A Sibling Death in the Family: Common and Consequential

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Abstract

Although a large literature analyzes the determinants of child mortality and suggests policy and medical interventions aimed at its reduction, there is little existing analysis illuminating the consequences of child mortality for other family members. In particular, there is little evidence exploring the consequences of experiencing the death of a sibling on one's own development and transition to adulthood. This article examines the prevalence and consequences of experiencing a sibling death during one's childhood using two U.S. data sets. We show that even in a rich developed country, these experiences are quite common, affecting between 5 % and 8 % of the children with one or more siblings in our two data sets. We then show that these experiences are associated with important reductions in years of schooling as well as a broad range of adult socioeconomic outcomes. Our findings also suggest that sisters are far more affected than brothers and that the cause of death is an important factor in sibling effects. Overall, our findings point to important previously unexamined consequences of child mortality, adding to the societal costs associated with childhood mortality as well as suggesting additional benefits from policy and medical innovations aimed at curbing both such deaths and subsequent effects on family members.

Keywords

Child mortality; Education; Siblings

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Introduction

Each year, more than 50,000 children die in the United States (National Center for Health Statistics (NCHS) 2000), a death rate of 58.85 per 100,000 for infants through age 14 and 65.5 per 100,000 for infants through age 24 (Kochanek et al. 2011). Child death is a profound loss for parents, resulting in elevated rates of marital disruption as well as depression and health problems persisting decades after the child's death (Rogers et al. 2008; Song et al. 2010). Of course, this large number of child deaths each year also affects a larger number of siblings. Indeed, in the two samples used in this article, the prevalence of experiencing a sibling death before age 25 is nearly 8 % of the population, making it as common as other consequential childhood experiences, such as experiencing a maternal death (Jacobs and Bovasso 2009) or chronic health conditions (Perrin et al. 2007). The uniqueness and typical longevity associated with sibling ties suggest that this experience could substantially disrupt the life course trajectory for the surviving sibling.

Specifically, the sibling relationship constitutes the longest-lasting family tie, beginning with the birth of the younger sibling and ending with the death of one member of the sibling pair. Siblings share a common family heritage and, in the case of birth siblings, a common genetic background. Perhaps for this reason, the sibling relationship is normatively characterized as egalitarian, reciprocal, and mutual (Pollet and Hoben 2011). Siblings influence one another's development, not only in childhood but throughout the life course (Kramer and Kowal 2005). Such spillover effects include both positive influences (Schultheiss et al. 2002; Whiteman et al. 2007) and risks emanating from negative behaviors (e.g., substance abuse, teen pregnancy) (East and Khoo 2005; Rende et al. 2005).

With the large set of shared experiences and interconnected developmental trajectories, the loss of a sibling during childhood might be expected to result in increased risk of poor outcomes along a variety of dimensions. These impacts could emanate either from the direct effects of the loss of a close family member or from the indirect effects of persistent grief on the part of the parents. They could be tied to the experience of having a sibling with a significant disability that ultimately resulted in death or to the circumstances surrounding the death (e.g., long-term illness vs. sudden or violent death). Surprisingly, although experiencing the death of a sibling is a prevalent event and is theoretically important in affecting development, there is currently no demographic literature examining this phenomenon.

In this article, we examine the effects of experiencing the death of one's sibling early in life in terms of spillover effects on outcomes for young adults, specifically on the markers of adult status (i.e., educational attainment, employment, marital status and history, and coresidence with parents). We seek to ascertain whether such outcomes differ in young adults who have experienced sibling death, whether these effects differ by gender of the surviving sibling, and whether the circumstances surrounding the death influence or mitigate the life course of the surviving sibling.

Background Literature

Several disciplines have rich literatures exploring the complex relationships of siblings as they age as well as how these relationships are nested within families and are shaped by parents. Psychologists suggest that the sibling relationship offers important early opportunities for the development of emotional understanding, self-regulation, and a sense of belonging (Brody 2004). Siblings are play partners during childhood, but as siblings strive to establish their independence during adolescence and young adulthood, the quality of the sibling relationship becomes increasingly susceptible to change because of factors in the individual siblings' lives (Cicirelli 1995). The sibling relationship is affected not only by life course stage but also by gender, with females reporting greater intimacy in sibling relationships than males and same-sex dyads being closer than male–female sibling pairs (Kim et al. 2006). These findings suggest potentially substantial negative effects of experiencing a sibling death and also suggest potential heterogeneity in the effects based on gender.

The psychological literature offers a conceptual model for understanding bereavement effects (Stroebe et al. 2006). Bereavement is conceptualized as a stressor that produces two types of demands: loss-oriented demands, such as experiencing the negative emotions associated with grief; and restoration-oriented demands, which are life changes that are consequences of the death. Coping with bereavement involves oscillating between these two types of demands and focusing on everyday life experiences. The outcomes of bereavement are the changes in functioning that result from the multiple demands of bereavement in relation to the available resources and risks for the individual in coping with those demands.

Although experiencing the death of a sibling may influence adult outcomes through bereavement, which has been shown to result in emotional loneliness and even suicidal ideation (Stroebe et al. 2005), a second channel exists through the reactions of their parents to the death. Siblings experience their parents' grief, which likely affects them. Intertwined with grief, the health consequences for parents are broad and often chronic. For example, past research has shown that parents are at risk of psychiatric hospitalization following the death of a child (Li et al. 2005); increased risk of cancer (Levav et al. 2000); elevated mortality (Li et al. 2003); and prolonged grief that lasts indefinitely (Klass 1999; Rogers et al. 2008). Each of these impacts may have secondary effects on surviving siblings. The specific cause of death may have a differential effect on siblings: death in violent circumstances (accidents, suicide, homicide) has been shown to have particularly negative effects on parents as compared with death attributable to medical causes (Keesee et al. 2008; Song et al. 2010; Wijngaards-de Meij et al. 2005), and the cause of death likely directly and indirectly (through parental reaction) affects sibling adaptation.

Within the economics literature, the primary relevant literature for our study is research exploring parents' fertility and child-investment decisions. Specifically, parents often shape sibling relationships indirectly in a variety of ways, such as through fertility choices, often described by a decision involving a child "quality-quantity trade-off" (Becker and Lewis 1973). That is, parents choose how many children to have by weighing the outcomes of quality (more human capital) or quantity (greater numbers of children). Siblings, then, are

thought to vie for parents' time and attention, while parents provide both material goods and emotional support to children. When a larger number of siblings are present, resources are distributed over a greater number, so there are likely fewer resources available per child. In contrast, siblings also contribute to one another's development and emotional stability. Therefore, if a child dies, there is likely to be less emotional support from the parents because of their own response and needs, even if the material resources to surviving children increase. And material resources might themselves decline because of either less work effort by parents or high expenditures tied to illnesses. Thus, predicting the effect of a child's death on surviving siblings is theoretically ambiguous: we would expect less competition for parental inputs on one hand, but we would also expect reduced parental inputs (because of grief) and the disappearance of positive inputs from the deceased sibling (Becker and Lewis 1973; Rosenzweig and Zhang 2009).

To date, relatively little research has examined how a surviving sibling is affected by the death of a brother or a sister. Most existing research is based on clinical cases or convenience samples: namely, samples that are based on death from a specific disease (e.g., cancer) or samples without a control or comparison group. Most studies also examine impacts of sibling death over a relatively short period of time (see Cicirelli (1995) for a review).

Although a few studies focusing on sibling death attributable to cancer show some positive effects of sibling death on surviving siblings, such as improving coping ability or maturity (e.g., Martinson and Campos 1991), most studies show negative effects, such as feeling sad, lonely, frightened, and angry; experiencing guilt, anxiety, depression, high-intensity grief symptomatology, somatic complaints, and sleeping difficulties; and fear of intimacy with others (Fanos and Nickerson 1991; McCown 1984; Rosen 1984).

A literature that has focused on the effects of having a sibling with a disability is also informative for our investigation. The literature examining sibling pairs in which one member has a developmental disability or mental illness suggests several aspects of the sibling tie that might be atypical (Taylor et al. 2008), including less genetic and experiential similarity between members of the sibling pair, less egalitarianism and reciprocal exchange in the relationship, and unequal amounts of attention from parents.

Growing up with a sibling who has a developmental disability produces mixed consequences, including small but statistically significant elevations in depression, anxiety, and internalizing and externalizing behaviors (Rossiter and Sharpe 2001), but also higher levels of conscientiousness and helpful behaviors than siblings of nondisabled brothers and sisters (Cuskelly and Gunn 2003). In contrast, siblings of individuals with mental illness show substantially elevated rates of depression and neuroticism and lower levels of cooperativeness and extraversion than controls (Farmer et al. 2003; Masi et al. 2003). Importantly, these effects persist across the life course (Taylor et al. 2008).

The economics literature has investigated complementary questions, with a focus on the effects of having a child with a disability on parental decisions (rather than sibling outcomes). Usually, the focus of the analysis has been on either the mother's time allocation

(in particular, work participation) or family resources. In general, the literature has found a decrease in labor force participation, and hence family income, but what these results may imply for a healthy sibling with a disabled sibling is not clear: the results suggest that fewer material resources are available but that perhaps more parental time is available for the healthy sibling (Gould 2004; Burton and Phipps 2009).

Based on the theoretical and empirical literatures in these disciplines as well as the related investigations exploring the effects of the presence of a disabled sibling, the goal of the present study is to examine the effect of sibling death on surviving young adult brothers and sisters. Our underlying model is that (1) parents experience grief that creates a variety of responses but results in less effective positive attention to the surviving sibling; (2) the surviving sibling experiences his/her own grief or emotional toll that may create a variety of negative (or in some cases positive) responses, such as helping his/her parents through grief; (3) in many cases, the family experiences a decline in financial resources attributable to medical and other care bills and lost time at work; and (4) although a reduction in family financial resources occurs frequently, there could also be less competition for these resources because of the decrease in family size, suggesting little change in material resources available to the surviving children.

In this study, we first analyze whether families in which a child dies differ systematically from those who do not experience this event. That is, we examine predictors of sibling death to confirm either that these families do not differ substantially from others in observable ways or to learn in which ways they do differ. After exploring this, we then focus on our main topic of interest: the influence of experiencing a sibling death on adult outcomes, such as educational attainment, occupational success, marital history, residential independence, and other life outcomes. In this research, we control for factors that may influence young adult outcomes and that also may covary with the probability of sibling death, such as family socioeconomic status (SES) and family structural factors (e.g., birth order and size of sibship). We also explore the role of gender to determine whether surviving brothers and sisters are differentially affected by sibling death during their young adult years. We hypothesize greater effects on sisters than brothers, based on prior research that suggested that sisters experience greater intimacy in the sibling relationship.

Data Summary

In our research, we use two panel data sets—the National Longitudinal Study of Adolescent Health (Add Health) and the Wisconsin Longitudinal Study (WLS)—in order to take advantage of differing strengths of each of these data sets and to offset limitations as well. Briefly, Add Health data allow us to explore a large number of outcomes, while the WLS permits us to explore whether the cause of death matters.

Add Health was originally fielded as a school-based, longitudinal study of the health-related behaviors of adolescents and their outcomes in young adulthood. Beginning with an in-school questionnaire administered to a nationally representative sample of students in grades 7–12 in 1994–1995 (Wave 1), the study follows up with a series of in-home interviews of respondents approximately 1 year (Wave 2; 1996), 6 years (Wave 3; 2001–2002), and 13

years (Wave 4; 2008) later. By design, the Add Health survey included a sample stratified by region, urbanicity, school type, ethnic mix, and size.[1]

The original Wave 1 sample collected information on more than 20,000 respondents, and approximately 15,000 have been followed longitudinally to Wave 4. In Wave 4, the respondents were asked two questions regarding their experiences with sibling deaths. As a follow-up to a question asking the number of siblings each respondent has,[2] individuals were asked how many siblings had died. Of the 15,701 respondents, 664 (4 %) reported no siblings. Of the remainder, nearly 1,300 (8 %) reported having experienced the death of at least one sibling, and 1 % reported the death of more than one sibling. We omit individuals who reported in Wave 1 being an only child (from the same biological parents), which leaves us with a sample of approximately 12,900 individuals. A follow-up question also asked the year that each sibling died, although Add Health contains no information on the cause of death. Because Wave 4 is the first wave in which all respondents were queried about experiences with sibling death, we are unable to examine issues of sample attrition related to sibling death in Add Health. However, researchers at the University of North Carolina at Chapel Hill have investigated the potential magnitude of nonresponse bias at Wave 4 and have shown minimal bias (< 1 %) along a large set of determinants of sample attrition (Brownstein et al. 2010).

In addition to having our primary independent variable, Add Health also includes a large set of health and background characteristics of each individual, such as race, gender, age, parent education, marital status, and income. Our primary dependent variables of interest include a broad set of young adult outcomes, such as education attainment and academic performance, marital status, living arrangements and fertility, and labor market participation and earnings. Table 1 presents summary descriptive statistics from the analysis sample[3] and separately for respondents who experienced the death of a sibling by Wave 4 and those who did not. Seven percent[4] (771) of this sample had experienced the death of a sibling by the fourth wave. In terms of outcomes as adults based on the fourth-wave data, average years of schooling were 14.46, with only a 5 % dropout rate and a college attendance rate of 79 %.[5] Sixteen percent of the sample still lived with their parents by the fourth wave (when average age is 29), 51 % had been married at least once, and 4 % were divorced (not conditional on ever being married). Eight percent had had a teenage pregnancy, and 81 % were currently employed (measured as working 10+ hours in the week prior to the interview). Looking at these outcomes based on whether a child had experienced the death of a sibling, we show that those who experienced such a death had fewer years of schooling, had a higher rate of dropping out, were less likely to attend college, and had a higher rate of teenage

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[1]See Udry (2003) for a full description of the Add Health data set.
[2]"How many brothers and sisters do you have, both living and deceased? Include biologically related, adoptive, and step-brothers or -sisters."
[3]In both our WLS analysis and the Add Health sample, we focus on "well children" as the focal individual and exclude those who have a developmental disability or major mental illness in order to isolate the influence of the death of a sibling. Were we to include surviving children with a disability, we would not fully know the causal factors in their adult outcomes.
[4]The number of sibling deaths is reduced from the full sample because we focus attention on deaths of biological siblings.
[5]Although this is a nationally representative sample of 7th- to 12th-graders from 1994–1995, because the data were collected at schools rather than households, this sample contains fewer dropouts than samples drawn from households. College attendance includes any postsecondary school attendance, including vocational schools and two-year colleges.

pregnancies. For other outcomes (e.g., marital status, employment, and coresidence with parents), we observe little or no difference in these descriptive statistics.

We also use the Wisconsin Longitudinal Study (WLS) in this study. The WLS is a random sample of 10,317 women and men who graduated from Wisconsin high schools in 1957 (Hauser and Roan 2006). Follow-up surveys were conducted in 1975 (9,138 (90.1 %) surviving members of the original sample), in 1992 (8,493 (87.2 %) of the surviving original respondents), and again in 2004 (7,265 (80.0 %) of the surviving respondents). Family background data in 1957 and high school IQ scores are available for the respondents. Data from three of the four surveys (1957, 1975, and 2004) were used in the present analyses. Most respondents were white, reflective of Wisconsin's population in the mid-twentieth century.

Respondents were asked questions regarding the mortality status of their children and whether any of their children had developmental disabilities or serious mental health problems. Specifically, developmental disability (DD) and mental illness (MI) of the children are identified through a series of 31 screener questions asked of all parents during the 2004 survey.[6] We eliminate surviving siblings with an identified developmental disability (e.g., Down syndrome, autism spectrum disorder, cerebral palsy, and specific genetic conditions) or major mental illness (schizophrenia, bipolar disorder, or major depression) because individuals with DD or MI are likely to influence their own outcomes and only a small number who have experienced the death of a sibling also have one of these conditions.[7] Those with other (less major) disabling conditions are included in the analysis.[8]

To examine the effects of sibling death on the adulthood outcomes of bereaved siblings and nondisabled healthy siblings who served as the comparison group, we analyze data for WLS respondents' adult children who were aged 25 and older in 2004 for families that had two or more children. In particular, we study 850 surviving adult children of WLS respondents who, before they reached 25 years of age, experienced the death of sibling and 17,342 adult children of WLS respondents who had only healthy living siblings.[9] In Table 2, we present descriptive WLS data for the entire sample, and separately for those who experienced the death of a sibling and those with only surviving siblings. Overall years of schooling is nearly identical to that for the Add Health data (14.33 for the WLS and 14.28 for Add Health); here again, children with a sibling who died tend to have less schooling than others in the sample. Other differences are small, consistent with the Add Health data set. A greater proportion of the WLS sample is employed (90 % WLS vs. 79 % Add Health), and fewer coreside with

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[6]The screener questions began by asking parents whether any of their children (living or deceased) had an intellectual or a developmental disability, or a severe mental illness, and then the specific diagnosis. In the few cases in which parents did not know the specific diagnosis given to their child, they did indicate that their child had disabilities; branching follow-up questions were asked to confirm the validity of the designation of having a DD or major MI (available from authors).

[7]Note that this information is not available in the Add Health data.

[8]One might argue against including any individual with a disability in the analysis. We do not do this because some of these conditions are temporary, may be the result of experiencing a sibling death (e.g., depressive symptoms), and are also likely unreported if they occur during years in which there is no survey. We thus include everyone unless they have an identified DD or major MI but do add a control for other disabilities when reported.

[9]We explored the issue of selective attrition in WLS by comparing attrition of those who had experienced a child's death by 1992 with those who had not. For the 2004 sample, 83.5 % of those who had experienced a child's death are included in the sample compared with 83.1 % of those who had not, thus providing evidence that there is no selective attrition according to experiencing the death of a child.

their parents. Both of these likely reflect the generally older age of the WLS sample (approximately 38 years old for WLS and 29 years old for Add Health).

Before turning to our analysis of the influence of having a sibling who died before an individual was age 25 on a set of outcomes, we comment on whether the families who have a child who died as a young person are systematically different from other families. That is, we address the question of selectivity. The regressions for both data sets for this are in Tables 8 and 9 in the appendix.[10] The results are consistent and tell a simple story: in terms of observable family and parental background characteristics, families who lost one of their children have few systematic observable differences compared with other families. The exception is a suggestion that those of higher SES (as captured by grandparents' occupational SES in 1957 in the WLS and by family income in Add Health) are slightly less likely to experience such a death. Therefore, in the estimates of the influence of a sibling death on surviving siblings, we include measures of family SES in the equations.

Empirical Approach

Our goal in this article is to identify the likely influence of experiencing a sibling's death during one's formative years on a set of adult outcomes. More specifically, we use our two samples, in which we limit our sample to those who had one or more siblings, to explore whether the death of a sibling during one's formative years (up to age 25) influenced a set of outcomes, such as one's years of schooling. In doing so, we control for other factors that are likely to influence such outcomes but do not include factors that themselves are endogenous —that is, outcomes that reflect or may result from the response of the family to the death of the sibling or child in the family.

The key variable of interest is whether this surviving young adult, during his or her formative years, had a sibling who died. We estimate our results separately by the sex of the surviving sibling under the expectation that sisters may be more sensitive and thus experience greater effects on outcomes. For control variables, we include personal characteristics of the surviving sibling, such as race (indicator variables for black and Hispanic in Add Health), whether the surviving child is adopted, the surviving child's birth order, and the surviving child's current age. We also include whether the surviving child is Catholic as well as information on the mother of the family, including whether she gave birth as a teenager and her age at the birth of the surviving child. In addition, as noted earlier, we control for the education of both the mother and the father. All these variables are available for both data sets. All results are based on standard linear regression analysis for continuous outcomes and logistic regressions for binary variables.

In addition, for the WLS sample, we have some information about the grandparents as well as details on the age and sex of the child who is deceased. Thus, for the WLS sample, we add variables for grandparents' income, parents' IQ (measured during high school), whether the deceased sibling was the same sex as the surviving sibling, and whether the surviving

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[10]To investigate the predictors of death of children, we analyzed the data of WLS respondents who had at least one child and completed the 2004 survey; for Add Health, we analyzed the sample of individuals who completed the Wave 4 survey, when the mortality status of siblings was asked.

sibling is older than the deceased sibling. These variables should permit us to ask whether particular characteristics of a sibling who died make a difference to the surviving child. In addition, we control for whether there is any sibling with a disability that is not a developmental disability or major mental illness.[11]

Table 3 reports the estimates for the determinants of years of schooling for both samples by sisters and brothers. This table also serves the purpose of making clear our specification of the regressions we estimate for our two data sets—both the variables in common and those unique to each one.

The first result to note is that experiencing the death of a sibling while in one's formative years has a negative influence on one's own years of schooling. This is the case for both sisters and brothers and is found for both data sets. The influence is greater for sisters than brothers, as hypothesized. Somewhat surprisingly, the influence is greater for those in the younger Add Health sample than siblings in the WLS sample. For sisters in Add Health, experiencing the death of a sibling while in one's formative years is estimated to reduce years of schooling by about half a year, a rather large reduction in schooling; for brothers, the influence is slightly less than a third of a year of schooling, or about one-half the influence on sisters. Sisters in the WLS experience a decrease in years of schooling of about a quarter of a year. Brothers in the WLS experience nearly as much a reduction, but for them, the estimate is not quite statistically significant at standard levels. Thus, a clear and substantial reduction in years of schooling is seen in response to the death of a sibling, and this effect is far larger for surviving sisters than brothers. We report a test of differences in the effect by gender at the bottom of each table, in upcoming tables beginning with Table 4.

We also find that adopted children have less schooling than their siblings—about 0.6, or nearly two-thirds of a year less across gender and data sets. We also find that those siblings who are Catholic tend to receive more schooling, especially if they are sons. Those born earlier in the birth order tend to receive more schooling, another result consistent across gender and data sets (although the difference is more pronounced in the older WLS sample). In terms of mother's childbearing, we find that children of mothers who first gave birth as a teenager tend to have less schooling and that children born to older mothers tend to receive more schooling. This seems especially true for children in the younger data set (Add Health). Again, this pattern seems consistent with existing literature on patterns of schooling.[12] Daughters of mothers with more schooling tend to get more schooling, and this effect is consistent across the two data sets; their sons also obtain more schooling, although in this case, the influence seems larger for the older cohort of the WLS. All children with fathers with more schooling receive more schooling; here, the influence is greater for the older WLS cohort and slightly larger for sons than daughters.

Turning to those variables included for only one data set, we again find expected patterns. Children in African American families have less schooling than other young adults; in this case, the difference is far greater for boys than girls. Of the variables unique to the WLS,

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[11]Recall that those with identified DD and MI are excluded from the analysis.
[12]The only result that differs substantially across the two data sets is own age, but this may reflect a wider disparity in ages in WLS.

only parental IQ is statistically significant and suggests (as expected) that children of parents with higher IQs tend to get more schooling.[13]

Our conclusions from these estimates are that experiencing sibling death seems to significantly reduce years of schooling (human capital), that the influence is greater for sisters than brothers, and that (based on the WLS–Add Health comparison) it may be increasing rather than decreasing in younger cohorts.

We turn now to ask whether additional outcomes are influenced by experiencing the death of a sibling. In those reported in the next section, we discuss only the influence of experiencing the death: that is, we discuss only the coefficient and significance of the indicator of the death of a sibling. The specification for all these equations in terms of control variables is the same as that reported for years of schooling above and in Table 3.

Full Results

Beginning with the WLS results, we are able to evaluate only the influence on the surviving sibling (in addition to years of schooling) on marital status, including whether, in 2004, the surviving sibling was currently married, had never-married, or was divorced. The average age of the sample was 38 as of 2004. We also analyze whether the sibling coresides with his or her parents, an unlikely status for individuals of this age group. In terms of labor force outcomes, we know only whether the surviving sibling is employed; unfortunately, we do not know type of employment, hours worked, or earnings.

The only statistically significant influence of having experienced a sibling death on these outcomes is for years of schooling (see earlier discussion). The differential effects by gender are not statistically significant. No other outcomes are statistically significant for individuals who experienced a sibling death, although there is a suggestion (significant at the 10 % level only) that sisters who had this experience are less likely to be currently married and more likely to be never-married. These results are reported in Table 4.

Turning to the Add Health findings, we begin our discussion of the influence of experiencing a sibling death on a surviving sibling with those outcomes that are also in the WLS. Here we find similar results as for the WLS sample: a strong and statistically significant influence is apparent only for years of schooling. In this set of outcomes, the differential effects based on gender are statistically significant only in the case of years of schooling. Results are reported in Table 5.

When we turn to the other outcomes of interest that we can measure only in the Add Health data, which include additional measures of human capital (dropping out of high school, attending college, test scores, and earnings), we find strong influences of experiencing the death of a sibling (see Table 6). For sisters, we find an increase in the probability of dropping out of high school and a decrease in the probability of attending college. We also find evidence of achieving lower test scores while in high school for both brothers and

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[13]The WLS contains information about the high school IQ score of the respondent (i.e., the parent of the child who died and his or her surviving sibling(s)). Thus, this variable reflects the IQ score of the parent who participated in the WLS.

sisters.[14] Sisters also appear to have far lower earnings if they experienced the death of a sibling—nearly 20 % lower compared with the overall average of approximately $30,000.

Sisters also appear influenced in other ways by their sibling's death. They are more likely to be on a social program (such as food stamps, welfare, or public housing),[15] to be idle (defined as not working more than 10 hours per week, attending school, or raising a child), and to have been pregnant as a teen. This picture is consistent with lower human capital, less work effort, and lower expectations in general. For several of these outcomes (college, social program participation, and being idle), the results are significantly different for brothers and sisters. Brothers appear to have lower test scores whether measured at Waves 1 or 3; in both cases, the marginal effects reported suggest a stronger reduction tied to the death of a sibling than for sisters, although the test for differences across sex is not statistically significant.

Thus, the picture that emerges from our analysis is one in which experiencing the death of a sibling has clear and substantial detrimental effects on the surviving sibling in terms of multiple dimensions of human capital, including test scores while in school, years of schooling, and labor market earnings. It is clearly an experience that appears to have lifelong implications, and the effects are much more pervasive for surviving sisters than for brothers.

Does the Cause of Death Matter?

The WLS has the advantage of providing data on cause of death. Parents reported the cause of their child's death and confirming data were obtained from the National Death Index (NDI). We used parents' report as the primary data source to identify the cause of child death. If the parents' report on the cause of death was missing or unclear, information from the NDI was used. If neither source of information is available, the case is dropped from this analysis. Prior analysis examined the concordance between parent report in the WLS and the NDI and found high levels of agreement (78 % exact matches; Rogers et al. 2008). We classify causes of death into four categories: infant death, accident or suicide, sudden illness, and long-term illness, based on prior research by Song and colleagues (2010).[16]

Table 7 presents our results on cause of death for the outcomes available in the WLS. For sisters, the results suggest that having a sibling die from a sudden illness has the strongest influence. The sisters whose sibling died from a sudden illness have, on average, nearly two-thirds of a year less schooling and are far more likely to coreside with their parents (as of 2004, at approximately age 39). There is also a suggestion that they may be somewhat more likely to be in the labor force and working. However, sisters are also influenced by death of a sibling for other reasons. If their sibling died in infancy, they are less likely to be married

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[14]The Add Health Picture Vocabulary Test (AHPVT) is a computerized, abridged version of the Peabody Picture Vocabulary Test-Revised (PPVT-R). The AHPVT is a test of hearing vocabulary, designed for persons aged 2.5 to 40 years old who can see and hear reasonably well and who understand standard English to some degree. The test scores are standardized by age. Some psychologists interpret PVT scores as a measure of verbal IQ. Information on the test is provided online (http://www.cpc.unc.edu/projects/addhealth/files/w3cdbk/w3doc.zip).

[15]The question asks, "Between {1995/2002} and {2006/2007/2008}, did you or others in your household receive any public assistance, welfare payments, or food stamps?"

[16]The data would allow us to separate accidents from suicide, but because parents may report a suicide as an accident, we chose to combine them.

(perhaps avoiding having children of their own); if their sibling died because of a long-term illness, they are more likely to be never-married. Thus, when we are able to include the cause of a sibling death, we find far more influences on sisters than if we know simply that a sibling died.

As noted earlier, for brothers, our evidence suggests a weaker influence of experiencing a sibling's death than for sisters. Among brothers, having a sibling die from an accident or suicide seems to have the greatest influence on our measurable outcomes. In particular, these brothers have more than one-third year less schooling, on average. No other cause of their sibling's death seems to have a significant effect on brothers.

Thus, our analysis of the differential causes of a sibling's death suggests that cause does matter. The results also suggest once again that the experience has far stronger effects on the surviving sister.

Discussion

This article presents what we believe is the first evidence in the literature exploring the effects of experiencing a sibling death during childhood on own socioeconomic outcomes in adulthood. We use two complementary data sets that both provide a common set of results as well as allow us to explore a large set of outcomes (Add Health) and examine the effects of specific causes of the sibling's death (WLS). Our analysis points to several new and important findings. First, using two large data sets, we show that experiencing the death of a sibling during childhood and early adulthood is a common phenomenon. Approximately 7 % of young adults in our nationally representative data (Add Health) reported this experience, which is mirrored in the more than 5 % who reported this experience in the representative data from Wisconsin. Thus, this experience is similar to many other important processes that have been the subject of researchers' attention, such as experiencing a maternal death during childhood (6.5 %) (Jacobs and Bovasso 2000, 2009); the prevalence of ADHD during childhood (~5 %) (Fletcher 2010); and the prevalence of childhood limitations of usual daily activities (7 %) (Perrin et al. 2007).

A second important finding of this article is the replicated negative effect of experiencing the death of a sibling on adult socioeconomic outcomes, particularly years of schooling. The estimates of 0.23 to 0.52 years of schooling reduction are quite large and are bolstered by the Add Health findings that these effects are found along multiple margins, such as high school dropout rates, college attendance, and test scores, all suggesting broad reductions in human capital. We also show these impacts are subsequently found in related outcomes, such as earnings, receipt of social assistance, and teen pregnancy rates.

A third important finding of this article is the stark gender difference in effects: sisters are far more affected than brothers in terms of more-severe reductions in human capital, residential/family status, and socioeconomic outcomes after experiencing a sibling death during childhood. This finding is both consistent with past research revealing that sisters form stronger bonds with siblings and also suggests an unequal family burden along many margins, such as caring for the emotional needs of surviving parents.

A fourth finding is the importance of cause of death in explaining effects on the surviving sibling. We interpret this heterogeneity as reflecting differences in the surviving sibling's own bereavement, perhaps reflecting both the immediacy of the loss and the strength of the bond with the deceased sibling; it may also be influenced by the bereavement experience of the parents. These effects are then found in a variety of family formation decisions during adulthood of the surviving sisters, such as coresiding with parents, delaying entry into a marriage, and choosing not to have children as a teenager.

Together, these effects suggest a divergent pattern of transition to adulthood following the experience of sibling death with respect to educational attainment, establishing an independent residence, marriage, employment, and fertility. Although we focus here on these sociodemographic outcomes, an important unanswered question concerned the underlying processes or mechanisms that account for these divergent patterns. Neither Add Health nor WLS include relevant data, but past clinical observations (e.g., Bank and Kahn 1997) and clinical research suggest three possible mechanisms. First, there is the direct effect of the surviving sibling's own grief, which has been shown in various studies to be associated with elevated levels of depression, aggressive behavior, social withdrawal, eating disorders, and behavior problems (Birenbaum et al. 1989–1990; Davies 1995; Hutton and Bradley 1994; McCown and Davies 1995). These emotional and behavioral problems could directly interfere with school achievement and employment, and reduce marriage prospects. Second, parental grief may disrupt effective parenting both in the short-term and long run, change the relationship between the parent and the surviving child, and change the home environment (Dyregrov and Dyregrov 1999; Horsley and Patterson 2006; Packman et al. 2006; Pantke and Slade 2006), which in turn may exacerbate the direct effects of grief experienced by the surviving sibling. Third, surviving siblings may experience an existential crisis in which they question the meaning of life, fear that they too might die, or lose religious faith (Lohan and Murphy 2002), which might dampen achievement motivation. These clinical studies were based on small nonrepresentative samples, so future research is needed to directly examine the link between psychosocial mechanisms and the sociodemographic patterns that we documented in this study.

Although our findings are new and important in understanding the full consequences of childhood death as well as the determinants of divergent transitions into adulthood, they also represent a first step in this direction of research. Several limitations should be considered when viewing the results. The nationally representative Add Health data do not include cause-of-death information nor any information on the characteristics of the deceased sibling. The WLS data overcome these shortcomings but have the limitations of characterizing the population from a single state and single age cohort and having somewhat limited data on outcomes of interest. In each case, these limitations can be overcome through future data collection. In the meantime, we use the strengths of each to make a preliminary sketch of the likely importance of this understudied research question. We find consistent evidence that the experience of a death of a sibling during childhood is quite common and consequential for a number of important outcomes during the transition into adulthood for the surviving siblings, especially for sisters.

Acknowledgements

Appendix

Table 8

Predictors of sibling death for the WLS sample

Outcome	Sibling Death
Grandfather's Occupational SES (1957)	-0.005^{*} (0.002)
Grandfather's Education (1957)	$-0.002^{\dagger}$ (0.001)
Grandfather's Income (1957) (1,000)	-0.0002 (0.001)
Parent Grew Up With Problem Drinker	0.007 (0.009)
Catholic (1957)	0.007 (0.007)
Parent IQ (1957)	0.0003 (0.0003)
Area in Which Parent Grew Up (1957)	-0.006
Rural	(0.008)
Urban	0.006 (0.009)
Other (omitted)	—
Mother's Age at the Deceased Sibling's Birth	-0.004^{**} (0.001)
Parent Planned to Go to College (1957)	-0.006 (0.009)
Parent Had Marriage Plan Influencing the Future (1957)	$.037^{**}$ (0.009)
Sibling With Developmental Disability in the Family	0.077^{**} (0.017)
Sibling With Mental Illness in the Family	0.045^{**} (0.017)
Deceased Sibling Was Adopted Child	-0.052^{*} (0.024)
Number of Observations	6,802

Note: Logistic equation reporting marginal effects.

$^{\dagger}p < .10;$

$^{*}p < .05;$

$^{**}p < .001$

Table 9

Predictors of sibling death for the Add Health sample

Outcome	Sibling Death
Black	0.08 (0.006)
Hispanic	-0.01 (0.008)
Other Race	-0.008 (0.009)

Outcome	Sibling Death
Maternal Age at Child's Birth	0.002[**] (0.000)
Mother Had a Teen Birth	0.01 (0.007)
Maternal Age at Child's Birth Missing	0.003 (0.006)
Catholic	−0.012[*] (0.006)
Missing Family Information	0.004 (0.005)
Parent Poor Health	0.01 (0.006)
Parent Alcoholic	0.006 (0.006)
Number of Siblings	0.014[**] (0.001)
Paternal Education	−0.001 (0.001)
Maternal Education	−0.002 (0.001)
Income (10,000 $)	−0.006[**] (0.002)
Missing Family Information 2	0.01[†] (0.005)
Sibling Developmental Disability	−0.013 (0.009)
Constant	−0.185 (0.021)
Number of Observations	12,825

Note: Logistic equation reporting marginal effects.

[†] $p < .10$;

[*] $p < .05$;

[**] $p < .001$

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Table 1

Add Health descriptive statistics

Variable	Wave	Full Sample		Death of Sibling		No Death of Sibling	
		Mean	SD	Mean	SD	Mean	SD
Education	4	14.46	2.06	13.84	1.94	14.50	2.07
Dropout	4	0.05	0.22	0.10	0.30	0.05	0.22
College	4	0.79	0.41	0.70	0.46	0.80	0.40
Test Score	3	102	15.61	97	17.63	102	15.39
Test Score	1	101	14.35	97	15.09	102	14.24
Ever-Married	4	0.51	0.50	0.51	0.50	0.51	0.50
Divorced	3	0.02	0.14	0.03	0.16	0.02	0.13
Divorced	4	0.04	0.18	0.04	0.19	0.04	0.18
Live With Parents	3	0.40	0.49	0.36	0.48	0.40	0.49
Live With Parents	4	0.16	0.36	0.18	0.38	0.15	0.36
Teenage Pregnancy	4	0.08	0.26	0.12	0.32	0.07	0.26
Earnings	4	36,955	45,453	32,122	48,640	37,334	45,202
Employment	4	0.81	0.40	0.78	0.42	0.81	0.39
Social Program Participation	4	0.21	0.41	0.31	0.46	0.20	0.40
Idle	3	0.12	0.32	0.18	0.38	0.11	0.32
Sibling Death	4	0.07	0.26	1.00	0.00	0.00	0.00
Age Sibling Died	4	9.45	10.82	9.45	10.82		
Age	1	16	1.74	16	1.76	16	1.73
Age	4	29	1.75	29	1.76	29	1.75
Male	All	0.45	0.50	0.39	0.49	0.46	0.50
Black	All	0.21	0.41	0.31	0.46	0.20	0.40
Hispanic	All	0.17	0.38	0.18	0.38	0.17	0.37
Other Race	All	0.08	0.28	0.08	0.27	0.08	0.28
Birth Order	All	2.00	1.24	2.57	1.89	1.96	1.16
Adopted	3	0.02	0.14	0.03	0.18	0.02	0.14
Adopted Missing	3	0.16	0.37	0.16	0.37	0.16	0.37
Maternal Age at Child's Birth	1	24	4.58	24	5.30	24	4.52

Variable	Wave	Full Sample		Death of Sibling		No Death of Sibling	
		Mean	SD	Mean	SD	Mean	SD
Mother Had Teen Birth	1	0.12	0.33	0.13	0.34	0.12	0.32
Mother's Age at Child's Birth Missing	1	0.15	0.35	0.19	0.40	0.14	0.35
Catholic	1	0.27	0.44	0.22	0.41	0.28	0.45
Missing Family Information	1	0.37	0.48	0.45	0.50	0.36	0.48
Number of Siblings	4	3.03	2.27	5.17	3.42	2.86	2.06
Paternal Education	1	13.28	2.38	12.83	2.30	13.31	2.38
Maternal Education	1	13.20	2.32	12.71	2.35	13.24	2.32
Family Income (equiv. scale)	1	2.19	1.84	1.76	1.19	2.22	1.87
Missing Family Information 2	1	0.20	0.40	0.26	0.44	0.19	0.39
Parent Poor Health	1	0.11	0.31	0.16	0.37	0.10	0.31
Alcoholic Parent	1	0.14	0.32	0.18	0.34	0.14	0.31
Developmentally Disabled	1	0.00	0.00	0.00	0.00	0.00	0.00
Sibling Developmentally Disabled	1	0.05	0.21	0.05	0.21	0.05	0.21
		N = [8,774; 10,820]		N = [611; 771]		N = [8,156; 10,039]	

Table 2

WLS descriptive statistics

Variable	Full Sample		Death of Sibling		No Death of Sibling	
	Mean	SD	Mean	SD	Mean	SD
Education (2004)	14.33	2.31	13.83	2.35	14.36	2.30
Married (2004)	.70	.46	.68	.47	.70	.46
Never-Married (2004)	.18	.38	.18	.40	.18	.38
Divorced (2004)	.12	.32	.13	.34	.12	.32
Employment (2004)	.90	.30	.91	.32	.90	.30
Live With Parents (2004)	.03	.16	.03	.15	.03	.16
Age	37.89	4.70	38.49	4.94	37.86	4.68
Adopted	.03	.18	.03	.20	.03	.18
Birth Order	2.44	1.44	2.89	1.73	2.42	1.41
Same Gender as Deceased Child	.63	.48	.48	.49	.63	.48
Older Than Deceased Child	.48	.50	.52	.50	.48	.50
Grandparent's Income (1957)	6,400	6,457	6,139	5,011	6,413	6,534
Grandfather's Occupational SES (1957)	34.49	23.16	31.82	21.98	34.62	23.21
Grandfather's Education (1957)	9.71	3.39	9.28	3.28	9.73	3.39
Parent Grew Up With Problem Drinker	.19	.39	.20	.40	.19	.39
Area in Which Parent Grew Up (1957)						
Rural	.31	.46	.30	.46	.31	.46
Urban	.24	.42	.27	.44	.23	.42
Maternal Age at the Deceased Sibling's Birth	25.11	4.07	24.76	4.19	25.12	4.06
Parent Planned to Go to College (1957)	.74	.44	.69	.46	.75	.43
Parent Had Marriage Plan Influencing the Future (1957)	.14	.35	.22	.42	.13	.34
Deceased Sibling Was Adopted Child	—	—	.02	.15	—	—
Catholic (1957)	.44	.50	.45	.50	.44	.50
Parent's IQ (1957)	101	14.45	102	14.02	101	14.47
Maternal Age at Child's Birth	25.32	4.42	24.71	4.66	25.35	4.41
Mother Had Teen Birth	.14	.35	.25	.40	.14	.34

Variable	Full Sample		Death of Sibling		No Death of Sibling	
	Mean	SD	Mean	SD	Mean	SD
Number of Siblings	2.98	1.73	4.16	1.96	2.92	1.69
Maternal Education	12.86	1.69	12.65	1.51	12.87	1.70
Paternal Education	13.53	2.65	12.91	2.34	13.56	2.67
Adjusted Family Income (1975)	6,284	4,631	5,475	5,019	6,327	4,601
Death of Sibling	.05	.22	1.00	.00	.00	.00
Developmental Disabilities of Sibling	.02	.13	.04	.20	.02	.13
Mental Illness of Sibling	.02	.14	.04	.20	.02	.15
	$N = [1,395–19,002]$		$N = [785–928]$		$N = [12,542–18,074]$	

Table 3

Summary of regression analysis for variables predicting education of siblings

	Add Health With SES Controls				WLS With SES Controls			
	Sisters		Brothers		Sisters		Brothers	
	b	**(SE)**	*b*	**(SE)**	*b*	**(SE)**	*b*	**(SE)**
Death of Sibling	−0.520 ***	(0.090)	−0.282 ***	(0.105)	−0.229 *	(0.110)	−0.180	(0.114)
Comparison Group (omitted)	—	—	—	—	—	—	—	—
Age	0.046 **	(0.018)	0.025	(0.019)	−0.081 ***	(0.009)	−0.045 ***	(0.011)
Black	−0.054	(0.113)	−0.226 **	(0.103)	—	—	—	—
Hispanic	0.107	(0.089)	−0.132	(0.098)	—	—	—	—
Adopted	−0.433 ***	(0.165)	−0.671 ***	(0.187)	−0.768 ***	(0.124)	−0.708 ***	(0.124)
Birth Order	−0.077 ***	(0.026)	−0.040 **	(0.018)	−0.196 ***	(0.023)	−0.198 ***	(0.022)
Same Gender as Deceased Sibling	—	—	—	—	0.014	(0.055)	0.020	(0.057)
Older Than the Deceased Sibling	—	—	—	—	−0.018	(0.063)	0.061	(0.068)
Having Any Sibling With Disability	—	—	—	—	0.088	(0.127)	−0.091	(0.127)
Grandparent's Income	—	—	—	—	0.002	(0.004)	0.002	(0.004)
Catholic	0.188 **	(0.076)	0.210 **	(0.092)	0.118 *	(0.049)	0.241 ***	(0.051)
Parent's IQ	—	—	—	—	0.014 ***	(0.002)	0.016 ***	(0.002)
Maternal Age at Child's Birth	0.048 ***	(0.006)	0.048 ***	(0.006)	0.016	(0.010)	0.023 *	(0.011)
Mother Had Teen Birth	−0.232 ***	(.077)	−0.173 *	(0.099)	−0.194 *	(0.078)	−0.163 ***	(0.082)
Maternal Education	0.183 ***	(0.025)	0.132 ***	(0.025)	0.194 ***	(0.017)	0.181 ***	(0.018)
Paternal Education	0.186 ***	(0.018)	0.199 ***	(0.016)	0.219 ***	(0.011)	0.244 ***	(0.013)
R^2	.210		.194		.242		.226	
Number of Observations	5,925		4,870		9,205		9,334	

Notes: Add Health additional variables (Other Race, Adopted Missing, Mother's Age at Child's Birth Missing, Missing Family Information, and Sibling With Developmental Disability); WLS additional variables (Older Than the Deceased Sibling Missing, Grandparent's Income Missing, Mother's Age at Child's Birth Missing, and Mother Had Teen Birth Missing).

*
  $p < .05$;

**
  $p < .01$;

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***
$p < .001$

Table 4

Summary of analysis for variables predicting sibling outcomes in adulthood, WLS sample

Outcome	Education		Married		Never-Married		Divorced		Employed		Coresidence	
	b	(SE)	b	(SE)	b	(SE)	b	(SE)	b	(SE)	b	(SE)
Sisters												
Sibling death	−0.229[*]	(.110)	−0.036[†]	(0.021)	0.027[†]	(0.016)	0.007	(0.015)	0.013	(0.019)	0.006	(0.004)
Number of observations	9,205		9,212		9,212		9,212		9,174		9,246	
Brothers												
Sibling death	−0.180	(.114)	−0.012	(0.023)	0.008	(0.020)	0.0001	(0.013)	−0.003	(0.009)	−0.004	(0.007)
Number of observations	9,334		9,334		9,334		9,334		9,309		9,373	
Gender Difference	ns		ns		ns		ns		ns		ns	

Notes: Age, Birth Order, Adoption, Gender Combination With the Deceased Sibling, Older Than the Deceased Sibling, Having Any Sibling With Disability, Grandparent's Income in 1957, Catholic, Parents' IQ, Mother's Age at the Child's Birth, Mother Had Teen Birth, Maternal Education, and Paternal Education were controlled in all analyses. For binary outcomes (i.e., Married, Never-Married, Divorced, Employed, and Coresidence), marginal effects from logistic regression are reported.

[†] $p < .10$;

[*] $p < .05$;

[**] $p < .01$.

Table 5

Summary of regression analysis for variables predicting sibling outcomes in adulthood, Add Health sample

Outcome	Education b	(SE)	Ever-Married b	(SE)	Divorced b	(SE)	Employment b	(SE)	Coresidence b	(SE)
Sisters										
Sibling death	−0.520**	(0.090)	0.007	(0.030)	0.005	(0.008)	−0.027	(0.020)	0.002	(0.017)
Number of observations	5,925		5,925		5,925		5,925		5,924	
Brothers										
Sibling death	−0.282*	(0.105)	0.005	(0.029)	−0.009	(0.007)	0.012	(0.018)	0.023	(0.020)
Number of observations	4,870		4,867		4,867		4,867		4,869	
Gender Difference	†		ns		ns		ns		ns	

Notes: Age, Gender, Race, Birth Order, Adopted, Maternal Age at Child's Birth, Mother Had Teen Birth, Catholic, Maternal Education, Paternal Education, and Missing Family Information were controlled in all analyses.

†
p < .10;

*
p < .05;

**
p < .01

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Table 6

Summary of regression analysis for variables predicting sibling outcomes in adulthood, Add Health Sample: Additional outcomes of interest

Outcome	High School Dropout	College	Test Score (W1)	Test Score (W3)	Earnings	Social Program	Idle (W3)	Teen Pregnancy
Sisters								
Sibling death	0.022** (0.005)	−0.065** (0.015)	−1.397† (0.737)	−2.035* (0.852)	−5,954.712** (1,018.733)	0.087** (0.023)	0.055** (0.011)	0.047** (0.014)
Number of observations	5,925	5,925	5,666	4,923	5,669	5,816	4,899	5,077
Brothers								
Sibling death	0.013 (0.009)	−0.033 (0.022)	−1.964* (0.893)	−2.272* (0.886)	2,611.961 (4,532.218)	0.005 (0.018)	0.004 (0.021)	0.003 (0.012)
Number of observations	4,870	4,870	4,581	3,841	4,667	4,858	3,854	3,969
Gender Differences	ns	†	ns	ns	ns	*	†	ns

Notes: Age, Gender, Race, Birth Order, Adopted, Maternal Age at Child's Birth, Mother Had Teenage Birth, Catholic, Maternal Education, Paternal Education, and Family Information Missing were controlled in all analyses.

†
$p < .10$;

*
$p < .05$;

**
$p < .01$

Table 7

Summary of analysis for variables predicting sibling outcomes in adulthood, WLS data: cause-of-death analysis

Outcome	Education		Married		Never-Married		Divorced		Employed		Coresidence	
	b	(SE)	b	(SE)	b	(SE)	b	(SE)	b	(SE)	b	(SE)
Sisters												
Sibling death: Accident/suicide	−0.241	(0.175)	−0.008	(0.030)	0.005	(0.022)	0.001	(0.021)	−0.016	(0.026)	−0.003	(0.007)
Sibling death: Infant death	−0.173	(0.187)	−0.094*	(0.037)	0.042	(0.032)	0.038	(0.024)	0.033	(0.037)	0.005	(0.009)
Sibling death: Sudden illness	−0.653*	(0.270)	0.046	(0.059)	0.019	(0.036)	−0.090	(0.062)	0.119†	(0.072)	0.022**	(0.006)
Sibling death: Long-term illness	0.053	(0.215)	−0.086†	(0.047)	0.074*	(0.033)	0.010	(0.033)	0.008	(0.047)	0.008	(0.009)
Number of observations	9,205		9,212		9,212		9,212		9,174		9,246	
Brothers												
Sibling death: Accident/suicide	−0.339*	(0.157)	−0.056†	(0.032)	0.049†	(0.026)	0.003	(0.020)	−0.012	(0.012)	−0.006	(0.010)
Sibling death: Infant death	−0.074	(0.222)	0.043	(0.044)	−0.039	(0.041)	−0.006	(0.024)	0.006	(0.017)	0.007	(0.012)
Sibling death: Sudden illness	−0.214	(0.329)	0.015	(0.060)	−0.048	(0.054)	−0.014	(0.040)	−0.009	(0.023)	−0.017	(0.026)
Sibling death: Long-term illness	0.122	(0.285)	−0.004	(0.067)	−0.005	(0.050)	0.016	(0.032)	0.032	(0.035)	−0.010	(0.019)
Number of observations	9,334		9,334		9,334		9,334		9,309		9,373	
Gender Difference	ns		*		ns		ns		ns		*	

Notes: Age, Birth Order, Adoption Status, Gender Combination With the Deceased Sibling, Older Than the Deceased Sibling, Having Any Sibling With Disability, Grandparent's Income in 1957, Catholic, Parent's IQ, Maternal Age at the Child's Birth, Maternal Teen Pregnancy, Maternal Education, Paternal Education were controlled in all analyses. For binary outcomes (i.e., Married, Never-Married, Divorced, Employed, Coresidence), marginal effects from logistic regression are reported.

† $p < .10$;

* $p < .05$;

** $p < .01$