

The Longitudinal Association Between Symptoms of Posttraumatic Stress and Complicated Grief: A Random Intercepts Cross-Lag Analysis

Kristin A. Glad¹, Synne Stensland¹, Nikolai O. Czajkowski^{2, 3}, Paul A. Boelen^{4, 5}, and Grete Dyb^{1, 6}

¹ Norwegian Centre for Violence and Traumatic Stress Studies (NKVTS), Oslo, Norway

² PROMENTA Research Center, Department of Psychology, University of Oslo

³ Norwegian Institute of Public Health, Oslo, Norway

⁴ Department of Clinical Psychology, Utrecht University

⁵ Arq Psychotrauma Expert Group, Diemen, the Netherlands

⁶ Institute of Clinical Medicine, University of Oslo

Objective: Knowledge about the temporal relationship between disturbed grief and symptoms of posttraumatic stress disorder (PTSD) may have important implications for clinicians working with bereaved trauma survivors. We aimed to investigate the longitudinal association between symptoms of complicated grief and PTSD in a bereaved trauma-exposed sample. **Method:** In total, 275 bereaved survivors (M age = 19.3, SD = 4.6 years; 47.3% females) of the 2011 massacre on Utøya Island, Norway, participated in semistructured interviews 4–5 months (Time 1 [T1]), 14–15 months (Time 2 [T2]), and 30–32 months (Time 3 [T3]) posttrauma. Complicated grief was measured using the Brief Grief Questionnaire, and posttraumatic stress reactions using the University of California at Los Angeles PTSD Reaction Index. To explore associations between symptoms of complicated grief and PTSD over time, we used a random intercepts cross-lagged panel model. **Results:** The participants had lost a close friend (n = 256) and/or a family member/partner (n = 19) in the attack. We found a strong correlation between stable individual differences in symptoms of complicated grief and PTSD across the three time-points. PTSD symptoms at T2 predicted complicated grief reactions at T3, but not vice versa. **Conclusion:** Findings suggest that targeting PTSD symptoms among trauma-exposed bereaved may hinder later development of complicated grief.

Clinical Impact Statement

We found a strong, positive association between symptoms of complicated grief and posttraumatic stress disorder (PTSD). PTSD symptoms predicted complicated grief reactions at a subsequent time point, but not vice versa. Our findings suggests that targeting PTSD symptoms may hinder later development of complicated grief.

Keywords: complicated grief, posttraumatic stress symptoms, trauma survivors, terrorist attack

Grief is a normal response to the loss of someone close. While most people experience that their bereavement-related distress diminishes over time, traumatic loss (e.g., death by homicide, suicide, or terrorist attack) can lead to severe, intense and persistent

psychological reactions, such as symptoms of posttraumatic stress disorder (PTSD) and complicated grief. As noted by Shear (2015), whereas the key distinctive feature of PTSD is fear, the hallmark of complicated grief is “persistent, intense yearning, longing and sadness, usually accompanied by insistent thoughts or images of the deceased and a sense of disbelief or an inability to accept the painful reality of the person’s death” (p. 154). The recent inclusion of conditions of disturbed grief in the diagnostic taxonomies (i.e., persistent complex bereavement disorder [PCBD] in the fifth edition of the *Diagnostic Statistical Manual of Mental Disorders* and prolonged grief disorder [PGD; American Psychiatric Association, 2013] in the 11th *International Classification of Diseases*; World Health Organization, 2018) gives great impetus to increase our understanding of grief reactions that occur in the wake of traumatic loss, including how grief reactions develop and persist over time, and how they relate to PTSD symptomatology (Layne et al., 2017). In the present study, we explore the longitudinal association

Kristin A. Glad  <https://orcid.org/0000-0002-9965-8595>

Nikolai O. Czajkowski  <https://orcid.org/0000-0002-3713-653X>

Grete Dyb  <https://orcid.org/0000-0002-7138-3665>

Due to ethical restrictions, supporting data is not available.

This research was supported by the Norwegian Directorate of Health.

We sincerely thank everyone who participated in this study. We also thank Manik Djelantik and Marianne Skogbrott Birkeland who provided important input on the statistical analysis.

Correspondence concerning this article should be addressed to Kristin A. Glad, Norwegian Centre for Violence and Traumatic Stress Studies, Gullhaugveien 1, 0484 Oslo, Norway. Email: k.a.glad@nkvtss.no

between complicated grief reactions and symptoms of PTSD among young bereaved survivors of a terrorist attack. (Note: we use the term *complicated grief* to refer to the condition of disturbed grief, which is also named prolonged grief disorder and persistent complex bereavement disorder in other research).

Research has shown that unnatural losses are associated with a high rate of complicated grief symptoms. For example, in a recent meta-analysis of the prevalence of disturbed grief in bereaved following unnatural losses, Djelantik et al. (2020) found that nearly 50% screened positive for complicated grief. Furthermore, empirical findings suggest that people who have been bereaved by a violent loss have significantly higher symptom-levels of PTSD compared to people bereaved by nonviolent losses (i.e., Boelen et al., 2015). Although, to our knowledge, epidemiological research is needed to study the overall prevalence of PTSD and complicated grief in traumatic loss survivors, several studies using latent class analysis (LCA) to identify subgroups of bereaved people have shed some light on this matter. For instance, in an LCA study among people confronted with traumatic loss in the Ukrainian airplane crash, Lenferink et al. (2017) found that 38.2% of participants belonged to a class with elevated complicated grief, PTSD, and depression. In a study among people who lost loved ones in an earthquake, Eisma et al. (2019) found that 25.5% participants belonged to a class with both elevated complicated grief and PTSD. In an LCA of data from 458 treatment-seeking traumatized patients who also had experienced bereavement (many, but not all having traumatic causes), 20% reported elevated complicated grief and PTSD, and 45% elevated complicated, PTSD, plus depression (Djelantik et al., 2020). These findings indicate that a combination of distressing and disabling grief plus PTSD is common among people with pervasive distress following traumatic losses. Importantly, whereas complicated grief reactions and symptoms of PTSD are related, they are phenomenologically distinct (Boelen et al., 2010; Golden & Dalgleish, 2010; Lichtenthal et al., 2004). Many have found a positive association between these constructs (Guarnerio et al., 2012; Nakajima et al., 2012; Pfefferbaum et al., 2001; Schaal et al., 2010). The prevailing assumption in the field seems to be that, following traumatic loss, PTSD symptomatology maintains disturbed grief more than disturbed grief maintains PTSD symptoms. For example, in their cross-sectional study, Schaal et al. (2010) found that the severity of orphaned and widowed genocide survivors' PTSD symptoms explained variances in their grief reactions. They concluded that "symptoms of PTSD may hinder the completion of the mourning process" (p.1). Similarly, in their review of the literature on the effects of posttraumatic stress on complicated grief among bereaved by violent death, Nakajima et al. (2012) stated that PTSD symptoms "work to disrupt the normal grief process and contribute to the onset of complicated grief" (p. 212). However, as noted by Djelantik and colleagues (2018), few empirical studies have examined how the symptoms of these disorders influence each over time. To our knowledge, only three longitudinal studies have investigated the temporal association between complicated grief and PTSD (i.e., Djelantik et al., 2018; Lenferink et al., 2019; O'Connor et al., 2015). Interestingly, the results from these studies suggest that the relationship may go in the opposite direction, with complicated grief prospectively predicting PTSD symptomatology. In the first study, O'Connor et al. (2015) explored the association between

changes in complicated grief and PTSD symptoms during the first four years after the death of an elderly spouse. They found that changes in symptoms of complicated grief disorder mediated changes in PTSD symptoms to a greater extent than vice versa, and concluded that changes in complicated grief may "precede and potentially directly impact changes in PTS following bereavement" (p.335). In the second study, Djelantik et al. (2018) used cross-lagged analysis to explore the temporal relationship between symptoms of complicated grief and PTSD among individuals who had experienced the death of a loved one within the past year (mostly losses due to a natural cause). Importantly, in cross-lagged analysis, initial levels of the dependent variables are controlled for, which allows the researchers to predict changes in the dependent constructs over and above previous levels (Selig & Little, 2012). Djelantik et al. (2018) found that symptoms of complicated grief predicted PTSD symptoms after loss, but not vice versa, suggesting that symptoms of complicated grief shortly after bereavement "may contribute to the exacerbation and maintenance of PTSD symptoms over time" (p.69). In the third and most recent study, Lenferink et al. (2019) investigated the temporal association between complicated grief, PTSD and depression symptoms among people who had lost a significant other(s) in a plane crash disaster (including a child, spouse, sibling, friend). In their cross-lagged analysis with four time-points, Lenferink et al. found that changes in symptom levels of complicated grief had a greater effect on changes in symptom levels of PTSD and depression than vice versa. They tentatively concluded that long-lasting distress may be prevented if grief symptoms are screened for and treated.

In sum, while the predominant hypothesis in the field is that symptoms of PTSD interfere with, or otherwise complicate, the grief process, results from the three existing longitudinal studies suggest that the relationship may go in the opposite direction. However, notwithstanding the importance of these three studies, they are limited in a number of ways. First, while Djelantik et al. (2018) investigated the direction of the relationship between the two constructs, because they only had two time points they could not separate within-person processes from between-person effects in their cross-lagged analysis. In other words, even though they found high autoregressive path coefficients between measurements, we do not know whether the bereaved in their study showed relatively similar or very different changes in grief and PTSD over time. Other statistical models, such as the random intercepts cross-lagged panel model (RI-CLPM), overcome this limitation, but at least three waves are necessary to conduct this type of analysis (Hamaker et al., 2015). While Lenferink et al. (2019) had four time points, they did not conduct a RI-CLPM. Their sample was also quite small (i.e., only 66 individuals completed all four waves). Second, as noted by Neria and Litz (2004), it has been argued that when traumatic loss is coupled with direct traumatization, this dual burden is particularly onerous (e.g., Raphael & Martinek, 1997). None of the existing studies have included directly exposed trauma survivors. As such, in order to get a better understanding of the association between complicated grief reactions and symptoms of PTSD, it is important to explore the longitudinal relationship between these constructs in a trauma exposed bereaved group, with more than two measurement time points.

In the present study, all participants had been directly exposed to a terrorist attack which occurred on Utøya Island, Norway.

While in mortal danger themselves, many witnessed the violent death of close friends when a man, dressed as a police officer, came to the small island where their annual political summer camp was being hosted, and began shooting those he came across. There were 564 people on the island, and the shooting lasted for approximately 90 minutes. In total, 69 people were killed in the Utøya attack; most of whom were youths or young adults. During the massacre, the survivors were highly exposed to the trauma that unfolded on the island; they heard the intense and persistent sound of gunshots, witnessed people being injured or killed, heard people scream in pain and fear, and many lost someone close (Dyb et al., 2014). At 4 to 5 months postterror, 47% of the survivors reported clinical levels of PTSD (Dyb et al., 2014). As noted by Neria and Litz (2004), while this dual burden of traumatic loss and direct traumatization is characteristic of disasters in general, and terrorist attacks in particular, few have explored the combined psychological consequences.

We aimed to investigate the longitudinal association between complicated grief reactions and PTSD symptomatology among the young bereaved survivors of the 22nd of July terrorist attack on Utøya Island. More specifically, we wanted to investigate potential directional effects between these constructs at three different time points, while controlling for time-invariant individual differences. Based on the existing literature, we expected to find a significant positive association between survivors' complicated grief reactions and PTSD symptoms at all time points, and that survivors' level of complicated grief would predict their PTSD symptomatology as reported at a subsequent time point.

Method

The present study is part of a comprehensive longitudinal interview study designed to examine the level of posttraumatic stress reactions, and potential predictors thereof, among survivors of the terrorist attack on Utøya Island in 2011 (Dyb et al., 2014).

Participants

In the first two interview waves, the study had an open cohort design. In total, 490 individuals (≥ 13 years old at the time of the attack) survived the massacre on Utøya Island and were invited to participate in the first interview wave (Time 1 [T1], 4–5 months postterror). After receiving the invitation letter, three of the survivors contacted the project group and said that they did not want to participate. The remaining 487 survivors were invited to participate in the second wave (Time 2 [T2], 14–15 months). At Time 3 (T3; 30–32 months), the study had a closed cohort design; only survivors who had participated at T1 and/or T2 were invited. Altogether, 355 survivors (72.4%) participated in the study at one or more time-points (T1 $n = 355$, T2 $n = 285$, T3 $n = 261$). Of these, 275 had lost someone close (i.e., a family member, partner, and/or close friend) in the terrorist attack and formed the sample for the present study. The survivors' mean age at the time of the terrorist attack was 19.3 years ($SD = 4.6$, range 13.3–56.8, 93.1% < 26), and 47.3% were female. The vast majority (87.7%) were of Norwegian origin (i.e., one or both parents were born in Norway). There were no significant differences between participants and nonparticipants with respect to age or sex (Stene & Dyb, 2016). A

more comprehensive description of the participants has been reported elsewhere (Dyb et al., 2014; Stene & Dyb, 2016).

Procedure

All eligible participants were sent an invitation letter and subsequently telephoned and asked if they were willing to participate. Participants took part in individual face-to-face interviews with experienced health care personnel (mostly psychologists, medical doctors, and nurses). Interviews lasted approximately an hour and a half. Participation was based on informed consent for adolescents aged ≥ 16 . Parents consented to participation for younger children in accordance with Norwegian law. All interviewers attended a 1-day training course, which included practical exercises and an in-depth explanation of the interview questions and the rationale behind each topic. If interviewers identified unmet needs among the participants, they were instructed to arrange for assistance. The study was approved by the Regional Committee for Medical and Health Research Ethics in Norway.

Measures

Complicated Grief

The participants were interviewed about their complicated grief reactions using the Brief Grief Questionnaire (BGQ; Shear et al., 2006). The BGQ consists of five items, tapping trouble accepting the death, grief interference in current life, troubling thoughts related to the death, avoiding doing things/reminders of the loss, and feeling cut off or distant from others. Responses are recorded on a 3-point Likert-scale, ranging from 0–2 (0 = *not at all*, 1 = *somewhat*, 2 = *a lot*), and a score of 5 or greater indicates possible pathological grief (Shear et al., 2006). The BGQ was calculated as a mean score, and was completed at T1 ($\alpha = .70$), T2 ($\alpha = .74$), and T3 ($\alpha = .78$).

Posttraumatic Stress Symptoms

The participants were interviewed about their posttraumatic stress reactions using the University of California at Los Angeles PTSD Reaction Index (UCLA PTSD-RI) for *DSM-IV* (Pynoos et al., 1998; Steinberg et al., 2004). The PTSD-RI is a 20-item scale assessing posttraumatic stress reactions in the past month. Because three items have two alternative formulations, with the highest score being used to calculate the total score, the total symptom scale score was made up of 17 items, corresponding with the *DSM-IV* criteria for PTSD (American Psychiatric Association, 1994). Responses are recorded on a 5-point Likert-scale, ranging from 0 (*never*) to 4 (*most of the time*), and possible total scores range from 0–68. A threshold score of 38 is used to determine likelihood of meeting the criteria for a PTSD diagnosis. The Norwegian version of the UCLA PTSD-RI has previously shown good psychometric properties ($\alpha = .82$ – $.87$; Jensen et al., 2009). The PTSD-RI was calculated as the mean score of all 17 items (possible scores range 0–4). The scale proved to have good reliability (T1 $\alpha = .88$, T2, $\alpha = .90$, T3, $\alpha = .92$).

Table 1

Correlations Between Symptoms of Posttraumatic Stress and Complicated Grief Over Time, 95% Confidence Intervals Are Given in Parenthesis

	<i>M (SD)</i>	Grief T1	Grief T2	Grief T3	PTSD-RI T1	PTSD-RI T2	PTSD-RI T3
Grief T1	1.89 (.46)	—					
Grief T2	1.70 (.46)	.64 (0.55–0.72)	—				
Grief T3	1.53 (.43)	.59 (0.47–0.69)	.76 (0.68–0.82)	—			
PTSD-RI T1	1.63 (.70)	.57 (0.48–0.65)	.48 (0.36–0.59)	.44 (0.29–0.56)	—		
PTSD-RI T2	1.31 (.70)	.44 (0.32–0.54)	.65 (0.56–0.72)	.60 (0.48–0.70)	.71 (0.64–0.78)	—	
PTSD-RI T3	1.20 (.72)	.43 (0.30–0.54)	.52 (0.40–0.62)	.64 (0.54–0.73)	.63 (0.54–0.71)	.74 (0.66–0.80)	—

Note. PTSD-RI = Posttraumatic Stress Disorder-Reaction Index; *M* = mean; *SD* = standard deviation. T1 = Time 1; T2 = Time 2; T3 = Time 3. All correlations were significant at the $p < .01$ level.

Statistical Analyses

To analyze the relationship between complicated grief reactions and PTSD symptomatology, we used structural equation modeling (SEM) in the software package Mplus (Muthén & Muthén, 1998–2017). To investigate potential directional effects between these constructs when time-invariant, trait-like individual differences are accounted for, we used a random intercepts cross-lagged panel model as put forth by Hamaker et al. (2015). Specifically, in our random intercepts cross-lag model, each observed score was regressed on its own latent factor (each factor loading fixed to 1). Then, to capture the trait-like differences between persons in both constructs, we added two overreaching random intercept factors (factor loadings fixed to 1). Because the residual variance of the observed scores was constrained to be zero, all variation in the observed measures was captured by the within-person and between-person factor structure.

In our model fitting approach, we proceeded as follows: First, we ran the full cross-lagged model. In the two subsequent models, we constrained the parameters for the cross loading paths to zero. This was tested independently in both directions, controlling for sex and age. Model fit was assessed using the overall chi-square value, the comparative fit index (CFI), Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA). RMSEA values $< .05$ and CFI and TLI values $> .95$ were considered indicative of a well-fitting model (Hu & Bentler, 1999).

Descriptive analyses were performed using IBM SPSS statistics for Windows, Version 20.0. For all modeling analyses we used Mplus Version 8 (Muthén & Muthén, 1998–2017).

Attrition Analyses

Of the 275 bereaved survivors who participated in at least one wave of the study, we had valid data on 248 survivors at T1, 206 at T2, and 163 at T3 for the complicated grief measure. For the PTSD-RI, we had valid data on 254 at T1, 221 at T2, and 207 at T3, respectively. Independent sample *t* tests indicated no significant differences in mean PTSD-RI or mean grief among survivors who participated at T1 and T2, compared to those who dropped out ($p > .05$).

Results

Descriptive Analyses

Of the 275 survivors in our study, most ($n = 256$) had lost a close friend in the terrorist attack, a few ($n = 6$) had lost a family

member/partner, and some ($n = 13$) had lost a close friend and a family member/partner. Both the complicated grief and the PTSD-RI mean score decreased somewhat from T1 through T3 (see Table 1).

Pearson correlations between the PTSD-RI and complicated grief at all three time points and over time are given in Table 1. All bivariate correlation coefficients were statistically significant ($p < .01$).

Random Intercepts Cross-Lagged Panel Model

First, to assess the evidence for longitudinal within-person changes, we calculated the intraclass correlation coefficients (ICC). For complicated grief, the ICC was .67. This indicates that 67% of the variance in the three measures of complicated grief can be accounted for by differences between the survivors, and the remaining 33% by within-person fluctuations. Likewise, the ICC for PTSD symptomatology was .71, which indicates that 71% of the variance in the three measures of PTSD was accounted for by differences between the survivors and 29% by fluctuations within individuals. To disentangle these two distinct sources of variance, we specified a RI-CLPM. The full RI-CLPM was found to have inadequate fit, $\chi^2(1, N = 275) = 3.468, p = .063$, CFI = .996, TLI = .946, RMSEA = .095, (90% CI [.000, .211]). Dropping the crossed paths from PTSD-RI at T1 and T2 to grief at T2 and T3 yielded poor model fit, $\chi^2(3, N = 275) = 9.287, p = .026$, CFI = .991, TLI = .954, RMSEA = .087, (90% CI [.027, .154]). However, dropping the crossed paths from grief to subsequent PTSD-RI resulted in a good fitting model, $\chi^2(3, N = 275) = 4.415, p = .220$, CFI = .998, TLI = .990, RMSEA = .041, (90% CI [.000, .117]). Standardized (unstandardized) parameter estimates from the RI-CLPM are reported in Figure 1.

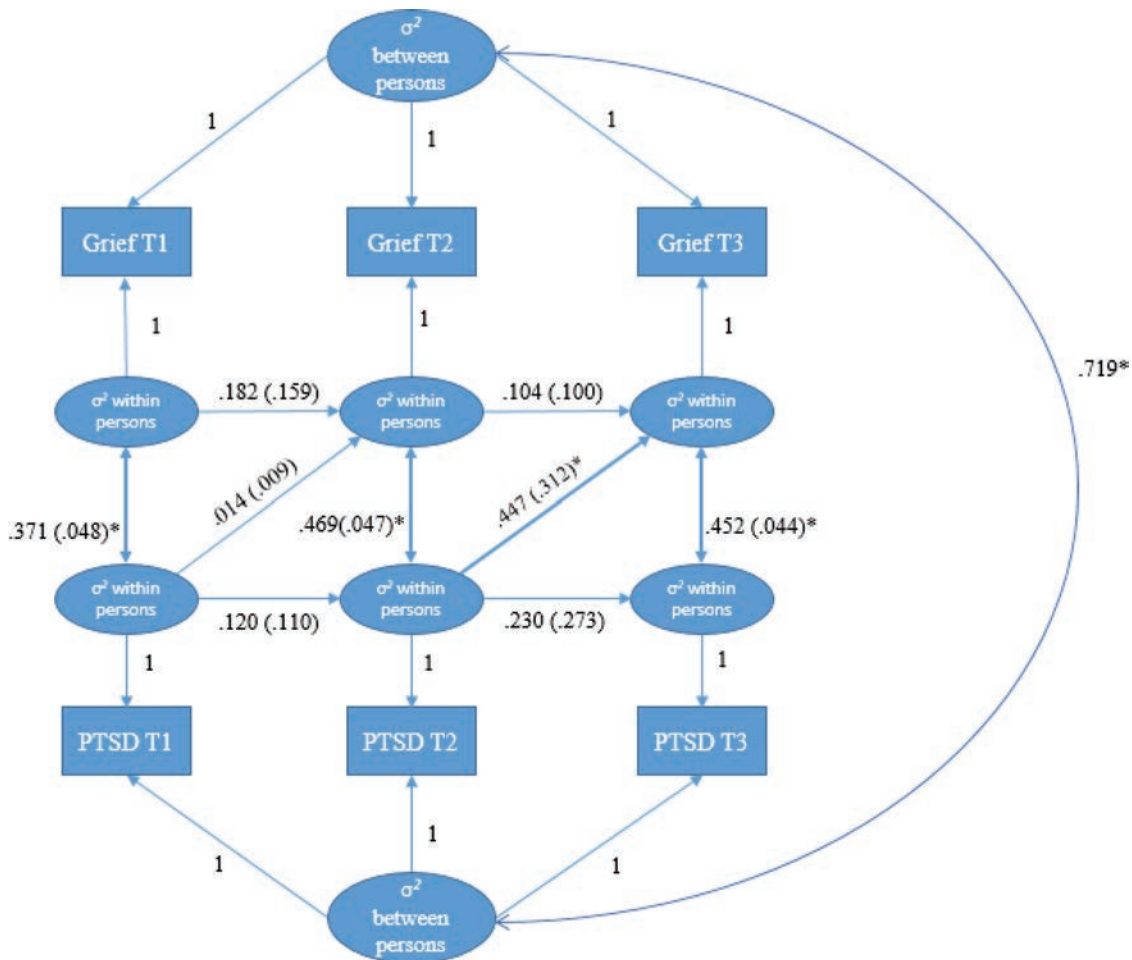
Complicated grief and PTSD-RI were significantly correlated at T1 ($r = .371, SE = .116, p = .001$), T2 ($r = .469, SE = .121, p < .001$), and T3 ($r = .452, SE = .116, p < .001$). The parameter estimates (see Figure 1) indicate a strong correlation between stable individual differences in complicated grief and PTSD symptoms (standardized estimate = .72). PTSD-RI T1 did not predict complicated grief at T2 ($\beta = .014, SE = .183, p = .938$), but PTSD-RI T2 predicted complicated grief at T3 (when controlled for grief at T1 and T2, respectively; $\beta = .447, SE = .194, p = .022$).

Discussion

The present study is the first to examine the temporal association between symptoms of complicated grief and PTSD in a

Figure 1

Three-Wave Random Intercept Cross-Lagged Panel Model With Standardized (Unstandardized) Estimates, Linking Posttraumatic Stress Symptoms and Subsequent Complicated Grief, Differentiating Within- and Between-Person Variance



Note: * $p < .05$. See the online article for the color version of this figure.

sample of bereaved trauma survivors. As hypothesized, we found a significant and positive association between stable individual differences in complicated grief and PTSD symptoms. In other words, participants who reported higher levels of complicated grief across these waves also reported higher levels of PTSD symptomatology across all three waves. This is in line with existing findings in the field (e.g., Guarnerio et al., 2012; Nakajima et al., 2012; Pfefferbaum et al., 2001), and suggests that the constructs are closely related. However, contrary to our expectations, when we explored the direction of the relationship between complicated grief and PTSD, we found that symptoms of PTSD predicted later complicated grief reactions. While this supports the notion that symptoms of PTSD may disrupt the mourning process and contribute to the severity of complicated grief reactions (e.g., Nakajima et al., 2012; Schaal et al., 2010); it contrasts with the three existing longitudinal studies in the field (i.e., Djelantik et al., 2018; Lenferink et al., 2019; O'Connor et al., 2015).

Several important differences between the present and prior longitudinal studies in relation to the level of exposure and methods

used may explain these conflicting findings. First and most importantly, while two of the previous studies (i.e., Djelantik et al., 2018; Lenferink et al., 2019) used CLPM, neither of them partitioned out potential trait-like components. Thus, we do not know whether time-invariant individual differences may have affected their findings. Second, O'Connor et al. (2015) examined grief and PTSD during the first 4 years after old age spousal loss. As such, both the nature and developmental timing of the loss differed markedly from the present study. Third, only one of the three existing longitudinal studies included a sample in which all were bereaved by an unnatural, violent death (i.e., Lenferink et al., 2019), which may be important when exploring the association between PTSD symptoms and disordered grief. While the present study is comparable to that of Lenferink et al. in terms of the traumatic nature of the loss (i.e., bereavement by an unexpected, large-scale, public, man-made violent death) and number of losses (many participants in both studies had suffered more than one loss), there are other important differences between the two studies, which may explain our contrasting findings. For example, the

level of exposure (learning about the plane crash vs. being in mortal danger during the massacre) varies notably in these studies, and we believe that the dual burden of loss by traumatic means coupled with direct exposure to the traumatic event may result in a different trajectory of PTSD symptomatology and complicated grief than when the bereaved are not directly exposed themselves. Also, methodologically, the studies differ in terms of the time passed since the event at the first measurement (11 months vs. 4–5 months); the sample's developmental stage (middle aged vs. young adults); the relationship with the deceased (predominantly family members vs. predominantly close friends); and the measures used to tap disturbed grief (the Traumatic Grief Inventory-Self Report assessing PCBD vs. the BGQ assessing complicated grief) and PTSD (PTSD checklist for *DSM-5* vs. UCLA-RI for *DSM-IV*).

Of note, while we found that PTSD symptomatology at T2 predicted complicated grief at T3, this association was not significant from T1 to T2. This indicates that the severity of PTSD symptoms within the first year of bereavement does not predict later grief severity, whereas beyond this first year, more pervasive PTSD symptoms seem to predict subsequent grief. It is possible that the timeline of natural recovery from PTSD symptomatology is shorter than for complicated grief symptoms. Also, high levels of PTSD at 1 year posttrauma could adversely affect the grief process by mitigating the survivors' ability to gradually accept and cope with their loss. As such, persistent PTSD symptoms (i.e., elevated symptoms more than 1 year posttrauma) might help identify individuals who are likely to struggle with continued PTSD and complicated grief symptoms. Pending replication of these findings, this suggests that targeting elevated PTSD may serve to alleviate the exacerbation of grief reactions.

Study Strengths and Limitations

To the best of our knowledge, this is one of the first studies to explore the longitudinal relationship between complicated grief reactions and symptoms of PTSD in a bereaved trauma-exposed sample. Because we used a RI-CLPM design, we were able to distinguish between the within-person and between-person processes of interest. Other study strengths include the use of face-to-face interviews with trained health care personnel, a high response rate (72%), and low levels of missing data.

The study has some limitations that ought to be considered when interpreting the results. First, although many of our participants suffered several losses on Utøya Island, we do not know exactly how many losses each survivor experienced. As such, we were unable to explore whether the number of losses affected PTSD and complicated grief severity. Second, because there was approximately 1 year between each measurement, it is possible that earlier and/or more short-term associations exist between the constructs that could not be captured in the present design. Third, despite the abovementioned strength of the RI-CLPM, when measures are used as observed scores, rather than latent factors, measurement errors may affect the results, as noted by Birkeland et al. (2016). Fourth, the BGQ was originally developed as a screening tool for complicated grief and lacks the item tapping yearning/longing for the deceased. This is considered a hallmark differentiating pathological grief from PTSD. Furthermore, the Utøya Island massacre was a national trauma, and the Norwegian society openly

supported and grieved with the bereaved (Thoresen et al., 2012). All study participants were both directly exposed to the massacre and experienced traumatic loss, and many of them belonged to a group before the attack (i.e., 82% of the participants were members of the Norwegian Labor Party's youth organization). These aspects of the event and its aftermath may limit the generalizability of the findings.

Conclusion

As stressed by several researchers, knowledge about the temporal relationship between complicated grief reactions and symptoms of PTSD may have important implications for clinicians working with bereaved trauma survivors (e.g., Djelantik et al., 2018; O'Connor et al., 2015). For example, it can help refine clinicians' ability to develop effective treatment strategies and formulate good treatment plans (e.g., deciding which symptoms to target first). Our findings suggest that persistent PTSD symptoms adversely impact long-term processing of loss and increase risk of complicated grief reactions among survivors of trauma. Helping bereaved cope with their posttraumatic stress reactions may hinder the development of disabling complicated grief.

References

- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders*. (4th ed.). American Psychiatric Publishing, Inc.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (Fifth edition).
- Birkeland, M. S., Knatten, C. K., Hansen, M. B., Hem, C., & Heir, T. (2016). Long-term relationships between perceived social support and posttraumatic stress after the 2011 Oslo bombing: A three-year longitudinal study. *Journal of Affective Disorders*, 202, 230–235. <https://doi.org/10.1016/j.jad.2016.05.037>
- Boelen, P. A., de Keijser, J., & Smid, G. (2015). Cognitive-behavioral variables mediate the impact of violent loss on post-loss psychopathology. *Psychological Trauma: Theory, Research, Practice, and Policy*, 7(4), 382–390. <https://doi.org/10.1037/tra0000018>
- Boelen, P. A., van de Schoot, R., van den Hout, M. A., de Keijser, J., & van den Bout, J. (2010). Prolonged Grief Disorder, depression, and post-traumatic stress disorder are distinguishable syndromes. *Journal of Affective Disorders*, 125(1–3), 374–378. <https://doi.org/10.1016/j.jad.2010.01.076>
- Djelantik, A. A. A. M. J., Robinaugh, D. J., Kleber, R. J., Smid, G. E., & Boelen, P. A. (2020). Symptomatology following loss and trauma: Latent class and network analyses of prolonged grief disorder, posttraumatic stress disorder, and depression in a treatment-seeking trauma-exposed sample. *Depression and Anxiety*, 37(1), 26–34. <https://doi.org/10.1002/da.22880>
- Djelantik, A. A. A. M. J., Smid, G. E., Kleber, R. J., & Boelen, P. A. (2018). Do prolonged grief disorder symptoms predict post-traumatic stress disorder symptoms following bereavement? A cross-lagged analysis. *Comprehensive Psychiatry*, 80, 65–71. <https://doi.org/10.1016/j.comppsy.2017.09.001>
- Dyb, G., Jensen, T. K., Nygaard, E., Ekeberg, O., Diseth, T. H., Wentzel-Larsen, T., & Thoresen, S. (2014). Post-traumatic stress reactions in survivors of the 2011 massacre on Utøya Island, Norway. *The British Journal of Psychiatry*, 204(5), 361–367. <https://doi.org/10.1192/bjp.bp.113.133157>
- Eisma, M. C., Lenferink, L. I. M., Chow, A. Y. M., Chan, C. L. W., & Li, J. (2019). Complicated grief and post-traumatic stress symptom profiles

- in bereaved earthquake survivors: A latent class analysis. *European Journal of Psychotraumatology*, 10(1), 1558707. <https://doi.org/10.1080/20008198.2018.1558707>
- Golden, A.-M. J., & Dalgleish, T. (2010). Is prolonged grief distinct from bereavement-related posttraumatic stress? *Psychiatry Research*, 178(2), 336–341. <https://doi.org/10.1016/j.psychres.2009.08.021>
- Guarnerio, C., Prunas, A., Della Fontana, I., & Chiambretto, P. (2012). Prevalence and comorbidity of prolonged grief disorder in a sample of caregivers of patients in a vegetative state. *The Psychiatric Quarterly*, 83(1), 65–73. <https://doi.org/10.1007/s11126-011-9183-1>
- Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. P. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods*, 20(1), 102–116. <https://doi.org/10.1037/a0038889>
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Jensen, T. K., Dyb, G., & Nygaard, E. (2009). A longitudinal study of post-traumatic stress reactions in Norwegian children and adolescents exposed to the 2004 tsunami. *Archives of Pediatrics & Adolescent Medicine*, 163(9), 856–861. <https://doi.org/10.1001/archpediatrics.2009.151>
- Layne, C. M., Kaplow, J. B., Oosterhoff, B., Hill, R. M., & Pynoos, R. S. (2017). The interplay between posttraumatic stress and grief reactions in traumatically bereaved adolescents: When trauma, bereavement, and adolescence converge. *Adolescent Psychiatry*, 7(4), 266–285. <https://doi.org/10.2174/2210676608666180306162544>
- Lenferink, L. I. M., de Keijser, J., Smid, G. E., Djelantik, A. A. M. J., & Boelen, P. A. (2017). Prolonged grief, depression, and posttraumatic stress in disaster-bereaved individuals: Latent class analysis. *European Journal of Psychotraumatology*, 8(1), 1298311. <https://doi.org/10.1080/20008198.2017.1298311>
- Lenferink, L. I. M., Nickerson, A., de Keijser, J., Smid, G. E., & Boelen, P. A. (2019). Reciprocal associations between symptom levels of disturbed grief, posttraumatic stress, and depression following traumatic loss: A four-wave cross-lagged study. *Clinical Psychological Science*, 7(6), 1330–1339. <https://doi.org/10.1177/2167702619858288>
- Lichtenthal, W. G., Cruess, D. G., & Prigerson, H. G. (2004). A case for establishing complicated grief as a distinct mental disorder in DSM-V. *Clinical Psychology Review*, 24(6), 637–662. <https://doi.org/10.1016/j.cpr.2004.07.002>
- Muthén, L. K., & Muthén, B. O. (1998–2017). *Mplus user's guide* (8th ed.).
- Nakajima, S., Ito, M., Shirai, A., & Konishi, T. (2012). Complicated grief in those bereaved by violent death: The effects of post-traumatic stress disorder on complicated grief. *Dialogues in Clinical Neuroscience*, 14(2), 210–214. <https://doi.org/10.31887/DCNS.2012.14.2/snakajima>
- Neria, Y., & Litz, B. T. (2004). Bereavement by traumatic means: The complex synergy of trauma and grief. *Journal of Loss and Trauma*, 9(1), 73–87. <https://doi.org/10.1080/15325020490255322>
- 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. <https://doi.org/10.1002/da.22349>
- Pfefferbaum, B., Call, J. A., Lensgraf, S. J., Miller, P. D., Flynn, B. W., Doughty, D. E., Tucker, P., & Dickson, W. L. (2001). Traumatic grief in a convenience sample of victims seeking support services after a terrorist incident. *Annals of Clinical Psychiatry*, 13(1), 19–24. <https://doi.org/10.3109/10401230109147125>
- Pynoos, R., Rodriguez, N., Steinberg, A., Stuber, M., & Frederick, C. (1998). *UCLA PTSD Index for DSM-IV*. UCLA Trauma Psychiatry Program.
- Raphael, B., & Martinek, N. (1997). Assessing traumatic bereavement and posttraumatic stress disorder. In J. P. Wilson & T. M. Keane (Eds.), *Assessing psychological trauma and PTSD* (pp. 373–398). Guilford Press.
- Schaal, S., Jacob, N., Dusingizemungu, J.-P., & Elbert, T. (2010). Rates and risks for prolonged grief disorder in a sample of orphaned and widowed genocide survivors. *BMC Psychiatry*, 10, 55. <https://doi.org/10.1186/1471-244X-10-55>
- Selig, J. P., & Little, T. D. (2012). Autoregressive and cross-lagged panel analysis for longitudinal data. In B. Laursen, T. D. Little, & N. A. Card (Eds.), *Handbook of developmental research methods* (pp. 265–278). Guilford Press.
- Shear, K. M., Jackson, C. T., Essock, S. M., Donahue, S. A., & Felton, C. J. (2006). Screening for complicated grief among Project Liberty service recipients 18 months after September 11, 2001. *Psychiatric Services*, 57(9), 1291–1297. <https://doi.org/10.1176/ps.2006.57.9.1291>
- Shear, M. K. (2015). Complicated grief. *The New England Journal of Medicine*, 372(2), 153–160. <https://doi.org/10.1056/NEJMcp1315618>
- Steinberg, A. M., Brymer, M. J., Decker, K. B., & Pynoos, R. S. (2004). The University of California at Los Angeles Post-Traumatic Stress Disorder Reaction Index. *Current Psychiatry Reports*, 6(2), 96–100. <https://doi.org/10.1007/s11920-004-0048-2>
- Stene, L. E., & Dyb, G. (2016). Research participation after terrorism: An open cohort study of survivors and parents after the 2011 Utøya attack in Norway. *BMC Research Notes*, 9, 57. <https://doi.org/10.1186/s13104-016-1873-1>
- Thoresen, S., Aakvaag, H. F., Wentzel-Larsen, T., Dyb, G., & Hjemdal, O. K. (2012). The day Norway cried: Proximity and distress in Norwegian citizens following the 22nd July 2011 terrorist attacks in Oslo and on Utøya Island. *European Journal of Psychotraumatology*, 3(1), Article 19709. <https://doi.org/10.3402/ejpt.v3i0.19709>
- World Health Organization. (2018). *International classification of diseases for mortality and morbidity statistics (11th Revision)*. <https://icd.who.int/en>

Received November 18, 2020

Revision received February 19, 2021

Accepted April 29, 2021 ■