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Abstract

Background: High levels of prolonged grief symptoms (PGS) and posttraumatic stress symptoms (PTS) are relatively common following bereavement. The two types of bereavement complications share some but not all of the same features. Little research has studied which of the two precedes the other following the death of a loved one. The purpose of this study was to examine the temporal relationship between change in PGS and PTS during the first four years following old age spousal loss.

Methods: Participants were 237 Danes (40% male; mean age = 73 years, *SD* = 4.4; range 65-81) who during the year of 2006 lost their spouse. Participants completed self-report questionnaires at six months (n = 237), 13 months (n = 198), 18 months (n = 192), and 48 months (n = 213) post-loss. Main outcome measures were Inventory of Complicated Grief– Revised and the Harvard Trauma Questionnaire.

Results: Lower-level mediation analyses were performed. Results indicated that PGS mediated 83% of the relationship between time and PTS, while PTS only mediated 17% of the relationship between time and PGS. These results suggest that changes in PGS mediated changes in PTS following spousal bereavement to a greater extent than vice versa.

Conclusions: The findings in the present study indicate that changes in PGS may precede and potentially directly impact changes in PTS following bereavement. This tentative conclusion points to the potential value of targeting PGS in psychological interventions at an early point in the long term perspective following old age spousal bereavement.

Introduction

Prolonged Grief (PG) is characterized by longing and yearning for the deceased that persists at least 6 months after the death of a loved one.[1] PG is a distinct response from other post-bereavement reactions, including Posttraumatic Stress Disorder (PTSD), anxiety, and depression.[2-5] Prolonged grief symptoms (PGS) can be associated with enduring mental and physical morbidity.[6-8] PG has been proposed as a new diagnosis in ICD-11.[9], although the specific diagnostic definitions of PG continue to be debated.[10-11] Posttraumatic stress symptoms (PTS) have also been identified as potential psychological complication following bereavement.[12] Prevalence of high levels of PTS following bereavement ranges from 9-27%[13-18] suggesting that these reactions are relatively common following bereavement.

Although PGS and PTS are correlated after bereavement[19,20], especially regarding intrusion symptoms of PTSD[6] and with considerable comorbidity between the two disorders.[19,20] Taken together the literature, which mainly draws from general, non-clinical bereaved samples, suggests that PTSD and PG most likely are distinct post-bereavement syndromes with some overlap on specific symptoms.[2,4,5, 19-23.]

Studies have concluded that PTS is predictive of, or contributes to, the development of PGS.[24,25] In contrast, other studies reported that PGS is predictive of PTS, rather than vice versa.[26] In a study of traumatic adult bereavement, a substantial proportion of bereaved adults with PGS did not present with PTS, whereas most participants with high levels of PTS also presented with PGS.[27] The mixed results have contributed to different opinions about optimal approaches to treating these conditions, with some prioritizing PTS [28], while others suggest first focusing on PGS.[25,27] A significant limitation of studies to date is the reliance on cross-sectional designs, which preclude the establishing of temporal precedence of the disorders. It is important to establish temporal precedence of complicated bereavement reactions because this type of knowledge can guide

clinicians to select which disorder is most relevant to target first for maximum effect. To our knowledge there are no empirical, longitudinal studies to date about the temporal relationship between these two conditions. The present study addresses these limitations by applying a longitudinal design to directly investigate the temporal sequencing of PGS and PTS in the four years following old age spousal bereavement.

To examine temporal precedence of change in PGS and PTS, we conducted a multi-wave longitudinal study of adaptation to old age spousal bereavement. In clinical assessment of PGS, it is relevant to identify those with grief reactions severe enough to warrant treatment. This is done by separating participants with severe PGS in need of treatment from those with natural grief reactions whom are not in need of treatment. A dichotomous approach to identify "caseness" of Prolonged Grief Disorder vs. Not Prolonged Grief Disorder is thus often applied. In the present study we intended ensure maximum variability in our data to look at the relationship between overall symptoms of PGS and PTS in a general population of older bereaved people. Therefore a dimensional approach using the total scores on measures of PGS and PTS was selected. Specifically, we employed lower-level mediation modeling[29] to determine how changes in PGS over time impacted PTS and vice versa across four time-points between 6 and 48 months post the death of a spouse in old age. This allowed us to examine four possible relationships between the symptoms: (1) that changes in PGS mediate changes in PTS symptoms but not vice versa, (2) that changes in PTS symptoms mediate changes in PGS but not vice versa, (3) that change in PGS and PTS symptoms mediate changes in each other, and (4) that changes in PGS and PTS symptoms are unrelated.

Materials and Methods

Procedure

The data in this study originated from a larger, longitudinal study[17] that was subsequently extended with a four year follow-up. In the original study all persons aged between 65-80 years, who lived in the county of Aarhus, Denmark and who lost their spouse during 2006 were contacted via the Danish Central Person Register (CPR) eight weeks after the loss. The CPR is a national registration containing personal information regarding age, marital status, name of partner, place of residence etc. Four years post bereavement baseline participants were contacted to complete the final follow-up questionnaire. At this time-point each participant received an information letter, a questionnaire, a pre-paid response envelope, and a gift voucher of 50 DKr./ $10 (not conditional of response). This recruitment method has previously demonstrated to yield high response rates.[30] The project was approved by the regional ethics committee. In line with recommendations from the ethics committee, verbal informed consent was obtained.

Participants

Participants completed the self-report measures at two, six, 13, 18, and 48 months post spousal death. At baseline two months post loss 839 elderly bereaved people were identified[31] of which 330 persons responded (response rate 41%). Because data on PGS was only collected from the 6 month follow-up in the original study, this time point was selected as baseline in the present study. [31] Data from the six (*N* = 237), 13 (*N* = 198), 18 (*N* = 192), and 48 (*N* = 213) month time-points was analyzed (further information[17,31]). Thus, of the 237 participants at 6 months post loss 90% (*N* = 213) participated in the 4-year follow-up.

Measures

Data were collected through self-report questionnaires. The first part of the questionnaire indexed demographic and loss-related questions including education, years of marriage, number of children, sense of forewarning before the death, and spousal illness before death.

The second part of the questionnaire contained well validated measures of psychological constructs measuring PGS and PTS.

The Inventory of Complicated Grief–Revised (ICG-R[8]) was used to index the severity of PGS. The scale consists of 15 items focusing on separation distress and traumatic distress rated on a 5-point Likert scale (maximum range on total scale 15-75). These 15 items were summed to create a continuously expressed total score of PGS. The scale has been found to be a reliable and valid measure of complicated grief reactions.[7] This scale evidenced high reliability across the four time points in the present study (α = .91-93). No cut-off score or set of diagnostic criteria defining a PGD subset was applied on the data in the present study.

The Harvard Trauma Questionnaire, PTS subscale[32] was used to estimate the occurrence of PTS. Two DSM IV-items regarding sudden emotional and sudden physical reactions when confronted with reminders of the traumatic event were collapsed into one resulting in 16 and not the usual 17 items indexing DSM-IV symptoms of PTSD (range 16-64). Participants completed the HTQ, PTS regarding their reactions during the last month to death of their spouse. Each item was rated on a 4-point Likert scale. The Danish version of the HTQ has been found to be reliable and valid[33], with high reliability across scores on the four time points in the present study (α = .83-88).

Data analysis

Pearson's correlations were first performed on total scores from all 4 time points for PGS and PTS. We conducted lower-level mediation analyses using the linear mixed-models module of SPSS version 20.0. This approach was selected above a lagged approach because the advantage of a lagged approach was outweighed by the reduction in statistical power due to the loss of one time point[34] caused when applying lagged analysis on the present dataset with only 4 time-points. Lagged analyses are often used for data with multiple time points[35,36],

where the loss of one time-point has less impact on statistical power. In the present study we examined reversed models, which provide some evidence on directionality. Reversed models reduce the advantages of lagged models further.

In the present study we examined the potential mediating role of PTS in the relationship between time and PGS (see Figure 1), and the potential mediating role of PGS in the relationship between time and PTS (see Figure 2) using lower-level mediation, which is a statistical technique that facilitates the investigation of change in variables across time (representing Level 1 of the analysis), nested within participants (representing Level 2 of the analysis)[28,36] This statistical technique is flexible and powerful, as it allows the number of observations to vary between participants, and effectively handles missing data.[37,38] It has been used previously to investigate the naturalistic relationship between changes in PTS and depression in survivors of sexual assault[39], and the association between changes in PTS and depression in children in the context of treatment.[35, 36] This analysis is considered lower-level mediation as both the predictor and mediator variables were measured at Level 1 (at each of the four time points). We conducted two sets of analyses. The first investigated the mediating role of PGS in the relationship between time and PTS (e.g., investigating whether changes in PGS accounted for changes in PTS over time). The second examined the reverse, namely the mediating role of PTS in the relationship between time and PGS (e.g., investigating whether changes in PTS accounted for changes in PGS over time) using the procedures outlined by Bauer, Preacher and Gil (2006).[37] This analytic strategy allows for the simultaneous evaluation of all inter-variable relationships, facilitating the estimation of the mediation model in a single step. This is in contrast to other methods in which each inter-variable relationship is modeled in a separate step.[e.g.29] This single-step approach has several advantages over previous approaches. First, it yields a complete set of covariance values. This facilitates the

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derivation of actual, rather than estimated, values of the covariance between direct pathways. Second, it uses restricted maximum likelihood estimation (REML) which provides less biased parameter estimates than maximum likelihood estimation (ML) which is necessarily used in multi-step approaches to compare pathways. We used an Unstructured Covariance structure in each mediation model. We also evaluated the significance of indirect effects in each model, and calculated the percentage mediated as a measure of effect size.[37]

Results

Demographic information and symptom scores

Six months post loss 237 elderly bereaved people (40% male) with a mean age of 72.98 years (SD = 4.33; range 65-81) participated. The participants had been married for a mean of 45.57 years (SD = 10.94; range 3-62 years), with a mean of eight years attendance to public school (SD = 1.59; range 5-14 years), and three years (SD = 2.59; range 0-13 years) of higher education. Most (n = 220, 93%) had children (mean = 2.6; SD = 1.49; range 1-9), experienced a period of spousal illness preceding the death (89%), and had participated in the daily care of their spouse (n = 185, 78%). Six percent (n = 14) received help from a psychologist at some point after the death of their spouse. With the exception of higher education (F (1,147) = 4.1; p=0.045), with males (M= 3.97 years) having more years of higher education than women (M=2.56 years), no significant differences between males and females were found on the demographic variables.

Mean scores and standard deviations for PTS and PGS are displayed in Table 1.

Pearson's correlations

The relationship between total scores of PGS and PTS on all four time points was investigated using Pearson's correlations coefficients. There were strong, positive correlations between all variables at all time-points (see Table 2).

Time Effects

We initially evaluated model fit for models using linear, quadratic, and natural log representations of the time variable. Models were compared using Akaike's Information Criterion (AIC), with the model evidencing the lowest AIC value being judged as best fitting the data. Using the linear time variable yielded best model fit for models of the association between Time and PGS, and the association between Time and PTS, thus the linear time variable was used in subsequent analyses.

Lower Level Mediation Analyses

Results of the lower level mediation model examining the mediating role of PGS in the relationship between time and PTS is presented in Table 3. Findings indicated that PGS significantly decreased over time (Path A in Table 3, $B = -0.01$, $SE = 0.01$, $p<.001$). Changes in PGS fully mediated changes in PTS, such that time did not explain significant variance in PTS after controlling for the effects of PGS (Path *C'* in Table 3, $B = -0.01$, $SE = 0.01$, $p=0.42$). Analyses revealed a significant indirect effect of time on PTS (via PGS symptoms; $B = -0.003$, $SE = 0.001$ 95% CI = -0.004 to -0.002), and a significant total effect of time on PTS ($B = -0.004$, $SE = 0.001$ 95% CI = -0.006 to -0.002). Changes in PGS mediated 82.62% of the total effect of time on PTS.

Results of the lower level mediation model examining the mediating role of PTS in the relationship between time and PGS is presented in Table 4. Findings indicated that PTS in spite of marginal change in mean scores significantly decreased over time (Path A in Table 4, $B = -0.01$, $SE = 0.01$, $p<.001$). Changes in PTS partly mediated changes in PGS, such that the

relationship between time and PGS remained significant after controlling for the effects of PTS (Path *C'* in Table 4, $B = -0.01$, $SE = 0.01$, $p<.001$). Analyses revealed a significant indirect effect of time on PGS (via PTS; $B = -0.002$, $SE = 0.001$ 95% CI $= -0.004$ to -0.001), and a significant total effect ($B = -0.012$, $SE = 0.001$ 95% CI $= -0.015$ to -0.009). Changes in PTS mediated 17.21% of the total effect of time on PGS.

Discussion

In this study we conducted lower-level mediation analyses to examine the association between naturalistic changes in severity of PGS and PTS over four years following old age spousal bereavement. Results indicated that PGS mediated 83% of the relationship between time and PTS, while PTS only mediated 17% of the relationship between time and PGS. This suggests that changes in PGS impacted PTS to a greater extent than vice versa. There appears to be both shared and unique symptom-components between PGS and PTS. [10,19,21] Correlation analyses indicated strong, significant relationships between all outcome variables at all four time points. Correlations were stronger between PGS at the different time points (.70-.87) than between PGS and PTS (.52-.70).

As presented in Table 1 there were marginal change in PGS (*M*=32.8 vs. *M*=25.0) and even less so in PTS (*M*=29.5 vs. *M*=26.6) from 6 to 48 months post loss. Lack of change between measurement means is unrelated to the mediation analyses which are within-person. This means that there can be no overall change over time but still intra-individual changes in one variable that predict changes in another which is in line with the findings of this study.

Results from this study are in line with previous research concluding that PGS and PTS are related, but still distinct phenomena. This is further supported by the finding in this study that correlations were stronger between PGS at the different time points than between PGS and PTS. Changes in PGS had a considerably stronger impact on subsequent changes in PTS than

vice versa in the lower level mediation analyses. Had PGS and PTS been expressions of the same latent variable, we would expect to find a bidirectional relationship between PGS and PTS where change in both constructs predicted approximately the same amount of variance in change in the other construct. This finding points to existence of directionality of change, with change in PGS coming before change in PTS following spousal bereavement. Following this line of thought, it is possible that reductions in symptoms of PGS may lead to decreased levels of PTS. This observation accords with the proposal that the defining features of PGS, which include yearning for the deceased and preoccupation with the loss, are pivotal in maintaining the bereavement-related distress[21] and that reduction of symptoms of yearning and preoccupations with the loss may reduce bereavement-related distress on an overall level. The results of this study also underscore the appropriateness of developing diagnostic structures that formally recognize a bereavement specific psychiatric disorder, such as in ICD-11.[9] There is increasing evidence of mechanisms that contribute to people with PGS experiencing elevated distress, including hypervigilance to loss reminders[40], disproportionate retrieval of loss-related memories[41], avoidance[42], and maladaptive appraisals about the loss.[43] These factors may all contribute to the potential impact of PGS on PTS.

The findings of this study may also have relevant treatment implications. Research has demonstrated the efficacy of interventions targeting PGS.[e.g. 44,45] The impact of changes in PGS on subsequent changes in PTS in the present study suggest, that it might be more relevant to first target PGS in bereaved individuals with co-morbid PTS. This is in contrast to previous assertions that PTS precedes PGS and should be targeted first.[23,24,27] We note that this study applied a dimensional approach on a sample that did not focus on people with disorder, and so the results of this study cannot be generalized to treatment samples or to time-points earlier than 6 months post loss.

This study is associated with a number of limitations. First, we only assessed PGS after 6 months which is also the minimum timeframe that PG can be diagnosed within. Future research may benefit from investigating the relationship between PGS and PTS in the acute phase following bereavement. Second, we used self-report measures of PGS and PTS rather than structured clinical interviews, and therefore were unable to investigate the relationship between clinical diagnoses of PGD and PTSD. Third, the present study included elderly people who were conjugally bereaved within a year in a defined geographical area. This may limit the generalizability of the findings to other populations. Furthermore, the death of the partner in old age may be considered more timely and expected than more sudden, unexpected or violent loss and thus old age spousal loss may presumably be less stressful than more unexpected losses. If this is the case, the finding of this study may not be applicable to other bereaved populations. However, results from the original first part of this study were analysed elsewhere and showed that 16% of the populations had clinically relevant symptoms of PTS across the four time-points in the first 18 months after the loss.[17] This indicates that timeliness of the loss considered, the death of the spouse in old age may very well be a traumatic stressor for some in line with more unexpected or untimely interpersonal losses. [17] Lastly, due to the specific scope and limited space for this paper we examined the relationship between only two constructs. Co-morbidity between multiple disorders is relatively common in complicated grief. [1-4, 15,18,19] Including only two constructs thus pose a potential limitation in applying the results from this study on clinical samples. Future research may benefit from a multi-construct approach also including data on symptoms of post-loss depression and anxiety.

Future research may also investigate the longitudinal relationship between changes in PGS and PTS in different bereavement populations, such as the relationship between PGS and PTS

in populations with clinically relevant PGS and PTS and including data on the first months post loss as well as in clinical intervention studies.

These limitations notwithstanding, the present study represents the first prospective investigation of the relationship between changes in PGS and PTS in elderly bereaved people. Our findings indicate that changes in PGS may precede and potentially directly impact changes in PTS following old age spousal bereavement and points to the potential utility of targeting PGS in psychological interventions in the long term perspective following bereavement.

Acknowledgements

References

1. Prigerson HG, Frank E, Kasl SV, Reynolds CF, Anderson B, Zubenko GS. Complicated grief and bereavement-related depression as distinct disorders: Preliminary empirical validation in elderly bereaved spouses. Am J Psychiat. 1995b;152:22-30.

2. Barnes JB, Dickstein BD, Maguen S, Neria Y, Litz BT. The distinctiveness of prolonged grief and posttraumatic stress disorder in adults bereaved by the attacks of September 11th. J Affective Disorders. 2012;133:366-369.

3. Boelen MA, van den Bout J, de Keijser J. Traumatic grief as a distinct disorder from bereavement related depression and anxiety: A replication study with bereaved mental health care patients. Am J Psychiat. 2003;160:1339-1341.

4. Boelen, PA, van den Schoot R, van den Hout MA, de Keijser J, van den Bout J. Prolonged grief disorder, depression, and posttraumatic stress disorder are distinguishable syndromes. J Affective Disorders. 2010;12: 374-378.

5. Golden AJ, Dalgleish T. Is prolonged grief distinct from bereavement-related posttraumatic stress? Psychiat Res. 2010;17:336-341.

6. Boelen PA, van den Hout M, van den Bout J. The factor structure of posttraumatic stress disorder symptoms among bereaved individuals: A confirmatory factor analysis study. Journal of Anxiety Disorders. 2008;22:1377-1383.

7. Jacobs S, Mazure C, Prigerson H. Diagnostic criteria of complicated grief. Death Studies. 2000;24:185-199.

8. Prigerson HG, Maciejewski PK, Reynolds CFI, Bierhals AJ, Newsom JT, Fasiczka A, et al. Inventory of Complicated Grief: A scale to measure maladaptive symptoms of loss. Psychiat Res. 1995b;59:65-79.

9. Maercker A, Brewin CR, Bryant RA, Cloitre M, Reed GM, van Ommeren M, Humayun A, Jones L, Kagee A, Llosa AE, Rousseau C, Somasundaram D, Souza R, Suzuki Y, Weissbecker I, Wessely S, First MB, Saxena S. Proposals for mental disorders specifically associated with stress in the ICD-11. The Lancet. 2013;381:1683-1685.

10. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. Fifth Edition. DSM-5. Arlington, USA: American Psychiatric Association, 2013.

11. Stroebe M, Schut H, Van Den Bout J. (eds.). Complicated grief. Scientific foundations for health care professionals. London: Routledge, 2013.

12. Bonanno GA, Kaltman S. Toward an integrative perspective on bereavement, Psychol Bull. 1999;125:760-776.

13. Brady KL, Acierno RE, Resnick HS, Kilpatrick DG, Saunders B E. PTSD symptoms in widowed women with lifetime trauma experiences. J Loss Trauma, 2004;9:35-43.

14. Elklit A, O'Connor M. Post-traumatic stress disorder in a Danish population of elderly bereaved. Scand J Psychol. 2005;4:439-445

15. Melhem NM, Rosales C, Karageorge J, Reynolds CF, Frank E, Shear M K. Comorbidity of Axis I disorders in patients with traumatic grief. J Clin Psychiat. 2001;62:884-887.

16. Zisook S, Chentsova-Dutton Y, Shuchter SR. PTSD following bereavement. Annals Clin Psychiat. 1998;10:157-163.

17. O'Connor M. A longitudinal study of PTSD in the elderly bereaved: Prevalence and predictors. Aging Men Health.2010a;14(6):670-678.

18. Onrust SA, Cuijpers P. Mood and anxiety disorders in widowhood: A systematic review. Aging Ment Health. 2006;10:327-334.

19. Lichtenthal WG, Creuss DG, Prigerson HG. A case for establishing complicated grief as a distinct mental disorder in DSM-V. Clin Psychol Review. 2004;24:637–662.

20. O'Connor M, Lasgaard M, Shevlin M, Guldin M. A Confirmatory Factor Analysis of Combined Models of the Harvard Trauma Questionnaire and the Inventory of Complicated Grief-Revised: Are We Measuring Complicated Grief or Posttraumatic Stress? J Anxiety Disorders. 2010;24:672-679.

21. Prigerson HG, Horowitz MJ, Jacobs SC, Parkes CM, Aslan M, Goodkin K, et al. Prolonged Grief Disorder: Psychometric validation of criteria proposed for DSM-V and ICD-11, PLoS Med. 2009;6:1-10.

22. Bonanno GA, Neria Y, Mancini A, Coifman KG, Litz B, Insel B. Is There More to Complicated Grief Than Depression and Posttraumatic Stress Disorder? A Test of Incremental Validity. J Abnormal Psychol. 2007;116;342-351.

23. Simon, N.M. (2012). Is complicated grief a post-loss traumatic disorder? Dep Anxiety. 2012;19:541-544.

24. Guarnerio C, Prunas A, Fontana ID, Chiambretto P. Prevalence and comorbidity of prolonged grief disorder in a sample of caregivers of patients in a vegetative stage. Psychiat Quart. 2012;83:65-73.

25. Nakajima S, Ito M, Shirai A, Konishi T. Complicated grief in those bereaved by violent death: the effects of posttraumatic stress disorder on complicated grief. Dialogues Clin Neuroscience. 2012;14:210-214.

26. Boelen PA, Prigerson HG. The influence of symptoms of prolonged grief disorder, depression, and anxiety on quality of life among bereaved adults. Europ Arch Psychiat. 2007;257:111-152.

27. Shear KM, Jackson CT, Essock SM, Donahue SA, Felton CJ. Screening for complicated grief among project liberty service recipients 18 months after September 11th. Psychiat Services. 2006;57:1291-1297.

28. Swan AH, Scott, C. Complicated grief: implications for the treatment of posttraumatic stress disorder. Sexual Relationship Ther. 2009;24:16-29.

29. Kenny DA, Korchmaros JD, Bolger N. Lower level mediation in multilevel models Psychol Methods 2003;8:115-128.

30. O'Connor M. The Challenge of Recruiting Control Groups. An Experiment of Different Recruitment Models in the Control Group of a Clinical Psychological Postal Survey. Qual Quant. 2011;45:743-750.

31. O'Connor M. PTSD in elderly bereaved people. Aging and Mental Health. 2010b;14(3):310-318.

32. Mollica R F, Caspi-Yavin Y, Bollini P, Truong T, Tor S, Lavelle J. The Harvard Trauma Questionnaire: Validating a Cross-Cultural Instrument for Measuring Torture, Trauma, and Posttraumatic Stress Disorder in Indochinese Refugees. J Nervous Mental Disease. 1992;180:111-116.

33. Bach ME. En empirisk belysning og analyse af „Emotional Numbing" som eventuel selvstændig faktor i PTSD [An empirical investigation and analysis of "Emotional Numbing" as a possible independent factor in PTSD]. Psykologisk Tidsskriftserie, 2003;5:1-199.

34. Anholt GE, Aderka IM, van Balkom JLM, Smith JH, Hermesh H, van Oppen P. The impact of depression on the treatment of obsessive-compulsive disorder: Results from a 5-year follow-up. J Affective Disorders. 2011;13: 201-207.

35. Aderka IM, Foa EB, Applebaum E, Shafran N, Gilboa-Schechtman E. Direction of influence between posttraumatic and depressive symptoms during prolonged exposure therapy among children and adolescents. J Consult Clin Psych. 2011;79:421-425.

36. Aderka IM, Gillihan SJ, McLean C P, Foa EB. The relationship between posttraumatic and depressive symptoms during prolonged exposure with and without cognitive restructuring for the treatment of posttraumatic stress disorder., J Consult Clin Psych. 2013;81:375-382.

37. Bauer DJ, Preacher KJ, Gil KM. Conceptualizing and testing random indirect effects and moderated mediation in multilevel models: New procedures and recommendations Psychol Methods, 2006;11:142-163.

38. Raudenbush SW. Comparing personal trajectories and drawing causal inferences from longitudinal data. Annu Rev Psychol. 2001;52:501-525.

39. Nickerson A, Steenkamp M, Aerka IM, Salters-Pedneault K, Carper TL, Barnes JB, Litz BT. Prospective investigation of mental health following sexual assault. Dep Anxiety. 2013;30:444-450.

40. Maccallum F, Bryant RA. Attentional bias in complicated grief. J Affect Disorders. 2010;125:316-322.

41. Maccallum F, Bryant RA. Self-defining memories in complicated grief. Behav Res Ther. 2008;46:1311-1315.

42. Fraley RC, Bonanno GA. Attachment and loss: A test of three competing models on the association between attachment-related avoidance and adaptation to bereavement. Personality and Social Psychology Bulletin. 2004;30:878-890.

43. Boelen PA, van den Bout J, van den Hout MA. Negative cognitions and avoidance in emotional problems after bereavement: A prospective study. Behav Res Ther. 2006;44:1657-1672.

44. Boelen PA, de Keijser J, van den Hout MA, van den Bout J. Treatment of complicated grief: A comparison between cognitive-behavioral therapy and supportive counselling. J Consult Clin Psych, 2007;75: 277-284.

45. Shear K, Frank E, Houck PR, Reynolds CF. Treatment of complicated grief. A randomized

controlled trial. JAMA. 2005;293:2601-2608.

Figure 1. Model of mediating role of PGS in relationship between time and PTS

Figure 2. Model of mediating role of PTS in relationship between time and PGS

Table 1. Means and standard deviations of PTS and PGS at each post loss timepoint.

	Mean (SD)
PTS 6 months	29.54 (8.48)
PTS 13 months	29.48 (7.86)
PTS 18 months	28.64 (7.59)
PTS 48 months	26.62 (6.99)
PGS 6 months	32.79 (10.64)
PGS 13 months	31.53 (10.76)
PGS 18 months	30.03 (10.26)
PGS 48 months	24.98 (9.34)

Table 2. Pearson's correlations between total scores of PGS and PTSD at all four time points

		1	2	3	4	5	6	7
1	PGS 6 months							
2	PGS 13 months	.87						
3	PGS 18 months	.81	.86					
4	PGS 48 months	.70	.76	.72				
5	PTS 6 months	.67	.58	.55	.47			
6	PTS 13 months	.55	.59	.57	.55	.81		
7	PTS 18 months	.57	.57	.65	.60	.73	.57	
8	PTS 48 months	.54	.52	.61	.70	.70	.54	.75

Note. All correlations ($p < .01$ (2-tailed))

Table 3. Mediating role of PGS in relationship between time and PTS

Path	Predictor	Outcome	*B*	*SE*	*T*	*P*
A	Time	PGS	-0.01	0.01	-10.27	<.001
B	PGS	PTS	0.35	0.03	11.45	<.001
C'	Time	PTS	-0.01	0.01	-0.77	0.42

Table 4. Mediating role of PTS in relationship between time and C symptoms

Path	Predictor	Outcome	*B*	*SE*	*T*	*P*
A	Time	PTS	-0.01	0.01	-5.33	<.001
B	PTS	PGS	0.47	0.05	9.2	<.001
C'	Time	PGS	-0.01	0.01	-10.14	<.001

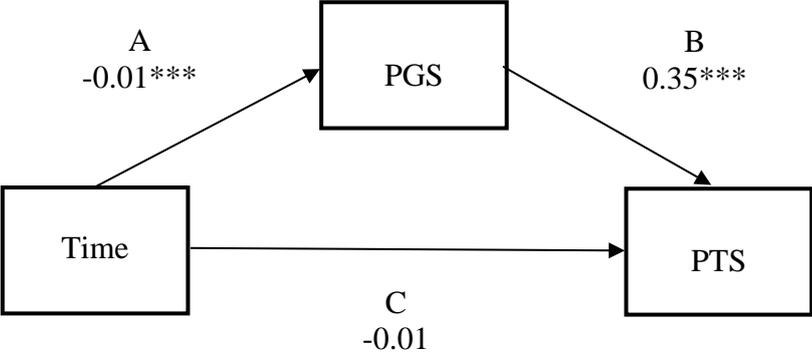Figure 1. Model of mediating role of PGS in relationship between time and PTS

Figure 2. Model of mediating role of PTS in relationship between time and PGS

A
-0.01***

PTS

B
0.47***

Time

PGS

C
-0.01***