

Original article

Development of DOB Social Isolation Scale: Validity and Reliability

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Abstract:

Objectives: The situation in which an individual disconnects their communication from their environment and avoids collective activities is called “social isolation”.Based on the literature reviewed, the measurement tools’ validity and reliability studies that were previously made were not sufficient in measuring the concept of social isolation. The study was conducted to develop a scale to evaluate social isolation. **Methods:** This methodologically was conducted with 584 university students between February and June 2019. The draft of the Social Isolation Scale was reviewed in the literature, and an item pool of 31 items in 5-point Likert type was created. Suggestions from 11 experts were evaluated. Finally, a scale with 28 items was prepared, and the items were corrected in terms of language and expression in line with expert opinion. The data were collected via a questionnaire prepared by the researchers. **Results:** The mean age of the students was detected as 20.45 ± 2.33 . Ten items were removed from the scale because their factor load was under 0.500. It was determined that the scale consists of eighteen items and the sole factor. The internal consistency coefficient (Cronbach’s alpha) of the scale was calculated as 0.912. **Conclusion:** This study demonstrates that the “DOB Social Isolation Scale” is a valid and reliable measurement instrument. Developed to measure social isolation, the DOB Social Isolation Scale is an adaptable scale to different cultures. The scale provides an advantage for healthcare professionals in determining social isolation.

Keywords: social isolation; scale development; validity and reliability

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Introduction:

Humans need others to survive, maintain their health, and help to establish one of their most basic needs, communication. However, it is getting harder and harder to establish and maintain social relationships in today’s societies due to individualization. Therefore, the number of socially isolated, lonely people and having problems adapting to society is steadily increasing. Many people say they feel anxious in social situations. Some also say that they do not like crowded places and that it is difficult for them to go to such places and communicate as they think they

will be disliked when they try and communicate with others ¹.

The extant literature includes various definitions of the concept of social isolation. The situation in which an individual disconnects their communication from their environment and avoids collective activities is called “social isolation” ¹. Social isolation is also defined as the lack of social and interpersonal relationships or the inability to maintain existing relationships in a competent manner ². Dury (2014) defines social isolation as a state in which the individual lacks a sense of belonging, social

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participation, and valuable relationships with other people³. According to Carpenito-Moyet (2012), it is a state of an individual or a group who has the need or desire to be with others or perceives so but cannot establish a relationship⁴.

Social isolation is categorized as objective and subjective social isolation. Objective social isolation is true social isolation, while subjective social isolation is defined as loneliness. Objective social isolation means feeling very lonely and away from other people; however, subjective social isolation, in other words, perceived loneliness, is defined as feeling lonely often because there are few close friends with whom a person can share their problems¹.

Loneliness is associated with the quality of the relationships rather than quantity⁵. It is quite normal for individuals to want to be alone from time to time. While the desire to be alone is voluntary and depends on the individual, social isolation is a negative and involuntary situation where the individual cannot choose⁶. Social isolation results from a lack of social belonging, a decrease in responsibility for other people, a very low level of social interaction, relationship quality, and dissatisfaction. Studies have shown that people suffering from social isolation have low health levels. For example, it is reported that they benefit less from interventions such as cardiovascular surgery². Neri et al. (2012) examined the relationship between age, gender, environment, and health status with social isolation⁷. Studies report that there may be a relationship between social isolation and mental health, distress, dementia, suicide, and early death⁸⁻¹⁰. Santini et al. (2020) examined the relationships between social disconnection, perceived isolation, and depression in adults¹¹.

The literature review shows that social isolation begins in childhood and adolescence and continues into adulthood, triggered by various stressors. Physical, mental, and social reasons come together to create the social withdrawal of a person. Factors such as technology and internet addiction, serious illnesses, surgical operations, divorce, job loss, traffic accidents, sudden death, economic crises, and infectious diseases can be causes of social isolation^{12,13}.

Today, with the development of technology, the time people of all age groups spend on the Internet has increased greatly. As a result, serious changes occur in people's mutual communication. The widespread use of the Internet replaces socialization and

minimizes socialization. People's excessive use of social media platforms weakens their skills of face-to-face communication¹⁴.

The coronavirus (COVID-19) epidemic that broke out in China at the end of 2019 and affected the whole world can be given as an example of the crises that caused further social isolation. On the one hand, the epidemic has caused many deaths worldwide, and on the other, stress and social isolation in individual and social dimensions. Although there are many medical studies on the coronavirus epidemic, few studies have examined the effect of this epidemic on social isolation^{12,13,15}. Isolation and being restricted significantly affect human physiology in several aspects¹⁶. During the pandemic period, isolation of individuals, fear of infection, quarantine, stigmatization, and the potential to be overloaded with excessive and false information have created risks of anxiety and depression, caused chronic stress, and led to a great burden on mental health^{17,18}.

In line with the information above, it was found in the literature that the measurement tools' validity and reliability studies which were previously made were not sufficient in measuring the concept of social isolation, and these tools were used to examine different concepts such as loneliness and social phobia, which are related to social isolation but do not exactly correspond to it. Therefore, an easy-to-use scale that can evaluate the concept of social isolation defined in the way demanded in the literature is needed. This study was conducted to develop a measurement tool for the evaluation of social isolation.

Materials and methods:

Phase One

Scope of the Scale

The draft of the Social Isolation Scale was reviewed in the literature, and an item pool of 31 items in 5-point Likert type was created. The instructions of the scale draft developed were sent to the lecturers of various nursing departments and medical faculties in our country and experts of the subject to evaluate the comprehensibility of the items in terms of language and expression and whether they cover the subject to be measured. The scale draft prepared before the application was checked for accuracy by having it read by a faculty member from the Turkish language and literature department regarding compliance with the Turkish language rules. Since other scales work in the elderly under the social isolation scale in the

literature,^{19,20} the scale we developed was named “DOB Social Isolation Scale” using the authors’ surnames’ initials. Experts were asked to evaluate the measurement degree of each item in the scale (1 = Not suitable, 2 = Much correction, 3 = Less correction, 4 = Very suitable), between 1-4 points. Suggestions from 11 experts were evaluated. Finally, a scale with 28 items was prepared, and the items were corrected in terms of language and expression in line with expert opinion. Expert opinions were evaluated with Kendall’s W cohesion analysis (number of experts: 11, Kendall’s W, $p > 0.05$).

Phase Two

Population and sample selection for scale drafting

The universe of the research consists of students studying at Sakarya University between February and June 2019. The study sample was planned to consist of at least 180 students who accepted to participate in the study, 10 times the scale item, met the inclusion criteria, and 584 students were reached during the study. The students were informed about the purpose of the study, and their verbal consent was obtained.

Phase Three

Validity and reliability analysis of the scale

Exploratory and confirmatory factor analysis after Kendall’s W fit analysis were applied for expert opinion for the content validity in the validation phase of the DOB Social Isolation Scale, while Cronbach’s alpha internal consistency analysis method was applied in the reliability phase.

-Factor analysis: To determine the suitability of the data for factor analysis, the Kaiser-Meyer-Olkin (KMO) Sample Fit Test and Bartlett’s Sphericity test, which shows the correlation of the items with each other, were applied before the factor analysis. Then, exploratory and confirmatory factor analysis was applied for the construct validity of the scale.

-Reliability analysis (Cronbach alfa): As one of the most frequently used criteria, Cronbach’s alpha reliability coefficient, which is the measure of internal consistency, was used criteria to evaluate the reliability of the scale.

Ethical Clearance:

Ethical approval of the study was obtained from Sakarya University Faculty of Medicine Clinical Research Ethics Committee (Number: 71522473 / 050.01.04 / 38). In order to carry out the study at Sakarya University, the necessary permission was

obtained from the Sakarya University Rectorate (Number: 044 / E.38346). The students included in the study were informed about the research, and their verbal and written consents were obtained.

Statistical Analysis

The study was carried out on 584 subjects. The data were completed by transferring to IBM SPSS Statistics 23 and IBM SPSS AMOS 23 programs. While evaluating the study data, frequency distribution (number, percentage) for categorical variables and descriptive statistics (mean, standard deviation) for numerical variables were given. For the validity of the scale, exploratory factor analysis, and confirmatory factor analysis, and for reliability, Cronbach’s alpha value was used for the results given in the tables.

Results:

Introductory Characteristics of the Students

The mean age of the students participating in the study is 20.45 ± 2.33 , and 78.4% are female. While the students who do not smoke are 75.5%, those who do not consume alcohol are 89.2%. 42.8% of the students live in a metropolitan area for most of their lives, while 41.4% have a protective family structure. The students stated that they spent most of their free time by phone (97.8%) and computer (94.8%).

Validity and Reliability Analysis of the Scale

Construct Validity

Factor analysis was performed at the construct validity stage of the scale. While applying the factor analysis, the sample size should be sufficient to ensure correlation reliability, and Kaiser Meyer Olkin (KMO) and Bartlett tests were used to determine that this competence is achieved. According to our study results, the KMO test result was found to be 0.939, and Bartlett’s sphericity test was found to be significant ($p < 0.001$) (Table 1).

Table 1. KMO and Bartlett Results

Kasiyer Meyer Olkin (KMO)		0,939
Bartlett Sphericity Test	X ²	4279,402
	Sd	153
	p	0,000***

*: $p < 0,05$ **: $p < 0,01$ ***: $p < 0,001$

Exploratory Factor Analysis (EFA)

Due to the applied factor analysis, the number of items decreased from 28 to 18. As a result of the content validity of these 18 items, it was seen that

they were collected in one factor, and all factor loads were above 0.500. The variance level of the items that make up the one-dimensional structure produced from EFA is 40.992%. Explanation rates, distribution of items, and factor loadings for this single factor are given below (Table 2).

Table 2. The factor analysis results of DOB Social Isolation Scale items

Items	Factor Loads	Variance Description Ratio	Value
SIS12	0,758	40,992	7,379
SIS26	0,744		
SIS20	0,739		
SIS23	0,693		
SIS3	0,689		
SIS18	0,687		
SIS6	0,673		
SIS22	0,665		
SIS21	0,664		
SIS8	0,635		
SIS7	0,634		
SIS10	0,617		
SIS13	0,581		
SIS11	0,571		
SIS2	0,541		
SIS19	0,531		
SIS1	0,514		
SIS25	0,502		

Confirmatory Factor Analysis (CFA)

CFA analyzed the single factor structure of the DOB Social Isolation Scale consisting of 18 items. The data obtained for the fit index as a result of the analysis are RMSEA = 0.07, CFI = 0.92, GFI = 0.91 and SRMR = 0.05 (Table 3).

Table 3. Findings related to the confirmatory factor analysis

Indexes	Good Fit	Acceptable Fit	Model Result
χ^2/df	$0 \leq \chi^2/df \leq 3$	$3 \leq \chi^2/df \leq 4$	3,542
GFI	$0.95 \leq GFI \leq 1$	$0.90 \leq GFI \leq 0.95$	0,914
IFI	$0.95 \leq IFI \leq 1$	$0.90 \leq IFI \leq 0.95$	0,919
TLI	$0.95 \leq TLI \leq 1$	$0.90 \leq TLI \leq 0.95$	0,907
CFI	$0.95 \leq CFI \leq 1$	$0.90 \leq CFI \leq 0.95$	0,919
RMSEA	$0 \leq RMSEA \leq 0.05$	$0.05 \leq RMSEA \leq 0.08$	0,066
SRMR	$0 \leq SRMR \leq 0.08$	$0.05 \leq SRMR \leq 0.10$	0,0473

In addition, the path diagram showing the standard load values distribution related to the single factor structure obtained with DFA is given in Figure 1.

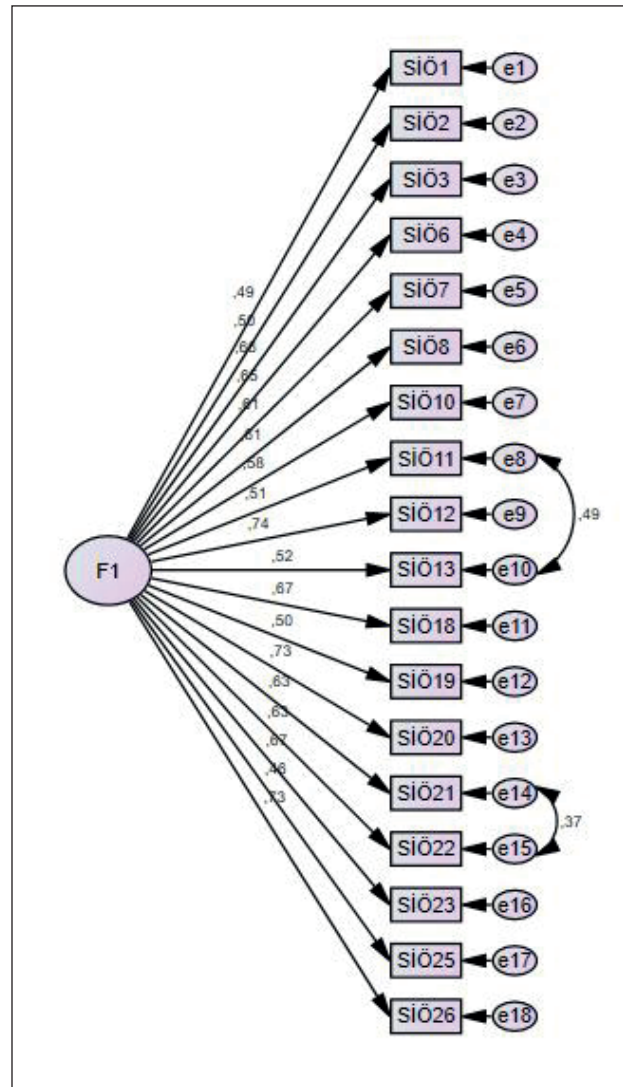


Figure 1. Single Sub-Dimensional 1st Order CFA Model (SIO Means DOB Social Isolation Scale)

Reliability Studies

Internal Consistency

Cronbach’s alpha reliability coefficient, one of the most frequently used criteria, was calculated to evaluate the scale’s reliability. These values are generally higher than the acceptable value of 0.70 (Table 4).

Discussion:

Measuring social isolation is important for public health. Social isolation is a health problem that can affect all age groups and must be intervened. However, some obstacles include the length of the scales developed in diagnosing social isolation and their application only to the advanced age group. Therefore, a new scale was developed in our study to evaluate social isolation. Scales developed on social

Table 4. Item Reliability Analysis of the DOB Social Isolation Scale

	Questions	Item-Total Correlation	Cronbach's Alpha Value	Cronbach's Alpha
			If the item is removed	
Social Isolation Scale	SIS1	0,458	0,911	0,912
	SIS2	0,487	0,910	
	SIS3	0,636	0,906	
	SIS6	0,613	0,907	
	SIS7	0,576	0,908	
	SIS8	0,577	0,908	
	SIS10	0,560	0,908	
	SIS11	0,517	0,909	
	SIS12	0,706	0,904	
	SIS13	0,525	0,909	
	SIS18	0,627	0,906	
	SIS19	0,477	0,911	
	SIS20	0,684	0,905	
	SIS21	0,604	0,907	
	SIS22	0,606	0,907	
	SIS23	0,638	0,906	
	SIS25	0,450	0,911	
	SIS26	0,691	0,905	

isolation in the literature are mostly long scales designed to measure more than one structure or scale applied, especially to the elderly population. Since some scales are embedded in other scales or have poor psychometric properties, they are insufficient to diagnose social isolation and confusion. DOB Social Isolation Scale is a measurement tool designed to measure whether a person is socially isolated. The items in the scale were prepared in a way to include many aspects of social isolation. The DOB Social Isolation Scale fills an important gap in the literature regarding the measurement of social isolation with these features.

In order to develop scales, it is recommended to use various sources such as literature review, consulting experts for the compatibility of the items, evaluating the scale draft in terms of compliance with the Turkish language rules, and collecting data from a heterogeneous sample group²¹. Our study started with a literature review on social isolation to develop a scale. Although there are many scales related to social phobia and loneliness, there are a limited number of scales with validity and reliability for evaluating social isolation.

Factor analysis was performed at the construct validity stage of the scale. While applying the

factor analysis, the sample size should be sufficient to ensure correlation reliability, and Kaiser Meyer Olkin (KMO) and Bartlett tests are used to determine that this competence is achieved. The result of the KMO test performed varies between 0 and 1, and it is expected to be approximately 1. For good factor analysis, the KMO value is recommended to be above 0.60. For the sample size to be suitable for factor analysis, the KMO test should be greater than 0.50, and the Bartlett's sphericity test result should be statistically significant²²⁻²⁴. In this context, according to our study results, the KMO test result was found to be 0.939, and Bartlett's sphericity test was found to be significant ($p < 0.001$) (Table 1). These results showed that the sample size was suitable for factor analysis²⁵. In the EFA evaluation made for the scale's construct validity, it was ensured that the statements with a factor load above 0.400 were included in the scale. It has been reported that the factor load value, which explains the relationship between the items in the scale and the factors, is at least 0.30 in single factor scales²³. In this direction, it was determined that the factor loads obtained as a result of the analysis made were sufficient. It was determined that 18 items explaining 40,992% of the total variance were collected in a single factor. The scale consisting of 18 items in total and a single sub-dimension was

named the DOB Social Isolation Scale.

Another important step of reliability analysis is internal consistency. Internal consistency is the reliability that determines that all items of the scale can measure the measured variable. The alpha coefficient measures the internal consistency of the items in the scale, and the Cronbach's Alpha Reliability Coefficient was calculated for the internal consistency reliability in our study. It has been reported that an alpha coefficient of 0.60 and higher proves the internal consistency²². However, the consistency increases as the alpha reliability coefficient approaches 1 and decreases as it approaches 0²⁵. According to our study results, the overall reliability coefficient of the DOB Social Isolation Scale was calculated as 0.91. According to this result, it is understood that the whole scale provides internal consistency.

Conclusion and suggestions

One of the most important limitations of this study is that the research results consist of data from the research group. Therefore, it may not be possible to generalize the research results to all university students or people of all age groups. To increase the generalizability of the validity and reliability results of the DOB social isolation scale, it should be tested on a sample of other age groups. Despite its limitations, this study is one of the few studies investigating social isolation in young people, and it is important to guide future studies to define social isolation. The study

results show that the DOB Social Isolation Scale is a valid and reliable measurement tool to evaluate social isolation. Developed to measure social isolation, the DOB Social Isolation Scale is an adaptable scale to different cultures. The scale provides an advantage for healthcare professionals in determining social isolation. For the DOB Social Isolation Scale to be used in many countries, conducting international, cross-sectional, multi-center validity-reliability studies in cooperation with international researchers will greatly contribute to the literature.

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Authors' contribution:

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Editing and approval of final draft: Gülgün Durat, Kevser Ilcioglu, Yasemin Hamlacı Başkaya

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