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# PSYCHOMETRIC QUALITIES OF THE UCLA LONELINESS SCALE-VERSION 3 AS APPLIED IN A TURKISH CULTURE

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*The University of California, Los Angeles, Loneliness Scale-Version 3 (UCLA LS3) is the most frequently used loneliness assessment tool. This study aimed to examine the psychometric properties of the UCLA LS3 by utilizing two separate and independent samples: Turkish university students (n = 481) and elderly (n = 284). The results demonstrate that the 3-factor model reveals significant results in both samples in terms of goodness of fit indices in confirmatory factor analysis. In addition to satisfactory reliability, the concurrent and discriminant validity of the scale were supported in both samples by revealing the association of the UCLA LS3 with conceptually related measures (i.e., social support, social provision, depression, positive affect, negative affect, and self esteem in the sample of university students; geriatric depression, self esteem and life satisfaction in the sample of elderly) and the unrelated measure (i.e., social desirability). In addition to examining the psychometric properties of the UCLA LS3, the present study adds to the present literature about loneliness, shedding light on a non-western culture.*

Loneliness is described as a state of emotional distress due to incongruity between actual and desired levels of social interaction (Peplau & Perlman, 1982). Moreover, it is explained as a lack of meaningful social relationships (Fees, Martin, & Poon, 1999). It has been associated with family communication, social activities (Morahan-Martin & Schumacher, 2003), life satisfaction (Civitci & Civitci, 2009), self esteem (Cacioppo, Hawkley et al., 2006; Civitci & Civitci, 2009), social support, social skills, and positive mood

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(Cacioppo, Hawkley et al., 2006) in low degrees, but on the other hand, negative mood, anxiety, anger (Cacioppo, Hawkley et al., 2006) and depression (Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006) in high degrees. Moreover, loneliness has been found to be related to health outcomes such as increment in hypertension (Cacioppo et al., 2002), inefficiency in sleep (Cacioppo & Hawkley, 2003) and poor perceived health (Theeke, 2009).

On the basis of demographic variables, individuals who are married (Allen & Oshagan, 1995), women (Allen & Oshagan, 1995), in lower income (Allen & Oshagan, 1995; Hector-Taylor & Adams, 1996) and less educated (Allen & Oshagan, 1995; Hector-Taylor & Adams, 1996) had higher scores of loneliness than their counterparts. However, while marital status predicted the loneliness scores of the elderly individuals in another study, age and gender did not predict the loneliness scores (Theeke, 2009). In the Turkish samples, there are controversial findings depending on the sample characteristics. For instance, while male university students reported higher levels of loneliness, females stated they built relations with friends with ease (Durmusoglu Saltalu, Ozturk, & Samur, 2009). In contrast, while female prisoners had high loneliness scores, male prisoners had low loneliness scores (Ozkurkcugil, 1998).

Loneliness has been investigated in the current literature on the basis of such studies as the above mentioned ones, and several new scales have been devised to evaluate it. The NYU Loneliness Scale (Rubenstein & Shaver, 1982); Social and Emotional Loneliness Scale for Adults (DiTommaso & Spinner, 1993); Loneliness Rating Scale (Scalise, Ginter, & Gerstein, 1984); and Differential Loneliness Scale (Schmidt & Sermat, 1983) are some of the measures assessing loneliness. Among these measures, the University of California, Los Angeles, Loneliness Scale (UCLA LS) (Russell, Peplau, & Cutrona, 1980; Russell, Peplau, & Ferguson, 1978) is the most frequently used scale in countries that range from Denmark (Lasgaard, 2007); Argentina (Sacchi & Richaud de Minzi, 1997); South Africa (Pretoirus, 1993); Taiwan (Wu & Yao, 2008) to Turkey (Demir, 1989). When the psychometric properties of the scale were tested with Turkish depressive and healthy individuals, the internal consistency (.96) and test-retest reliability (.94 for one-month interval) findings reveal significant results (Demir, 1989). The scale is used to evaluate loneliness of different healthy samples such as adolescents (Civitci & Civitci, 2009; Lasgaard, 2007; Mahon, Yarcheski, & Yarcheski, 2004); undergraduate students (Durmusoglu Saltalu et al., 2009; Morahan-Martin & Schumacher, 2003; Wu & Yao, 2008); older adults (Fees et al., 1999; Theeke, 2009) as well as unhealthy individuals with opiate dependency (Britton & Conner, 2007) and elderly individuals

with cerebral palsy (Balandin, Berg, & Waller, 2006). The scale has satisfactory internal consistency and unidimensional factor structure (Russell et al., 1980).

The original version is criticized in that wording all items negatively causes systematic bias in responding to the items (Russell, 1996). Moreover, high correlations between depression, self esteem, and loneliness endanger the discriminant validity (Russell, 1996). In addition to these criticisms, debates related to multidimensionality of loneliness (Goossens et al., 2009) decrease the popularity of the original version of the scale. Due to these problems associated with the UCLA LS, the developers revised the scale. The revised UCLA LS consists of 10 negatively and 10 positively worded items (Russell et al., 1980). This version had satisfactory discriminant validity with the measures of personality, social desirability, and depression (Russell et al., 1980). Additionally, the scale's 1-factorial (Pretoirus, 1993); 2-factorial (positive and negative items, Mahon, Yarcheski, & Yarcheski, 1995); and 3-factorial structure (intimate others, social others, and afilliative environment, McWhirter, 1990; isolation, relational connectedness, collective connectedness, Dussault, Fernet, Austin, & Leroux, 2009) were tested in a wide variety of studies. Hartshorne (1993) compared the 1-factorial, 2-factorial, and 3-factorial structure of the revised UCLA LS. He found that the 2-factorial solution revealed better results than the other factorials structures on the basis of confirmatory factorial analysis. Conversely, Dussault et al. (2009) found that the 3-factorial solution had better goodness of fit indices rather than the 1-factorial and the 2-factorial solution.

However, the double negative items in this revised version of UCLA LS are also criticized for having lower clarity (Russell, 1996). This clarity problem affects the responses of the elderly individuals (Russell, 1996). In addition to the clarity problem, some wordings (i.e., my social relationships are "superficial") of the items are not understood by the college students (Russell, 1996). While considering all problems in the original as well as the revised version of the scale, Russell (1996) developed the UCLA Loneliness Scale-Version 3 (UCLA LS3) consisting of 9 positively and 11 negatively worded items. He changed the response format of the items by adding "how often do you feel" at the beginning of the each item. The internal consistency and test-retest reliability results were satisfactory (Britton & Conner, 2007; Russell, 1996). Moreover, the internal consistency of the scale was invariant across gender, race, ethnicity, and education with the individuals suffering from opiate dependency (Britton & Conner, 2007). In addition to reliability, the factorial structure of the scale was tested in a wide variety of studies. For instance, Russell (1996)

compared a 2-factor model, a 1-factor model (that were found in the earlier versions of the scale), and a 3-factor model (global factor, negative items, and positive items). He found the 3-factor model as the most relevant one on the basis of goodness of fit indexes of the confirmatory factor analysis. However, in the Danish culture, a unidimensional structure was found in a sample of adolescents (Lasgaard, 2007) due to the characteristics of the sample. In addition to factorial structure, the scale had a satisfactory concurrent validity with the other measures evaluating loneliness (NYU Loneliness Scale and the Differential Loneliness Scale) and discriminant validity with the other measures evaluating social support and social desirability in the sample of college students (Russell, 1996). In the Danish version, the correlation between loneliness and depression or between loneliness and self esteem was satisfactory as evidence for convergent validity (Lasgaard, 2007).

Psychometric properties of the previous version of UCLA LS were tested by Demir (1989). However, other versions of the scale have not been examined psychometrically in Turkish samples. Adaptation of the scale to Turkish culture can provide a deeper understanding. The purpose of the present study is to investigate the psychometric properties of the UCLA LS3 in the Turkish culture using two different samples: university students aged between 18 and 28 and elderly members of the society aged between 60 and 79. (Throughout the manuscript, these samples are referred to university students and elderly for clarity.) This study includes two phases in which the factor structure of the scale is examined along with its internal consistency and a range of item-total correlation coefficients. Moreover, the concurrent validity is studied by examining the correlation between the UCLA LS3 and social support, social provision, depression, positive affect, negative affect, and self esteem in the sample of university students; by examining the correlation between the UCLA LS3 and geriatric depression, self-esteem and life satisfaction in the sample of elderly. Futhermore, the discriminant validity of the scale is studied by examining the correlation between the UCLA LS3 and social desirability. The reliability and validity coefficients of the UCLA LS3 are examined in a sample of university students in the first study and in a sample of elderly in the second.

## STUDY I

### Participants

The sample of the study was composed of 478 students, 291 females (60.9%) and 187 males (39.1%). Their ages ranged between 18 and

28 ($M = 21.57$, $SD = 1.92$). Approximately, 14.4% of the subjects were preparatory ($n = 69$), 11.1% were freshmen ($n = 53$), 16.7% were sophomores ($n = 80$), 28.5% were juniors ($n = 136$), 29.1% were seniors ($n = 89$) and 0.2% were master degree students ($n = 1$). (Turkish undergraduate students undergo a study cycle of four years.) The mean of monthly family income was 1746.16 Turkish Liras (TL) (1164.11 USD) ($SD = 4610.76$ TL or 3073.84 USD), ranging from 400 TL to 100000 TL (266.67 USD to 6666.6 USD). (Their education is funded by their families. The majority of students work neither full-time nor part-time.) On the basis of residence, 41.2% of the subjects were living in a flat with their friends ($n = 197$), 27% were living in a university dormitory ($n = 129$), 21.5% were living in a private dormitory ($n = 103$), 7.9% were living with their families ($n = 38$), 2.1% were living in a flat alone, and 0.2% were living with their relatives ($n = 1$). The mean of the perceived health status of the participants was 3.87 ($SD = 0.91$), ranging from 1(very bad) to 5 (very good).

## Measures

In addition to the Demographic Information Form, seven measures were employed in the sample of university students.

The UCLA Loneliness Scale (Version 3) was developed by Russell (1996) to evaluate loneliness. The scale consists of 20 items (9 positively worded and 11 negatively worded) rated on a four-point Likert scale. Their internal consistencies ranged between .89 and .94 in the sample of college students, nurses, teachers, and the elderly. Test-retest reliability over a one-year period was .73 in the sample of the elderly. The 3-factor model was found relevant on the basis of goodness of fit indexes of the confirmatory factor analysis. The concurrent validity of the scale was proved when the correlation between the scale and other loneliness measures (NYU Loneliness Scale and the Differential Loneliness Scale) was examined. The scale had satisfactory concurrent validity when correlation between the scale and other loneliness measures (NYU Loneliness Scale and the Differential Loneliness Scale). On the other hand, the discriminant validity of the scale was shown to be unrelated with social support (Social Provisions Scale) and social desirability in the sample of college students. Additionally, the scale was significantly correlated with the measures of well-being (life satisfaction and depression) in the sample of the elderly.

The Social Provision Scale (SPS) was developed by Cutrona and Russell (1987) in order to evaluate the perceived availability of social support. The scale consists of 24 items rated on a four-point Likert

scale and comprises of six dimensions including attachment, social integration, reassurance of worth, reliable alliance, guidance, and opportunity for nurturance. The internal consistency was .84, and test-retest reliability coefficients ranged between .37 and .66. Duru and Balkıs (2007) adapted the scale into Turkish. They found the internal consistency to be .90, and the test-retest reliability to be .75 over a one-month period.

The Multidimensional Scale of Perceived Social Support (MSPSS) was developed by Zimet, Dahlem, Zimet, and Farley (1988) to measure a person's perception of the adequacy of social support from friends, family and significant others. It is a 12-item self-report instrument rated on a seven-point Likert type scale. The Turkish adaptation of the scale revealed a 3-factor structure and high reliability (Eker & Arkar, 1995).

The Beck Depression Inventory (BDI) was developed by Beck, Ward, Mendelson, Mock, and Erbaugh in 1961 in order to evaluate emotional, motivational and cognitive symptoms of depression with 21 items rated on a four-point Likert-type scale ($0 =$ having no depressive symptoms; $3 =$ having severe depressive symptoms; minimum score $= 0$, maximum score $= 63$). The scale was adapted to Turkish by Hisli (1988), who found the split-half reliability was .74, and the correlation between BDI and Minnesota Multiphasic Personality Inventory's Depression subscale was .63 for convergent validity.

The Positive and Negative Affect Scale (PANAS) was developed by Watson, Clark, and Tellegen (1988) in order to evaluate positive and negative affect with 20 items rated on a five-point Likert-type scale. In PANAS, the scale includes 10 items evaluating positive affect (PA) and 10 other items evaluating negative affect (NA). The internal consistency estimates for the PANAS measuring mood across seven different time periods (a day to a year) ranged between .84 and .87 for the NA scale. Gençöz (2000) examined the psychometric properties of the Turkish version of the scale. She found the internal consistency reliability was .83 and .86 and the test-retest reliability was .40 and .54, for PA and NA, respectively.

The Rosenberg Self-Esteem Scale (RSES) was developed by Rosenberg in 1965 in order to assess the degree of self esteem with 10 items rated on a four-point Likert-type scale. The internal consistency of the scale was found as .88 and the test-retest reliability of the scale over a one-week interval was found to be .82 in another research (Fleming & Courtney, 1984). The scale was adapted into Turkish by Çuhadaroğlu (1986), who used a five-point Likert-type scale. She found the internal consistency was .76. Also, the RSES correlation between the subscales of Symptom Check List-90 was satisfactory

(depression subscale = .66, psychosomatic symptoms subscale = .70, and interpersonal threat subscale = .45).

The Social Desirability Scale-17 (SDS-17) was developed by Stöber (2001) in order to evaluate socially desirable responses with 17 items (e.g., ''I never hesitate to help someone in case of emergency'' or ''In traffic I am always polite and considerate of others''). Higher scores obtained by the scale demonstrate the ability to portray oneself in a positive manner. The scale was translated into Turkish by Durak and Coşkun (2010). Unlike the original scale of Stöber (2001), they preferred a five-point Likert type scale instead of a yes-no format. They also excluded two items which had lower item total correlations; therefore, they turn it into a scale that has 15 items. In the present study, the internal consistency of the scale was found to be .77, and the corrected item-total correlations ranged between .24 and .54. This scale was used in the present study because social desirability is conceptually distinct from the constructs of the UCLA LS.

### Procedure

Before collecting the data, the items of the UCLA LS3 were translated into Turkish by three independent native English-speaking translators fluent in Turkish. The items were then reviewed with three native, Turkish-speaking psychologists fluent in English to check for accuracy. Any discrepancies were discussed carefully by the three translators and three psychologists and then resolved by joint agreement.

The scales were distributed to the university students in a classroom setting. All subjects were informed about the aim of the present study, and their consent was obtained. All participants took part voluntarily and were not remunerated for participation.

### RESULTS

### Confirmatory Factor Analysis

In order to examine the adequacy of the1-factor, 2-factor model, and 3-factor model of the UCLA LS3 as mentioned by Russell (1996), confirmatory factor analysis was conducted. Russell (1996) tested the 1-factor, 2-factor (positively worded items/nonloneliness and negatively worded items/loneliness) and 3-factor (loneliness, nonloneliness and global loneliness) multidimensionality of the scale. In the present study, these factor structures were tested to evaluate

**Table 1. The confirmatory factor analysis results for the one-factor, two-factor and three-factor-solution of the UCLA LS3 in the samples of the university students and the elderly**

| | $\chi^2$ | $\chi^2$/df | IFI | TLI | CFI | RMSEA |
|---|---|---|---|---|---|---|
| | | | Model fit statistics[a] | | | |
| Confirmatory Factory Analysis Results in the sample of University Students ($n = 478$) | | | | | | |
| One-factor solution | 970.619 | 5.710 | .759 | .729 | .758 | .099 |
| Two-factor solution | 635.462 | 3.760 | .860 | .841 | .859 | .076 |
| Three-factor solution | 406.015 | 2.725 | .923 | .901 | .922 | .060 |
| Confirmatory Factory Analysis Results in the sample of Elderly Adults ($n = 480$) | | | | | | |
| One-factor solution | 452.107 | 2.659 | .770 | .739 | .767 | .100 |
| Two-factor solution | 351.205 | 2.078 | .852 | .830 | .849 | .081 |
| Three-factor solution | 246.501 | 1.654 | .922 | .897 | .919 | .063 |

[a]$\chi^2$ = Chi-square; $df$ = degrees of freedom; IFI = incremental fit index TLI = Tucker–Lewis index; CFI = comparative fit index; RMSEA = root mean square error of approximation.

factorial structure of the scale with Turkish individuals. In order to examine the model fit, the incremental fit index (IFI), comparative fit index (CFI), Tucker–Lewis index (TLI), and relative fit index (RFI) were handled. These indexes range from .00 to 1.00, and larger values indicate better model fit. As evidence of good model fit, values of .90 or greater are desired (Bentler & Bonett, 1980). In addition to these indexes, smaller root-mean-square error of approximation (RMSEA) is used. Furthermore, the ratio of $\chi^2$ to degrees of freedom ($df$) should be less than three (Kline, 2005).

The model was examined by the AMOS 7.0 (Arbuckle, 2006) software program to test the relationship between theoretical models identified by Russell (1996) (1-factor, 2-factor and 3-factor model) and the data. The 1-factor solution presented adequate fit, $\chi^2$ (170, $N = 478$) = 970.619, $p = .000$; RMSEA = .099, IFI = .759, TLI = .729, CFI = .758, $\chi^2/df = 5.710$. Such goodness of fit indexes (i.e., RMSEA, TLI) revealed poor fit, and the ratio of $\chi^2$ to $df$ was above three.

The 2-factor solution model presented adequate fit, $\chi^2$ (103, N = 478) = 635.462, $p = .000$; RMSEA = .076, IFI = .860, TLI = .841, .841, CFI = .859, $\chi^2/df = 3.760$. On the other hand, such goodness of fit indexes (i.e., RMSEA, TLI) revealed poor fit, and the ratio of $\chi^2$ to df was above three.

The 3-factor solution presented adequate fit, $\chi^2$ (103, N = 478) = 406.015, p = .000. Both the suggested $\chi^2$/df ratio ($\chi^2$/df = 2.725) and goodness of fit index showed that the fit could be regarded as

adequate;   RMSEA = .060,   IFI = .923,   TLI = .901,   CFI = .922. RMSEA and other indexes indicated a good fit over the first model. Table 1 demonstrates detailed fit indices for the models of the UCLA LS3.

## The Internal Consistency Results

Descriptive statistics of the UCLA LS3 items are indicated in Table 2. Reliability was computed through the internal consistency indexes. All sub-scale scores had discrete the internal consistency and adequate item total correlations. For the university student sample, the internal consistency coefficient was .90 for global loneliness, .86 for loneliness, .85 for the non-loneliness scale and the corrected-item total correlations ranged between .31 and .62 for global loneliness, .37 and .86 for loneliness and .48 and .63 for the non-loneliness scale.

## Concurrent, Criterion and Discriminant Validity

In order to examine concurrent validity, participants' scores on the UCLA LS3 subscales were compared with conceptually related constructs (the subscales of perceived social support and social provision, depression, positive affect, negative affect, and self esteem). The UCLA LS3 was positively correlated with depression (r = .48, p = .000) and negative affect (r = .45, p = .000). On the other hand, the UCLA LS3 was negatively correlated with perceived social support from family (r = −.40, p = .000), perceived social support from friend (r = −.50, p = .000), perceived social support from significant others (r = −.34, p = .000), attachment (r = −.60, p = .000), social integration (r = −.61, p = .000), reassurance of worth (r = −.54, p = .000), reliable alliance (r = −.60, p = .000), guidance (r = −.65, p = .000), opportunity nurturance (r = −.44, p = .000), positive affect (r = −.40, p = .000), self esteem (r = −.58, p = .000) and perceived health (r = −.26, p = .000) (see Table 3).

Regarding the criterion validity, UCLA LS3 was expected to differentiate university students on the basis of residence.

To examine discriminant validity, participants' scores on the UCLA LS3 subscales were compared with conceptually unrelated concept, social desirability. On the other hand, the UCLA LS3 was significantly correlated with social desirability (r = −.17, p = .000) despite the magnitude of the correlation was low (see Table 3).

**Table 2. The descriptive statistics of the UCLA LS3 items**

| Items | University Students (n = 478) | | | | | | | Elderly (n = 166) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | Std. D. | Skewness | Kurtosis | ITC-G | ITC-N | ITC-P | Mean | Std. D. | Skewness | Kurtosis | ITC-G | ITC-N | ITC-P |
| 1 | 3.42 | .61 | -.77 | .70 | .54 | – | .58 | 3.47 | .66 | -.99 | .42 | .62 | – | .68 |
| 2 | 2.62 | .76 | -.28 | -.23 | .31 | .37 | – | 2.64 | .80 | -.55 | -.10 | .34 | .38 | – |
| 3 | 2.32 | .85 | .09 | -.65 | .50 | .55 | – | 2.30 | .91 | .05 | -.89 | .51 | .55 | – |
| 4 | 2.49 | .76 | -.07 | -.34 | .52 | .58 | – | 2.52 | .81 | -.01 | -.48 | .56 | .58 | – |
| 5 | 3.32 | .79 | -.97 | .25 | .56 | – | .58 | 3.24 | .89 | -.97 | .05 | .51 | – | .50 |
| 6 | 3.06 | .71 | -.47 | -.21 | .44 | – | .48 | 3.10 | .77 | -.57 | -.04 | .50 | – | .51 |
| 7 | 2.05 | .77 | .25 | -.54 | .61 | .62 | – | 1.94 | .80 | .25 | -1.01 | .60 | .58 | – |
| 8 | 2.29 | .79 | .16 | -.41 | .47 | .48 | – | 2.31 | .84 | .12 | -.56 | .44 | .46 | – |
| 9 | 3.37 | .72 | -.93 | .42 | .47 | – | .55 | 3.43 | .81 | -1.43 | 1.46 | .54 | – | .64 |
| 10 | 3.31 | .75 | -.93 | .58 | .57 | – | .63 | 3.41 | .76 | -1.18 | .85 | .59 | – | .65 |
| 11 | 1.85 | .74 | .66 | .35 | .55 | .57 | – | 1.73 | .82 | .93 | .24 | .57 | .55 | – |
| 12 | 2.18 | .74 | .20 | -.24 | .54 | .56 | – | 2.11 | .73 | -.09 | -.92 | .53 | .57 | – |
| 13 | 2.42 | .81 | .10 | -.46 | .53 | .51 | – | 2.30 | .88 | .12 | -.74 | .41 | .44 | – |
| 14 | 2.06 | .78 | .34 | -.34 | .62 | .63 | – | 1.90 | .85 | .43 | -.89 | .63 | .62 | – |
| 15 | 3.22 | .84 | -.84 | -.09 | .47 | – | .52 | 3.31 | .91 | -1.09 | .16 | .48 | – | .55 |
| 16 | 3.10 | .80 | -.64 | -.02 | .54 | – | .56 | 3.22 | .83 | -.82 | -.07 | .60 | – | .61 |
| 17 | 2.39 | .83 | .25 | -.46 | .51 | .52 | – | 2.18 | .91 | .22 | -.86 | .53 | .53 | – |
| 18 | 2.21 | .74 | .15 | -.31 | .57 | .58 | – | 2.07 | .84 | .30 | -.63 | .49 | .53 | – |
| 19 | 3.39 | .74 | -.99 | .31 | .59 | – | .62 | 3.38 | .81 | -1.08 | .20 | .66 | – | .67 |
| 20 | 3.35 | .77 | -.93 | .09 | .58 | – | .61 | 3.37 | .86 | -1.32 | .96 | .61 | – | .64 |
| | Cronbach's Alpha (α) | | | | .90 | .86 | .85 | Cronbach's Alpha (α) | | | | .90 | .84 | .85 |

*Note 1.* Sd. D. = Standard Deviation, ITC-G = Item Total Correlation for Global Factor, ITC-N = Item Total Correlation for Loneliness Items, ITC-P = Item Total Correlation for Non-Loneliness Item.

**Table 3. The correlations among the variables**

STUDENTS

| | PS | X | Sd | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Loneliness | 20–80 | 40.34 | 8.95 | | -.40*** | -.50*** | -.34*** | -.60*** | -.61*** | -.54*** | -.60*** | -.65*** | -.44*** | .48*** | -.40*** | .45*** | -.58*** | -.17*** | -.26*** |
| 2. Family support | 4–28 | 24.09 | 4.63 | | | .42*** | .27*** | .32*** | .30*** | .31*** | .35*** | .41*** | .23*** | -.39*** | .32*** | -.30*** | .35*** | .19*** | .24*** |
| 3. Friend support | 4–28 | 23.07 | 5.82 | | | | .31*** | .47*** | .45*** | .42*** | .53*** | .57*** | .27*** | -.43*** | .31*** | -.30*** | .38*** | .11* | .17*** |
| 4. Signif. others support | 4–28 | 19.71 | 8.88 | | | | | .50*** | .26*** | .27*** | .30*** | .36*** | .21*** | -.28*** | .23*** | -.19*** | .35*** | .13* | .10* |
| 5. Attachment | 4–16 | 12.70 | 2.57 | | | | | | .59*** | .53*** | .66*** | .70*** | .42*** | -.41*** | .36*** | -.37*** | .56*** | .12* | .16*** |
| 6. Social integration | 4–16 | 12.84 | 2.21 | | | | | | | .63*** | .67*** | .67*** | .54*** | -.39*** | .36*** | -.31*** | .54*** | .15*** | .18*** |
| 7. Reassurance of worth | 4–16 | 12.22 | 2.66 | | | | | | | | .61*** | .60*** | .50*** | -.41*** | .39*** | -.30*** | .55*** | .20*** | .18*** |
| 8. Reliable alliance | 4–16 | 13.66 | 2.36 | | | | | | | | | .82*** | .48*** | -.43*** | .35*** | -.36*** | .55*** | .08 | .21*** |
| 9. Guidance | 4–16 | 13.36 | 2.66 | | | | | | | | | | .47*** | -.44*** | .37*** | -.33*** | .55*** | .13** | .22*** |
| 10. Opportunity nurturance | 4–16 | 12.24 | 1.94 | | | | | | | | | | | -.31*** | .29*** | -.19*** | .43*** | .16*** | .11* |
| 11. Depression | 0–63 | 10.07 | 8.71 | | | | | | | | | | | | -.39*** | .59*** | -.55*** | -.15*** | -.30*** |
| 12. Positive affect | 10–50 | 32.80 | 7.46 | | | | | | | | | | | | | -.33*** | .45*** | .19*** | .25*** |
| 13. Negative affect | 10–50 | 22.58 | 7.10 | | | | | | | | | | | | | | -.42*** | -.07 | -.30*** |
| 14. Self esteem | 10–50 | 39.30 | 7.50 | | | | | | | | | | | | | | | .25*** | .23*** |
| 15. Social desirability | 15–75 | 56.76 | 10.02 | | | | | | | | | | | | | | | | .09* |
| 16. Perceived health | 1–5 | 3.88 | 0.80 | | | | | | | | | | | | | | | | |

ELDERLY

| | PS | X | Sd | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|
| 1. Loneliness | 20–80 | 39.08 | 9.80 | | .59*** | -.46*** | -.25*** | -.34*** |
| 2. Geriatric depression | 0–30 | 9.07 | 5.87 | | | -.68*** | -.44*** | -.53*** |
| 3. Self esteem | 10–50 | 40.75 | 5.85 | | | | .41*** | .41*** |
| 4. Life satisfaction | 5–35 | 24.35 | 6.69 | | | | | .23** |
| 5. Perceived health | 1–5 | 3.48 | 0.87 | | | | | |

*Note 1.* The lower diagonal (in which the numbers go from the upper left corner to lower right) demonstrates the correlations among the variables in the university student sample. On the other hand, the upper diagonal demonstrates the correlations among the variables in the adult sample.

*Note 2.* \* $p < .05.$ \*\* $p < .01.$ \*\*\* $p < .001.$

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## STUDY 2

Loneliness is prevalent during later adulthood (Theeke, 2009). Thus, psychometric properties of the UCLA LS3 were examined among elderly individuals as well.

## METHOD

### Participants

The sample included 74 males (44.6%) and 92 females (55.4%) whose ages ranged between 60 and 79 (M = 63.70, SD = 5.31). The majority (n = 125; 75.3%) of the participants were married with the remaining participants reporting losing his/her spouse (n = 22; 13.3%), being divorced (n = 8; 4.8%), single (n = 4; 2.4%) and widowed (n = 7; 4.2%). Among the married participants, the age of their spouses ranged between 45 and 79 (M = 61.60, SD = 7.35). Among the participants losing their spouses, time passed since death of spouse ranged between 1 month and 300 months (M = 56.14, SD = 84.37). In terms of education level, 41% of them (n = 68) were primary-school graduates, 9.6% of them (n = 16) were secondary-school graduates, 25.3% of them (n = 42) were high-school graduates and 24.1% of them (N = 40) were university graduates. In terms of living place, 47.6% of the subjects were living in a flat with only their spouse (n = 79), 24.7% were living in a flat with their spouse and their children (n = 41), 12% were living in a flat alone (n = 20), 7.2% were living in a flat with their children (n = 12), 6% were living children's' home (n = 10) and 2.4% were living in a flat with others (i.e., caregivers) (n = 4). Participants' number of children ranged between 1 and 6 (1 child: n = 22, 13.3%; 2 children: n = 87, 52.4%; 3 children: n = 28, 16.9%; 4 children: n = 15, 9%; 5 children: n = 4, 2.4%; 6 children: n = 6, 3.6%). The monthly income of participants ranged between 400 TL and 15000 TL (266.67 USD to 10000 USD) (*M* = 1335.31 TL or 890.21 USD, *SD* = 1654.40 TL or 1102.93 USD). Few participants (n = 4) did not report their income level. The mean of the perceived health status of the participants was 3.48 (SD = 0.87), ranging between 1(very bad) and 5 (very good). All of the participants had at least one social security entitlement.

### Measures

In addition to the UCLA LS3 and RSES that were used in Study 1, the Geriatric Depression Scale, Satisfaction with Life Scale and Demographic Information was employed in the third study.

*The Geriatric Depression Scale* (GDS) was developed by Yesavage et al. (1983) to evaluate depression levels among elderly adults with 30 items. Participants are asked to answer "yes" or "no" in reference to how they felt on the day of administration. The developers found test-retest reliability as .85 and the internal consistency as .94. The instrument was adapted into Turkish by Ertan, Eker and Sar with sufficient reliability (1997). They found test-retest reliability as .72 and the internal consistency as .92.

*The Satisfaction with Life Scale* (SWLS) was developed by Diener, Emmons, Larsen, & Griffin (1985) to assess global life satisfaction using five statements with regard to quality of life. Participants are asked to indicate their level of agreement with the statements on a 7-point Likert-type scale. In terms of its reliability and validity, Diener et al. (1985) reported that the internal consistency of the instrument was .87, and the test-retest correlation was .82. Also, they found a one-factor structure that explained 66% of the variance. Psychometric properties of the SWLS with Turkish samples (university students, correctional officers, and elderly adults) were examined by Durak, Senol-Durak and Gencoz (in press). The internal consistency and item-total correlation coefficients was found as .81, .82 and .89 respectively. They found a single-factor solution model as relevant in all three different samples.

### Procedure

The measures were distributed to elderly Turkish adults by using snowball sampling due to the difficulties associated with recruiting elderly individuals for psychological studies. After they were informed about the purpose of the study, all participants indicated their informed consent by signing a consent form. Participation in the study was voluntary. Completion of the questionnaires took approximately 0.5 to 1.5 hours. When needed, the participants were permitted to take a 5 to 10 minute break during the interview.

## RESULTS

### Confirmatory Factor Analysis

To test the adequacy of the one-factor, two-factor and three-factor model of the UCLA LS3 as mentioned by Russell (1996), confirmatory factor analysis was conducted. Likewise in the sample of university students, three models were tested by the AMOS 7.0 (Arbuckle, 2006) in the elderly.

The 1-factor solution presented adequate fit, $\chi^2$ (170, N = 166) = 452.107, p = .000; RMSEA = .100, IFI = .770, TLI = .739, CFI = .767, $\chi^2$/df = 2.659. Such goodness of fit indexes (i.e., RMSEA, TLI) revealed poor fit despite the ratio of $\chi^2$ to df was below 3.

The 2-factor solution model presented adequate fit, $\chi^2$ (103, N = 166) = 351.205, p = .000; RMSEA = .081, IFI = .852, TLI = .830, CFI = .849, $\chi^2$/df = 2.078. On the other hand, such goodness of fit indexes (i.e., RMSEA, TLI) revealed poor fit even though the ratio of $\chi^2$ to df was below 3.

The 3-factor solution presented adequate fit, $\chi^2$ (103, N = 166) = 246.501, p = .000. Both the suggested $\chi^2$/df ratio ($\chi^2$/df = 1.654) and goodness of fit index showed that the fit could be regarded as adequate; RMSEA = .063, IFI = .922, TLI = .897, CFI = .919. RMSEA and other indexes indicated a good fit over the first model. Table 1 demonstrates detailed fit indices for the models of the UCLA LS3.

### The Internal Consistency Results

Descriptive statistics of the UCLA LS3 items are indicated in Table 2. Reliability was computed through the internal consistency indexes. All sub-scale scores had discrete the internal consistency and adequate item total correlations. In the sample of the elderly, the internal consistency coefficient was .90 for global loneliness, .84 for loneliness, .85 for the non-loneliness scale and the corrected-item total correlations ranged between .34 and .66 for global loneliness, .38 and .62 for loneliness and .50 and .68 for the non-loneliness scale.

### Concurrent Validity

To examine concurrent validity, participants' scores on the UCLA LS3 subscales were compared with conceptually related constructs (geriatric depression, life satisfaction, and self esteem). The UCLA LS3 was positively correlated with geriatric depression (r = .59, p = .000). On the other hand, the UCLA LS3 was negatively correlated with life satisfaction (r = −.25, p = .000), self esteem (r = −.46, p = .000) and perceived health (r = −.34, p = .000) (see Table 3).

### DISCUSSION

The UCLA LS3 is accepted as an available measurement to evaluate loneliness in diverse settings for elderly individuals (Russell, 2009),

undergraduate university students (Warwick, Nettelbeck, & Ward, 2010), and members in the community (Stepanikova, Nie, & He, 2010). To evaluate whether Turkish version of the UCLA LS3 is a valid measurement instrument to evaluate loneliness, psychometric properties of the scale were examined with the samples of university students and elderly adults. The current results provide a deeper understanding of the multidimensionality of the UCLA LS3 structural validity since there has been a debate in the literature whether the scale has unidimensional or multidimensional structure. In the previous version of the UCLA, 1-factorial (Pretoirus, 1993), 2-factorial (Mahon et al, 1995), 3-factorial (McWhirter, 1990) solutions were tested. By the same token, UCLA LS3's factorial structure was tested by comparing 1-factorial, 2-factorial, 3-factorial solutions (Russell, 1996).

On the basis of the current literature, 1-factorial, 2-factorial, 3-factorial solutions were compared in Study 1 and Study 2. Confirmatory factor analysis results indicated that the UCLA LS3 had multidimensional structure. Multidimensionality of the previous versions of the UCLA has been supported by several researchers (Dussault et al., 2009; Mahon et al., 1995, McWhirter, 1990, Hartshorne, 1993) "to clarify client's need and appropriate interventions" (McWhirter, 1990, p. 56). Consistently, the multidimensionality of the UCLA LS3 is supported by Russell (1996). When comparing the 1-factorial, 2-factorial (loneliness and non-loneliness) and 3-factorial solutions (loneliness, non-loneliness, global loneliness) in the present study, both 2-factorial and 3-factorial solutions revealed better results than 1-factorial solution in both samples. However, the results may differ in different cultural context. For example, in Danish version, 1-factorial structure was significant (Lasgaard, 2007). This difference may be explained by the characteristics of the sample. While adolescents are selected in the Danish version, adults were selected as participants in the present study.

When comparing 2-factorial and 3-factorial solutions, the fundamental factor structure of the UCLA LS3 was 3-dimensional in the sampling of both university students and elderly adults on the basis of model fit indices (i.e., RMSEA, IFI, and CFI) and ratio of $\chi^2$ to df. This finding is consistent with Russell's (1996) findings who evaluated the factorial structure of UCLA LS3 and Dussault et al (2009) who evaluated the factorial structure of the UCLA Revised Version.

Investigating the factorial stability and the validity of the UCLA LS3 by means of using different sampling is certainly desirable to affirm the latent structure. However, the same factor structure may

not be obtained when a scale is administered to different samples. Consistent with Russell's (1996) study, three-factor solution in the sample of university students could be replicated in the sample of the elderly. Therefore, it can be said that factorial invariance across the university students and the elderly was confirmed by obtaining consistency of the factor analyses of the UCLA LS3 administered to two different samples.

Similar to the findings in the sample of Danish adolescents (Lasgaard, 2007) and American opiate dependent individuals (Britton, & Conner, 2007), the sub-scales of the UCLA LS3 were internally consistent in terms of reliability. Moreover, the item-total correlations for the subscales of the UCLA LS3 were within acceptable ranges. The results of the internal consistency analysis clearly demonstrated the UCLA LS3 to be highly acceptable for 3-factor solution in the sample of university students and elderly adults.

In addition to factorial structure and the internal consistency, the scale had satisfactory concurrent validity that is provided by the association between the subscales of the UCLA LS3 and several scales. In the sample of university students, the association between the subscales of the UCLA LS3, social support, social provision, depression, positive affect, negative affect, and self esteem were compared. As expected, all subscales of perceived social support (perceived social support from family, perceived social support from friend and perceived social support from significant others) and social provision (attachment, social integration, reassurance of worth, reliable alliance, guidance, opportunity nurturance) were negatively correlated with UCLA LS3. The results between UCLA LS and Social Provision were consistent with Russell's (1996) findings. Moreover, negative association between UCLA and other scales assessing social support were mentioned before (Wu & Yao, 2008). Furthermore, UCLA LS was negatively correlated with positive affect and positively correlated with negative affect. In addition to social support, UCLA LS was negatively correlated with self esteem and positively correlated with depression as found in Russell's (1996) study. The relationship between UCLA LS3 and depression was also negative in Lasgaard's study (2007).

In the sample of elderly adults, the association between UCLA LS3, geriatric depression, self esteem and life satisfaction was compared to evaluate concurrent validity. UCLA LS was negatively correlated with life satisfaction and positively correlated with geriatric depression. Consistent findings between UCLA LS, depression and life satisfaction were found by Russell (1996) in the sample of elderly adults. Furthermore, UCLA LS3 was negatively correlated

with self esteem as found in the sample of college students (Russell, 1996).

In addition to concurrent validity, the discriminant validity of the UCLA LS3 was examined with the sample of university students. As an evidence of discriminant study, consistent with Russell (1996), the correlation between UCLA LS3 and social desirability was low. Therefore, UCLA LS3 was distinct from social desirability.

The results of the present study should be evaluated by taking some methodological limitations into account. Gathering data from different samples is necessary to improve the generalizability of the results. Research with other age groups or with other participants is recommended for future similar studies. In addition to the elderly, when Lasgaard's study (2007) is considered, especially adolescents may be selected as participants since the factorial structure may differ. For instance, adolescents may conceptualize loneliness as less complicated. In addition to different samples, the replication of the results related with the reliability and validity of UCLA LS3 in different cultures is valuable to generalizability as culture has an effect on loneliness (Theeke, 2009).

The results demonstrated that in addition to satisfactory reliability and the validity results, UCLA LS3 has multidimensional factor structure in different Turkish samples. The scale can be used as an assessment tool to assess loneliness of the adults and the elderly. Further research involving demographically diverse samples in different cultures would support the psychometric results of UCLA LS3.

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