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Trajectories of grief: Comparing symptoms from the *DSM-5* and ICD-11 diagnoses

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Abstract

Background: Diagnostic criteria for prolonged grief have appeared in the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*; persistent complex bereavement disorder, PCBD) and in the ICD-11 (prolonged grief disorder, PGD), and the question of which diagnosis is most clinically useful has been hotly debated. This study provides the first longitudinal comparison of PCBD and PGD in their ability to capture symptom change over time and their relation to long-term outcomes.

Methods: A community sample was recruited consisting of 282 individuals who had recently lost a spouse. Structured clinical interviews were conducted at 3, 14, and 25 months postloss for symptoms corresponding to PCBD and PGD criteria. Outcomes at 25 months included PCBD and PGD caseness, depression, global functioning, and interviewer ratings of participant suffering.

Results: PCBD and PGD trajectories determined by growth mixture modeling, each captured three primary outcomes: *resilience*, *moderate-improving* symptoms, and *prolonged-stable* symptoms. The PGD solution also identified trajectories of increasing and decreasing distress: *prolonged-worsening* and *acute-recovering* symptoms. Prediction of 25-month outcomes indicated differences conforming to the severity of PGD symptoms, and the *prolonged-worsening* trajectory was associated with the worst adjustment.

Conclusions: PGD symptoms were more differentiated, better-captured psychopathology, and other outcomes and were more sensitive to change over time compared to PCBD.

1 | INTRODUCTION

Bereavement is a difficult and often excruciating experience that can lead to prolonged distress reactions. Maladaptive adjustments to loss are associated with functioning impairments and a considerable public health cost (Maercker et al., 2013; Stroebe, Schut, & Stroebe, 2007). Complicated grief symptoms uniquely differ from depression and posttraumatic stress disorder (Boelen, Lenferink, Nickerson, & Smid, 2018; Bonanno et al., 2007; Djelantik, Smid, Kleber, & Boelen, 2017; Lenferink, de Keijser, Smid, Djelantik, & Boelen, 2017; Malgaroli, Maccallum, & Bonanno, 2018; Prigerson et al., 2009) and have been effectively treated by grief-specific interventions (Boelen, de Keijser, van den Hout, & van den Bout, 2007; Shear, Houck, & Reynolds, 2005). To facilitate targeted treatment, new diagnostic criteria for a prolonged grief disorder (PGD) have appeared in the *Diagnostic and statistical manual of mental disorders* (*DSM-5*; American Psychiatric Association, 2013) and in the ICD-11 (World Health Organization [WHO], 2018). The *DSM-5* diagnosis, persistent complex bereavement disorder (PCBD), is listed as a condition for further study, while the ICD-11 criteria for PGD have yet to receive an extensive evaluation.

Although PCBD and PGD criteria show commonalities (Boelen et al., 2018), the question of which grief criteria might be the most clinically useful remains hotly debated (Cozza et al., 2019; Mauro et al., 2018; Prigerson & Maciejewski, 2017), as is the appropriate threshold for psychiatric grief-related distress (Maciejewski & Prigerson, 2017). Both diagnoses require that grief-related symptomatology persists for at least a certain amount of time after the loss: the duration of symptoms is considered abnormal after at least 6 months for PGD (criterion C) and

12 months for PCBD (part of criteria B and C). However, many bereaved individuals will endorse fluctuating symptoms over time without being good diagnostic candidates (Maercker et al., 2013), with considerable evidence for heterogeneous symptom patterns other than prolonged grief (Bonanno et al., 2002; Galatzer-Levy & Bonanno, 2012; Maccallum, Galatzer-Levy, & Bonanno, 2015). Thus, the presence of unrelenting distress becomes a crucial characteristic when distinguishing bereavement-related pathology from normal grief.

Despite the importance of the temporal frame in defining grief-related distress, no research has yet comparatively examined how well the symptom sets that comprise PGD and PCBD capture patterns of change over time. To have adequate specificity, it is essential for the diagnosis to differentiate the longitudinal course of prolonged grief from other culturally normative reactions. A quantitative approach to this end is the application of growth mixture modeling (GMM; Muthén & Muthén, 2019). GMM has been extensively used in epidemiological and treatment investigations to distinguish heterogeneous trajectories of change over time, and to identify distinct subpopulations of individuals with chronic, acute, worsening, or improving symptoms (Bonanno et al., 2011; Bonanno et al., 2012;; Galatzer-Levy, Huang, & Bonanno, 2018; Uher et al., 2010) A number of bereavement studies have utilized the GMM to identify heterogeneous trajectories of change in depression following loss (Bonanno, Papa, Moskowitz, & Folkman, 2005; Galatzer-Levy & Bonanno, 2012; Maccallum et al., 2015). More recently, several studies have examined longitudinal trajectories of grief symptoms. Surprisingly, and at odds with the broader literature, the grief trajectories identified in these studies tended to show only minimal change over time. The reason for this divergence may be due in part to methodological limitations. Two of the grief trajectory studies (Lenferink, Nickerson, de Keijser, Smid, & Boelen, 2018; Nielsen, Carlsen, Neergaard, Bidstrup, & Guldin, 2018) used constrained forms of growth modeling that fixed all variance parameters to be identical within trajectory classes, thus excluding exploration of alternative modeling solutions (Nagin & Odgers, 2010). Another study (Sveen, Bergh Johannesson, Cernvall, & Arnberg, 2018) used the more flexible GMM approach, which allowed for random variance parameters. However, both this study and Lenferink et al. (2018) suffered from small sample sizes for GMM (Kim, 2012) and only examined data on grief after the first year of bereavement. Thus, these studies were unable to identify early patterns of longitudinal change. Importantly, none of the grief trajectory studies examined the possibility that different sets of grief symptoms might vary in their capacity to capture change.

To address this critical question in the current investigation we examined longitudinal trajectories for both PGD and PCBD grief symptoms in a sample of adults who recently lost a spouse. We addressed previous limitations in grief trajectory studies by using GMM with a sufficiently large sample of individuals recruited from the community to ensure adequate heterogeneity in symptom presentation and to allow for exploration of a range of possible modeling solutions. Crucially, we assessed grief symptoms at 3, 14, and 25 months postloss using structured clinical interviews, which allowed us to examine the course of symptoms at both early and later points in bereavement. To our knowledge, this is the first study to use GMM to examine growth trajectories of PCBD and PGD symptoms assessed with clinical interviews and the first to compare their differential outcomes.

2 | METHODS

2.1 | Participants and procedure

Participants were bereaved individuals younger than 65 years of age who had recently lost a spouse. Recruitment was accomplished by sending invitation letters based on public death listings obituaries and support group referrals, as well as fliers, internet, and newspaper advertisements seeking research volunteers. Bereavement was verified by death certificates. Participants were administered structured clinical interviews at three time points: 3 months postloss (Time 1: $M = 2.67$; $SD = 1.01$), 14 months postloss (Time 2: $M = 14.25$; $SD = 0.98$), and 25 months postloss (Time 3: $M = 24.92$; $SD = 0.64$). The final sample consisted of 282 individuals for whom data were available for at least two time points, and 206 participants completed all three sessions. Participants were on average 55.3 years of age ($SD = 7.2$), two-thirds female (66.0%), predominantly White (90.0%), with a college degree or above (60.8%), and working full time (61.5%).

2.2 | Structured clinical interviews

Participants were administered structured clinical interviews that included assessment of the presence/absence of 16 symptoms that comprised Prolonged Complicated Bereavement Disorder (PCBD) corresponding to the *DSM-5* criteria (American Psychiatric Association, 2013), and 12 symptoms that comprised of PGD corresponding to the ICD-11 diagnostic criteria (WHO, 2018). All PGD symptoms assessments were identical to those overlapping in the PCBD criteria (see Table 1), with two exceptions: (a) The PCBD symptom of difficulty reminiscing positively about the deceased is phrased more broadly in PGD as an inability to experience positive mood/emotion; accordingly, these were assessed as separate symptoms in each disorder; (b) the guilt and denial symptoms from the PGD diagnosis are specified only in the PCBD diagnosis.[1] Interviews were conducted by psychologists and advanced doctoral candidates in clinical psychology and videotaped, and also included assessment of *DSM-5* symptoms for major depressive disorder

[1]The ICD-11 PGD diagnosis only specifies the word denial for this symptom. On the basis of the common clinical understanding of denial as the refusal to accept reality, as if a painful event had not occurred, we measured denial in the current study as a difficulty remembering key aspects of loss due to the painful nature of the event. The coding of this symptom in our structured interview explicitly specified that the that the difficulty remembering should be due to the painful nature of the loss and not to the situational complexity or to the interviewees preoccupation or inability to attend/process the event. In other recent studies, Mauro et al. (2018) used the symptom "difficulty accepting the loss" as a proxy for denial. This symptom was also included in the current study. However, the ICD-11 criteria for PGD specify difficulty accepting the loss as a separate symptom from denial. Boelen et al. (2018) measured denial using the PCBD item, avoidance of places, objects, thoughts, or memories associated with the deceased. However, conceptually this symptom is closer to explicit avoidance than denial and was found to show poor sensitivity and low factor loadings. Because of the ambiguity surrounding this symptom, we tested whether our primary results would change without the denial symptom. Notably, however, the findings were essentially identical as when the denial symptom was included.

TABLE 1 Symptoms comprising diagnosis for PCBD (*DSM-5*) and PGD (ICD-11)

Criteria symptom	PCBD	PGD	Structured interview item match
Persistent yearning for deceased	A	A	Persistent yearning for deceased
Preoccupation with the deceased	A	A	Preoccupation with the deceased person
Intense sorrow/emotional pain	A	B	Intense sorrow and emotional pain because of the death
Preoccupation with circumstances of death	A	–	Preoccupation with circumstances of the death
Difficulty accepting the death	B	B	Marked difficulty accepting the death
Disbelief, emotional numbness	B	B	Feeling shocked, stunned, or emotionally numb since the loss
Difficulty with positive reminiscing	B	–	Difficulty in positive reminiscing about the deceased
Bitterness/anger related to loss	B	B	Bitterness or anger related to the loss
Self-blame	B	B	Maladaptive self-blame in relation to the deceased or death
Avoidance of reminders of the loss	B	–	Excessive avoidance of reminders of the loss (e.g., avoiding places or people associated with the deceased)
Desire to die to reunite with deceased	B	–	A desire not to live to be with the deceased
Difficulty trusting others	B	–	Difficulty trusting other people since the death
Feeling alone or detached from other people	B	–	Feeling alone or detached from other people since the death
Feeling life is meaningless or empty or that one cannot function without the deceased	B	–	Feeling life is meaningless or empty or that one cannot function without the deceased
Role confusion (feeling part of oneself died)	B	B	Confusion about one's role in life or a diminished sense of one's identity (e.g., feeling a part of oneself died)
Difficulty pursuing interests/planning for future, such as friendships/other activities	B	B	Difficulty or reluctance to pursue interests or to plan for the future (e.g., friendships/other activities) since the loss
Guilt	–	B	Feelings of worthlessness or excessive or inappropriate guilt
Denial	–	B	Inability to remember an important aspect of the death (due to the painful nature of the loss and not the complexity of the loss or preoccupation and inability to attend to or process all events
Inability to experience positive emotion/mood	–	B	Persistent inability to experience positive emotions

Note. A: A criterion; B: B criterion; PCBD: persistent complex bereavement disorder; PGD: prolonged grief disorder.

and posttraumatic stress disorder, as well as a number of other metrics. Interviewers coded the presence/absence of each symptom. Symptom absence was further coded as either subthreshold or true absence, however, only the binary presence/absence distinction was used in the current study. A randomly selected set of five interviews were recoded for reliability. Interclass correlation (ICC = 0.94) for absolute agreement indicated high rater reliability.

2.3 | Outcome measures

Depression. Depression was measured using the Center for Epidemiological Studies-Depression (CES-D; Kohout, Berkman, Evans, & Cornoni-Huntley, 1993), an 11-item self-report scale.

Functioning. Participants were assessed based on their overall psychological, social, and occupational functioning using the Global Assessment of Functioning scale (GAF; Jones, Thornicroft, Coffey, & Dunn, 1995). GAF scores are considered a reliable method to measure outcomes at a group level (Söderberg, Tungström, & Armelius, 2005). Inter-rater reliability was assessed as having three external trained raters, each recode GAF scores on random subsets of 20 participants with very high interclass correlation (ICC = 0.92) for absolute agreement.

Interviewer ratings of Patient Suffering. Interviewers were also asked to rank on a 7-point Likert scale the extent to which each participant was suffering during the interview (IRPS).

PCBD/PGD Prevalence. We assigned PCBD diagnosis using the criteria specified in *DSM-5*, with impaired functioning defined as GAF below 60. Assigning caseness for PGD is less straightforward because "as the new ICD disorder definitions are based on a typological approach, there is no strict requirement for the number of symptoms needed to meet the diagnostic threshold" (Killikelly & Maercker, 2018). Nonetheless, to facilitate empirical assessment of PGD, recent studies (Boelen et al., 2018; Mauro et al., 2018) have translated the ICD-11 description of PGD to specify an A criterion (the presence of either persistent yearning or intense preoccupation for the deceased), and a B criterion that requires at least one symptom of intense emotional pain (e.g., sadness, guilt, anger, denial, blame, difficulty accepting the death, feeling one has lost a part of one's self, an inability to experience positive mood, emotional numbness, difficulty in engaging with social or other activities; see Table 1). We used this algorithm in the current study, along with impaired functioning as defined above for PCBD. In addition, for exploratory purposes, we also considered two other PGD diagnostic algorithms: One with the B criterion defined by three or more symptoms (PGD_{1+3}) and one with the B criterion defined by five or more symptoms (PGD_{1+5}).

2.3.1 | Data analysis

Growth Mixture Modeling (GMM) was performed using Mplus 8.0 (Muthén & Muthén, 2019) to identify the best-fitting trajectory models for grief symptoms. GMM does not rely on the assumption that individuals can be meaningfully described by a homogeneous mean response, instead of allowing to tease out subpopulations (or classes) characterized by discrete growth patterns (i.e., heterogeneous reactions to the loss). Separate analyses were conducted using the 16 symptoms for PCBD (*DSM-5*) and the 12 symptoms for PGD (ICD-11). In each analysis, we explored intercept, linear slope and quadratic parameters as either fixed or random effects. In the final models, intercept variances were allowed to be freely estimated, whereas linear slope variances were fixed and quadratic parameters were nonsignificant and thus removed to facilitate model convergence. Model solutions with an increasing number of classes were compared in relation to model fit indices, including Akaike (AIC), Bayesian (BIC), and sample-size adjusted Bayesian (SSABIC) Information Criteria, Entropy, and Lo–Mendell–Rubin Adjusted Likelihood Ratio Test. Choice of best-fitting solutions was based on these indices, explanatory properties, and theoretical coherence (Bonanno, 2004; Muthén, 2003).

3 | RESULTS

3.1 | PCBD (*DSM-5*) symptoms

Fit statistics for unconditional models with two to four classes were compared (see Table 2). The information criteria (AIC, BIC, and SSABIC) decreased consistently, suggesting indicated increased fit with increasing class size. Entropy, as a measure of certainty in class membership assignment, was high for the 2- and 4-class (0.87) solutions, but higher for the 3-class (0.91) solution. The adjusted LRT indicated significantly improved model fit from 1- to 2-class solutions and from 2- to 3-class solutions but did not approach significance for the 4-class solution ($p = 0.63$). Given these metrics, the 3-class model was clearly the optimal solution.

Examining the 3-class model further (see Figure 1a), the majority of the sample (71%) was assigned to a trajectory indicative of *Resilience*, characterized by low grief symptoms at 3 months (intercept = 2.22, $SE = 0.02$, $p < 0.001$) that declined slightly over time (slope = −0.76, $SE = 0.12$, $p < 0.001$). The second largest class (24%) described a *Moderate-Improving* trajectory with moderate-high grief symptoms at 3 months (intercept $M = 7.10$, $SE = 0.51$, $p < 0.001$) that declined more steadily but not completely over time (slope = −1.30, $SE = 0.40$, $p = 0.001$). Finally, a third, smaller portion of the sample (5%) described a *Prolonged-Stable* trajectory characterized by high grief symptoms at 3 months (intercept = 10.88, $SE = 0.80$, $p \leq 0.001$) that changed minimally over time (slope = −0.68, $SE = 0.51$, $p = 0.18$).

3.1.1 | PGD (ICD-11) symptoms

Unconditional models with two to six classes were compared. The information criteria (AIC, BIC, and SSABIC) decreased steadily for all the six classes, indicating an increasingly better model fit. Entropy was high (0.89) for the 2-class solution and increased further (>0.91) for all class solutions beyond the 2-class solution. The adjusted LRT indicated significantly improved model fit through the 5-class solution. Because the 5-class model was the best-fitting and was also judged to be the most theoretically relevant and coherent, this solution was chosen as the optimal solution.

Examining the 5-class model further (see Figure 1b), the majority of the sample (58%) was assigned to a trajectory suggesting *Resilience*, characterized by low grief symptoms at 3 months (intercept = 1.58, $SE = 0.16$, $p < 0.001$) that declined slightly over time (slope = -0.63, $SE = 0.08$, $p < 0.001$). The next two most prevalent classes each had moderately high initial grief symptoms: A *Moderate-Improving* trajectory (18%) described moderate grief symptoms at 3 months (intercept $M = 3.63$, $SE = 0.33$, $p < 0.001$) that declined steadily but not completely over time (slope = −0.62, SE = 0.17, $p = 0.001$), and a *Moderate-Stable* trajectory (13%) described moderate symptoms at 3 months (intercept = 4.52, $SE = 0.43$, $p < 0.001$) that did not change significantly over time (slope = 0.06, $SE = 0.22$, $p = 0.80$). The final two trajectories each had high initial levels of grief: A *Prolonged-Worsening* trajectory (4%) had high symptoms at 3 months (intercept = 5.51, $SE = 0.87$, $p < 0.001$) that grew markedly worse over time (slope = 1.23, $SE = 0.37$, $p = 0.001$) and an *Acute-Recovery* group (7%) had very high symptoms at 3 months

TABLE 2 Fit indices for 2–4 class models of PCBD symptoms (*DSM-5*) and for 2–6 class models of PGD symptoms (ICD-11)

	PCBD (*DSM-5*)			PGD (ICD-11)				
	2 classes	3 classes	4 classes	2 classes	3 classes	4 classes	5 classes	6 classes
Akaike information criteria	3648.8	**3597.8**	3573.6	3187.0	3129.4	3083.5	**3058.4**	3041.1
Bayesian information criteria	3681.6	**3641.5**	3628.3	3219.8	3173.1	3138.1	**3123.9**	3117.7
Sample-size adjusted BIC	3653.1	**3603.5**	35680.7	3191.2	3135.0	3090.5	**3066.9**	3051.1
Entropy	0.87	**0.91**	0.87	0.89	0.93	0.95	**0.91**	0.92
LMR-LRT (*P* value)	<0.05	**<0.05**	0.63	<0.05	<0.001	<0.05	**<0.005**	0.22

Note. Best-fitting model indicated in bold font.

AIC: Akiake information criterion; BIC: Bayesian information criterion; LMR-LRT: Lo–Mendell–Rubin adjusted Likelihood Ratio Test; PCBD: persistent complex bereavement disorder; PGD: prolonged grief disorder; SSABIC: sample-size adjusted Bayesian information criterion.

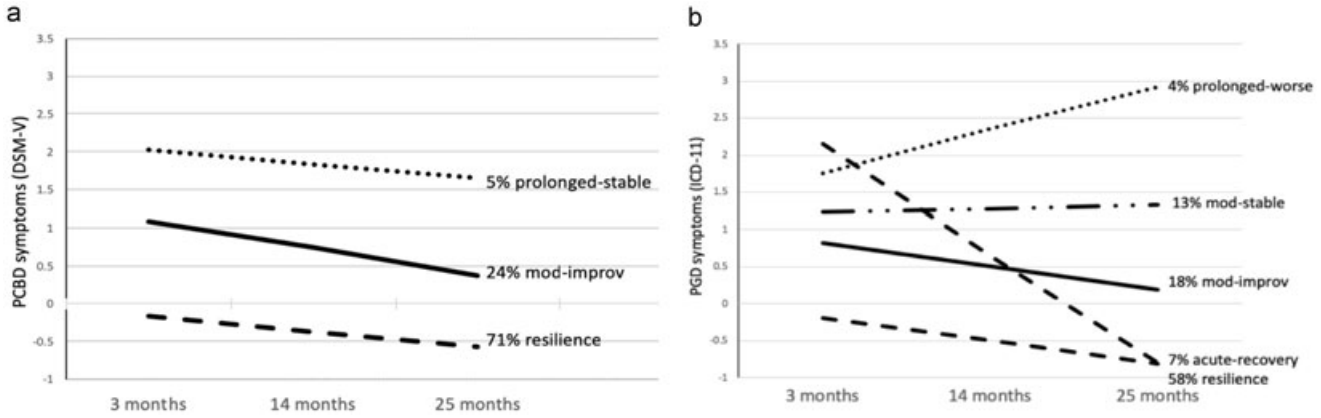

FIGURE 1 Trajectories of PCBD symptoms (a) and PGD symptoms (b). Symptoms presented as standardized *z* scores to facilitate comparison. PCBD: persistent complex bereavement disorder; PGD: prolonged grief disorder

(intercept = 6.26, *SE* = 0.47, $p < 0.001$) that improved dramatically over time (slope = −3.04, *SE* = 0.24, $p = 0.001$) and by 25 months postloss had reached the low grief level of the resilient group.

3.1.2 | Comparing PCBD and PGD

Caseness overlap

Contingency analysis of 25-month caseness for PCBD and PDG resulted in a significant nonchance distribution, $\chi^2(1, N = 270) = 94.5$, p 0.001, indicating convergence. However, only about one-third (36.4%) of the individuals who met criteria for PGD also met criteria for PCBD. Caseness for the exploratory PGD diagnoses was 8.8% for PGD_{1+3} and 4.6% for PGD_{1+5}. However, close to half (48%) of the individual who met criteria for PGD_{1+3} met criteria for PCBD, whereas three quarters (76.9) of those who met criteria for the more restrictive PGD_{1+5} met the criteria for PCBD.

Trajectory overlap

The classification overlap between the two final trajectory solutions produced a significant nonchance distribution, $\chi^2(8, N = 282) = 238.5$, $p < 0.001$. However, as can be seen in Table 3, only about half (53.3%) of the PCBD Prolonged-Stable trajectory was classified in the PGD Prolonged-Worsening trajectory ($n = 8$, $res_a = 10.2$, $p < 0.001$). Complimentarily, only two-thirds of the PGD Prolonged-Worsening trajectory was captured by the PCBD Prolonged-Stable trajectory. By contrast, most of the PCBD Moderate-Improving trajectory was captured in the two moderate PGD trajectories: Moderate-Improving ($n = 28$, 41.2%; $res_a = 5.5$, $p < 0.001$) and the Moderate-Stable trajectory ($n = 25$, 36.8%; $res_a = 5.8$, $p < 0.001$). Finally, most of those categorized in a resilient trajectory by the PCBD analysis ($n = 160$, 80.4%; $res_a = 11.9$, $p < 0.001$) were also categorized in the PGD resilient trajectory. Of note, however, more than half of the PGD acute-recovery trajectory was misclassified in the PCBD analysis as a resilient trajectory of stable low grief ($n = 10$, 52.6%; $res_a = 1.8$, $p < 0.05$).

Trajectories as predictors of T3 caseness and adjustment

The PGD trajectories outperformed the PCBD trajectories in matching diagnostic caseness (see Table 4). Although PCBD caseness was relatively infrequent (4.3%), only about two-thirds (68.6%) of all individuals classified in the Prolonged-Stable trajectory met PCBD criteria. By contrast, caseness for PGD was more frequent (11. 7%) and spread across the Prolonged-Worsening, Moderate-Stable, and

TABLE 3 Distribution of PCBD symptom trajectories across PGD trajectories

	PCBD trajectory		
	Prolonged-stable	Moderate-improving	Resilience
PGD trajectory	% HAR	% HAR	% HAR
Prolonged-worsening	8 (9.7)***	3 (−0.1)	1 (−4.8)***
Moderate-stable	6 (3.2)***	25 (6.8)***	5 (−6.8)***
Moderate-improving	1 (−1.2)	28 (5.5)***	23 (4.6)***
Acute-recovery	0 (−1.1)	9 (2.5)**	10 (1.8)*
Resilience	0 (−4.7)***	3 (−10.2)***	160 (11.9)***

Note. HAR: Haberman's adjusted residual; PCBD: persistent complex bereavement disorder.
Probabilities for individual cells, in parentheses, are based on Haberman's adjusted residual.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

TABLE 4 PCBD and PGD trajectories as predictors of T3 caseness and mean (*SD*) functioning, distress, and depression

	PCBD trajectories				PGD trajectories					
T3 score	Prolonged-stable *n* = 15	Moderate-improving *n* = 66	Resilient *n* = 189		Prolonged-worsening *n* = 12	Moderate-stable *n* = 36	Moderate-improving *n* = 52	Acute-recovering *n* = 17	Resilient *n* = 153	
PCBDdiagnosis	10 66.6%	2 3.0%	0 –	χ^2(2) 270 152.5***	–	–	–	–	–	–
PGDdiagnosis	–	–	–	–	12 100%	14 38.9%	7 13.5%	0 –	0 –	χ^2(4) 270 140.6***
PGD_{1+3}	–	–	–	–	12 100%	13 36.1%	0 –	0 –	0 –	χ^2(4) 270 179.2***
PGD_{1+5}	–	–	–	–	12 100%	1 2.7%	0 –	0 –	0 –	χ^2(4) 270 259.9***
GAF	50.8_a (9.2)	62.9_b (9.4)	74.9_c (9.4)	*F*(2,261) 73.9***	49.6_a (8.2)	62.1_b (9.0)	$65.3_{b,c}$ (9.1)	71.3_c d(10.4)	76.0_d (9.5)	*F*(4,259) 43.1***
CES-D	13.7_a (3.8)	10.2_b (3.7)	5.2_c (3.6)	*F*(2,235) 67.4***	15.2_a (2.7)	9.8_b (4.2)	$9.2_{b,c}$ (3.9)	$5.9_{c,d}$ (2.8)	5.0_d (3.7)	*F*(4,233) 32.2***
IRPS	5.4_a (1.8)	4.0_b (1.5)	2.4_c (1.4)	*F*(2,260) 53.1***	5.7_a (1.4)	4.1_b (1.8)	3.6_b (1.3)	$3.3_{b,c}$ (1.4)	2.3_c (1.3)	*F*(4,258) 27.4***

Note. CES-D: Center for Epidemiological Studies-Depression; GAF: Global Assessment of Functioning; IRPS: Interviewer ratings of Patient Suffering; PCBD: persistent complex bereavement disorder; PGD: prolonged grief disorder; *SD*: standard deviation.
For GAF, CES-D, and IRPS, cells that share subscripts are not significantly different by Tukey test for multiple comparisons ($p < 0.05$).
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

Moderate-Improving trajectories. Importantly, however, every participant (100%) classified in the Prolonged-Worsening trajectory also met criteria for PGD. This was true also for the two exploratory PGD diagnoses (PGD_{1+3} and PGD_{1+5}). Moreover, using the most restrictive exploratory diagnosis (PGD_{1+5}), caseness was almost completely exclusively represented by the Prolonged-Worsening trajectory.

The prolonged trajectories in both diagnostic sets performed well in differentiating continuous measures of T3 adjustment. The PCBD trajectories significantly differentiated each T3 variable. Tukey tests controlling for multiple comparisons confirmed that the PCBD Prolonged-Stable trajectory was associated with the poorest functioning, and greatest depression and observed suffering. Similar analyses for the PGD trajectories also differentiated each T3 variable. Tukey tests also indicated that the PGD Prolonged-Worsening trajectory was associated with the poorest functioning, and greatest depression and observed suffering.

4 | DISCUSSION

An abundant body of research using GMM has identified heterogeneous trajectories of change following highly aversive events (Galatzer-Levy et al., 2018), including studies that examined trajectories of depression during bereavement (Bonanno et al., 2005; Galatzer-Levy & Bonanno, 2012; Maccallum et al., 2015). Surprisingly, however, recent bereavement studies that examined trajectories of grief symptoms observed uncharacteristically flat trajectories that showed only minimal change over time (Lenferink et al., 2018; Nielsen et al., 2018; Sveen et al., 2018). As discussed earlier, this divergence from previous studies may be due in part to methodological limitations. In the current study, we addressed these methodological limitations but also examined whether the grief symptom sets might also inform sensitivity to change. Our findings demonstrate clearly that PGD (ICD-11) symptoms showed greater ability to capture change over time compared to PCBD (*DSM-5*) symptoms. Interestingly, although our study addressed the methodological limitations of previous grief trajectory studies, the findings for the PCBD trajectories were nonetheless similar to the findings of the previous studies. In our study, the best-fitting PCBD model produced three relatively flat parallel trajectories that were distinct at 3 months postloss but diverged only slightly over time. These trajectories suggested outcomes of Resilience, Moderate-Improving symptoms, and Prolonged-Stable grief symptoms. As can be seen in Figure 1, the best-fitting PGD model identified a greater number of trajectories and also showed greater variation in symptom levels over time than did the PCBD trajectories. The PGD trajectories identified trajectories of Resilience and Moderate-Improving symptoms comparable to the PCBD analysis. However, the PGD analysis also identified a second trajectory of moderate symptoms that remained stable over time and, crucially, two additional trajectories, not identified with PCBD symptoms. These were characterized by high early levels of grief symptoms that either increased further over time, the Prolonged-worsening trajectory (4%), or dramatically decreased over time, and acute-recovery trajectory (7%). Of note, the variation in

symptom severity over time revealed by these PGD two trajectories was not well-represented in the PCBD trajectories. Only two-thirds of the PGD Prolonged-Worsening trajectory overlapped with the PCBD Prolonged-Stable trajectory and over half of the PGD Acute-Recovering pattern was misclassified in the PCBD analysis as a Resilient trajectory.

The PGD trajectories also better-captured participants meeting diagnostic criteria than the PCBD symptoms trajectories. Although PDG caseness was observed in each of the more severe trajectories, every individual (100%) classified in the PGD trajectory of Prolonged-Worsening grief met criteria for PGD. By contrast, only about two-thirds (68.8%) of the individuals classified in the PCBD trajectory of Prolonged-Stable grief met criteria for PCBD. Of interest, an exploratory PGD diagnosis using more restrictive criteria mapped almost exclusively onto the PGD Prolonged-Worsening trajectory. Outcome analyses for continuous measures of adjustment at T3 (25 months postloss) also revealed two other findings of interest regarding the PGD trajectories. First, confirming the unique nature of the PGD trajectory of Prolonged-Worsening grief, participants in this group had a significantly poorer adjustment on each T3 measure relative to all other groups. Second, although the PGD trajectory of Acute-Recovering had the highest grief symptoms at T1, by T3 this group was not significantly different from the resilient group on any adjustment measure. Thus, in terms of the general functioning, suffering, depression, and grief, this group was essentially completely recovered.

One possible explanation for the reduced sensitivity to changes in the PCBD trajectory model is that a large number of symptoms in PCBD diagnostic criteria produces spurious combinations. Lenferink and Eisma (2018) compared all possible symptoms combinations that could comprise the PCBD and PGD diagnosis. They found that the PCBD diagnosis produced a dramatically high number of possible symptom combinations (37,650) compared to a relatively small number (48) for PGD. Alternatively, the larger amount of PCBD symptoms could minimize the contribution of its more salient characteristics. Analyses of PCBD symptoms using a network approach (Borsboom & Cramer, 2013) suggested that yearning and emotional pain (Maccallum, Malgaroli, & Bonanno, 2017; Robinaugh, Millner, & McNally, 2016), as well as identity disruptions (Malgaroli et al., 2018), are among its most central and defining characteristics. These elements more closely reflect PGD's smaller subset of symptoms, whereas the other additional and less-distinguishing PCBD symptoms (e.g., difficulty trusting others) may reflect more characterological phenomena less specifically related to grief course.

Our study has a number of strengths. Most notably, we used a flexible modeling approach, GMM, to explore possible trajectory solutions using a sample and design specifically tailored to longitudinal trajectory research, with symptoms measured through reliable clinical interviews. Despite these strengths, however, several limitations are worth noting. First, although the heterogeneity inherent in a community sample is ideal for latent trajectory analyses, the absolute numbers of individuals with elevated psychopathology were limited. Future trajectory research comparing different symptoms sets would, therefore, benefit from the use of both community and clinical samples. Second, relatedly, although the sample size for the current investigation was adequate for latent trajectory modeling (Kim, 2012), even larger sample sizes would allow for greater exploration of psychopathological patterns. Third, it will be important to replicate the greater sensitivity to change we observed for the ICD-11 PGD symptoms. Because this symptom set has not previously been examined using GMM, further research is warranted. Fourth, in assigning caseness, we used a cut-score from the GAF to designate impairment. However, this measure does not specifically reference impairment due to grief symptoms. Finally, it is worth acknowledging that although latent growth mixture modeling of symptom trajectories tells us a great deal about how well symptom sets capture change over time, this approach cannot interrogate the crucial distinction in psychiatric diagnoses between mandatory and accessory symptoms.

Overall, PGD symptoms better-captured psychopathology and associated outcomes and were more sensitive to change over time when compared to PCBD. The suggested spuriousness of PCBD could result in a decreased diagnostic utility, as indicated by previous studies showing a nonadequate sensitivity in clinical and community samples (Cozza et al., 2016; Mauro et al., 2018). Ultimately, more research on bereavement outcomes is needed to better understand heterogeneity in the fluctuations of grief symptoms over time. Experience sampling methods, for example, would allow a more fine-grained temporal analysis of prolonged grief, offering insights on symptoms interactions and on the appropriate inclusion/exclusion criteria. In the meantime, the available empirical evidence and the findings from the current study argue in favor of the clinical utility of the more concise set of PGD symptoms.

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REFERENCES

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®)*. Washington, DC, US: American Psychiatric Pub.

Boelen, P. A., de Keijser, J., van den Hout, M. A., & van den Bout, J. (2007). Treatment of complicated grief: A comparison between cognitive-behavioral therapy and supportive counseling. *Journal of Consulting and Clinical Psychology*, *75*(2), 277–284.

Boelen, P. A., Lenferink, L. I. M., Nickerson, A., & Smid, G. E. (2018). Evaluation of the factor structure, prevalence, and validity of disturbed grief in DSM-5 and ICD-11. *Journal of Affective Disorders*, *240*, 79–87. https://doi.org/10.1016/j.jad.2018.07.041

Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist*, *59*(1), 20–28.

Bonanno, G. A., Lehman, D. R., Tweed, R. G., Haring, M., Wortman, C. B., Sonnega, J., & Nesse, R. M. (2002). Resilience to loss and chronic grief:

A prospective study from preloss to 18-months postloss. *Journal of Personality and Social Psychology*, *83*(5), 1150–1164. https://doi.org/10.1037//0022-3514.83.5.1150

Bonanno, G. A., Mancini, A. D., Horton, J. L., Powell, T. M., LeardMann, C. A., Boyko, E. J., & Smith, T. C. (2012). Trajectories of trauma symptoms and resilience in deployed US military service members: Prospective cohort study. *The British Journal of Psychiatry*, *200*(4), 317–323. https://doi.org/10.1192/bjp.bp.111.096552

Bonanno, G. A., Neria, Y., Mancini, A., Coifman, K. G., Litz, B., & Insel, B. (2007). Is there more to complicated grief than depression and posttraumatic stress disorder? A test of incremental validity. *Journal of Abnormal Psychology*, *116*(2), 342–351.

Bonanno, G. A., Papa, A., Moskowitz, J. T., & Folkman, S. (2005). Resilience to loss in bereaved spouses, bereaved parents, and bereaved gay men. *Journal of Personality and Social Psychology*, *88*(5), 827–843. https://doi.org/10.1037/0022-3514.88.5.827

Bonanno, G. A., Westphal, M., & Mancini, A. D. (2011). Resilience to loss and potential trauma. *Annual Review of Clinical Psychology*, *7*, 511–535. https://doi.org/10.1146/annurev-clinpsy-032210-104526

Borsboom, D., & Cramer, A. O. J. (2013). Network analysis: An integrative approach to the structure of psychopathology. *Annual review of clinical psychology*, *9*, 91–121.

Cozza, S. J., Fisher, J. E., Mauro, C., Zhou, J., Ortiz, C. D., Skritskaya, N., & Shear, M. K. (2016). Performance of DSM-5 persistent complex bereavement disorder criteria in a community sample of bereaved military family members. *American Journal of Psychiatry*, *173*(9), 919–929.

Cozza, S. J., Shear, M. K., Reynolds, C. F., Fisher, J. E., Zhou, J., Maercker, A., & Zisook, S. (2019). Optimizing the clinical utility of four proposed criteria for a persistent and impairing grief disorder by emphasizing core, rather than associated symptoms. *Psychological Medicine*, 1–8.

Djelantik, A. A. A. M. J., Smid, G. E., Kleber, R. J., & Boelen, P. A. (2017). Symptoms of prolonged grief, post-traumatic stress, and depression after loss in a Dutch community sample: A latent class analysis. *Psychiatry Research*, *247*, 276–281.

Galatzer-Levy, I. R., & Bonanno, G. A. (2012). Beyond normality in the study of bereavement: Heterogeneity in depression outcomes following loss in older adults. *Social Science & Medicine*, *74*(12), 1987–1994. https://doi.org/10.1016/j.socscimed.2012.02.022

Galatzer-Levy, I. R., Huang, S. H., & Bonanno, G. A. (2018). Trajectories of resilience and dysfunction following potential trauma: A review and statistical evaluation. *Clinical Psychology Review*, *63*, 41–55. https://doi.org/10.1016/j.cpr.2018.05.008

Jones, S. H., Thornicroft, G., Coffey, M., & Dunn, G. (1995). A brief mental health outcome scale: Reliability and validity of the Global Assessment of Functioning (GAF). *The British Journal of Psychiatry*, *166*(5), 654–659.

Killikelly, C., & Maercker, A. (2018). Prolonged grief disorder for ICD-11: The primacy of clinical utility and international applicability. *European Journal of Psychotraumatology*, *8*(Suppl 6), 1476441. https://doi.org/10.1080/20008198.2018.1476441

Kim, S.-Y. (2012). Sample size requirements in single- and multiphase growth mixture models: A Monte Carlo Simulation Study. *Structural Equation Modeling: A Multidisciplinary Journal*, *19*(3), 457–476. https://doi.org/10.1080/10705511.2012.687672

Kohout, F. J., Berkman, L. F., Evans, D. A., & Cornoni-Huntley, J. (1993). Two shorter forms of the CES-D Depression Symptoms Index. *Journal of Aging and Health*, *5*(2), 179–193.

Lenferink, L. I. M., & Eisma, M. C. (2018). 37,650 ways to have "persistent complex bereavement disorder" yet only 48 ways to have "prolonged grief disorder. *Psychiatry Research*, *261*, 88–89. https://doi.org/10.1016/j.psychres.2017.12.050

Lenferink, L. I. M., de Keijser, J., Smid, G. E., Djelantik, A. 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. (2018). Trajectories of grief, depression, and posttraumatic stress in disaster-bereaved people. *Depression and Anxiety*, *0*(0) https://doi.org/10.1002/da.22850

Maccallum, F., Galatzer-Levy, I. R., & Bonanno, G. A. (2015). Trajectories of depression following spousal and child bereavement: A comparison of the heterogeneity in outcomes. *Journal of Psychiatric Research*, *69*, 72–79. https://doi.org/10.1016/j.jpsychires.2015.07.017

Maccallum, F., Malgaroli, M., & Bonanno, G. A. (2017). Networks of loss: Relationships among symptoms of prolonged grief following spousal and parental loss. *Journal of Abnormal Psychology*, *126*(5), 652–662.

Maciejewski, P. K., & Prigerson, H. G. (2017). Prolonged, but not complicated, grief is a mental disorder. *The British Journal of Psychiatry*, *211*(4), 189–191.

Maercker, A., Brewin, C. R., Bryant, R. A., Cloitre, M., van Ommeren, M., & Jones, L. M., et al. (2013). Diagnosis and classification of disorders specifically associated with stress: Proposals for ICD-11. *World Psychiatry: official journal of the World Psychiatric Association (WPA)*, *12*(3), 198–206.

Malgaroli, M., Maccallum, F., & Bonanno, G. A. (2018). Persistent complex bereavement disorder, depression, and ptsd symptoms in a conjugally bereaved sample: A network analysis. *Psychological Medicine*, *48*(14), 2439–2448.

Mauro, C., Reynolds, C. F., Maercker, A., Skritskaya, N., Simon, N., Zisook, S., & Shear, M. K. (2018). Prolonged grief disorder: Clinical utility of ICD-11 diagnostic guidelines. *Psychological Medicine*, 1–7.

Muthén, B. (2003). Statistical and substantive checking in growth mixture modeling: Comment on Bauer and Curran (2003). *Psychological Methods*, *8*(3), 369–377.

Muthén, L. K., & Muthén, B. (2019). Mplus. The comprehensive modelling program for applied researchers: user's guide, 5.

Nagin, D. S., & Odgers, C. L. (2010). Group-based trajectory modeling in clinical research. *Annual review of clinical psychology*, *6*, 109–138.

Nielsen, M. K., Carlsen, A. H., Neergaard, M. A., Bidstrup, P. E., & Guldin, M.-B. (2018). Looking beyond the mean in grief trajectories: A prospective, population-based cohort study. *Social Science & Medicine*, https://doi.org/10.1016/j.socscimed.2018.10.007

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 Medicine*, *6*(8), e1000121. Retrieved from. https://doi.org/10.1371%2Fjournal.pmed.1000121

Prigerson, H. G., & Maciejewski, P. K. (2017). Rebuilding consensus on valid criteria for disordered grief. *JAMA Psychiatry*, *74*(5), 435–436.

Robinaugh, D. J., Millner, A. J., & McNally, R. J. (2016). Identifying highly influential nodes in the complicated grief network. *Journal of Abnormal Psychology*, *125*, 747–757. https://doi.org/10.1037/abn0000181

Shear, K., Frank, E., Houck, P. R., & Reynolds, C. F. (2005). Treatment of complicated grief: A randomized controlled trial. *JAMA: The Journal of the American Medical Association*, *293*(21), 2601–2608. Retrieved from. https://doi.org/10.1001/jama.293.21.2601

Stroebe, M., Schut, H., & Stroebe, W. (2007). Health outcomes of bereavement. *The Lancet*, *370*(9603), 1960–1973.

Sveen, J., Bergh Johannesson, K., Cernvall, M., & Arnberg, F. K. (2018). Trajectories of prolonged grief one to six years after a natural disaster. *PLOS One*, *13*(12), e0209757. Retrieved from. https://doi.org/10.1371/journal.pone.0209757

Söderberg, P., Tungström, S., & Armelius, B. Å. (2005). Special section on the GAF: Reliability of global assessment of functioning ratings

made by clinical psychiatric staff. *Psychiatric Services*, *56*(4), 434–438.

Uher, R., Muthén, B., Souery, D., Mors, O., Jaracz, J., Placentino, A., & Rietschel, M. (2010). Trajectories of change in depression severity during treatment with antidepressants. *Psychological Medicine*, *40*(8), 1367–1377.

World Health Organization (WHO). (2018). Retrieved May 15, 2018, from http://www.who.int/classifications/icd/revision/en/

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