Longitudinal Effects of Parental Bereavement on Adolescent Developmental Competence

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Abstract

Objective—To assess the impact of sudden parental bereavement on subsequent attainment of developmental competencies.

Method—This longitudinal study reports on 126 youth bereaved by sudden parental death (suicide, accident, or natural death) and 116 demographically similar non-bereaved controls assessed at 9, 21, 33, and 62 months after parental death, and at comparable times in controls. Half were female and 84.7% Caucasian. Youths and care-giving parents were assessed on psychiatric disorders, psychological characteristics, and contextual variables antecedent and subsequent to bereavement. At month 62, at which time youth on average aged 18.4 years (SD=3.1), participants were assessed on developmental competence using an adaptation of the Status Questionnaire; peer attachment using the Inventory of Parent and Peer Attachment; and educational aspirations using the Future Expectations Scale. The bereaved and non-bereaved groups were compared using univariate and multivariate statistics, including path analyses.

Results—On univariate analyses, bereaved youth had more difficulties at work, less well-elaborated plans for career development, lower peer attachment, and diminished educational aspirations. The effects of bereavement were most commonly mediated via its effects on offspring and caregiver functioning and family climate, even after adjusting for the impact of pre-death characteristics. Outcomes were unrelated to age at the time of parental death, gender of the deceased parent, or cause of death.

Conclusions—Children who lost a parent to sudden death evidenced lower competence in work, peer relations, career planning, and educational aspirations, primarily mediated by the impact of bereavement on child and parental functioning and on family climate.

Keywords

COMPETENCE; BEREAVEMENT; LONGITUDINAL; PARENTAL; YOUTH

Introduction

The loss of a parent is one of the most stressful events that a child can experience (Harrison & Harrington, 2001; Yamamoto et al., 1996). Moreover, parental bereavement is rarely an isolated event, but instead, often initiates a cascade of untoward consequences that increase family burden and adversity (Dowdney, 2000; Tremblay & Israel, 1998). Both retrospective and prospective studies have documented that parentally-bereaved youth are at risk for a range of psychological problems, including depression, post-traumatic stress disorder (PTSD), substance abuse, and health risk behaviors (Brent, Melhem, Donohoe, & Walker, 2009; Hamdan et al., 2012; Kendler, Sheth, Gardner, & Prescott, 2002; Maier & Lachman, 2000; Melhem, Walker, Moritz, & Brent, 2008).

In developmental psychopathology, research on effects of family risks and adversities on youth has expanded beyond a focus on psychological problems to include consequences for broader indicators of adaptive outcomes, most particularly, the consequences of adversity for attainment of developmental tasks in the arenas of education, work, and interpersonal relationships (Masten, Burt, & Coatsworth, 2006; McCormick, Kuo, & Masten, 2011). To date, there is a limited literature linking parent loss to positive, adaptive, developmental outcomes. Early retrospective studies of childhood bereavement, typically in case series or controlled studies in referred or convenience samples, found that adults who lost a parent during childhood were more likely to have difficulties in educational attainment, the establishment of intimate and stable relationships, and parenting their own children (Balk, 1991; Birtchnell & Kennard, 1982; Harris, 1991; Hepworth, Ryder, & Dreyer, 1984; Jacobson & Ryder, 1969; Ragan & McGlashan, 1986).

More recently, the impact of parental bereavement on health and developmental attainment has been assessed in large community surveys of adults who reported that they lost a parent as a child. In these studies, death of a parent was associated with depressive symptoms, poorer health outcomes, lower sense of mastery and self-confidence, less perceived family support, and diminished educational attainment (Mack, 2001; Maier & Lachman, 2000; Marks, Jun, & Song, 2007). In two of the few prospective studies on the effects of parental bereavement on youth, bereaved young people, in comparison to non-bereaved peers were found to be less optimistic about the future, with attenuated educational achievements and aspirations (Cas, Frankenberg, Suriastini, & Thomas, 2009; Himaz, 2009). While these studies controlled for socio-demographic variables, they did not adjust for the possible role of psychiatric sequelae of bereavement on youths' developmental achievements and aspirations. Thus, it was not clear whether bereavement had unique associations (which could be due to direct effects or indirect, cascading effects) with positive indicators of adjustment over and above the well-established effects of bereavement on psychiatric problems.

There may differential psychological and functional consequences conditional on the age that the child loses a parent, and the gender of the deceased parent. Studies in Western countries that have focused on psychiatric outcomes of parental death due to suicide show that the younger the age of the child at the time of the suicide of a parent, the greater the likelihood of psychiatric sequelae, whereas the same trend was not discerned in the children of parents who died by accidents (Niederkrotenthaler, Floderus, Alexanderson, Rasmussen, & Mittendorfer-Rutz, 2012; Wilcox et al., 2010) Studies similar in locale and focus have found greater psychiatric sequelae from the loss of a mother than from a father (Brent et al., 2009; Kuramoto et al., 2010). In contrast, in non-Western countries, studies of the impact of parental death on educational attainment found that older siblings were more adversely affected compared to younger siblings, presumably because the older siblings took on parental responsibilities in lieu of the pursuit of education (Cas, Frankenberg, Suriastini, &

Thomas, 2011; Chen, Chen, & Liu, 2009; Gertler, Levine, & Ames, 2004). Also, while some of these studies conducted in developing countries found a greater impact following the loss of a mother on educational outcomes (Case & Ardington, 2006; Chen et al., 2009; Evans & Miguel, 2007), others found that paternal death had a greater effect on youths' educational outcomes (Cas et al., 2011).

Understanding the significance of parental bereavement for the subsequent attainment of competence in age-salient developmental tasks is an important complement to previous work on the psychiatric and psychological sequelae of bereavement in children. Across multiple domains of adjustment, indicators of psychopathology and competence have shown effects on one another over time, described as "developmental cascades (Masten & Cicchetti, 2010)." Theoretically, these effects may be progressive, spreading across domains over time, or transactional in nature, with bi-directional effects of two domains on each other. For example, cascade effects initiated by antisocial behavior problems have been widely documented. Specifically, conduct problems may spill over to impair school and social functioning, which in turn may increase the risk for internalizing symptoms and disorders (Burt, Obradovic, Long, & Masten, 2008; Burt & Roisman, 2010; Masten et al., 2005; Obradovic, Burt, & Masten, 2010). Ultimately, an emphasis on developmental competence is important in evaluating the overarching impact of parental bereavement, because, as articulated decades ago by Erikson (Erikson, 1963), the ultimate arbiters of the optimal development can be framed as their impact on the ability "to love and to work," manifested through attainment of important interpersonal, educational, and occupational goals.

In our longitudinal study of the impact of sudden parent death on children's outcomes, we have shown that, even prior to parental death, the bereaved sample, compared to the non-bereaved controls, had higher rates of personal and family psychiatric disorder (Brent et al., 2009; Melhem et al., 2008). In addition, over time, bereaved youth showed higher rates of depression, post-traumatic stress disorder (PTSD), alcohol abuse, and other health risk behaviors, as well as less adaptive coping, lower family cohesion, lower self-esteem, and higher hopelessness (Brent et al., 2009; Hamdan et al., 2012; Melhem et al., 2008). The surviving parents of these bereaved youth also showed higher post-bereavement rates of depression and functional impairment, with parental impairment mediating several of these adverse outcomes for the bereaved youth (Brent et al., 2009; Hamdan et al., 2012; Melhem et al., 2008). In this paper, we focused on the possible sequelae of sudden parental death with respect to the competence of bereaved youth, particularly key developmental task domains of education, work, and interpersonal relationships. Youth who had lost a parent to suicide, accidental death, or sudden natural death were compared to a non-bereaved control group after an average of 5 years since the parental death. Because the psychiatric and psychological variables that we found to be associated with bereavement have also been shown to be related to important developmental outcomes (Masten et al., 2006; Masten & Cicchetti, 2010), we hypothesized that bereaved youth, relative to non-bereaved controls, would show less optimal adaptation with respect to achievements in education, work and career planning, and in peer and romantic relationships. In addition, we had hypotheses about the roles of pre-death variables, aspects of the parent loss, and the known psychological sequelae of bereavement on developmental outcomes. First, we hypothesized that previously psychiatric history in the parents and child would have an effect on developmental outcome, above and beyond bereavement. Second, based on the bereavement studies in conducted in developed countries (Brent et al., 2009; Kuramoto et al., 2010; Niederkrotenthaler et al., 2012; Tsuchiya, Agerbo, & Mortensen, 2005; Wilcox et al., 2010), we predicted that there would be a more profound development effect on children who were younger at the time that their parent died, and also in those who had lost a mother rather than a father. Third, we hypothesized that the previously identified sequelae of bereavement,

namely incident psychiatric disorder and functional impairment in the child and parent, as well as changes in self-esteem and family cohesion, would mediate the impact of bereavement on developmental outcome.

Methods

Sample and recruitment

The sample for this study is drawn from a total of 156 bereaved and 100 non-bereaved families. The original sample of families consisted of 242 offspring, bereaved by accident (23.7%), sudden natural death (41.7%), or suicide (34.6%), and 151 adult caregivers. Bereaved families were recruited through coroner's records (49.7%) or by newspaper advertisement (50.3%). Deceased probands were between the ages of 30–60, had to have a definite verdict of suicide, accident, or sudden natural death, died within 24 hours, and had to have at least one biological offspring between the ages of 7–21 living in one of the parents' homes. In this paper, we restricted the sample to those who were age 18 or less at the time of the parent's death, and who were retained in study through the month 62 assessment, when assessment of developmental competencies took place (N=126). Families in which there were multiple deaths or injuries were excluded. The most common methods of accidental and sudden death were by traffic accident and by myocardial infarction, respectively. In the bereaved families, the caretaking parent was almost always female (86.1%) and the biological parent of the child (87.9%). The rate of participation for eligible bereaved families was 71%. The demographic characteristics of probands who died of suicide and accidents were similar to those of all people who died of suicide and accident in Allegheny County (metropolitan Pittsburgh, Pennsylvania), and there were no demographic differences as a function of method of recruitment.

The non-bereaved comparison group is drawn from a total sample of 185 non-bereaved youths and their 102 adult caregivers. In this paper, the sample of non-bereaved control youth (n=116) is restricted to those who were age 18 or less at the time of entry into the study, and who were retained for the 62 month assessment, at which time the assessment of developmental competencies took place. The non-bereaved offspring had to have two living biological parents, lived in the home of at least one of them, and had no first-degree relatives who had died within the previous two years. Control families were recruited using random-digit dialing and by advertisement. The probands of the deceased parents and control parents were frequency-matched on age, race, sex, and neighborhood. Of those who were eligible, 55% agreed to participate. During the follow-up in this study, 4 offspring from two control families experienced the loss of a parent, and so they are excluded from these analyses.

The University of Pittsburgh Institutional Review Board approved this study. After a complete description of the study, caregivers' consent was obtained for their participation, as well assent or consent from their offspring. The majority of the interviews took place in the homes of the participants. Participants were compensated for their participation. Assessments of parents were conducted blind to the psychiatric status of the child and vice versa.

Assessment

Participants were interviewed at four points in time, 9, 21, 33, and 62 months after the death, with parallel timing for the non-bereaved controls. Retention for the study from the initial cohort was 385/427 (90.2%), 358/427 (83.8%) and 317/427 (74.2%) for the 21, 33 and 62 month assessments, respectively. The bereaved group was less likely to be retained (166/242 (68.6%) vs. 151/185 (81.6%), χ^2_1=9.30, P=.002) as were those who were of non-European ancestry (49/78 (62.8%) vs. 268/349 (76.8)%, χ^2_1 =6.51, P=.01). Families in which the

adult caretakers had a new onset diagnosis of depression (70/105 (66.7%) vs. 213/274 (77.7%), χ^2_1=4.92, P=.03), or post-traumatic stress disorder (PTSD) (41/68 (60.3%) vs. 253/328 (77.1%), χ^2_1=8.35, P=.004) were also less likely to be retained. There were no other attrition-related differences in demographic, psychiatric or psychological characteristics. At the 62 month assessment, 22.7% of offspring were aged 12–15, 20.7% were 16–17, and 56.6% were 18 and older; 84.7% were Caucasian, 10.7% African American, and 4.6% Biracial. None of the participants was Hispanic, consistent with Allegheny County's demographic make-up (at the time of recruitment into the study, 0.5–1.0% Hispanic).

Clinical variables

Table 1 lists the instruments used in this report, their internal consistency, and when appropriate, inter-rater reliability in this study. The following clinical measures were obtained at each follow-up point. The School Age Schedule for Schizophrenia and Affective Disorders, Present and Lifetime Version (K-SADS-PL) (Kaufman et al., 1997) was used to assess offspring younger than 18 years old, and the Structured Interview for DSM-IV Axis I Disorders (SCID-I) (First, Spitzer, Gibbon, & Williams, 1996) was used for adult offspring and caregivers with respect to DSM-IV Axis I psychiatric disorders (APA, 1994). The Structured Interview for DSM-IV Personality Disorders (SCID-II) (First, Gibbon, Spitzer, Williams, & Benjamin, 1997) was used to assess personality disorders in all participants over the age of 18. Psychiatric assessment of the proband was conducted using a psychological autopsy procedure (Hawton et al., 1998). The onset, offset, and duration of disorders were recorded on the Adolescent Longitudinal Interval Follow-Up Evaluation (A-LIFE) - Psychiatric Status Ratings (PSR) score sheet for offspring younger than 18 years old, and on the Psychiatric Rating Scale (PSR) of the Longitudinal Interval Follow-up Evaluation (LIFE) for older offspring and caregivers. Functional status was determined using the Children's Global Assessment Scale (CGAS) or the Global Assessment Scale (GAS) for adults (Endicott, Spitzer, Fleiss, & Cohen, 1976; Shaffer et al., 1983). In both of these scales, a lower score is associated with greater impairment. Inter-rater reliability was high for the K-SADS-PL and SCID-I diagnoses (kappa's 0.61 to 1.00) and for the CGAS and GAS (intra-class correlation coefficients [ICCs] 0.90 and 0.85 respectively).

Self-reported hopelessness was assessed using the Child Hopelessness Scale (Kazdin, French, Unis, Esveldt-Dawson, & Sherick, 1983) for youth under aged 14, and the Beck Hopelessness Scale (Beck, Weissman, Lester, & Trexler, 1974) for participants over the age of 14. Self-esteem was assessed by the Weinberger Adjustment Inventory self-esteem subscale (Weinberger, Feldman, Ford, & Chastain, 1987). Family climate was assessed using the Family Adaptability and Cohesion Evaluation II (FACES-II) (Olsen, Portner, & Lavee, 1985) Within the bereaved sample, symptoms of complicated grief were assessed using the Inventory for Complicated Grief- Revised for Children (ICG-RC), which has good internal consistency, convergent, and predictive validity (Melhem, Moritz, Walker, Shear, & Brent, 2007; Melhem, Porta, Shamseddeen, Walker Payne, & Brent, 2011; Melhem, Porta, Walker Payne, & Brent, 2012).

Developmental outcomes

The Status Questionnaire, the Peer sub-scale of the Inventory of Parent and Peer Attachment, and the Future Expectations Scales (described below) were administered only at the 4th follow-up point, which for the bereaved was around 62 months after the loss of their parent (M=62.7 months, SD=10.4, range: 40–91).

Competence in Developmental Tasks

Developmental competence was assessed by an interview based on questions from the Status Questionnaire instrument developed by the Project Competence group at the University of Minnesota (Masten et al., 1995; Masten et al., 1999; Masten et al., 2005). Success at work (N=171), satisfaction with romantic relationships (N=246), involvement with friends (N=246), academic success (N=245), and quality of career development plans (N=226) were rated by the interviewer in youth aged 14 or older based on assessments with the child and parent. However, not all items could be rated for all participants; e.g., success at work could not be rated for people who did not have a job. All ratings were on a Likert scale, with 5 being the greatest satisfaction or level of competence, and 1 being the lowest. Inter-rater agreement for the interview ratings was calculated by having the project coordinator (MWP), who was blind to bereavement status, independently listen to tapes (N=12) of the Status Questionnaire and rate them. Internal consistency and inter-rater reliability for each domain was moderate to high (see Table 1).

Peer attachment

The Peer subscale of The Inventory of Parent and Peer Attachment (IPPA) (Armsden & Greenberg, 1987) examines security of attachment by assessing quality of communication, trust, and alienation with peers. While the Status Questionnaire was administered to offspring age 14 and older, the IPPA was administered to all youth (N=248).

Future Expectations Scale

To complement the assessment of career planning on the Status Questionnaire, youth aged 14 and above answered this 4-item questionnaire about educational aspirations (N=278) (Linver, Barber, & Eccles, 1997).

Data Analysis

There were three primary outcomes, the Status Questionnaire, total score on the Peer Attachment, and the Future Expectations Scale. Within each outcome measure, we adjusted the alpha to the number of contrasts, with alphas equal to .01, .05 and .025 respectively. At these sample size and alphas, an effect size of d=0.36 to 0.54 could be detected at 80% power. The differences between the bereaved and non-bereaved groups were examined using a t-test or a Mann-Whitney test, as appropriate, and effect sizes are reported. Next, for all outcomes that showed a significant univariate relationship with bereavement, we examined the impact of bereavement, age, and tested for an age by bereavement interaction. Age of the child at the time of parental death was a significant covariate, but there were no bereavement by age interactions, whether age was treated as a continuous variable or trichotomized to those under age 11, 12–16, and 17+. In order to develop explanatory models linking pre-death variables, bereavement, post-death variables, and outcome, we: (1) first identified those pre-death variables that were related to both bereavement and the outcome, and then ran backward stepwise regressions to identify the most parsimonious set of pre-death variables associated with the outcome, including bereavement and demographics (age, race, and sex) at each step; (2) obtained bi-variate correlations to identify potential mediators between bereavement and outcome, namely those post-death variables associated with both outcome and bereavement; (3) adjusted the alpha to control for multiple comparisons using the False Discovery Rate (FDR)(Storey, 2003), *qqvalue* package in STATA (StataCorp, 2009) available at http://ideas.repec.org/c/boc/bocode/s457100.html, since there were 70 potential mediating variables; and (4) added each variable identified in step 2 to the final model from step 1, one at a time, and tested their main effects, and interactions with bereavement and with age. The variables that were significant in step 3, either as main effect, or as interaction with bereavement or age, were included in a

path model, together with the pre-death variables from step 1. In order to test mediation, we did not include variables at month 62 that would have been contemporaneous with the outcome; however, when assessing adult or offspring psychiatric disorder over time, we utilized the LIFE/ALIFE to include data up to 1 year prior to the assessment, at month 50. The path models were generated using Mplus 6.12 (Muthén & Muthén, 1998–2010). We chose models that balanced parsimony with a good fit to the data as per the following test statistics: chi-square test of model fit, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Weighted Root Mean Square Residual (WRMR). We stratified the data by age, or when appropriate, by sex in order to examine if the path coefficients were stable with respect to different stratifications. Because the path coefficients within these stratifications were quite similar to the entire sample, we report herein only on the path analyses on the full sample. Since there was often more than one participant from each family, all multivariate analyses and path analyses included a term to account for clustering within families.

Results

Characteristics of the sample at baseline and subsequent time points

The demographic characteristics of bereaved and control youth, and those clinical and psychological variables that significantly differed between them at the time of assessment of developmental competencies are detailed in Table 2. The variables that discriminated between the two groups at baseline and across time points are consistent and very similar to those reported previously (Brent et al., 2009; Hamdan et al., 2012; Melhem et al., 2008).

Status Questionnaire (see Table 3)

Bereaved youth were found to have less success at work (Cohen's *d* effect size [*d*] =0.42), and a less well-developed career development plan (*d*=0.50) than non-bereaved controls. There were no group differences with respect to educational competence or in the area of romantic relationships; the univariate association between bereavement and friendship escaped statistical significance (unadjusted p=0.015).

Status Questionnaire and Peer Attachment (see Table 3)

Bereavement was associated with lower overall peer attachment (*d*=.39).

Future Expectations (see Table 3)

The bereaved group showed diminished educational aspirations relative to the controls (*d*=.29), but no group difference with respect to certainty about the future.

Multivariate Analysis

In Table 4, we report on the relationship between bereavement and outcomes that were significant upon univariate analyses after controlling for demographic and pre-death variables significantly associated with a given outcome, equivalent to step 1 in the data analytic plan described above. Path analyses yielded the following results:

Work—Bereavement had no direct effect on work performance, but its effects were mediated by its impact on offspring functional status, explaining 35.4% of the variance (see Fig. 1). There was a significant total indirect effect of bereavement on work performance (β=−0.58, standard error [SE]=0.17, z=−3.34, p=.001). Significant specific indirect effects were through youth functional status 9 and 21/33 months after the death (β= −0.10, SE=0.04, z=−2.78, p=.005) and from bereavement to youth functional status 21/33 months after the death to work performance (β= −0.12, SE=0.05, z=−2.15, p=.03). The indirect path

of bereavement through adult care-giving parent mood disorder at months 21/33 and 50 just escaped statistical significance (p=.07).

Career planning—The effect of bereavement on career planning was mediated by its impact on the offspring's functional status, the latter of which was also influenced by the child's past history of behavioral or depressive disorders (see Fig. 2, R^2=23.4%). There was a significant total indirect effect of bereavement on career planning (β=−0.17, SE=0.05, z= −3.18, p=.001). The significant specific indirect effect was through youth functional status 9 months after the death (β=−0.11, SE=0.05, z=−1.99, p=.046).

Peer attachment—The impact of bereavement on peer attachment was mediated via its effects on family cohesion and adaptability and on the youth's functional status (see Fig. 3, R^2=12.4%). There was a significant total indirect effect of bereavement on peer attachment (β=−0.13, SE=0.03, z=−4.13, p<.001). Significant specific indirect effects were through functional status 21/33 months after the death (β=−0.07, SE=0.02, z=−3.09, p=.002), and through family adaptability and cohesion at 21/33 months (β=−0.06, SE=0.02, z=−2.50, p=. 01).

Future expectations—The impact of bereavement on future educational aspirations was mediated via its effect on youth functional status 9 months after the death, and on youth's functional status 21/33 months after death; the later was also influenced by the proband's history of psychiatric disorder (see Fig. 4, R^2=12.4%). There was a significant total indirect effect of bereavement on future educational aspirations (β=−0.18, SE=0.04, z=−4.39, p<. 001). Significant specific indirect effects were through youth functional status 21/33 months after the death (β=−0.08, SE=0.03, z=−2.80, p=.005), and through functional status 9 and 21/33months after the death (β=−0.07, SE=0.02, z=−3.04, p=.002). The indirect path from bereavement through family adaptability and cohesion was not statistically significant (β= −0.03, SE=0.02, z=−1.48, p=.14).

Relationship of bereavement-related variables to developmental outcomes

There was no relationship between the age at the time of death, the gender of the deceased parent, the time since death, or the cause of death and any of the developmental outcomes (corrected alphas > .99). Only child and adult survivor functioning were predictive of outcome within the bereaved sample after application of the FDR procedure. While symptoms of complicated grief at baseline and 21/33 months after death were inversely related to peer attachment on the IPPA (r's −.24, −.27, uncorrected p's from 0.02 to 0.004), these findings did not survive correction for multiple comparisons using FDR (corrected p's >.29).

Discussion

In this controlled follow-up study, parentally bereaved youth were found to have lower competence than non-bereaved controls in the areas of work, career planning, peer attachment, and future educational aspirations. To a large extent, the effects of bereavement on child developmental competencies were mediated via the impact of bereavement on child and adult functioning, and on family adaptability and cohesion. Pre-death parental and offspring psychiatric disorder tended to have a negative impact on child and parent functioning, which in turn were related to the developmental outcomes in question. Although children who were younger showed lower competence, there was no interaction between bereavement and age, meaning that children who were younger at the time of their parental death were not more vulnerable to the developmental effects of bereavement. There were no differential effects of cause of death on bereaved youths' developmental outcomes.

We now place these findings in the context of the strengths and limitations of this study, and the extant literature.

Among the study's strengths is that it is one of the few, controlled, community-based studies of parental bereavement that has followed youth prospectively from close to the time of the parental loss. Also, the assessment of these youth and their surviving caregivers covered a broad array of domains salient to psychiatric and developmental outcomes. Consequently, we were able to identify potential confounders and correlates of developmental outcomes that antedated and followed the death and thus test the unique impact of bereavement on outcome. However, one important limitation is that youth in this sample were only assessed with respect to developmental competencies and related constructs at one point in time around five years after the death. While we controlled for relevant variables that antedated, co-occurred, or followed the death, we do not have a direct assessment of these competencies in the bereaved or control groups *prior* to death. Another limitation is that we assessed developmental competencies in a group that ranged in age from early adolescence through young adulthood. However, while age was related to some of these outcomes, the age at the time of death was not, nor did analyses stratified by age yield any different results.

Although our sample retention was acceptable, we still had differential attrition, insofar as we had greater attrition from the bereaved sample, and from those youth whose care-giving parents were more likely to have had depression and/or PTSD. Since development outcomes tended to be negatively affected by bereavement and by caregiver impairment, and we still found effects despite losing participants who were more at risk for having a negative impact from bereavement, it is unlikely that our findings are explained by attrition.

Our sample has a relatively low minority make-up, reflecting the demographics of adult suicides and accidents, as well as the population make-up of Allegheny County. Given the demographic characteristics of the sample, we cannot necessarily conclude that these findings would generalize to minority children who lose a parent to sudden death. We hypothesized that children who were younger at the time of parental loss would be more greatly affected by bereavement. We were not able to detect any age by bereavement interactions, although we may have been limited by sample size in our ability to detect interactions. Different developmental forces may be at work in shaping the outcomes for youth who lose their parents in childhood or closer to young adulthood. For example, some studies report a higher risk for mood disorders, suicidal behavior, and suicide if the loss occurs earlier in life (Dowdney, 2000; Reinherz et al., 1993). However, in studies that include parent deaths other than suicides, and those that focus on broader outcomes like educational attainment, young adult children are more adversely affected than their younger siblings, presumably because they need to assume parental responsibilities in lieu of educational pursuits (Cas et al., 2011; Chen et al., 2009; Niederkrotenthaler et al., 2012).

These findings add to previous reports of adults who lost parents as children that found difficulties in intimacy, parenting, lower perceived support, and lower educational attainment compared to non-bereaved controls (Birtchnell & Kennard, 1982; Hepworth et al., 1984; Maier & Lachman, 2000; Marks et al., 2007). Studies conducted in Ethiopian and in Indonesian youth who lost their parents to HIV/AIDS or to a tsunami, respectively, also showed the negative impact of parental death on children's school attendance, educational aspirations, and optimism about the future (Cas et al., 2011; Himaz, 2009). While the circumstances and context of bereavement in our sample are quite different to some of the above-cited studies, we do provide evidence for a possible mechanism by which bereavement impedes the attainment of developmental competencies, namely, via by the impact of bereavement on child and parent functioning and on family cohesion. The effects of bereavement on these outcomes was clinically significant, with small to moderate effect

sizes found even five years after the death, and path analyses explaining between 13 and 31% of the variance in these outcomes. Therefore, interventions that could alter the developmental trajectory of bereaved youth could have long-term positive implications.

As hypothesized, there was also an impact of parental and personal psychiatric history on developmental outcome that was also mediated by child functional status. On univariate, and even in some multivariate analyses, child depression, ADHD, and behavioral disorders were related to developmental outcomes, but child global functioning had the strongest relationship with specific developmental competencies, and thus held sway in the path analyses. Therefore, while psychiatric conditions did not persist in the path analyses, they were likely to be contributors to the difficulties in bereaved youths' attainment of developmental competence. In fact, our data, and the extant developmental cascade literature highlight a recursive process between psychopathology and developmental competence, showing that, for example, conduct disorder may disrupt the attainment of competence with peers and at school, which in turn may predispose to internalizing symptoms (Brent et al., 2009; Masten et al., 2005; Obradovic et al., 2010).

We have previously demonstrated that high levels of symptoms of complicated grief are associated cross-sectionally, and over time, with an increased risk for depression, and functional impairment (Melhem et al., 2007; Melhem et al., 2011). Longitudinal follow-up of parentally bereaved youth who were randomly assigned to either a preventive intervention or care as usual showed that problematic grief was associated with social detachment and insecurity and that problematic grief was less prevalent in those who received the intervention (Sandler et al., 2010). Though our findings that complicated grief adversely affected peer attachment escaped statistical significance after correction for multiple comparisons, the direction and magnitude of the effects in this study are consistent with those reported by Sandler et al.(Sandler et al., 2010).

Parental bereavement has effects on the quality of interpersonal relationships, and may also contribute to reported difficulties at work (Hazan & Shaver, 1990). The impact of parental loss and separation on children's ability to form and maintain intimate relationships is consistent with animal models and human observational studies about the impact of parental separation on development of social behavior (Hofer, 1996; Shear & Shair, 2005). It is sobering that we found evidence of these difficulties five years after the loss of a parent. There was no differential effect of cause of parental death, similar to other reports (Brown, Sandler, Tein, Liu, & Haine, 2006). In previous reports, we have found relatively few differences in psychiatric and functional outcome among groups with respect to psychiatric disorder and health risk behaviors at 9 months after the death, although at 2 or more years after the death, the suicide group may be at higher risk for depression (Brent et al., 2009; Hamdan et al., 2012; Melhem et al., 2008), and this is consistent with an earlier comprehensive review of the literature (Dowdney, 2000). However, these findings of the impact of bereavement on child outcome cannot be explained simply by parental suicides, since we did not find an effect of cause of death, and similar findings persisted even when we excluded the offspring of suicides from our sample.

In this study, we only have an assessment of developmental competence at one point in time. However, the co-occurrence of psychopathology and of difficulties with the attainment of developmental competencies are consistent with the emerging cascade literature indicating that difficulties in key competence domains increase the risk for psychiatric symptoms, and vice versa (Burt et al., 2008; Burt & Roisman, 2010; Masten et al., 2005; Obradovic et al., 2010). Identification and treatment of psychopathological conditions may help bereaved youth to more optimally attain needed developmental progress. Conversely, the attainment

of developmental competency may protect against the development of psychiatric sequelae of bereavement.

Our findings support the view that there are developmental sequelae subsequent to the sudden loss of a parent that are mediated by personal and parental functioning and by family cohesion. Clinically, these results suggest that it is important to consider assessments and interventions focused on the attainment of developmental competency as well as on symptoms among patients with a history of parental bereavement. In addition, our study is consistent with the prevention studies of Sandler and colleagues, which have identified that the positive effects of their preventive program for parentally bereaved youth are mediated through the impact on parental mental health, family cohesion, and child adaptive coping (Tein, Sandler, Ayers, & Wolchik, 2006). In those studies, youth and parents who were highly symptomatic were not included. However, our findings suggest that a similar approach, coupled with efforts to actively reduce levels of symptomatology in impaired youth and surviving parents, may be similarly effective.

Prevention and intervention efforts for bereaved children should be evaluated not only on their ability to prevent psychiatric sequelae, but also with respect to their impact on bereaved individuals' capabilities "to love and to work." This may require interventions that not only address emerging psychopathology in bereaved youth and their surviving parents, but also augment individual and family resources to promote greater competency.

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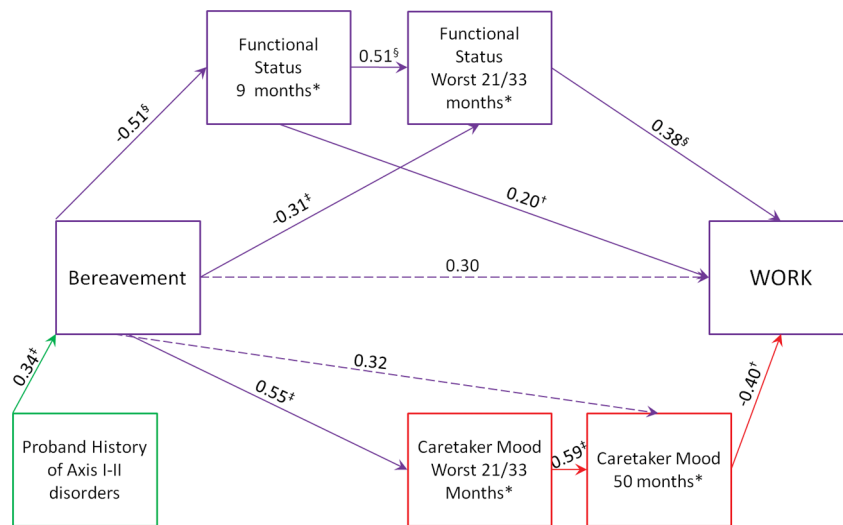
Figure 1.
Path Analysis of Work Performance
* Months after parental death
Functional status: higher score indicates better functioning
Numbers are standardized path coefficients. †p<.05, ‡p<.01, §p<.001
Solid lines indicate statistically significant paths. Dotted lines indicate not significant paths.
Purple indicates offspring's variables. Red indicates adult caretaker's variables. Green indicates proband's variables.
chi-square test of model fit: χ^2_{10}=13.73, p=.19, CFI=0.98, TLI=0.96, RMSEA=0.05, WRMR=0.55, R^2=35.4%
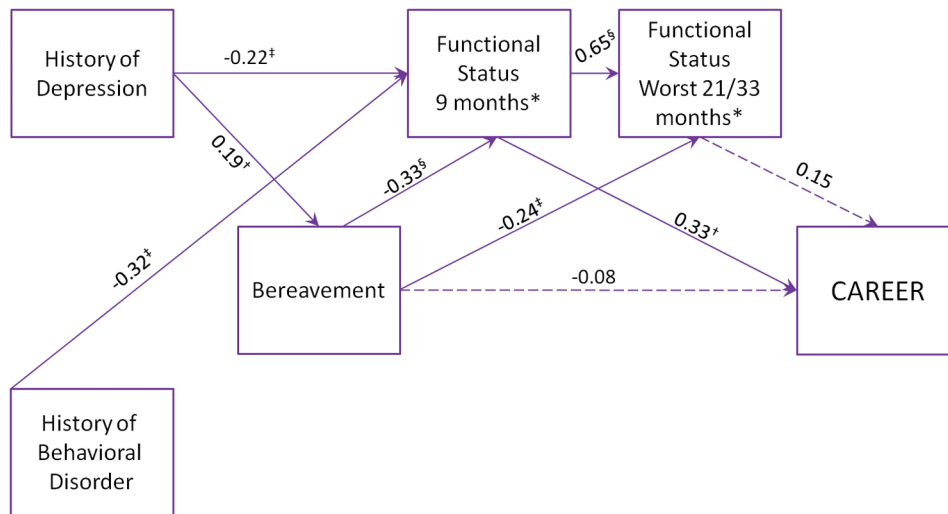
Figure 2.
Path Analysis of Career Planning
* Months after parental death
Functional status: higher score indicates better functioning
Numbers are standardized path coefficients. [†]p<.05, [‡]p<.01, [§]p<.001
Solid lines indicate statistically significant paths. Dotted lines indicate not significant paths.
All variables are offspring's.
chi-square test of model fit: χ^2_5=5.90, p=.32, CFI=0.99, TLI=0.98, RMSEA=0.03,
WRMR=0.44, R^2=23.4%
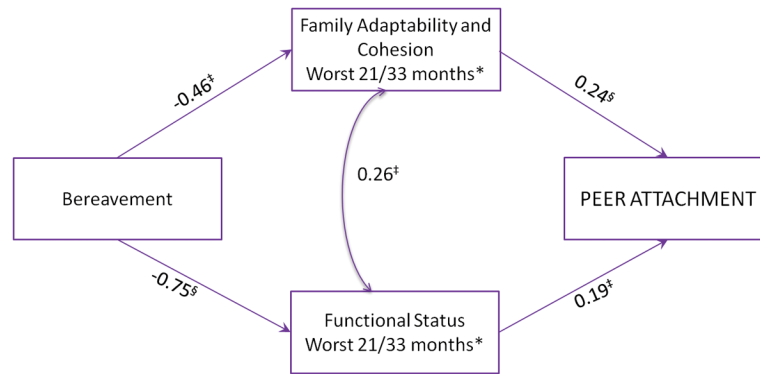
Figure 3.
Path Analysis of Peer Attachment
* Months after parental death
Functional status: higher score indicates better functioning
Family Adaptability and Cohesion: higher score indicates better adaptability and cohesion
Numbers are standardized path coefficients. [‡]p<.01, [§]p<.001,
Solid lines indicate statistically significant paths.
All variables are offspring's.
chi-square test of model fit: χ^2_1=1.49, P=.22. CFI=0.99, TLI=0.97, RMSEA=0.05,
R^2=12.4%
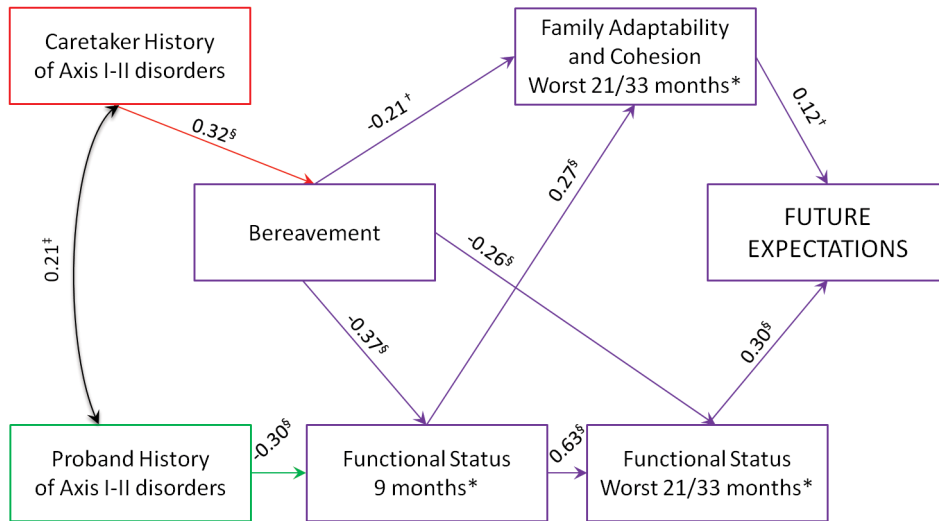
Figure 4.
Path Analysis of Future Expectations
* Months after parental death
Functional status: higher score indicates better functioning
Family Adaptability and Cohesion: higher score indicates better adaptability and cohesion
Numbers are standardized path coefficients. ‡p<.01, §p<.001
Solid lines indicate statistically significant paths. Dotted lines indicate not significant paths.
Purple indicates offspring's variables. Red indicates adult caretaker's variables. Green indicates proband's variables.
chi-square test of model fit: $\chi^2_{11}=13.93$, p=.24, CFI=0.98, TLI=0.96, RMSEA=0.03, WRMR=0.48, $R^2=12.4\%$

Table 1

Study Measures: Items, Composite Scores, Internal Consistency, and Inter-Rater Reliability

Scale	Number of items	Cronbach's α (95% CI)	Reliability (95% CI)
K-SADS-PL	N/A	N/A	Kappa's=1.00
SCID-I	N/A	N/A	Kappa's 0.61 (0.34–0.90) to 1.00
LIFE	N/A	N/A	N/A
A-LIFE	N/A	N/A	N/A
Child Hopelessness Scale	17	0.67 (0.63–0.70)	N/A[‡]
Beck Hopelessness Scale	20	0.89 (0.86–0.91)	N/A[‡]
Family Adaptability and Cohesion	30	0.959 (0.955–0.963)	N/A[‡]
Self-Esteem	7	0.86 (0.84–0.87)	N/A[‡]
Status Questionnaire: Success at Work [*]	2	0.89 (0.85–0.92)	ICC=0.62 (−0.08–0.91)
Status Questionnaire: Career [*]	1	--	ICC=0.78 (0.38–0.94)
Status Questionnaire: Romantic Relationships [*]	2	0.72 (0.64–0.79)	ICC=0.85 (0.50–0.96)
Status Questionnaire: Friends [*]	2	0.85 (0.81–0.89)	ICC=0.69 (0.23–0.90)
Status Questionnaire: Education [*]	1	--	N/A[†]
Peer Attachment	25	0.94 (0.93–0.95)	N/A[‡]
Future Expectations Scale Expectations	1	--	N/A[†]
Future Expectations Scale Degree of Certainty	3	0.68 (0.61–0.73)	N/A[†]

CI: Confidence Interval. N/A: Not applicable.

[*] Interviewer's summary rating.

[†] Question is multiple-choice.

[‡] Self-reported measure.

Table 2

Demographic, Clinical and Psychological Characteristics of the Bereaved and Non-Bereaved Groups

	Bereaved (N=126)	Control (N=116)	Test	df[×]	P
Offspring					
Age at time of parent death,[†], M (SD)	13.0 (3.2)	13.1 (2.7)	t=0.26	238.6	.80
Age at time of assessment, M (SD)	18.8 (3.3)	18.0 (2.7)	t=−2.07	237.6	.04
Gender, N (% Female)	61 (48.4)	62 (53.4)	χ^2=0.61	1	.43
Race, N (% Caucasian)	103 (81.7)	102 (87.9)	χ^2=1.78	1	.18
Socio-economic status (M, SD)[٭]	42.8 (12.5)	47.9 (10.8)	t=2.70	155	.008
Mean follow-up time – mos (M, SD)	68.2 (10.8)	58.2 (7.1)	t=−8.53	217.3	<.001
Pre-Death Variables – N (% Yes)					
History of Depression	23 (18.4)	11 (9.6)	χ^2=3.85	1	.05
History of Anxiety	14 (11.1)	8 (7.0)	χ^2=1.25	1	.26
History of ADHD	11 (8.7)	0 (0.0)	χ^2=10.43	1	.001
History of Behavioral Disorders	6 (4.8)	3 (2.6)	FET	--	.51
History of Alcohol/Substance Abuse	0 (0.0)	1 (0.9)	FET	--	.48
History of abuse	9 (7.1)	1 (0.9)	FET	--	.02
Diagnoses – N (% Yes)					
Depression 9 mos	38 (30.2)	7 (6.0)	χ^2=23.22	1	<.001
Depression 21/33 mos	33 (26.2)	12 (10.3)	χ^2=10.02	1	.002
Depression 50 mos	29 (23.0)	12 (10.4)	χ^2=6.74	1	.009
Anxiety 9 mos	17 (13.5)	10 (8.6)	χ^2=1.45	1	.23
Anxiety 21/33 mos	19 (15.1)	10 (8.6)	χ^2=2.39	1	.12
Anxiety 50 mos[٭]	24 (19.0)	14 (12.2)	χ^2=2.14	1	.14
ADHD 9 mos	15 (11.9)	12 (10.3)	χ^2=0.15	1	.70
ADHD 21/33 mos	15 (11.9)	15 (12.9)	χ^2=0.06	1	.81
ADHD 50 mos[٭]	17 (13.5)	13 (11.3)	χ^2=0.26	1	.61
Behavioral Disorders 9 mos	6 (4.8)	5 (4.3)	χ^2=0.03	1	.87

	Bereaved (N=126)	Control (N=116)	Test	df$^\times$	P
Behavioral Disorders 21/33 mos	10 (7.9)	2 (1.7)	χ^2=4.95	1	.03
Behavioral Disorders 50 mos ●	4 (3.2)	0 (0.0)	FET	--	.12
Alcohol/Substance Abuse 9 mos	0 (0.0)	1 (0.9)	FET	--	.48
Alcohol/Substance Abuse 21/33 mos	9 (7.1)	1 (0.9)	FET	--	.02
Alcohol/Substance Abuse 50 mos ●	17 (13.5)	9 (7.8)	χ^2=2.01	1	.16
Functional Impairment 9 mos§	75.8 (12.5)	83.1 (9.0)	t=5.23	225.6	<.001
Functional Impairment 21/33 mos§	73.3 (13.0)	83.3 (8.4)	t=6.97	215.9	<.001
Self-Reported Symptoms, M (SD)					
Hopelessness 9 mos *	-0.02 (1.04)	-0.06 (1.01)	U=6779.00	--	.90
Hopelessness 21/33 mos *	0.28 (0.94)	0.08 (0.81)	U=6009.50	--	.09
Aggression 9 mos	72.1 (22.5)	66.4 (18.8)	t=-2.10	232	.04
Aggression 21/33 mos	75.7 (25.0)	67.4 (18.8)	t=-2.89	218.9	.004
Self-Esteem 9 mos	14.2 (6.1)	12.5 (5.2)	t=-2.31	233.4	.02
Self-Esteem 2	14.0 (6.1)	12.2 (4.6)	t=-2.70	219.7	.008
Adaptability/Cohesion 9 mos ◆	51.3 (9.5)	54.3 (8.2)	t=2.56	228	.01
Adaptability/Cohesion 21/33 mos ◆	52.1 (9.2)	56.7 (8.0)	t=4.08	232	<.001
Life Events 9 mos	12.9 (5.0)	10.7 (4.2)	t=-3.61	215.1	<.001
Life Events 21/33 mos	6.8 (2.6)	6.6 (2.6)	t=-0.75	187	.46
Negative Coping - Efficacy 9 mos *	-0.01 (1.0)	-0.05 (1.0)	U=4466.50	--	.71
Negative Coping - Efficacy 21/33 mos *	0.21 (1.0)	0.35 (1.0)	U=3715.00	--	.41
Adult Caregiver					
Pre-Death Variables – N (% Yes)					
History of Axis I Diagnosis	87 (71.9)	61 (54.0)	χ^2=8.07	1	.004
History of Axis II Diagnosis	2 (1.6)	3 (2.6)	FET	--	.68
Diagnoses – N (% Yes)					
Depression 9 mos	54 (43.9)	3 (2.9)	χ^2=49.94	1	<.001
Depression 21/33 mos	55 (44.7)	14 (13.9)	χ^2=24.77	1	<.001

	Bereaved (N=126)	Control (N=116)	Test	df$^{\times}$	P
Depression 50 mos ◆	33 (28.7)	5 (5.3)	χ^2=19.00	1	<.001
Anxiety 9 mos	26 (21.1)	7 (6.8)	χ^2=29.25	1	.002
Anxiety 21/33 mos	23 (18.7)	10 (9.9)	χ^2=3.42	1	.07
Anxiety 50 mos ◆	21 (18.3)	8 (8.5)	χ^2=4.12	1	.04
PTSD 9 mos	27 (22.0)	1 (1.0)	χ^2=22.73	1	<.001
PTSD 21/33 mos	23 (18.7)	0 (0.0)	χ^2=21.05	1	<.001
PTSD 50 mos ◆	18 (15.7)	0 (0.0)	χ^2=16.10	1	<.001
Bipolar Disorder 9 mos	5 (4.1)	0 (0.0)	FET	--	.07
Bipolar Disorder 21/33 mos	5 (4.1)	0 (0.0)	FET	--	.07
Bipolar Disorder 50 mos ◆	5 (4.3)	1 (1.1)	FET	--	.23
Alcohol/Substance Abuse 9 mos	9 (7.3)	5 (4.9)	χ^2=0.59	1	.44
Alcohol/Substance Abuse 21/33 mos	10 (8.1)	3 (3.0)	χ^2=2.70	1	.10
Alcohol/Substance Abuse 50 mos ◆	11 (9.6)	3 (3.2)	χ^2=3.36	1	.07
Functional Impairment 9 mos§§	74.3 (11.2)	83.6 (7.4)	t=7.37	210.0	<.001
Functional Impairment 21/33 mos§§	72.2 (11.7)	82.5 (8.0)	t=7.72	214.8	<.001
Proband					
History of Axis I Diagnosis	96 (76.2)	78 (67.8)	χ^2=2.10	1	.15
History of Axis II Diagnosis	29 (23.0)	1 (0.9)	χ^2=27.30	1	<.001

FET: Fisher's exact test. U: Mann-Whitney U. PTSD: Post-Traumatic Stress Disorder mos: Months since the death

$^{\times}$Degrees of freedom are non-integer when t-test with unequal variances is used following a significant Levene test for equality of variances.

[†]Six-months prior to baseline interview for controls.

°Measured by the Hollingshead's scale (Hollingshead, 1975)

•50 months corresponds to one year prior to fourth assessment.

§Measured by the Global Assessment Scale (Child and Adult Versions).

*Standardized score.

◆Family measure

[§§]Measured by the Global Assessment Scale (Adult Version)

Table 3

Developmental Competence.

	Control	Bereaved	Test	df	P	*d* (95% CI)
Status Questionnaire**						
Work performance (N=165)*a*	3.3 (0.8)	2.9 (1.1)	t=2.68	151.35	.008	0.42 (0.25, 0.65)
Romantic relationships (N=240)*a*	2.7 (1.1)	2.7 (1.1)	t=−0.35	238	.73	−0.05 (−0.25, 0.14)
Friendships (N=240)*a*	3.5 (0.8)	3.2 (0.8)	t=2.44	238	.02	0.32 (0.17, 0.45)
Educational success (N=239)*a*	3.3 (1.5)	3.3 (1.5)	t=−0.38	237	.70	−0.05 (−0.32, 0.22)
Career development (N=220)*a*	3.0 (1.2)	2.4 (1.2)	t=3.70	218	<.001	0.50 (0.27, 0.73)
Inventory of Peer Attachment						
Total Score (N=248)*b*	78.2 (9.0)	74.4 (10.1)	t=3.04	246	.003	0.39 (−1.25, 2.11)
Future Expectations						
Expectations (N=276)*c*	4.2 (0.9)	3.9 (1.2)	t=2.38	df=260.5	.02	0.29 (0.14, 0.48)
Degree of Certainty (N=276)*c*	5.8 (1.3)	5.7 (1.2)	t=0.90	df=272	.37	0.11 (−0.11, 0.32)

* *Interviewer's summary ratings. d: effect size (Cohen's d).* CI: Confidence Interval.

a α=0.05/5=0.01

b α=0.05

c α=0.05/2=.025

Multivariate Models.

Table 4

	β	SE	t	P	partial η^2	Adjusted R^2
Status Questionnaire - Work						
Bereaved	−0.35	0.15	−2.38	.02	0.05	
Age at time of parental death	−0.002	0.03	0.08	.94	<0.001	
Female	0.14	0.15	0.97	.33	0.008	15.8%
Caucasian	0.46	0.17	2.70	.008	0.06	
Proband Hx of Anxiety	−0.43	0.18	−2.46	.02	0.05	
Hx of Behavioral Disorders	−0.95	0.26	−3.71	<.001	0.11	
Status Questionnaire – Career						
Bereaved	−0.40	0.18	−2.24	.03	0.03	
Age at time of parental death	0.08	0.03	2.79	.006	0.05	
Female	0.28	0.16	1.73	.09	0.02	19.9%
Caucasian	0.65	0.19	3.55	.001	0.08	
Hx of Depression	−0.82	0.21	−3.93	<.001	0.10	
Hx of Behavioral Disorders	−0.92	0.38	−2.43	.02	0.04	
Inventory of Peer Attachment						
Bereaved	−3.35	1.23	−2.73	.007	0.04	
Age at time of parental death	0.12	0.19	0.62	.54	0.002	8.0%
Female	3.54	1.22	2.90	.004	0.05	
Caucasian	2.89	1.76	164	.10	0.02	
Future Expectations - Expectations						
Bereaved	0.12	0.13	0.92	.36	0.005	
Age at time of parental death	0.03	0.02	1.76	.08	0.02	
Female	0.35	0.11	3.08	.002	0.05	
Caucasian	0.16	0.16	1.00	.32	0.006	20.8%
Proband Mood Disorder	−0.45	0.13	−3.41	.001	0.06	
Proband Axis II	−0.80	0.24	−3.27	.001	0.06	
Adult Caretaker Axis II	0.69	0.21	3.22	.002	0.06	

	β	SE	t	P	partial η²	Adjusted R²
Hx of ADHD	−0.84	0.28	−3.01	.003	0.05	

SE: Standard Error. Hx: History. ADHD: Attention Deficit Hyperactivity Disorder