studies (12,19). The reliability level surpasses the accepted threshold of 0.60, indicating high reliability (30-32).

Consequently, the Turkish version of the SBDI is a highly valid and reliable scale for use in clinical settings and research within the adult Turkish population. When evaluating the psychometric properties of the SBDI, it has frequently been compared to the widely used 21-item BDI. Considering advantages such as time efficiency, particularly in primary care or outpatient treatment settings, and minimizing somatic symptoms, the SBDI can serve as an alternative to many other depression

assessment tools.

#### *Limitations of the Study:*

Our study has contributed to the scientific literature by providing broader information on the validity and reliability of the SCBI. However, there are certain limitations, some of which are related to the methodology, that need to be considered. Limitations include the online administration of research data on students from Trakya University Faculty of Medicine, a shortage of voluntary participants in the study population, and the limited time in which data was collected. Additionally, the study data was obtained solely from self-report scales, which may limit the generalizability of the findings due to potential issues with the objectivity of responses.

Furthermore, as is common in many studies, the number of male and female participants was not equal, thereby restricting the generalizability of the data to both genders. Another limitation is the brevity of the inventory, which is one of its most notable positive features. Nevertheless, more research is needed to validate this inventory. Another limitation of the study is that this study, conducted on university students, cannot be generalized to the entire adult Turkish population.

It is crucial to emphasize that it is suitable primarily for screening purposes, and it should be remembered that none of these inventories can replace a complete diagnostic procedure if a secure diagnosis is required. This is an extremely important consideration.

It is advised that the study be carried out for future research on different groups or individuals who have been diagnosed with depression or are undergoing depression treatment. Additionally, it is suggested that research data be collected over a broader time frame and through face-to-face interactions. Studies with equal gender ratios are recommended to ensure the generalizability of the data to both women and men. Furthermore, for future studies involving chronic illnesses, it is recommended to use the Short Beck Depression Inventory to avoid false diagnoses of depression.



## Conclusion

In conclusion, the Short Beck Depression Inventory demonstrated robust psychometric properties in terms of factor structure, confirmatory

validity, and reliability. The results support its utility as a unidimensional tool for assessing depressive symptoms, aligning with previous literature findings.

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