

Turkish Version of Self Concept and Identity Measure (SCIM): Psychometric Properties

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Abstract

In the current study, it is aimed to adapt Self-Concept and Identity Measure (SCIM) into Turkish. The participants of the study were internet users (n = 364). According to exploratory factor analysis results, Turkish version of SCIM (T-SCIM) consists of two factors (disturbed identity and consolidated identity). Moreover, T-SCIM showed expected correlations with emotion regulation, coping strategies, and psychopathologies. The internal consistency (Cronbach's $\alpha = 0.88$) and test-retest reliability ($\alpha = 0.82$, $r = 0.70$; ICC = 0.82) scores were found to be very good. It is concluded that T-SCIM is a reliable and valid scale that can be used in Turkey. (**Journal of Cognitive Behavioral Psychotherapy and Research 2016; 111-118**)

Keywords: Identity, identity disturbance, self concept, scale adaptation, psychopathology, factor analysis

Özet

Benlik Kavramı ve Kimlik Ölçeğinin (BKKÖ) Türkçe Versiyonu: Psikometrik Özellikleri

Bu çalışmada Benlik Kavramı ve Kimlik Ölçeğinin (BKKÖ) Türkçe'ye uyarlanması amaçlanmıştır. Çalışmanın örneklemini 364 internet kullanıcısı oluşturmaktadır. Açıklayıcı faktör analizi sonuçlarına göre BKKÖ'nün Türkçe uyarlaması iki faktörden (örselenmiş kimlik ve bütünleşmiş kimlik) oluşmaktadır. Ayrıca BKKÖ duygu düzenleme, baş etme yöntemleri ve psikopatolojilerle beklenen şekilde korelasyon göstermiştir. İç tutarlılığı (Cronbach $\alpha = 0.88$) ve test-tekrar test güvenilirliği ($\alpha = 0.82$, $r = 0.70$; ICC = 0.82) oldukça iyidir. Bu bulgular doğrultusunda, BKKÖ'nün Türkiye'de kullanılacak güvenilir ve geçerli bir ölçek olduğu sonucuna varılmıştır. (**Bilişsel Davranışçı Psikoterapi ve Araştırmalar Dergisi 2016; 111-118**)

Anahtar kelimeler: Kimlik, kimlik kargaşası, benlik kavramı, ölçek adaptasyonu, psikopatoloji, faktör analizi

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INTRODUCTION

In Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (APA, 2013), identity is defined as feeling self as separated from others with clear boundaries and having a sense that the self is unmatched. Moreover, it is characterized by having a consistent self-esteem, a precise self-appraisal, and ability of regulating own emotions. Identity formation which is mostly emphasized by Erik Erikson (e.g. Erikson, 1968) is a milestone in an individual's development (Cote & Levine, 2002). It is defined as a process during which characteristics of a personality are founded and expand along the lifespan (Cote & Levine, 1987). In psychology literature, there are a great number of studies related to this crucial topic, identity. Developmental psychologists mostly focused on development (Marcia, 1966; Grotevant & Cooper 1985; Grotevant & Cooper, 1986), socialization (Adams & Marshall 1996), conceptualization (Grotevant, 1987), and problems of identity and identity formation (Erikson, 1956). Whereas social psychologists preferred to study, more specifically, social identity (O'Connor, Longman, White & Obst, 2015; Pauker, Apfelbaum & Spitzer, 2015), racial identity (Maxwell, Brevard, Abrams & Belgrave, 2015; Chakawa, Butler & Shapiro, 2015), leadership identity (Guillen, Mayo & Korotov, 2015; Marchiondo, Myers & Kopelman, 2015), gender identity (Egan & Perry, 2001), and sexual identity (Shively & Dececoco, 1977; Frable, 1997) etc.

As for clinical psychology literature, divergent topics related to identity are limited in number. Researchers mostly focused on identity disturbance and borderline personality disorder (Wilkinson-Ryan & Westen, 2000; Meares, Gerull, Stevenson & Korner, 2011; Sollberger et al., 2012). Some of the other topics studied are eating disorders (Stanghellini, Castellini, Brogna, Faravelli & Ricca, 2012), schizophrenia (Boulanger, Dethier, Gendre & Blairy, 2013), substance use (Talley, Tomko, Littlefield, Trull & Sher, 2011), and emotion regulation (Neacsiu, Herr, Fang, Rodriguez & Rosenthal, 2015) etc. In all conditions, it is clear that identity has a crucial role in psychological well-being of individuals.

For both clinical and empirical studies, many scales have been developed and some of them have been adapted into Turkish. Unfortunately, the existing measures of identity have some limitations. Firstly, all the studies of those adapted scales included university students (Oskay, 1998; Demir, 2011; Morsünbül & Atak, 2013; Morsünbül & Çok, 2014). From

a developmental perspective developing scales for adolescents may seem sensible as one of the stages of Erikson's psychosocial theory, identity vs. role confusion, corresponds to this developmental stage (Erikson, 1968). However, from a clinical point of view, it would be better to have scales suitable for all age groups as the psychopathologies related to identity (e.g. personality disorders) are not diagnosed before young adulthood (APA, 2013). Secondly, the scales used in Turkey have many factors which can make it difficult and complicated to use in research studies, especially when a deep understanding of the identity is not in consideration (e.g. Oskay, 1998; Demir, 2011; Morsünbül & Çok, 2014). Finally, the number of items included in the measures in Turkish is a lot which may make it difficult to use in clinical applications (e.g. Oskay, 1998; Morsünbül & Atak, 2013).

Considering those limitations, a new scale is needed in Turkish and Self-Concept and Identity Measure (SCIM) (Kaufman, Cundiff & Crowell, 2015) is a measure that can eliminate all those limitations of existing scales. SCIM has three factors, namely, consolidated identity, disturbed identity, and lack of identity. Consolidated identity refers to a healthy wholeness, having a link with one's past, and to have a sense of self. Disturbed identity corresponds to problems related to identity, like confusion, disturbance, diffusion, etc. Finally, lack of identity is characterized with feelings of emptiness, soullessness, and being broken. Number of items and factors of SCIM are acceptable for both research and clinical purposes and more importantly can be applied to general population. Therefore, one of the aims of this study is to adapt SCIM and bring in Turkish literature. It is hypothesized that the factor structure will be identical to original form. Furthermore, there will be negative associations between consolidated identity and disturbed identity, and consolidated identity and lack of identity.

When the clinical literature related to identity disturbance is reviewed, it is very possible to find studies related to borderline personality disorder, as mentioned above. In this literature, another concept which is mostly studied with borderline personality disorder is emotion dysregulation (e.g. Glenn & Klonsky, 2009). Therefore, as in the original study of SCIM, we included emotion regulation and ways of coping strategies in our study and consistent with Kaufman et al. (2015) results we hypothesized that participants who show disturbed identity or lack of identity will report emotion dysregulation and ineffective coping strategies in addition to psychopathologies.

METHOD

Participants

Participants of the current study were 364 subjects, 237 (65.1 %) of which were female and 127 (34.9 %) of which were male. Their age range was 18 to 58 ($\alpha = 23.87$; $sd = 6.41$). As for education reports, there was 1 (0.28 %) missing data. 1 participant (0.28 %) reported being graduated from primary school, 4 participants (1.1 %) from secondary school, 26 participants (7.14 %) from high school, 6 participants (1.65 %) from upper secondary education, 58 participants (15.93 %) from university, 17 participants (4.67 %) having a master's degree, 3 participants (0.82 %) having a doctoral degree, 2 participants (0.55 %) being a master program student, 264 participants (72.53 %) being a university student. University students got bonus points for their participation. The data was collected via internet. Therefore, in common, all the participants were internet users. Prior to the presentation of the scales, all the participants declared that they participated the study voluntarily.

Procedure

After taking permission from the researchers who developed SCIM and from Ethical Committee of Ankara Yıldırım Beyazıt University, the 27 original items of SCIM were translated into Turkish by three researchers. For each item, all three translations were checked by five researchers and the most suitable one was chosen. If the translations were not good enough, items were translated again. Following the translation process, the items were checked by two psychologists, one linguistic scientist and an independent researcher. In the light of the feedbacks, the items were reviewed again and backward translation was conducted.

When the scale was completed, a pilot study was run with 6 participants. The participants both rated themselves and the difficulty of the items on a 5-point Likert type scale. Nine items which got 3 points and higher were reviewed and rewritten. This time one-to-one translation was ruled out and the meaning was aimed to be kept. The same participants rated new nine items. As the mean of the ratings were not high, the scales were loaded on Qualtrics program and the link of the study was disseminated via e-mail, social media, and university's student affairs information system to collect the data. SPSS 20 was used for the analysis of the data.

Instruments

Demographic information form includes questions for age, gender and education level.

Self-concept and identity measure (SCIM) was developed by Kaufman et al. (2015). Originally, it is a 27-item, self-report scale. It was developed to assess identity integrity and "clinically-relevant identity disturbance". The contents of the items were addressing many important aspects of identity; evaluation of "self-concept and role continuity" under different circumstances, stability of "values and interests", "self-worth", differentiation of self and others, and self-consistency. Participants' responses can vary from 1 to 7 (1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=neither agree nor disagree, 5=somewhat agree, 6=agree, and 7=strongly agree). Test-retest reliability of SCIM is $\alpha = 0.93$, internal consistency is 0.88 for total SCIM score, 0.86 for disturbed, 0.87 for lack of identity, and 0.76 for consolidated identity.

Emotion regulation questionnaire was developed by Gross and John (2003) and adapted into Turkish by Yurtsever (2008). ERQ is a 10 item, self-report scale for assessing the individuals' emotion regulation strategies, either reappraisal or suppression. It is a 7-point Likert type scale ranging from 1 (strongly disagree) to 7 (strongly agree). Cronbach's alpha coefficient for reappraisal is 0.85 and suppression is 0.78. For reappraisal subscale, the test-retest reliability was 0.88 and for the suppression subscale was 0.82. Aka (2011) revised the items and in the current study this revised version was used. In our sample Cronbach's alpha coefficient for reappraisal was 0.87 and for suppression was 0.77.

Ways of coping inventory was developed by Şahin and Durak (1995). Taking Folkman and Lazarus's Ways of Coping Inventory as a guide, Şahin and Durak added emotional states like depression, anxiety, loneliness, psychological stress for the new Turkish Ways of Coping Inventory. It is a 30 item, self-report inventory which has at first order 2 factors, problem focused/effective and emotion focused/ineffective, and at second order 5 factors, namely, optimist approach, self-confident approach, desperate approach, submissive approach, social support seeking. It is a 4-point Likert type scale ranging from 0% to 100% (0%-totally not suitable, 30%-partially not suitable, 70%-partially suitable, 100%-totally suitable). Cronbach's alpha coefficients for optimist approach were between 0.49 and 0.68, for self-confident approach they were between 0.62 and 0.80, for desperate approach they were between 0.64 and 0.73, for sub-

missive approach they were between 0.47 and 0.70, for social support seeking they were between 0.45 and 0.47. In our study, the first order factors were considered and Cronbach's alphas were 0.83 for problem-focused/effective and 0.80 for emotion-focused/ineffective.

Symptom check list-90-revised (SCL-90-R) was developed by Derogatis, Lipman and Covi (1973) and was adapted to Turkish by Gökler (1978). It is a 90-item, self-report, 4-point Likert type scale, ranging from 0 (not at all) to 4 (extremely). The check list was developed to detect the psychological symptom clusters of patients. It has nine sub-scales, namely, somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism. Test-retest reliability was 0.90 for general score, and changed between 0.65 and 0.87 for the subscales. Cronbach's alpha for SCL-90 total score was 0.98, and were 0.91, 0.85, 0.89, 0.92, 0.91, 0.83, 0.86, 0.79, 0.87 for the subscales in the same order given above.

Results

In Table 1 descriptive statistics of the scales are given. For the current sample, the internal consistency of the scales in use were calculated. For SCL-90, the internal consistency was perfect (Cronbach's $\alpha = 0.98$). As for WCI-Problem-focused/effective, WCI-Emotion-focused/ineffective, ERQ/reappraisal, and ERQ/suppression the scores were good (Cronbach's $\alpha = 0.83, 0.80, 0.87, 0.77$).

Table 1. Descriptive statistics for measures

Measure	Mean (SD)	Range
T-SCIM-Total	71.70 (21.61)	32-143
T-SCIM-Disturbed Identity	47.71 (16.54)	17-99
T-SCIM-Consolidated	48.01 (8.11)	17-62
ERQ-Reappraisal	30.32 (6.44)	6-42
ERQ-Suppression	14.16 (5.19)	4-28
WCI-Problem-focused/effective	15.21 (2.23)	9.33-21
WCI-Emotion-Focused/ineffective	15.21 (3.23)	7.50-24
SCL-90-Total	2.16 (0.71)	1-4.04
SCL-90-Somatization	2.03 (0.79)	1-4.67
SCL-90-OC	2.53 (0.75)	1-4.60
SCL-90-Interpersonal Sensitivity	2.35 (0.85)	1-4.67
SCL-90-Depression	2.40 (0.87)	1-4.85
SCL-90-Anxiety	2.02 (0.81)	1-4.60

SCL-90-Hostility	2.08 (0.82)	1-4.33
SCL-90-Fobic Anxiety	1.68 (0.74)	1-4.71
SCL-90-Paranoid	2.27 (0.82)	1-4.83
SCL-90-Psychotism	1.93 (0.77)	1-4.60

Exploratory Factor Analysis

Prior to analysis the data was screened for missing data, outliers, normality, and multicollinearity (Tabachnick & Fidell, 2007). For being more conservative, listwise deletion was performed for missing data. In order to determine the underlying component structure of T-SCIM a Principal Component Analysis (PCA) was performed on 27-item T-SCIM. The Keiser-Meyer-Olkin (KMO) Measure of Sampling of adequacy was 0.90. The significance of KMO and Bartlett's Test of Sphericity indicates the good fit of the analysis to the data.

The factors were decided according to the eigenvalues and scree plot. Eigenvalues gave 6 components, whereas scree plot gave 2 or 3 components. Therefore, the analyses were conducted for both 2 and 3 factor structures with a promax rotation. The reason for choosing an oblique rotation is that the factors of SCIM are expected to be correlated. The results of three-factor structure indicated that, cumulatively, the factors explain 46.18 % of the total variance. However, the loadings of the items were not interpretable and there were 6 cross-loaded items. As for results of two-factor structure, the factors cumulatively explained 39.95 % of the variance. Although the explained variance has decreased and there were 3 cross-loaded items (T-SCIM14, T-SCIM18, T-SCIM23), the factor structures become more interpretable. Therefore, two-factor solution was selected.

Factor loadings of each T-SCIM item is given in Table 2. All the cross-loaded items (T-SCIM14, T-SCIM18, T-SCIM23) were decided to be included under the factors on which they have greater loads. One item (T-SCIM11) which failed to load substantially on any factor was excluded from the Turkish form. After the exclusion, a new exploratory factor analysis was conducted with 26 items and the explained variance increased to 41.41%.

Considering the original form of the scale, the factors are labeled as Disturbed Identity and Consolidated Identity. The first component, Disturbed Identity, accounted for 31.85 % of the total variance with an eigenvalue of 8.28. The loads of 17 items under this component range between 0.42 and 0.73. An example item to this component is "I no longer know who I

am". The second component, Consolidated Identity, accounted for 9.56 % of the total variance with an eigenvalue of 2.49. The loads of the 9 items under this factor range between 0.48 and 0.74. "I always have a good sense about what is important to me" is an example item for this factor. As expected, consolidated identity and disturbed identity correlated negatively ($r = -0.47$). With 26 items, the scale demonstrated a strong internal consistency (Cronbach's $\alpha = 0.74$). While the internal consistency of Consolidated Identity is also strong (Cronbach's $\alpha = 0.78$), the internal consistency of Disturbed Identity is excellent (Cronbach's $\alpha = 0.90$). For split-half reliability test,

the data was randomly divided into two halves and Gutmann-Split-Half Coefficient was found to be 0.72. Internal consistency scores of both parts were found to be similar (Cronbach's $\alpha = 0.59$). For T-SCIM-Total, and two factors, the skewness and kurtosis values were acceptable (T-SCIM-Total skewness=0.57, SE=0.13, kurtosis= -0.16, SE=0.26; T-SCIM-Disturbed Identity skewness=0.60, SE=0.13, kurtosis= -0.05; SE=0.26; T-SCIM-Consolidated skewness= -0.85, SE=0.13, kurtosis=0.70, SE=0.26).

For test-retest reliability, 72 participants filled the scale ones more, after the first participation. The time passed between the two applications ranged from 5

Table 2. Factor loadings for two-factor structure using PCA with promax rotation, corrected item-total correlation, communalities

Items	Factor 1: Disturbed identity	Factor 2: Consolidated identity	Corrected Item-Total Correlation	Communalities
T-SCIM27	0.73		0.52	0.47
T-SCIM21	0.71		0.48	0.38
T-SCIM22	0.67		0.54	0.60
T-SCIM12	0.64		0.49	0.52
T-SCIM20	0.64		0.50	0.45
T-SCIM6	0.63		0.43	0.30
T-SCIM13	0.63		0.51	0.55
T-SCIM15	0.62		0.48	0.58
T-SCIM25	0.61		0.44	0.33
T-SCIM10	0.61		0.49	0.49
T-SCIM26	0.60		0.43	0.37
T-SCIM8	0.60		0.48	0.49
T-SCIM7	0.60		0.48	0.54
**T-SCIM18	0.55	0.38	0.35	0.23
T-SCIM4	0.54		0.38	0.28
**T-SCIM23	0.51	0.33	0.29	0.20
T-SCIM24	0.41		0.31	0.36
T-SCIM2		0.74	0.003	0.47
T-SCIM1		0.74	-0.11	0.55
T-SCIM3		0.64	0.07	0.30
T-SCIM17		0.63	-0.19	0.50
**T-SCIM14	0.34	0.63	0.13	0.29
T-SCIM5		0.62	-0.27	0.56
T-SCIM16		0.61	-0.05	0.32
T-SCIM19		0.49	-0.16	0.30
T-SCIM9		0.49	-0.23	0.35
*T-SCIM11			-0.04	0.02
Eigenvalue	8.28	2.49		
Variance	31.85 %	9.56 %		

Values smaller than 0.32 were suppressed.

*Unloaded item **Cross-loaded items

days to 21 days. For all three scores, the test-retest reliability scores were strong (T-SCIM-Total Cronbach's $\alpha = 0.82$, $r = 0.70$, ICC = 0.82; T-SCIM-Disturbed Identity Cronbach's $\alpha = 0.81$, $r = 0.69$, ICC = 0.81; T-SCIM-Consolidated Cronbach's $\alpha = 0.71$, $r = 0.57$, ICC = 0.71).

Construct Validity

For construct validity, the correlation coefficients of T-SCIM scores and other measures (ERQ, WCI, SCL-90) were evaluated (Table 3).

DISCUSSION

In the scope of this study, Self-Concept and Identity Measure, which was developed by Kaufman et al. (2015), was adapted into Turkish and the reliability and validity studies were conducted. In order to detect the factor structure of T-SCIM, exploratory factor analysis was used. According to the exploratory factor analysis results, two factors were decided. As mentioned above, the original SCIM consists of 3 factors, consolidated identity, disturbed identity, and lack of identity. However, in our sample disturbed identity and lack of identity items merged under one factor. It could be due to cultural differences between Turkish culture and USA culture. Moreover, one item (SCIM11- I have been interested in the same types of

things for a long time), which failed to load on any factor, was excluded from the T-SCIM. Even there is not any study related to hobbies and identity in Turkish culture, the reason for this failure most probably is that in Turkish culture hobbies, interest areas, music preference etc. are not indicators of identity, contrary to other cultures. Therefore, this item did not work in our sample. At the end, T-SCIM is a 26-item scale and 3 scores can be obtained from the scale, namely, T-SCIM-Total (is calculated by reversing the Consolidated ID items and increased T-SCIM-Total scores indicate higher identity disturbance), T-SCIM-Disturbed ID, and T-SCIM-Consolidated ID.

For the reliability of the scale, internal consistency, split half reliability and test-retest reliability were analyzed and according to the results, all test scores, T-SCIM-Total and two factors, were strong enough. Those results show that T-SCIM is a reliable measure for Turkish culture.

For construct validity, the relation between T-SCIM-Total, T-SCIM-Disturbed ID and T-SCIM-Consolidated ID scores and scores of ERQ, WCI, and SCL-90 were tested. Identity disturbance and ways of coping scores were found to be consistent with the literature (Wilkinson-Ryan & Westen, 2000; Sollberger et al., 2012; Boulanger et al., 2013; Neacsiu et al., 2015) and the scores of the development

Table 3. Correlations of factor 1, factor 2 and T-SCIM-Total with other measures

	Factor 1 T-SCIM-Disturbed ID	Factor 2 T-SCIM-Consolidated ID	T-SCIM-Total
ERQ-Reappraisal	-0.11*	0.26**	-0.18**
ERQ-Suppression	0.35**	-0.12*	0.31**
WCI-Problem/effective	-0.37*	0.42*	-0.44*
WCI-Emotion/ineffective	0.46*	-0.24*	0.44*
SCL-90-Total	0.45*	-0.32*	0.47*
SCL-90-Somatisation	0.35*	-0.27*	0.37*
SCL-90-OC	0.43*	-0.28*	0.44*
SCL-90-Interpersonal sensitivity	0.45*	-0.28*	0.45*
SCL-90-Depression	0.41*	-0.33*	0.44*
SCL-90-Anxiety	0.38*	-0.27*	0.39*
SCL-90-Hostility	0.40*	-0.26*	0.40*
SCL-90-Phobic Anxiety	0.40*	-0.29*	0.41*
SCL-90-Paranoid	0.37*	-0.23*	0.37*
SCL-90-Psychotism	0.44*	-0.29*	0.44*

significant at *0.01 **0.05 (two-tailed)

study of SCIM (Kaufman et al., 2015). Accordingly, with SCL-90 and its all nine sub-scale scores, and WCI-Emotion/ineffective scores T-SCIM-Total and T-SCIM-Disturbed ID showed a positive significant correlation while T-SCIM-Consolidated ID showed negative significant correlation. For WCI-Problem/effective, T-SCIM-Consolidated ID showed a positive significant relation, contrary to T-SCIM-Total and T-SCIM-Disturbed ID, which showed negative significant relations. Similarly, T-SCIM-Total and T-SCIM-Disturbed ID demonstrated a negative significant correlation with ERQ-reappraisal while having a positive significant relation with ERQ-suppression. As for T-SCIM-Consolidated ID, it had a negative significant correlation with ERQ-suppression, while having a positive significant relation with ERQ-reappraisal. Those results support the construct validity of T-SCIM. Moreover, these correlations are in the same line with previous research which study the relations of identity disturbance with emotion dysregulation or psychopathologies (Wilkinson-Ryan & Westen, 2000; Meares et al., 2011; Sollberger et al., 2012; Stanghellini et al., 2012; Talley et al., 2011; Boulanger et al., 2013; Neacsu et al., 2015). In other words, identity disturbance scores, obtained via T-SCIM were found to be related to both emotion dysregulation and psychopathologies. Accordingly, T-SCIM might distinguish psychologically healthy individuals from psychologically unhealthy ones. However, to make such an inference more studies, especially the ones conducted in clinical settings, and different diagnosis are needed.

Finally, all T-SCIM scores demonstrated an expected relation consistent with the original study (Kaufman et al., 2015); T-SCIM-Consolidated ID had a negative correlation with T-SCIM-Total and T-SCIM-Disturbed ID, and the correlation of T-SCIM-Disturbed ID and T-SCIM-Total was positive.

This study shows some strengths of T-SCIM. First of all, participants of the study were not just university students. Therefore, as the reliability scores are strong enough, it can be concluded that T-SCIM can be used in general population. Secondly, the number of items is acceptable which makes it easier to demonstrate. Finally, having just two factors eases to use T-SCIM both for research and clinical purposes.

As for limitations, the participants of the study were from non-clinical population. For detecting the discriminant power of the scale, more research is needed with clinical samples. Furthermore, not including a scale that screens any of the disorders that are characterized by identity disturbance is also a li-

mitation. Moreover, this study was a cross-sectional design. To determine the predictive value of T-SCIM, longitudinal studies are needed. In a long period, the development of or problems related to development of identity can demonstrate the predictive power of T-SCIM. Finally, collecting data via internet was itself a limitation for the study.

All in all, with its 26-item, 2-factor structure, the reliability and validity levels of T-SCIM is acceptable to use this scale in Turkish culture. To test the reliability and validity of T-SCIM for clinical samples and discriminant power of the scale, studies are needed to be conducted with clinical samples.

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