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To cite this article: Sahar Zarei, Amir Hossein Memari, Pouria Moshayedi & Monir Shayestehfar (2016) Validity and reliability of the UCLA loneliness scale version 3 in Farsi, Educational Gerontology, 42:1, 49-57, DOI: 10.1080/03601277.2015.1065688

To link to this article: http://dx.doi.org/10.1080/03601277.2015.1065688

Accepted author version posted online: 19 Aug 2015.
Published online: 19 Aug 2015.

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Validity and reliability of the UCLA loneliness scale version 3 in Farsi

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ABSTRACT

The UCLA Loneliness Scale Version 3 (UCLA LS3) is a widely used instrument to assess subjective feelings of loneliness. The aim of this study was to evaluate cross-cultural adaptation, reliability and validity of a Farsi version of the UCLA LS3. The questionnaire was translated into Farsi and completed by 300 healthy adults. In confirmatory factor analysis, three-factor structure showed a good fit to the data. Internal consistency of the scale was high; and in the concurrent validity, the UCLA LS3 had a positive association with the Social Network Index. In addition, test-retest reliability over a four-week period supported stability of the UCLA LS3 score. Our findings indicated that the Farsi version of the UCLA LS3 is a valid and reliable measure to assess loneliness in a Farsi-speaking population.

Loneliness is described as a perception of distance between desirable relationships and perceived (actual) relationships. This perception, in turn, leads to an aversive state in an individual (Peplau, 1982). Recent studies have shown that loneliness is a predictor of increased risk of mortality and morbidity (Patterson & Veenstra, 2010; Shiovitz-Ezra, & Ayalon, 2010). Loneliness negatively affects mental well-being by increasing the risk for depressive symptoms (Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006); anxiety and perceived stress (Cacioppo, Hawkley, & Berntson, 2003); anger, a diminished self-esteem (Cacioppo et al., 2006); and cognitive problems (Memari, Shayestehfar et al., 2013) or dementia (Wilson et al., 2007). In addition, loneliness is associated with impairments in physical health such as cardiovascular function (Hawkley, Burleson, Berntson, & Cacioppo, 2003); quality of sleep (Cacioppo et al., 2002); level of blood pressure (Hawkley, Thisted, Masi, & Cacioppo, 2010); and immunity (Pressman et al., 2005).

Thus, the precise assessment of loneliness has recently been a priority in public health, parallel with social psychology and neuroscience studies. Several instruments have been developed to assess loneliness such as NYU Loneliness Scale (Rubenstein & Shaver, 1982); Differential Loneliness Scale (Schmidt & Sermat, 1983); Loneliness Rating scale (Scalise, Ginter, & Gerstein, 1984); and Social and Emotional Loneliness Scale for Adults (DiTommaso & Spinner, 1993). However, the most widely used instrument has been the University of California, Los Angeles (UCLA) Loneliness Scale (Russel, Peplau, & Cutrona, 1980; Russell, Peplau, & Ferguson, 1978; Russell, 1996) that has been validated in different languages and countries including Germany (Döring & Bortz, 1993); Russia (Ruchkin, Eisemann, & Hägglöf, 1999); South Africa (Pretorius, 1993); Zimbabwe (Wilson, Cutts, Lees, Mapungwana, & Maunganidze, 1992); and Argentina (Sacchi & Richaud de Minzi, 1997).

The original version of the UCLA Loneliness Scale (Russell et al., 1978) included 20 items that assessed an individual's description of loneliness experiences. This initial version of loneliness scale was likely to produce a systematic bias in responses by participants because all the items
were negatively worded (Russell, 1996). In addition, the discriminate validity of UCLA Loneliness Scale has been shown to be poor because it is highly correlated with scores of depression and self-esteem (Russell, 1996). In order to improve these limitations, a revised version of the UCLA Loneliness Scale was developed by Russell et al. (Russell et al., 1980). In the revised version, 10 negatively worded items and 10 positively worded items were included. Furthermore, the discriminate validity related with personality, social desirability, and depression measures was acceptable (Russel et al., 1980).

A number of following studies performed exploratory factor analysis on the second version of the UCLA Loneliness Score. Findings showed a variety of factor solutions, including one-factor (Pretorius, 1993); two-factor with negative and positive items (Knight, Chisholm, Marsh, & Godfrey, 1988; Mahon, Yarcheski, & Yarcheski, 1995); three-factor namely “social others,” “affiliative environment,” and “intimate others” (McWhirter, 1990, p. 56); another three-factor namely “collective connectedness,” “isolation,” and “relational connectedness” (Dussault, Fernet, Austin, & Leroux, 2009, p. 853); as well as four-factor or five-factor structures (Hojat, 1982; Neto, 1992). Indeed, inconsistent results for second version of UCLA limited its use in loneliness assessment. Furthermore, there were some words or phrases that were double negative—for instance, answering the item “I do not feel alone” by “Never.” This statement might be difficult to understand by individuals who were at risk of loneliness. Russell (1996) also revealed that understanding some items was difficult for the college-student population—for example, “my social relationships are superficial.”

Regarding the mentioned problems with the revised version of UCLA, Russell (1996) developed a simplified version of the scale named the UCLA Loneliness Scale Version 3 (UCLA LS3). This revised scale consisted of 11 negatively worded and nine positively worded items. Russell (1996) also added a stem at the beginning of all the statements: “how often do you feel.” A satisfactory internal consistency and test-retest reliability has been reported for the UCLA LS3 by several studies (Britton & Conner, 2007; Russell, 1996). The discriminate validity and convergent validity of the scale have also been supported (Russell, 1996). Furthermore Russell (1996) suggested a three-factor solution (Global, Negative, and Positive) as the best model fit for UCLA LS3. Examining UCLA LS3 in other cultures, Lasgaard (2007) indicated an acceptable convergent validity of the scale in a Danish population related with measures of depression, self-esteem, and personality traits of extraversion and neuroticism.

Confirming the superiority of the UCLA LS3 against two previous versions, a number of researchers worldwide have tried to adapt the scale to different cultures: Canada (DiTommaso, Turbide, Poulin, & Robinson, 2007); Portugal (Neto, 2014); Turkey (Durak & Senol-Durak, 2010); France (DiTommaso et al., 2007); Taiwan (Wu & Yao, 2008); Italy (Boffo, Mannarini, & Munari, 2012); Northern Ireland (Shevlin, Murphy, & Murphy, 2014); Belgium (Goossens, Klimstra, Luyckx, Vanhalst, & Teppers, 2014); and United Arab Emirates (Dodeen, 2014).

However, as far as we know, there was no validation study in Farsi on the UCLA LS3. Thus, the goal of this study was to evaluate validity and reliability of the UCLA Loneliness scale (version 3) in an unstudied Iranian population. We examined the internal consistency, concurrent validity, and test-retest reliability as well as factorial structure of the scale.

**Method**

**Participants**

We collected data from 300 healthy male and female participants aged 18–70 years (mean = 28.6, SD = 10.6). All the participants received a written informed consent before enrolling in the study. The participants received a demographic questionnaire followed by the UCLA LS3 and the Social Network Index (SNI) questionnaires to complete 20 minutes. The Institutional Review Board approved the current study.
**Measures**

The UCLA Loneliness Scale Version 3 consists of 20 items that measure the subjective feelings of loneliness and social isolation. The UCLA LS3 was developed and revised from the original version including 11 negative or lonely items and nine positively or nonlonely items. All the statements begin with a stem of “how often do you feel . . .,” and each item has a 4-point Likert scale ranging from 1 (never) to 4 (always). Final scores range from 20 to 80 with higher scores indicating stronger perception of loneliness (Russell, 1996).

Social Network Index (SNI) was developed initially in the Alameda Country Study (Berkman & Syme, 1979). Participants were asked about different types of social connections, namely their current marital status, to discover if they were married, single, or have any other status (e.g., living with a partner, never married, widowed, or divorced). Moreover, questions about the number of relatives and friends—as well as the quantity of their relationships and their memberships in the religious and nonreligious groups—were asked.

The SNI scores reflect four levels of social connection: socially isolated (nonmarried with few close contacts and nonmember in any religious or community group), moderately isolated, moderately integrated, and socially integrated (Berkman & Syme, 1979).

**Cross-cultural adaptation**

We translated the UCLA LS3 considering the international guidelines for the cultural adaptation of measurement instruments in social sciences (Beaton, Bombardier, Guillemin, & Ferraz, 2000; Memari, Ziaee et al., 2013). Initially, a preliminary translation was conducted from English to Farsi by two independent bilingual translators. They both had experience in translating questionnaires in health related fields, though one of translators was not aware of the purpose of the questionnaire translation. Finally, the drafts of Farsi translations as well as the original English version of the questionnaire were compared to prepare the final Farsi draft. The Farsi translation was back-translated to English by a bilingual native English translator who understood and spoke Farsi but had no knowledge of the concepts and purposes of the instrument.

An expert committee compared the original English version with the Farsi translation as well as the back-translated draft to finalize the Farsi version of the questionnaire. The expert committee, including experts from psychology, linguistics, medicine, and statistics, reviewed and revised the items and assessed their idiomatic, semantic, and cultural equivalents. In the final stage, we tested the final Farsi draft of the UCLA LS3 among a sample of 20 students to confirm the intelligibility and comprehensibility of the questionnaire in an Iranian sample.

**Statistical analysis**

Data analysis was carried out using the Statistical Package for Social Sciences (SPSS) version 17.0 and the Analysis of Moment Structures (AMOS) 19.0. In order to assess test-retest reliability of the questionnaire, we used Intraclass Correlation Coefficient (ICC) by asking the 20 participants to complete the questionnaire for a second time after one month. We also evaluated the internal consistency of the questionnaire by Cronbach’s coefficient alpha. To examine the concurrent validity of the UCLA LS3, we compared scores of the UCLA LS3 with the SNI scores by the nonparametric Spearman rank correlation (Spearman, 1904). Furthermore, Confirmatory Factor Analysis (CFA) was conducted to evaluate the adequacy of the one-factor, two-factor and three-factor models of the questionnaire. Variances and the covariance among the items were estimated in this analysis, and the maximum likelihood method was used to fit a model to the observed data. As suggested by Russell (1996), the one-factor model is a bipolar factor and an indicator of covariance in response to the scale. The two-factor model represents a response to two negative (lonely) and positive (nonlonely)
factors. And the three-factor model consists of a bipolar factor including all the 20 items (Global factor), Negative factor and Positive factor that the latter two were not correlated with each other.

We used various relative and absolute model-fit indices to find the best fit for the model with observed data. The relative or incremental fit indices included a Comparative Fit Index (CFI), a Normed Fit Index (NFI), an Incremental Fit Index (IFI), and a Tucker-Lewis Index (TLI). Examining the hypothesized model compared with the null model, a relative fit index ≥ .95 indicated a good fit, and a value of .90 was acceptable. The absolute fit indices used in this analysis were Root Mean Square Error of Approximation (RMSEA) and the chi-square ($\chi^2$). Although $\chi^2$ is sensitive to the size of sample, it equals to zero in the best-fit state. As mentioned by Hu and Bentler (1999), RMSEA assumes a cut-off criteria less than .6 for a good fit.

**Results**

**Participants**

The average age of participants was 28.6 years ($SD = 10.6$); 129 (43%) participants were female and 171 (57%) were male. In terms of education, 4 (1.3%) participants had a PhD degree, 48 (16%) had a master’s degree, 126 (42%) had a bachelor’s degree, 18 (6%) had an associate’s degree, 90 (30%) had a high school diploma, and 3 (1 %) were uneducated. Participants were educated in mathematics and engineering (37%), humanities (18%), natural science (20%), and art (15%). In addition, 60 (20%) of the participants were married, and the majority of the participants (80%) were single.

**Confirmatory factor analysis**

The descriptive statistics for the total scores and individual items of the UCLA LS3 are shown in Table 1. CFA was conducted to test goodness of fit to the acquired data for one-factor, two-factor, and three-factor models of the UCLA LS3. The fit indices for one-factor structure showed a poor model fit: $\chi^2 = 560.863$ ($p < .001$), DF = 170, $\chi^2/df = 3.299$, TLI = .78, NFI = .77, CFI = .82, IFI = .83 and RMSEA = .088 with 90% CI = .080–.096. The two-factor structure indicated an adequate model fit to the data, with $\chi^2 = 313.425$ ($p< .001$), DF= 169, $\chi^2/df = 1.855$, TLI = .92, NFI = .87, CFI = .93, IFI = .93, RMSEA = .053 with 90% CI = .044–.063. The analysis for three-factor structures also

<table>
<thead>
<tr>
<th>Items</th>
<th>Mean</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
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<td>.91</td>
<td>-.10</td>
<td>-.70</td>
</tr>
<tr>
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<td>2.59</td>
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<td>.02</td>
<td>1.02</td>
</tr>
<tr>
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<td>.96</td>
<td>-.22</td>
<td>-.73</td>
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<td>.52</td>
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<td>-.91</td>
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<td>2.53</td>
<td>.94</td>
<td>.03</td>
<td>-.78</td>
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<td>.47</td>
<td>-.59</td>
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<td>-.86</td>
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<td>.09</td>
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<td>-.74</td>
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<td>-.83</td>
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<td>20</td>
<td>2.29</td>
<td>.95</td>
<td>.11</td>
<td>-.98</td>
</tr>
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</table>
showed a good fit to the data with the fit indices as \( \chi^2 = 257.107 \) (\( p < .001 \)), DF = 149, \( \chi^2/df = 1.72 \), TLI = .93, NFI = .89, CFI = .95, IFI = .95, RMSEA = .049 with 90% CI = .039–.059 (Table 2).

**Reliability**

Internal consistency was evaluated for each subscale by Cronbach’s alpha. The results showed a high internal consistency (a = .91) of the UCLA LS3 for the total items (see Table 3). The item total correlation for *Global* factor ranged from .27 to .67, and the item deleted alpha coefficients varied from .90 to .91.

The correlation among items assigned to *Negative* subscale ranged from 0.26 to 0.68, and item deleted alpha coefficients varied from .85 to .88, while the overall coefficient alpha for this subscale was .87. The corrected-item total correlations for *Positive* subscale ranged between .51 and .73 and item deleted alpha coefficients was ranging from .83 to .85 with an internal consistency coefficient of .90. All the items had adequate correlation in relation to each subscale except item 17 (How often do you feel shy?) that had the lowest correlation with a total subscale of .27 with a global scale of .26 with *Negative* subscales. Further analysis showed a high test-retest reliability of the Farsi version of the UCLA LS3 after one month; the intraclass correlation coefficient for the total loneliness scores was .93, \( p < .001 \).

Table 2. Goodness of fit summary for one-, two- and three-factor models.

<table>
<thead>
<tr>
<th>Model</th>
<th>( \chi^2 )</th>
<th>df</th>
<th>( \chi^2/df )</th>
<th>IFI</th>
<th>TLI</th>
<th>NFI</th>
<th>CFI</th>
<th>Value</th>
<th>90% CI</th>
<th>p value</th>
</tr>
</thead>
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<tr>
<td>One-factor</td>
<td>560.863*</td>
<td>170</td>
<td>3.299</td>
<td>.83</td>
<td>.78</td>
<td>.77</td>
<td>.82</td>
<td>.088</td>
<td>.080–.096</td>
<td>&lt;0.001</td>
</tr>
<tr>
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<td>1.855</td>
<td>.93</td>
<td>.92</td>
<td>.87</td>
<td>.93</td>
<td>.053</td>
<td>.044–.063</td>
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<td>1.72</td>
<td>.95</td>
<td>.93</td>
<td>.89</td>
<td>.95</td>
<td>.049</td>
<td>.039–.059</td>
<td>&lt;0.001</td>
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</tbody>
</table>

*p value < .001.

Table 3. Internal consistency values for the farsi version of the UCLA LS3.

<table>
<thead>
<tr>
<th>Item</th>
<th>Alpha if item deleted-global factor</th>
<th>Alpha if item deleted-negative items</th>
<th>Alpha if item deleted-positive items</th>
<th>Item total correlation-global factor</th>
<th>Item total correlation-negative items</th>
<th>Item total correlation-positive items</th>
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</thead>
<tbody>
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</table>
Validity

Examining concurrent validity, the total score of the Farsi version of the UCLA LS3 was significantly correlated with the SNI scores. A high negative correlation was found between the UCLA LS3 and the SNI scores ($r = -0.55$, $p < .001$). Moreover, acceptable negative correlations were found between the UCLA LS3 and the SNI subscales ranging from .26 to .36, ($p$ values = .01).

Discussion

The UCLA LS3 is a self-report instrument that is frequently used to measure loneliness. This study evaluated the validity and reliability of the Farsi version of UCLA LS3. From proposed models, the two-factor structure (Negative and Positive loneliness) and the three-factor structure (Negative, Positive, and Global loneliness) of the UCLA LS3 scale showed a better fit compared with the one-factor structure.

Previous validation studies have also identified a three-factor structure for the UCLA LS3. The initial CFA conducted by Russell (1996) and the subsequent CFA outcome in a Turkish study of the UCLA LS3 both proved the three-factor structure to be superior over the one- or two-factor models to fit to the observed data (Durak & Senol-Durak, 2010). Also, Hawkley et al. (2005) conducted a factor analysis for the UCLA LS3 in two samples of young and old adults in the United States. Their results favored a three-factor structure in both samples. Moreover, the factorial structure analysis in French Canadian teachers confirmed the three-factor structure of UCLA LS3 to be a better model fit and proved stability of the model across genders and levels of teaching class (Dussault et al., 2009).

In an Italian version of UCLA LS3, Boffo et al. (2012) conducted an exploratory structure equation modeling (ESEM) approach in Italian young adults and reported that a three-factor ESEM leads to a satisfactory fit to the data.

However, there were some inconsistent results in other populations. For example, in a Danish study, the one-factor solution emerged for UCLA LS3 (Lasgaard, 2007). This could be explained by a narrow age group of participants (only adolescents) selected for this study. On the other hand, a recent study examined psychometric properties of the UCLA LS3 in a new English-speaking sample of 1,434 adolescents and reported the best fitting model for the three-factor structure (Shevlin et al., 2014).

In fact, multidimensional structure in contrast to one-dimensional structure implies that loneliness is a complex experience regarding various situations and interactions. There was a consensus among previous studies that the multidimensional model (i.e., three-factor) is statistically superior to a one-dimensional model (Boffo et al., 2012; Durak & Senol-Durak, 2010; Hawkley et al., 2005). We add to the literature that loneliness, as measured by the Farsi UCLA LS, is also multidimensional in nature because the factors were differentially associated with social network variables. This three-factor representation of loneliness emerged as consistent across age, gender, and cultural backgrounds, suggesting a universality of this representational model for loneliness.

Our results are in agreement with previous studies validating UCLA LS3 in the United States (Britton & Conner, 2007), Denmark (Lasgaard, 2007), and Turkey (Doğan, Çötok, & Tekin, 2011; Durak & Senol-Durak, 2010) that also reported a high internal consistency for each subscale of UCLA LS3. These findings supported the stability of the scale. In addition, similar to results reported by Durak & Senol-Durak (Durak & Senol-Durak, 2010), our study showed that item total correlations for subscales were satisfactory, and each subscale was internally stable. In terms of the item-deleted alpha coefficient, our analysis revealed no inappropriate item; so there was no need to remove any items. Furthermore, based on our findings, test-retest reliability revealed a high stability for the Farsi version of the UCLA LS3 after four weeks, which is similar to the findings by Russell (1996).

Examining the concurrent validity of the Farsi version of the UCLA LS3, our study indicated a strong negative correlation between subscales of the Farsi version of the UCLA LS3 and the social
network scale subscales. This result was in line with other studies in which authors argued that loneliness is negatively correlated with social support and provision (Durak & Senol-Durak, 2010; Wu & Yao, 2008). They also indicated that UCLA LS3 scores were positively correlated with depression and they predict a negative effect on the well-being of adolescents and adults (Lasgaard, 2007; Memari et al., 2015). Furthermore, the scale was negatively correlated with perceived social support from family, friends, or significant others, as well as social integration and attachment and individual’s self-esteem. It is worthy to mention these findings have been confirmed in a variety of age groups, including adolescence, elderly, and adulthood, as well as in different socioeconomic groups including teachers, students, and nurses (Durak & Senol-Durak, 2010; Lasgaard, 2007).

Elaborating on positive correlations of loneliness with depression and anxiety and negative correlations of loneliness with self-esteem and social support, one can argue that people with narrow social networks are at risk for stronger feelings of loneliness (Cacioppo et al., 2006; Hawkley & Cacioppo, 2010; Ranjbar et al., 2015). Our data provides another evidence for relation of UCLA LS3 score to theoretical determinants and consequences of loneliness. To our knowledge, this is the first study examining reliability, validity, and factor structure of UCLA LS3 in the Farsi language.

There are, however, some limitations in this study. First, the sample of studied subjects only included adults. Applying the questionnaire in samples with different age groups (e.g., adolescents and elderly individuals) with different demographic profiles will help to confirm the generalizability of UCLA LS3. Another limitation concerns the concurrent validity because we used only one scale instead of multiple designs. It would be more advantageous to correlate the UCLA LS3 with other scales in Farsi (e.g., depression and self-esteem scales) to assess concurrent and discriminate validity.

Conclusion

In conclusion, the Farsi version of the UCLA LS3 showed acceptable psychometric indices while indicating a multidimensional structure. This scale will be applicable for measuring loneliness in the adult population in Iran.

Acknowledgments

We would like to thank Mahziar Abarashi for his valuable help with this study.

References


