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The centrality of a loss-event: Patterns, correlates, and predictive value

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ABSTRACT

Background and objectives: Evidence shows that the centrality of a loss-event maintains emotional distress following loss. Aims of the current study were to examine (i) if subgroups of bereaved people can be distinguished based on their endorsement of different manifestations of loss-centrality, (ii) if subgroup membership was associated with socio-demographic and loss-related variables, and (iii) the linkage of subgroup membership with symptom-levels of prolonged grief (PG), posttraumatic stress (PTS), and depression assessed concurrently and 6 months later.

Methods: Three-hundred ninety-eight bereaved people completed the 7-item Centrality of Event Scale, with their loss as anchor-event and completed symptom-measures concurrently and 6 months later. Latent profile analysis (LPA) was used to identify profiles of loss-centrality.

Results: LPA revealed a three-profile solution representing low, average, and high centrality classes, respectively. The death of a partner and younger age increased the likelihood of membership of classes evidencing stronger centrality. Membership of the low centrality class was associated with lower concurrent PG, PTS, and depression; membership of the high centrality class predicted elevated PG 6 months later, beyond baseline PG.

Conclusions: Subgroups of loss-centrality were distinguished by increasing endorsement of all (rather than some) manifestations of loss-centrality. Clinical implications are discussed.

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Accumulating evidence shows that deaths of loved ones may precipitate severe distress in a minority of people, including symptoms of prolonged grief (PG), posttraumatic stress (PTS), and depression (Prigerson et al., 2009; Shear, 2015). In different theoretical models, changes to a person's self-view and self-identity brought about by a loss have been associated with persistent post-loss psychopathology. For instance, cognitive behavioral theorizing postulates (Boelen et al., 2006) and research confirmed (Boelen et al., 2012b; Golden & Dalgleish, 2012) that negative self-views following loss maintain distress. Maccallum and Bryant's (2013) cognitive attachment model proposes that such distress is associated with the degree to which the bereaved's self-identity is entwined with the deceased. One further concept helpful in understanding the linkage between bereavement, self-identity, and outcome is "event centrality." Drawing from Berntsen and Rubin's (2006) work, event-centrality refers to an individual's perception of the extent to which a negative event (e.g., the death of a loved one) forms (a) a reference point in one's memory, (b) a turning point in one's life, and (c) a central element of one's identity. Research evidence shows that event-centrality is concurrently and longitudinally associated with elevated psychological problems following loss

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(Boelen, 2012a, 2017) and psychotrauma (Blix et al., 2016). Centrality maintains event-related distress by heightening access to disturbing thoughts, memories, and emotions connected with the event and interfering with emotional processing (Berntsen & Rubin, 2006).

To our knowledge, event-centrality has only been studied using a *variable-centered approach* with, for instance, scores on measures of event-centrality and event-related distress from an entire sample being averaged and correlated. To our knowledge, no studies have yet used a *person-centered approach* to study event-centrality, an approach that can be used to categorize subjects in common subpopulations (cf. Howard & Hoffman, 2018). Accordingly, it is still an outstanding question whether subgroups of bereaved individuals can be distinguished based on the endorsement of different manifestations of loss-centrality. Here, it is worthy to note that Berntsen and Rubin (2006) introduced centrality as a unitary concept, whereas others have proposed that the three elements of centrality are unique factors (cf. Robinaugh & McNally, 2011). Considering those three elements of centrality, theoretically it is possible that, e.g., for some people the loss serves as a reference point in autobiographical memory and a turning point in life, but is not so strongly connected with how they view themselves. If so, subgroups would be distinguishable varying in the endorsement of some but not other elements of centrality. However, one might also reason that elements of centrality are conceptually related and, therefore, that increases/decreases of any element of centrality coincide with increases/decreases in the others elements. In that case, it would still be meaningful to examine the number and nature of subgroups (e.g., two, three, four or more subgroups, differing by low to very high endorsement of centrality constructs) and, subsequently, predictors and outcomes of these subgroups.

The present study was designed to investigate if subgroups exist among bereaved people differing in terms of loss-centrality. Using data from a large sample of bereaved people, who all completed the 7-item *Centrality of Event Scale* (CES; Berntsen & Rubin, 2006), latent profile analysis (LPA; Collins & Lanza, 2010) was used to classify individuals into homogeneous latent subgroups based on their item scores. Two possible findings were anticipated. First, it was possible that *parallel profiles* would emerge differentiated by increasing likelihoods of endorsing all CES items. That would indicate that different manifestations of loss-centrality are consistently endorsed with, e.g., stronger tendencies to perceive the loss as an anchor-event and turning point co-occurring with the loss being more central to self-identity. Alternatively, it was possible that *non-parallel profiles* would emerge, differing in the endorsement of some, but not other elements of loss-centrality. Apart from examining whether different profiles emerged, a second aim was to examine to what extent these were associated with socio-demographic and loss-related variables (e.g., kinship to deceased, natural vs. unnatural loss). Our third aim was to examine whether profiles were differentially related with symptom-levels of PG, PTS, and depression assessed concurrently as well as longitudinally, approximately six months beyond baseline.

Examining loss-centrality from a person-centered approach is theoretically important as it allows to explore the possibility that meaningful subgroups of bereaved people exist differing in terms of loss-centrality, a possibility that is ignored by variable centered-approaches. Moreover, identifying emergent subgroups differing in loss-centrality and understanding the relations of these subgroups with bereaved outcome is clinically relevant. For instance, if parallel profiles would emerge with increasing endorsement of all CES items being associated with increasing levels of post-loss psychopathology, it might be useful to target intervention to all elements of loss-centrality. If non-parallel profiles would emerge, differing in their associations with psychopathology, that would shed light on elements of loss-centrality that should be targeted in treatment.

Method

Participants and procedure

The present study draws from the Utrecht Longitudinal Study on Adjustment to Loss (ULSATL project), an ongoing online survey study on cognitive processes involved in grief (see also Boelen,

2017). At the time of the current study, $N = 906$ people were enrolled. The current study used data from a selection of $N = 398$ people, bereaved between 1 and 12 months earlier, $n = 188$ of whom completed follow-up measures 6 months after inclusion. At baseline, most (77.1%) were women. The mean age was 54.0 (SD = 14.0, range 21–89) years; 227 (57.0%) participants had college/university level education, 171 (43.0%) had followed lower levels of education; 185 (46.5%) participants lost a partner, 31 (7.8%) a child, and 182 (45.7%) another relative. The mean time since loss was 5.02 (SD = 2.88) months. Losses were due to natural/nonviolent causes in 358 (89.9%) participants and due to unnatural/violent causes (suicide, homicide, accidents) in 40 (10.1%) participants. The study was approved by the ethical review board of the social sciences faculty at Utrecht University (FETC16-062).

Measures

Data on sociodemographic variables and loss-related variables were gathered with a self-constructed questionnaire. Loss-centrality was assessed with the 7-item CES, developed by Berntsen and Rubin (2006) and adapted by Boelen (2012a, 2017) to assess centrality of a loss-experience. Its items tap the degree to which the loss has become central to one's identity ("I feel that the loss has become part of my identity"), life story ("The loss permanently changed my life"), and meanings assigned to other events ("The loss has colored the way I think and feel about other experiences") rated on 5-point scales (1 = *totally disagree* to 5 = *totally agree*). The CES has adequate psychometric properties (Berntsen & Rubin, 2006; Boelen, 2012a, 2017).

PG severity was assessed with the 11-items *Prolonged Grief Disorder scale* (PGD scale; Boelen et al., 2012b). This measure taps the presence of PG symptoms as defined by Prigerson et al. (2009) – resembling disordered grief as per other criteria (Maciejewski et al., 2016) – during the past month on 5-point scales (1 = *never*, 5 = *always*). Several studies (e.g., Boelen et al., 2012b) supported its psychometric properties.

Depression was assessed using the depression subscale of the *Hospital Anxiety and Depression Scale* (HADS-D; Zigmond & Snaith, 1983). Respondents rate the severity of seven depressive symptoms on 4-point scales. The HADS-D showed good psychometric properties (Zigmond & Snaith, 1983).

Posttraumatic stress was assessed using the *PTSD Symptom Scale-Self-Report version* (PSS-SR), tapping PTS symptom as per DSM-IV (American Psychiatric Association [APA], 2000). Participants rate the frequency of symptoms during the preceding month on 4-point scales (0 = *not at all*, 3 = *five/more times per week/almost always*). The index event was defined as "the death of your loved one" (e.g., "How often did you have unpleasant dreams or nightmares about the death of your loved one?"). The measure has good psychometric properties (Foa et al., 1993).

In the current sample, Cronbach's alphas for all scales (at baseline and follow-up) were $>.88$, evidencing excellent internal consistency.

Statistical analyses

LPA was performed with Mplus (Muthén & Muthén, 1998–2019), using the sevenitem-scores on the CES, transformed into z-scores, as indicators, and using a maximum likelihood estimator. To evaluate model fit, we considered statistical indices and interpretability. Statistical indices were (i) Akaike information criterion (AIC), (ii) Bayesian information criterion (BIC), and (iii) sample-size adjusted Bayesian information criterion (SABIC), with lower values reflecting better fit, (iv) entropy (with values closer to 1 indicating better fit), as well as the (v) Lo-Mendell-Rubin likelihood ratio test (LRT), and (vi) the bootstrap likelihood ratio test (BLRT) comparing the fit of models with K profiles, with a solution with K-1 profiles. After selection of the optimal class solution, the most likely class membership was used in a multinomial regression analyses in SPSS (Version 25) to examine to what extent class membership differed as a function of socio-demographic variables (i.e., age, sex, dichotomized education), and loss-related variables (i.e., number of months since

loss, relationship to deceased [categorized as loss of partner/spouse, child, other relationship], and dichotomized cause [i.e., natural/non-violent loss vs. unnatural/violent loss, due to suicide, homicide, or accidents]). Next, three one-way analyses of variance (ANOVAs) were performed to examine if concurrently assessed symptom-levels of PG, depression, and PTS differed between classes. Lastly, with the subgroup completing data at follow-up, three analyses of covariance (ANCOVAs) tested if symptom-levels of PG, depression, and PTS at follow-up differed between classes while controlling baseline symptom-levels.

Results

The goodness of fit indices for the 1-profile through 5-profile models are shown in Table 1. The three-profile solution was retained. AIC, BIC, and SA-BIC values were lower for that solution compared to the two-profile model, and the VLRT indicated that this solution fit better than the two-profile model. AIC, BIC, and SA-BIC values were lower for the 4-profile and 5-profile models but the magnitude of reductions in these values was small. Parsimony and interpretability supported selection of the three-profile model. Standardized item responses are shown in Figure 1. As can be seen, profiles represented Low Centrality ($n = 96$, 24.1%), Average Centrality ($n = 148$, 37.1%), and High Centrality ($n = 154$, 38.6%) Classes, respectively.

Outcomes of the multinomial regression analyses are summarized in Table 2. Compared to participants in the Low Centrality Class, participants in the Average Centrality Class were more likely to be younger, woman, and confronted with the death of a partner. Compared to participants in the Low Centrality Class, people in the High Centrality Class were more likely younger, to have experienced loss more months ago, and to be confronted with the death of a partner or a child. Compared to people in the Average Centrality Class, people in the High Centrality Class were more likely younger, to have experienced their loss longer ago, and to be confronted with the death of a partner (all p 's < .05).

In terms of concurrent symptoms, ANOVAs showed that symptom-levels of PG ($F(2, 395) = 170.40$), depression ($F(2, 395) = 107.04$), and PTS ($F(2, 395) = 142.35$, all p 's < .001) differed significantly between classes. Post-hoc (Bonferroni) testing showed that PG, depression, and PTS differed significantly between all classes (all p 's < .001). Symptom-levels were lowest in the Low Centrality Class, higher in the Average Centrality Class, and highest in the High Centrality Class.¹ Using data from participants with follow-up data ($n = 188$), ANCOVA showed that follow-up PG differed between classes, while controlling baseline PG ($F(2, 184) = 5.69$, $p = .004$). Post-hoc testing indicated that participants in the High Centrality Class had significantly higher PG at follow-up compared to their counterparts in the Low Centrality Class ($p = .003$) and trended toward having higher PG than participants in the Average Centrality Class ($p = .061$). Two further ANCOVAs showed that depression and PTS at follow up did not differ between classes when controlling baseline depression and PTS (F 's < 1).²

Discussion

There is growing evidence that bereaved people for whom a loss is a reference point and central to their life story and identity have greater trouble to recover from their loss (Boelen, 2012a, 2017). This

Table 1. Goodness-of-fit indices for latent profile models.

Model	AIC	BIC	SA-BIC	Entropy	VLRT	BLRT	Sample size by class based on most likely membership
1 profile	7901.77	7957.58	7913.16				398
2 profiles	6482.95	6570.65	6500.85	.92	<.001	<.001	131/267
3 profiles	6043.72	6163.31	6068.12	.89	<.001	<.001	96/148/154
4 profiles	5967.15	6118.64	5998.06	.84	.536	<.001	75/115/73/135
5 profiles	5881.01	6064.37	5918.43	.84	.382	<.001	70/41/69/112/106

Note. AIC: Akaike information criterion; BIC: Bayesian information criterion; BLRT: bootstrap likelihood ratio test (BLRT); SABIC: Sample-size adjusted Bayesian information criterion; VLRT: Vuong-Lo-Mendell- Rubin likelihood ratio test.

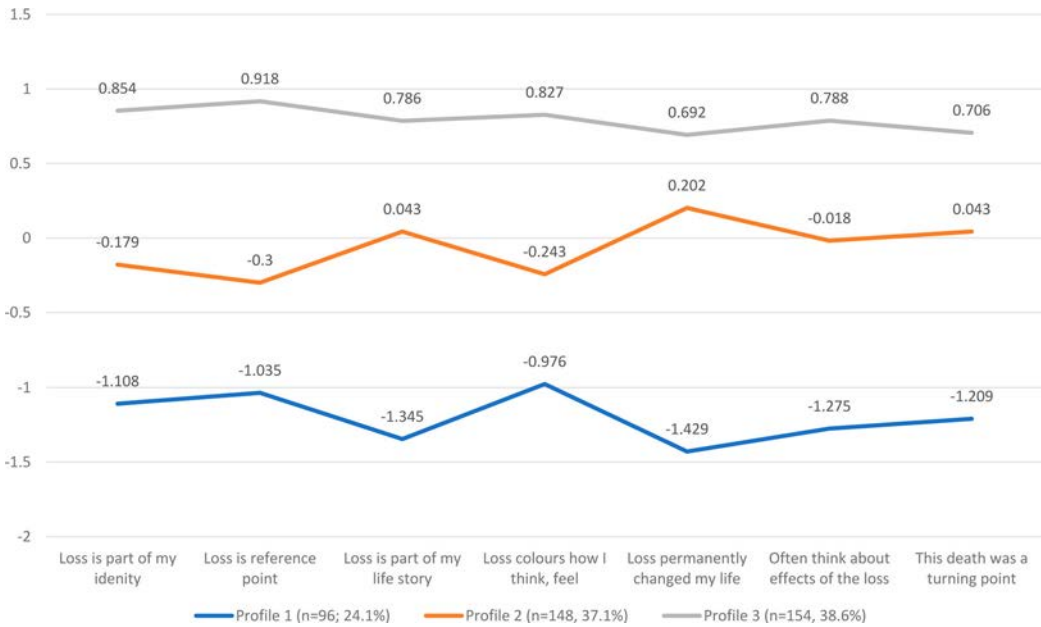


Figure 1. Means of standardized loss-centrality item responses for each latent profile.

is the first study to examine whether subgroups of bereaved people could be distinguished, based on the endorsement of indicators of loss-centrality. Considering the three elements of centrality (i.e., the event serving as memory reference point, life’s turning point, and element of identity) it was possible that *non-parallel profiles* would emerge, pointing at subgroups differing in one or two, but not all of these elements. However, instead, our findings revealed *parallel profiles* of low, average, and high loss-centrality, representing groups of bereaved people who increasingly endorsed that the loss served as a memory reference point, a turning point in life, and central to

Table 2. Summary of multinomial regression analyses of class comparisons for sociodemographic and loss-related variables.

Comparison profile	Reference profile											
	Low Centrality					Average Centrality						
	B	SE	Exp (B)	95% CI	P	B	SE	Exp (B)	95% CI	p		
Average centrality												
Age	-0.06	0.01	0.94	0.91	0.97	<.01						
Education (0=low, 1=high)	0.13	0.30	1.13	0.63	2.04	.68						
Sex (0=man, 1=woman)	0.71	0.35	2.03	1.02	4.02	.04						
Months since loss	0.03	0.06	1.04	0.92	1.16	.56						
Deceased is partner	2.19	0.37	8.89	4.29	18.43	<.01						
Deceased is child	1.18	0.71	3.27	0.81	13.10	.09						
Cause (0=natural, 1=unnatural)	1.23	0.70	3.41	0.86	13.53	.08						
High centrality												
Age	-0.11	0.02	0.90	0.87	0.92	<.01	-0.05	0.01	0.95	0.93	0.97	<.01
Education (0=low, 1=high)	0.07	0.33	1.07	0.56	2.04	.84	-0.06	0.26	0.94	0.57	1.57	.82
Sex (0=man, 1=woman)	0.65	0.39	1.92	0.89	4.14	.10	-0.05	0.33	0.95	0.50	1.80	.87
Months since loss	0.17	0.06	1.19	1.05	1.34	<.01	0.14	0.04	1.15	1.05	1.25	<.01
Deceased is partner	3.03	0.41	20.71	9.27	46.28	<.01	0.85	0.30	2.33	1.29	4.20	.01
Deceased is child	1.72	0.74	5.59	1.32	23.66	.02	0.54	0.47	1.71	0.67	4.34	.26
Cause (0=natural, 1=unnatural)	1.28	0.72	3.61	0.88	14.85	.07	0.06	0.39	1.06	0.50	2.27	.88

identity. Findings from our person-centered analyses converge with variable-centered factor analytic studies indicating that one continuous latent factor underlies scores on different elements of centrality (Berntsen & Rubin, 2006; Wamser-Nanney, 2019), although one such study found distinct underlying dimensions (Robinaugh & McNally, 2011). The findings make intuitive sense, considering the conceptual similarity between elements of centrality. However, more research applying both variable-centered *and* person-centered approaches is needed to enhance our understanding of the linkage between different elements of centrality across groups exposed to different forms of adversity.

Our second aim was to examine socio-demographic and loss-related correlates of loss-centrality profiles. Findings from multinomial regression analyses showed that increasing loss-centrality was associated with being younger and having lost a partner. In addition, compared to those in the Low Centrality Class, members of the Average Centrality Class were more likely to be women, and members of the High Centrality Class more likely to have lost a child and to be further removed from their loss in time. Members of the High Centrality Class also had a higher time since loss, compared to those in the Average Centrality Class. It is notable that membership of classes with increasing loss-centrality was associated with younger age and having lost a partner; although more research is needed to understand these associations, they fit with the notion implicated in cognitive behavioral theories that losing a partner earlier in life is a life-changing event, strongly shattering one's self-identity and affecting appraisals of later events (Boelen et al., 2006; Maccallum & Bryant, 2013). It was unexpected that confrontation with the death caused by an unnatural/violent cause did not increase the likelihood of membership of the high centrality class; it is possible that this is due to the fact that relatively few participants had experienced unnatural/violent loss. Although it is possible that other variables like kinship and time since loss more strongly determine loss-centrality, it would be interesting for future studies to further explore if loss-centrality differs as a function of cause of loss.

The final aim was to investigate the linkage of centrality profiles with symptom of PG, depression, and PTS. Cross-sectionally, symptom-levels differed straightforwardly between classes with the lowest levels observed in the Low Centrality Class, intermediate levels in the Average Centrality Class, and highest symptom-levels reported by participants in the High Centrality Class. Longitudinally, membership of the High Centrality Class was associated with higher PG severity later in time (controlling baseline PG). Membership of centrality classes did not predict later depression and PTS. These findings add to prior evidence that elevated event-centrality is concurrently and longitudinally associated with increased event-related psychopathology following loss-events (Boelen, 2012a, 2017) as well as other adverse events (Blix et al., 2016; Boals & Ruggero, 2015). We did not assess loss-centrality at a later point; intriguingly, a recent study indicated that, among people exposed to terror, PTS severity prospectively predicted later event-centrality but not vice versa (Glad et al., 2020). Whether elevated PG or other psychopathology after bereavement similarly predicts later loss-centrality, needs further scrutiny.

There are several limitations that should be considered. First, the generalizability of the current findings is limited by the fact that our sample was self-selected and that women and people with relatively high education were overrepresented. Moreover, as this was a nonclinical sample, caution should be applied in generalizing the findings to clinical groups with severely disturbed grief. Third, all data were obtained using an internet-based survey and common method variance may have affected results. Fourth, although symptoms of PG assessed in this study resemble recent descriptions of disordered grief in DSM-5 (Maciejewski et al., 2016) overlap was not perfect and, thus, the associations with centrality profiles with persistent complex bereavement disorder as described in DSM-5 (APA, 2000) still needs to be examined. A fifth caveat is that adjusting baseline symptoms has been debated; future research may use different methods (e.g., latent variable modeling) to examine relations of loss-centrality subgroups with outcomes (cf. Farmus et al., 2019).

Notwithstanding these considerations, this study increases our understanding of loss-centrality and its role in post-loss psychopathology. The findings suggest that subgroups of bereaved

people can be distinguished on the basis of their endorsement of indicators of loss-centrality, with items tapping different elements of loss-centrality being increasingly endorsed across different subgroups. Findings also lend further support to the role of event-centrality in adjustment to bereavement. The findings have potential clinical relevance; for instance, early attempts to alleviate risks for disordered grief may be focused on bereaved people displaying elevated loss-centrality. It may be important to help these people to explain how loss-centrality causes events and actions to be linked with the loss. These people may also benefit from interventions strengthening aspects of self-identity that are unrelated to the loss and the deceased loved. Examples are interventions focused on identifying personal values and goals that can be pursued independently (cf. Maccallum & Bryant, 2013). Future research is needed to examine the impact of such interventions to alleviate and prevent distress following bereavement.

Notes

1. For exploratory reasons, we examined zero-order correlations of the CES total score with concurrently assessed outcomes. Correlations were .71, .69, and .64 (p 's < .001) for associations of CES scores with symptom-levels of PG, PTS, and depression, respectively.
2. For exploratory reasons, we examined zero-order correlations of the CES total score with residualized changes in outcomes. Baseline CES scores were significantly correlated with residualized changes in PG severity ($r = .18, p = .01$) but not depression ($r = .10, p = .16$) and PTS ($r = .09, p = .23$).

Disclosure statement

No potential conflict of interest was reported by the author(s).

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