

The development and psychometric properties of the Turkish death anxiety scale (TDAS)

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ABSTRACT

The purpose of the present study was to develop the Turkish Death Anxiety Scale (TDAS) and test its initial psychometric properties. Four independent samples participated in the study: 943 college students in item generation, 388 college students in validation, 171 college students in reliability investigation, and 338 adults in cross-validation. Principal component analysis with a varimax rotation revealed that 20 items of the scale contained three factors (i.e., Ambiguity of Death, Exposure to Death, and Agony of Death), which explained over 67% of the total variability. Confirmatory factor analyses indicated acceptable fit. Significant correlations were found between the scale and death anxiety, state anxiety, trait anxiety, depression, and hopelessness in the student sample. In the adult sample, death anxiety significantly correlated with trait anxiety. Reliability coefficients were also found acceptable. The authors conclude that the TDAS is a promising instrument in assessing the death anxiety levels in Turkey.

Death or dying is a complex physiopsychosocial phenomenon that can be an anxiety-inducing event for dying individuals, their loved ones, caregivers, and those who are around them. Therefore, the concept has long been the interest of researchers (Kübler-Ross, 2014).

Among the death-related attitudinal constructs, anxiety has received a great attention (Rajabi, Begdeli, & Naderi, 2015). More recently, there has been an increasing interest in the study of death anxiety (e.g., Nia, Ebadi, Letho, & Peyrovi, 2015; Nienaber & Goedereis, 2015). However, there still exists no single agreed-upon definition of death anxiety in the literature (Lehto & Stein, 2009). Lonetto and Templer (1986) defined it as unpleasant thoughts and feelings that one has regarding one's own death, whereas Abdel-Khalek and Tomás-Sábado (2005) frame death anxiety as a result of awareness about death. According to Nyatanga and Vocht (2006), death anxiety is an existentially rooted disturbing feeling that results from multifaceted worries of the idea of one's own (or others') death. Existential theorists consider it as one of the core anxieties people experience (Yalom, 2001).

It has been articulated in the literature that death anxiety might be experienced explicitly or implicitly (e.g., Barrett, 2013). However, the relationship between

these two is not necessarily clearly understood (Lehto & Stein, 2009). Such a distinction is also carried over to the measurement of death anxiety. On one hand, earlier researchers have attempted to assess the implicit forms of death anxiety via thematic apperception tests (e.g., Richardson, Berman, & Piwowarski, 1983), implicit association tests (e.g., Bassett & Dabbs, 2003), or galvanic skin response tests (e.g., Schultz, 1977). On the other hand, the explicit forms of death anxiety have been more intensely studied, mostly by using self-report techniques (e.g., Abdel-Khalek, 2004; Neimeyer & Moore, 1994; Templer et al., 2006; Tomás-Sábado & Gómez-Benito, 2005). A review of the relevant literature reveals that current researchers focus more on the explicit forms of death anxiety. Similarly, we made an attempt in the present study to develop an assessment instrument that can be used to assess the conscious form (i.e., explicit) of death anxiety among people who live in Turkey.

Several self-report instruments have been developed for the purpose of assessing levels of death anxiety: The Collett-Lester Fear of Death Scale (Lester & Abdel-Khalek, 2003), the Templer Death Anxiety Scale (DAS) and its revisions (Templer, 1970; Templer et al., 2006), the revised Death Anxiety Scale (R-DAS; Thorson & Powell, 1992), the Corriveau-Kelly Death

Anxiety Scale (Kelly & Corriveau, 1995), and the Multi-dimensional Fear of Death Scale (Neimeyer & Moore, 1994). Death anxiety instruments have also been developed for non-English speaking populations such as the Jewish population (i.e., the Fear of Personal Death Scale; Florian & Kravetz, 1983), the Chinese population (i.e., the Chinese Death Anxiety Inventory; Wu, Tang, & Yan, 2003), the Arabic population (i.e., the Arabic Scale of Death Anxiety; Abdel-Khalek, 2004), and Spanish-speaking populations (i.e., the Death Anxiety Inventory; Tomás-Sábado & Gómez-Benito, 2005).

At present, there is no death anxiety instrument developed to measure the construct among people who live in Turkey. However, a few of the abovementioned scales have been adapted to Turkish. For example, the DAS was adapted to Turkish by Akça and Köse (2008), Ertufan (2000), and Şenol (1989). However, the factor structure of the DAS has been found to be unclear in the original form (e.g., Durlak, 1982; Gilliland & Templer, 1985–1986; Schell & Zinger, 1984) and was not confirmed in the Turkish version (e.g., Akça & Köse, 2008).

The Fear of Personal Death Scale (Florian & Kravetz, 1983) was adapted to Turkish by Aslıtürk (2001), where he reported only two out of the three subscales' internal consistency. No study of the Turkish version's validity was found in the literature. The Collett-Lester Fear of Death Scale was adapted to Turkish (Zeyrek & Lester, 2008). Even though the current version includes four subscales, the scale's factor structure in various studies has been found to include five to seven subscales (e.g., Lester, 2004; Neimeyer, Moser, & Wittkowski, 2003), thus raising questions about its factorial validity. The Turkish adaptation included only internal consistency and concurrent validity information but failed to report the construct validity of the scale. Neither exploratory nor confirmatory analyses of the adapted version have been reported in the Turkish context.

The latest version of the R-DAS was adapted to Turkish by Ak and Conk (2009), Karaca and Yıldız (2001), and Tanhan (2010). Karaca and Yıldız (2001) extracted four factors in the Turkish version that accounted for less than half of the variability. Tanhan (2010) replicated the scale's four dimensions, but reported internal consistency coefficients as low as .44. Because the Turkish R-DAS holds better psychometric properties in comparison to other available death anxiety measures, it was used in the present study to test the concurrent validity of the TDAS.

In addition to the aforementioned limitations of the adapted death anxiety scales, a review of the literature shows that culture plays a significant role in anxiety (e.g., Hofmann, Asnaani, & Hinton, 2010). More specifically, culture might have a significant impact on

the process of conceptualizing, experiencing, and interpreting death and dying (Byrant, 2003); therefore, death anxiety experiences may vary among different cultures (e.g., Lester, Templer, & Abdel-Khalek, 2006–2007).

There is also evidence that Turkish culture may be different from Western cultures in terms of the meaning of death and death rituals (e.g., Artun, 2011; Güngör, 2007; Onay, 2013; Şahin, 2014). For example, Turks had a tradition of believing in the hereafter even long before they accepted Islam; therefore, death is a relatively welcomed concept in the culture (Ersoy, 2002). Anxiety may still be experienced due to the ambiguity of death or the idea of suffering during dying; but at the same time, most Turks regard death as a new beginning of an eternal life. When taken altogether, funeral processions before and after burial, the culture of offering condolences, and other practices show that the entire process is heavily social (Artun, 2011). That is, death brings people together in the Turkish culture, much more so than in Western cultures. Continuous graveyard visits are quite common practices and provide a prolonged connection between the dead and living as well as awareness about death (Güngör, 2007).

We believe that a culturally more sensitive and a psychometrically more sound measure of death anxiety that could be of great interest in future studies is due. Therefore, the purposes of the current study were to develop a death anxiety assessment instrument that is rooted in the Turkish culture and study the initial psychometric properties of the newly developed instrument.

Method

Samples

Four different samples participated in the various stages of the study. All samples were selected using the convenience sampling method and included voluntary participants. According to the latest available statistical data, 99.2% of people who live in Turkey identify themselves as Muslims (Diyanet İşleri Başkanlığı, 2014); therefore, even though it was not formally assessed in this study, we assume that the overwhelming majority of the participants were Muslims. First three samples were college students enrolled in classes in a state university in the central part of the country and the fourth sample included adults who were living in the central part of the country.

Sample 1

The initial pool of items ($n = 87$) was administered to 943 college students. Additional characteristics of this sample are presented in Table 1.

Table 1. Demographic characteristics of the various samples of the study.

Characteristic	Samples							
	Sample 1		Sample 2		Sample 3		Sample 4	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Gender								
Men	335	35.52	162	41.75	58	33.92	180	53.25
Women	608	64.48	226	58.25	113	66.08	158	46.75
Marital status								
Not married			370	95.32			80	23.67
Married			18	4.68			258	76.33
College status								
Freshman	297	31.50	128	33.00	70	40.94		
Sophomore	261	27.68	108	27.84	87	50.88		
Junior	133	14.10	23	5.93				
Senior	52	5.51	27	6.95	14	8.19		
Graduate	200	21.21	102	26.28				
Department								
Elementary education	324	34.36	35	9.02				
Counseling	168	17.82	200	51.55	157	91.81		
Social studies	111	11.77	29	7.47				
Science education	54	5.73	23	5.93				
Child development	39	4.14						
Art	27	2.86						
Finance	20	2.12						
Graduate	200	21.20						
History			16	4.12				
Turkish			41	10.57				
Mathematics			21	5.41				
Other			23	5.93	14	8.19		
Occupation								
Teacher							101	29.88
Homemaker							71	21.01
Retired							16	4.73
Farmer							9	2.66
Other							141	41.72
Educational level								
Elementary or less							97	28.69
Middle school							44	13.02
High school							45	13.32
Higher education							152	44.97
Total	943		388		171		338	

Sample 2

After the initial screening of the items, the remaining items ($n=36$) were administered to 388 college students whose ages ranged from 18 years old to 40 years old ($\bar{x}=21.76$, $sd=2.94$). Most students in this group were single (95.32%) and did not lose any close friend/relative within the last five years (97.54%). More information about this sample is presented in Table 1.

Sample 3

This sample participated in the test-retest of the final 20 items and included 171 college students whose ages ranged from 17 years old to 23 years old ($\bar{x}=19.51$, $sd=1.26$). Most of the students in this sample were counseling majors (91.81%). Demographic characteristics of this sample are presented in Table 1.

Sample 4

A group of adults responded to the final 20 items of the TDAS. This sample included 338 adults whose ages ranged from 25 years old to 90 years old ($\bar{x}=42.52$,

$sd=11.64$). Other demographic characteristics of this sample are presented in Table 1.

Instruments

Data were collected using a research packet that included the newly developed TDAS, the Turkish versions of the R-DAS (Tanhan, 2010), Beck Depression Inventory (BDI; Hisli, 1988), Beck Hopelessness Scale (BHS; Seber, Dilbaz, Kaptanoğlu, & Tekin, 1993), State-Trait Anxiety Inventory (STAI; LeCompte & Öner, 1975), and a demographic information sheet. The initial TDAS items ($n=87$) and a demographic information sheet were given to the first sample. The second sample was administered the demographic information sheet, the revised items of the TDAS ($n=36$), R-DAS, BDI, BHS, and STAI. The third sample responded to the demographic information sheet and the finalized items of the TDAS ($n=20$) twice within a 2-week interval. Finally, the adult sample responded to the 20-item TDAS and the Trait Anxiety Inventory along with the demographic information sheet.

The R-DAS

The most current version of the R-DAS includes 25 Likert-type items under four factors (i.e., Fear of Uncertainty, Fear of Helplessness, Afterlife Concerns, and Fear of Pain). The scale's validity and reliability have been evidenced in the literature (e.g., Thorson & Powell, 1992). The R-DAS was adapted to Turkish by Karaca and Yıldız (2001). The adaptation extracted four factors in the Turkish version that accounted for 47.70% of the variability: Loss of Physical and Spiritual Functions (26.30%), Fear of Hereafter (8.70%), Fear of Decomposition (7.10%), and Fear of Pain (5.60%). The researchers found that the reliability coefficients ranged between .73 and .90. More recently, Tanhan (2010) studied the psychometric properties of the Turkish R-DAS and confirmed the four dimensions, which accounted for 55.28% of the total variability: Fear of Helplessness (22.49%), Fear of Uncertainty (13.73%), Afterlife Concerns (9.75%), and Fear of Pain (9.31%). He also reported that Cronbach alpha internal consistency coefficients for the subscales were .87, .85, .83, and .44, respectively. The internal consistency of the R-DAS in the present study was found to be .88; .81 for the Fear of Helplessness; .72 for the Fear of Uncertainty; .67 for Afterlife Concerns; and .63 for the Fear of Pain.

The BDI

To assess the level, intensity, and fluctuation of depressive symptoms, Beck, Ward, Mendelson, Mock, and Erbaugh (1961) developed 21 items. The validity and reliability of the BDI have been extensively studied and assured throughout the years. Hisli (1988) adapted the BDI into Turkish and found it to be a valid and reliable measure of depression in the Turkish context. The internal consistency of the BDI in the present study was found to be .85.

The BHS

Beck, Weissman, Lester, and Trexler (1974) developed 20 items to assess negative expectations about future. The psychometric properties of the BHS have been shown in the literature (see Beck et al., 1974). The adaptation and validation of the BHS into Turkish were completed by several researchers (Durak, 1994; Seber et al., 1993; Terzi-Unsal & Kapci, 2005). The internal consistency of the BHS items in the present study was found to be .86.

The STAI

The STAI is a 40-item, 4-point Likert-type self-report instrument developed to measure transitory and stable anxiety reactions (Spielberger, Gorsuch, & Lushene,

1970). First 20 items measure the feelings of apprehension, tension, nervousness, and worry about the current situation (i.e., State Anxiety) and the remaining 20 items assess how the respondents feel in general (i.e., Trait Anxiety). Spielberger (1983) reported evidence for the discriminant and predictive validity and internal consistency of the inventory. The STAI was adapted to Turkish by LeCompte and Öner (1975) and shows adequate psychometric properties. In the present study, the internal consistency of the State Anxiety was found to be .91, whereas the internal consistency of the Trait Anxiety was found to be .86.

Procedure

The development of the TDAS

First phase. The first step in item generation was an extensive review of the death anxiety literature, including the items of the previously developed death anxiety instruments. Afterwards, a small group of voluntary college students ($n=15$) were contacted in a closed-group format. They were given a series of open-ended questions related to death and dying experiences to contemplate, followed by focused-group discussions. At the end of these discussions, a total of 139 initial items were generated.

Four independent focus groups were conducted to discuss the initial 139 items. A total of 68 students voluntarily participated in these groups. The first group included 22 students (14 women and eight men), the second group had 16 students (four women and 12 men), the third group had 17 students (seven women and 10 men), and the last group consisted of 13 students (six women and seven men). All groups started with a literature-based discussion about fear and anxiety that death and dying might lead to among dying individuals, their loved ones, caregivers, and those who are around them. Then, a list of initial 139 items was distributed and students' opinions on the items were discussed. At the end of focus group discussions, an additional 14 items were included to the initial item pool, totaling up to 153 items.

Next, 153 items were distributed to a group of experts, including practitioners ($n=6$), academicians ($n=3$), psychiatrists ($n=8$), psychologists ($n=2$), and neurology nurses ($n=3$) who have had either practical experiences with terminally ill patients or had theoretical knowledge on death and dying. The experts rated each item on the ability to assess death anxiety as "assesses well," "does not assess at all," or "no idea." Eighty-seven items (57%) received acceptable ratings from at least half of the experts. Then, items regarded as acceptable were given to two independent Turkish

language experts for grammar and understandability check. They suggested minor corrections on eight of the items. A 5-point Likert scale was formed ranging from 1 (*never*) to 5 (*always*). Thus, the initial scale included 87 5-point Likert-type items. The initial scale was administered to 943 college students. Based on the responses, items that had item-total correlations lower than .50 were dropped from the initial item pool, resulting 36 items.

Second phase. A group of 406 college students who had not participated in the first phase were selected and voluntarily responded to the 36-items and the BDI, BHS, R-DAS, and STAI. First, missing value analysis was performed. Because the missing value-to-total ratio was under 5%; missing values did not show any pattern; and the study variables showed normal distribution (Tabachnick & Fidell, 2013), missing values were replaced with the mean of the group. Univariate outliers were decided z outside of ± 3.3 ($p < .001$). Univariate normality was decided with a skewness $> |3.3|$ and kurtosis $> |7|$. Multivariate normality was evaluated by the Mahalanobis distance of $p < .001$. Multicollinearity and singularity were investigated by a correlation coefficient $> .90$.

After initial univariate, bivariate, and multivariate data screening, exploratory and confirmatory factor analyses were performed on the data to investigate and confirm the underlying factor structure. Data were inspected by Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity to ensure that they were fit for factor analysis. In order to determine the number of factors, eigenvalues (> 1) and the scree test were investigated. In order to extract maximum variance from the data, principal component analysis (PCA) with a varimax rotation was used. Varimax rotation was used to maximize high correlations between components and items and minimize the lower ones (Tabachnick & Fidell, 2013). An initial communality index (h^2) of .50 or above was accepted as an indication of how well variables represented extracted factors (Şencan, 2005). As suggested by Comrey and Lee (1992), a component loading of .45 or above was used as a cutoff in the present study. Any item that loaded on more than one component or whose loading differences were lower than .20 was removed from the analysis (Tabachnick & Fidell, 2013).

After exploratory factor analysis, confirmatory factor analysis was run to test whether the component structure indicated an acceptable fit between the predicted model and the observed data. Confirmatory factor analysis was specified, estimated, and evaluated using EQS 6.2. A covariance matrix was computed using the 20 items of the TDAS and model parameters estimated

by the maximum likelihood method. In order to evaluate the fit of the model, observed model covariance was compared with the null hypothesis model (Yamada & Pandey, 1995). The fit of the model was assessed by χ^2 , incremental fit index (IFI; Bollen, 1989) $\geq .90$, normalized fit index (NFI; Bentler & Bonett, 1980; Marsh, Balla, & McDonald, 1988) $\geq .80$, nonnormalized fit index (NNFI; Bentler & Bonett, 1980) $\geq .90$, comparative fit index (CFI; Bentler, 1990) $\geq .90$, and root mean square error approximation (RMSEA; Bentler & Bonett, 1980; Marsh et al., 1988; Steiger, 1990) $< .10$.

The TDAS's concurrent validity was tested by its correlations with the R-DAS, STAI, BDI, and BHS using the data collected from the second sample. In addition, the scale was tested by comparing the mean scores of the upper-and-lower 27% of the groups. For reliability estimates, internal consistency (Cronbach alpha) and split-half (Spearman-Brown) coefficients for the total scale and subscale scores were computed. Test-retest reliability was investigated in a 2-week interval using the data from the third sample. As indicated by DeVellis (2012) and Nunnally and Bernstein (1994), a value of .70 was decided as an acceptable lower bound for reliability. In addition, internal consistency coefficients for all the scales used in the present study were computed and reported.

Results

First phase

Eighty-seven items were administered to 943 college students and an investigation of item-total correlation coefficients showed that correlations ranged from .21 to .79. A total of eight items (9.20%) had item-total correlations lower than .50 and were dropped. Bivariate correlations among the items were investigated and it was found that 43 items shared higher common variance (65% or higher) with the other items in the scale and were dropped. If two items were found similar, the one with the higher item-total correlation was retained. At the end of this process, a total of 36 items remained in the scale.

Second phase

Four hundred six college students participated in this phase. A total of 18 cases were dropped from the further analysis because they were univariate or multivariate outliers. No singularity or multicollinearity problem was detected (i.e., all correlations were lower than .90). Thus, the remaining analyses were performed on 388 cases.

The validity of the TDAS

Structural validity. Exploratory and confirmatory factor analyses were used to test the structural validity of the TDAS. In addition, mean differences between the upper and lower 27% were investigated.

Exploratory factor analysis. The initial factor structure of the TDAS was tested by exploratory factor analysis. $KMO = .96$ and Bartlett's test of sphericity [$\chi^2_{(378)} = 8125.73, p < .001$] indicated that the data were appropriate for factor analysis. The screening of communalities showed that five items had $h^2 < .50$ and were eliminated. The remaining communalities ranged from .53 to .77. PCA after varimax rotation showed that three components whose eigenvalues were over 1 accounted for 65.6% of the total variability. A visual investigation of the scree plot also showed three distinct factors. A total of 11 items loaded on more than a single component and had loading differences less than .20; therefore, they were removed from the scale.

With the remaining 20 items and 388 cases, data were still appropriate for PCA [$KMO = .95$, $\chi^2_{(190)} = 5562.31, p < .001$]. PCA with a varimax rotation showed that there were three components whose eigenvalues were greater than 1 and were apparent in the scree plot, which altogether accounted for 67.27% of the variability. The first component had an eigenvalue of 10.53 and accounted for 53% of the variability. The second component had an eigenvalue of 1.88 and accounted for 9% of the variability and the third component had an eigenvalue of 1.05 and accounted for 5% of the variability. Table 2 shows the items and the components on which they heavily loaded.

Ten items highly loaded on the first component, which was titled the Ambiguity of Death. The second component was named Exposure to Death and included seven items. The third component contains three items and was titled the Agony of Death. All bivariate correlations between the components were found to be significant ($r_{12} = .68$; $r_{13} = .68$; $r_{23} = .57$; $p < .001$).

Confirmatory factor analysis. The three-component structure of the TDAS suggested by the principal factor analysis was tested by maximum likelihood confirmatory factor analysis using the data from the second (i.e., the student sample) and fourth samples (i.e., the adult sample). In the student sample, results show that $\chi^2_{(167)} = 591.34$, a ratio of = 3.54 ($p < .001$). In the adult sample, similar results show that $\chi^2_{(165)} = 420.03$, a ratio of = 2.55 ($p < .001$). Acceptable fit indices of the three-factor structure for the student and adult samples are shown in Table 3.

Although the χ^2 of the model is large and statistically significant in both groups, this should not lead to the rejection of the model as χ^2 is extremely sensitive to sample size (Tanaka, 1987). In both groups, support was found for the three-component structure as indicated by CFI, IFI, NNFI, and NFI. In addition, the RMSEA values were within acceptable bounds.

Results show that standardized loadings were all positive and significant, ranging from .64 to .86 in the student sample and from .60 to .83 in the adult sample (see Figures 1 and 2, $p < .001$). In both samples, the lowest loading (.64 and .60) was "I am anxious of coming down with a terminal disease" (Item 7) in the Agony of Death component and the highest loading (.86 and .80) was "not being able to know what kind of a feeling death makes me anxious" (Item 23) in the Ambiguity of Death component, respectively.

Significance of the upper-and-lower 27% groups. In the student sample, the lower and upper 27% are classified as the lower ($n = 105$) and higher ($n = 105$) anxiety groups, respectively, and statistical significance between the means of these two groups on the total and subscales of the TDAS were computed. The results of Levene's test for equality of variances showed that variabilities for all comparison groups were equal ($p > .08$). Independent samples t test results showed that the mean difference between the higher [$\bar{x} = 60.77$ (sd = 8.61)] and lower [$\bar{x} = 18.86$ (sd = 7.57)] death anxiety groups was significant on the total TDAS scores [$t_{(216)} = 41.92, p < .001$, 99% confidence interval (CI) = (39.06–44.77)]. Similar results were found in the lower ($n = 91$) and higher ($n = 91$) anxiety groups in the adult sample. The results of Levene's test for equality of variances showed that variabilities of the groups were different ($p < .001$). The mean difference between the higher [$\bar{x} = 53.87$ (sd = 10.24)] and lower [$\bar{x} = 6.52$ (sd = 4.44)] death anxiety groups was significant on the total TDAS scores [$t_{(122.63)} = 40.46, p < .001$, 99% CI = (50.41–44.29)].

Because the three subscales of the TDAS significantly correlated, differences between the lower and higher anxiety groups were investigated by one-way between-subjects multivariate analysis of variance (MANOVA). A nonorthogonal design (i.e., unequal cell sizes) was used. SPSS MANOVA was used to adjust the non-orthogonality problem before the analyses.

In the student sample, a significant main effect of groups was found [$\lambda = .12, F_{(3,206)} = 514.01, p < .0005, \eta^2 = .88$], which indicated significant multivariate differences between the lower and higher anxiety groups on the dependent variables. Because omnibus MANOVA showed a significant main effect for groups, the nature of the relationships between this main effect

Table 2. Varimax rotated component matrix of the Turkish death anxiety scale items.

Item	Components		
	1	2	3
1. Item 2: Not being able to know how death will happen makes me anxious [Ölümün nasıl bir şey olacağını bilememek beni kaygılandırır]	.78		
2. Item 4: The ambiguity of death makes me anxious [Ölümün belirsizliği beni kaygılandırır]	.81		
3. Item 10: The thought of nobody being with me while I am dying makes me anxious [Ölürken yanımda kimsenin olmaması düşüncesi beni kaygılandırır]	.57		
4. Item 11: I am anxious about what will happen to me after I am dead [Öldükten sonra bana ne olacağı konusunda kaygılanıyorum]	.76		
5. Item 14: Not being able to know what will happen after death makes me anxious [Ölümden sonra ne olacağını bilememek beni endişelendirir]	.83		
6. Item 20: The loneliness of death makes me anxious [Ölümün yalnızlığı beni kaygılandırır]	.66		
7. Item 22: Not being able to know how I will die makes me anxious [Nasıl öleceğimi bilememek beni kaygılandırır]	.71		
8. Item 23: Not being able to know what kind of a feeling dying is makes me anxious [Ölmenin nasıl bir his olduğunu bilmemek beni endişelendirir]	.78		
9. Item 33: Not being able to know when I will die makes me anxious [Ne zaman öleceğimi bilememek beni kaygılandırır]	.61		
10. Item 36: Not being able to do anything against death makes me anxious [Ölüme karşı elimden bir şey gelmemesi beni kaygılandırır]	.53		
11. Item 9: Seeing a coffin makes me anxious [Bir tabut görmek beni kaygılandırır]		.74	
12. Item 16: Talking about death makes me anxious [Ölüm hakkında konuşmak beni kaygılandırır]		.66	
13. Item 27: Watching a TV program about death makes me anxious [Ölümlle ilgili bir televizyon programı izlemek beni kaygılandırır]		.75	
14. Item 28: Seeing a funeral procession passing by makes me anxious [Yolda ilerleyen bir cenaze alayını görmek beni kaygılandırır]		.84	
15. Item 29: Giving condolences makes me anxious [Taziye ziyaretlerine gitmek beni kaygılandırır]		.77	
16. Item 32: Reading a text written about death makes me anxious [Ölümlle ilgili bir yazı okumak beni kaygılandırır]		.77	
17. Item 35: Seeing people crying over a deceased person makes me anxious [Ölmüş birinin arkasından ağlayanları görmek beni kaygılandırır]		.74	
18. Item 7: I am anxious of coming down with a terminal disease [Ölümcül bir hastalığa yakalanmaktan endişe duyarım]			.71
19. Item 31: The idea of suffering while dying makes me anxious [Ölürken canımın yanacağı fikri beni kaygılandırır]			.59
20. Item 34: I am anxious of dying slowly [Yavaş yavaş ölmekten endişelenirim]			.82

and the other dependent variables was investigated. Because all the intercorrelations among dependent variables were in excess of .30, stepdown analyses were performed (Tabachnick & Fidell, 2013). Roy-Bargmann stepdown analyses showed that lower and higher anxiety groups significantly differed on all the subscales. The higher anxiety group, $\bar{X}(\text{adj}) = 31.69$, $SE = .47$, scored higher than the lower anxiety group, $\bar{X}(\text{adj}) = 8.16$, $SE = .47$, on the Ambiguity of Death subscale ($p < .001$). On Exposure to Death subscale, the higher anxiety group, $\bar{X}(\text{adj}) = 19.94$, $SE = .42$, scored higher than the lower anxiety group, $\bar{X}(\text{adj}) = 6.18$, $SE = .42$, $p < .001$. Similarly, on the Agony of Death subscale, the higher anxiety group, $\bar{X}(\text{adj}) = 9.48$, $SE = .20$, scored

higher than the lower anxiety group, $\bar{X}(\text{adj}) = 4.03$, $SE = .20$, $p < .001$.

In the adult sample, a significant main effect of groups was found as well, $\lambda = .10$, $F_{(3,178)} = 548.54$, $p < .0001$, $\eta^2 = .90$. Roy-Bargmann stepdown analyses showed that lower and higher anxiety groups in this sample differed on all the subscales. The higher anxiety group, $\bar{X}(\text{adj}) = 28.68$, $SE = .49$, scored higher than the lower anxiety group ($\bar{X}(\text{adj}) = 3.21$, $SE = .49$) on the Ambiguity of Death subscale ($p < .001$). On Exposure to Death subscale, the higher anxiety group, $\bar{X}(\text{adj}) = 16.17$, $SE = .42$, scored higher than the lower anxiety group, $\bar{X}(\text{adj}) = 1.78$, $SE = .42$, $p < .001$. Finally, on the Agony of Death subscale, the higher anxiety group, $\bar{X}(\text{adj}) = 9.02$, $SE = .20$, scored higher than the lower anxiety group, $\bar{X}(\text{adj}) = 2.14$, $SE = .20$, $p < .001$.

Table 3. Fit indices of the three-component structure model of the Turkish death anxiety scale.

Fit indices	Student sample	Adult sample
Normalized fit index	.90	.97
Nonnormalized fit index	.91	.98
Comparative fit index	.92	.98
Incremental fit index	.92	.98
Root mean square error approximation	.08	.07
Goodness-of-fit index	.86	.89
Adjusted goodness-of-fit index	.83	.86
Root mean square error approximation	.05	.04

Concurrent validity. The TDAS was investigated in relation to the R-DAS to test its concurrent validity using the data collected from the second sample. As shown in Table 4, both the total and subscale scores of the TDAS were significantly correlated with the R-DAS and its subscales.

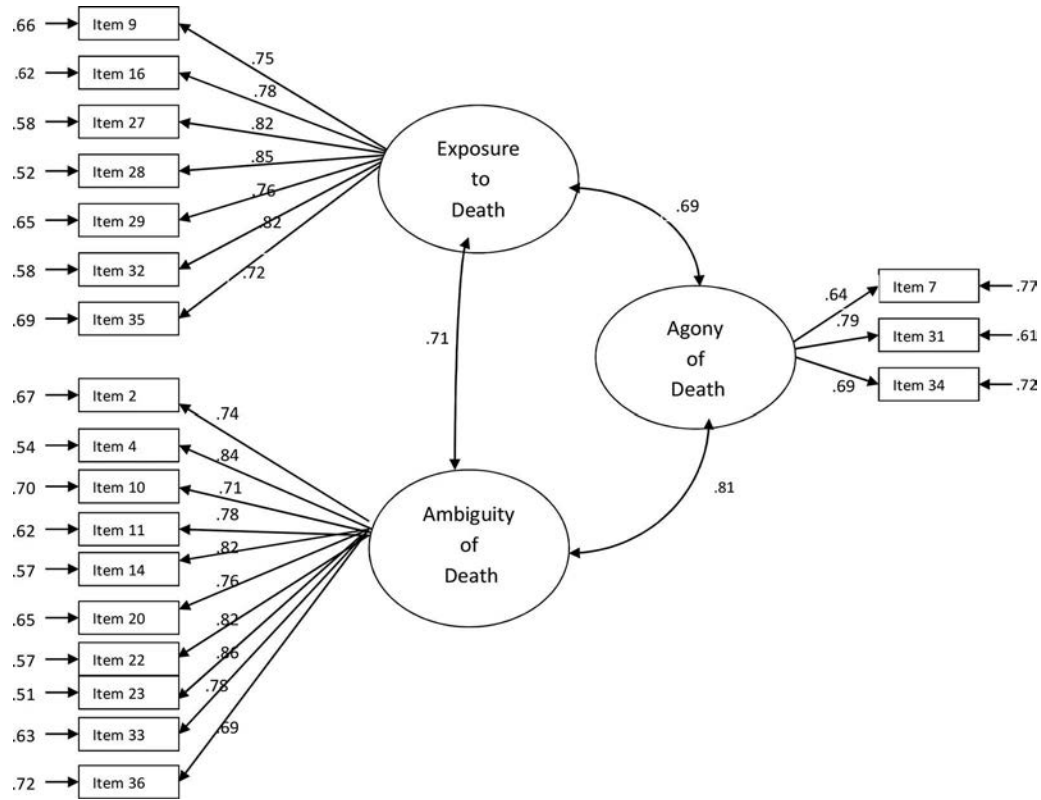


Figure 1. The three-component structure of the Turkish death anxiety scale for the student sample (all coefficients are significant, $p < .01$).

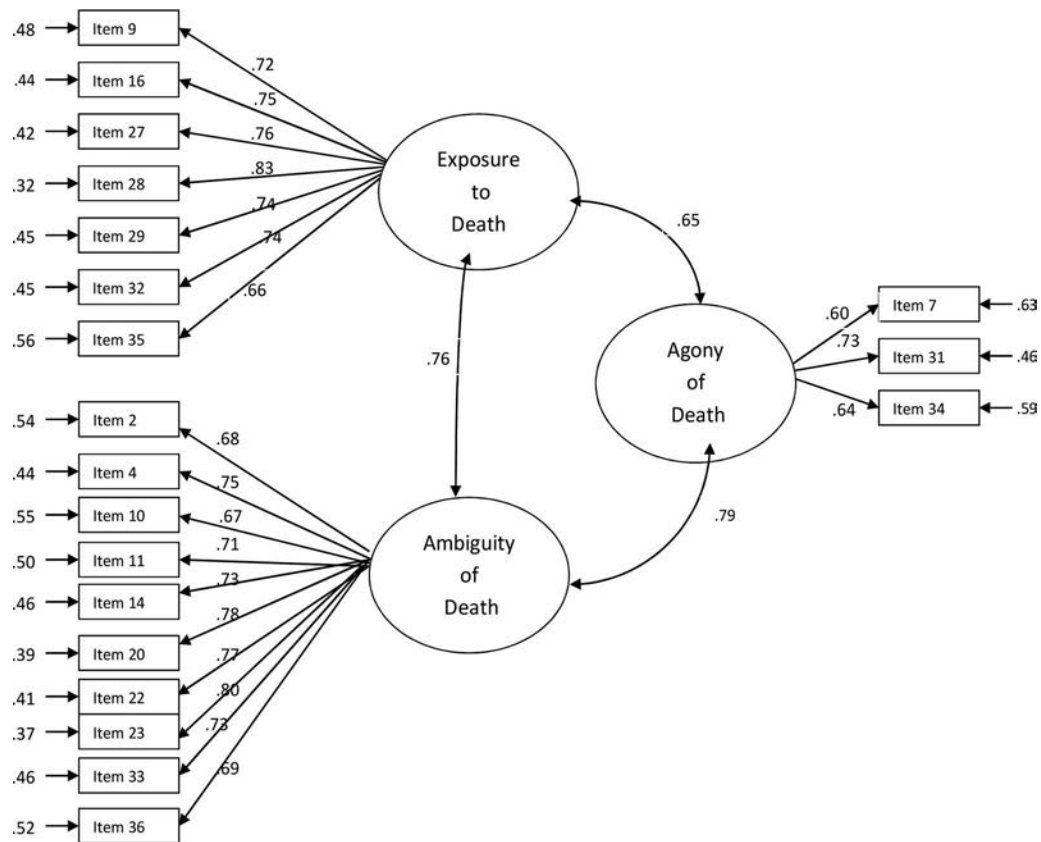


Figure 2. The three-component structure of the Turkish death anxiety scale for the adult sample (all coefficients are significant, $p < .01$).

Table 4. Means, standard deviations, split-half, internal consistency, and concurrent validity coefficients of the total and subscale scores of the Turkish death anxiety scale (TDAS).

	TDAS			
	Ambiguity of death subscale (n = 10)	Exposure to death subscale (n = 7)	Agony of death subscale (n = 3)	TDAS (total) (n = 20)
Revised death anxiety scale (total)	.75**	.61**	.60**	.76**
Fear of helplessness subscale	.61**	.45**	.42**	.59**
Fear of uncertainty subscale	.69**	.52**	.49**	.68**
Afterlife concerns subscale	.51**	.39**	.35**	.50**
Fear of pain subscale	.57**	.58**	.66**	.66**
State anxiety	.24**	.26**	.26**	.28**
Trait anxiety	.39** (.45**)	.39** (.53**)	.37** (.36**)	.43** (.50**)
Beck Depression Inventory	.23**	.20**	.23**	.24**
Beck Hopelessness Scale	.10*	.08	.10*	.11*
Cronbach's α coefficients	.94 (.92)	.91 (.89)	.76 (.71)	.95 (.95)
Spearman-Brown split-half coefficients	.93 (.90)	.89 (.87)	.77 (.72)	.92 (.92)
Test-retest coefficients	.80	.82	.93	.83
<i>M</i> s	19.33 (14.94)	12.97 (8.26)	6.79 (5.12)	39.08 (28.33)
<i>SD</i> s	9.88 (10.68)	6.60 (6.86)	2.89 (3.27)	17.28 (19.17)

Note: Within parentheses are the statistics for the adult sample.

* $p < .05$. ** $p < .01$.

Convergent validity. When a construct is related to other theoretically relevant constructs it said to have convergent validity (DeVellis, 2012). In the present study, the TDAS was investigated in relation to state anxiety, trait anxiety, depression, and hopelessness. Significant correlations were found between the scores of the TDAS and other relevant constructs as shown in Table 4.

The reliability of the TDAS

Internal consistency, split-half, and test-retest reliabilities of the TDAS were investigated at the total and subscale levels in the student sample. Coefficients are shown in Table 4. In the student sample, internal consistency coefficients ranged from .76 (the Agony of Death Subscale) to .95 (Total TDAS) whereas split-half reliabilities ranged from .71 (the Agony of Death Subscale) to .92 (Total TDAS). Two-week test-retest reliability coefficients ranged from .82 (Exposure to Death subscale) to .93 (Agony of Death subscale) in the student sample (see Table 4). In the adult sample, internal consistency and split-half reliabilities were similar to the student sample (Table 4). Internal consistency coefficients ranged from .71 (the Agony of Death Subscale) to .95 (Total TDAS) and split-half reliabilities ranged from .72 (the Agony of Death Subscale) to .92 (Total TDAS).

Scoring

The TDAS includes 20 items scored on a 5-point Likert rating ranging from 0 (*never*) to 4 (*always*). Subscale scores are found by summing the individual item scores and the total scale score is found by summing the subscale scores. The total scale scores may range from 0 to 80 and the higher scores indicate the higher levels of death anxiety. There is no item to be reversed in the

scoring scheme. The range of scores in the current study was 0 to 80 ($\bar{x} = 39.08$, $sd = 17.28$) for the student sample and 0 to 80 ($\bar{x} = 28.33$, $sd = 19.17$) for the adult sample. Means and standard deviations for each subscale are given in Table 4.

The total and subscale scores were normally distributed (Kolmogorov-Smirnov Z s ranged from 1.03 to 2.58, $p > .001$). Therefore, cutoff scores for the total TDAS were calculated as 1.50 standard deviation below the mean to be 0–7 (very low level anxiety); between .50 and 1.50 standard deviation below the mean to be 8–25 (low level anxiety); $\pm .50$ standard deviation around the mean to be 26–44 (medium level anxiety); between .50 and 1.50 standard deviation above the mean to be 45–63 (high level anxiety); and 1.50 standard deviation above the mean to be 64–80 (very high level anxiety).

In the current sample, 6.91% of the cases were in the very low-level anxiety group, 25.42% were in the low-level anxiety group, 37.79% were in the medium level anxiety group, 21.74% were in the high-level anxiety group, and 8.14% were in the very high-level anxiety group.

Discussion

DeVellis (2012) suggests that the number of items in the initial item pool be at least 4 or 5 times the final number of items in the scale. The current study started out with 153 items and the final version includes 20 items (a ratio of 7.65/1). Using both the inductive and deductive approaches (Hinkin, 1995), 153 initial items were generated. These items were subjected to the expert opinions. In addition, all the administrations fulfilled the variable-to-case ratio of 1:10 as suggested by Nunnally and Bernstein (1994).

The structural validity of the TDAS showed that the scale items accounted for over 67% of the variability and that the three-component structure of the data fit well with the model. Thus, out of all the available death anxiety scales, the TDAS explained the highest variability in death anxiety. The first component of the scale, the Ambiguity of Death, concentrates on the unknown or unpredictable nature of death. In fact, many items in this component include common phrases such as “not being able to know” or “what or how it will happen.” The second component titled Exposure to Death covers encountering dead, death, or dying in the form of seeing, watching, talking/reading about, or visiting. The Agony of Death component seems to elicit the fear of suffering as a result of death or dying.

The ambiguity and agony of death in the TDAS focus on the fear of uncertainty and fear of pain, respectively. The Ambiguity of Death subscale correlated highest with the Fear of Uncertainty subscale of the R-DAS and the Agony of Death subscale correlated highest with the Fear of Pain subscale of the R-DAS. Thus, it can be said that the TDAS displays evidence of convergent validity. It is significantly related to the concepts it is supposed to correlate. However, the R-DAS does not have any anxiety component concerning exposure to death. Items relevant to encountering internal (e.g., reading or talking about death) or external (e.g., seeing or watching) stimuli formed a unique death anxiety component in the Turkish population.

Currently available adaptations of death anxiety instruments in Turkey have not investigated the suitability of the factor structures of the original scales in the Turkish population. Only a single research investigated to confirm the DAS's factor structure (i.e., Akça & Köse, 2008) in which data failed to confirm the suitability of its factor structure to the Turkish population. Present data confirm that the component structure of the TDAS fits well with the Turkish population, thus offering a psychometrically more sound assessment of the construct.

The concurrent validity of the TDAS was studied by its relationships with the R-DAS. At the total scale level, the R-DAS and the TDAS share 58% common variability, which means that both instruments assess similar constructs. According to Cohen's (1988) conventional definition, the percentage of common variability greater than 25% may be considered as large. Therefore, the effect size in this relationship may be considered as large. However, the remaining 42% of unaccounted variability may be attributed to cultural differences and/or measurement error. For example, death anxiety inducing items relevant to losing physical functions due to aging or the decomposition of body in the grave

in the DAS and the R-DAS have not showed up in the TDAS. This can be explained by the fact that aging is not an anxiety eliciting process in the Turkish culture. It is regarded as a part of maturation, which mostly draws respect from others. Similarly, the decomposition of the body in the grave is not an anxiety producing process. This may be more related to the teachings of Islam in the culture, in which physical body is given much less value compared to the spiritual body, which is believed to be eternal.

The convergent validity of the TDAS was studied by its relationships with other theoretically related constructs such as state anxiety, trait anxiety, depression, and hopelessness. Results show that death anxiety is more closely related to trait anxiety than it does to state anxiety. These results support both existential theorists who regard death anxiety as more of a core construct than a transient one (Yalom, 2001) and researchers who have found higher correlations between trait anxiety and death anxiety than state anxiety and death anxiety (e.g., Abdel-Khalek & Tomás-Sábado, 2005; Yaparel & Yıldız, 1998).

Literature puts forward that depression and anxiety are closely related but separate constructs (Bieling, Anthony, & Swinson, 1998). In the present study, death anxiety was moderately related to depression ($r = .24$), which was also the case in several other death anxiety studies (e.g., Brown, 2011; Özişik-Eyüboğlu, 2009; Yaparel & Yıldız, 1998). Finally, the findings of the current study support previous research findings that have shown positive relationships between death anxiety and hopelessness (e.g., Brown, 2011; Yıldız, 2011). In conclusion, the direction and magnitude of the relationships between death anxiety measured by the TDAS and other relevant constructs altogether lend support to the convergent validity of the TDAS. However, the current study lacks attention to the divergent and predictive validity and we suggest that future studies focus on providing information on how much predictive power (if any) the TDAS might have as well as how different it is from theoretically unrelated constructs (i.e., divergent validity).

Researchers indicate that a reliability coefficient of .70 or above would evidence the reliability of self-report measures (DeVellis, 2012; Nunnally & Bernstein, 1994). Internal consistency coefficients of the TDAS both at the total and subscale levels were acceptable. Even though the Agony of Death subscale contains only three items, its internal consistency coefficient is still at the acceptable level. In terms of split-half reliability, similar conclusions can be made. Literature as well as the findings of the present study support that death anxiety is a more stable construct, which is evidenced by a

significant 2-week test re-test reliability. However, the stability of the TDAS and its subscales should be tested with longer time intervals in future studies.

In sum, the results of the present study land support to the construct, concurrent, and convergent validity and internal consistency, split-half, and test-retest reliability of the TDAS in assessing death anxiety levels among people who are natives of Turkey. Results should be confirmed with other populations such as clinical groups, terminally ill patients, and geriatric samples.

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