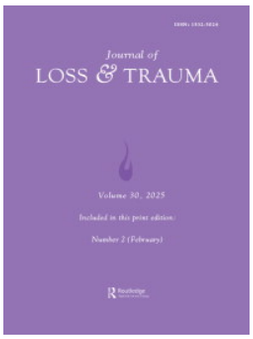

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Journal of Loss and Trauma

International Perspectives on Stress & Coping

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/upil20

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To cite this article: Emma Nolan, Enya Redican, Philip Hyland, Michael Duffy, Thanos Karatzias & Mark Shevlin (21 Feb 2025): Experiences of Social Disconnection in a Bereaved Community Sample from Ontario, Canada, Journal of Loss and Trauma, DOI: 10.1080/15325024.2025.2465392

To link to this article: https://doi.org/10.1080/15325024.2025.2465392

JOURNAL OF LOSS AND TRAUMA
https://doi.org/10.1080/15325024.2025.2465392

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Experiences of Social Disconnection in a Bereaved Community Sample from Ontario, Canada

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ABSTRACT

Lower perceived social support is a known risk factor for problematic grief reactions, but specific facets such as social disconnection may play a critical role in shaping grief responses. This study utilized the Oxford-Grief Social Disconnection Scale (OG-SD) to examine the demographic, loss-related, and psychological correlates of its three core dimensions, as identified in previous research: Negative Interpretation of Others' Reactions to Grief Expression, Altered Social Self, and Safety in Solitude. Participants were a non-probability sample of $N=1171$ bereaved adults living in Ontario, Canada. Confirmatory factor analysis (CFA) was used to confirm the three dimensions of grief-related social disconnection identified in previous research. Correlation and one-way ANOVA tests explored demographic and loss-related correlates of these dimensions, while associations with symptoms of Prolonged Grief Disorder (PGD), depression, and anxiety were assessed through correlational analyses. CFA results confirmed that the OG-SD was best reflected by a correlated three-factor model comprising Negative Interpretation of Others' Reactions to Grief Expression, Altered Social Self, and Safety in Solitude latent variables. Distinct associations between the core dimensions of social disconnection and loss-related variables were identified, and significant associations between all three dimensions and scores on measures of PGD, depression, and anxiety were also observed. Findings from this study not only provide additional support for the validity and reliability of the OG-SD in a general population sample of Canadian adults, for the first time, but also identify demographic, loss-related, and psychological factors associated with social disconnection.

ARTICLE HISTORY
Received 8 July 2024
Accepted 6 February 2025

KEYWORDS
Validity; reliability; grief; prolonged grief disorder; social disconnection

Most people will experience the death of a loved one during their lifetime. Although the majority of bereaved individuals find ways to adapt to and adjust to their loss (Nielsen et al., 2019), a considerable minority experience significant psychological distress in the form of depression, anxiety,

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Supplemental data for this article can be accessed online at https://doi.org/10.1080/15325024.2025.2465392.

posttraumatic stress disorder (PTSD), and prolonged grief disorder (PGD) (e.g., Lenferink et al., 2020; Lundorf et al., 2017; Shear & Skritskaya, 2012). PGD is a newly recognized grief-specific diagnosis in the ICD-11 (WHO, 2019) and DSM-5-TR (American Psychiatric Association, 2022). PGD is characterized by intense longing for and/or preoccupation with the deceased accompanied by intense emotional pain such as feelings of sadness, guilt, anger, and difficulties accepting the death (American Psychiatric Association, 2022; WHO, 2019). Findings from a recent international review have indicated that approximately 13% of bereaved adults meet diagnostic requirements for PGD (Comtesse et al., 2024), and that PGD frequently co-occurs with other mental disorders including depression, anxiety, and PTSD (Komischke-Konnerup et al., 2021).

Since PGD was introduced in the ICD-11 and DSM-5-TR, identifying risk factors associated with the disorder has emerged as a critical research priority. Thus far, research has identified numerous factors associated with increased risk of PGD such as the nature of the death (sudden/unexpected), relationship to the deceased (child, partner/spouses, siblings), symptoms of pre-loss grief, and greater frequency of contact with the deceased prior to their death (e.g., Buur et al., 2024; Thieleman et al., 2023). However, a limitation of the aforementioned risk factors is that they are all tied to the nature of the loss, with much less known surrounding the individual or social level risk factors for PGD. Loss-related risk factors are non-modifiable so they simply help to identify those individuals most at risk of developing PGD. Identifying individual or social level risk factors are likely to be more modifiable and therefore of importance for thinking about interventions to prevent or treat PGD.

While lower perceived social support has been identified as a risk factor for problematic grief reactions (Mason et al., 2020), a recent systematic review reported inconsistent and conflicting results regarding the association between social support and PGD (Scott et al., 2020). Although authors suggested that this may be due to methodological aspects and differential operationalizations of support, it is possible that additional and more complex explanations may be at work. Research has demonstrated, for example, that social support can intensify grief when bereaved people interpret others' responses to their grief negatively (Cacciatore et al., 2021; Smith, 2018). Additionally, bereaved people's social cognitions and cognitive processes influence the way they perceive other people's support (Smith, 2018). Thus, evidence indicates that particular facets of social support may play an integral role in determining grief responses.

In recognition of this, Smith et al. (2020) introduced the concept of "grief-related social disconnection" which characterizes the feeling of alienation and detachment that bereaved individuals feel from their social environment as well as their belief that they must conceal their

grief. To empirically measure grief-related social disconnection, Smith and colleagues (2020) developed the Oxford Grief-Social Disconnection Scale (OG-SD). The OG-SD is a multidimensional questionnaire designed to evaluate the extent to which bereaved individuals perceive other people's reactions to their grief as being negative, having experienced an alteration in their social self, and preferring to experience their grief in isolation (Smith et al., 2020). Findings from the initial development and validation study (Smith et al., 2020), as well as another study (Wanza et al., 2023), demonstrated that the OG-SD captured three core dimensions of grief-related social disconnection including negative reactions of others, altered social self, and safety in solitude. Notably, these previous studies explored the OG-SD using individuals recruited from bereavement charity mailing lists, social media advertisements, and from the Google content network, meaning that the participants were likely to be reflective of the most distressed bereaved members of the population or at the very least, those experiencing more distressing grief symptoms were more likely to self-select for participation. Thus, determining whether social disconnection is best captured by three aforementioned dimensions in general population samples of bereaved persons is important. Notably, while previous studies (Smith et al., 2020; Wanza et al., 2023) found that higher levels of social disconnection were positively associated with PGD, PTSD, and depression, as well as avoidant coping strategies, there are few studies which have examined demographic and loss-related correlates of social disconnection (as measured by the OG-SD) among bereaved persons.

This study aimed to use the OG-SD to examine the demographic, loss-related, and psychological correlates of social disconnection and its three core dimensions of negative interpretation of others' reactions to grief expression, altered social self, and safety in solitude. Consistent with prior research (Smith et al., 2020), it was anticipated that social disconnection would be best captured by three distinct albeit related dimensions; this would be supported by a correlated three-factor confirmatory factor analysis model providing acceptable model fit. There is a paucity of research regarding demographic and loss-related variables associated with social disconnection, but some tentative predictions could be made based on the extant research on grief and loneliness. On the basis of the findings reported in a systematic review of loneliness and grief (Vedder et al., 2022) it was predicted that higher levels of social disconnection would be associated with being older, shorter time since bereavement, lower levels of social contact, nature of the death, and relationship to the deceased. Moreover, we also expected that the three core dimensions of social disconnection would be significantly and positively associated with measures of PGD, anxiety, and depression (Smith et al., 2020; Wanza et al., 2023).

Method

Recruitment and participants

Data were collected from a large sample of bereaved adults ($N = 1{,}310$) from Ontario, Canada by the online survey company Qualtrics. Qualtrics collaborates with Ontario specific research panel providers to recruit participants from a vast pool of potential candidates who have agreed to be contacted for research studies. Previous research indicates that these samples are highly representative of the target populations (e.g., Boas et al., 2020). Participants from across the province of Ontario were recruited through managed, double opt-in research panels, utilizing various methods such as email, SMS (short message service), and in-app notifications. Non-probability, quota sampling methods benchmarked against the latest data from Statistics Canada in 2021 in terms of age, gender, and income distributions were used to recruit a representative sample. Inclusion criteria were that participants were 18 years or older, were residing in Ontario, could complete the survey in English, and had answered "Yes" to the following question that screened for lifetime bereavement: "During your life, has someone close to you died (for example, a partner, parent, child, close friend)?" This resulted in a final analytic sample of $N = 1170$ of people that have experienced a bereavement.

The final sample deviated slightly from the quotas by recruiting more females (53.7%), fewer younger people (18–34 years: 28.1%), and more in the lower income band (<$50k: 58.6%). The mean age of the sample was 48.16 (SD = 16.65, range = 18–91 years) and just over half of the sample (53.7%; n = 627) were female. The other demographic characteristics of the sample are reported in Supplementary Table S1. Ethical approval was granted from the research ethics committee at Maynooth University Ireland.

Measures

Social disconnectedness

The OG-SD (Smith et al., 2020) consists of 15 items that assess an individual's perceptions, thoughts, and feelings of social interactions regarding grief-related experiences with others. The items included three questions relating to how they feel about sharing thoughts related to grief, (e.g., "Others will not be able to manage if I tell them about the loss"), their sense of authenticity (e.g., "When I am with people, I feel I am putting on a performance"), three items relating to how they feel about solitude after grief (e.g., "It is better to be by myself than to show others how I am feeling"), and eight items relating to how they perceive a change in their social self (e.g., "I don't fit in socially the way I used to"). Participants were asked to rate the extent to which they agreed with each statement on a 7-point Likert Scale ranging form 1 = totally disagree to 7 = totally agree.

PGD

The International Grief Questionnaire (IGQ; Hyland et al., 2023) is a brief self-report measure of ICD-11 PGD. Participants were instructed to indicate how bothered they have been by each of five symptoms in the last week using a five-point Likert scale with responses ranging from 0 ("Not at all") to 4 ("Extremely"). An additional item assessed the degree to which symptoms exceed social, cultural, or religious norms and three response options are provided including "no," "yes," and "I don't know." Finally, a question assessed functional impairment with a "yes" or "no" response options. The IGQ was used to generate severity scores by summing the symptom items, and to identify participants meeting diagnostic requirements for probable PGD. Possible scores range from 0 to 20, with higher scores indicating greater symptom severity. The internal reliability of the IGQ scores in the current study was excellent (α = .86).

Generalized anxiety

The International Anxiety Questionnaire (IAQ; Shevlin et al., 2022) is an eight-item self-report measure which assesses generalized anxiety disorder (GAD) as described in the ICD-11. Participants were asked to indicate how often they had been bothered by each of the symptoms over the last several months using a five-point Likert scale with responses ranging from 0 ("Never") to 4 ("Every day"). The IAQ can be used both to generate symptom severity scores and to identify participants meeting clinical caseness. Possible scores range from 0 to 32, with higher scores indicating greater symptom severity. The internal reliability of the IAQ in the current study was excellent (α = .95).

Depression

The International Depression Questionnaire (IDQ; Shevlin et al., 2022) is a nine-item self-report measures which assesses single-episode depression as it is defined by ICD-11. Participants were asked to indicate how often they had been bothered by each of the symptoms over the last two weeks using a five-point Likert scale with responses ranging from 0 ("Never") to 4 ("Every day"). Possible scores range from 0 to 36, with higher scores indicating greater symptom severity. The internal reliability of the IDQ in the current study was excellent (α = .95).

Loss-related variables

Loss-related variables included time since bereavement (1 = within the last six months, 2 = six months to a year ago, 3 = 1–2 years ago, 4 = 2–3 years ago, 5 = 3–5 years ago, 6 = 6–10 years ago, and 7 = more than 10 years ago), nature of the death (1 = anticipated natural deaths, 2 = unexpected natural

death, 3 = sudden unnatural death, 4 = suicide, 5 = other). The "other" bereavements category in the survey was an open-ended qualitative response field, where participants provided 36 distinct responses. Upon reviewing these responses, we identified seven key themes: cancer, assisted death, COVID-19 related death, organ failure, complications following surgery, birth-related deaths, and murder. Many of these could plausibly fit within the predefined categories of bereavement in the survey, such as "sudden unnatural death" or "unexpected natural death"; however, participants may not have categorized their responses this way at the time of completion. This suggests that the wording of the questions may have influenced how participants interpreted and classified their bereavement experiences. Contact with the deceased in the year prior to their death was also included (1 = Every day, 2 = Almost every day, 3 = Several times a week, 4 = Several times a month, 5 = A few times in the year, 6 = Not at all during that year). This was reverse coded to ease interpretation in subsequent analyses (1 = not at all during that year, 2 = a few times in the year, 3 = several times a month, 4 = several times a month, 5 = several times a week, 6 = every day). Participants were also asked to report on the types of bereavements they have experienced. Six categories were produced based on the list of loss types: (1) death of a child, (2) death of a partner/spouse, (3) death of a parent, (4) death of sibling, (5) death of extended family (i.e., grandparents, auntie/uncle, cousins, niece/nephew), and (6) death of friend (i.e., close friend, colleague, or acquaintance).

Data analysis

The analyses were conducted in three phases. First, descriptive statistics for the subscales and total scale scores were calculated for the OG-SD. Item level missingness and item-to-total correlations were also assessed. Second, confirmatory factor analysis (CFA) models were tested to assess the latent structure of the OG-SD indicators. Two models were estimated including a one-factor model where all items loaded onto a single latent variable reflecting social disconnectedness and a correlated three-factor model where items 1 to 3 loaded onto a latent variable reflecting negative interpretation of others' reactions to grief expression, items 4 to 11 loaded onto a latent variable reflecting altered social self and items 12 to 15 loaded onto a latent variable reflecting safety in solitude. Analyses were conducted in Mplus 8.1 (Muthén & Muthén, 1998–2017) using robust maximum likelihood estimation (MLR: Yuan & Bentler, 2000).

Numerous fit statistics were used to evaluate the goodness of fit for each model including the chi-square (χ^2) where a non-significant value indicates acceptable fit; the comparative fit index (CFI; Bentler, 1990) the

Tucker-Lewis Index (TLI; Tucker & Lewis, 1973) where values ≥.90 and ≥.95 were considered as good and excellent model fit; the Root Mean Square Error of Approximation (RMSEA; Steiger, 1990) and the standardized root mean square residual (SRMR) (Jöreskog & Sörbom, 1996) where a value less than .05 indicated close fit and values up to .08 indicated reasonable errors of approximation. Moreover, to compare models the Bayesian Information Criterion (BIC; Sclove, 1987) was used and the model with the lowest BIC was considered the better model. The standardized factor loadings from the best model were used to calculate composite reliability estimates. Composite reliability estimates have been shown to provide a more accurate estimation of internal reliability than Cronbach's alpha because they assume a congeneric model rather than a tau-equivalent model (Raykov, 1997).

Given the differences in the number of items comprising each subscale, mean scores on the OG-SD subscales were used. The correlations between the mean negative interpretation of others' reactions to grief expression, altered social self, and safety in solitude subscale scores and demographic and bereavement related factors were calculated next. Then the means of the mean OG-SD subscale were stratified by the "nature of the death" variable and the "time since death" variable and two separate one-way ANOVAs were used to test for differences. Eta-squared ($\eta 2$) was used as the effect size indicator for these one-way ANOVA tests. Based on guidance from Cohen (2013) values of .05 and less indicate a "small" effect, values from .06 to .13 indicated a "moderate" effect, and values .14 or larger indicate a "large" effect. Finally, three multivariate linear regressions were conducted to examine the association between the mean negative interpretation of others' reactions to grief expression, altered social self, and safety in solitude subscale scores and measures of depression (measured by the IDQ), anxiety (measured by the IAQ), and PGD (measured by the IGQ).

Results

Descriptive statistics

Item level statistics are shown in Table 1. The observed scores ranged from 15 to 105, with a mean score of 52.71 (SD = 23.61, Median = 54.00). The mean scores for the items generally ranged between 3 (Somewhat disagree) and 4 (Neither agree or disagree) and the range indicated that the entire range of response categories was being used. The OG-SD items with the highest mean scores were item 15 (*It is easier to be alone than to have to pretend to feel ok*; Mean = 4.12, SD = 1.98), item 13 (*I can only let me true feelings show when I am on my own;* Mean = 4.12, SD = 1.98) and item 14 (*I can only be myself when I am on my own*; Mean = 3.85, SD = 2.02).

Item-to-total correlations ranged from .69 for item 1 (*If I show my real feelings other people will think I am not normal*) to .83 for items 7 (*I feel alien to those around me*), 8 (*I don't fit in socially the way I used to*), and 10 (*When I am around other people, it feels like I am ruining their enjoyment*).

CFA and reliability results

Model fit statistics from the CFA (see Table 2) showed that the one-factor model fitted the data poorly while the three-factor model fitted the data well. The difference in BIC values between both models was very large (ΔBIC = 1,780.85) and thus the three-factor model was selected as the

Table 1. Descriptive statistics for the Oxford Grief-Social Disconnection Scale items.

	Mean	SD	Range	% missing	Item to total correlation
1. If I show my real feelings other people will think I am not normal.	3.32	1.92	1–7	.3	.69
2. Others would judge me if I were to speak openly about my grief	3.27	1.86	1–7	.3	.70
3. Others will not be able to manage if I tell them how I feel about the loss.	3.38	1.87	1–7	.4	.72
4. The company of others makes me feel uncomfortable.	3.19	1.88	1–7	.4	.78
5. I need to be able to leave social situations when I want or I will break down.	3.70	1.96	1–7	.3	.73
6. I can't be myself around other people the way I used to.	3.33	1.93	1–7	.2	.82
7. I feel alien to those around me.	3.14	1.91	1–7	.3	.83
8. I don't fit in socially the way I used to.	3.36	1.97	1–7	.2	.83
9. I find it draining to be around other people.	3.62	1.97	1–7	.3	.82
10. When I am around other people, it feels like I am ruining their enjoyment.	3.15	1.90	1–7	.3	.83
11. When I am with other people, I feel I am putting on a performance.	3.45	1.93	1–7	.5	.82
12. It is better to be by myself than to show others how I am really feeling.	3.81	1.93	1–7	.8	.75
13. I can only let my true feelings show when I am on my own.	4.01	1.98	1–7	.6	.77
14. I can only be myself when I am on my own.	3.85	2.02	1–7	.5	.80
15. It is easier to be alone than to have to pretend to feel okay.	4.12	1.98	1–7	.5	.76
Total	52.71	23.61	15–105	2.7	n/a

Table 2. Model fit statistics for the CFA models of the Oxford Grief-Social Disconnection Scale.

Model	Chi-square (df)	AIC	BIC	ssaBIC	CFI	TLI	RMSEA (95% C.I.)	SRMR
One factor model	1593.551 (90), $p < .001$	58569.127	58797.041	58654.106	.849	.824	.119 (.114, .125)	.057
Three factor model	474.097 (87), $p < .001$	56773.079	57016.188	56863.723	.961	.953	.062 (.056, .067)	.030

Note: AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion, ssaBIC = sample size adjusted BIC; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; RMSEA = Root Mean Square Error of Approximation, SRMR = Standardized Root Mean Residual.

better model. Table 3 contains the standardized factor loadings and factor correlations for the three-factor model. All factor loadings were positive, strong, and statistically significant ($p < .001$), ranging from .73 to .91. Factor correlations were all statistically significant ranging from .66 to .83. The composite reliability for each of the subscales was high: Negative Interpretations of Others' Reactions to Grief Expression, CR = .90, Altered Social Self, CR = .95, and Safety in Solitude, CR =.92. Supplementary Table S1 contains the mean subscale scores of the OG-SD and symptom and mean scores of mental health problems of anxiety, depression and PGD in this sample. Supplementary Table S2 contains the standardized factor loadings for the three-factor model.

Demographic and loss-related correlates

The correlation coefficients between the demographic and bereavement factors and the negative interpretation of others' reactions to grief expression, altered social self, and safety in solitude subscale scores are reported in Table 3. Age of the bereaved and time since bereavement were negatively associated with all subscales. Female sex was

Table 3. Correlations with demographic and bereavement related variables and scores on the social disconnection after grief scale.

	Negative reactions of others		Altered social self		Safety in solitude	
	r	p	r	p	r	p
Age	−.28***	<.001	−.39***	<.001	−.35***	<.001
Sex	.03	.265	.05	.102	.06*	.033
Contact with deceased	.08**	.006	.09**	.002	.08*	.011
Time since bereavement	−.10***	<.001	−.17***	<.001	−.11***	<.001
Death most impacted by						
Child (vs. not most impacted by death of a child)	.03	.319	.05*	.035	.04	.111
Partner/spouse (vs. not most impacted by death of a partner/spouse)	.01	.817	.04	.157	.03	.196
Parent (vs. not most impacted by death of a parent)	−.10***	<.001	−.18***	<.001	−.16***	<.001
Sibling (vs. not most impacted by death of sibling)	.03	.288	.04	.150	.06*	.038
Extended family (vs. not most impacted by death of extended family)	.06*	.045	.09***	<.001	.09***	.003
Friends (vs. not most impacted by death of friends)	.02	.491	.04	.135	.02	.428

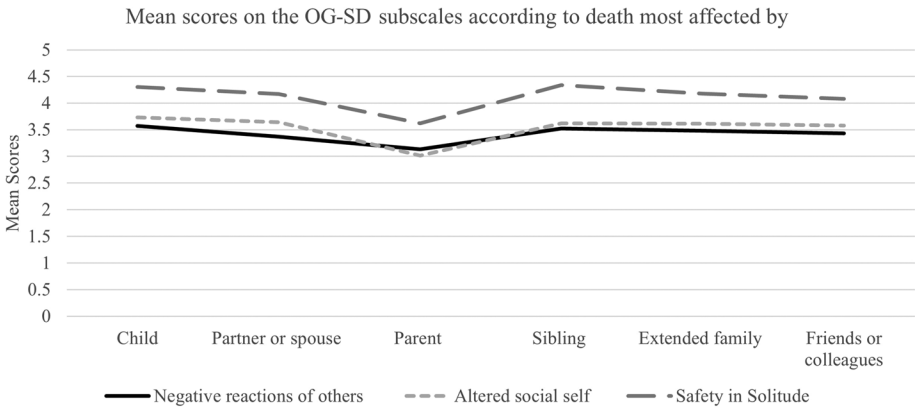

Figure 1. Mean scores on the OG-SD subscales by death most affected by.

positively associated with the safety in solitude subscale only. Frequency of contact with the deceased was positively associated with all subscales. Regarding death most affected by, being most affected by the death of extended family (vs. not most impacted by death of extended family) were positively associated with all subscales. Being most impacted by the death of a parent (vs. not most impacted by death of a parent) were negatively associated with all subscales. The mean plots are shown in Figure 1.

Nature of the loss and time since loss

There was a significant main effect of nature of the loss on mean scores on the Negative Reactions of Others ($F(4, 1164) = 5.29$, $p < .001$, $\eta^2 = .02$), Altered Social Self ($F(4, 1165) = 10.07$, $p < .001$, $\eta^2 = .03$), and Safety in solitude ($F(4, 1163) = 9.27$, $p < .001$, $\eta^2 = .03$) variables. Tukey's HSD post-hoc tests showed how mean negative reactions of other scores were significantly higher for those who experienced a sudden unnatural death ($M = 3.89$, $SD = 1.72$) compared to those who experienced an anticipated natural death ($M = 3.17$, $SD = 1.69$) and an unexpected natural death ($M = 2.29$, 1.69). Mean safety in solitude scores were significantly lower for those who experienced an anticipated natural death ($M = 3.73$, $SD = 1.77$) compared to a sudden unnatural death ($M = 4.38$, $SD = 1.66$), suicide ($M = 4.66$, $SD = 1.93$), and other ($M = 4.79$, $SD = 1.57$). Moreover, mean safety in solitude scores were significantly higher for those who experienced an unexpected natural death ($M = 3.93$, $SD = 1.77$) compared to a death from other causes. Finally, mean altered social self scores were significantly lower for those who experienced an anticipated natural death ($M = 3.13$, $SD = 1.64$) compared to those who experienced a sudden unnatural death ($M = 3.90$, $SD = 1.61$) ($p < .001$), suicide ($M = 4.07$, $SD = 1.87$)

(p = .003), and other (M = 4.02, SD = 1.60) (p = .004). The mean plots are shown in Figure 2.

Moreover, there was a significant main effect for time since loss on mean scores on the Negative Reactions of Others (F (6, 1162) = 2.43, p = .024, η^2 = .01), Altered Social Self (F (6, 1163) = 7.42, p < .001, η^2 = .04), and Safety in solitude (F (6, 1161) = 3.58, p = .002, η^2 = .02) variables. The mean plots are shown in Figure 2. Tukey's HSD post-hoc tests showed no significant differences in mean safety in solitude scores and negative reactions of others scores. However, post hoc tests showed how mean altered social self scores were significantly higher for those bereaved less than six months (M = 3.98, SD = 1.79) and 2 to 3 years ago (M = 3.80, SD = 1.61) compared to those bereaved 10 or more years ago (M = 3.05, SD = 1.59). The mean plots are shown in Figure 3.

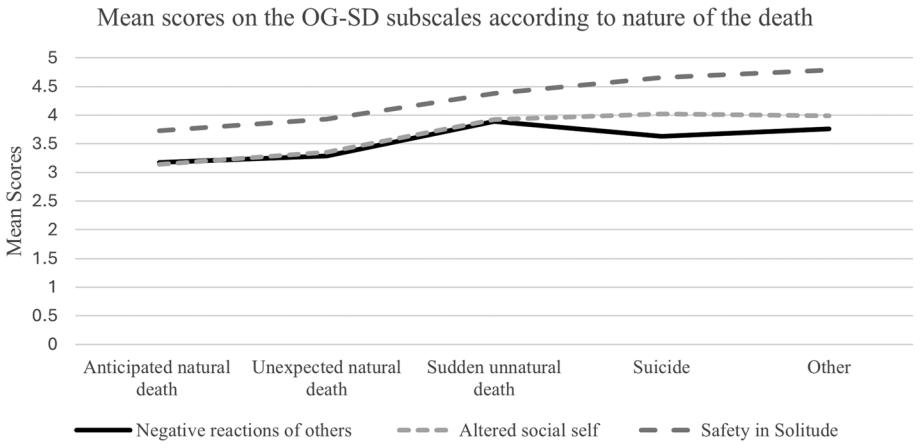

Figure 2. Mean scores on the social disconnection after grief sub-scales by nature of death.

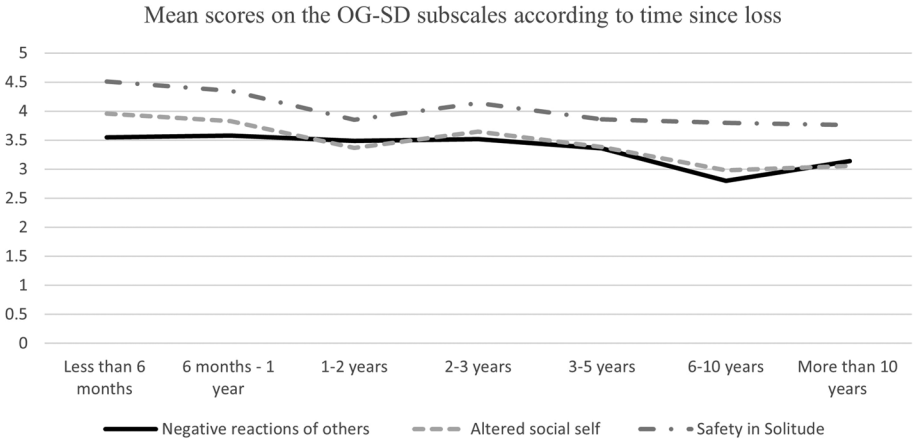

Figure 3. Mean scores on the social disconnection after grief sub-scales by time since loss.

Regression results

Finally, the multivariate association between the mean subscale scores and each of the mental health outcomes were examined (see Table 4). Findings demonstrated that both the altered social self and safety in solitude subscales were associated with increased scores on all mental health outcomes, whereas the negative reactions of others subscale was associated with PGD scores only.

Discussion

This primary aim of this study was to use the OG-SD to examine the demographic, loss-related, and psychological correlates of social disconnection and its three core dimensions of negative interpretation of others' reactions to grief expression, altered social self, and safety in solitude. Consistent with previous findings (Smith et al., 2020; Wanza et al., 2023), CFA results supported the representation of social disconnection as reflecting three related domains of Negative Interpretations of Others' Reactions to Grief Expression, Altered Social Self and Safety in Solitude. All items loaded robustly onto their respective latent factors, and the three latent variables were positively correlated with each other. Similar to prior studies (Smith et al., 2020; Wanza et al., 2023), OG-SD scores demonstrated high levels of internal reliability.

The current study sought to identify demographic and bereavement-related correlates associated with the three core dimensions of social disconnection as verified by the CFA. Findings demonstrated that younger age of the bereaved was associated with all three aspects. This is to be expected, as previous studies have demonstrated that younger bereaved adults report experiencing social constraints more frequently such as limited opportunities to address their bereavement in supportive situations (Juth et al., 2015). Compared to males, females reported significantly higher safety in solitude scores. This is somewhat surprising since the existing literature indicates that females tend to be more confrontive and

Table 4. Regression analysis examining association between social disconnection after grief subscales and scores on mental health measures.

	Depression				Anxiety				PGD			
	B (se)	b	t	p	B (se)	b	t	p	B (se)	b	t	p
Negative reactions of others	.121 (.198)	.019	.610	.542	−.087 (.179)	−.016	−.482	.630	.480 (.133)	.135	3.60	<.001
Altered social self	3.36 (.268)	.526	12.53	<.001	2.74 (.244)	.487	11.26	<.001	.927 (.181)	.254	5.12	<.001
Safety in Solitude	.888 (.224)	.148	3.96	<.001	.997 (.203)	.189	4.90	<.001	.440 (.151)	.129	2.91	.004
R^2		.443				.407				.223		

expressive of their emotions than men (Stroebe et al., 2001), and that males grieve in isolation or engage in avoidance related behaviors (Stroebe et al., 2007). However, research also indicates that while males are more prone to experiencing social loneliness due to their grief, females are more likely to experience emotional loneliness stemming from the absence of intimate relationships (Szabó et al., 2019). The items comprising the safety in solitude construct (e.g., "*I can only let my true feelings show when I am on my own*") clearly reflect an emotional component which may explain why females report higher safety-in-solitude scores. Regarding loss-related correlates, greater frequency of contact with the deceased was associated with higher average scores on the negative reactions of others, altered social self, and safety in solitude subscales. It is widely established that closeness to the deceased is associated with increased risk of maladaptive grief responses (Burke & Neimeyer, 2013), and thus it is not surprising that those in greater contact had significantly higher scores.

Moreover, being most affected by the death of a sibling (as compared to being most affected by other losses) was associated with negative reactions of others and altered social self. A sibling is typically seen as one of a person's oldest relationships and is sometimes regarded as a "double loss" because of the sibling's passing and the loss of emotional support provided by parents or other important parties who may be overwhelmed by their own grief (Koenig, 2017). Being most affected by the loss of a child was positively associated with scores on the altered social self-subscale. This is not particularly surprising since prior research (Smith & Ehlers, 2020) found that of all loss characteristics such as mode of death and age, only child loss was a unique predictor of severe and enduring grief. Interestingly, a positive association was observed between being most affected by the death of an extended family member and all grief subscales. This finding is somewhat unexpected, particularly considering previous research suggesting that closeness to the deceased is more strongly linked to maladaptive grief responses (Burke & Neimeyer, 2013). One possible explanation is that certain types of losses garner more social support than others. For instance, community support tends to be greater for bereaved children, spouses, or parents compared to those grieving for more distant relatives (Logan et al., 2018). Consequently, those most affected by the death of extended family members may experience less social support, and as a result, experience greater negative interpretations of other reactions to their grief expressions.

Moreover, findings demonstrated how altered social self scores were highest across all loss types which is in keeping with prior research demonstrating altered social self to be the most pervasive aspect of social disconnection experienced by bereaved individuals (Wanza et al., 2023). Furthermore, scores on each of the three dimensions of social

disconnection were highest for those who had experienced an unnatural bereavement or a bereavement due to suicide. This is not surprising since unexpected deaths are considered traumatic experiences (Keyes et al., 2014), and research has shown how those within the social network of a bereaved individual from traumatic causes often experience greater anticipated tension in expressing sympathy to, and interacting with, the bereaved (Logan et al., 2018).

The final aim of the current study was to examine the association between scores on the core dimensions of grief-related social disconnection and three mental health variables. Consistent with prior studies (Wanza et al., 2023), findings demonstrated moderate associations between the OG-SD subscale scores and depression, anxiety, and PGD symptomology. These findings offer support to the hypothesis that higher levels of social disconnection may be associated with increased risk of mental health problems such as PGD (Smith et al., 2020). Interestingly, negative reactions of others was associated with increased PGD symptoms but not depression or anxiety symptoms. This is not particularly surprising given that research has shown how people with PGD symptoms are perceived more negatively and elicit more negative emotions and a higher preferred social distance in others (Eisma, 2018). Thus, perceived negative reactions of others may be important to target in clinical practice given its unique role in explaining PGD symptoms. One potential method for addressing this is cognitive behavioral therapy (CBT) for grief, which focuses on how maladaptive cognitions about the self, others, life, and the future contribute to the development and maintenance of PGD (Komischke-Konnerup et al., 2021). For individuals with high scores on negative reactions of others, one component of therapy could center on transforming maladaptive thoughts or perceptions (e.g., "Others will judge me if I openly discuss my grief") into more adaptive ones.

Both altered social self and safety in solitude were associated with all of the mental health outcomes, with altered social self having the greatest influence on depression symptoms and safety in solitude on anxiety symptoms. There are numerous potential explanations for these findings. One possibility is that the nature of the altered social self items (e.g., *I don't fit in socially the way I used to* and *I find it draining to be around other people*) may be more closely related to depression. Specifically, symptoms such as loss of interest or pleasure in activities and fatigue, which are central to a depression diagnosis (American Psychiatric Association, 2022; WHO, 2019), align with these statements. In contrast, the items from the "Safety in solitude" subscale (e.g., *"Better to be by myself"*) may be more strongly linked to anxiety, given the fear-based avoidance is a hallmark of many anxiety conditions (Hofmann & Hay, 2018).

Strengths of the current study include identifying, for the first time, the demographic and loss-related correlates associated with the three core dimensions of grief-related social disconnection across a broad, representative sample of adults with diverse bereavement experiences. However, despite this, findings should be considered in light of some limitations. First, participants were recruited using a non-probability sampling method, and therefore it is unclear how accurately our sample reflects the bereaved population of Canada. Participants used in panel surveys are typically recruited through specific channels and have agreed to take part, which can introduce biases. For example, they might be more technology-savvy or more interested in survey topics than the general population, leading to overrepresentation of certain demographics or attitudes. Second, this is a cross-sectional survey and thus inferences regarding the direction of the associations observed are not possible. For instance, it is not possible to determine whether social disconnection precedes or succeeds grief-related psychopathology in the present study. However, this has been addressed in a prior study by Smith et al. (2020) where higher levels of baseline social disconnectedness were associated with higher levels of distress overtime.

Overall, findings from the present study not only identify an important modifiable cognitive correlate of PGD symptoms (and depression and anxiety symptoms) that can inform clinical treatments but also identify bereavement-related characteristics—such as younger age of the bereaved, more frequent contact with the deceased, loss of a sibling or a child, and female gender—associated with these risk factors. Better understanding this construct, its correlates and how it relates to risk or outcome, will help elucidate the role it plays in determining those at risk of a potential mental health problem in the aftermath of bereavement. Future studies are needed to further explore the mechanisms underlying the associations between specific risk factors and the core dimensions of grief-related social disconnection, such as the link between female gender and safety in solitude. Moreover, further longitudinal analyses similar to Smith et al. (2020) will be required to determine whether social disconnection may mediate or moderate the association between various loss-related characteristics and psychological distress. In specific settings, such as hospices providing care for terminally ill patients, psychoeducation for families highlighting the importance of such factors can be provided as a preventive measure.

Disclosure statement

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

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Data availability statement

Neither the data nor the materials have been made available on a permanent third-party archive; requests for the data or materials should be sent via email to authors (Mark Shevlin: m.shevlin@ulster.ac.uk or Philip Hyland: Philip.Hyland@mu.ie).

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