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Prolonged grief reactions after old age spousal loss and centrality of the loss in post loss identity

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Abstract

Background: The loss of a spouse is a major life event. Previous research found that centrality of the loss to one's identity using Centrality of Event Scale (CES) is related to complicated bereavement reactions, such as depression, posttraumatic stress symptoms (PTS), and prolonged grief symptoms (PGS). This study aims to examine loss-centrality in elderly bereaved people up to 4 years post loss, to determine the relation of loss-centrality to complicated bereavement reactions, such as PGS, depression, and PTS, and to identify early predictors of loss-centrality.

Method: Self-reported data were collected from 208 elderly bereaved people (mean age 72 years, 63.9% women), who completed measures of psychological distress (PTS, depression, PGS) as well as intra- and interpersonal factors (coping-style, crisis support, satisfaction with life, and NEO-PI-R) at 2, 6, and 48 months post spousal loss. CES was measured 48 months post spousal loss.

Results: In line with previous findings (Boelen, 2012a), loss-centrality 4 years following the loss was significantly related to depression, PTS, and PGS. Additionally, early PGS and gender predicted later loss-centrality.

Limitations: Self-report data was used rather than clinical interviews. CES was only measured 48 months post loss. PGS was first measured 6 months post.

Conclusions: The results support the link between loss-centrality and post loss psychopathology in a population particularly vulnerable to complicated

bereavement reactions. The close link between prolonged grief and CES may be relevant in developing treatments for PGS, especially considering the potential relationship between high CES, high PGS, and possibly lack of acceptance of the loss.

Key words: Bereavement; complicated bereavement; prolonged grief disorder; elderly/aging; centrality of event scale.

Introduction

For 10 to 15 percent of bereaved people, the death of a loved one results in the development of complicated bereavement reactions (Bryant, 2013; Prigerson, 2004), such as depression, bereavement-related posttraumatic stress disorder (PTSD), and prolonged grief disorder (PGD) (Maciejewski, Maercker, Boelen & Prigerson, 2016; Prigerson et al., 2009). PGD is a clinical condition that covers specific grief reactions including daily symptoms of longing and yearning for the deceased, pangs of grief, difficulties accepting the loss, and difficulties moving on without the deceased (Maciejewski et al., 2016; Prigerson et al., 2009; Bryant, 2013). Previous studies show that symptoms of PGD are distinct from other types of complicated bereavement reactions, such as depression and PTSD - and, if left untreated, PGD is associated with significant impairments in health and quality of life (Prigerson, Frank et al., 1995; Prigerson et al., 2009).

In the past decade, several studies have attempted to identify risk factors for the development of PGD as well as other difficulties in adjusting to the death of a loved one (for a review, see Burke & Neimeyer, 2013). However, the multidimensional nature of adaptation to loss makes it difficult to identify specific risk factors predicting PGD, leading to the possibility that some risk factors have been overlooked.

One such risk factor may be the centrality of the loss event to the bereaved individual's self-identity and life story. With the centrality of event concept, Berntsen & Rubin (2006, 2007) proposed that highly emotional memories including traumatic events indeed remain highly accessible within memory, since

unusual and emotionally intense events are most likely to violate our schema-driven expectations. Consequently, the memory of the traumatic event forms multiple links to other memories in the autobiographical knowledge system and therefore becomes a highly integrated reference point in an individual's life story and, thus, more central to their identity (Berntsen, Willert, & Rubin, 2003). To measure event-centrality to identity, Berntsen & Rubin (2006) created the Centrality of Event Scale (CES) based on research on stressful and traumatic events.

CES-scores for different populations and with different types of trauma have been found to be related to PTSD symptoms (e.g. Blix, Solberg, & Heir, 2014; Webb & Jobson, 2011), supporting the theoretical position that higher levels of event-centrality for stressful or traumatic events are associated with higher levels of psychopathology.

Losing a loved one represents a highly emotional life-event. A number of studies provide preliminary evidence that such loss-events as highly central to identity may be related to complicated bereavement reactions such as PGD, depression and PTSD following personal loss (Boelen, 2009; 2012a; 2012b; 2017).

In a cross-sectional study controlling for a number of factors, Boelen (2009) found that loss-centrality was a significant predictor of PGD symptoms. In contrast, the relationship between loss-centrality and other forms of complicated bereavement reactions, such as symptoms of PTSD and depression, disappeared when controlling for personality factors, cognitive-behavioural variables, and concomitant symptoms. Boelen (2009) also found that loss related distress was

strongly associated with increased inclusion of the deceased within autobiographical information. Similarly, Maccallum & Bryant (2008) found frequent inclusion of the deceased in self-defining memories of patients with PGD. In a longitudinal study, Boelen (2012a) found that loss-centrality significantly predicted symptoms of PGD, depression, and PTSD 1 year following the loss, of which the strongest association was identified between depression and loss-centrality. Overall, Boelen (2009) found that loss-centrality strongly predicted symptoms of PGD, whereas Boelen (2012a; 2012b) found that loss-centrality predicted PGD, depression, and PTSD 1 year following the loss. These data suggest that, 1 year following the loss, loss-centrality predicts a wider range of complicated bereavement reactions as well as PGD symptoms.

The present study extends the line of research conducted by Boelen (2009; 2012a; 2012b) by investigating the relationship between loss-centrality and complicated bereavement reactions 4 years post loss in a particularly vulnerable group, that is, older individuals who have lost their spouse.

Elderly people have a comparatively high frequency of interpersonal loss, in particular loss of spouse. Moreover, the prevalence of PGD is high in both elderly people and individuals who have lost their spouse (Lundorff, Holmgren, Farver-Vestergaard, I. Zachariae, & O'Connor, 2017; Newson, Boelen, Hek, Hofman, & Tiemeier, 2011; Kersting, Brähler, Glaesmer & Wagner; 2011). These findings suggest that elderly people who have lost their spouse may be particularly vulnerable to the experience of PGD, which is why it is important to investigate risk factors for PGD in this population.

Based on Boelen's findings (2009; 2012a; 2012b), the overall goal of the present study is to explore how loss-centrality relates to complicated bereavement reactions 4 years post loss in a potentially vulnerable population, namely elderly people who have lost their spouse. The study has two main aims. The first aim is to investigate the extent to which degree loss-centrality predicts symptoms of prolonged grief symptoms (PGS), depression, and symptoms of posttraumatic stress (PTS) 4 years post loss, controlling for loss related variables, intra- and interpersonal variables, and baseline level psychopathology. Based on previous findings (Boelen, 2012), we expect high levels of loss-centrality to predict increased levels of PGS, depression, and PTS.

A growing number of studies show that event-centrality predicts increased levels of psychopathology (Boals, 2014; Boelen, 2012a, 201b, 2017; Blix, Birkeland, Solberg, Hansen, & Heir, 2016), whereas early predictors of event-centrality have received little attention. Boals (2010) has found that women as compared to men are more likely to rate negative events as central to identity, and Ogle, Siegler, Bechkam, & Rubin (2016) have found that higher levels of neuroticism predict higher levels of event-centrality. By emphasizing the emotionality, rehearsal, and centrality of traumatic memories, Ogle et al. (2016) have also demonstrated that neuroticism contributes to PTSD symptoms. The above studies indicate that the directional relationship between event-centrality and event-related psychopathology remains unclear, which is why the extent to which symptoms of psychopathology lead to increased levels of event-centrality needs to be addressed in research. Consequently, the second aim of this study is to investigate

if loss-centrality 4 years post loss was predicted by baseline levels of loss related variables, intrapersonal variables, and early PGS, PTS and depression symptoms.

Method

Procedure and participants

The data in this study originate from a large longitudinal study (see O'Connor, 2010a and 2010b; O'Connor, Nickerson, Aderka, & Bryant, 2015). The present study includes self-report data from elderly bereaved people, who have lost their spouse, at 2 months (Time 1), 6 months (Time 2), and 48 months (Time 3) post loss.

Out of the 296 participants at baseline, 213 took part in the 4-year follow-up 48 months post loss (response rate = 72%). Due to poor data quality at baseline, 5 cases were excluded, leaving a total of 208 participants. Table 1 summarizes characteristics of the participants.

Measures

The data were collected via self-report questionnaires. Demographic information on gender, education, length of marriage, number of children, and information about the loss event was obtained at Time 1. The following loss event variables were selected for use in this study: sense of forewarning before death of spouse (yes/no), spousal illness preceding death (yes/no), duration of illness (months),

and participation in daily caregiving (yes/no). 7-point Likert scale items were utilized to obtain information about the following loss-event variables: feelings of distress, death anxiety, and helplessness in relation to the death situation, close friends, and emotional loneliness ("I feel lonely even when I am with others").

The second part of the questionnaire contains a number of measures for assessment of various aspects of psychological well-being, as follows:

Symptom measures and event centrality:

The Inventory of Complicated Grief-revised (ICG-r) short form

The ICG-r short form is a short version of the ICG (Prigerson & Jacobs, 1995; Prigerson, Maciejewski, et al., 1995; Schneider, Elhai & Gray, 2007). In this study, we used a Danish version of the ICG-r short form, which has been validated in Danish populations (Guldin, O'Connor, Sokolowski, Jensen & Vedsted, 2011; O'Connor, Lasgaard, Shevlin & Guldin, 2010). The scale consists of 29-items for measuring PGS of which only the 15 items corresponding to the original consensus criteria of complicated grief were applied in the present study (Schneider et al., 2007; Guldin et al., 2011). Participants rate the presence of symptoms in the last month on a 5-point Likert scale ranging from 1 (never) to 5 (always). In the original study, data on PGS were included from Time 2 (6 months post loss). Thus, this data included as a baseline measure in the present study. Due to lack of participation at 6-month follow-up (Time 2), 39 persons (19%) were excluded, leaving a total of 169 persons who responded to PGS at both time points. 3 persons were excluded due to poor data quality (n=166). PGS showed excellent internal consistency across time points ($\leq .91-.93$).

The Beck Depression Inventory (BDI)

The BDI (Beck et al., 1988) is a 21-item self-report measure used for assessing severity of depressive symptoms over the past two weeks. Each item consists of statements describing the symptom in question at varying degrees of intensity (range 0-3). For ethical reasons, item 21, which pertains to sexuality, was excluded at Time 1, leaving a total of 20 items with good internal consistency (≤ 0.87). When item 21 was included in the BDI at Time 3, the scale also demonstrated good internal consistency (≤ 0.88).

The Harvard Trauma Questionnaire-Part IV (HTQ)

The Harvard Trauma Questionnaire PTS subscale (Mollica, Caspi-Yavin, Bollini, & Truong, 1992) was used to estimate the occurrence of PTS. The participants completed the HTQ concerning their reactions during the last month to the 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 (Bach, 2003), with good reliability across scores on the two time points in the present study ($\leq .81-.83$).

The Centrality of Event Scale (CES)

The CES (Berntsen & Rubin, 2006) is a measure for assessing the extent to which a traumatic event is central to one's everyday inferences, life-story, and identity. This study utilized the 7-item version of CES (Berntsen & Rubin, 2006). Items were

rated on a 5-point scale ranging from 'totally disagree' to 'totally agree'. In the present study the loss of a spouse was the most distinctive stressful life event. The CES was only utilized at Time 3, and it showed excellent internal consistency (≤ 0.93).

Other outcome measures

The NEO Personality Inventory-Revised (NEO-PI-R) (McCrae & Costa, 2004); *The Coping Style Questionnaire (CSQ)* (Roger, Jarvis, & Naiarian, 1993); *The Satisfaction With Life Scale (SWLS)* (Diener, Emmons, Larsen, & Griffin, 1985), and *The Crisis Support Scale (CSS)* (Joseph, Andrew, Williams, & Yule, 1992), were selected as additional outcome measures. See O'Connor (2010b) for further information on these scales. In this study measures for NEO-PI-R, CSQ, SWLS, and CSS were included at time 1.

Timing of assessment

In the present study baseline consisted of data collected at time 1 (2 months post loss) but symptom scores of PGS were included from time 2 (6 months post loss), since PGS was only measured from time 2 in the original study. No other measures from time 2 were included in this study.

Missing values

On subscales with fewer than 50% missing values and a Cronbach's α value > 0.7 , the missing values were substituted with the mean of the remaining

filled items on the subscale as recommended by Schafer & Graham (2002). Less than 10% of the subscales had any missing values and the majority of these only had one or two missings. The above procedure was completed for these subscales. Subscale scores with $\geq 50\%$ missing values were coded as missing, and no total score was calculated.

Results

Correlational analysis

Pearson's Correlations were conducted to examine the relationships between loss-centrality, PGS, depression, and PTS, 4 years post loss. A number of significant correlations between outcome and predictor variables at time 3 were identified (see Table 2). Most pertinent to the aims of this study, the symptom measures of depression, PTS, and PGS, were strongly positively correlated with the the CES-scores, and with each other.

The CES-scores were also significantly positively correlated with feeling of distress, death anxiety, helplessness in relation to the death situation, and emotional coping style. Additionally, the CES-scores were significantly positively correlated with emotional loneliness and neuroticism, but the correlations were small. Small but significant negative correlations between CES and SWLS, presence of illness, and length of illness emerged. Importantly, no correlations were identified with an $r > .80$ (all r 's $< .72$), therefore multicollinearity was not an issue in the subsequent multiple regression analysis.

Does loss-centrality predict complicated bereavement reactions?

Hierarchical multiple regression analyses were conducted to examine the degree to which CES-scores explained variance for PGS, depression, and PTS scores, at time 3 respectively, when taking into account relevant loss related variables, intra- and interpersonal variables, and the shared variance between symptom scores at baseline (Table 3).

In line with the procedure applied by Boelen (2009; 2012a), predictors were entered sequentially in blocks. The majority of variables were included inspired by the findings by Boelen (2009, 2012a) and a meta-analysis by Burke & Neimeyer (2013). Previous research has included demographic variables, but findings related to PGD are contradictory (Burk & Neimeyer, 2013). In the present study, demographic variables did not correlate significantly with complicated bereavement reactions, which is why they were not included in the regression analyses. To obtain the best foundation for comparison of the findings the order in which blocks of items were entered into the regression model is in line with Boelen (2012). Including the baseline symptom scores at step 4 also allowed us to control for overlap between symptoms scores at baseline and 4-year follow-up.

Block 1: Loss related variables

Relevant loss related variables explained 23% of the variance in PGS, $F(6, 89)=4.46$, $p=.001$, and 22% in PTS ($F(6, 90)=4.15$, $p=.001$). More specifically, feeling of distress explained unique variance in PGS, and feeling of helplessness

explained unique variance in PTS. Loss related variables alone did not significantly predict symptoms of depression ($F(6, 90)=1.14, p=.35$).

Block 2: Intrapersonal variables

The overall regression models for PGS ($F(10, 85)=2.75, p=.006$) and PTS ($F(10, 86)=4.50, p=.001$) continued to significantly predict psychopathology symptoms following the inclusion of intrapersonal variables in block 2. Intrapersonal variables did not explain any additional variance in the models for PGS and depression. Feeling distressed in relation to the loss remained the explanation of a significant proportion of unique variance for PTS, accounting for an additional 13% of the variance in the overall model. The model did not significantly predict symptoms of depression ($F(10, 86)=1.90, p=.45$).

Block 3: Interpersonal variables

The inclusion of interpersonal variables in the models accounted for a significant proportion of the variance in PGS (9%; $F(13, 82)=3.16, p=.001$), and depression (14%; $F(13, 83)=2.05, p=.03$). More specifically, feelings of distress in relation to spousal death and emotional loneliness explained a unique proportion of the variance for PGS, while emotional loneliness explained a unique proportion of the variance for depression. Although the overall model remained significant for PTS ($F(13, 83)=3.78, p=.001$), interpersonal variables did not significantly account for any additional variance.

Block 4: Symptoms at baseline

In block 4, symptoms scores at baseline were entered to control for overlap between symptoms scores at baseline and 4-year follow-up. Block 4 explained a significant proportion of the variance for all 3 regression models: 25% of the variance for PGS ($F(16, 79)=6.82, p=.001$), 9% for depression ($F(16, 80)=2.46, p=.004$), and 14% for PTS ($F(16, 80)=5.13, p=.001$). More specifically, emotional loneliness explained a unique variance for depression. PGS scores at baseline explained a unique proportion of the variance in PGS and PGS, and PTS scores at baseline explained a unique variance for PTS at 4-year follow-up.

Block 5: CES

In block 5, the CES-scores collected at time 3 were entered to investigate if they significantly predicted variation in PGS, depression, or PTS, at time 3 - taking other variables entered into the models into consideration. The CES-scores accounted for a significant proportion of the explained variance for all 3 symptom groups 4 years post loss: CES-scores accounted for 11% of the explained variance for PGS ($F(17, 78)=10.35, p=.001$), 13% for depression ($F(17, 79)=3.97, p=.001$), and 9% for PTS ($F(17, 79)=6.98, p=.001$). In addition to CES-scores, feeling of distress, PGS, as well as PTS at baseline explained unique variance in PGS at follow-up. Emotional loneliness and depression symptom-scores at baseline explained unique variance in depression at follow-up. Finally, the PTS baseline symptom level explained unique variance in PTS at follow-up.

Once all variables were entered into the three regression models, 69%, 46%, and 60%, of the variance were accounted for in PGS, depression and PTS respectively. As hypothesized, CES-scores significantly predict PGS, depression, and PTS, in elderly people following the loss of a loved one, 4 years post loss.

What predicts long-term loss-centrality

To identify early predictors of loss-centrality a hierarchical multiple regression analysis was conducted with CES as outcome variable. Predictors collected at baseline were then entered sequentially in blocks. Outcomes of the regression model are shown in Table 4.

The regression model for relevant demographic and loss related variables was significant ($F(5, 80)=2.47, p=.04$), but no specific variables accounted for a unique proportion of the variance.

The addition of intrapersonal variables to the model did not significantly account for any additional variance ($F(9, 76)=1.98, p=.053$).

In block 3, symptoms scores at baseline significantly accounted for an additional 14% of the explained variance of CES ($F(12, 73)=3.01, p=.002$). More specifically gender and PGS symptom level at baseline explained a unique proportion of the variance. The full regression model explained 33% of the variance of CES-scores.

Discussion

Building on the work of Boelen (2009, 2012a, 2012b, 2017), the first aim of this study is to investigate the relationship between loss-centrality and PGS, depression, and PTS, in a population vulnerable to high levels of bereavement-related psychopathology, namely elderly people who have lost their spouse (Newson et al., 2011, Kersting et al., 2011). The second aim is to utilize the prospective nature of the study to explore potential early predictors of CES at 4 years post spousal loss.

In relation to the first aim, hierarchical regression analyses confirm that higher levels of loss-centrality significantly predict higher levels of PGS, depression, and PTS, in elderly people 4 years following spousal loss. These findings are in line with the findings of Boelen (2009, 2012a, 2012b, 2017) showing that loss-centrality predicts concurrent and prospective symptoms of bereavement-related psychopathology after controlling for a number of variables. The findings of the present study thereby provide further evidence demonstrating a link between loss-centrality and post loss psychopathology, and they support previous research linking event-centrality and post-event psychopathology more generally (e.g. Blix et al., 2014, Webb & Jobson, 2011).

Taken together, such findings lend further support to the position that even though the development of CES is based on the theoretical models of posttraumatic stress (Berntsen & Rubin, 2006, 2007; Berntsen et al., 2003) loss-centrality is found to be associated with types of complicated bereavement reactions other than PTSD. Therefore, this is an indication of the fact, that higher

levels of event-centrality in identity are associated with higher levels of post-event psychopathology across a variety of populations (general population, elderly people), and a variety of events (traumatic, loss related). Although CES originally was developed as pertaining to a traumatic event, it also appears to capture other negative events that can become central to identity such as loss of a loved one. In this study as in Boelens (2012) work CES appears to be closely related to prolonged grief reactions as well as to bereavement related PTSD or depression. As loss of a loved one often includes the loss of a significant figure that has been a part of daily living for many years, it is not surprising that this event is closely related to identity, and that high loss-centrality is related to different types of complicated bereavement reactions such as PGS and bereavement related depression and PTSD. Future bereavement research may benefit from investigating these relationships further.

The outcome of this study demonstrates that the concurrent relationships between loss-centrality and complicated bereavement reactions are robust in that they continue to exist up to 4 years post loss, and remain to exist when they undergo control for loss related variables, intra- and interpersonal variables, and bereavement-related symptoms of psychopathology at baseline. In addition to concurrent event-centrality, a number of variables assessed at baseline were found to predict symptoms of psychopathology 4 years post loss. In line with Boelen (2012), baseline symptoms of psychopathology predict symptoms of psychopathology prospectively. Moreover, feelings of distress associated with the loss-event at baseline were found to predict symptoms of prolonged grief, and high levels of emotional loneliness were found to predict symptoms of depression

4 years post loss. Differences in baseline predictors of post loss psychopathology provide further evidence supporting the view that factors involved in the onset and maintenance of prolonged grief disorder may be distinct from other types of complicated bereavement reactions, such as depression and PTSD (Prigerson, Frank et al., 1995; Prigerson et al., 2009). These findings are further supported by Boelen (2017) who finds that higher levels of loss-centrality predicts later symptoms of different complicated bereavement reactions, but more so for PGS than depression and PTSD. One very plausible explanation may be that high initial levels of loss-centrality may block the acceptance of the loss, which is a core symptom in PGD (Boelen 2017; Prigerson et al., 2009). It is likely that lack of acceptance of the loss is a main factor in maintaining prolonged grief reactions. Developing and including treatment strategies that address high levels of CES in treatments of prolonged grief disorder may be a way of targeting lack of acceptance of the loss, and through this enhance chances efficacy of the treatment. More specifically, screening for high levels of CES in treatment for prolonged grief may be a potential first step in that direction. For cases with high loss centrality, psycho-education about this concept and investigating the meaning of loss centrality for the client may be relevant techniques to apply. Future clinical research must inform us further about usefulness and efficacy of these and other CES related treatment strategies.

A novel aspect in the current study is the investigation of early predictors of loss-centrality after 4 years. Gender and baseline PGS significantly predicted loss-centrality at the 4-year follow-up, while months of spousal illness, helplessness,

emotional loneliness, neuroticism, coping-style, satisfaction with life, baseline PTS, and depression, did not account for any additional variance within the final regression model.

As in previous research with student populations (Boals, 2010), gender was found to significantly predict later event-centrality in that, compared to men, women experienced the loss event as significantly more central to their identity and life story. However, in the present study, gender explained only 2% of the variance in later loss-centrality, which may indicate that gender is not necessarily a strong early predictor of loss-centrality in elderly bereaved people. In contrast to previous research (Ogle et al., 2016), neuroticism was not found to predict a high level of loss-centrality so further research is called for in order to determine if this difference in findings may be the result of differences in populations studied or the nature of the life events under investigation.

Higher levels of PGS at baseline significantly predicted higher ratings of centrality of spousal loss 4 years later. In contrast, high levels of depressive symptoms or PTS were not predictive of later loss-centrality. This finding suggests that following bereavement a reciprocal relationship may exist between loss-centrality and PGS such that changes in loss-centrality and symptoms of prolonged grief may continue to influence each other over time. High levels of centrality over time may maintain memories of the loss event and thereby prevent the bereaved individual from updating their self-identity to incorporate memories of important life events following the loss of spouse. Additionally, symptoms of prolonged grief may serve

to keep the loss-event highly central to identity through experience of a diminished sense of self, rumination about the loss, and feelings of anger and bitterness towards the loss (Prigerson et al., 2009). However, 2 longitudinal studies investigating if symptoms of posttraumatic stress are predictive of event centrality did not find such a relationship (Blix et al., 2015; Boals & Ruggero, 2016). Therefore, more longitudinal studies are called for in order to determine the directional nature of the relationship between event-related centrality and psychopathology, before any claims as to the uniqueness of this relationship to complicated bereavement reactions can be made.

Strengths and limitations

One clear strength of this study is that recruitment of participants was conducted via a health register such that all elderly people who lived in the county of Aarhus and had lost a spouse within a given period of time were invited to participate (for more information see O'Connor, 2010 a+b). This systematic recruitment procedure is likely to minimize selection-biasing effects of sampling via active response to, for example, newspaper advertisements and internet advertisements, as seen in previous studies (Boelen, 2009, 2012). In addition, it may lead to recruitment of a more representative sample of the total population. Future research may benefit from utilizing similar recruitment methods across a wide population sample, including individuals of various ages, from a number of geographical areas and across a variety of other bereavement types.

When considering the results of the present study, it is important to note that to receive a formal diagnosis of prolonged grief disorder, individuals must have

experienced symptoms at least 6 months after the loss (Maciejewski et al., 2016; Prigerson et al., 2009). Consequently, high scores on PGS prior to this 6-month period may be indicative of a natural bereavement reaction rather than the more severe symptoms associated with a diagnosis of prolonged grief disorder (Prigerson, Frank et al., 1995). To address this issue in the present study, the baseline measure of PGS was collected after 6 months post loss, whereas baseline measures of PTSD and depression were measured 2 months post loss. Therefore, differences between predictors of post loss psychopathology may possibly be biased by differences in time of symptom measurement rather than to unique associations with specific bereavement reactions.

Furthermore, the use of self-report questionnaires may be less reliable relative to more objective measurement instruments such as clinical interviews. Additionally, the use of self-report measures also limits the generalizability of research findings to the general population. Further research with formally diagnosed individuals is called for in order to determine if similar relationships are present in clinical presentations of complicated bereavement reactions. Finally, it is notable that even though the design was longitudinal, CES was only measured at the 4-year follow-up time point, which is why it was not possible to assess the extent to which loss-centrality following spousal loss prospectively predicted loss related psychopathology. It would have been more powerful, if loss-centrality were measured at all time points, but this was not possible in the year 2005 when the original study was designed, because the CES had not yet been constructed.

Conclusion

The findings of the present study demonstrate that for elderly people who have lost their spouse, loss-centrality at 4 years post loss significantly predicts high levels of post loss psychopathology, also when controlling for loss related variables, intra- and interpersonal variables, and baseline symptom levels. Furthermore, gender and baseline PGS were found to predict loss-centrality up to 4 years post loss. Overall, these findings support the link between loss-centrality and complicated bereavement reactions, such as PGS, depression, and PTS, in an elderly bereaved group of people.

References

Bach, M.E. (2003). En empirisk belysning og analyse af 'Emotional Numbing' som eventuel selvstændig faktor i PTSD. *Psykologisk Tidsskriftserie*, 6(1), 1-199.

Beck, A.T., Steer, R.A., & Garbin, M.G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review*, 8(1), 77-100.

Berntsen, D., & Rubin, D.C. (2006). The Centrality of Event Scale: A measure of integrating a trauma into one's identity and its relation to post-traumatic stress disorder symptoms. *Behaviour Research and Therapy*, 44(2), 219-231.

Berntsen, D., & Rubin, D.C. (2007). When a trauma becomes a key to identity: Enhanced integration of trauma memories predicts posttraumatic stress disorder symptoms. *Applied Cognitive Psychology*, 21(4), 417-431.

Berntsen, D., Willert, M., & Rubin, D.C. (2003). Splintered memories or vivid landmarks? Qualities and organization of traumatic memories with and without PTSD. *Applied Cognitive Psychology*, 17(6), 675-693.

Blix, I., Birkeland, M.S., Solberg, Ø., Hansen, M.B., & Heir, T. (2016). The launching and ensnaring effects of construing a traumatic event as central to one's identity and life story. *Applied Cognitive Psychology*, 30(4), 526-531.

Blix, I., Birkeland, M. S., Hansen, M. B., & Heir, T. (2015). Posttraumatic growth and centrality of event: A longitudinal study in the aftermath of the 2011 Oslo bombing. *Psychological Trauma: Theory, Research, Practice, and Policy*, 7(1), 18-23.

Blix, I., Solberg, Ø., & Heir, T. (2014). Centrality of event and symptoms of posttraumatic stress disorder after the 2011 Oslo bombing attack. *Applied Cognitive Psychology*, 28(2), 249-253.

Boals, A. (2010). Events that have become central to identity: Gender differences in the centrality of events scale for positive and negative events. *Applied Cognitive Psychology*, 24(1), 107-121.

Boals, A. (2014). Using Event Centrality to Predict Depressive Symptoms after a Romantic Conflict: A Prospective Design. *Applied Cognitive Psychology*, 28(2), 259-265.

Boals, A., & Ruggero, C. (2016). Event centrality prospectively predicts PTSD symptoms. *Anxiety, Stress & Coping*, 29(5), 533-541.

Boelen, P.A. (2009). The centrality of a loss and its role in emotional problems among bereaved people. *Behaviour Research and Therapy*, 47(7), 616-622.

Boelen, P.A. (2012a). A prospective examination of the association between the centrality of a loss and post loss psychopathology. *Journal of Affective Disorders*, 137(1-3), 117-124.

Boelen, P.A. (2012b). Variables mediating the linkage between Loss Centrality and postloss psychopathology. *Journal of Affective Disorders*, 200(9), 801-806.

Boelen, P.A. (2017). Self-identity after bereavement. Reduced Self-Clarity and Loss-Centrality in emotional problems after the death of a loved one. *The Journal of Nervous and Mental Disease*, 205 (5), 405-408.

Bryant, R.A. (2013). Is pathological grief lasting more than 12 months grief or depression? *Current Opinion in Psychiatry*, 26 (1), 41-46.

Burke, L.A., & Neimeyer, R.A. (2013). Prospective risk factors for complicated grief: A review of the empirical literature. In M. Stroebe, H. Schut, P. Boelen & J.

Van den Bout (Eds.), *Complicated grief: Scientific foundations for health care professionals* (pp. 145-161). Washington, DC: American Psychological Association.

Diener, E., Emmons, R.A., Larsen, R.J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49(1), 71-75.

Guldin, M., O'Connor, M., Sokolowski, I., Jensen, A.B., Vedsted, P. (2011). Identifying bereaved subjects at risk of complicated grief: Predictive value of questionnaire items in a cohort study. *BMC Palliative Care*, 10, 1-7.

Joseph, S., Andrew, B., Williams, R., & Yule, W. (1992). Crisis support and psychiatric symptomatology in adult survivors of the Jupiter cruise ship disaster. *British Journal of Clinical Psychology*, 31(1), 63-73.

Kersting, A., Brähler, E., Glaesmer, H., & Wagner, B. (2011). Prevalence of complicated grief in a representative population-based sample. *Journal of Affective Disorders*, 131(1-3), 339-343.

Lundorff, M., Holmgren, H., Farver-Vestergaard, I., Zachariae, B.Z. O'Connor, M. (2017). Prevalence of prolonged grief disorder in adult bereavement: A systematic review and meta-analysis. *Journal of Affective Disorders*, 212, 138-149.

Maccallum, F., & Bryant, R.A. (2008). Self-defining memories in complicated grief.

Behaviour Research and Therapy, 46(12), 1311-1315

McCrae, R.R., & Costa, P.T., Jr. (2004). A contemplated revision of the NEO five-factor inventory. *Personality and Individual Differences*. 36(3), 587-596.

Maciejewski, P.K., Maercker, A., Boelen, P.A., Prigerson, H.P. (2016). "Prolonged grief disorder" and "persistent complex bereavement disorder", but not "complicated grief", are one and the same diagnostic entity: an analysis of data from the Yale Bereavement Study. *World Psychiatry*, 15(3), 266-274.

Mollica, R.F., Caspi-Yavin, Y., Bollini, P., & Truong, T. (1992). The Harvard Trauma Questionnaire: Validating a cross-cultural instrument for measuring torture, trauma and posttraumatic stress disorder in Indochinese refugees. *Journal of Nervous and Mental Disease*, 180(2), 11-116.

Newson, R.S., Boelen, P.A., Hek, k., Hofman, A., & Tiemeier, H. (2011). The prevalence and characteristics of complicated grief in older adults. *Journal of Affective Disorders*, 132 (1-2), 231-238.

O'Connor, M. (2010a). PTSD in older bereaved people. *Aging & Mental Health*, 14(6), 670-678.

O'Connor, M. (2010b). "A longitudinal study of PTSD in the elderly bereaved: Prevalence and predictors": Erratum. *Aging & Mental Health*, 14(5), 3.

O'Connor, M., Lasgaard, M., Shevlin, M. & Guldin, M. (2010). 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? *Journal of Anxiety Disorders*. 24, 672-679.

O'Connor, M., Nickerson, A., Aderka, I.M., & Bryant, R.A. (2015). The temporal relationship between change in symptoms of prolonged grief and posttraumatic stress following old age spousal bereavement. *Depression and Anxiety*, 32(5), 335-340.

Ogle, C.M., Siegler, I.C., Beckham, J.C., & Rubin, D.C. (2016). Neuroticism Increases PTSD Symptom Severity by Amplifying the Emotionality Rehearsal and Centrality of Trauma Memories. *Journal of Personality*.

Prigerson, H.G. (2004). Complicated grief: When the path of adjustment leads to a dead-end. *Bereavement Care*, 23, 38-40.

Prigerson, H.G., Frank, E., Kasl, S.V., Reynolds, C.F., Anderson, B., Zubenko, G.S., & Kupfer, D.J. (1995). Complicated grief and bereavement-related depression as distinct disorders: Preliminary empirical validation in elderly bereaved spouses. *The American Journal of Psychiatry*, 152(1), 22-30.

Prigerson, H.G., Maciejewski, P.K., Reynolds, C.F., Bierhals, A.J., Newsom, J.T., Fasiczka, A. et al. (1995). Inventory of Complicated Grief: a scale to measure maladaptive symptoms of loss. *Psychiatry Research*. 59(1-2), 65–79.

Prigerson, H.G., Horowitz, M.J., Jacobs, S.C., Parkes, C.M., Aslan, M., Goodkin, K., & Maciejewski, P.K. (2009). Prolonged grief disorder: Psychometric validation of criteria proposed for DSM-V and ICD-11. *PLoS*, 6(8)

Prigerson, H.G. & Jacobs, S.C. (2001). Traumatic grief as a distinct disorder: a rationale, consensus criteria, and a preliminary empirical test. In M.S. Stroebe, R. O. Hansson, W. Stroebe, & H.A.W. Schut (Eds.), *Handbook of bereavement research. Consequences, coping, and care* (pp. 613-647). Washington, DC, US: American Psychological Association, Washinton, DC.

Prigerson, H.G., Maciejewski, P.K., Reynolds, C.F., Bierhals, A.J., Newsom, J.T., Fasiczka, A. et al. (1995). Inventory of Complicated Grief: a scale to measure maladaptive symptoms of loss. *Psychiatry Research*, 59(1-2), 65–79.

Roger, D., Jarvis, G., & Naiarian, B. (1993). Detachment and coping: The construction and validation of a new scale for measuring coping strategies. *Personality & Individual Differences* 15(6). 619-626.

Schafer, J.L., & Graham, J.W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, 7(2), 147-177.

Schneider, K.R., Elhai, J.D. & Gay, M. (2007). Coping style use predicts posttraumatic stress and complicated grief symptom severity among college students responding to a traumatic loss. *Journal of Consulting Psychology*, 54 (3), 344-350.

Webb, H., & Jobson, L. (2011). Relationships between self-consistency, trauma-centred identity, and post-traumatic adjustment. *Clinical Psychologist*, 15(3), 103-111.

Table 1 Characteristics and symptom scores of the sample (N=208).

<i>Demographic Characteristics</i>	
Gender (<i>N (%)</i>)	
Men	75 (36.06)
Women	133 (63.94)
Age at baseline (years), <i>M (SD)</i>	72 (4.24)
Years Married, <i>M (SD)</i>	45 (11.40)
Public schooling (years), <i>M (SD)</i>	8 (1.58)
Further Education (years), <i>M (SD)</i>	3 (2.44)
Have children, <i>N (%)</i>	191 (91.83)
<i>Loss Characteristics</i>	
Spousal illness preceding the death, <i>N (%)</i>	178 (85.58)
Participated in the daily care of the spouse, <i>N (%)</i>	144 (69.23)
Forewarning of death, <i>N (%)</i>	143 (68.75)
Received help from a psychologist, <i>N (%)</i>	6 (2.88)
Received help from a priest, <i>N (%)</i>	59 (28.37)
<i>Symptom scores</i>	
Symptom scores at baseline, <i>M (SD)</i>	
BDI	6.97 (6.05)
PGS*	32.45 (10.72)
PTS	28.87 (7.24)
Symptom scores at follow-up, <i>M (SD)</i>	
BDI	6.90 (7.23)
PGS	24.70 (8.55)
PTS	26.69 (7.00)
<i>CES at 48 months post loss, M (SD)</i>	20.43 (7.55)

*Note.** Baseline measure of PGS in the present study was collected 6 months post loss (Time 2). N =166 for this variable.

Table 2 Pearson's Correlations between 4 year outcome and predictor variables in bereaved older adults

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Gender																		
2. Illness	-.05																	
3. Length of illness	.10	.12																
4. Caregiving	.03	.29**	.12															
5. Sense of forewarning	.08	.44**	.02	.31**														
6. Feelings of distress	-.27**	-.24**	-.21**	-.15*	-.28**													
7. Death anxiety	-.05	-.14*	-.14*	.11	-.02	.22**												
8. Helplessness	-.21**	-.06	-.18*	-.14*	-.05	.55**	.26**											
9. Near friend	-.11	.03	.04	.09	-.03	.11	.16*	.26**										
10. Emotional loneliness	-.09	.04	-.14	.05	.11	.18*	.27**	.39**	.47**									
11. CSQemo	-.06	-.15*	-.12	-.01	-.01	.23**	.34**	.44**	.34**	.40**								
12. CSQavoid	-.02	-.12	.06	.02	-.10	.02	.10	.02	-.18*	.05	.17**							
13. NeoN	-.03	-.13*	-.06	.03	.05	.08	.31**	.38**	.25**	.39**	.56*	-.25**						
14. SWLS	.05	.13*	-.04	-.04	-.02	-.15*	-.14*	-.28**	-.27**	-.35**	-.45**	.18**	.44**					
15. CSS	.08	-.09	-.08	-.09	-.11	-.05	.13*	-.21**	-.35**	-.27**	-.25**	.17**	.27**	.37**				
16. CES	-.01	-.14*	-.20**	-.08	-.04	.22*	.25**	.28**	.02	.22**	.34**	.09	.01	-.13*	.03			
17. BDI	.14*	-.13*	-.12	.02	.02	.16*	.25**	.20**	.16*	.44**	.41**	.02	-.08	-.31**	-.19**	.48**		
18. PTS	.08	-.13*	-.13	.02	.05	.23**	.35**	.25**	.18*	.33**	.46**	.05	-.09	-.27**	-.16**	.53**	.71**	
19. PGS	.06	-.21**	-.20**	-.16	-.13*	.31**	.22**	.27**	.05	.27**	.42**	.06	.03	-.15*	-.03	.55**	.67**	.71**

Note. CSQemo=emotional coping subscale and CSQavoid= avoidant coping subscale from the Coping Style Questionnaire. * p < .05, **p < .01

Table 3 Summary of regression analyses predicting 4 year PGS, BDI and PTS scores.

	Block 1			Block 2			Block 3			Block 4			Block 5		
	PGS	Dep	PTS	PGS	Dep	PTS	PGS	Dep	PTS	PGS	Dep	PTS	PGS	Dep	PTS
	β	β	β	β	β	β	β	β	β	β	β	β	β	β	β
<i>Loss-related Variables</i>															
Illness of the spouse	.04	.01	.01	.05	.02	.05	.03	.07	.09	-.02	.02	.05	-.05	-.01	.02
Caregiving	.03	.07	.15	.01	.03	.09	.02	.01	.07	.05	.01	.07	.04	.003	.07
Sense of forewarning	-.002	-.05	-.05	-.01	-.08	-.10	-.04	-.09	-.10	-.06	-.06	-.12	-.03	-.02	-.08
Feeling of distress	.41**	.14	.20	.41**	.14	.21	.38**	.10	.19	.22*	-.01	.07	.23**	.01	.08
Feeling of death															
Anxiety	.04	.05	.16	.03	.05	.14	.02	.02	.12	-.10	-.003	.02	-.14	-.05	-.02
Feeling of helplessness	.09	.13	.23*	.06	.04	.06	.04	-.01	.03	-.01	-.02	-.04	-.08	-.10	-.11
<i>Intrapersonal Variables</i>															
Neuroticism				.003	.08	.16	-.06	-.03	.11	-.08	-.11	.09	-.07	-.10	.10
SWLS				-.06	-.11	-.18	-.03	-.02	-.13	.05	.02	-.06	.08	.05	-.03
CSQ-emotion focused				.05	.07	.14	.09	.08	.14	-.01	.004	.06	-.05	-.05	.02
CSQ-avoidance				.07	.01	.01	.01	-.03	.08	.03	.02	.07	.11	.10	.14
<i>Interpersonal Variables</i>															
CSS							.07	-.05	-.08	-.11**	-.01	-.04	.09	-.03	-.06
Near friends							-.17	-.12	-.05	-.14	-.07	-.05	-.08	-.01	.004
Emotional loneliness							.32**	.45**	.19	.16	.31*	.11	.10	.23*	.05
<i>Symptoms at baseline</i>															
PGS										.50***	.15	.31**	.35**	-.01	.18
Depression										.04	.31	-.09	.08	.35*	-.06
PTS										.23	.06	.36*	.24*	.07	.37**
<i>CES</i>															
													.41**	.44**	.37**

<i>R</i> ²	.23	.07	.22	.25	.10	.34	.33	.13	.37	.58	.33	.51	.69	.46	.60
<i>R</i> ² Change	.23	.07	.22	.01	.03	.13	.09	.14	.03	.25	.09	.14	.11	.13	.09
<i>F</i> Change	4.46**	1.14	4.15**	.38	.81	4.15**	3.65*	5.09**	1.24	15.46***	3.43*	7.28***	28.68***	19.20***	18.56***

Note. **p* < .05. ***p* < .01. ****p* < .001.

Table 4 Summary of regression analyses predicting 4 year CES scores.

	Block 1	Block 2	Block 3
	β	β	β
<i>Demographic/Loss-related Variables</i>			
Gender	-.17	-.23*	-.25*
Length of illness of the spouse	-.10	-.08	.004
Feeling of distress	.10	.05	.04
Feeling of death anxiety	.13	.15	.06
Feeling of helplessness	.17	.19	.13
<i>Intrapersonal Variables</i>			
Neuroticism		-.20	-.17
SWLS		-.19	-.12
CSQ emotion-focused		.06	.04
Emotional loneliness		.13	.08
<i>Symptoms at baseline</i>			
PGS			.44***
Depression			-.01
PTS			-.002
R ²	.13	.19	.33
R Change	.13	.06	.14
F Change	2.47*	1.32	5.13

Note. *p < .05. **p < .01. ***p < .001.