

# The Psychometric Validity and Reliability of the Turkish Version of the Existential Loneliness Questionnaire

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**Abstract** Loneliness is accepted as a universal concept but it is still controversial in terms of its source and nature. Existential loneliness, a primary and inevitable condition of human existence as the only certain thing is death, was described as intolerable emptiness, sadness, and longing due to the awareness of one's fundamental separateness as a human being. The Existential Loneliness Questionnaire (ELQ) was particularly developed to assess existential loneliness. The objective of the current study was to examine psychometric reliability and validity of the ELQ in Turkish samples. As a result of exploratory factor analysis, two items were deleted, and the remaining 20 items formed the three factors of ELQ, loneliness in social ties, loneliness in close relationships, and finding meaning in life. Twenty-item Turkish ELQ appeared to be a reliable and valid measure of existential loneliness. The 3-factor structure of ELQ obtained through principle component analysis was also partially supported by multigroup confirmatory factor analysis (MGCFA) indicating that ELQ is an aggregate measure. Further research with a larger community sample is needed in order to demonstrate the generalizability of the current findings to other samples.

**Keywords** Loneliness · Existential loneliness · Reliability · Validity · Psychometric properties

Although loneliness is accepted as a universal concept, it is still controversial in terms of its source and nature. It was

described as a “distressing experience” due to not being able to attain expected or desired level social relationships (McWhirter 1990). Loneliness can be examined in three categories: state-related form of loneliness, personality-related form of loneliness, and existential loneliness. State-related form of loneliness appears when individuals feel different from others in attitudes, values, and background. Personality-related form of loneliness, on the other hand, is felt when individuals experience unsatisfactory social conditions that may prevent secure attachment or when they have personality characteristics, such as low self-esteem, interfering with communication skills (Ernst and Cacioppo 1999). These two categories fall short of explaining the concept of loneliness comprehensively. Hence, the third category, existential loneliness, emerged from the “existentialist school of thought”. According to existential loneliness perspective, loneliness is a primary and inevitable condition of human existence, since perfect communication with other individuals is unfeasible and the only certain thing is death (Mayers and Svartberg 2001). Thus, anybody and everybody may feel existential loneliness. In life threatening situations, people confront with death and in connection with this, they feel existential loneliness that can be defined as “intolerable emptiness, sadness, and longing, that results from the awareness of one's fundamental separateness as a human being” (Ettema et al. 2010, p. 142). It was argued that there is no permanent remedy for that kind of loneliness and people only put off this feeling with hobbies, love relationships, and vacations until they face with death or separation (Mayers et al. 2002). Some researchers even asserted that existential loneliness works as a driving force to develop companionships and create relationships.

As mentioned above, existential loneliness is an inevitable condition for humans. However, some individuals are more vulnerable to existential loneliness. It was stated that individuals with serious psychiatric illnesses experience loneliness at the existential level (Nilsson et al. 2008). In their study,

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informants reported that they experience loneliness as almost always present as if it is an invisible follower in feelings; they already felt like outsiders in their childhood. Similarly, Erdner et al. (2005) stated that individuals suffering from mental illnesses are stigmatized, and they feel unwanted and unimportant. In spite of this, these negative experiences that contribute to their loneliness had often been neglected and attributed to their condition (Lindgren et al. 2004). It is not only mentally ill individuals, but also some physically ill individuals, who are more prone to experience existential loneliness. Individuals with incurable cancer in palliative home care settings (Melin-Johansson et al. 2008; Sand et al. 2008) and their families (Sand and Strang 2006), women who had acute myocardial infarction and their partners (Svedlund and Danielson 2004), HIV-infected women (Mayers and Svartberg 2001), and even breast cancer survivors (Rosedale 2009) have been shown to experience existential loneliness. Thus, clinical, counselling and health psychologists and nurses should not neglect existential loneliness and associated feelings of their clients and have to deal with them.

For human beings, there is a strong and pervasive desire to be accepted by other individuals (Baumeister and Leary 1995). In case of loneliness, however, individuals experience rejection, exclusion, separation or disapproval and their sense of belongingness is destroyed (Shaver and Mikulincer 2012); and as Twenge et al. (2003) found that individuals respond to this unmet drive in different negative ways. Similarly, according to Stillman et al. (2009), social rejection and continuing feelings of loneliness threaten belongingness needs and then people have a difficulty to find meaning in their interactions with each other and in their lives in general. Attachment theory argues that attachment security which was defined by Shaver and Mikulincer (2012, p. 2) as “a sense rooted in one’s history of close relationships, that the world is a generally safe place, other people are helpful when called upon, and I, as a unique individual, am valuable and lovable, thanks to being valued and loved by others”, have an easing function to cope with existential anxieties. However, when individuals feel existential loneliness, it means that the sense of attachment security is lost. Thus, both loneliness and existential loneliness in particular are expected to have negative consequences on physical and psychological health. The literature does also support this idea. For instance, it was found that loneliness is closely associated with depression (Cacioppo et al. 2006), sleeping problems (Cacioppo et al. 2002), and disturbed appetite especially in old ages (Tijhuis et al. 1999). The more pathological results of loneliness were found among those adults, who develop personality and adaptation disorders including alcohol overconsumption (Akerlind and Hörnquist 1992), loss of self-esteem (Peplau et al. 1982), extreme forms of anxiety (De Jong Gierveld 1998), powerlessness (Rotenberg et al. 2001), and stress (Hawkey et al. 2007). Loneliness does also seem to contribute

to hospitalization and placement in nursing homes for older adults (De Jong Gierveld 1998). Beside the negative consequences of general loneliness, existential loneliness was thought to be the main source of anxiety, since it constitutes “one’s deepest fear” –death– (Mayers and Svartberg 2001, p.541), and it was linked with depression (Park 2006). As Frankl proposed, existential pain of meaninglessness and inability to find meaning may trigger negative health-related behaviors as well, such as excessive drinking, drug abuse, and gambling (as cited in Routledge et al. 2011). This consistent negative association between existential loneliness and health necessitated the development of a psychometric tool measuring existential loneliness.

To measure loneliness, quite a few scales, such as UCLA Loneliness Scale (Russell et al. 1978), Loneliness Rating Scale (Scalise et al. 1984), and Differential Loneliness Scale (Schmidt and Sermat 1983) were developed. Although the literature supports the multi-dimensional approach to loneliness, scales measuring a single type of loneliness, like existential loneliness, are few. As mentioned by Mayers and Svartberg (2001), there are only two known instruments for measuring existential loneliness; The Belcher Extended Loneliness Scale (BELS; Belcher 1973) and the Existential Loneliness Questionnaire (ELQ; Mayers et al. 2002). In BELS, 8 out of 60 items constitute existential loneliness factor and the scale was criticized due to its length and conceptually complex, and cumbersome structure. Thus, BELS was not specifically developed for the assessment of existential loneliness and it is not a user-friendly tool. However, the 22-item ELQ was particularly developed to assess existential loneliness using a sample (i.e., HIV-infected women) that is very likely to experience existential loneliness. Clinical health psychologists using existential therapy may need a sound tool assessing existential loneliness to demonstrate the effectiveness of their individual and group interventions. Therefore, ELQ was chosen to adapt to Turkish culture.

In the literature, so far, the ELQ has been used in a limited number of studies. Due to the unwillingness of existential psychologists to treat individuals as numbers, the number of researches that operationalized and measured existential concepts are very few (Migdal 2007). Accordingly, the studies including the ELQ were mostly reviews on examining the relation of the concept of existential loneliness and end-of-life-care (Ettema et al. 2010), identifying and categorizing spiritual outcome measures (Selman et al. 2011), or investigating psychometric properties of different meaning in life instruments (Brandstätter et al. 2012).

To our knowledge, in Turkish language, there is no psychometric tool to measure existential loneliness. Therefore, the aim of the current study is to translate ELQ into Turkish and examine its psychometric properties with a sample of Turkish university students. Similar to the original study (Mayers et al. 2002), it was hypothesized that the Turkish

version of ELQ would have good internal consistency and test-retest reliability; would be positively correlated with Beck Depression Inventory (BDI), UCLA Loneliness Scale Version 3, the Hopelessness Scale (HS), Social and Emotional Loneliness Scale for Adults-Short Form (SELSA-S), and Suicide Ideation Scale; and would be negatively correlated with the Purpose in Life Scale (PLS), The Satisfaction with Life Scale (SWLS), The Multidimensional Scale of Perceived Social Support (MSPSS), and The Life Orientation Test (LOT). By considering the expectations of Mayers et al. (2002), it was also hypothesized that the one-factor model would fit significantly better than multifactorial model, suggesting unidimensionality of the ELQ.

## Method

### Participants

The current study included two different samples. Sample 1 was used for all of the analyses and sample 2 was used only for multigroup confirmatory factor analysis (MGCFA). Detailed information about demographic characteristics of the sample 1 for all measures and sample 2 for Existential Loneliness Questionnaire (ELQ) was given in Table 1.

Sample 1 consisted of 250 Turkish university students (77.6% female,  $n = 194$ ; 22.4% male,  $n = 56$ ) with ages ranging between 18 and 48 ( $M = 21.43$ ,  $SD = 2.88$ ) at Time 1. The number of the participants, who reported their perceived socioeconomic status as low, middle, and high were 12 (4.8%), 222 (88.8%), and 15 (6%), respectively.

One and a half months later, Time 1 measurement participants were invited to Time 2 measurement, and only 37 (14.8%) of them (75.7% female,  $n = 28$ ; 24.3% male,  $n = 9$ ) accepted to participate. The age range of Time 2 sample was between 18 and 48 ( $M = 21.00$ ,  $SD = 4.90$ ), too. Similar to the first assessment, most of the Time 2 participants perceived themselves as the members of middle SES (86.5%,  $n = 32$ ) and the rest of them indicated themselves as the members of high (10.8%,  $n = 4$ ) or low (2.7%,  $n = 1$ ) SES. Time 1 and Time 2 samples were not statistically significant from each other in terms of age and study variables (i.e., perceived social support, depression, hopelessness, purpose in life, suicidal ideation, social and emotional loneliness, loneliness, and optimism).

The sample for MGCFA, i.e., sample 2, consisted of 240 individuals aged 61 and over (57.5% female,  $n = 138$ ; 42.5% male,  $n = 102$ ) with ages ranging between 61 and 90 ( $M = 70.73$ ,  $SD = 5.61$ ).

## Instruments

**Existential Loneliness Questionnaire (ELQ; Mayers et al. 2002)** It is a 6-point Likert type scale developed specifically to measure existential loneliness. The original sample consisted of 47 HIV-infected women and due to the small sample size, its factor structure could not be studied. The preliminary version of the questionnaire was examined, and due to substantial misfit of 32 items to the Rasch model (Wright and Masters 1982), 10 items were excluded. The remaining 22 items seemed to meet the Rasch model's criteria and they were internally consistent (Cronbach's  $\alpha = .90$ ). To examine whether ELQ is useful to discriminate HIV-infected women with and without AIDS-related medical symptoms from each other, their ELQ scores were compared. Accordingly, symptomatic women ( $n = 21$ ;  $m = 70.0$ ,  $sd = 23.6$ ) scored significantly higher on ELQ than asymptomatic women ( $n = 22$ ;  $m = 53.0$ ,  $sd = 20.5$ ),  $t(41) = 2.52$ ,  $p = .016$ ). Also, in their systematic review of meaning in life assessments, Brandstätter et al. (2012) pointed out that the concurrent validity of ELQ was satisfactory since its correlation with another meaning in life instrument was above .50. Mayers et al. (2002) recommended the replication of the 22-item version with larger samples by performing factor analysis. Items 1, 2, 7, 14, 17, and 18 are reverse items and getting higher scores on this questionnaire point to higher existential loneliness. The internal consistency reliability of the questionnaire for the present sample was .88.

**The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al. 1988)** This self-report instrument consists of 12 items measured on a 7-point Likert-type scale ranging between 1 (*very strongly disagree*) and 7 (*very strongly agree*). It has 3 subscales, namely perceived social support from family, friends, and a significant other. The internal consistency reliabilities of the composite scale and subscales ranged between .85 and .91 (Zimet et al. 1990). The Turkish adaptation study of MSPSS (Eker and Arkar 1995) confirmed the three-factor structure of the scale with high internal consistency reliability (for composite scale  $\alpha = .89$ , for subscales =  $\alpha_{\text{range}} = .85-.92$ ). The correlational analyses between the MSPSS, Beck Depression Inventory (BDI; Beck et al. 1961), and Spielberger State-Trait Anxiety Inventory (STAI; Spielberger et al. 1970) revealed that MSPSS was significantly and negatively correlated with BDI and Spielberger STAI. This finding suggested that MSPSS is a valid scale (as cited in Eker and Arkar 1995). The higher the scores on this scale, the higher the social support perceived from family, friends, and significant other. The internal consistency reliability of the scale for the present sample was .90.

**Beck Depression Inventory (BDI; Beck et al. 1961)** This inventory measures the level of depressive symptoms by

**Table 1** Descriptive statistics and mean differences of demographic characteristics of participants by ELQ (for sample 1 and sample 2), HS, SIS, BDI, SELSA-S, ULS, MSPSS, LOT, PLS, SWLS

Variable	ELQ (Sample 1)			ELQ (Sample 2)			HS		
	M	SD	df	t	F	df	t	F	M
Gender									
Female	46.45	15.45	248	-1.33 <sup>ns</sup>	---	238	.64 <sup>ns</sup>	---	3.95
Male	49.63	16.82	247	.68 <sup>ns</sup>	---	227	.99 <sup>ns</sup>	---	4.61
Health Status									
Physical Illness	49.39	14.57	246	5.23 <sup>***</sup>	---	221	1.18 <sup>ns</sup>	---	3.70
No Physical Illness	47.03	15.89	2	---	2.76 <sup>ns</sup>	2	---	1.70 <sup>ns</sup>	4.14
Psychological Health	70.45	17.55	248	---	---	248	---	---	6.82
Psych. Problems	46.19	14.89	247	---	---	247	---	---	3.99
No Psych. Problems	56.83	15.82	2	---	---	2	---	---	8.83a
Economic Status	47.00	15.36	246	---	---	246	---	---	3.93b
Low	43.26	19.59	246	---	---	246	---	---	2.87b
Middle	43.26	19.59	246	---	---	246	---	---	2.45
High	43.26	19.59	246	---	---	246	---	---	2.45
Variable									
SIS									
M	2.57	2.87	248	---	---	248	---	---	---
SD	2.77	2.78	247	---	---	247	---	---	---
BDI									
M	3.02	2.96	246	---	---	246	---	---	---
SD	2.58	2.83	246	---	---	246	---	---	---
Physical Illness	5.09	4.66	2	---	---	2	---	---	---
No Physical Illness	2.49	2.67	2	---	---	2	---	---	---
Psychological Health	3.33	3.68	248	---	---	248	---	---	---
Psych. Problems	2.61	2.77	247	---	---	247	---	---	---
No Psych. Problems	2.20	3.23	246	---	---	246	---	---	---
Economic Status	5.09	4.66	2	---	---	2	---	---	---
Low	2.49	2.67	2	---	---	2	---	---	---
Middle	3.33	3.68	2	---	---	2	---	---	---
High	2.61	2.77	2	---	---	2	---	---	---
Variable									
MSPSS									
M	67.59	13.81	248	---	---	248	---	---	---
SD	63.61	14.68	247	---	---	247	---	---	---
Gender									
Female	65.04	13.01	248	---	---	248	---	---	---
Male	66.80	14.20	247	---	---	247	---	---	---
Health Status									
Physical Illness	59.64	14.71	246	---	---	246	---	---	---
No Physical Illness	67.00	14.02	2	---	---	2	---	---	---
Psychological Health	55.00a	12.96	248	---	---	248	---	---	---
Psych. Problems	66.78b	13.97	247	---	---	247	---	---	---
No Psych. Problems	73.87b	11.27	2	---	---	2	---	---	---
Economic Status	55.00a	12.96	2	---	---	2	---	---	---
Low	66.78b	13.97	2	---	---	2	---	---	---
Middle	73.87b	11.27	2	---	---	2	---	---	---
High	73.87b	11.27	2	---	---	2	---	---	---

ELQ: Existential Loneliness Questionnaire, BDI: Beck Depression Inventory, HS: Hopelessness Scale, SELSA-S: Suicide Ideation Scale, SELSA-S: Social and Emotional Loneliness Scale for Adults-Short Form, ULS: UCLA Loneliness Scale Version 3, MSPSS: The Multidimensional Scale of Perceived Social Support, LOT: Life Orientation Test, PLS: Purpose in Life Scale, SWLS: Satisfaction with Life Scale

Groups with same subscripts are significantly different from one another at least  $p < .05$  using Tukey post-hoc criterion for significance

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

taking into consideration the presence and severity of affective, cognitive, motivational, and psychomotor components of depression. This self-report inventory consists of 21 items, and higher scores on the inventory indicate higher level of depression. Tegin (1980) and Hisli (1988) had translated the inventory into Turkish. While the test–re-test reliability of the Turkish BDI was 0.65, the split-half reliability was .78 for students and .61 for depressive patients. By looking at the correlation between the BDI and the depression subscale of the Minnesota Multiphasic Personality Inventory, the convergent validity of the scale was calculated to be .63 (Hisli 1988). The internal consistency reliability of the inventory for the present sample was .89.

**Social and Emotional Loneliness Scale for Adults-Short Form (SELSA-S; DiTommaso et al. 2004)** It consists of 15 items constituting three factors, which are romantic, family, and social loneliness. While romantic and family subscales are used to measure emotional loneliness, social loneliness subscale is used to measure social loneliness. It is a 7-point Likert type scale and response alternatives range from 1 (*strongly disagree*) to 7 (*strongly agree*). Çeçen (2007) translated SELSA-S into Turkish and confirmed its 3-factor structure, which is an indication of the construct validity. The internal consistency reliabilities of the Turkish SELSA-S were .83 for romantic loneliness, .76 for family loneliness, and .74 for social loneliness (Öztaş 2009); and for the present sample they were .90, .88, and .89, respectively.

**UCLA Loneliness Scale Version 3 (ULS; Russell 1996)** Since the first two versions were not appropriate for the population apart from college students, especially for elderlies, this latest version of the scale was developed. It is a 4-point Likert type scale consisting of 20 items. Confirmatory factor analysis supported its 3-factor structure; global factor, negative items, and positive items. The internal consistency of the scale varied between .89 and .94, and the test-retest reliability over 1-year period was .73. Using both elderlies and undergraduate university students, Durak and Senol-Durak (2010) adapted the scale into Turkish. Construct validity and high internal consistency reliability (Cronbach's alpha = .96) of the scale were demonstrated in the study. The internal consistency reliability of the scale for the present sample was .93.

**Hopelessness Scale (HS; Beck et al. 1974)** This scale was developed to assess whether an individual has an expectation to be able to deal with unpleasant life situations or to reach things that are valued. It is a self-report instrument with 20 items in yes/no format. The Kuder-Richardson reliability coefficient of the scale was found as .93. It consists of three factors namely affective, motivational, and cognitive aspects. The reliability and validity study of the Turkish version was performed by Seber et al. (1993), and repeated by Durak

(1994). Both studies revealed satisfactory reliability and validity (The scale successfully differentiated the members of the control group from patients with major depression, dysthymic disorder, and suicide attempters) values. The internal consistency reliability of the scale for the present sample was .86.

**Purpose in Life Scale (PLS; Crumbaugh and Maholick 1964)** This scale was designed to capture the degree of experiencing purpose in life by individuals. In the original version of the scale, all 20 items were measured on a 5-point scale that was specific to each item. The Turkish version of the scale was translated into Turkish by Yağcıoğlu and Bozo (n.d.). In the Turkish version of the instrument, the original 20 items were transformed into statements measured on a standard scale ranging from 1 (*not at all true of me*) to 5 (*very much true of me*). Higher scores on this scale indicate higher purpose in life experienced by individuals. The internal consistency reliability of the scale for the present sample was .87.

**Satisfaction with Life Scale (SWLS; Diener et al. 1985)** It consists of 5 items measured on a 7-point Likert type scale. Higher scores on this scale indicate more satisfaction with life. The internal consistency ( $\alpha = .87$ ) and test-retest reliability coefficients ( $r = .82$ ) were satisfactory. The reliability and validity study of the Turkish version was performed by Durak et al. (2010). Accordingly, the internal consistency reliability of the scale for Turkish university students ranged from .55 to .63 and for Turkish elderlies it ranged from .68 to .78. They also showed that concurrent validity (significant relation with conceptually related measures including depression, self-esteem, positive affect, and negative affect) and discriminant validity (non-significant relation with a conceptually unrelated construct, for example willingness to self-censor) of the scale. The internal consistency reliability of the scale for the present sample was .87.

**Suicide Ideation Scale (SIS; Levine et al. 1989)** This scale was developed to determine the level of suicide ideation. It consists of 17 items in yes (1) / no (0) format. The internal consistency (Cronbach's alpha = .84) and test-retest reliability ( $r = .88$ ) of the Turkish version of the scale were satisfactory (Akbiyık 2000). In the current study, item 10 was deleted, since after deleting this item Cronbach's alpha coefficient increased .20 points. The final internal consistency reliability of the scale for the present sample was .80.

**Life Orientation Test (LOT; Scheier and Carver 1985)** This test was developed to measure dispositional optimism level of the individuals. It consists of 8 items that are rated on a 5-point scale ranging from 0 (*strongly disagree*) to 4 (*strongly agree*). It has been adapted to Turkish by Aydin and Tezer (1991) and its internal consistency reliability was reported as .72. As an indication of construct validity, the

items loaded under two factors as in the original scale, and they explained 57.7% of the total variance. The internal consistency reliability of the test for the present sample was .75.

**Procedure** After the permission to adapt the ELQ was received from one of the developers of the questionnaire, three clinical psychology graduate students, who are fluent in both Turkish and English, translated ELQ into Turkish. During the translation process, the items that were specific to HIV (item 4, 8 and 22) were converted into general statements that apply to other conditions, too. After the researchers (an associate professor of health psychology and a graduate student in clinical psychology) decided on the best translated items, the items were back translated by a doctoral student in clinical psychology. Then, the researchers compared the back translated items with the original ones and they made minor modifications on some of the items. After the translation process was finalized, ethical approval was obtained from the Review Board of the university. The Sample 1 participants were chosen among students of two state universities in Ankara while the Sample 2 participants were chosen individuals aged 61 and above via convenience sampling (there were only two exclusion criteria: the age of a participant should be more than 60 and the participant should not live in a rest home). After the written informed consent forms were obtained, data collection was completed approximately in 30 min. To avoid order effect, the order of the scales in the questionnaire set was counterbalanced.

### Data Analysis

Apart from multigroup confirmatory factor analysis (MGCFA), all other analyses were run using SPSS Version 23. For MGCFA, EQS version 6.1 was used.

## Results

### Principle Component Analysis

Since exploratory factor analysis (EFA) enables researchers to investigate the factor structure of an adapted instrument and it is one of the aspects of the validation studies (i.e., construct validity), the present researchers chose to use it (Borsa et al. 2012).

Before conducting principle component analysis, all of the items constituting the ELQ were analyzed in terms of the accuracy of data entry and missing values. The frequency analysis showed that all values are within the range values. All missing values were replaced by mean substitution method, since the percentage of the missing values was less than 5% for each item. According to Tabachnick and Fidell (2007), for the 5% or less missing data, every procedure used to deal with missing data yields similar results. The correlation matrix

showed that there was no singularity or multicollinearity problem as there was no correlation coefficient above .90. Item-total correlations were also examined. Accordingly, item total correlation of item 6 and item 11 were low ( $r = .173$  and  $r = .106$ , respectively); after deleting these items the internal consistency reliability of the scale increased from .882 to .894. Therefore, these two items were removed from all subsequent analyses. Then, to test the sampling adequacy, the Kaiser-Meyer Olkin measure was examined and it suggested that the sample was factorable ( $KMO = .872$ ). Bartlett test was also significant indicating that the correlation among the items were enough for factor analysis ( $\chi^2(231) = 2171.18, p < .001$ ) (Tabachnick and Fidell 2007). So, principle component analysis with varimax rotation was conducted. Eigenvalues suggested 5 factors explaining 62.10% of the total variance. However, obtained factors were not theoretically meaningful. Therefore, the items were forced to load under three factors that seemed to be theoretically more meaningful. The explained variance by 3 factors was 50.77%. According to factor loadings, all items contributed to at least one factor and all standardized factor loadings were above .30. Factor 1, named as *loneliness in social ties*, consisted of 8 items and it explained 18.96% of the total variance. Factor 2, *loneliness in close relationships*, consisted of 5 items and it explained 17.34% of the total variance. The last factor, *finding meaning in life*, consisted of 7 items and it explained 14.47% of the total variance. The item loadings, eigenvalues, and explained variances are presented in Table 2.

### Confirmatory Factor Analysis

In order to confirm the factor structure obtained via principle component analysis, a confirmatory factor analysis (CFA) was performed on a separate sample as suggested by Prooijen and Kloot (2001). Since there were two separate samples varying on demographic characteristics, multigroup confirmatory factor analysis (MGCFA) was performed to investigate whether the factor structure invariant across these two groups.

First of all, to determine the baseline model for the Sample 1 (university students) and Sample 2 (individuals aged 61 and over), two separate confirmatory factor analyses (CFAs) were performed using maximum likelihood as a parameter estimation method. For the Sample 1, the assumptions of CFA (i.e., a sufficient sample size, the correct a priori model specification, and a random sample) were met but the assumption of multivariate normality was not met (Mardia's  $z = 29.92$ ), so robust results were interpreted. When the goodness of fit statistics were examined, relatively poor fit between the hypothesized model and the data was observed ( $S-B\chi^2(167, N = 250) = 439.44, p < .001, \chi^2/df = 2.63, CFI = .79, RMSEA = .08, 90\% CI [0.07, 0.09], Rho = .90$ ). The Lagrange Multiplier test recommended three significant and theoretically meaningful modifications: adding an error covariance between item 18 and item 19 (both

**Table 2** Factor loadings of the items after deleting item 6 and item 11

Item	Factor		
	Loneliness in social ties	Loneliness in close relationships	Finding meaning in life
ELQ 4. I have had trouble finding people I can talk to.	<b>.73</b>	.26	.13
ELQ 3. I am surrounded by strangers I cannot connect with.	<b>.68</b>	.10	.12
ELQ 7. I feel I have people I can trust and rely on if I need them.	<b>.65</b>	.27	.31
ELQ 5. I feel lonely.	<b>.65</b>	.36	.17
ELQ 20. No one else in the world can understand my feelings.	<b>.65</b>	.12	.08
ELQ 21. My world seems so different from everybody else's.	<b>.62</b>	.08	-.08
ELQ 14. I mean something to others.	<b>.44</b>	.19	.41
ELQ 13. I feel alone.	<b>.47</b>	.59	.31
ELQ 9. If I had the right relationship, I would never feel alone.	-.09	<b>.80</b>	.02
ELQ 22. I feel hopeless about having a romantic relationship.	.09	<b>.68</b>	-.09
ELQ 15. Important relationships have ended or become weaker.	.39	<b>.55</b>	.18
ELQ 10. I stay in bad relationships too long in order not to be alone.	.20	<b>.48</b>	.28
ELQ 8. My fears of being rejected have made it harder to be around other people.	.27	<b>.48</b>	.09
ELQ 12. I feel helpless.	.42	.57	<b>.38</b>
ELQ 16. I feel at the mercy of the world.	.33	.51	<b>.32</b>
ELQ 18. The universe is full of meaning.	.06	-.01	<b>.82</b>
ELQ 19. I feel that there is little point to life.	.06	.10	<b>.74</b>
ELQ 2. I have goals in my life.	.07	.14	<b>.71</b>
ELQ 17. I feel dead.	.27	.45	<b>.46</b>
ELQ 1. I am happy with the way I have lived my life.	.31	.35	<b>.37</b>
Eigenvalue	3.79	3.47	2.89
Explained variance	18.96	17.34	14.47
Alpha coefficient	.84	.70	.80
Item-total coefficient range	.41–.69	.42–.57	.45–.64

Note. Standardized factor loadings in bold face represent an item loading on that factor

items related with finding a meaning in life and can be considered as reverse of each other), between item 20 and item 21 (both items shared “world” as a common term and in both cases they were listed in the scale consecutively, which in turn might led participants to perceive these item as pairs), and cross-loading of item 13 on factor 3 (the relation between social rejection and reduced meaning illustrated in the literature e.g. Stillman et al. 2009). All these modifications were separately performed and the chi square difference tests showed that all these modifications were significant and a program developed by Satorra and Bentler (2001) explained by Crawford and Henry (2003) was used to compute whether the difference was significant or not. As a result, the third alternative model (S-B $\chi^2$  (164) = 292.60,  $p < .001$ ,  $\chi^2/df = 1.78$ , CFI = .90, RMSEA = .06, 90% CI [0.05, 0.07]), was accepted as a baseline model for the Sample 1.

Similar to the Sample 1, for the Sample 2 the assumptions of CFA (i.e., a sufficient sample size, the correct a priori model specification, and a random sample) were met but the assumption of multivariate normality was not met (Mardia's  $z = 27.21$ ) so robust results were interpreted. When the

goodness of fit statistics were examined, relatively poor fit between the data and the hypothesized model was observed (S-B $\chi^2$  (167) = 440.10,  $p < .001$ ,  $\chi^2/df = 2.64$ , CFI = .75, RMSEA = .08, 90% CI [0.07, 0.09], Rho = .87). The Lagrange Multiplier test recommended three significant modifications; adding an error covariance between item 16 and item 17 (already discussed for Sample 1), adding an error covariance between item 4 and item 5 (they were about related to finding a satisfactory relationship with others) and adding an error covariance between item 1 and item 2 (both items shared “my life” as a common term and in all cases they were listed in the scale consecutively). All these modifications were separately performed and the chi square difference tests showed that all these modifications were significant. As a result, the third alternative model (S-B $\chi^2$  (164) = 334.30,  $p < .001$ ,  $\chi^2/df = 2.04$ , CFI = .85, RMSEA = .07, 90% CI [0.06, 0.08]), was accepted as a baseline model for the Sample 2. Although the most widely used criteria for CFI value is .95 and high and for RMSEA values is .06 and low (Hu and Bentler 1999), these cutoff scores has been criticized as being so stringent that make difficult to attain (Marsh et al. 2004).

According to Marsh et al. (2004), CFI scores such as .80 can discriminate the true model from the misspecified models. Hence, the criterion as suggested by Marsh et al. (2004) was accepted in the following analyses as well.

According to the configural invariance test results, the configural model fit the data well enough ( $S-B\chi^2(328) = 626.03, p < .001, \chi^2/df = 1.90, CFI = .88, RMSEA = .06, 90\% CI [0.05, 0.07]$ ) suggesting that the latent factor in the university students sample was quite similar to the sample composed of individuals aged 61 and over. As a next step, the factor loadings invariance and error covariance invariance were tested by metric invariance test. The results showed that  $S-B\chi^2(345) = 690.96, p < .001, \chi^2/df = 2.00, CFI = .86, RMSEA = .06, 90\% CI [0.06, 0.07]$ . When the model was compared to the configural model, significant change was observed ( $\Delta S-B\chi^2(17) = 64.93, p > .001$ ) according to the Satorra and Bentler (2001) chi square difference test results. The difference in the comparative fit index (CFI) was more than .01, which is the rule of thumb (Cheung and Rensvold 2002). Moreover, the Lagrange Multiplier test suggested that the loading of item 14 (item 12 in ELQ 22-item version) should be released due to the significant improve in the model after deleting this constraint. That means, Sample 1 and Sample 2 interpreted that item content in a different way. All these results limited the possibility of full measurement invariance but to examine partial invariance, intercept invariance and latent mean differences were tested (after deleting the constraint).

To investigate the two groups have the same intercepts or not, MACS approach, analyses based on means and covariance structures, was used. According to the results,  $S-B\chi^2(365) = 849.75, p < .001, \chi^2/df = 2.33, CFI = .85, RMSEA = .07, 90\% CI [0.07, 0.08]$ . When the model was compared to the metric model, significant change was observed ( $\Delta S-B\chi^2(20) = 158.79, p > .001$ ) according to the Satorra and Bentler (2001) chi square difference test results. However, the difference in the comparative fit index (CFI) was not more than .01 and the fit indexes were still in acceptable ranges. Moreover, the Lagrange Multiplier test suggested that only two constraints should be released since deleting them significantly improved the model. According to these constraints, intercepts on item 3 and item 18 (item 20 in ELQ 22-item version) changed across groups, that is, these two groups were non-invariant in terms of their intercepts. However, Cooke et al. (2001) argued that factor loading invariance is more important than intercept non-invariance so the constraints were not deleted in the following analysis. The measurement invariance results were summarized in Table 3. Finally, latent mean difference between the two groups was examined to test the hypothesis that the university students perceived three factors of ELQ in a similar way with the individuals aged 61 and over. The results supported the hypothesis for each three factors and no significant difference between the two samples was found ( $B = -.20, t = -.29, ns$ , loneliness in social ties;

**Table 3** Testing for measurement invariance across the university students sample and individuals aged 65 and over

Model	$SB\chi^2$	<i>df</i>	$SB\chi^2/df$	CFI	RMSEA
Configural Invariance	626.03*	328	1.91	.88	.06
Metric Invariance	690.96*	345	2.00	.86	.06
Scalar Invariance	849.75*	365	2.33	.85	.07

$SB\chi^2$  = Satorra-Bentler chi-square; CFI = comparative fit index; RMSEA = root mean square error of approximation

\* $p < .001$

$B = .10, t = 1.26, ns$  for loneliness in close relationships;  $B = .07, t = 1.13, ns$ , for finding meaning in life).

### Correlations among the ELQ Subscales

The correlation coefficients among all of the subscales were significant. The association of loneliness in social ties with loneliness in close relationships ( $r = .56, p < .01$ ), and finding meaning in life ( $r = .67, p < .01$ ) were significant. Loneliness in close relationships and finding meaning in life were also significantly associated ( $r = .56, p < .01$ ).

### Reliability Analyses

The Cronbach's alpha coefficients of the subscales were .85 for loneliness in social ties, .70 for loneliness in close relationships, and .80 for finding meaning in life. The Guttman split-half coefficient of the scale was .89 (Part-1  $\alpha = .83$  and Part-2  $\alpha = .81$ ) indicating good reliability. Test-retest reliability of the ELQ over a one and a half month-interval was .75. The same analysis was run for each subscale. Accordingly, the test-retest reliability for loneliness in social ties was .82, for loneliness in close relationships was .66, and for finding meaning in life was .83.

### Convergent Validity

Concepts such as depression, hopelessness, and loneliness that are not specified as existential were considered as related concepts with existential loneliness (Mayers et al. 2002). Therefore, high-to-moderate positive associations between the measures of these concepts and the ELQ were expected. According to correlational analyses, there was a strong positive association between ELQ and UCLA Loneliness Scale version 3 ( $r = .75, p < .01$ ). ELQ was also positively associated with Social and Emotional Loneliness Scale for Adults-Short Form (SELSA-S) ( $r = .59, p < .01$ ), Beck Depression Inventory (BDI) ( $r = .64, p < .01$ ), Hopelessness Scale (HS) ( $r = .59, p < .01$ ), and Suicide Ideation Scale ( $r = .57, p < .01$ ) (see Table 4).



**Table 4** Correlations of the 19-item ELQ with study measures at time 1

Measures	ELQ	BDI	HS	SIS	SSELSA-S	ULS	MSPSS	LOT	PLS	SSWLS
ELQ	(.89)									
BDI	.64*	(.89)								
HS	.59*	.66*	(.86)							
SIS	.57*	.72*	.54*	(.80)						
SELSA-S	.59*	.42*	.49*	.44*	(.82)					
ULS	.75*	.53*	.46*	.45*	.56*	(.93)				
MSPSS	-.55*	-.44*	-.48*	-.41*	-.75*	-.58*	(.89)			
LOT	-.47*	-.50*	-.54*	-.46*	-.26*	-.42*	-.30*	(.76)		
PLS	-.55*	-.51*	-.58*	-.45*	-.37*	-.44*	.39*	.50*	(.87)	
SWLS	-.56*	-.60*	-.54*	-.53*	-.50*	-.46*	.50*	.48*	.58*	(.87)

\* $p < .001$

ELQ: Existential Loneliness Questionnaire, BDI: Beck Depression Inventory, HS: Hopelessness Scale, Suicide Ideation Scale, SELSA-S: Social and Emotional Loneliness Scale for Adults-Short Form, ULS: UCLA Loneliness Scale Version 3, MSPSS: The Multidimensional Scale of Perceived Social Support, LOT: Life Orientation Test, PLS: Purpose in Life Scale, SWLS: Satisfaction with Life Scale

Scores shown in parentheses on diagonal are alpha internal consistency reliabilities

The convergence of existential loneliness (ELQ) and general loneliness (ULS) was examined after controlling for the effect of depression (BDI), since in the literature depression was consistently and strongly associated with loneliness (e.g., Rokach 1997). Thus, a multiple hierarchical regression analysis was performed to test whether general loneliness explains any variance in existential loneliness beyond the variance explained by depression. The findings revealed that depression significantly explains 41% of the variance in existential loneliness ( $R^2 = .41$ ,  $F(1236) = 166.64$ ,  $p < .001$ ) and adding general loneliness to the regression equation results in a significant increment in this explained variance ( $R^2 = .66$ ,  $\Delta R^2 = .24$ ,  $F_{inc}(1235) = 163.90$ ,  $p < .001$ ). As the third step of the regression analysis, social and emotional loneliness (SELSA-S) was added to the equation to test whether social and emotional loneliness explains any variance in existential loneliness beyond the variance explained by depression (BDI) and general loneliness (ULS). Adding social and emotional loneliness to the regression equation resulted in a significant increment in the explained variance in existential loneliness ( $R^2 = .68$ ,  $\Delta R^2 = .03$ ,  $F_{inc}(1, 234) = 19.32$ ,  $p < .001$ ). Thus, although existential loneliness share some variance with depression, general loneliness, and social and emotional loneliness (an indication of convergent validity), the remaining unexplained variance (32%) in ELQ implied that existential loneliness is different from the other closely related concepts.

### Divergent Validity

There are some studies demonstrating a strong and negative relation between purpose in life and loneliness (e.g., Bondevik and Skogstad 2000), and life satisfaction and loneliness (e.g., Neto 1995). However, there is also a controversy in the

literature on the relation between perceived social support and loneliness for non-chronically ill children (Florian and Krulik 1991) and on the relation between low meaningfulness and existential problems (Stillman et al. 2009). According to our findings, ELQ was negatively and moderately associated with the Purpose in Life Scale (PLS) ( $r = -.55$ ,  $p < .01$ ), Satisfaction with Life Scale (SWLS) ( $r = -.56$ ,  $p < .01$ ), The Multidimensional Scale of Perceived Social Support (MSPSS) ( $r = -.55$ ,  $p < .01$ ), and Life Orientation Test (LOT) ( $r = -.47$ ,  $p < .01$ ) (see Table 4). The results demonstrated that these concepts are significantly related but not with such a degree to reject divergent validity.

### Discussion

The aim of the current study was to examine psychometric reliability and validity of the Existential Loneliness Questionnaire (ELQ) in Turkish samples. Initially a principle component analysis was run. After deleting two items with low item-total correlations, the rest of the items loaded under three meaningful factors; loneliness in social ties, loneliness in close relationships, and finding meaning in life. These deleted two items (“When I feel lonely, I do whatever I can not to think about those feelings” and “I immediately get involved in new relationships as soon as I break up”) were both related with how individuals cope with loneliness. The study of Rokach (2001) showed that young adults have the highest scores on distancing and denial while coping with loneliness. Since the sample of the current study consists of young adults, they might have denied their loneliness and thereby these items had low item-total correlation coefficients. As a second step, multigroup confirmatory factor analysis (MGCFA) was performed to test for the

equivalence of an ELQ across different groups. The results showed the partial measurement invariance (factorial invariance) suggesting that items of the ELQ was interpreted in a conceptually similar manner by respondents in two samples. The age ranges of the two samples were considerably different from each other that may influence their approaches to loneliness, and this difference can be an explanation of the partial invariance. All in all, the remaining 20-item, 3-factor version of the scale appeared to be a reliable and valid measure of existential loneliness for Turkish university students. However, it is still important to consider the generalizability of the 3-factor structure across different populations since in the second sample consisting of older individuals, the CFI and RMSEA values showed only relative fit.

In the loneliness literature, the association of loneliness with a number of psychosocial difficulties, such as low social competence and poorer quality in social interactions, and with mental health problems, such as depression and suicidal behaviors was well demonstrated (Heinrich and Gullone 2006). In line with the literature and our hypotheses, depression, hopelessness, non-existential loneliness and suicide ideation were all positively associated with existential loneliness. On the other hand, purpose in life, life satisfaction, perceived social support, and optimism were negatively associated with existential loneliness. Although it does not mean that existential loneliness is very similar to those concepts, these negative associations limit divergent validity and imply that they have several characteristics in common.

ELQ was developed to measure only existential loneliness, an inborn universal human characteristic, which is not related to object loss or absence of close relationships (Bekhet et al. 2008). In other words, ELQ was developed as a unidimensional measurement tool implying that existential loneliness does not contain other types of loneliness, such as social or emotional loneliness. However, in the current study, ELQ appeared to be an aggregate measure including several factors. As a result of principle component analysis three factors emerged, and this factor

structure was partially supported by multigroup confirmatory factor analysis. One of the possible explanations of this unexpected finding is that ELQ does not measure only existential loneliness (as suggested by Mayers et al. 2002) but also other types of loneliness. If so, this can be considered as an important limitation of the ELQ. On the other hand, the strong positive association of UCLA Loneliness Scale and the moderate positive association of SELSA-S with 3-factor ELQ support the view that these measurement tools also share unspecific or general loneliness (Perlman 1989). In a more general sense, particular elements like lack of close personal relationships or social interactions were suggested as the underlying causes of the similarities in conceptualization of loneliness both by theory builders and scale designers (Cramer and Barry 1999). This possible association of existential loneliness with romantic or

social loneliness was mentioned by McGraw (1995) as follows: “Without the warmth of meaningful intimacy and the light of intimate meaning, one’s existence wanes and withers; inevitably one feels exiled in the glacial desert that comprises the wilderness of loneliness” (p. 45). Similarly, Hawthorne (2008) stated that people have an internally regulated need to belong and it is consistent with existential loneliness hypothesis. Therefore, even if the so-called “unidimensional” ELQ appeared to be a 3-factor measure of existential loneliness in the current study, intimate and social relationships are inseparable parts of the composite existential loneliness concept as stated in the literature. However, this does not mean that existential loneliness is not a unique type of loneliness.

This questionnaire performs well in measuring the concept of existential loneliness. Although the items are related to the conditions that may constitute existential loneliness, as stated by Ettema et al. (2010), they are not describing how people feel lonely in an existential way. To solve this problem of description, researchers are suggested to use qualitative methods in the future studies to reveal the meaning attached to the concept by individuals themselves (Routasalo and Pitkala 2003). In this way, individuals’ personal understanding of existential loneliness would be described. Moreover, the analyses did not reveal clear justifications for divergent validity. Thus, future studies are suggested to test the divergent validity of the ELQ with different concepts and/or samples. Furthermore, to increase the generalizability of the findings (i.e., very small sample size for test-retest findings) further research should be performed using different populations and with larger sample sizes. The representativeness therefore must be made very cautiously until the current study is replicated.

As a concept, existential loneliness was perceived as a process where the negative experience of man’s lonely nature is transformed into a positive experience (Booth 1997; Yalom 1980). In other words, individuals who confront existential loneliness due to a life crisis have more meaning in their lives and this is called a process of inner growth (Mayers et al. 2005). Thus, measuring existential loneliness is not only crucial in understanding the mechanisms behind the association of existential loneliness with psychosocial problems but also in understanding the trajectories to personal growth.

In conclusion, in the current study the Existential Loneliness Questionnaire was adapted to Turkish language. The results of reliability and validity analyses were satisfactory. Existential loneliness was positively related with negative psychological outcomes (i.e., depression, hopelessness and suicide ideation) and negatively associated with concepts indicating better psychological functioning (i.e., purpose in life, life satisfaction, perceived social support, and optimism). Although these findings indicate a negative connotation for existential loneliness, this loneliness type may also be a route to personal growth. Therefore, the usage area of this assessment tool is quite broad. All in all, ELQ can be used by psychologists,

psychiatrists, counselors and other mental healthcare professionals to investigate the prevalence and severity of existential loneliness among different populations and to develop effective primary and secondary prevention strategies.

### Compliance with Ethical Standards

**Funding** This study was not funded by any institution.

**Conflict of Interest** The authors declare that they have no conflict of interest.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

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