Journal of Psychiatric Research 69 (2015) 72–79

Contents lists available at ScienceDirect

Journal of Psychiatric Research

journal homepage: www.elsevier.com/locate/psychires

Trajectories of depression following spousal and child bereavement: A comparison of the heterogeneity in outcomes

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ARTICLE INFO

Article history:
Received 5 March 2015
Received in revised form
2 June 2015
Accepted 16 July 2015

Keywords:
Bereavement
Depression
Resilience
Latent growth mixture modeling
Adjustment

ABSTRACT

Our understanding of how individuals react to the loss of a close loved one comes largely from studies of spousal bereavement. The extent to which findings are relevant to other bereavements is uncertain. A major methodological limitation of current studies has been a reliance on retrospective reporting of functioning and use of samples of individuals who have self-selected for participant in grief research. To address these limitations, in the current study we applied Latent Growth Mixture Modelling (LGMM) in a prospective population-based sample to identify trajectories of depression following spousal and child bereavement in later life. The sample consisted of 2512 individual bereaved adults who were assessed once before and three times after their loss. Four discrete trajectories were identified: Resilience (little or no depression; 68.2%), Chronic Grief (an onset of depression following loss; 13.2%), Depressed-Improved (high pre-loss depression that decreased following loss; 11.2%), and Pre-existing Chronic Depression (high depression at all assessments; 7.4%). These trajectories were present for both child and spousal loss. There was some evidence that child loss in later life was associated more strongly with the Chronic Grief trajectory and less strongly with the Resilience trajectory. However these differences disappeared when covariates were included in the model. Limitations of the analyses are discussed. These findings increase our understanding of the variety of outcomes following bereavement and underscore the importance of using prospective designs to map heterogeneity of response outcomes.

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1. Introduction

In recent years there has been a transformation in our understanding of how people respond to the loss of close loved ones. Emerging longitudinal studies have highlighted the significant heterogeneity in bereavement outcomes: Some people experience ongoing, disabling levels of distress, some people experience symptoms that gradually decline, and others experience little or no disruption in functioning (e.g., Bonanno et al., 2004; Bonanno et al., 2002; Galatzer-Levy and Bonanno, 2012; Mancini et al., 2011; Thomas et al., 2013). Latent growth mixture modelling (LGMM) has emerged as a particularly strong methodology to explore such population heterogeneity. LGMM tests whether the population under investigation is best represented by a single response trajectory or is composed of several discrete populations each characterized by a different growth curve (Curran and Hussong, 2003). LGMM has been used to investigate heterogeneity in a wide variety of potentially stressful life events, including injury, cancer, combat, and bereavement (Bonanno et al., 2012; Bryant et al., 2015; Burton et al., 2014; Galatzer-Levy and Bonanno, 2012; Karstoft et al., 2013; Pietrzak et al., 2014).

In the context of bereavement, Bonanno and colleagues (Boerner et al., 2005; Bonanno et al., 2004, 2002) identified trajectories of depression following spousal loss in a prospective sample of participants drawn from the changing Lives of Older Couples (CLOC) study, who were followed up to 48 months post-bereavement. LGMM analysis identified a robust model solution characterized by four distinct trajectories (Galatzer-Levy and Bonanno, 2012): Participants who reported little or no depression at any time point (Resilience; 66.3%); participants who reported a high level of depression at all points (Pre-existing Chronic; 14.5%); participants who reported high levels of depression at the pre-bereavement assessment followed by lower levels of post-

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http://dx.doi.org/10.1016/j.jpsychires.2015.07.017
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bereavement depression (Improved; 10.1%); and participants who reported low pre-bereavement levels of depression followed by high post-bereavement levels (Chronic grief; 9.1%; see also Lotterman et al., 2014). Underscoring the utility of identifying distinct trajectories, financial stress was associated with elevated depression for all classes, whereas poor health was associated with higher depression in the resilient and remitting classes only. That is, financial stress appeared to be a general stressor, whereas, health impacted depression only in populations that were otherwise doing well. Age did not predict response trajectories for any class.

To date, our understanding of the distinct trajectories of bereavement comes largely from studies examining spousal bereavement (e.g., Galatzer-Levy and Bonanno, 2012; Holland et al., 2014; Utz et al., 2012). The extent to which these trajectories are present following other bereavements has yet to be investigated. It is possible that the number, shape, and predictors of response trajectories may vary across loss type, indicating that bereavement response differs by loss type. This may be the case as studies have suggested that individuals who experience the death of a child are more likely to show chronically high levels of distress (Dyregrov et al., 2003; Meert et al., 2011). However this research has relied on samples of individuals who have self-selected for participation in bereavement studies and most involve the loss of young children (e.g., Arnold et al., 2005; Bonanno et al., 2005; Dyregrov et al., 2003; Meert et al., 2011). The extent to which such findings are representative of the population of individuals who have experienced the death of a child is unknown (Levav et al., 1988). Moreover, existing studies have typically relied on retrospective self-report or longitudinal assessments lacking pre-loss assessments, which may also introduce bias associated with self-report of past emotional functioning (Watkins, 2002). True prospective studies are important, however, not only for overcoming memory biases, but also for identifying the full set of population trajectories. In the CLOC study, more than half of participants with high levels of post-bereavement depression were in fact depressed prior to their spouse's death. However, not all individuals who were depressed prior to the death remained depressed (Galatzer-Levy and Bonanno, 2012). Thus, while existing investigations of the impact of child loss have been helpful in highlighting potential differences between child and spousal loss, there is a critical need for the issue to be examined using a prospective design in a sample of individuals not self-selected for bereavement.

We addressed this issue in the current study using data from the Health and Retirement Study, a large nationally representative longitudinal survey that collects data from individuals on an array of family, health, and economic variables every 2 years. Of particular value for addressing questions relating to bereavement, loss information has been recorded but individuals have not been included on the basis of their losses, thus minimizing the possible impact of selection biases. The database also allows for ongoing assessment of pre- and post-loss functioning. It has previously been used to map the heterogeneity of responses to such events as cancer and chronic pain (Burton et al., 2014; Zhu et al., 2014). Accordingly, in the current study, we applied LGMM to the HRS to identify prospective trajectories of depression following spousal and child bereavement. We expected that the trajectories associated with spousal bereavement would be similar to those identified in Galatzer-Levy and Bonanno (2012; see also Bonanno et al., 2004). We hypothesized that we would observe a large class of resilient individuals and three smaller classes comprising pre-existing chronic depression, chronic grief, and improved depression. In the case of child bereavement, we expected that similar trajectories would be identified; however, based on existing literature we anticipated that the proportion of individuals classified into the chronic grief trajectory would be greater (Dyregrov et al., 2003; Meert et al., 2011). As the HRS comprises mainly older respondents, and the majority of the children in the sample were adults at the time of their death, we included age of the deceased among the potential predictors of trajectory membership.

2. Materials and methods

2.1. Data

Data were taken from the Health and Retirement Study (HRS), a nationally representative longitudinal study designed to explore numerous aspects of aging in American adults. The study commenced in 1992 and collected data every 2 years. Data for the current analysis were drawn from 9 waves (1994–2010) from the RAND HRS vM and RAND family database. Data from Wave 1 (1992) were excluded as that wave used an alternate measure of depression. (For details of the survey and sampling methods see Sonnega et al., 2014). Data was received and analyzed following approval from the Teachers College Columbia University Institutional Review Board (IRB).

2.2. Participants

Participants were asked at each time point about marital status and if immediate family members were alive or deceased. Individuals who indicated that they were widowed at any time point between 1996 and 2006 inclusive, but had been married at the previous time point comprised the spousal bereaved group. Similarly, participants in the child bereavement group had a son or daughter deceased between 1996 and 2006 but alive at the previous time point. Data were organized using a floating baseline methodology (Galatzer-Levy and Bonanno, 2014; Galatzer-Levy et al., 2010). Using this method, measures were centered on the wave where the loss was first reported and trajectories were modelled over a 6 year period, including one pre-loss assessment. For modeling purposes we restricted the sample to individuals who had experienced one type of loss (spousal or child), were alive for the four time points under investigation, and had data for at least two of the four time-points, including immediately before and after the loss. Although this is not a requirement of LGMM we used this method because the sample size was large and time points were widely dispersed. We were concerned that we would over-identify trajectories if we included participants who did not provide information immediately before and after the loss (Galatzer-Levy and Bonanno, 2014). We also restricted the child loss sample to individuals who had experienced the loss of a biological child (rather than a stepchild or child-in-law) as there was no data regarding the length of time non-biological children had been included as a family member. The final sample consisted of 2512 participants (see Table 1 for sample characteristics). 12.6% of participants had data available at two time points only, 14.3% had data available at three time points, and 73.1% of participants had data available at all four time points.

2.3. Measures

Depression: Depression symptoms were measured using eight items from the Center for Epidemiologic Studies-Depression (CES-D) scale (Radloff, 1977). This version of the CES-D asked participants to endorse whether they had experienced any of the listed symptoms during the past week. It has demonstrated high external and construct validity (Karim, Weisz, Boibi, & ur Rehman, 2014; Kohout et al., 1993).

Table 1
Participant characteristics.

	Spousal loss n = 1995	Child loss n = 517	Total sample n = 2512
Male	516	64	580
Female	1479	453	1932
Age	70.24 (9.89) [39–90]	71.11 (9.69) [40–90]	70.42 (9.85)
Education			
Did not graduate high school	31.5%	45.3%	34.4%
High school graduate	45.5%	55.6%	53.5%
College graduate	9.3%	12.8%	12.1%
Household income:			
<$10,000	27.5%	46.2%	31.4%
$10,000–$100,000	35.1%	29.8%	34.0%
>$100,000	35.3%	24.0%	33.0%
missing	2%	0	40
Age of deceased	73.61 (9.86) Median = 70 [41–100]	47.16 (9.92) Median = 46 [13–74]	68.12 (14.58)

Note: Standard deviations appear in parentheses. Ranges appear in brackets.

2.4. Statistical analysis

We performed LGMM using Mplus 6.0 (Muthen & Muthen, 1998–2010). The first goal was to determine the optimal number of classes that best described the population of depression trajectories in the sample. All models included intercept, slope and quadratic parameters. For the purpose of model convergence, we allowed the variance of intercept and slope terms to be freely estimated across classes, while variance of the quadratic term was fixed. We employed a robust full information maximum-likelihood (FIML) estimation procedure for handling missing data (Enders, 2001; Muthen, 1987). To determine the best fitting trajectory solution we compared progressive models using information criteria including the Akaike (AIC), Bayesian (BIC), and sample-size adjusted Bayesian information criterion (SSBIC) indices, entropy values, and Lo-Mendell-Rubin (LRT) and boostrap (BLRT) likelihood ratio tests. Our selection of the final model was based on overall model fit, interpretability, and theoretical coherence (Bonanno, 2004; Muthen, 2003).

After determining the optimal model we examined the effect of loss type on trajectories by running the best fitting model as a multiple groups mixture model, with loss type used as a known-class variable (e.g., Connell et al., 2012; Muthen & Muthen, 1998–2010). We then conducted a series of Wald Chi Square Tests of parameter equality to examine the extent to which model parameters were comparable across loss types. Finally, based on previous literature we nested covariates in the model to examine the extent to which they predicted class membership.

3. Results

3.1. Unconditional model

Table 2 presents the information indices and likelihood tests for the one to five class models. These indices showed improved fit as the number of classes increased, with the exception of a negligible reduction in entropy and a non-significant result for Lo-Mendell test for the five-class model. This indicated that the five-class model failed to fit the data better than the four-class model. Overall consideration of the indices suggested that the four-class model provided a better fit than either the two-or three-class model. Consequently we chose the four-class model as optimal (see Fig. 1).

The largest class, *Resilient* (68.2%) was characterized by a low intercept ($b = 0.78$, $SE = 0.04$, $p < .001$) and a significant overall linear ($b = 0.48$, $SE = 0.07$, $p < .001$) and quadratic slope ($b = -0.14$, $SE = 0.02$, $p < .001$). Next largest, a *Chronic Grief* Class (13.2%) showed depression symptoms that emerged only after the loss, a relatively low initial intercept ($b = 1.70$, $SE = 0.16$, $p < .001$), and a significant linear ($b = 3.60$, $SE = 0.26$, $p < .001$), and quadratic slope ($b = -0.97$, $SE = 0.09$, $p < .001$). A third class, *Depressed-Improved* (11.2%), had a high initial intercept ($b = 4.90$, $SE = 0.15$, $p < .001$), a significant negative linear slope ($b = -2.77$, $SE = 0.23$, $p < .001$) and a significant quadratic slope ($b = 0.64$, $SE = 0.07$, $p < .001$). The forth class, *Pre-existing Chronic Depression* (7.4%) was characterized by consistently high levels of depressive symptomatology before and after the loss. This class had a high intercept ($b = 6.20$, $SE = 0.20$, $p < .001$), and non-significant linear ($b = 0.09$, $SE = 0.21$, $p = .68$) and quadratic slopes ($b = -0.09$, $SE = 0.08$, $p = .22$).

3.2. Conditional model with known class (loss type)

To examine the effect of loss type on depression trajectories, the four-class model was extended to include loss type as a known class variable. This analysis identified the same trajectories described above for both the spousal and child bereavement groups (Model Entropy = 91.7; See Fig. 2). In the spousal group, 9.1% were classed as Pre-existing Chronic Depression, 11.1% were classed as Chronic Grief, 9.2% were classed as Depressed-Improved, and 70.6% classed as Resilient. In the child bereavement group, 10.7% were classed as Pre-Existing Chronic, 14.0% as Chronic Grief, 11.1% as Depressed-Improved, and 64.3% as Resilient. Z-tests indicated that the proportion of child bereavement participants classified as Chronic Grief was significantly greater than the proportion of spousally bereaved participants classified as Chronic Grief ($z = 1.84$). Conversely, the proportion of spousally bereaved participants

Table 2
Fit indices for one-to five-class growth mixture models of bereavement (unconditional N = 5212).

Growth Mixture Models					
Fit index	One-class	Two-classes	Three-classes	Four-classes	Five-classes
AIC	38,565.40	37,648.84	37,303.59	36,939.95	36,744.42
BIC	38,623.69	37,730.44	37,408.51	37,068.18	36,895.97
SSBIC	38,591.92	37,685.96	37,351.32	36,998.28	36,813.35
Entropy	–	0.91	0.886	0.877	0.854
LRT		p < .001	p < .001	p < .001	p > .235
BLRT	–	p < .001	p < .001	P < .001	p < .001

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; SSBIC = sample size adjusted Bayesian information criterion; LRT = Lo-Mendell-Rubin test.
BLRT = bootstrap likelihood ratio test.

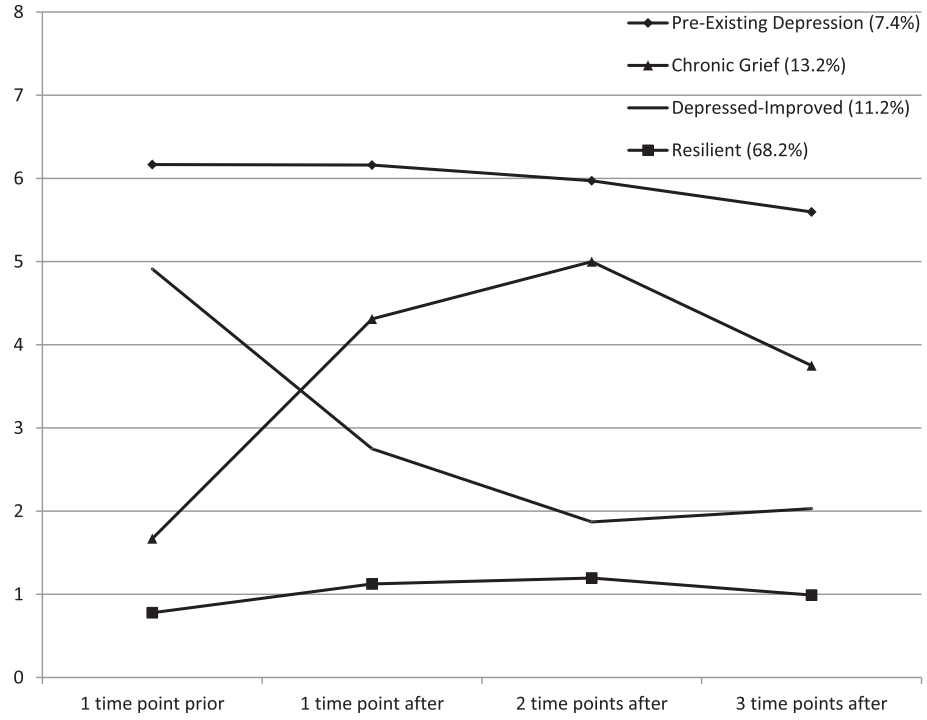

Fig. 1. Four class unconditional trajectory model of CES-D scores (n = 2512).

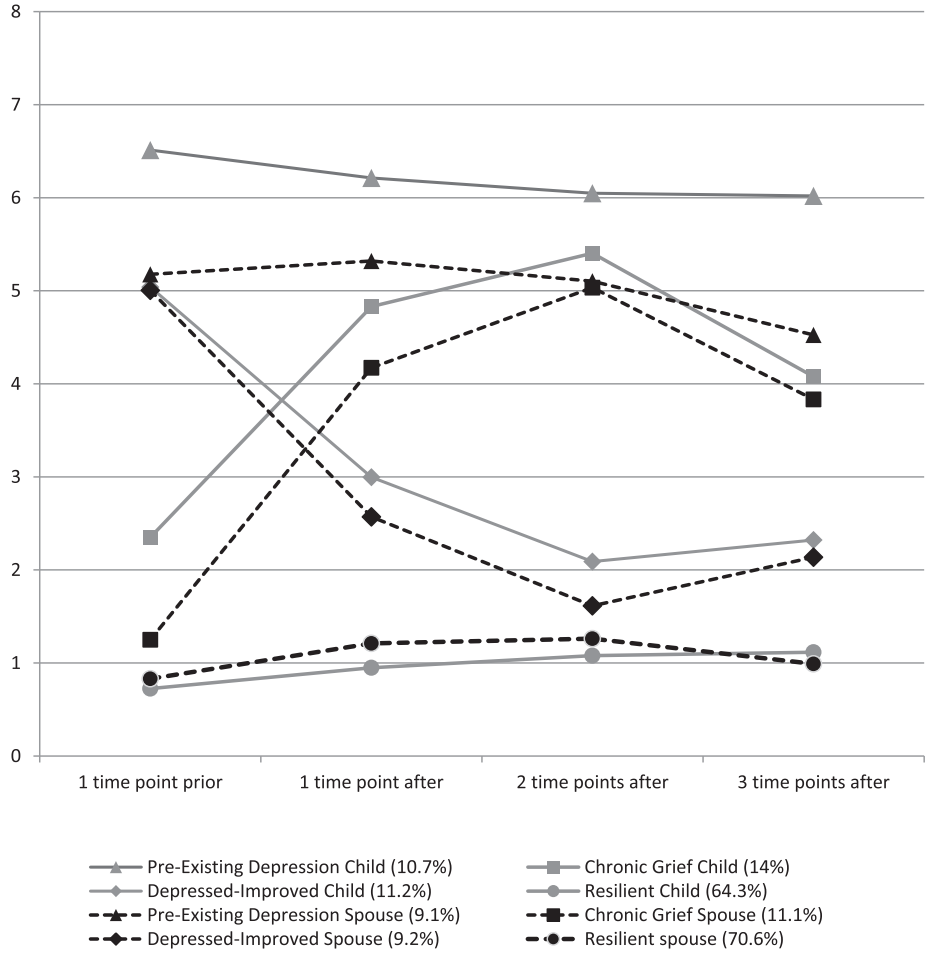

Fig. 2. Multiple groups (loss type) 4 class trajectory model of CES-D scores (n = 2512).

classified as Resilient was greater than the proportion of child bereaved participants classified as Resilient ($z = 2.81$). The proportions classified as Depressed-Improved and Pre-Existing Chronic Depression did not differ. To determine the extent to which loss type predicted class membership we conducted a multinomial regression within this conditional model. The Resilient class served as the reference class. We found no effect for the Depressed-Improved ($b = -.284$, $SE = 1.54$) or the Preexisting Chronic classes ($b = -.250$, $SE = 1.40$). There was a near significant trend for the Chronic Grief class ($b = 0.326$, $SE = 1.93$ $p < .055$). Compared to being classified in the Resilient class, experiencing the death of a child was a weak predictor of classification in the Chronic Grief class.

As can be seen in Table 3, the Wald Test indicated a significant difference in trajectory parameters for spousal and child bereavement. Comparison of specific trajectories indicated that the child loss trajectory had a higher intercept than the spousal loss trajectory in both the Pre-Existing Chronic Depression and Chronic Grief classes. In the Resilient class the spousal loss group had greater linear and quadratic slopes than the child loss group. Overall, these findings indicate that in the Pre-existing Chronic Depression and Chronic Grief classes, the child loss group reported more depressive symptoms than the spousal loss group across each time point. While in the Resilient class, the slope of the trajectory changed more in the spousal loss than the child loss group.

3.3. Conditional model with additional covariates and predictors of class membership

We nested participant's age, age of deceased, gender, education, and pre-loss financial assets in the model to examine the potential role of these covariates in predicting class membership. To assist in convergence, age and financial variables were standardized. Data was missing for 94 participants; however the pattern of missing data did not differ across loss type or latent class membership. Regression estimates are displayed in Table 4. In the first set of comparisons the Resilient class served as the reference class. Compared to the Resilient class, the Pre-existing Chronic Depression and the Chronic Grief classes were less likely to have graduated from high school. The Pre-existing Chronic Depression class was also more likely to be female, and had lower pre-loss financial assets. In a second set of analyses the Chronic Grief class served as the reference class. Compared to the Chronic Grief class, the Pre-existing Chronic Depression class was more likely to be female and had lower financial assets, and the Depressed-Improved class was more likely to have finished high school. Neither participant age nor deceased age were significant predictors of class membership. Also, with the inclusion of the additional covariates loss type was no longer a significant predictor of class membership. In a third set of analyses we included interaction terms and found no interactions between loss type and covariates: that is, the relationship between the covariates and class membership did not differ according to loss type.

Table 4
Multinomial Regression estimates for covariate predictors of trajectory membership.

	Covariate	Est	SE
Compared to Resilient			
Pre-Existing Chronic Depression	Loss	−0.546	0.447
	Age	0.140	0.143
	Deceased's age	−0.272	0.221
	Gender (Female)	0.970	0.275**
	Financial Assets	−1.509	0.803*
	Education	−0.888	0.169**
Chronic Grief	Loss	0.144	0.398
	Age	−0.027	0.126
	Deceased's age	0.001	0.192
	Gender (Female)	0.252	0.201
	Financial Assets	0.064	0.061
	Education	−0.847	0.157**
Depressed-Improved	Loss	0.337	0.470
	Age	0.054	0.149
	Deceased's age	0.098	0.217
	Gender (Female)	0.067	0.213
	Financial Assets	−0.306	0.190
	Education	−0.140	0.176
Compared with Chronic Grief			
Pre-Existing Chronic Depression	Loss	−0.691	0.565
	Age	0.167	0.182
	Deceased's age	−0.273	0.279
	Gender (Female)	0.718	0.332*
	Financial Assets	−1.654	0.805*
	Education	−0.041	0.219
Depressed-Improved	Loss	−0.144	0.398
	Age	0.080	0.182
	Deceased's age	0.097	0.270
	Gender (Female)	−0.185	0.271
	Financial Assets	−0.371	0.197
	Education	0.708	0.217**
Resilient	Loss	−0.144	0.398
	Age	0.027	0.126
	Deceased's age	−0.001	0.192
	Gender (Female)	−0.252	0.201
	Financial Assets	−0.064	0.061
	Education	0.847	0.157**

Note. Est = Parameter Estimate; SE = Standard Error; Age, deceased's age and Financial assets were standardized for entry to the model; Education = Completed high school.
*$p < 0.05$; **$p < 0.001$.

4. Discussion

In this study we used a large population-based sample and a

Table 3
Model parameters and Wald test results for Multiple Groups trajectory model with loss type as a known variable.

		Spouse	Child	df	Wald test	*p*
Pre-Existing Chronic Depression	Intercept	5.178	6.512	1	3.92	.048
	Slope	0.323	−0.386		1.993	.158
	Quadratic	−0.180	0.068		2.749	.097
Chronic Grief	Intercept	1.251	2.355	1	10.238	.001
	Slope	3.950	3.423		0.976	.323
	Quadratic	−1.031	−0.950		0.143	.706
Depressed-Improved	Intercept	5.005	5.039	1	.251	.616
	Slope	−3.173	−2.612		.827	.363
	Quadratic	0.739	0.569		.895	.344
Resilient	Intercept	0.838	0.725	1	1.248	.249
	Slope	0.534	0.271		5.820	.002
	Quadratic	−0.161	−0.047		8.181	.004
Overall test				12	29.36	.000

prospective design to examine trajectories of depression following spousal and child bereavement in later life. While a number of population-based studies have examined depression trajectories in the context of spousal loss (Galatzer-Levy and Bonanno, 2012) this is the first study to use a population-based prospective design to explore trajectories following spousal and child loss. In doing so, this study enables direct comparison of outcomes following these two different types of bereavement. Consistent with previous studies (e.g., Bonanno et al., 2004, 2002; Galatzer-Levy and Bonanno, 2012), we found that a four-class model best represented the data: a class characterized by low depression levels at each time point (Resilient; 69.3%), a class with low levels of pre-loss but high levels of post-loss depression (Chronic grief; 11.7%), a class with high levels of pre-loss depression that decreased over time (Depressed-improved; 9.5%), and a class which reported high levels of depression at each time point (Pre-existing Chronic Depression; 9.4%). Notably, we found the same four trajectories in both bereavement populations. The rank order of each class was also similar across loss type; Resilient was the largest class in both groups, Chronic Grief the second most common, then the Depressed-improved, and Preexisting Chronic Depression classes (See Fig. 2 for percentages). That is, overall we found similar patterns of heterogeneity in depression outcomes in both the spousal and child loss groups.

Studies that have investigated child loss in non-population based databases have typically reported higher levels of chronic distress than that found in spousal loss studies (Stroebe et al., 2007). Consistent with this proposition, we found a greater proportion of the child loss participants were classified as Chronic Grief compared to spousal loss participants. However, within the model, child loss was only a weak predictor of classification in the Chronic Grief versus Resilient class, and with the inclusion of additional demographic covariates loss type longer predicted class membership. This suggests loss type was not a major determinant of trajectory membership in this analysis, where the majority of children were adults at the time of their death. However, we did observe differences between the trajectory shapes for child and spousal loss for three of the trajectories (see Table 3). With respect to Pre-existing Chronic Depression and Chronic Grief classes, the rate of change in depression did not differ between loss types, however, in both classes the child group had a significantly higher intercept, indicating a greater level of depression than the comparative spousal group. Interestingly, however, this finding indicates the difference in depression was also present prior to the loss. The cause of this difference is unknown. The child and spousal loss trajectories also differed for the Resilient class. Both trajectories had similar intercepts, but the slope and quadratic parameters for the spousal loss group were greater than for child loss group. It is possible that this resulted because the spousal group showed more fluctuation in symptoms. However, given the relatively large sample size for this class, these results may be relatively less meaningful. As can be seen in Fig. 2, the differences between the resilient trajectories in each group were minimal.

We investigated a number of potential predictors of class membership in addition to loss type. Membership of the pre-existing chronic class was associated with a range of indicators of low socioeconomic functioning such as lower levels of education and wealth. Socioeconomic inequalities have been frequently associated with chronic depression (Lorant et al., 2003) and this result underscores previous findings that a proportion of individuals showing post-bereavement depression may be experiencing depression independent of their bereavement (Galatzer-Levy and Bonanno, 2012). Not having graduated from high school was also a predictor of membership of the Chronic Grief class. Age did not predict membership of any class. This is consistent with previous bereavement studies that have comprised individuals aged 65 and over (e.g., Galatzer-Levy and Bonanno, 2012; Holland et al., 2014; Isherwood et al., 2012). While acknowledging the mean age of our sample was approximately 70, the sample did include a much broader age range than has typically been included, suggesting the effect may not be limited to older adults. Interestingly, age of the deceased similarly failed to predict of class membership. As indicated in Table 1, we note that the majority of the deceased children in our sample were adults at the time of their death, with the youngest being 13 years of age. The extent to which the findings from this study generalize to the subgroup of individuals who lose a young child will need to be examined in future studies utilizing younger populations. However, the current finding is consistent with the proposition that factors other than young age may impact bereavement outcomes. For example, the death of a child at different life stages may be associated with different but significant impacts, such as loss of potential grandchildren, a close attachment, or practical support in old age (Arnold et al., 2005; Crawford et al., 1989). It is likely that the appraisals associated with the death may be important for understanding the impact of deaths of children at different ages. (Boelen, van den Hout, & van den Bout, 2006; Bonanno and Kaltman, 1999). We note that the HRS collects a limited number of psychological variables and different information relevant to spousal and child loss, limiting the extent to which specific covariates could be simultaneously examined within the model. The HRS offered a unique opportunity to simultaneously compare trajectories following different loss types. Future studies will be necessary to examine the extent to which potential risk factors (e.g., sudden death, dependent relationships, anxious attachment style) may differentially predict trajectory membership (Denckla et al., 2011; Kaltman and Bonanno, 2003; Wijngaards-de Meij et al., 2005; Wijngaards-de Meij et al., 2007).

We note a number of additional limitations to the conclusions that can be drawn from the study. The HRS collects data every two years. Thus our model may have missed short-term heterogeneity in depressive symptoms in the immediate aftermath of the death. In using the term Resilient to describe the low symptom class, we acknowledge that some of these participants may have experienced significant symptoms in the period between the loss and the first post-loss assessment; however, they had returned to low levels by the first post-loss assessment. As such we see our findings to be reflective of long-term outcomes following bereavement. Also, the current study examined patterns of depression in response to loss. Depression is only one potential consequence of bereavement: for example, recent studies have identified Prolonged (or Complicated) Grief as a potential outcome of bereavement (Prigerson et al., 2009; Shear et al., 2011). Although closely related to depression, it has been shown to be associated with unique emotional and functional impairments (Shear et al., 2011; Thomas et al., 2013). The HRS dataset used in this analysis predates the development of the PG construct. Future studies should include measures of PG to differences between loss types in heterogeneity in prolonged grief.

Notwithstanding these limitations, the findings from this study contribute to our understanding of bereavement in a number of important ways. By simultaneously examining trajectories of depression in response to spousal and child loss we were able to directly compare outcomes for these two populations. Further, as our sample did not self-select for participation in a bereavement study the findings are less susceptible to selection bias. We found numerous similarities between outcomes for the two loss types. Following either spousal or child loss later in life approximately 20% of individuals reported high levels of chronic distress; however, consistent with previous spousal loss studies the long-term normative response in the sample was resilience. Moreover, of

those individuals who experienced post-loss distress, half were depressed prior to the loss. Recognition of this distinction is important for understanding the etiology, course and prognosis for depression in bereavement. As such, this finding underscores the importance of using a true prospective design. There was some indication that individuals who had lost a child in later life were more likely to have a chronic grief response, however, this effect was weak. The ongoing application of longitudinal modelling techniques using prospective designs will be required to fully map the complexity and heterogeneity of bereavement outcomes following different losses.

Role of the funding source

Funding bodies had no involvement in any aspect of this study.

Author contributions

F. Maccallum, I. R. Galatzer-Levy and G. A. Bonanno designed the study and wrote the manuscript. F Maccallum analyzed the data. All authors have approved the final manuscript.

Declaration of conflicting interests

Conflicts of interest: none.

Acknowledgments

Fiona Maccallum is supported by a National Health and Medical Research Council Early Career Research Fellowship (NHMRC GNT1053997). I R Galatzer-Levy is supported by an NIMH grant K01MH102415. G. A. Bonanno is the recipient of an NIMH grant R01MH091034.

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