Validation of Sense of Coherence (SOC) 13-item scale in Iranian sample

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Abstract

Objective: The aim of the present study was to test the reliability and validity of Farsi version of the Sense of Coherence 13-item scale (SOC; Antonovsky 1987) in Iranian sample. Methods: participants completed Farsi SOC 13-item scale and Hardiness 45-item scale (Kobasa, Maddi, and Kahn, 1982; Bartone, 1991; Besharat, 2008). Data from a cross-sectional study with a sample of 375 undergraduate students, (137 males and 238 females), age 18-24, were analyzed. Results: Test of internal consistency of the SOC-13, revealed that all 13 items are highly correlated with total score. The Cronbach’s alpha for the inventory was 0.77. The alpha for the males was 0.75, and for females was 0.78. The correlation between SOC 13-item scale and Hardiness 45-item scale was significant ($r=0.54$, $p<0.01$). A re-test after 6-8 weeks showed a significant correlation ($r=0.66$, $p>0.01$) between test and re-test scores. Statistical significant correlation were observed between subscales score and total score (Meaningfulness $r=0.76$, Comprehensibility $r=0.86$, Manageability $r=0.81$). Factor analysis extracted four factors with an eigenvalue of greater than 1 that could explain 53.49% of the total variance.

Conclusion: The results confirmed the reliability and validity of Sense of Coherence 13-item scale (Farsi version) in Iranian population.

Keywords: Sense of Coherence; SOC; Validity &Reliability; Antonovsky; Hardiness; Meaningfulness; salutogenesis.

1. Introduction

According to Antonovsky, Sense of Coherence (SOC) is an internal resource that helps individuals deal with stressful situations (Kravetz, Drory, & Florian, 1993). Base on model of salutogenesis from Latin, salus = health and genesis = origins proposed by Antonovsky (1979, 1987) in contrast to the pathogenic model, a well-developed sense of coherence (SOC) represents a salutogenic personality trait that facilitates optimal adjustment in a number of domains functioning. In the salutogenic view, health is defined as a continuum between the two poles of total wellness and total disease, and Antonovsky suggested that the degree of sense of coherence in life influenced his or her position on this continuum (Flensborg-Madsen, Ventegodt, & Merrick, 2005). The Sense of coherence is a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that (1) the stimuli deriving from one’s internal and external environments in the course of living are structured, predictable, and explicable [comprehensibility]; (2) the

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resources are available to one to meet the demands posed by these stimuli [manageability]; and (3) these demands are challenges, worthy of investment and engagement [meaningfulness] (Antonovsky, 1979). Antonovsky stated that it is not necessary to feel that all of life is highly comprehensible, manageable, and meaningful in order to have a strong SOC. It is indeed possible to have a strong SOC and at the same time not see the entire world as coherent. This is due to the fact that all people set boundaries, and what goes beyond these simply does not matter to us, whether comprehensible, manageable, or meaningful or not (Flensborg-Madsen, Ventegodt, & Merrick, 2005).

1.1. Significance

The SOC 13-item scale is one of two original SOC scales, and there is high intercorrelation ($r = 0.96, P < 0.001$) between SOC-13 and SOC-29 (Eriksson & Lindstrom, 2005). A strong sense of coherence was associated with a 0.30 reduction in mortality from all causes (rate ratio = 0.69, $p < 0.0001$), cardiovascular disease (rate ratio = 0.70, $p = 0.001$), and cancer (rate ratio = 0.74, $p = 0.003$), independent of age, sex, and prevent chronic disease (Surtees, wainwright, Luben, khaw, & Day, 2003). The SOC scale has high inverse correlations with depression (Konttinen, Haukkala, & Uutela, 2008), diabetes and risk of type 2 diabetes (Agardeh, & colleagues, 2002), risk of smoking and tobacco use among adolescents (Glanz, & Maskarinec, 2005), psychosomatic complaints (Simonson, Nilsson, Leppert & Vinod, 2008), headache among adolescents (Koushede, Holstein, & Scient, 2008), Alcohol related problems among adolescents (Nilsson & colleagues, 2007), alcohol and drug addiction (Arevalo, prado, & Amaro, 2008), the SOC was shown to be strongly related to: perceived health, especially mental health (Eriksson, & Lindstom, 2006) recovery from major depression (Skarsater & colleagues, 2009), psychological health and symptoms (Antonovsky, 1993; Flensborg-Madsen, Ventegodt, & Merrick, 2005, 2006; Topinen-Tanner, Kalimo, 2003; Skarsater & colleagues, 2009; Hart, Wilson & Hittner, 2006), lower levels of systolic blood pressure (Lindfors, Lundberg, & Lundberg, 2005), natural killer cell activity, (Nakamura & colleagues, 2001), predicting recovery following surgery (Chamberlin, Petri, & Azariha, 1992).

1.2. Aims

Purposes of the present study were: 1- preparation the Farsi version of the SOC-13 scale. 2- Study the validity and reliability of the SOC-13 item scale. 3- Study the psychometric properties of the SOC in students population. 4- Study of psychometric properties of the scale in participant’s demographical variables. Demographical variables in this study were: gender, age, marriage, academic courses, birth order, and parent’s education level.

2. Methods

2.1. Participants

In a cross-sectional study, a sample of 400 undergraduate students ages 18-24, from a university in west Azerbaijan, completed the SOC 13-item scale (Antonovsky, 1987), and Hardiness 45-item scale (Bartone, 1991; Besharat, 2007). At least data from 375 participants, 137 males (36.8%) and 238 females (63.2%), were analyzed.

2.2. Measures and Statistical procedures

We translated the SOC-13 item scale to Farsi language. The SOC-13 item scale rated on a 7-point Likert scale. Addition to total SOC score, it yielding 3 separate subscores corresponding to the components of the SOC concept: comprehensibility (consist items: 2, 6, 8, 9, and 11), Manageability (items: 3, 5, 10, and 13), and Meaningfulness (items: 1, 4, 7, and 12). To score the SOC scale for a given participant, responses code of items 1, 2, 3, 7, & 10 should be reversed. The SOC total score ranges 13 to 91 (Antonovsky, 1987).

Hardiness 45- item scale was used for examine the criterion validity. The Hardiness 50-item scale was established by Kobasa (1982). Bartone et al established 45-item scale to solve early hardiness scale problems relate to changing hardiness subscale scores to Z-scores (Kosaca, 1996). The 45-item form has the additional virtue of being full balanced for positive and negative items with an equal number (15) of each (Bartone, 1991). Like SOC scale, personality-based Hardiness components consist a total score and 3 separate subscores: commitment, control,
and challenge. Hardiness rated on a 4-point Likert scale (Kobasa, Maddi, & Khan, 1982; Bartone, 1991). We used a Farsi version (Besharat, 2008) of Hardiness 45-item scale.

The Pearson coefficient was used to examine the validity & criterion validity, Cronbach alphas and test-retest (to measure reliability), and factor analysis (to examine the construct validity). The Statistical Package for the Social Science (SPSS) version 11.5, was used for all analysis.

3. Results

Descriptive statistic. Distribution of SOC total scale scores was evaluated by Kolmogorov-Smirnov test. Distribution of the SOC (Z=0.69, p= 0.72), and Hardiness total score (Z= 0.79, p= 0.45) were within normal limit for the entire sample. Skewness of the SOC and Hardiness were normal, and showed that we can use the parametric statistic. The SOC total scores for the full sample ranged from 20-87. The mean of SOC-13 item score in our study was 58.08 (S.D. =12.63). Mean of subscores, and standard deviation for the male and female (meaningfulness, 20.30, S.D.=4.28; 19.19, S.D.=4.61; comprehensibility, 20.87, S.D.=5.68; 19.19, S.D.=4.61, and manageability 18.63, S.D.=4.48; 18.30, SD=4.77) were different. The t-test (t = 2.19) used to comparing the male and female SOC score difference.

| Table 1. Cronbach alphas for the SOC and subscales in the men and women |
|---------------------------------------------------|
| Scales | SOC | Meaningfulness | Manageability | Comprehensibility |
|--------|-----|----------------|---------------|------------------|
| Men    | 0.75| 0.54           | 0.45          | 0.52             |
| Women  | 0.78| 0.58           | 0.50          | 0.63             |
| Total  | 0.77| 0.56           | 0.48          | 0.61             |

Result indicated difference between men (N=138, M=59.81, S.D. =11.83), and women (N=237, M=56.93, S.D. =12.97), men’s SOC was significantly (p< 0.05) strong than women. Relation between other demographic variables (age, marriage, academic courses, birth order, and parents education level), and the SOC score were not statistically significant. A poor correlation (r=12, p <0.05) was observed between age and SOC score. Reliability of the SOC scale examined by test-retest (6-8 weeks interval), and showed a good correlation (r = 0.66, p <0.01). Base on previous studies (Eriksson, & Lindstrom, 2005) the SOC 13- item scale test-retest reliability ranges 0.69 to 0.72. Internal consistency measured by Cronbach alphas, and indicated a = 0.77. Alpha values for the SOC (men, women, and total) were 0.74, 0.78 and 0.77; for meaningfulness were 0.54, 0.58, and 0.56; for manageability were 0.45, 0.50, and 0.48; for comprehensibility were 0.52, 0.63, and 0.61.

Correlation coefficient between the SOC and its subscales Meaningfulness (r = 0.76), Comprehensibility (r = 0.86), and Manageability (r = 0.80) were high and significant (p < 0.01). Subscales highest intercorrelation refers to manageability and comprehensibility (r = 0.54, p < 0.01). Correlation for the SOC and items has a range from r = 0.44 to r = 0.58, and was significant (p < 0.01). (Table, 2)

Criterion validity examined by correlation between the SOC 13-item scale and Hardiness 45-item scale. Result was statistically significant (r = 0.54, p < 0.01). Correlations between Sense of coherence subscales and Hardiness subscales were significant, except in Hardiness Challenge subscale (range from -0.05 to 0.07), the highest correlation (r = 0.51, p < 0.01), was observed between meaningfulness and commitment.

Construct validity of the SOC examined by Factor analysis. Kaiser-Meyer-Olkin measure of sampling Adequacy (KMO = .813), and Bartlett’s test of sphericity (= 805/202, p = .000) indicates factor analysis can be used. Factor analysis showed that correlation between all 13 items and total score is statistically significant (range from 0.44 to 0.58). There was not important modify in alphas after deleting the items.

| Table 2. Statistical properties for 13-items, PC analysis |
|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Items | I | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|------|---|---|---|---|---|---|---|---|---|----|----|----|----|
| mean | 5.18 | 3.83 | 3.98 | 5.38 | 5.32 | 3.60 | 4.62 | 4.45 | 3.67 | 3.82 | 4.94 | 4.94 | 5.32 |
| S D  | 1.89 | 1.77 | 1.81 | 1.68 | 1.99 | 2.03 | 1.54 | 2.15 | 2.13 | 1.94 | 1.89 | 1.68 | 1.71 |
| r *  | 0.47 | 0.56 | 0.55 | 0.44 | 0.44 | 0.55 | 0.55 | 0.58 | 0.55 | 0.57 | 0.45 | 0.45 | 0.44 |
| Alphas** | 0.76 | 0.75 | 0.75 | 0.76 | 0.76 | 0.76 | 0.75 | 0.75 | 0.75 | 0.75 | 0.76 | 0.75 | 0.76 |
| Extraction | 0.53 | 0.56 | 0.56 | 0.47 | 0.34 | 0.50 | 0.50 | 0.65 | 0.54 | 0.63 | 0.58 | 0.60 | 0.44 |
*All Correlations (r) with total score are significant at p < 0.01

**Alpha values after delete the items.

Exploratory factor analysis indicates first factor has an eigenvalue of 3.55, and occurred for explaining 27.4 percent of the variance. Principal components analysis manifested 4 factors explaining 53.49 percent of the variance (table, 3). Scree plot confirmed the results of Principal Component Analysis.

Table 3. Result of Factor Analysis for SOC items. Items Initial Eigen values.

| items | 1   | 2    | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  |
|-------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Total | 3.55| 1.31 | 1.07| 1.01| .92 | .84 | .79 | .71 | .65 | .60 | .54 | .52 | .44 |
| % of Variance | 27.34| 10.09| 8.24| 7.80| 7.07| 6.50| 6.08| 5.49| 5.01| 4.68| 4.15| 4.06| 3.42|
| Cumulative % | 27.3 | 37.43| 45.68| 53.49| 60.57| 67.07| 73.15| 78.64| 83.64| 88.35| 92.50| 96.57| 100|

3. Discussion

Our study showed that Farsi version of Sense of Coherence 13-item is valid. Antonovsky (1993) reviewed evidence from studies conducted in 20 countries for the feasibility, reliability, and validity of the scale. The alphas of 16 studies using SOC-13 range from 0.74 to 0.91. The alpha values in 127 studies using Soc-13 range from 0.70 to 0.92 (Eriksson & Lindstrom, 2005). In our current study Cronbach alphas is 0.77 that shows a good internal consistency. Test–retest reliability of the SOC-13 item scale in current study is $r=0.66$ at $p<0.01$, (over a 7-weeks). Antonovsky, (1993) reports test–retest correlations stability, 0.54 over a 2-year period among retirees. Eriksson and Lindstrom (2005) studied 458 scientific publications and 13 doctoral thesis (published 1992-2003). Test-retest correlation show stability and range from 0.69 to 0.78 (over a year). The Reported Test-retest reliability of the scales is very different and range from 0.92 (one week), 0.65 (three weeks), 0.93 one month, and 0.77 six month, for SOC-29. Using SOC-13, the corresponding range is 0.69 to 0.72. The Test-retest correlation ($r=0.66$ at $p<0.01$) in our study shows a noticeable stability of SOC 13-item Farsi- scale.

Criterion validity in our study was confirmed by a moderate correlation ($r=0.54$, $p=0.01$). Intercorrelation between SOC subscores and hardiness subscores correspondant antonovsky (1987) arguments. According to Antonovskys (1987, p.47) comparison between sense of coherence and five similar concepts, SOC and hardiness both represent a positive orientation which focuses on an individuals internal sources of health. Each of the components to which SOC theoretically refers has a counterpart among the three components of hardiness. Connotative and denotative definitions of these constructs seem to overlap (Kravetz, Drory, & Florian, 1993). Antonovsky (1978) argued that the meaningfulness component of SOC construct and the commitment component of the hardiness construct refer to an individual drive to enhance understanding of the word and its resources. Meaning fullness component of SOC only partially corresponds to the control component of the hardiness construct, and there is less similarity between the comprehensibility and the challenge. In current study correlation between Meaningfulness and commitment was 0.50 at $p < 0.01$, Manageability and control was $r=0.39$ at $p<0.01$, and comprehensibility and challenge $r=0.04$.

In the current study significant ($p<0.05$) correlation observed between gender and SOC score. The girls scored lower than the boys. This difference corresponds very of previous studies e.g. Koushede (2009), simonsson & colleagues (2008), and is contrast to the work of Langland and Wahl (2009). The mean of SOC Total score is lower for women than for men. Some researchers suggested it relate to womens different coping strategies (simonsson & colleagues, 2008). There was not statistically significant difference in other demographical variables (age, marriage, academic courses, birth order, and parent’s education level). The SOC mean score of participants with illiterate fathers were 58.46, S.D.=11.83, this score in participants with primary educated fathers decrease (M=57.25 S.D.=12.85). Although the SOC score of participants with moderate educated father increased (M=58.06, SD=12.37), but was lower than score of illiterate father participants. Inverse relation was observed between participants SOC score and fathers low education. The mean score of participants with high school educated fathers was high (M=59.15, SD=12.68). Probably, father’s high education is relate to SOC strong, and there is inverse relate to low educated. Between 4 age groups, score increas by age. Mean of total score for 18-19 age group was 56.33 (S.D.=11.67), and for 24 & up was 61.45 (S.D.=13.15). These are similar to Antonovsky (1987, 1993), and Simonsson & colleagues (2007).
Limitations
The data from participants in the current study is limit in population (1450 students), and age range (18-24 & older). Second limitation relate to participants less cultural differences. Most of participants were native students.

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