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Validation of the prolonged grief scale (PG-13) and investigation of the prevalence and risk factors of prolonged grief disorder in Turkish bereaved samples

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ABSTRACT

The aim of this study was to validate the Turkish version of the Prolonged Grief Scale (PG-13) and to determine the prevalence and predictors of prolonged grief disorder (PGD). Data were gathered from two independent samples of 306 (Study 1) and 271 (Study 2) bereaved adults to determine if findings in one sample could be replicated in the other. The results supported the one-factor structure of PG-13. PGD prevalence rates were 11.4% in Study 1 and 10% in Study 2. Lower level meaning reconstruction and unnatural cause of death were found as risk factors for the PGD diagnosis in both studies.

Introduction

Almost everyone experiences the loss of a loved one over the course of his or her lifetime. Specific physical, emotional, cognitive, and social reactions to the loss occur with regularity and are, to some extent, expected and predictable. Most bereaved people adjust to the loss over time; however, a subgroup of people experience substantial difficulty adjusting to the death (Lenferink et al., 2020; Nielsen et al., 2019). Prigerson et al. (2009) labeled this response prolonged grief disorder (PGD) and conducted a field trial to test and ultimately validate consensus criteria for PGD. A PGD diagnosis characterized by symptoms such as yearning, being stunned, dazed, and/or confused by the death, an inability to accept the death, shock, disbelief, emotional numbness, an inability to trust people since the death, an impaired sense of self or identity, and avoidance of reminders of the death of their loved one. When these symptoms are significantly elevated at or beyond 6 months and impair professional-social function, a diagnosis of PGD can be made (Prigerson et al., 2009).

Prigerson et al. (2009) developed the prolonged grief scale (PG-13) to measure the symptoms of PGD. The PG-13 contains 11 Likert type questions and two "yes/no" questions, which evaluate symptoms of separation distress and other cognitive-emotional behaviors specific to PGD. The "yes/no" questions (items 3

and 13) examine the timing criteria (whether at least 6 months have elapsed after the loss) and social-occupational functional impairment, respectively. The 11 symptoms can be summed and used as an assessment tool to measure the severity of PGD symptoms. The PG-13 was designed to map onto validated diagnostic criteria for PGD. The PG-13 is used both as a diagnostic algorithm and as a measurement tool to measure the severity of symptoms of prolonged grief in many different cultures and languages from the Americas to Asia, from Europe to Africa (e.g., Delalibera et al., 2011; He et al., 2014; Pohlkamp et al., 2018; Tsai et al., 2018). Besides, many studies have used PG-13 diagnostic criteria and have yielded consistent results across cultures in terms of the prevalence of PGD diagnosis (Hinton et al., 2013; Schaal et al., 2014; Thomas et al., 2014).

Although, the PG-13 is widely used in many different cultures and languages, a Turkish version has not been psychometrically tested. There are also no studies on the prevalence of PGD among bereaved people, or on risk factors for PGD, in Turkish culture. To address this deficiency, a study comprising two independent samples (Studies 1 and 2) was designed. The first aim of Study 1 was to explore factor structure, test internal consistency, and convergent validity of the Turkish form of the PG-13. Because previous studies have shown that there are significant relationships between prolonged grief symptoms and

depressive symptoms, anxiety, meaning reconstruction (e.g., Gillies et al., 2015; Lenferink et al., 2020), these variables were assessed to investigate convergent validity. The second aim of Study 1 was to investigate the prevalence and predictors of a PGD diagnosis, such as age, gender, marital status, income, education, age of deceased, nature of the loss, time since loss, and meaning reconstruction. The aims of Study 2 were to confirm the factor structure of the PG-13 and to re-test the prevalence and predictors of PGD diagnosis in an independent sample.

Methods

Participants and procedure

Data for Study 1 were collected in 2015 and 2016 and for Study 2 in 2016 and 2017. In both studies, data were collected via an online questionnaire. The studies complied with ethical principles and were approved by the Hacettepe University Ethical Board. Participation was voluntary, and all participants provided online consent. In both Study 1 and Study 2, the participants were contacted via an online announcement explaining the purpose and scope of the study with a link to the online survey sent as an e-mail to Hacettepe University staff, students, and Hacettepe University Hospital employees via Department of Media Affairs of Hacettepe University. The announcement and link were also sent to several bereaved groups using social media. Hacettepe University Psychology Department students were also asked to share the announcement and link of the study on social media. Through these e-mails and social media posts, the visibility of the announcement of the study was increased. People who volunteered to participate in the study clicked on the link and completed the questionnaire at home.

While online data were gathered, control strategies were employed, such as monitoring how many minutes it took each participant to complete the questionnaire and whether the questionnaire was completed more than once from the same computer. The controls did not reveal any elements that could affect the reliability of the data collection process. The participants were given the telephone number and e-mail address of the researcher so that it was possible to contact the researcher in the event of any problems while completing the questionnaire.

Eligibility criteria included being over 18 years of age, having lost a loved one (parent, spouse, or sibling) due to death, and volunteering to participate in the online questionnaire. In Study 1, 306 bereaved adults (Age $M = 35.71$, $SD = 11.30$) who had lost at least one close family member (parent, spouse, or sibling) at least 6 months and not more than 10 years were recruited. Two hundred thirty-five (76.8%) participants had lost one relative in the last 10 years. Those who had experienced more than one death were asked to fill out all questionnaires according to the loss that had the greatest impact on them. In Study 2, 271 adults (Age $M = 40.9$, $SD = 12.6$) who had lost a close family member (parent, spouse, or sibling) at least 6 months and no more than 5 years before the study were recruited. Of the 271 people included in the sample, 245 (90.4%) had experienced one loss in the last 5 years. People who had experienced more than one loss were asked to specify the loss that had affected them most and to answer the questionnaire according to that loss.

Measurement tools

Demographic information form

Background information of the participant such as gender, age, education, income, age of deceased, date of death, and cause of death, nature of death, the time elapsed since the loss was obtained by self-report.

The prolonged grief scale (PG-13)

The PG-13 is a well-validated tool for the evaluation symptom severity of the PGD which was developed by Prigerson et al. (2009). The PG-13 contains 11 Likert response formatted questions rated on a 5-point scale (1-Not at all, 5-Several times a day or 1-Not at all, 5-Overwhelmingly). These 11 questions evaluate separation distress (e.g., longing, yearning, preoccupation with missing the deceased, etc.) as well as cognitive, emotional, and behavioral symptoms of prolonged grief (e.g., diminished sense of self, difficulty accepting the death, difficulty trusting others, avoidance, emptiness, meaninglessness, feeling stunned, etc.). The severity of prolonged grief can be evaluated by summing the scores obtained from these 11 items. Additionally, the PG-13 contains two questions that serve to assess the time elapsed since the bereavement and whether there has been any impairment of social-occupational function.

It is also possible to diagnose PGD using all 13 questions. A total of five criteria (A–E) must be met for a diagnosis of PGD. These criteria are:

A. Event criterion: the respondent must have experienced the loss of a loved person

B. Separation distress: the respondent must experience separation distress. That is, the respondent must experience at least one of the conditions stated in items 1 and 2 of the scale, at least once a day.

C. Cognitive, emotional and behavioral symptoms: the respondent must have answered at least 5 of items 4–12 of the PG-13 as "at least once a day" or "quite often."

D. Duration criterion: the separation anxiety must still be high at least 6 months after the loss. In other words, the time criterion specified in item 3 of the PG-13 must be answered as "Yes."

E. Impairment criterion: the respondent must have significant impairment in social, occupational, or other important areas (e.g., domestic responsibilities). That is, item 13 of the PG-13 must be answered as "Yes."

In the present study, the PG-13 was translated into the Turkish language as a diagnostic tool to evaluate the severity of prolonged grief symptoms. The translation-back translation method which was proposed by Bracken and Barona (1991) was used. That is to say, two different specialists with doctoral degrees in clinical psychology translated the PG-13 to Turkish. The two translations were compared by the research team and the necessary edits were made. Afterward, the edited Turkish questions were translated into English by a professional translator. The research team compared the original English version with the back-translated versions and made the necessary corrections. Finally, the psychometric properties of the Turkish form of PG-13 were investigated.

The grief and meaning reconstruction inventory

The grief and meaning reconstruction inventory (GMRI) assesses meaning reconstruction after a loss. It consists of 29 Likert type questions rated on a 5-point scale. The five subscales of the GMRI were labeled Continuing Bonds, Personal Growth, Emptiness and Meaninglessness, Sense of Peace, and Valuing Life. Items of the Emptiness and Meaninglessness subscale were reverse-coded so that a positive score reflected greater intensity of the measure. In the original study, the internal consistency coefficients of the subscales were between 0.76 and 0.83. The correlations between the total score and the subscales ranged between 0.51 and 0.71. The test–retest reliability was found to be 0.71 for the total scale, 0.60 for the Continuing Bonds subscale, 0.60 for the Personal Growth subscale, 0.73 for the Sense of Peace subscale, 0.62 for the Emptiness

and Meaninglessness subscale, and 0.71 for the Valuing Life subscale (Gillies et al., 2015).

The validity and reliability study of the Turkish version of the scale was published in Keser and Isikli (2018). In the validation study, it was found that the 27-item, 4-subscale structure of the GMRI was better suited to Turkish culture. The subscales were Continuing Bonds, Growth, Sense of Peace, Emptiness and Meaningless. The items of the Valuing life subscale of the original form of the GMRI loaded on the Growth subscale in the Turkish form. Two items did not load any of these subscales and removed from the Turkish form. In the validation study, the internal consistency coefficients of the subscales were found to be between 0.76 and 0.82. In the present study, the internal consistency coefficient of the GMRI was 0.81 and the internal consistency coefficients of the subscales were between 0.74 and 0.85. The Turkish form of the GMRI was used in this study.

The state-trait anxiety inventory

The state-trait anxiety inventory (STAI), originally developed by Spielberger (1988), is a 4-point Likert type measurement tool consisting of 40 items, 20 of which measure state anxiety and 20 of which measure trait anxiety. The state anxiety subscale evaluates the anxiety and fear that people experience due to stressful and troubling situations. The trait anxiety subscale assesses individuals' general proneness to anxiety and the extent to which they experience anxiety and fear in their lives. In the current study, the internal consistency coefficients of the STAI were 0.95 for the whole scale, 0.90 for the trait anxiety subscale, and 0.91 for the state anxiety subscale.

The Beck depression inventory

The Beck depression inventory (BDI) is a measurement tool consisting of 21 4-point Likert type questions developed to evaluate the cognitive, emotional, and physiological symptoms of depression (Beck, 1961). The items on the scale are scored between 0 and 3, the highest possible score is 63. Higher scores on the scale indicate an increase in depressive symptoms. The validation study of the Turkish version of the scale, used in this study, was conducted by Hisli (1989). In the validation study, the test–retest reliability of the BDI was found to be 0.65 and the split-half reliability value was found to be 0.78. In the present study, the internal consistency coefficient was calculated as 0.91.

Measurements of Study 2

In the second phase of the study, participants were asked to complete the demographic information form, the Turkish version of the PG-13, the BDI, and the GMRI. The demographic information form contained questions regarding basic information about the deceased and the nature of the loss.

Data analysis

Statistical Package for the Social Sciences (SPSS) version 22 and IBM AMOS 20 programs were used for the data analysis. Missing values were under 1% and replaced by sample mean values. The data met the normality assumption. Samples of the studies were compared with Chi-Square test in terms of demographic variables.

In Study 1, a principal component analysis (PCA) with direct oblimin rotation was used to determine the factor structure of the PG-13. Factors of the PG-13 were determined by using eigenvalues and scree plot graph. After conducting the PCA, a parallel analysis (O'Connor, 2000) was conducted to re-test the factor structure of the scale by using the data of Study 1. That is to say, eigenvalues of the actual data were compared with extracting eigenvalues from random data sets which were derived from the actual data by the Parallel Analysis software (O'Connor, 2000). A correlation analysis was performed to investigate the concurrent validity of the Turkish form of PG-13. The correlation coefficients were calculated between PG-13 and BDI, STAI, GMRI scores.

In Study 2, a confirmatory factor analysis (CFA) was carried out to confirm the factor structure of the PG-13 which was explored in Study 1. The CFA was performed using structural equation modeling with AMOS. To decide fitness of confirmatory model of the PG-13, Chi-Square/Degrees of Freedom (CMIN), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI), Normal Fit Index (NFI), and Root Mean Square Residual (RMSEA) values were used. Acceptable limits of these fit indices can be summarized as follows: CMIN $\leq$ 5 (Marsh & Hocevar, 1988), GFI $\geq$ 0.90, AGFI $\geq$ 0.90 (Shevlin & Miles, 1998), CFI $\geq$ 0.90 (Hu & Bentler, 1999), NFI $\geq$ 0.90 (Bentler & Bonett, 1980), and RMSEA $\leq$ 0.08 (Hooper et al., 2008). The confirmatory model of the PG-13 was evaluated by using these criteria.

To evaluate the internal consistency of the Turkish form of the PG-13, Cronbach's Alpha values were calculated in both Study 1 and Study 2. Finally, multiple logistic regression analyses were conducted to evaluate the predictors of PGD diagnosis in both samples. PGD diagnosis (presence/absence) was the categorical outcome variable in the multiple logistic regression analyses.

Results

Characteristics of the samples

Characteristics of the samples are compared in Table 1. In addition to the characteristics displayed Table 1, several more characteristics of the samples were investigated. For Sample 1, causes of the death were cancer 49% ($n = 152$), heart attacks/brain hemorrhages 27% ($n = 83$), organ failure/Alzheimer's Disease/dementia 11% ($n = 35$), traffic accident 6.5% ($n = 20$), suicide 2% ($n = 6$), terror attack 1.3% ($n = 4$), natural disaster 1.3% ($n = 4$), and homicide 0.7% ($n = 2$). The mean age of the deceased was 54 years ($SD = 17.2$), and the elapsed time since loss was $Median = 45$ and $Mean = 42$ months. For Sample 2, causes of death were 34% ($n = 92$) cancer, 25% ($n = 68$) heart attack/brain hemorrhages, 14% ($n = 38$) old age, 6.5% ($n = 18$) diabetes/high blood pressure, 4% ($n = 11$) suicide, 4% ($n = 11$) accident, and 10% ($n = 26$) the other reasons. The mean age of the deceased was 62 years ($SD = 17.7$). The elapsed time since loss was $Median = 29$ and $Mean = 29.7$ months. Chi square analyzes showed that the samples significantly differed from each other in terms of the demographic variables such as gender, marital status, income, education level, age of bereaved, number of losses, and age of deceased (see Table 1).

Findings of study 1 ($n = 306$)

Factor structure of the Turkish form of the PG-13

A PCA was performed to determine the factor structure of the PG-13. The Kaiser–Meyer–Olkin (KMO) value was found to be 0.89. Results of Bartlett's test for sphericity were found to be $X^2 = 1725.3$ $df = 55$ ($p < .001$).

The PCA results showed two factors with eigenvalues greater than 1. Items 1, 2, and 4 were on the first factor, and the other items were on the second factor. The first factor had an eigenvalue of 5.45, and the second factor an eigenvalue of 1.2. The first factor explained 50%, and the second factor 11% of the variance. Moreover, the apparent decline and diffraction in the scree plot table also indicated that the scale has two-factor structure. Conversely, the eigenvalue of the second factor was slightly higher than 1, and there

Table 1. Comparison of sample characteristics of Study 1 ($n = 306$) and Study 2 ($n = 271$).

Variables	Study 1		Study 2		Chi square (X^2)
	Number	Percentage	Number	Percentage	
Gender					$X^2 (1) = 6.19, p = .01$
Female	234	76.5	182	67.2	
Male	72	23.5	89	32.8	
Age of bereaved					$X^2 (3) = 35.14, p = .000$
18–25	71	23.2	49	18.1	
26–35	94	30.7	42	15.5	
36–50	103	33.7	103	38	
51–65	38	12.4	77	28.4	
Education					$X^2 (3) = 19.54, p = .000$
Primary or Middle	23	7.6	31	11.4	
High school	64	20.9	80	29.5	
University	110	35.9	106	39.2	
Postgraduate	109	35.6	54	19.9	
Marital status					$X^2 (1) = 10.59, p = .001$
Married	134	43.8	156	57.2	
Single	172	56.2	116	42.8	
Income					$X^2 (2) = 10.53, p = .005$
Low	93	30.4	76	28.0	
Middle	136	44.4	94	34.7	
High	77	25.2	101	37.3	
Deceased					$X^2 (3) = 2.2, p = .53$
Mother	88	28.8	79	29.2	
Father	158	51.6	131	48.3	
Spouse	16	5.1	11	4.1	
Sibling	44	14.4	50	18.4	
Cause of death					$X^2 (1) = 1.92, p = .16$
Natural	250	81.7	233	86.0	
Unnatural	56	18.3	38	14.0	
Time since loss					–
6–12 month	58	19.0	58	21.4	
12–24	42	13.7	62	22.9	
24–36	34	11.1	55	20.3	
36–48	31	10.1	36	13.3	
48–60	29	9.5	60	22.1	
60–120	112	36.6	–	–	
Number of losses					$X^2 (1) = 19.03, p = .000$
One	235	76.7	245	90	
More than one	71	23.3	26	10	
Age of deceased					$X^2 (3) = 22.32, p = .000$
<30	28	9.2	14	5.2	
31–45	62	20.3	34	12.5	
46–60	108	35.3	76	28.0	
61<	108	35.3	147	54.2	

was a remarkable difference between eigenvalues of the first factor and the second factor (5.45 and 1.2). Therefore, to determine Turkish form of the PG-13 has one or two factors a parallel analysis (O'Connor, 2000) was conducted. Based on the eigenvalues obtained from the parallel analysis, the data obtained were compared with the random data which were derived from the actual data by the parallel analysis software (O'Connor, 2000). Table 2 shows that the difference between the eigenvalues of the first subscale in the actual data and the eigenvalues obtained from the random data is quite high. In the second factor, the eigenvalue obtained from the present data and the eigenvalue obtained from the random data were found to be similar. These results support the conclusion that a one-factor structure best fit the data.

Table 2. Results of the parallel analysis.

Factors	Eigenvalues obtained from existing data	Eigenvalues obtained from random data
Factor 1	4.84	1.37
Factor 2	1.27	1.25
Factor 3	0.94	1.17
Factor 4	0.61	1.11

The results of the findings of the parallel analysis determined that the scale has a one-factor structure. Another PCA was performed to determine the factor loads of the scale items in a one-factor structure. Table 3 shows the factor loads, communalities values, and item-total correlation coefficients.

Communality scores show the proportion of common variance within the variable. In other words, the variance in each item which can be explained by the

Table 3. Results of the exploratory factor analysis and item total correlations.

Items	Component matrix scores	Communalities scores	Item-total correlations
12. Do you feel that life is unfulfilling, empty, or meaningless since your loss?	0.81	0.66	.81**
6. Do you feel confused about your role in life or feel like you do not know who you are (i.e., feeling that a part of yourself has died)?	0.80	0.64	.80**
10. Do you feel that moving on (e.g., making new friends, pursuing new interests) would be difficult for you now?	0.77	0.60	.77**
2. In the past month, how often have you had intense feelings of emotional pain, sorrow, or pangs of grief related to the lost relationship?	0.76	0.58	.75**
7. Have you had trouble accepting the loss?	0.72	0.51	.72**
5. In the past month, how often have you felt stunned, shocked, or dazed by your loss?	0.70	0.49	.69**
9. Do you feel bitter over your loss?	0.69	0.47	.67**
1. In the past month, how often have you felt yourself longing or yearning for the person you lost?	0.66	0.44	.64**
8. Has it been hard for you to trust others since your loss?	0.64	0.40	.65**
11. Do you feel emotionally numb since your loss?	0.61	0.37	.62**
4. In the past month, how often have you tried to avoid reminders that the person you lost is gone?	0.54	0.35	.55**

Total explained variance: 50%. **$p < .001$.

factors is presented by these scores (Field, 2000). For example, 66% of the variance associated with item 12 of the PG-13 is shared variance. As can be seen in Table 3, common variances of all items of the scale are higher than 35%. Kline (1994) stated that items that have higher loading scores than 0.30 could be seen acceptable. Thus, it can be inferred that all items of the PG-13 are in the acceptable range in terms of factor loadings. Besides, item-total correlations of the items were higher than 0.55 ($p < .001$). Component matrix scores show the loadings of all items onto the factors (Field, 2000, p. 661). Tabachnick and Fidell (2001) emphasized that component matrix scores must be higher than 0.32. As can be seen in Table 3, the factor loadings of the items are higher than 0.54. When component matrix scores, communality values, and item-total correlations were considered together, it was decided to keep all items of the scale.

Concurrent validity of the Turkish form of the PG-13

The correlation between PG-13 and BDI, STAI-T, STAI-S, and GMRI were found 0.63, 0.51, 0.52, and −0.27 ($p < .001$), respectively. These findings supported the concurrent validity of the PG-13.

Internal consistency of the Turkish form of the PG-13

The reliability of the PG-13 was calculated by calculating the internal consistency coefficients. The Cronbach's alpha value for the 11 items Likert-type items of the PG-13 was found to be 0.90. This value indicates that the PG-13 has high internal consistency.

Findings of study 2 (n = 271)

CFA of the Turkish form of the PG-13

A CFA was performed using the data collected in Study 2 to confirm factor structure of PG-13. It was found that the fit indices were $X^2/Sd = 3.11$, GFI = 0.92, AGFI = 0.87, NFI = 0.92, IFI = 0.95, CFI = 0.95, and RMSEA = 0.08. These values showed that almost all model fit indices were within acceptable limits, except for the AGFI value. Therefore, it can be inferred that the one factor of the Turkish form of the PG-13 was supported. Standardized values, error values, and inter-item co-variances are presented in Figure 1.

Internal consistency of the Turkish form of the PG-13

In addition to the CFA, the internal consistency coefficient of PG-13 was calculated as 0.90.

Prevalence and predictors of PGD

The prevalence rates of PGD among the Study 1 and Study 2's participants were examined and a series of simple logistic regression analyses were conducted to determine risk factors of PGD diagnosis across the samples. That is, the predictive roles of gender, income, education, marital status, age of bereaved, nature of death (unnatural/natural), age of deceased, relationship with the deceased (mother, father, spouse, or sibling), number of losses, elapsed time since loss, and meaning reconstruction variables were tested separately. PGD diagnosis was a categorical outcome of the logistic regression analyses. After the risk factors were tested separately in both Study 1 and Study 2,
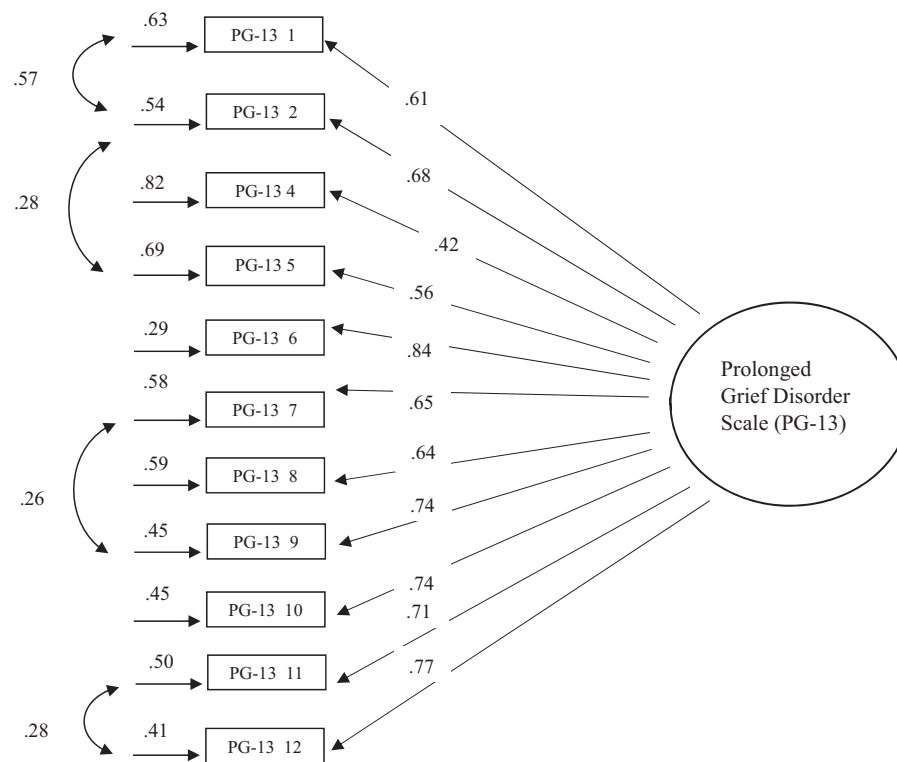
Figure 1. Results of the confirmatory factor analysis of the factor structure of the PG-13.

the variables which were found as significant predictors of PGD diagnosis were examined together by using multiple logistic regression analyzes.

The results of Study 1

According to the PG-13 diagnostic criteria, the prevalence of PGD was 11.4% ($n = 35$) in Study 1. The mean score of the PG-13 was 30.38 ($SD = 10.01$). The PG-13 scores of the participants who met the diagnostic criteria of PGD ranged between 37 and 53 ($M = 46.52$, $SD = 4.13$). The simple logistic regression analyzes results showed that gender (X^2 (1) = 2.06, $p = .15$) education (X^2 (3) = 2.35, $p = .50$), marital status (X^2 (1) = 0.36, $p = .54$), income (X^2 (2) = 4.00, $p = .13$), the relationship with the deceased (X^2 (3) = 6.28, $p = .10$), number of losses (X^2 (1) = 0.003, $p = .95$), and elapsed time since loss (X^2 (5) = 5.35, $p = .37$) variables were not significant predictors of PGD. Conversely, age of bereaved ($\beta = -0.05$, $SE = 0.02$, $p = .01$), nature of the death (natural/unnatural) (X^2 (1) = 13.14, $p = .000$), age of the deceased ($\beta = -0.04$, $SE = 0.01$, $p = .000$), and meaning reconstruction ($\beta = -0.04$, $SE = 0.01$, $p = .002$) variables were found as significant predictors of the PGD diagnosis (see Table 4).

The results of Study 2

The prevalence of PGD was 10% ($n = 27$) in Study 2. The mean score of the PG-13 was 27.66 ($SD = 9.9$). The PG-13 scores of the participants who met the diagnostic criteria of PGD ranged between 36 and 52 ($M = 43.36$, $SD = 3.77$). As in Study 1, the simple logistic regression analyzes results showed that gender (X^2 (1) = 3.05, $p = .08$), education (X^2 (3) = 5.14, $p = .16$), income (X^2 (2) = 3.86, $p = .14$), number of losses (X^2 (1) = 0.07, $p = .78$), the relationship with the deceased (X^2 (3) = 6.62, $p = .09$), and elapsed time since loss (X^2 (4) = 2.59, $p = .62$) variables did not significantly predict a diagnosis of PGD. Conversely, age of bereaved ($\beta = -0.04$, $SE = 0.02$, $p = .02$), marital status (X^2 (1) = 4.92, $p = .02$), age of the deceased ($\beta = -0.03$, $SE = 0.01$, $p = .006$) nature of the death (X^2 (1) = 10.21, $p = .001$), and meaning reconstruction ($\beta = -0.08$, $SE = 0.01$, $p = .000$) variables were found as significant predictors of the PGD diagnosis (see Table 4).

Final models for the predictors of PGD

As can be seen in Table 4, age of bereaved, age of deceased, cause of death (natural/unnatural), and meaning reconstruction variables were evaluated separately and found as significant predictors of PGD in Study 1, and these results were replicated and

Table 4. Results of simple logistic regression analyzes both in Study 1 and Study 2.

| | Association with PGD diagnosis | | | |
| | Study 1 (N = 306) | | Study 2 (N = 271) | |
Variables	OR	95% CI	OR	95% CI
Gender (Female vs. Male)	1.91	.73–5.28	2.31	.84–6.31
Age of bereaved (continuous)	.95*	.91–.98	.96*	.93–.99
Education				
Primary or middle (vs. postgraduate)	1.10	.28–4.25	1.82	.34–9.63
High school (vs. postgraduate)	1.36	.56–3.32	3.29	.89–12.19
University (vs. postgraduate)	.67	.26–1.61	1.38	.35–5.45
Marital status (single vs. married)	.80	.39–1.62	.40*	.17–.91
Income				
Middle (vs. low)	.64	.29–1.39	.49	.19–1.28
High (vs. low)	.36	.12–1.04	.39	.15–1.06
Deceased				
Mother (vs. spouse)	.83	.28–2.46	.60	.18–1.98
Father (vs. spouse)	.63	.22–1.75	.67	.23–1.92
Sibling (vs. spouse)	3.2	.82–12.85	4.19	.93–18.69
Cause of death (unnatural vs. natural)	4.21**	1.99–8.88	4.53**	1.89–10.88
Time since loss (months)				
12–24 (vs. 6–12)	1.25	.41–3.76	.47	.15–1.52
24–36 (vs. 6–12)	1.07	.32–3.60	.43	.12–1.48
36–48 (vs. 6–12)	.92	.25–3.35	.49	.13–1.96
48–60 (vs. 6–12)	1.00	.27–3.64	.60	.20–1.82
60–120 (vs. 6–12)	.41	.14–1.21	–	–
Number of losses (more than one vs. one)	.98	.42–2.26	1.20	.33–4.29
Age of deceased (continuous)	.95**	.93–.98	.97*	.95–.99
Meaning reconstruction (continuous)	.96*	.93–.98	.92**	.89–.95

*$p < .05$, **$p < .001$. AOR: Adjusted odds ratio. Unnatural loss: The losses because of traffic or working accidents, suicide, homicide, terror attack, physical assault.

Table 5. Results of multiple logistic regression analyses both in Study 1 and Study 2.

| | Association with PGD diagnosis | | | |
| | Study 1 (N = 306) | | Study 2 (N = 271) | |
Predictor variables	AOR	95% CI	AOR	95% CI
Cause of death (unnatural vs. natural)	2.57*	1.13–5.86	2.97*	1.01–8.76
Age of deceased	.97	.94–1.00	.98	.95–1.01
Age of bereaved	.98	.94–1.02	.99	.95–1.03
Meaning reconstruction	.97*	.94–.99	.93**	.90–.96

*$p < .05$, **$p < .001$. AOR: Adjusted odds ratio. Unnatural loss: The losses because of traffic or working accidents, suicide, homicide, terror attack, physical assault.

confirmed in Study 2. Finally, these significant predictors were tested together by using multiple logistic regression analysis to determine whether they predict PGD diagnosis when they were included in the regression equation together. The multiple regression analysis results revealed that while the cause of death and meaning reconstruction variables still continued to predict the PGD diagnosis, age of deceased and age of bereaved variables were not significant predictors when evaluated with the other variables. These results were confirmed in Study 2 (see Table 5).

Discussion

This study has demonstrated that the Turkish form of the PG-13 is a reliable and valid measurement tool that can be used to measure PGD in bereaved adults in Turkish culture. The PCA and Parallel Analysis indicated that the Turkish version of the PG-13 has a one-factor structure consistent with the original form. In addition, the results of CFA performed using the data collected from the sample in Study 2 showed that the fit indices for the one-factor structure of the PG-13 were acceptable. These findings support the results of studies demonstrating the single factor structure of the PG-13 measure. In previous studies of different samples with versions of the PG-13 in different languages, the PG-13 was shown to have a one-factor structure (Pohlkamp et al., 2018; Prigerson et al., 1995, 2009; Tsai et al., 2018).

The positive association with the PG-13 with depression and anxiety measurements and its negative

association with the meaning reconstruction measurement support the expected concurrent validity of the PG-13. Prior studies have shown that there is a moderate positive association between depression/anxiety symptoms and prolonged grief symptoms, and a weak negative relationship between meaning reconstruction and prolonged grief symptoms (Boelen et al., 2010; Gillies et al., 2015; Tsai et al., 2018). It has been shown that specific emotions, thoughts, and physical symptoms, especially sorrow, are reported to be common in both depression and prolonged grief (Friedman, 2012; Prigerson et al., 1995). Similarly, anxiety, especially separation anxiety, is known to be among the basic components of prolonged grief (Prigerson et al., 1995, 2009). The positive relationship between the PG-13 and depression and anxiety measurements can be explained by the overlap between the structures. Depression and other anxiety disorders are also known to have high comorbidity with PGD (Boelen & Prigerson, 2007). One of the possible explanations of the relationship found in this study is that the symptoms of depression and anxiety coexist with those of prolonged grief. A negative relationship between the meaning reconstruction score and the PG-13 score is also considered to be a theoretically expected outcome. Meaning reconstruction contains measures such as "growth," "solace," and "peace," that demonstrate the ability to cope with difficulties brought about by bereavement, increased well-being, and positive change after the loss (Gillies et al., 2015). Therefore, meaning reconstruction reflects a situation that is counter to that experienced by bereaved individuals with prolonged grief. Thus, moderate level correlation coefficients between the PG-13 and BDI, STAI can be considered as an indicator of concurrent validity of the PG-13. Similarly, a weak negative correlation coefficient between PG-13 and GMRI scores can be regarded as another indicator of the validity of the PG-13.

In the present study, PGD prevalence was found to be 11.4% ($n = 34$) in Study 1 and 10% ($n = 27$) in Study 2. This rate is similar to other reports in the literature. For example, in their meta-analysis study using the findings of 14 different studies, Lundorff et al. (2017) found the prevalence of PGD to be 10.3% in bereaved adults. Similarly, Pohlkamp et al. (2018) found the prevalence of PGD to be 16% in bereaved Swedish parents who had lost a child to cancer.

The risk factors of PGD diagnosis were analyzed in both Study 1 and Study 2. In Study 1, unnatural nature of loss and inability to make sense of the loss were significant risk factors for the PGD diagnosis.

The results of Study 2 confirmed the predictive roles of these variables. Despite the sample of Study 2 significantly differed from the sample of Study 1 in terms of the demographic variables such as gender, marital status, income, education level, age of bereaved, number of losses, and age of deceased, the findings were strikingly similar. This replication suggests the robustness of the findings. Moreover, these results are consistent with previous studies in the relevant literature (e.g. Boelen & Bout, 2007; Currier et al., 2006). To date, many studies have showed that the sudden/violent or unnatural nature of the loss is a risk factor for prolonged grief symptoms (Boelen, & Bout, 2007; Currier et al., 2006; Kersting et al., 2011). It has been stated that people who experience a sudden/violent and unexpected loss are not mentally prepared for the loss, have more difficulty confronting the reality of loss, are likely to use more denial mechanisms, and have more difficulty making sense of the loss (Barry et al., 2002; Currier et al., 2006; Goldsmith et al., 2008). Similarly, it has been stated that an unnatural death will make the loss more difficult to accept and shatter a person's basic assumptions about themselves, others, and the world (Janoff-Bulman, 1989; Reed, 1998). Finally, consistent with previous findings in the literature, the meaning reconstruction variable negatively predicted PGD diagnosis in this study. As in our study, Holland et al. (2006) found low-level sense-making and benefit finding to be related to higher-level PGD symptoms. Similarly, Currier et al. (2006) found that sense making levels had a mediating role in the relationship between violent loss and PGD symptoms. Gillies et al. (2015) found a negative relationship between meaning reconstruction and PGD. The meaning reconstruction variable includes restructuring the basic assumptions shaken by the loss, restructuring the self-narrative, making sense of the loss, positive change in identity after the loss, growth, finding peace, and valuing life more (Gillies et al., 2015; Neimeyer, 2006). Therefore, a negative relationship between higher levels of meaning reconstruction and decreased symptoms of prolonged grief was expected.

Strengths and limitations

This study has numerous strengths, including two fairly large, community-based samples of bereaved relatives of the deceased, the restriction of the time elapsed after the loss, that the relationship to the deceased be immediate relatives of the bereaved, using standardized measurement tools, and being the first

study conducted in Turkish culture using the PG-13. However, the studies did not allow for cause-effect inference due to the cross-sectional design. Self-reported measurements were used instead of a structured clinical interview, there were no participants who lost a child in the sample, most of the participants in the study were women, and the average age of the samples was relatively young. These limitations of the samples could reduce the generalizability of the findings.

Finally, it should be considered that PGD criteria (Prigerson et al., 2009) are not identical with PGD criteria of ICD-11 (International Classification of Diseases World Health Organization, 2018), and PCBD (Persistent Complex Bereavement Disorder) criteria of DSM-5 (Diagnostic and Statistical Manual of Mental Disorders American Psychiatric Association, 2013) even though most of the symptoms overlap. To date, several studies have compared these different diagnostic criteria and it has been showed that there can be significant differences between different diagnostic criteria in terms of the prevalence of the PGD (Boelen et al., 2018; O'Connor et al., 2019). It should be considered that there may be different results according to other diagnostic criteria, such as PGD (WHO, 2018) and PCBD (APA, 2013).

Conclusions and future directions

The Turkish PG-13 is a valid and reliable instrument for assessing symptoms of PGD among Turkish bereaved adults. Unnatural death and the inability to make sense of the loss were significant risks for PGD diagnosis. Future studies are needed to determine PGD's prevalence and predictors in more homogeneous groups (e.g., losses of children, losses due to cancer, etc.). Longitudinal studies of other psychosocial variables predicting prolonged grief symptoms and studies based on interviews would extend the findings of this study. Finally, we believe that PG-13 is a measurement tool that can be used clinically and to monitor treatment effects of bereaved individuals with PGD in Turkey.

Disclosure statement

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