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Brief report

Prolonged Grief Disorder, depression, and posttraumatic stress disorder are distinguishable syndromes

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ABSTRACT

Background: This study examined the distinctiveness of symptoms of Prolonged Grief Disorder (PGD), depression, and posttraumatic stress disorder (PTSD). We compared the fit of a one-factor model with the fit of four hierarchical models in which symptoms formed three distinct correlated higher-order dimensions, and PTSD-items were modeled in different ways.

Methods: Self-reported data were available from two samples; 572 mourners recruited via the internet and 408 mourners recruited via healthcare workers.

Results: In Sample 1, the unitary model did not fit the data. The four hierarchical models all fit better. The model in which PTSD-items constituted four lower-order factors of reexperiencing, avoidance, dysphoria, and hyperarousal fit the data best. The fit was further improved, when one weak PGD-item and one weak PTSD-item were removed, and error-terms of similar items were allowed to correlate. Findings from Sample 1 were replicated in Sample 2.

Limitations: This study relied on self-reported data. Not all PGD-criteria and depression-criteria were assessed.

Conclusions: This is the first confirmatory factor analysis study showing that symptoms of PGD, depression, and PTSD represent distinguishable syndromes. PGD-symptoms should be addressed in the assessment and treatment of bereaved people seeking treatment.

1. Introduction

A minority of bereaved people develops Prolonged Grief Disorder (PGD), a disorder of grief proposed for inclusion in DSM that was formerly referred to as "complicated grief" (Prigerson et al., 2009). PGD-symptoms are predictive of health impairments beyond concomitant depression and anxiety (Bonanno et al., 2007). Several studies have examined the distinctiveness of PGD, depression, and *general anxiety* (Prigerson et al., 2009). Only one factor analytic study has supported the distinctiveness of PGD, depression, and *posttraumatic stress disorder* (PTSD; Golden and Dalgleish, in press). A limitation of that study is that it relied on exploratory factor analysis, a method that does not allow the evaluation of competing models of the dimensionality of symptoms.

The present study used confirmatory factor analysis (CFA) to examine the distinctiveness of symptoms of PGD, depression, and PTSD. Because the three-factor structure of PTSD-symptoms from DSM-IV has not been strongly empirically supported, we included four alternative models for the structure of PTSD, based on PTSD-literature (Palmieri et al., 2007). Thus, we planned to test the fit of five models. In *Model 1*, all symptoms formed a single dimension of loss-related distress. Models 2 through 5 were hierarchical models in

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which symptoms formed three distinct but correlated higher-order dimensions, and the PTSD-symptoms were modeled as forming: three dimensions of reexperiencing, avoidance, and hyperarousal as distinguished in DSM-IV (*Model 2*); two dimensions of reexperiencing/avoidance and numbing/hyperarousal (*Model 3*); four dimensions of reexperiencing, avoidance, numbing, and hyperarousal (*Model 4*); and four dimensions of reexperiencing, avoidance, dysphoria, and hyperarousal (*Model 5*). In Model 5, the depression-factor and PTSD-dysphoria factor were allowed to correlate, given the similarity in content between items in these factors. No subdimensions of PGD-symptoms have been distinguished by Prigerson et al. (2009) and no subdimensions of depression are distinguished in DSM-IV. Hence, symptom of PGD and depression were modeled as unitary factors. The fit of the models was tested in a first sample and then cross-validated in a second sample.

2. Methods

2.1. Subjects

Sample 1 included 572 bereaved people, originally recruited for a study on cognitive variables in grief via announcements on internet websites. People willing to participate sent an e-mail to the first author and were then sent a digital or paper-form questionnaire-package. Over a 5 year period, 1154 questionnaires were sent out; 813 (70.4%) were returned. In total, 701 participants were sent a second questionnaire-package immediately on receipt of the first questionnaire-package and 572 (81.6%) were returned. Data for the current study were obtained from this second package.

Sample 2 (cross-validation sample) included 408 bereaved people originally recruited for a study on memory and grief, via professional and lay mental healthcare workers. Over a 2 year period, approximately 600 questionnaires have been distributed; 408 (68%) were returned. Both studies were approved by local review boards and informed consent was obtained from all participants.

In Sample 1, the mean age was 43.2 years (SD = 12.2). Most participants ($N = 516$; 90.2%) were female; 33.2% had lost a spouse, 16.3% a child, 9.1% a sibling, 32.5% a parent, and 8.9% some other loved one. Losses occurred on average 44.7 months (SD = 80.0) earlier; 221 participants (38.6%) experienced a sudden loss (e.g., due to accident or unexpected medical causes), 344 (60.1%) a non-sudden loss (e.g., due to illness), and 7 did not report cause.

In Sample 2 the mean age of the participants was 53.7 years (SD = 13.6). Most participants ($N = 317$; 77.7%) were female; 57.6% had lost a spouse, 10.8% a child, 2.9% a sibling, 19.4% a parent, and 9.3% someone else. Losses occurred $M = 5.1$ months (SD = 3.4) earlier; 136 participants (33.3%) experienced sudden loss, 253 (62%) non-sudden, and 19 did not report cause. Samples differed such that participants in Sample 2 were older, more recently bereaved, and included relatively more men, more spousally bereaved people, and more victims of sudden loss ($Ps < 0.002$).

2.2. Measures

Items for the factors were selected before any model was tested. Items for the PGD-factor were taken from the Inventory of Complicated Grief-revised (ICG-R; Prigerson and Jacobs, 2001; Dutch version: Boelen et al., 2003). We selected nine items representing nine of ten proposed PGD-criteria (Table 2). The tenth symptom ("difficulty moving on") was not included in the Dutch ICG-R and therefore excluded from the present analyses.

In Sample 1, items for the depression-factor were taken from the depression subscale of the Dutch Symptom Checklist (SCL; Arrindell and Ettema, 2003). We selected six items corresponding to six of all nine DSM-IV criteria of a depressive episode. The "thoughts of death" criterion was not included, because this likely had ambiguous meaning in the present sample. The other two criteria were omitted because they were not included in the Dutch SCL. In Sample 2, depression was measured with the Beck Depression Inventory (Beck et al., 1996; Dutch version: Van der Does, 2002). Because we intended to test similar models in both samples, we selected six items that had similar content as items used in Sample 1 (Table 2).

PTSD-symptoms were from the PTSD Symptom Scale Self-Report version (PSS-SR) (Foa et al., 1993; Dutch version: Engelhard et al., 2007). It includes 17 items corresponding to DSM-IV PTSD-criteria. All items were included in the analyses. The index-event was defined as "the death of your loved one".

2.3. Statistical analyses

CFA was conducted using Mplus-5.21 (Muthén and Muthén, 2007). Because item scores were nonnormally distributed, a robust maximum likelihood (MLR) estimator was used. This produces maximum likelihood parameter estimates and standard errors (computed using a sandwich estimator) that are robust to nonnormality. Because missing data were completely at random, participants with missing data were included in the model estimations using full information maximum likelihood estimation (Enders and Bandolos, 2001).Goodness-of-fit was evaluated using the comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Although there is little consensus on cut-off values for adequate fit (Lance et al., 2006), conventional guidelines were followed whereby fit is considered adequate if CFI and TLI values are >0.90, RMSEA is <0.08, and SRMR is <0.05. χ^2-difference tests, calculated using the χ^2-scaling correction factor (Satorra, 2000), and Akaike information criterion (AIC) were used to compare the fit of competing models.

3. Results

The mean ICG-*r* score in Sample 1 was 68.9 (SD = 23.1) and in Sample 2 it was 69.3 (SD = 21.9; $t < 1$). Scores fell within the subclinical range (Boelen et al., 2003). Table 1 shows outcomes of the CFA. First, models were tested using data from Sample 1. Model 1 provided a poor fit to the data. Models 2 through 5 all fit significantly better than the unitary

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Table 1
Fit statistics for confirmatory factor analyses in Sample 1 (S1, $N=572$) and Sample 2 (S2, $N=408$.)

Model	χ^2		*df*		CFI		TLI		RMSEA		SRMR		AIC	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
1	2363.74	1425.93	464	464	0.75	0.78	0.73	0.77	0.08	0.07	0.07	0.07	45082	28066
2	1607.46	1111.36	458	458	0.85	0.85	0.84	0.84	0.07	0.06	0.06	0.06	44179	27697
3	1648.34	1095.35	459	459	0.84	0.86	0.83	0.85	0.07	0.06	0.06	0.06	44227	27678
4	1580.42	1094.30	457	457	0.85	0.86	0.84	0.84	0.06	0.06	0.06	0.06	44146	27676
5	1553.25	1024.20	456	456	0.86	0.87	0.84	0.86	0.07	0.06	0.06	0.06	44116	27593
6	1287.24	859.14	397	397	0.88	0.89	0.87	0.88	0.06	0.05	0.05	0.06	41447	25706
7	1014.90	753.49	392	392	0.92	0.92	0.91	0.91	0.05	0.05	0.05	0.05	41128	25588

Note. AIC = Akaike information criterion; CFI = comparative fit index; RMSEA = root mean square error of approximation; S1 = Sample 1; S2 = Sample 2. SRMR = standardized root mean square residual. TLI = Tucker–Lewis index.

model ($\Delta\chi^2>495.48$, $Ps<0.001$). Fit-estimates showed that these four models approached the thresholds for acceptable model fit (Table 1). Model 5 fit the data best: it had the largest difference in χ^2-value between any of the models and the unitary model (i.e. $\Delta\chi^2=594.29$, $P<0.001$), the lowest AIC, and the best fit-indices.

The standardized factor-loadings of PGD-item 4 (avoidance) and PTSD-item 8 (inability to recall) were low (0.26 and 0.31 respectively), indicating that these items were relatively weak markers of PGD and PTSD. Accordingly, we tested a sixth model without these items. This model was an improvement of the fifth model ($\Delta\chi^2=264.76$, $P<0.001$).

Although the fit could be considered adequate, modification indices indicated that strong correlations existed between the error-terms of PGD-items 3 (difficulty accepting) and 6 (bitterness); PGD-items 7 (numbness) and 9 (feeling stunned/dazed); depression-items 3 (blaming self) and 6 (self is worthless); PGD-item 8 (life feels unfulfilling) and PTSD-item 12 (foreshortened future); and PGD-item 5 (mistrust) and PTSD-item 16 (hypervigilance). Because these item-pairs included items with comparable content, we assumed that these correlations reflected non-random measurement error stemming from content overlap. Accordingly, a seventh model was tested in which these error-terms were allowed to correlate. Model 7 fit the data significantly better than did Model 6 ($\Delta\chi^2=198.63$, $P<0.001$) and had good fit estimates (Table 1).

Findings from Sample 1 were cross-validated in Sample 2 (Table 1). Again, the unitary model did not fit the data. Models 2 through 5 all fit better ($\Delta\chi^2>253.64$, $Ps<0.001$), with Model 5 fitting best. Model 6—leaving out PGD-item 4 (avoidance) and PTSD-item 8 (inability to recall), which again had low factor-loadings (both 0.29)—was an improvement of Model 5 ($\Delta\chi^2=164.43$, $P<0.001$). Modification indices again indicated that the fit was further improved when the error-terms of the aforementioned five item-pairs were allowed to correlate. Model 7 fit the data better than did Model 6 ($\Delta\chi^2=85.58$, $P<0.001$) and had good fit estimates (Table 1).

Table 2 shows standardized factor-loadings from Model 7 in both samples. Factor-loadings of the four lower-order dimensions of *reexperiencing*, *avoidance*, *dysphoria*, and *hyperarousal* on the higher-order PTSD-factor in Sample 1 were 0.86, 0.79, 0.93, and 0.68 respectively, and in Sample 2 were 0.92, 0.78, 0.92, and 0.93 respectively. Correlations between PGD and depression, PGD and the PTSD higher-order factor, and depression and the PTSD higher-order factor in Sample 1 were 0.78, 0.87, and 0.80 respectively, and in Sample 2 were 0.75, 0.85, and 0.75 respectively.

4. Discussion

This is the first study that used CFA to examine the distinctiveness of symptoms of PGD, depression, and PTSD. The main finding is that, in two independent samples, models in which symptoms formed distinct factors fit the data significantly better than a unitary model with all items forming a single dimension of distress. Findings are in line with a recent exploratory factor analysis (Golden and Dalgleish, in press) and provide additional evidence that PGD-symptoms are distinct from symptoms of depression and PTSD (Prigerson et al., 2009).

In both samples, the model in which PTSD-items formed four lower-order factors of reexperiencing, avoidance, dysphoria, and hyperarousal (Model 5) fit the data best and fit better than the PTSD-model from DSM-IV (Model 2). The poor fit of the DSM-model accords with prior studies among bereaved (Boelen et al., 2008) and non-bereaved (Palmieri et al., 2007) samples.

Our finding that model fit was improved with the removal of the PGD "avoidance" item and the PTSD "inability to recall" item accords with earlier findings that these items are weak markers of PGD (Boelen et al., 2003) and PTSD (Palmieri et al., 2007). In the final model we tested, error-terms of five item-pairs were correlated. Although this may seem weak, this is not unexpected given the overlap in content between some of the items. Notably, fit-statistics of the model without these correlations were already acceptable (Lance et al., 2006) and superior to those of the unitary model.

Strengths of this study include its reliance on two independent samples with different characteristics. The successful cross-validation supports the generalizability of the findings. Weaknesses are that the data were self-reported and that not all PGD-symptoms and depression-symptoms were assessed.

Notwithstanding these considerations, our findings complement earlier findings that PGD is a distinct clinical entity (Prigerson et al., 2009). Findings suggest that PGD-symptoms

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Table 2
Standardized factor-loadings for Model 7 in Sample 1 (S1, $N = 572$) and Sample 2 (S2, $N = 408$).

	Loadings on PGD factor	Loadings on depression factor	Loadings on PTSD-reexperiencing factor	Loadings on PTSD-avoidance factor	Loadings on PTSD-dysphoria factor	Loadings on PTSD-hyperarousal factor
	S1/S2	S1/S2	S1/S2	S1/S2	S1/S2	S1/S2
Inventory of Complicated Grief-revised						
1. Yearning	0.67/0.68					
2. Part of self died	0.73/0.75					
3. Difficulty accepting the loss	0.70/0.60					
4. Avoiding reminders of deceased	−/−					
5. Mistrust others	0.52/0.60					
6. Bitterness about the loss	0.75/0.68					
7. Numbness	0.85/0.76					
8. Life feels unfulfilling	0.76/0.76					
9. Feeling stunned/dazed	0.84/0.80					
Symptom Checklist/Beck Depression Inventory						
1. Low energy		0.72/0.66				
2. Poor appetite		0.56/0.53				
3. Blaming yourself		0.58/0.34				
4. Feeling sad/unhappy		0.88/0.68				
5. Diminished pleasure		0.86/0.71				
6. Self is worthless		0.64/0.54				
Posttraumatic Stress Self-Report Scale						
1. Intrusive thoughts			0.74/0.71			
2. Dreams/nightmares			0.48/0.53			
3. Flashbacks			0.67/0.63			
4. Emotional reactivity			0.70/0.72			
5. Physical reactivity			0.71/0.61			
6. Avoiding thoughts				0.64/0.61		
7. Avoiding reminders				0.62/0.66		
8. Inability to recall moments					−/−	
9. Loss of interest					0.79/0.78	
10. Detachment					0.73/0.75	
11. Restricted affect					0.53/0.56	
12. Foreshortened future					0.62/0.57	
13. Disturbed sleep					0.57/0.57	
14. Irritability/anger					0.53/0.51	
15. Difficulties concentrating					0.68/0.66	
16. Hypervigilance						0.64/0.66
17. Exaggerated startle						0.68/0.78

should be addressed in the assessment and treatment of bereaved people seeking help.

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Conflict of interest

All authors declare that they have no conflicts of interest.

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