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Research Paper

The Validation of the Multidimensional Orientation toward Dying and Death Inventory in an Iranian People

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Multidimensional orientation toward dying and death inventory, Death, Dying, Factor structure, Validity, Reliability.

Abstract

Introduction and Objective: The Multidimensional Orientation Toward Dying and Death Inventory (MODDI-F) is a 47-item self-report scale. This study aimed to assess the psychometric properties of the MODDI-F in a sample of Muslims.

Research Methodology: In this study, which was a cross-sectional design, 465 individuals (220 men and 245 women) were selected by random sampling and completed the Death Anxiety Scale (DAS), the Death Obsession Scale (DOS), the Death Depression Scale (DDS), and the MODDI-F. Data were analyzed using principal component analysis and multiple analyses of variance (MANOVA).

Findings: The factor analysis results using principal component analysis (PCA) showed that the MODDI-F was a multidimensional scale and four factors including fear of oneself death, fear of other's death, death loneliness, and death acceptance explained the most variances respectively. Females had higher scores on the MODDI-F than males. In order to examine concurrent validity of the MODDI-F, the relations of the MODDI-F to the DAS, the DOS, and the DDS were investigated. The results showed that the MODDI-F had an appropriate concurrent validity. In addition, three types of reliability (test-retest, split-half, and internal consistency) were reported.

Conclusion: Considering desirable psychometric properties of the MODDI-F in the present study, this scale can be used in research on death among Iranian people.

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Introduction

Death anxiety and fear of death can be triggered by many psychological problems and accordingly, psychologists interested in the study of death tend to empirically study some issues such as death attitude and death reaction (Menzies & Menzies, 2023). Death is an inevitable reality, and each person may have an impression and a unique reaction to it. Death seems threatening for many people because of the importance of its ambiguity (Waite, Hyland, Bennett, Bentall, & Shevlin, 2022). Death anxiety and fear of death are common among all cultures, and different religions deal with it differently (Hurta, Amelia, Yip, & Martin, 2006). Fear of death is a powerful motivator of behavioral agitation including cultural affiliations (Menzies & Menzies, 2023). According to terror management theory (Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989), remembrance of depravity leads to an extraordinary anxiety that provokes people to reduce it (Cohen et al., 2005). Fear of death can be considered as a significant threat to psychological well-being. It is especially true in younger individuals, because fear of death is stronger in this group compared to adults (Fortner & Neimeyer, 1999; Cohen et al., 2005).

Iverach, Menzies, & Menzies (2014) have suggested that death anxiety is a meta-diagnostic construct. It means it can make an individual vulnerable to psychological disorders and lead to the creation and maintenance of psychological disorders (Cikrikcili & Altıntaş, 2024). On the other hand, cognitive-behavioral therapies have also shown an interest in the meta-diagnostic concepts in the treatment of psychiatric disorders (Kutlesa & Arthur, 2008; Egan, Wade, & Shafran, 2011). If fear of death is a diagnostic construct, then valid necessary tools should be provided to assess it for professionals who deal with death and dying (Dong, et al, 2024). In this regard, some tools have been introduced to measure morbid attitudes towards death in the literature the most famous of which are the Death Anxiety Scale (DAS; Templer, 1970), the Death Obsession Scale (DOS; Abdel-Khalek, 1998), and the Death Depression Scale (DDS; Templer, Lavoie, Chalgujian, & Thomas-Dobson, 1990). Psychometric research carried out on these scales has two major constraints: first, validity and especially reliability of these scales have been reported as medium and second, they are mostly one-dimensional and they examine morbid attitudes towards death. For example, death acceptance is not evaluated in this questionnaire (Wittkowski, 2011).

The Multidimensional Orientation Toward Dying and Death Inventory (MODDI-F) designed by Wittkowski (2001) contains 47 items. This scale has shown high psychometric properties in research and it is the only tool that measures two dimensions of fear of death and death acceptance in a multidimensional structure (Wittkowski, 2001, 2011). Wittkowski (2001) studied the factor analysis of the MODDI-F using principal component analysis (PCA) in a sample of 944 (age range = 18-93 years) German participants. Based on this study, 47 items of this scale were loaded on seven factors. Four factors were related to fear of death and three factors were associated with death acceptance, but due to the heterogeneity of the items of a factor, Wittkowski divided that factor into two parts and thus introduced eight factors. These eight factors were: fear of oneself dying (8 items), fear of oneself death (6 items), fear of other's dying (6 items), fear of other's death (4 items), fear of the corpse (4 items), acceptance of oneself death and dying (8 items), acceptance of other's death (6 items), and denial of oneself death (5 items). Fear of death refers to lack of existence as a result of death, and fear of dying also points to the experience of pain and suffering in the process of dying. In order to investigate intercultural validity, several years later, Wittkowski (2011) repeated these results on 256 subjects (age range=16-23 years) from Hong Kong students, and among eight obtained factors, five factors were related to fear of death and three factors to death acceptance. The reliability coefficients using the internal consistency method for the identified factors were between 0.68 and 0.91. In the most recent research on the MODDI-F, MacDougall and Farreras (2016) have identified seven factors in a sample of 404 English-speakers (age range=16 -23 years), with five factors specific to fear of death and two factors to death acceptance. Although the number of these factors were different from previous studies, they were conceptually in line with the two previous studies. The reliability coefficients of these factors by using Cronbach's alpha ranged from 0.82 to 0.92 and by using test-retest were between 0.79 and 0.89.

The present study acknowledges the significant role of cultural context in shaping attitudes toward dying and death. Cross-cultural research indicates that death anxiety and attitudes toward death are universal phenomena but are experienced and interpreted differently across cultures due to varying religious beliefs, social norms, and existential worldviews (Mohammadzadeh & Oraki, 2018; Mohammadzadeh & Najafi, 2018). In the Iranian context, for example, religious beliefs strongly influence individuals' perceptions of death, often framing it within spiritual and afterlife perspectives, which affects their orientation toward dying (Zandian et al.,2017). Moreover, cultural factors such as family structure, social support, and collective values modulate how death-related fears and acceptance manifest among individuals (Hajizadehmeymandi et al, 2021). Therefore, validating the Multidimensional Orientation Toward Dying and Death Inventory in an Iranian sample contributes to understanding these culturally specific dimensions and provides a basis for culturally sensitive assessments and interventions. In this regard, the aim of this study was to validate the MODDI-F in an Iranian society.

Methodology

This research is a descriptive cross-sectional study. A sample of 485 students and staff (220 men and 245 women) from Tabriz universities was selected based on gender variable using stratified random sampling. Due to incomplete information in the questionnaires, 20 participants were excluded, resulting in a final sample size of

465 individuals, who responded to the questionnaires during the period from late September to late December 2024.

First, the MODDI-F was translated into Persian. Then, two English professors were asked to back-translate Persian items into English, and then the gaps in the translation of English items and the original version were corrected. Finally, the translated Persian version was experimentally implemented on a few subjects and the existing errors were corrected for the final use. After selecting the classes in each faculty, researchers first introduced themselves to the students and described the purpose of the research. Then, the MODDI-F was provided to them and the subjects were told that there was no time limit. The DAS (Templer, 1970), the DOS (Abdel-Khalek, 1998), and the DDS (Templer et al., 1990) were performed on 100 individuals as secondary tools to assess concurrent validity of the MODDI-F. In order to observe the ethics of research and the rights of participants, firstly subjects were allowed to enter the study and the questionnaires were provided to them without any restrictions and after the end of the class. Secondly, subjects were told both verbally and written that: "In order to be sure, you need not to mention your name and other personal details, except for your gender." Regarding inclusion and exclusion criteria, since our study is descriptive and cross-sectional, and participants completed the questionnaire only once, exclusion criteria were less applicable throughout the study. Instead, inclusion criteria were primarily considered, which included: being a student or staff member at the university, providing informed consent to participate in the research, and not having severe psychological or physical disorders that could potentially influence attitudes toward death.

Measures

The MODDI-F (Wittkowski, 2001): It is a 47-item self-report scale which assesses the two dimensions of fear of death and death acceptance in a multidimensional structure. The questionnaire was made according to Collett and Lester's (1969) perspective that distinguishes death-related attitudes from the attitudes towards the process of dying. Each of the two dimensions is conceptualized both in relation to one's own personality and others. Research has shown that the validity and reliability of the MODDI-F are acceptable. MacDougall and Farreras (2016) have reported that the test-retest reliability coefficients of the MODDI-F subscales were between 0.79 and 0.89 and the Cronbach's alpha coefficients of the MODDI-F subscales were between 0.82 and 0.92.

The DAS: This scale consists of 15 items that measure the attitudes of subjects towards death. Subjects respond to questions with "yes" or "no". The answer "yes" indicates anxiety in the individual. The scores of this scale can range from 0 to 15 in which high scores show a high rate of death anxiety in individuals. Studies have shown that the validity and reliability of the DAS is valid. The test-retest reliability coefficient of this scale has been reported to be 0.83 in the original culture. The concurrent validity of the DAS through its correlation with the Manifest Anxiety Scale (MAS) and the depression scale in the original culture has been reported to be 0.27 and 0.40 respectively (quoted by Rajabi and Bohrani, 2001). Reliability and validity of this questionnaire in Iran have been investigated by Rajabi and Bohrani (2001). Rajabi and Bohrani (2001) have reported that the split-half reliability and the Cronbach's alpha coefficients of this scale were 0.62 and 0.73 respectively. They used the MAS and the Death Worry Scale (DWS) to assess the validity of the scale, and the correlation coefficients of the DAS with the MAS and DWS were 0.43 and 0.40 respectively.

The DOS (Abdel-Khalek, 1998): This scale includes 15 items which evaluate obsessive thoughts about death on a 5-point Likert scale from 1 (at all) to 5 (very high) and the range of scores is between 15 and 75. The DOS has three factors including death rumination, death domination, and death-related repeated beliefs. Abdel-Khalek (1998) has reported that the internal consistency coefficient of this scale and its factors in the original culture is equal to .90 or higher. The concurrent validity of the DOS was investigated by calculating its correlation coefficient with similar scales. The results showed that the correlation coefficients of the DOS with the DAS, the DDS, the General Obsession Scale, the General Anxiety Scale, the General Depression Scale, and the psychosis subscale of the Eysenck Personality Inventory were 0.62, 0.57, 0.46, 0.33, 0.42, and 0.35 respectively. In Iran, Mohammadzadeh et al. (2009) have shown that this scale has a three-factor structure similar to the original scale by using PCA. They assessed the concurrent validity of the DOS via assessing the association of this scale with the DAS and showed that this questionnaire had an adequate concurrent validity ($r= 0.76$, $p <0.001$). Also, these authors have revealed that the test-retest reliability of the scale is equal to 0.73 ($p<0.001$).

The DDS (Templer et al., 1990): This scale is a 17-item self-report scale in forms of two-option (yes-no) and Likert (from completely true to completely false). This scale assesses depressive attitudes related to death in six dimensions of death despair, death loneliness, death dread, death sadness, death depression, and death finality. Research studies have shown that the validity and reliability of the DDS are valid. For example, Templer et al. (1990) have reported that the validity and reliability of the scale were acceptable. In Iran, using PCA, Aghazadeh et al. (2014) have shown that this questionnaire is a multidimensional scale, and the four factors of death despair, death failure, death loneliness, and death acceptance explain the highest variances respectively. They have also assessed the concurrent validity of the DDS through evaluating the correlation of the DDS with the DAS showing adequate concurrent validity of the DDS ($r=0.68$, $p<0.001$). In addition, the test-retest reliability ($r = 0.76$, $p <0.001$), the split-half reliability ($r = 0.77$, $p<0.001$), and the internal consistency ($r = 0.78$, $p<0.001$) of the scale have been shown to be appropriate (Aghazadeh et al., 2014).

Results

Participant frequency in gender categories is shown in descriptive statistics in Table 1.

Table 1. Demographic characteristics of the sample based on gender.

Groups	N	%	Mean age	Standard deviation
Male	220	45.5	23.42	6.71
Female	265	54.6	24.85	8.51
Total sample	465	100	24.14	7.42

Factor analysis

In our study, we utilized Exploratory Factor Analysis (EFA) to investigate the inventory's factor structure within the Iranian population, where no prior validation or theoretical model existed. EFA was chosen due to the absence of a predefined factor structure and a theoretical framework, making it suitable for uncovering the natural grouping of items without imposing preconceived notions. As this study represents an initial stage of instrument validation, EFA served to explore the dimensionality of the inventory and identify the underlying factor structure, especially given the limited prior research on attitudes toward dying and death within the Iranian cultural context, which would render applying Confirmatory Factor Analysis (CFA) premature and potentially misleading.

First, the adequacy for factor analysis was examined by the Kaiser-Meyer-Olkin Measure (KMO) and the Bartlett's Test of Sphericity. The Kaiser-Meier-Olkin Measure (KMO=0.88) showed that the adequacy of sampling and the Bartlett's Test of Sphericity (5749.77, p = 0.0001) were significant, indicating that the data correlation matrix in the population was not zero and therefore the factor extraction was justifiable. Then, in order to investigate the factor structure of the MODDI-F, exploratory factor analysis (EFA), and PCA with Promax rotation were used. The data of total statistical sample (n = 485) were entered into factor analysis. Items with a factor loading of 0.30 or higher were included. Table 8 shows factor loadings of each factor and its items after Promax rotation. As shown in Table 2, there were four factors with an eigenvalue higher than 1. These four factors were proposed based on the Screen test and factor loading patterns and these factors explain 33.96% of the total variance.

Table 2. Factor loadings with Promax rotation for the MODDI-F

Items	Factor pattern matrix coefficients				Communality
	First factor	Second factor	Third factor	Fourth factor	
21	0.63				0.49
8	0.57				0.46
46	0.57				0.44
29	0.56				0.29
16	0.53				0.37
1	0.51				0.37
20	0.43				0.17
28	0.41	0.39			0.36
13	0.39				0.35
35	0.38				0.35
27	0.37				0.26
6	0.35	0.30			0.28
5	0.34				0.18
45		0.62			0.45
41		0.56			0.43
39		0.52			0.30
31		0.52			0.46
33		0.49			0.38
34		-0.48			0.35
25		0.45			0.25
10		0.44	0.39		0.42
12		0.44			0.25
18		0.37			0.29
37	0.30				0.30
22			0.74		0.62
30			0.71		0.45
7			0.63		0.50
15			0.50		0.35

17			-0.45		0.37
9			0.43		0.25
38			0.42		0.27
47				0.63	0.40
32				0.62	0.44
44				0.54	0.28
11				0.50	0.26
24				0.48	0.31
4				0.44	0.34
40		-0.38		0.44	0.36
26	-0.38			0.43	0.42
9				0.41	0.28
19	-0.41			0.41	0.40

Note. Items 3, 14, 23, 36, 42, and 43 had factor loadings less than 0.30. Therefore, these items were removed from the analysis.

The results showed that the first factor namely fear of death (14 items) had an eigenvalue of 8.89 and explained 18.91% of the variance. This factor was named "fear of oneself death". The second factor called "fear of other's death" (10 items) had an eigenvalue of 2.68 and explained 5.71% of the variance. The third factor called "death loneliness" (9 items) had an eigenvalue of 2.3 and explained 4.88% of the variance. The fourth factor called "death acceptance" (10 items) had an eigenvalue of 2.09 and explained 4.46% of the variance.

The Scree test which indicates the number of extracted factors is represented in Fig. 1.

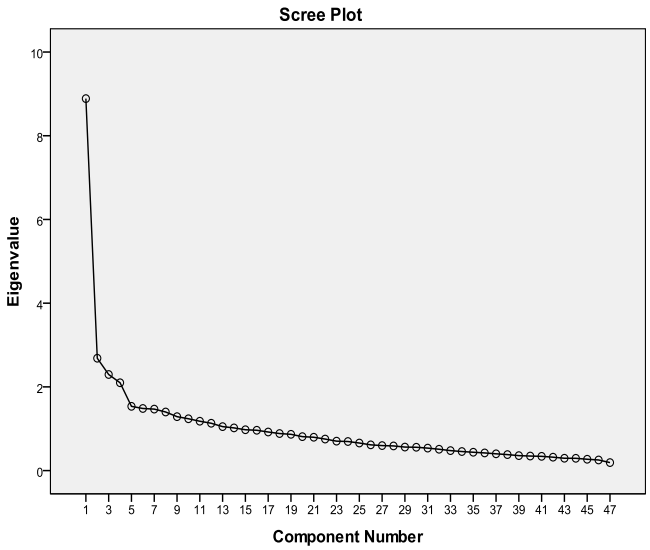

Fig. 1. Scree test.

Concurrent validity

In order to examine the concurrent validity of the MODDI-F, the correlations of the scale with the DAS, the DOS, and the DDS were calculated. Table 3 shows the matrix of correlation coefficients between these scales. The results showed that the MODDI-F and its subscales had significant correlations with the DAS, the DOS, and the DDS (Table 3). These findings confirmed adequate concurrent validity of the MODDI-F.

Table 3. The correlations of the MODDI-F and its subscales with the DAS, the DOS, and the DDS

	1	2	3	4	5	6	7
1- MODDI-F	-						
2- Fear of oneself death	0.83*	-					
3- Fear of other's death	0.78*	0.61*	-				
4- Death loneliness	0.74*	0.46*	0.49*	-			
5- Death acceptance	0.00	-0.40*	-0.19*	-0.21*	-		
6- DAS	0.77*	0.83*	0.61*	0.62*	0.86*	-	
7- DDS	0.71*	074*	0.69*	0.76*	-0.72*	0.65*	-
8- DOS	0.65*	0.73*	0.68*	0.62*	0.69*	0.73*	0.62*

* $p<0.01$

Test-retest reliability: Test-retest reliability was obtained on a subset of 65 individuals over a four-week period. The results showed that test-retest reliability for the total MODDI-F and its subscales including fear of oneself death, fear of other's death, death loneliness, and death acceptance were 0.89, 0.82, 0.3, 0.77, and 0.75 respectively ($p<0.001$).

Split-half reliability: In order to determine split-half reliability of the MODDI-F, we used the total sample data. For this purpose, the questions of this scale were divided into two odd and even parts, and the subjects' scores were calculated in each section. Then, the correlation coefficients between the two parts were calculated based on the corrected correlation coefficient of Spearman Brown. The coefficient for the total scale was 0.82 and the coefficients for the subscales of fear of death, fear of other's death, death loneliness, and death acceptance were 0.74, 0.77, 0.72 and 0.66 respectively ($p<0.001$).

Internal consistency reliability: Cronbach's alpha coefficient was used to measure the internal consistency reliability of the MODDI-F. Here, all sample data were analyzed. The results showed that the Cronbach's alpha coefficients for the total scale and the subscales of fear of death, fear of other's death, death loneliness, and death acceptance were 0.81, 0.82, 0.79, 0.72, and 0.62 respectively ($p<0.001$), showing an acceptable reliability.

Comparison of males to females: Multivariate analysis of variance (MANOVA) was used to compare males to females regarding the MODDI-F and its subscales. The results of the test are shown in Table 4. The results revealed that females had higher scores on the total MODDI-F and the subscales of fear of oneself death, fear of other's death, and death loneliness ($p<0.001$) than men. Also, no significant differences were observed between males and females regarding death acceptance (Table 4).

Table 4. MANOVA to compare males and females regarding the MODDI-F and its subscales.

	Gender	Mean	SD	F	p	Wilks' lambda	p
Total MODDI-F	Female	22.20	6.40	49.33	0.001*	0.90	0.001*
	Male	18.23	6.00				
Fear of oneself death	Female	4.59	3.42	31.46	0.001*	0.90	0.001*
	Male	3.43	3.43				
Fear of other's death	Female	4.72	2.59	32.96	0.001*	0.90	0.001*
	Male	3.70	2.59				
Death loneliness	Female	4.75	2.06	32.47	0.001*	0.90	0.001*
	Male	3.75	2.07				
Death acceptance	Female	7.75	2.07	1.29	0.25	0.90	0.001*
	Male	7.16	2.65				

* $p<0.001$.

Discussion and Conclusion

The present study aimed to investigate the factor structure and other psychometric properties of the MODDI-F. In this study, the factor structure of the MODDI-F was investigated using PCA with Promax rotation. In terms of factor analysis, all various methods of factor analysis are extracted with a correlation matrix between the variables based on a pattern of relationships between the data. But these methods are different from each other regarding the underlying assumptions and the path through which the factors are extracted. The term factor analysis includes several types of methods including PCA and factor analysis (FA). These two are similar in many respects and are used instead of each other (Tabachnick & Fidell, 2007). The factor analysis method used in this study was PCA. In this method, no special assumptions are needed about constructing the infrastructure of variables, and the researcher wants to know what the best linear combination between variables is. In the analysis of factors, the rotations are either orthogonal or oblique. Based on theoretical conceptualizations of death depression, its factors are not completely uncorrelated components. Also, because of the relationships among nine dimensions in this study denoting full non-independence of factors, the factor analysis rotation should be of oblique type, and according to Fabrigar, Wegener, MacCallum, and Strahan (1999) and Thompson (2004), among various types of oblique rotations, Promax method was used due to its high ability to identify factors. The factor analysis results showed that the MODDI-F was a multidimensional scale and its four factors including fear of oneself death, fear of other's death, death loneliness, and death acceptance explained the highest degrees of variance respectively. According to the results, fear of death is the most important feature of multidimensional orientation towards death and dying, and there is no difference between the attitude towards oneself death and the process of oneself dying. In addition, fear of others' death and the process of dying others are important components of the factor structure of this scale. Also, the loss of friends and relatives as a result of death (loneliness) was another feature of the attitudes of Iranian participants towards death. The present study showed that death acceptance as an adaptive attitude towards death also explains some of the observed variances (Jong, 2021).

The results of this study are somewhat consistent with the results of Wittkowski's (2001) study on German samples, Wittkowski's (2011) study on samples from Hong Kong, and MacDougall and Farreras's (2016) study

on English samples, but there are differences in the number of the extracted factors between the present study and the above-mentioned studies so that in the present study, four factors were identified while in the previous research seven (Wittkowski, 2001; MacDougall & Farreras, 2016) or eight factors (Wittkowski, 2011) were determined. Also, since the MODDI-F scale evaluates both maladaptive and adaptive attitudes about death, the results of this study are in line with previous research, because there are factors related to fear of death and dying and also factors related to death acceptance in the current research. Extracting the death loneliness factor in this study was one of the important differences between the results of the factor analysis of the present study and those of previous studies. The present study showed that in the Iranian society, part of morbid attitudes towards death is due to fear of loneliness and forgetfulness as a result of death. This finding can be explained by the cultural differences between Western societies which mainly emphasize individualism and Eastern societies including Iran which emphasize on collectivism. In the same vein, other research findings emphasize high individual and cultural differences in the fearful aspects of death. For example, after the examination of a group of Muslims, it turned out that certain factors such as corrupting the body and unknown affairs which are frequently seen in western responses were not observed in Muslims, and among westerns, spirituality-understanding the meaning of life- was more important than religious commitment to reduce anxiety and death obsession (Pyne, 2010).

In terms of reliability coefficients of the MODDI-F factors, the results of this study were similar to previous research. Reliability coefficients of the identified MODDI-F factors via the internal consistency in the Wittkowski's (2011) study were between 0.68 and 0.91, and the reliability coefficients of the MODDI-F factors using Cronbach's alpha in MacDougall & Farreras's (2016) study were 0.82 and 0.92, and they were between 0.79 and 0.89 by using test-retest. Reliability coefficients of the MODDI-F indicated that this scale does not undergo changes in state and condition and it has sufficient stability over time. The coefficients obtained from the concurrent implementation of the DAS, the DDS, and the DOS with the MODDI-F were also satisfactory and confirmed adequate validity of the MODDI-F.

The results of this study showed that females had higher scores on the subscales of fear of oneself death, fear of other's death, and death loneliness, but there was no difference between the two groups in terms of death acceptance. This finding was in line with previous studies (e.g., Fortner & Neimeyer, 1999; Mohammadzadeh and Najafi, 2010; Zhao, Wong, You, & Tao, 2019), showing that morbid attitudes towards death are more common in females than males. This difference may be due to the presence of emotional items in the questionnaire and it is possible that males have more inhibition in expressing their emotions compared to females. Also, this difference may be due to the fact that females accept the worrisome feelings about death while males avoid it. This justification is consistent with the emotional state of females throughout life (Cicirelli, 2002).

In general, the results of this study indicate that the use of the MODDI-F can measure morbid attributes towards death in students and possibly other social groups of Iranian society. Using this scale can be the source of many studies in which the measurement of attitudes towards death is of particular importance.

Limitations and suggestions

The sample of this study included students, so it seems that caution should be taken in generalizing the findings of this research to other social classes because it is possible to see the differences in attitudes towards death according to the anthropological factors (Fessler & Navarrete, 2005). In the present study, access to a sample of elderly people was not provided to compare the findings. Since the death-related attitudes can be changed in different stages of development (Mohammadzadeh & Najafi, 2016), it is suggested that the present study be conducted on other samples too, especially on the elderly and those awaiting death.

Ethical Considerations

This study was conducted using data extracted from the Web of Science database; therefore, no human participants were directly involved, and ethical approval was not required.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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