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The Distinctiveness of Grief, Depression, and Posttraumatic Stress: Lessons From Children After 9/11

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Objective: The clinical and nosological significance of grief reactions in youth exposed to a shared trauma (9/11, the September 11, 2001 terrorist attacks on the United States) was tested by examining whether the predictors (ie, non−loss-related trauma versus traumatic bereavement), clinical correlates, factorial structure, and phenomenology of grief reactions are distinct from those of major depressive disorder (MDD) and 9/11-related posttraumatic stress disorder (PTSD).

Method: In a representative sample of New York City schoolchildren (N = 8,236; grades 4−12; n = 1,696 bereaved), assessed 6 months post-9/11, multivariate regressions examined predictors of grief, PTSD, and MDD, as well as the incremental validity of grief in predicting health problems and functional impairment. Factor analysis and latent class analysis determined, respectively, the factorial and the syndromic distinctiveness of grief, PTSD, and MDD.

Results: Four types of evidence supporting the distinctiveness of grief emerged. (1) Bereavement was associated with grief independently of PTSD and MDD, but not with PTSD and MDD after adjusting for grief; conversely, non−loss related trauma was associated primarily with PTSD. (2) Grief contributed uniquely to functional impairment. (3) Grief reactions loaded on a separate factor. (4) Youth with elevated grief reactions fell into two classes characterized by only moderate and negligible probability of co-occurring PTSD and MDD symptoms, respectively.

Conclusion: A multifaceted approach provided convergent evidence that grief reactions are independent of other common types of postdisaster child and adolescent psychopathology, and capture a unique aspect of bereavement-related distress. These findings suggest that grief reactions in traumatically bereaved youth merit separate clinical attention, informing tailored interventions.

Key words: depression, grief, posttraumatic stress disorder

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Give sorrow words; the grief that does not speak
Whispers the o'er-fraught heart and bids it to break.
—William Shakespeare, *Macbeth*, act IV, scene III.[1]

Malcom's words in Shakespeare's tragedy *Macbeth*[1] perfectly express the intense suffering and anguish that can follow the death of a loved one. Similar to adults, bereaved youth display symptoms of psychological distress after a loss, including grief reactions and—especially after traumatic and unexpected losses—major depressive disorder (MDD) and posttraumatic stress disorder (PTSD).[2-10] In *DSM-5,* persistent complex bereavement-related disorder (PCBD) has been proposed as a condition for further study.[11] Because new disorders should be created only when necessary, it is important to consider whether clinically significant grief reactions can be more parsimoniously explained by and incorporated into existing diagnostic entities, such as MDD or PTSD.[12] Thus, the task of establishing whether a new bereavement disorder warrants a place in psychiatric nosology, in addition to taking into account its course, prognosis, and treatment, requires demonstrating that its (1) predictors, (2) clinical correlates (eg, incremental validity above and beyond related disorders), (3) symptom structure, and (4) phenomenology (ie, symptom profiles) are distinct and independent from those of its "nearest neighbors" such as PTSD and MDD.[13-17]

The childhood and adolescent literature about the distinctiveness of grief, PTSD, and MDD is scarce. Among adolescents exposed to a peer's suicide, the occurrence of grief was found to be independent from that of MDD and PTSD.[4] In that sample, grief reactions shared some risk factors with MDD and PTSD; however, each had their own

unique predictors.[18] In youth bereaved by sudden parental death, grief reactions made a unique contribution to functional impairment cross-sectionally[19] and over the course of 3 years,[20] showing incremental validity over PTSD and MDD. The factorial distinctiveness of grief, PTSD, and MDD,[17] and of grief, MDD, and anxiety,[15] has been identified through factor analysis. Other studies have shown the correlation of MDD and PTSD with traumatic grief,[21] PCBD domains,[8] and grief factor scores.[4,7] In addition to a resilient class, an examination of the distinctiveness of grief phenomenology from bereavement-related PTSD identified two symptom profiles characterized, respectively, by high probability of reporting predominantly grief reactions, and high probability of endorsing both grief and PTSD symptoms.[16]

The childhood and adolescent literature reviewed above has several limitations. No study on the distinctiveness of grief reactions, PTSD, and MDD was conducted in a representative sample, and only 2 studies focused on youth bereaved by mass trauma: the World Trade Center terrorist attack (N = 83),[7] and the Bosnian War.[8] Four additional limitations are related to the four criteria required to establish a new disorder, mentioned above, and to our corresponding research questions. (1) Published studies, including studies in youth bereaved by mass trauma, did not assess traumatic events other than loss, which could potentially explain differences across bereavement-related outcomes. It is particularly important to disentangle the independent effects of multiple risk factors on grief, PTSD, and MDD given that (a) loss- and trauma-related events, particularly in traumatically bereaved youth,[3,22] often overlap; (b) PTSD and PCBD can have common precipitating events when the death of a family member or friend results from violent acts, such as 9/11, the September 11, 2001 terrorist attacks on the United States[9]; (c) bereavement is no longer an exclusion for MDD; (d) the inclusion of a traumatic bereavement specifier (causing persistent distressing preoccupations regarding the traumatic nature of the death, often in response to loss reminders) in PCBD raises questions concerning the distinction between grief reactions related to traumatic bereavement and symptoms of a trauma-related disorder such as PTSD.[2] (2) The incremental validity of grief predicting functional impairment independently of other diagnoses was examined only in a sample of youth exposed to sudden parental death.[19,20] (3) Only two studies (in non-US samples) on the factorial distinctiveness of symptoms of grief, PTSD, and MDD used factor analysis[15,17]; correlation analysis[4,7,8,21] is not suitable for this purpose. (4) Given the phenomenological overlap between PCBD symptoms and symptoms of PTSD (eg, intrusive thoughts and memories; avoidance of reminders) and MDD (eg, sadness, crying, depressed mood, suicidal thinking), it is surprising that the co-occurrence of grief, PTSD, and MDD symptoms in disaster-bereaved youth remains relatively unexplored; yet, clinical correlates and treatment effectiveness may differ across distinct symptom profiles. To our knowledge, only one study sought to identify subgroups of children characterized by different profiles of grief and bereavement-related PTSD symptoms.[16] However, this study relied on a small sample of help-seeking youth recruited from different sources and bereaved due to various causes of death; thus, results may not generalize to children bereaved via mass trauma. Furthermore, MDD symptoms were not examined.

Thus, this study sought to replicate and extend previous findings to a representative sample of children and adolescents exposed to a shared mass traumatic event (9/11), by examining whether the (1) predictors (ie, non−loss-related trauma versus traumatic bereavement), (2) clinical correlates (new health problems since 9/11, functional impairment), (3) factorial structure, and (4) phenomenology of grief are distinct and independent from those of PTSD and MDD. In this sample, Hoven *et al.* assessed, 6 months after 9/11, five grief reactions, symptoms of PTSD and MDD, and different types of exposure to 9/11 (see Method section).[23] Given the fact that only five grief reactions were assessed, this study should not be considered an examination of the usefulness of specific PCBD criteria in identifying youth with maladaptive grief reactions; other reports have addressed this issue.[24,25] However, despite this limitation, research concerning the distinctiveness of grief, PTSD, and MDD in a large representative sample of youth exposed to trauma and traumatic bereavement can contribute to informing decisions about the placement of a new bereavement disorder in forthcoming *DSM* editions.

METHOD

Participants

The World Trade Center (WTC) Board of Education (WTC-BOE) Study sample consists of 8,236 youth in grades 4 to 12, and is representative of 715,966 New York City (NYC) public school students at the time of assessment, conducted with a self-report questionnaire 6 months after 9/11.[23] The sampling strategy is described elsewhere[23] (see also Supplement 1, available online). Parental consent was required for 4th- and 5th-graders; parental notification was required for 6th- through 12th-graders. This study complied with the Columbia University−New York State Psychiatric Institute Institutional Review Board, the NYC-BOE, and the New York State Office of Mental Health Committee for WTC-Related Research. For the current study, 113 participants were excluded because they reported on grief

reactions but did not report bereavement (N = 8,123; 52.6% female participants). Age ranged between 8 and 21 years (mean age = 13.6 ± 2.6; 50.2% in grades 4−8). Race/ethnicity was 35.6% Hispanic, 22.3% African American, 19.0% Asian, 18.9% white, 4.8% mixed/other.

Measures

Bereavement. We defined as "bereaved" those participants who experienced the loss of a mother, father, sister, brother, grandmother, grandfather, aunt, uncle, other family member, friend, and/or someone else on 9/11 (Supplement 2, available online, shows the number of bereaved youth with respect to each relationship to the bereaved). The following non−mutually exclusive variables were created: (1) death of a family member (n = 277; 3.36%), (2) death of a friend (n = 576; 6.99%), and (3) death of someone else they knew (n = 1,003; 12.18%). In total, 1,696 youth were bereaved, representing 133,446 (18.71%) 4th- through 12th-graders attending NYC public schools 6 months after 9/11.

Grief Reactions. Five items selected from the UCLA Grief Screening Scale,[26] previously adapted from the UCLA Grief Inventory,[27,28] queried bereaved youth about the intensity (0 = not at all, 1 = somewhat, 2 = a lot) of both theorized normal (missing the person, continuing to feel connected to them) and less adaptive (avoiding conversations, avoiding activities, and unhelpful rumination about the person) grief reactions experienced during the previous month (sample Cronbach's $\alpha = 0.88$). Items were selected on the basis of their factor loadings and clinical utility in prior studies.[26] All five items showed evidence of assessing an underlying grief process (Supplement 3 and Figure S1, available online; see also Figure 1); based on item response theory analysis (Supplement 3 and Figure S2, available online), reactions endorsed as "2" were classified as present. Endorsement of grief reactions was as follows: 1 = 12.1%, 2 = 8.3%, 3 = 4.5%, 4 = 4.2%, and 5 = 3.5%. A dichotomous grief outcome was created based on endorsement of ≥2 reactions (20.5% of bereaved youth).

Probable PTSD and MDD. PTSD and MDD symptoms were assessed with the Diagnostic Interview Schedule for Children (DISC) Predictive Scales (DPS), a screening measure derived from the DISC-IV; it includes DISC items most predictive of *DSM-IV* DISC diagnoses.[29] Eight and nine dichotomous items (Figures 1 and 2) were used to evaluate PTSD and MDD symptoms, respectively, in the previous month.[23,30] PTSD items referred to the WTC attack as the anchoring traumatic event. Endorsement of ≥5 and ≥8 symptoms plus impairment (see below) defined probable PTSD (hereafter: PTSD; 9.1% of the total sample used for this study) and probable MDD (hereafter: MDD; 9.2%), respectively.[23,29]

Clinical Correlates

Functional Impairment. On a scale from 0 (not at all) to 3 (a lot of the time), participants reported the frequency of seven impairment indicators that they may have experienced because of the way that they had been feeling/acting in the previous month: (1) parents felt worried/concerned about the child; (2) parents or (3) teachers got annoyed/upset with the child; (4) being unable to do things/go to places with the family or (5) with peers; (6) feeling bad/upset; (7) problems with schoolwork/grades.[23,29] Items were coded positive if endorsed as "3."[30] Endorsement of ≥2 indicators was coded as reflecting impairment (categorical outcome)[30]; total score (0−21) was also examined.

New Health Problems Since 9/11. Two variables were analyzed: any new health problem (headaches, stomachaches, breathing problems/asthma attacks, trouble sleeping, eating too much/too little, sore throat/cough, other problems), and the total number of new health problems.

Exposure to the WTC Attack

Indirect Exposure. Participants reported whether a family member (n = 286; 3.52%), a friend (n = 302; 3.72%), and/or someone else (n = 297; 3.66%) was hurt in the attack (3 variables), and whether a family member (n = 1,200; 14.77%), a friend (n = 937; 11.54%), and/or someone else (n = 910; 11.20%) was in the WTC area but escaped unhurt (3 variables).

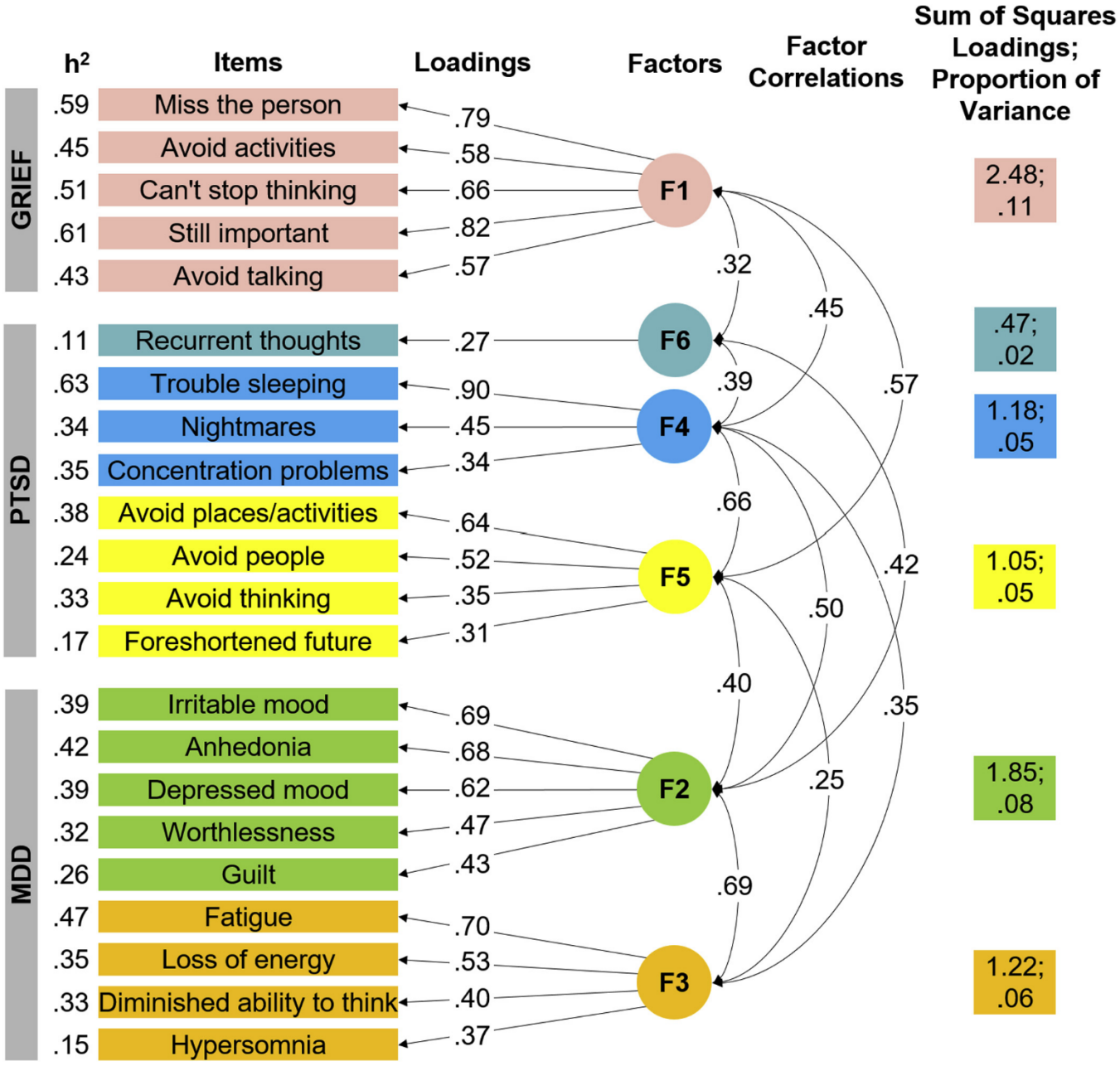
Direct Exposure. Participants were asked whether they: (1) personally witnessed the attack (n = 1,566; 19.28%), (2) were hurt in the attack (n = 270; 3.32%), (3) were in/near the cloud of dust and smoke (n = 1,949; 23.99%), and (4) were evacuated to safety (n = 3,747; 46.13%).

Media Exposure. Media exposure was defined as "a lot of time" spent learning about the attack from (1) television (1) with (n = 4,084; 50.28%) and (2) without (n = 836; 10.29%) adults, (3) websites (n = 560; 6.89%), and/or (4) radio, newspapers or magazines (n = 2,465; 30.35%).

Data Analyses Within the Whole Sample (N = 8,123)

Distinctiveness of Predictors. At step 1, the relations between grief, PTSD, MDD, and the predictors were examined with separate multivariate regressions models for each set of predictors: (a) bereavement and indirect 9/11 exposure (9 variables); (b) direct exposure (4 variables); and (c) media exposure (4 variables). At step 2, for each psychiatric outcome, items that were at least marginally significant ($p < .1$) at step 1 were jointly included in multivariate regression

FIGURE 1 Factor Analysis of Grief, Posttraumatic Stress Disorder (PTSD), and Major Depressive Disorder (MDD) Symptoms

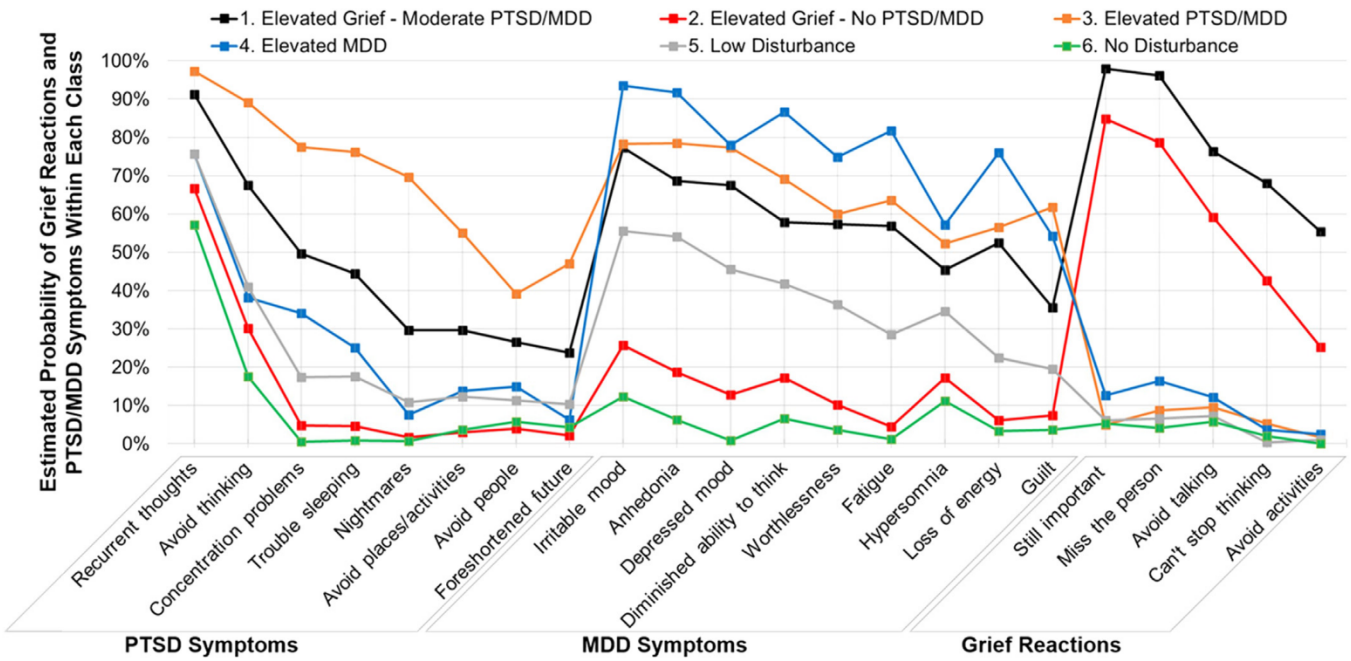


Note: *Only standardized loadings ≥0.20 are shown. The analyses were conducted within the bereaved sample (n = 1,696).*

models. At step 2, each outcome was examined with models that were both adjusted and unadjusted for the other 2 outcomes. Sex (female versus male), age group (youth in grades 4–8 versus youth in grades 9–12), and race/ethnicity (Hispanic, African American, Asian, mixed/other race/ethnicity versus white race/ethnicity) were included in every regression. Analyses were conducted in SUDAAN release 11.0.1 Version 8[31] to account for clustering of the data due to sampling design.[23]

Incremental Validity of Grief. Grief, PTSD, and MDD were simultaneously examined in SUDAAN for their association with impairment (categorical outcome; total score) and health problems (any new health problem; total number of new health problems), adjusting for demographic variables. For this analysis, since impairment was one of the dependent variables, the requirement of impairment was removed from the definition of PTSD and MDD; thus, for this analysis, PTSD and MDD are

FIGURE 2 Six-Class Model and Estimated Probability of Posttraumatic Stress Disorder (PTSD), Major Depressive Disorder (MDD), and Grief Reactions Within Each Class



Classes	n (%) of subjects	Mean probability of reactions/ symptoms from LCA			Mean (SD) number of reactions/ symptoms			n (%) of subjects positive for each outcome		
		PTSD	MDD	Grief	PTSD	MDD	Grief	PTSD	MDD	Grief 2+
1	127(7.5%)	45.3%	57.6%	78.8%	3.6(2.0)	5.2(1.9)	4.0(1.0)	30 (23.6%)	15(11.8%)	127(100%)
2	143 (8.4%)	14.6%	13.3%	58.1%	1.2(1.0)	1.1(1.1)	3.0(1.0)	0 (0.0%)	0 (0.0%)	142 (99.3%)
3	208 (12.3%)	68.9%	66.3%	6.1%	5.7(1.2)	6.0(1.7)	0.3(0.6)	133 (63.9%)	45 (21.6%)	17(8.2%)
4	236 (13.9%)	27.0%	77.1%	9.5%	2.1(1.2)	7.2(1.1)	0.5(0.8)	0 (0.0%)	75 (31.8%)	35(14.8%)
5	689 (40.6%)	24.6%	37.6%	4.3%	2.0(1.2)	3.4(1.4)	0.2(0.5)	7(1.0%)	0 (0.0%)	27 (3.9%)
6	293 (17.3%)	11.3%	5.5%	3.4%	0.9 (0.8)	0.4 (0.6)	0.2 (0.4)	0 (0.0%)	0 (0.0%)	0 (0.0%)

Note: *The analyses were conducted within the bereaved sample (n = 1,696).*

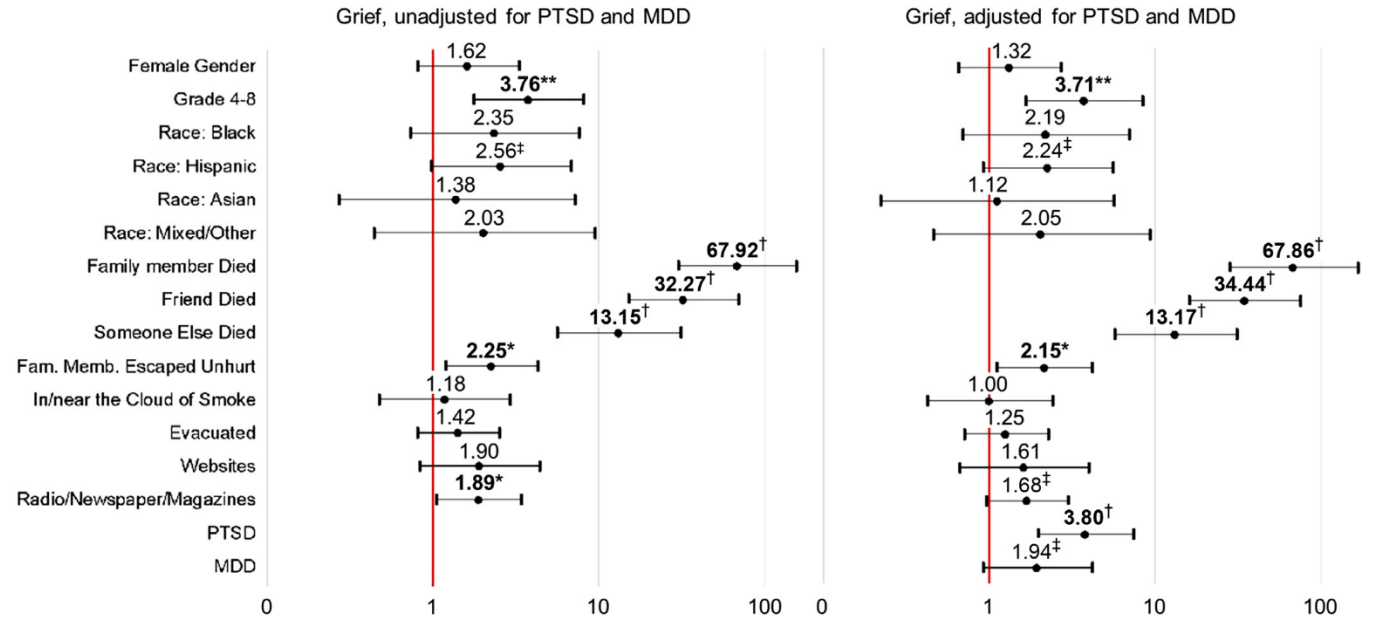
defined as endorsement of ≥5 and ≥8 symptoms, respectively, without impairment.

Data Analyses Within the Bereaved Sample (n = 1,696)

Factorial Distinctiveness. Factor analysis of grief reactions and PTSD/MDD symptoms was implemented with the R package *psych*, with "promax" oblique transformation.[32] The number of factors to retain was determined with parallel analysis in *psych* (see Supplement 4 and Figure S3, available online).[32]

Phenomenological Distinctiveness. Latent class analysis (LCA) performed with the R package *poLCA*,[33] was applied to grief reactions and PTSD and MDD symptoms. LCA probabilistically groups individuals into latent classes, identifying and characterizing clusters of cases with similar symptom profiles. We were interested in testing whether LCA could identify symptom profiles characterized by a high probability of reporting mainly grief reactions, not co-occurring with PTSD and MDD symptoms. We started with a two-class model and iteratively increased the number of latent classes by one. The two most widely used parsimony measures are the Bayesian Information Criterion (BIC) and Akaike Information Criterion (AIC). However, preferred models are usually those that minimize BIC values, because BIC is "consistent": assuming that there is a fixed number of models and that one of them is the true model, a consistent criterion will select the true model with

FIGURE 3 Regression Analysis, Odds Ratios, and 95% Confidence Intervals With Grief as Dependent Variable



Note: The analyses were conducted in the whole sample (N = 8,123). The results shown were obtained at step 2 of the regression models used to examine the distinctiveness of predictors of posttraumatic stress disorder (PTSD), major depressive disorder (MDD), and grief reactions (see Method section). Results are plotted on a logarithmic scale.

*p < .05; **p < .01; ***p < .001; †p < .0001; ‡p < .10.

probability approaching 100% as N → ∞; in this context, the true model is the smallest adequate model (ie, most parsimonious model). AIC is not consistent because it has a nonvanishing chance of choosing an unnecessarily complex model as n becomes large.[34] For BIC, both type I (overfit model) and type II (underfit model) error rates decrease slowly as N increases; for AIC, type II error rates drop more quickly, but type I error rate is constant and never approaches zero.[34] After the selection of the most parsimonious BIC-favored model, the association between latent classes (predictors) and impairment and health problems (dependent variables) was examined in SUDAAN.

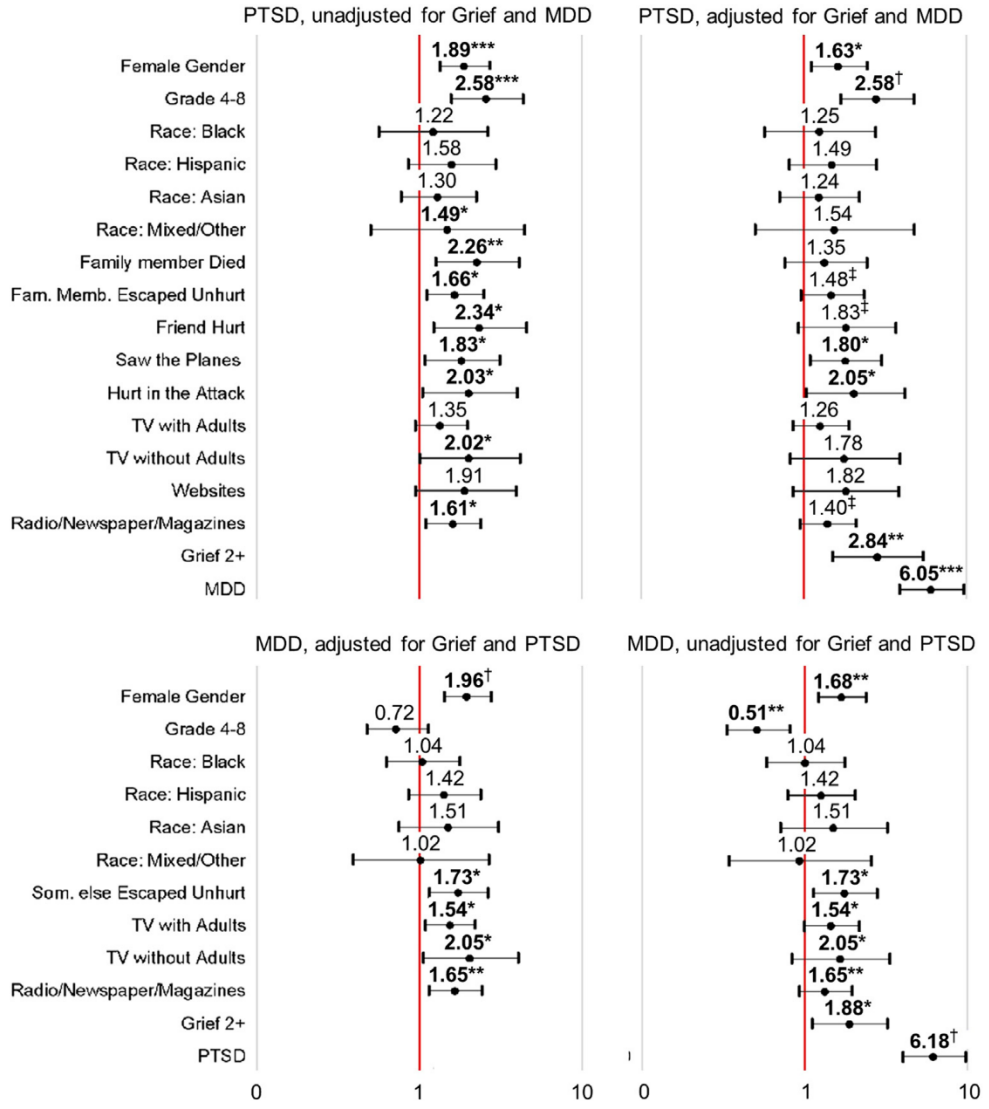
RESULTS

Analyses Within the Whole Sample

Distinctiveness of Predictors. In the regression model unadjusted for PTSD and MDD (Figure 3, left panel), grief was strongly associated with all loss-related variables; grief was also associated with younger age, knowing a family member who escaped unhurt from the WTC area, and media exposure through radio/newspapers/magazines. Adjusting for PTSD and MDD (Figure 3, right panel), grief was still strongly associated with all loss-related variables; knowing a family member who escaped unhurt from the WTC area was also still associated with grief, while the association with media exposure became only marginally significant. In the model unadjusted for grief and MDD (Figure 4, upper left panel), PTSD was associated with female gender, younger age, and with direct (saw the planes; hurt in the attack), indirect (family member escaped unhurt; friend hurt), and media exposure (TV exposure without adults; exposure through radio/newspapers/magazines) variables; PTSD was also associated with traumatic bereavement (loss of a family member). Adjusting for grief and MDD (Figure 4, upper right panel), only female sex, younger age, and direct exposure variables remained significantly associated with PTSD. In the model unadjusted for grief and PTSD (Figure 4, bottom left panel), MDD was associated with female sex, knowing someone who escaped unhurt from the WTC area, and most media exposure variables. Adjusting for grief and PTSD (Figure 4, bottom right panel), MDD was associated with female sex, older age and knowing someone who escaped unhurt from the WTC area.

Incremental Validity of Grief. Controlling for PTSD and MDD, grief marginally increased the odds of reporting any new health problem since 9/11, and was significantly associated with a higher likelihood of functional impairment, and a higher impairment score. PTSD and MDD were independently and strongly associated with health problems and functional impairment (Table 1).

FIGURE 4 Regression Analysis, Odds Ratios, and 95% Confidence Intervals With Posttraumatic Stress Disorder (PTSD) and Major Depressive Disorder (MDD) as Dependent Variables



Note: The analyses were conducted in the whole sample (N = 8,123). The results shown were obtained at step 2 of the regression models used to examine the distinctiveness of predictors of PTSD, MDD, and grief reactions (see Method section). Results are plotted on a logarithmic scale.
*p < .05; **p < .01; ***p < .001; †p < .0001; ‡p < .10.

Analyses Within the Bereaved Sample

Factorial Distinctiveness. Parallel analysis suggested six factors. The solution (Figure 1) produced good fit (root mean square residual = 0.016, df-corrected standardized root mean square residual = 0.022; BIC = −615; Tucker Lewis index = 0.971; root mean square error of approximation (RMSEA) / 90% CI = 0.025/ 0.02−0.029). In Figure 1, the factors are numbered by their sums of squared (SS) loadings (eigenvalues); the highest SS loadings were observed for factor 1, which captured grief reactions and accounts for the largest proportion of variance (11%; eigenvalue / number of variables). Cognitive/emotional and physical MDD symptoms loaded on factor 2 and 3, respectively. *DSM-IV* PTSD cluster D and cluster C symptoms loaded on factor 4 and 5, respectively. Recurrent thoughts of the WTC attack had a weak loading on factor 6, and explained very little variance. The strongest and weakest correlation of factor 1 was with factor 5 and 3, respectively (Figure 1).

Phenomenological Distinctiveness. A six-class model had the lowest BIC value and was therefore chosen as the most parsimonious and best-fitting model (Figure 2). The

TABLE 1 Association of Grief, Posttraumatic Stress Disorder (PTSD), and Major Depressive Disorder (MDD) With Health Problems and Functional Impairment (N = 8,123)

	Any New Health Problem	Number of New Health Problems	Impairment	Impairment Score
	OR	β	OR	β
Demographics				
Female sex	1.13	0.02	0.94	−0.01
Grade 4−8	2.69**	0.11*	0.85	−0.09
Race: Black	1.29	0.03	1.23	0.18*
Hispanic	1.12	0.03	1.03	0.10
Asian	0.75	−0.06	0.69	−0.09
Mixed/other	1.17	0.01	1.2	0.21
Grief and Psychiatric Disorders				
Grief	1.95†	0.26	1.78*	0.36**
PTSD	4.07†	0.46***	2.28†	0.48†
MDD	1.88*	0.24*	4.4‡	1.03†

Note: *OR = odds ratio.*
*p < .05; **p < .01; ***p < .001; †p < .0001; ‡p < .10.

number/percentage of subjects within each class, and the mean probability of grief reactions and PTSD/MDD symptoms, are shown in Figure 2. The mean number of grief reactions and PTSD/MDD symptoms, and the number/percentage of subjects positive for grief, PTSD, and MDD within each class are also shown in Figure 2. An "Elevated Grief–Moderate PTSD/MDD" class (class 1) was defined by high probabilities of reporting grief reactions and moderate/low probabilities of PTSD and MDD symptoms. Youth in this class had a high mean number of grief reactions and intermediate mean levels of PTSD/MDD symptoms; 100% of youth were positive for grief, whereas only 23.6% and 11.8% were positive for PTSD and MDD, respectively. An "Elevated Grief–No PTSD/MDD" class (class 2) was characterized mainly by high probabilities of reporting grief reactions only, not co-occurring with PTSD/MDD symptoms. Compared to class 1, the average probability of endorsing grief reactions and the mean number of grief reactions in class 2 were slightly lower; 99.3% of subjects in this class were positive for grief. The average probability and mean number of PTSD/MDD symptoms were negligible; no individual in class 2 was positive for PTSD or MDD. Class 3 (Elevated PTSD/MDD) and Class 4 (Elevated MDD) showed, respectively, high probabilities of PTSD and MDD symptoms, and MDD symptoms only; probabilities of grief reactions were negligible in both classes. The "Low Disturbance" and "No Disturbance" classes (class 5 and 6, respectively) were defined by moderate to extremely low probability of endorsing grief reactions or psychiatric symptoms. Compared to the classes characterized by low and no disturbance (classes 5 and 6 combined; reference group), the two classes defined by elevated grief (classes 1 and 2 combined) were significantly associated with the onset of any new health problem since 9/11 (odds ratio [OR] = 3.48, 95% CI = 1.31−9.20; $p = .0124$), presence of impairment (OR = 2.17, 95% CI = 1.20−3.91; $p = .0102$), and a higher impairment score ($\beta = 0.58$, SD = 0.20; $p = .0040$). Compared to the classes characterized by low and no disturbance (combined), the Elevated PTSD/MDD and Elevated MDD classes (classes 3 and 4 combined) were not associated with impairment and health problems.

DISCUSSION

The inclusion of PCBD as a condition for further study in *DSM-5* rightly calls for further investigation into the essential features of grief reactions, including etiological factors, predictors, primary correlates, symptom structure, and phenomenology. Currently, most evidence regarding grief reactions and their distinctiveness from established psychiatric disorders comes from adult studies.[2] In addition, the traumatic bereavement specifier calls for further study regarding clinical features that best distinguish individuals placed at highest risk by the circumstances of the death.[35] Our findings regarding the predictors, incremental validity, factor structure, and phenomenology of grief provide convergent support that grief reactions in children and adolescents who were traumatically bereaved on 9/11 represent a clinically meaningful and unique aspect of bereavement-related

distress that is not captured by other forms of trauma- and bereavement-related maladjustment, such as PTSD and MDD.

First, this study offered the opportunity to disentangle predictors of grief, PTSD, and MDD in youth exposed to mass trauma, shedding light on an understudied population in which precipitating events for these disorders co-occur. In the full sample, grief, PTSD, and MDD were differentially associated with different predictors. Loss-related variables were not associated with MDD. Furthermore, traumatic bereavement did not significantly increase PTSD risk after accounting for grief reactions. Instead, bereavement was strongly associated with grief reactions even after controlling for PTSD and MDD. Direct exposure variables were associated only with PTSD. Female sex was associated with PTSD and MDD, as shown previously,[23,30] but not with grief. Elevated grief reactions and PTSD were more likely in the younger age group, whereas MDD was less likely. These age-related differences might indicate a possible developmental shift in symptomatology from predominantly anxious symptoms in younger children to predominantly depressive symptoms in adolescents, as suggested by Kaplow *et al.* in a review article.[2] Exposure to 9/11 through the media, and having a family member who was in the WTC area but escaped unhurt, possibly acting as reminders of the traumatic loss, both increased the risk of grief.

Second, consistent with prior studies on the incremental validity of grief beyond PTSD and MDD in youth bereaved by sudden parental death,[19,20] grief reactions uniquely contributed to functional impairment after controlling for PTSD and MDD in the full sample. Furthermore, LCA findings in the bereaved subsample showed that—unlike youth belonging to the Elevated PTSD/MDD or Elevated MDD classes—youth belonging to the two classes defined by elevated probabilities of endorsing grief reactions had higher odds of reporting new health problems since 9/11 and of being functionally impaired, and had a higher impairment score, compared to youth in classes characterized by low and no disturbance. This last result may seem surprising, given that PTSD and MDD were associated with health problems and impairment in the whole sample. A possible explanation for this finding is as follows. In the Elevated PTSD/MDD and Elevated MDD classes (combined), the average number of PTSD and MDD symptoms was higher (3.8 and 6.7, respectively), compared to classes defined by elevated grief reactions (2.3 and 3.0, respectively) and classes characterized by little disturbance (1.6 and 2.5, respectively). Yet, the average number of PTSD and MDD symptoms in the Elevated PTSD/MDD and Elevated MDD classes combined was lower than the number of symptoms required to make a probable diagnosis of PTSD ($\geq$5) and MDD ($\geq$8) based on the DPS (see Method section); in fact, in the two classes combined, the prevalence of PTSD and MDD was equal to 30.0% and 27.0%, respectively. On the other hand, in the two classes (combined) characterized by elevated grief, the average number of grief reactions was 3.4, which is higher than the number of reactions used in this study to identify grief cases ($\geq$2; see Method section); therefore, 99.6% of youth in these classes were positive for grief, which—in the whole sample—was significantly associated with impairment and impairment score, like PTSD and MDD, and marginally associated with health problems. Thus, compared to the high prevalence of grief (99.6%) in the 2 elevated grief classes, the relatively lower prevalence of PTSD (30.0%) and MDD (27.0%) in the Elevated PTSD/MDD and Elevated MDD classes combined may explain why these classes were not associated with higher odds of health problems and impairment.

Third, grief reactions loaded on a separate factor. The grief factor correlated moderately to strongly with factors underlying *DSM-IV* cluster D and cluster C PTSD symptoms, respectively, and modestly with other factors. Extending previous studies,[15,17] these findings show that the factorial distinctiveness of grief reactions holds in a representative sample of traumatically bereaved youth. Given the dual risks that traumatic bereavement poses for both grief and PTSD,[27] this differentiation between grief and PTSD factors is especially notable and underscores the potential utility of adding a bereavement-related disorder to *DSM-5*. Furthermore, our finding that the grief factor explained more variance than all other factors underscores the key role of grief reactions in understanding youth adjustment 6 months after 9/11.

Fourth, this study sheds new light on the phenomenological distinctiveness of grief, PTSD, and MDD symptoms by identifying two classes with high probability of reporting grief reactions and only moderate (Elevated Grief–Moderate PTSD/MDD) or low (Elevated Grief–No PTSD/MDD) probability or endorsing PTSD and MDD symptoms. Youth in these classes had a high mean number of grief reactions; the prevalence of grief was close to 100%. These two classes were distinct from classes characterized by high probability of PTSD and MDD symptoms (Elevated PTSD/MDD) and MDD symptoms only (Elevated MDD) and from classes with low (Low Disturbance) and negligible (No Disturbance) probability of endorsing grief reactions or PTSD/MDD symptoms. Paralleling earlier factor analytic findings that grief reactions manifest differently from PTSD,[16] these results

indicate that grief reactions assessed in the WTC-BOE Study differ from MDD and PTSD.

Study limitations included the use of only five grief items, limited coverage of PTSD and MDD symptoms by the DPS, and sole reliance on youth self-reports. It should be noted that, despite the limited number of grief reactions assessed and the low threshold used to identify grief cases (ie, two or more grief reactions), grief independently predicted functional impairment in the whole sample (the association with health problems was only marginally significant); furthermore, among traumatically bereaved youth, symptom profiles defined by elevated grief were the only ones associated with health problems and functional impairment. In addition, examination of risk factors for grief, PTSD and MDD differentiated among only three types of loss (family member, friend, someone else); however, in general, the analyses offered little specificity in terms of grief reactions (and related predictors, clinical correlates, and symptom profiles) to specific losses. Moreover, no information was collected regarding participants' psychological proximity to persons killed on 9/11; nevertheless, all three bereavement variables, including death of "someone else," were independently and significantly associated with grief. Furthermore, the measure of functional impairment used captured a broad range of problems (eg, school problems, parent and teacher reactions) that prevented more precise analyses of links between types of youth exposures, distress, and functioning in specific developmental tasks. Also, the examination of the factorial and phenomenological distinctiveness of grief reactions and PTSD and MDD symptoms did not take into account the clustering of the data due to sampling design. Finally, these results may not generalize to youth bereaved by other than mass traumatic events.

Study Implications and Recommendations for Further Research

Study findings support the potential clinical relevance of a new bereavement disorder during sensitive developmental periods spanning from middle childhood to late adolescence. Namely, grief reactions have added clinical value, and merit clinical attention, because they describe maladaptive reactions after 9/11 that are not adequately captured by other disorders such as PTSD and MDD. Given the magnitude, co-occurrence, and complexly reverberating impacts of multiple risk factors inherent in the WTC attack,[22] it is especially noteworthy that grief reactions did not overlap with PTSD or MDD, but instead tapped a dimension separate from these disorders. These findings, and especially the unique variance in functional impairment explained by grief reactions, suggest that a primary benefit of establishing a new bereavement disorder would be to fill in a current gap in describing, explaining—and eventually predicting and therapeutically addressing—reactions to traumatic bereavement. The inclusion of a new bereavement disorder into the main text of *DSM* would also promote the development of empirically validated measures of grief reactions in youth,[13] and of conceptual frameworks and research designs that could help clarify how different risk factors, such as loss-related factors, traumatic exposures, and trauma reminders, exert differential causal effects through different pathways of influence.[8,22] Such advances will, in turn, assist efforts to explain the development, course, and clinical features of maladaptive grief; distinguish between adaptive versus maladaptive grief reactions; and understand the interplay of grief, PTSD, and MDD over time, including minimal time durations before diagnosis can be made.[8,22] Such studies can be strengthened methodologically by incorporating longitudinal designs to clarify predictive and causal effects, both direct and mediated, the knowledge of which can significantly enhance screening accuracy (by identifying markers of distress and dysfunction) and treatment effectiveness (by identifying candidate targets for intervention).[22] Such studies can also integrate youth self-report data with clinician assessments, parental reports, and school records (attendance, grades, disciplinary actions), although this may not be feasible in large representative studies or disaster settings.

Over time, these pursuits will facilitate the development of the theoretical and empirical evidence base needed for effective interventions. Because most treatment studies of grief are in adults, developing and evaluating specific treatment methods for traumatically bereaved youth are important challenges for future research.[17] Different treatment methods may be required for the different symptom profiles, underscoring the promise of assessment-driven, modularized interventions that use youths' assessment profiles to flexibly tailor treatment to address a variety of potential forms of distress and dysfunction.[36] A recent finding that youths' PTSD symptoms and grief reactions responded differentially to trauma- versus loss-focused treatment components suggests that grief may require its own independent clinical focus, including separate attention given to trauma versus loss reminders, both of which may be omnipresent in a mass casualty setting.[37]

In pursuing such work, we suggest that two points regarding the essential distinctiveness of grief are in order. The first is our finding that grief is phenomenologically and empirically distinguishable from MDD and PTSD and merits separate clinical attention. Second, grief is theorized

to constitute an adaptive process that facilitates adjustment to loss, whereas clinically significant maladaptive grief reactions are a comparatively rare exception,[22] a finding that also emerged in this study. Thus, intervention can flexibly aim to promote adaptive grief reactions while helping maladaptive reactions to recede.[36] Thus, in supporting a new bereavement diagnostic entity in childhood and adolescence, our findings substantiate what Stroebe *et al.*[38] explained regarding pleas for a biopsychosocial medical model of grief: bereavement and associated maladaptive grief reactions should be incorporated "into the realm of topics of medical concern" (p. 349). Improved awareness can improve the effectiveness and cost efficiency of interventions by identifying and providing specialized treatment to those bereaved youths who truly need it, while offering general support (designed to facilitate adaptive grief reactions) on a widespread basis.[38]

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