

# Sibling Death and Death Fear in Relation to Depressive Symptomatology in Older Adults

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**Previously overlooked factors in elders' depressive symptomatology were examined, including death fear, sibling death, and sibling closeness. Participants were 150 elders (61 men, 89 women) aged 65–97 years with at least one sibling. Measures were proportion of deceased siblings, sibling closeness, the Death Fear Subscale of the Death Attitude Profile–Revised, and the Center for Epidemiological Studies–Depression scale (20-item adult form). Age and education were exogenous variables in a structural equation model. Death fear, sibling closeness, and proportion of dead siblings were directly related to depression, with path coefficients of .42, –.24, and .13, respectively. Proportion of dead siblings had indirect effects on depression, as did age and education. Depressive symptomatology in old age is influenced by death fear related to sibling death as well as by poor relationships with them; it must be understood within a situational context including death fear and sibling relationships.**

**Key Words:** Death fear—Depressive symptomatology—Sibling closeness—Sibling death.

DEPRESSION in older adults is pervasive due to many factors. An important factor is the grief suffered from loss of family members. For example, grief suffered in widowhood is well-known (Blazer, 2003; Hansson & Stroebe, 2007). However, grief following death of siblings has not been studied sufficiently to determine its relationship to depressive symptomatology in old age. The overall aim of the present study was to examine the connections of death of siblings and feelings of sibling closeness to older adults' fear of death and depressive symptomatology, influenced by age and educational level. Knowledge of these relationships should lead to a better understanding of sibling death and depression in old age.

The sibling relationship is a unique one for most siblings, involving a strong enduring closeness over the life span. Even siblings who have experienced a good deal of rivalry early in life tend to mellow and become closer in their later years (Cicirelli, 1985, 1995). According to attachment theory, siblings maintain attachments to each other throughout life and even after a sibling's death (Bowlby, 1980; Fraley & Shaver, 1999; Hogan & DeSantis, 1992, 1995). Surviving siblings are influenced by continuing memories and feelings toward the deceased sibling, and a strong attachment can remain regardless of how long the sibling has been dead. There is "an abiding sense of the lost person's continuing and benevolent presence" (Bowlby, 1980, p. 243). Although some theorists feel the attachment bond must be broken in order to become involved in new relationships and get on with life, and others feel that individuals with resilient personalities can take the loss in stride and continue to function effectively (Bonanno, Moskowitz, Papa, & Folkman, 2005), it would seem that one could take the death of a sibling in stride and still retain some feeling

of attachment. The individual can adjust to the sibling's death, but enduring memories and feelings can still have an impact.

Although its effect is frequently overlooked, a sibling's death is a major life event and a traumatic loss for surviving siblings. Studies of sibling bereavement from adolescence to old age have found that many survivors of a sibling's death have intense and prolonged grief reactions often lasting for decades (Cicirelli, 1995; Davies, 1991, 2003; Fanos, 1996; Forest, 1995; Hays, Gold, & Peiper, 1997; Hogan & DeSantis, 1992, 1995; Moss & Moss, 1989; Robinson, 2001). Such continuing effects of sibling death are hypothesized to be a factor in elders' fear of death and depressive symptoms and would be expected to be greater as the number of dead siblings within a sibship increases.

The death of a sibling produces in the survivors a sense of existential incompleteness, in that the sibling subsystem within the family of origin is no longer intact. Surviving siblings typically experience loss of feelings of family togetherness, an enhanced sense of their own mortality and vulnerability to events beyond their control (Hays et al., 1997; Moss & Moss, 1989), and an increased fear of death (Cicirelli, 2002). Indeed, many of the elders interviewed by Moss and Moss reported engaging in complex calculations regarding their own life expectancy, and some took steps to put their own affairs in order. One would expect the greater sense of their own mortality and vulnerability among those who have lost siblings to result in a greater fear of death compared with those who have not experienced sibling death.

Death fear (a term used interchangeably with death anxiety) can be defined as an emotional reaction to perceptions of one's own inevitable mortality, involving feelings of helplessness in the face of this threat to one's existence. In general, fear of death gradually declines from young

adulthood to late middle age, remaining relatively low but stable throughout old age (Fortner, Neimeyer, & Rybarczyk, 2000), despite the fact that many elders appear to develop an acceptance of death (Johnson & Barer, 1997). Yet, considerable individual differences in elders' fear of death exist, with many reporting substantial fear.

If death fear is the emotional reaction to one's own perceived mortality and one's helplessness in the face of this threat, then feelings of depression are an outcome of this fear, involving a sense of hopelessness at being unable to avoid one's mortality or to recover lost loved ones. This relationship of death fear to depressive feelings in older adults has been demonstrated in earlier work (e.g., Wong, Reker, & Gesser, 1994). Thus far, no one has investigated the relationship of sibling death to these variables.

Obviously, individuals who have more than one sibling may differ in their feelings of closeness to the various siblings in their family of origin. Nevertheless, the great majority of elders hold long-term positive attachment bonds to their siblings. They tend to draw closer to their siblings in old age and attempt to mend poor relationships (Charles & Charles, 2006; Cicirelli, 1995; Hays et al., 1997). The mechanism of symbolic attachment (Cicirelli, 1995) has been used to explain the continuing attachment to someone who is separated by distance and with whom reunion to gain feelings of closeness and comfort is difficult or impossible. In symbolic attachment, thoughts and memories of closeness to the absent person provide the sense of comfort that maintains the attachment relationship. According to Hogan and DeSantis (1992, 1995), when a sibling is dead, the surviving siblings experience a "continuous emotional attachment that maintains the ongoing presence of the deceased sibling" (p. 174). Also, some evidence (Moss & Moss, 1989) indicates that relationships with surviving siblings may grow closer following a sibling's death.

Whether through the maintenance of ongoing feelings of attachment to deceased siblings or increased feelings of closeness to living siblings, older adults with greater feelings of closeness to siblings are hypothesized to gain emotional support from sibling relationships, resulting in less death fear and fewer depressive symptoms than reported by older adults with less close sibling relationships. More generally, attachment theory (the lingering bond between living and dead siblings) can help to explain the overall impact of sibling death on the sibling survivors' closeness to siblings, fear of death, and depressive symptomatology.

Age and educational level must also be considered within the context of the present study. As people grow older, more of their siblings are likely to have died, with an increasing impact on death fear and depression. Considering education as an indicator of socioeconomic status level, those with more education (and higher socioeconomic status) tend to have less fear of death and less closeness to their siblings than those with less education (Cicirelli, 1995; Neimeyer, 1994). Also, because of their greater longevity, those with

more education are more likely to have a greater proportion of their siblings alive in old age.

Previous studies have not examined the connections of sibling death and feelings of sibling closeness to elders' death fear and subsequent depressive symptomatology. To explore these connections, a path model is hypothesized such that, as the proportion of dead siblings within a sibship increases, death fear will increase and, in turn, the number of depressive symptoms will increase. As the proportion of dead siblings increases, average feelings of closeness to all siblings will also increase. Greater feelings of closeness to siblings will be related to decreased depressive symptomatology, both directly and indirectly through its effect on death fear. Finally, age and level of education are included in the model as exogenous variables, hypothesized to be directly related to proportion of deceased siblings and average feelings of sibling closeness, and both directly and indirectly related to death fear. (Other factors, e.g., gender, were considered but not included in the model for various reasons.) Among other background factors that might be considered in the present study, participant gender and marital status were considered in preliminary analyses but were not included because relationships with the sibling variables were negligible; correlations of proportion of dead siblings with gender and marital status were .09 and  $-.08$ , respectively, and correlations of sibling closeness with these variables were  $-.08$  and  $-.05$ . However, gender was examined in supplementary analyses in relation to sibling gender. Health, a known factor in depressive symptomatology, was also considered as a potential study variable but was not included because it appeared unrelated to the sibling variables that were central to the study; the correlation of health with the proportion of dead siblings was  $-.04$  and with sibling closeness was  $-.07$ . Similarly, although existing research has identified a substantial number of factors related to both depressive symptomatology and fear of death in later life, to include these here is beyond the scope of the present study, which focuses only on the contributions of sibling death and sibling closeness.)

## METHODS

### *Sample*

Participants were 150 elders (61 men, 89 women) ranging in age from 65 to 97 years ( $M = 78.18$ ,  $SD = 8.55$ ) who had at least one sibling. They were volunteers obtained from assisted living facilities ( $N = 80$ ) and senior centers ( $N = 70$ ) in a medium-sized Indiana city.

Overall, study participants were well educated; 85% were at least high school graduates and 29% were college graduates or had advanced degrees. Regarding marital status, 49% were widowed, 33% married, 17% divorced or separated, and 1% never married. On average, they had 2.92 children; only 13% reported any deceased children. Regarding

health, 76% of participants reported themselves in good, very good, or excellent health, with only 24% in not so good or poor health.

### Measures

*Fear of death.*—The Fear of Death Subscale from the Death Attitude Profile–Revised (Wong et al., 1994) was used as the measure of elders' death fear. It consists of seven items assessed on a 7-point response scale; a high score indicates greater death fear. Internal consistency reliability for participants of the present study was .82.

*Depressive symptomatology.*—The Center for Epidemiological Studies Depression Scale for adults (Radloff, 1977), a self-report measure of depressive symptomatology, was used. It consists of 20 items assessing frequency of occurrence of depressive symptoms on a 4-point scale ranging from 0 to 3. (Four positively worded items were given reverse coding.) A high score indicates greater symptom frequency. Internal consistency reliability for study participants was .85.

*Sibling measures.*—Participants were interviewed regarding each sibling in their family of origin, noting whether the sibling was living or dead. (All siblings were full siblings.) The total number of siblings in the sibship, number of living siblings, and number of dead siblings were obtained directly from these data. Additionally, participants were asked for each sibling's gender, relative age (older, younger), and age spacing in years. (Although it would have been desirable to know how long ago a sibling had died, many participants were unable to recall this information. However, no one reported that a sibling had died within the previous year. Thus, one can assume that the immediate trauma of the sibling loss had passed for all participants; yet, long-term effects of grieving persist to some degree for most surviving siblings.)

Study participants were also asked to rate their closeness of feeling toward each sibling, living or dead, on a 5-point scale ranging from 1 (not close at all) to 5 (very close). In order to obtain a measure of the participant's overall closeness of feelings to all siblings, the average of the closeness ratings for each of the siblings was used. This average can be regarded as a characteristic level of feelings of closeness within the sibling system, although feelings toward individual siblings can be higher or lower than this average. (Similar averages were obtained for closeness to living siblings only and for closeness to dead siblings only.)

*Background variables.*—The participant's gender, age in years, and level of education were also obtained during the interview. Education was coded on the Hollingshead (Hollingshead & Redlich, 1957; Miller & Salkind, 2002)

7-point scale ranging from 1 (0–6 years of school) to 7 (post-graduate study).

### Procedure

The project and informed consent procedures were approved by the Institutional Review Board at Purdue University. After being informed about the study and signing an informed consent document, each participant was interviewed individually at a convenient time, using a structured interview questionnaire.

## RESULTS

### *Preliminary Analyses of Sibling Data*

*Number of siblings.*—Participants' number of siblings ranged from 1 to 11 ( $M = 3.95$ ,  $SD = 2.67$ ), with 17% reporting one sibling, 19% two siblings, 19% three siblings, 19% four or five siblings, and 24% six or more siblings. Number of living siblings ranged from 0 to 11 ( $M = 2.06$ ,  $SD = 1.94$ ), as did the number of dead siblings ( $M = 1.89$ ,  $SD = 2.03$ ).

Using the raw sibling data in analyses presented difficulties inasmuch as study participants reported varying numbers of siblings in their sibship; and even within a given sibship size, the numbers of living siblings and dead siblings varied. No single sibship size had a sufficient number of participants for analysis.

Because the study focused on effects of the entire sibling subsystem on death fear and depressive symptomatology, two overall indices were constructed. The first was the proportion of dead siblings in the sibship (the ratio of the number of dead siblings to the total number of siblings, living and dead), which could vary from zero to one. For the second index, the proportion of dead siblings was recoded to construct three groups for use in certain analyses: 1 (no siblings dead), 2 (some siblings dead), or 3 (all siblings dead).

*Sibling closeness in relation to the proportion of dead siblings.*—Analysis of variance (ANOVA) was used to determine whether the average closeness to siblings depended on the proportion of dead siblings, using the three sibling groups as the independent variable. In the entire sample, range of sibship sizes and mean number of siblings were closely similar for the group with no dead siblings (range = 1–11,  $M = 2.63$ ,  $SD = 2.08$ ) and the group with all dead siblings (range = 1–11,  $M = 2.69$ ,  $SD = 2.39$ ), but the mean number of siblings was greater for the group with some dead siblings (range = 2–11,  $M = 5.08$ ,  $SD = 2.53$ ). However, no significant difference in closeness to siblings (Table 1) between the three groups was found,  $F(2, 147) = 1.78$ ,  $p = .17$ . (Results differed only slightly when age, sex, education, and number of siblings were used as covariates.) This analysis was repeated for a subgroup of participants with

Table 1. Mean Closeness to Siblings for Three Groups Differing in Proportion of Dead Siblings<sup>a</sup>

Sibship Size	None Dead			Some Dead			All Dead			<i>F</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	%	<i>M</i>	<i>SD</i>	%	<i>M</i>	<i>SD</i>	%		
2	3.64	1.01	38	4.14	0.66	48	3.75	0.69	14	1.02	.37
3	3.96	1.07	29	3.71	0.71	50	4.10	0.71	21	0.53	.60
1–11	3.59	1.06	27	3.91	0.76	54	3.67	1.22	19	1.78	.17

Note: <sup>a</sup>With *F* tests for differences between group means, for respondents with 2 (*N* = 29), 3 (*N* = 28), and 1–11 siblings (*N* = 150).

two siblings and a subgroup with three siblings, even though these subgroup sizes were small (Table 1). In neither case was there a significant difference in sibling closeness depending on whether none, some, or all siblings were dead. These findings support the contention that the sibling bond continues through time, regardless of a sibling's death.

Additionally, a within-groups ANOVA (Table 2) was carried on, using data from the 81 participants who had both living and dead siblings, to determine whether their feelings of closeness toward their living and dead siblings differed. Although closeness to living siblings was slightly greater than to dead siblings, the difference did not reach statistical significance,  $F(1, 80) = 2.56, p = .12$ . (Use of covariates did not change the results.) When this analysis was repeated for those with two siblings, and those with three siblings, there was also little difference in participants' closeness of feelings toward living and dead siblings.

#### Intercorrelations of Study Variables

Table 3 presents intercorrelations of depressive symptomatology, death fear, proportion of dead siblings, sibling closeness, age, and educational level. As hypothesized, greater death fear was related to greater depressive symptomatology ( $r = .44$ ), whereas greater sibling closeness was related to less depressive symptomatology ( $r = -.20$ ). Also, the greater the proportion of dead siblings, the greater the death fear ( $r = .22$ ) and the greater the sibling closeness ( $r = .20$ ).

#### Estimation of Path Model for All Participants

Using LISREL8 (Byrne, 1998; Jöreskog & Sörbom, 1993), maximum likelihood estimates of path coefficients in the hypothesized model were obtained. Age and education were included as exogenous variables and potential predictors of the proportion of dead siblings, closeness to siblings, and death fear. The final model with the resulting

path coefficients is shown in Figure 1. Indicators of fit for this analysis were  $\chi^2(4) = 4.04, p = .40$ ; the goodness of fit index (GFI) = 0.99; the root mean square residual (RMR) = 0.03; and the normed fit index (NFI) = 0.97. All of these suggest an acceptably good fit.

Only age was significantly related to the proportion of dead siblings ( $R^2 = .17$ ), with a path coefficient of .39. Older participants had a greater proportion of dead siblings. Both education and the proportion of dead siblings were related to sibling closeness ( $R^2 = .09$ ), with path coefficients of  $-.22$  and  $.23$ , respectively. Those with less education had greater closeness to siblings. Also, as hypothesized, those with a greater proportion of dead siblings had greater closeness to all siblings. Next, the proportion of dead siblings, age, and education were all related to death fear ( $R^2 = .22$ ), with path coefficients of  $.37, -.24$ , and  $-.32$ , respectively. Those with a greater proportion of dead siblings had greater death fear, as hypothesized, and those who were younger and less educated also had greater death fear. Contrary to hypothesis, the path to death fear from closeness to siblings was not significant. Finally, the proportion of dead siblings, death fear, and closeness to siblings were all related to depressive symptomatology ( $R^2 = .24$ ), with path coefficients of  $.13, .42$ , and  $-.24$ , respectively. Those with a greater proportion of dead siblings, greater death fear, and less sibling closeness had more depressive symptomatology.

Interpreting these effects in terms of raw scores, a change in the mean sibling closeness score from 3 to 4 would result in roughly a 2-point decrease in depressive symptomatology scores, whereas an increase in the proportion of dead siblings from .33 to .67 would result in a 1-point increase in the depressive symptomatology score and a 3-point increase in the death fear score; the 3-point increase in fear would result in a 1-point increase in depressive symptomatology.

In sum, proportion of dead siblings had both a direct effect on depressive symptomatology and an indirect effect through its effect on death fear. The effect of both paths was

Table 2. Comparison of Mean Closeness to Living Siblings and Dead Siblings for Elders With Both Living and Dead Siblings<sup>a</sup>

Number of Siblings	Living Siblings		Dead Siblings		<i>N</i>	<i>F</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
2	4.21	0.70	4.07	1.16	14	0.14	.72
3	3.79	1.02	3.75	0.92	14	0.14	.71
2–11	4.02	0.84	3.82	1.03	81	2.56	.12

Note: <sup>a</sup>Presented for various sibship sizes, with *F* tests for differences between means in a within-subjects analysis of variance.

Table 3. Intercorrelations of Depressive Symptomatology, Fear of Death, Sibling Closeness, Proportion of Dead Siblings, Age, and Education ( $N = 150$ )

Variable	1	2	3	4	5	6
1. Depression	—	.44***	-.20**	.17**	-.11	-.13
2. Fear of death		—	.03	.22**	-.15*	-.31***
3. Sib closeness			—	.20**	.09	-.18**
4. Proportion of dead sibs				—	.41***	-.16**
5. Age					—	.20**
6. Education						—
<i>M</i>	20.89	20.47	3.78	0.46	78.18	4.79
<i>SD</i>	6.87	8.27	0.95	0.37	8.55	1.44
Range	10–46	7–45	1–5	0–1	65–97	1–7

Note: \* $p < .10$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

that those with a greater proportion of dead siblings reported more depressive symptomatology. However, this effect was mitigated somewhat by its indirect effect through its effect on sibling closeness; those with a greater proportion of dead siblings had greater closeness to siblings and in turn had fewer depressive symptoms.

#### Estimation of the Path Model for Participants With One, Two, or Three Siblings

Because of concerns that the presence of larger sibship sizes in the sample may have been responsible for the findings of the previous path model, the model was reestimated for the 83 participants with one, two, or three siblings. The resulting paths are shown in Figure 2 (also see Table 4 for intercorrelations). Indicators of fit for this analysis were  $\chi^2(4) = 4.53$ ,  $p = .34$ ; GFI = 0.98; RMR = 0.04; and NFI = 0.94. Again, these suggest an acceptable fit.

Despite some differences in the size of path coefficients, in the main the two path diagrams are quite similar. One notable difference is that the path coefficient from the proportion of dead siblings to sibling closeness is now negligible. In the final stage of the model, only death fear and sibling closeness were related to depressive symptomatology ( $R^2 = .16$ ), with path coefficients of .32,

and  $-.21$ , respectively. Thus, these results suggest that the relationships shown in Figure 1 are relatively independent of sibship size.

#### Supplementary Analyses

*Effect of dead siblings on sibling closeness.*—The measure of mean sibling closeness included the closeness of feelings to all siblings, living or dead. In the overall analysis, a greater proportion of dead siblings was related to greater sibling closeness, as indicated by the path coefficient of .23. One can question whether losing siblings to death resulted in the individual's increased closeness to both living siblings and dead siblings or whether closeness increased to only one of the two. To investigate this question, hierarchical linear modeling (Raudenbush & Bryk, 2002) was used because ratings of closeness to individual siblings (Level 1) and the overall proportion of dead siblings (Level 2) were at different levels of analysis, with the closeness ratings for a given respondent's siblings nested within the proportion of dead siblings reported by that respondent. When the relationship of sibling closeness and proportion of dead siblings was examined first for 121 respondents with 305 living siblings (with variables centered),

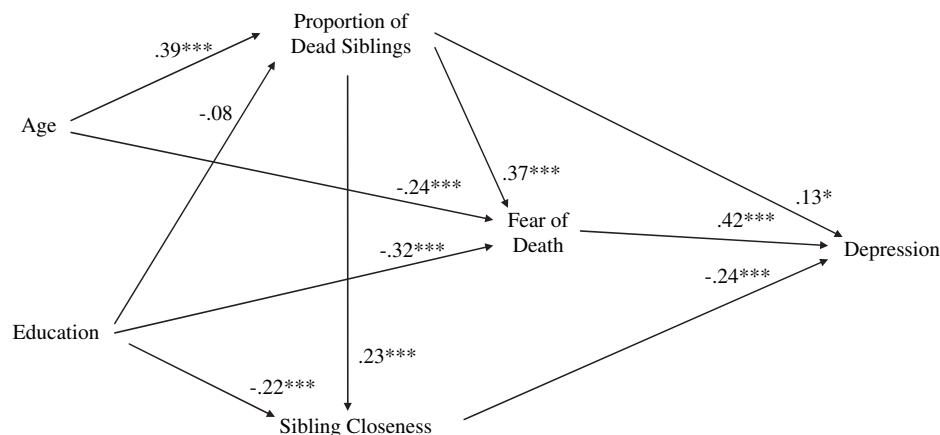


Figure 1. Path diagram of the relationship of proportion of dead siblings, mean closeness to all siblings, and fear of death to depressive symptomatology for all sibship sizes ( $N = 150$ ). Significance of path coefficients: \* $p < .10$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

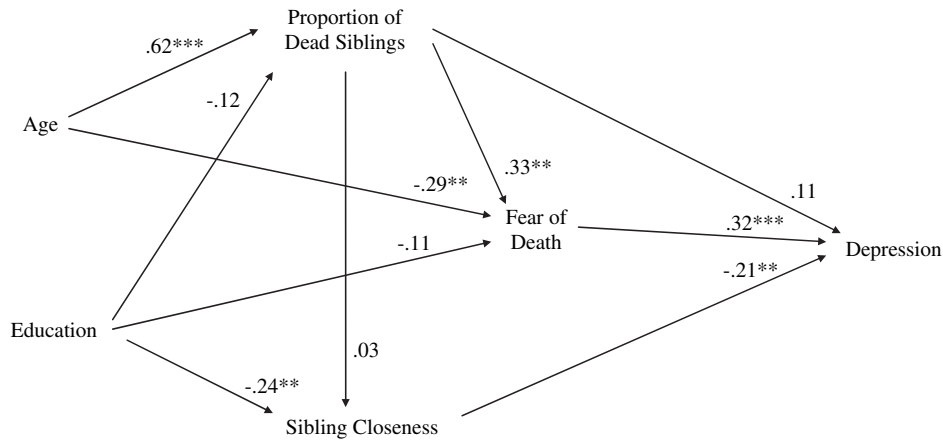


Figure 2. Path diagram of the relationship of proportion of dead siblings, mean closeness to all siblings, and fear of death to depressive symptomatology for participants with one, two, or three siblings ( $N = 83$ ). Significance of path coefficients: \* $p < .10$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

there was a significant relationship (estimate = 0.35,  $SE = 0.32$ ,  $t = 2.28$ ,  $p = .02$ ), indicating a greater closeness to living siblings among respondents with a greater proportion of dead siblings. When the relationship was examined next for 110 respondents with 267 dead siblings, it was not significant.

A second question is whether closeness to living siblings and closeness to dead siblings are differentially related to death fear and depressive symptomatology. Again using hierarchical linear modeling to examine these effects, no significant relationships with death fear were found for either the sample of respondents with living siblings or the sample with dead siblings. However, when the relation of sibling closeness to depressive symptomatology was examined for the sample of 110 respondents with 267 dead siblings, there was a significant relationship (estimate =  $-0.030$ ,  $SE = 0.012$ ,  $t = -2.40$ ,  $p = .02$ ), indicating an association of greater sibling closeness and less depressive symptomatology. No significant relationship between sibling closeness and depressive symptomatology was found for the sample of 121 respondents with 305 living siblings.

*Relative age of dead siblings.*—A third question was whether the relative age of dead siblings was related to the variables of interest. This question was examined again us-

ing hierarchical linear modeling with two samples; first, among a sample of 84 respondents with 185 dead older siblings and then among a sample of 58 respondents with 82 dead younger siblings. In these analyses, no significant relationships with sibling closeness were found for either proportion of dead siblings, death fear, or depressive symptomatology. Thus relative age of a sibling does not appear to be important for sibling closeness.

*Sibling closeness in relation to sibling structure.*—Although the main analyses of the study used a measure of sibling closeness that was a mean of the participant’s ratings of closeness for all siblings in the family, secondary analyses were carried on to determine whether closeness depended on such sibling structure characteristics as age spacing between siblings, relative age, and sibling gender.

For the 145 participants for whom data on sibling age spacing were available, age spacing ranged from 1 to 20 years. The correlation between age spacing and the closeness rating for a particular sibling was only .02, indicating that closeness of feeling did not depend on siblings’ closeness in age.

To examine the effect of relative age, separate mean closeness scores were constructed for participants’ older and younger siblings. An ANOVA was carried out with

Table 4. Intercorrelations of Depressive Symptomatology, Fear of Death, Sibling Closeness, Proportion of Dead Siblings, Age, and Education for Participants With One, Two, or Three Siblings ( $N = 83$ )

Variable	1	2	3	4	5	6
1. Depression	—	.33***	-.19*	.15	-.02	-.07
2. Fear of death		—	.05	.15	-.13	-.18*
3. Sib closeness			—	.02	.11	-.24**
4. Proportion of dead sibs				—	.59***	.05
5. Age					—	.28**
6. Education						—
<i>M</i>	20.04	19.61	3.71	0.45	78.58	5.17
<i>SD</i>	5.97	7.93	1.09	0.41	8.70	1.40
Range	10–37	7–43	1–5	0–1	65–97	2–7

Note: \* $p < .10$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

mean closeness scores from 78 participants who had both older ( $M = 3.78$ ,  $SD = 1.09$ ) and younger ( $M = 3.87$ ,  $SD = 1.01$ ) siblings, with relative age as a within-subjects variable and participant gender as a between-subjects variable. Neither the main effect for relative age was significant,  $F(1, 76) = 0.97$ ,  $p = .79$ , nor the main effect of participant gender,  $F(1, 76) = 1.62$ ,  $p = .21$ . The interaction of participant gender and relative age also was not significant,  $F(1, 76) = 1.28$ ,  $p = .26$ .

To examine the effect of sibling gender on feelings of closeness, separate mean closeness scores were constructed for 96 participants who had both sisters and brothers, with participants feeling slightly closer to sisters ( $M = 3.92$ ,  $SD = 0.97$ ) than to brothers ( $M = 3.77$ ,  $SD = 1.01$ ). However, when an ANOVA was carried out with sibling gender as a within-subjects variable and participant gender as a between-subjects variable, neither the main effect for participant gender was significant,  $F(1, 76) = 1.25$ ,  $p = .27$ , nor the effect of sibling gender,  $F(1, 76) = 1.41$ ,  $p = .24$ . The interaction of sibling gender with participant gender also was not significant,  $F(1, 76) = 0.97$ ,  $p = .33$ .

## DISCUSSION

Study results provide support for the hypothesis that sibling death leads to greater death fear and in turn to greater depressive symptomatology, as well as support for the proposition that feelings of attachment continue after an attachment figure's death. However, the effect of sibling death on participants' death fear would not seem to be due to prolonged grieving for dead siblings. Rather, it appears to be consonant with elders' increased sense of personal vulnerability following sibling death observed by earlier researchers (Hays et al., 1997; Moss & Moss, 1989), although they did not link it to increased death fear. Findings regarding the relationship of death fear to depressive symptomatology are consonant with earlier work (McCoy, Pyszczynski, Solomon, & Greenberg, 2000; Wong et al., 1994).

Study findings also provide some support for the hypothesis that closeness to siblings increases as the proportion of dead siblings increases, with a significant path coefficient in the path diagram. However, the subsequent analysis indicated that the overall connection was due in part to the greater closeness of feeling for living siblings when the proportion of dead siblings was greater. This latter finding is consonant with previous observations that the relationship with surviving siblings grows closer following sibling death (Moss & Moss, 1989).

Study findings support the notion that symbolic attachment functions as a psychological support, offering a sense of closeness and comfort in times of difficulty and when direct contact is not possible (Cicirelli, 1995). The fact that no significant differences were found between closeness to living and dead siblings (Table 2), or that the average closeness did not differ significantly among groups differing in

the proportion of dead siblings (Table 1), offers evidence for the concept of a continuing emotional attachment to the deceased sibling (Hogan & DeSantis, 1992, 1995). Such a conception would help to explain the finding that depressive symptomatology was less when there were closer feelings to siblings, living or dead, or conversely that depressive symptomatology was greater when the sibling relationship was poorer. The efforts of many individuals to mend poorer sibling relationships as they grow older (Cicirelli, 1995; Hays et al., 1997) gain in importance when viewed in terms of the relationship of sibling closeness to depressive symptomatology in old age.

The hypothesized connection between sibling closeness and death fear was not borne out by the data. That is, there was no evidence that closeness of feelings to siblings helped study participants to defend against death fear. However, greater sibling closeness was related to reduced depressive symptomatology, as hypothesized.

The findings that experiencing sibling death and having a poor sibling relationship are both related to increased depressive symptomatology in old age need to be confirmed in future studies. Additionally, further study is needed to clarify whether the relationship of death fear to depressive symptomatology is influenced primarily by elders' continuing grief over sibling death or by concerns over their own increased vulnerability to death. Also, the roles of age and educational level in relation to the previously described variables need further study.

The limitations of the present study are readily acknowledged. A major limitation was the wide range of sibship sizes in the sample. Although the use of the proportion of dead siblings and average sibling closeness as measures in the analyses attempted to reduce the effects of variation in sibship size, further studies that deal with a single sibship size (e.g., three siblings) would help to clarify the present findings. The considerable range of study participants' age and level of education, even though they increase generalizability, are also limitations of the study, making it more difficult to determine effects of sibling variables. Even though these variables were used as covariates or exogenous variables in the analyses in an attempt to control their effects, future studies should endeavor to select a sample with less variation in age and socioeconomic status. At the same time, future studies need to examine study variables among other racial/ethnic groups to extend the findings beyond the sample of Caucasian participants in the present study.

A further limitation existed in the measuring instruments used. The Death Attitude Profile-Revised offered only a single death fear subscale. However, a multidimensional instrument would offer the possibility of determining whether sibling death was associated with particular aspects of death fear. Similarly, the relatively high mean sibling closeness ratings are a limitation of the study, even though both the obtained individual sibling ratings and mean sibling ratings

represented the full range of the scale. A more extensive scale than a single item measuring feelings of closeness to siblings would be desirable in order to produce a wider range of variability. Asking study participants to respond to a longer scale assessing closeness to each of a number of siblings in the sibship would make the measurement task onerous for those with large sibships but would certainly be possible in future work if sibship size was restricted to participants with two or three siblings. Still another limitation of the study was the lack of information on the cause of a sibling's death and how long ago the sibling had died, both of which could be important. In this study, participants were not asked about the cause of a sibling's death. If a sibling's death occurred more than a few years ago, older study participants tended to be unable to provide accurate information about time of death, at least in the immediate interview situation. One possible way of getting more accurate information in future studies would be to ask participants to assemble this information a day or so in advance of the interview. Alternatively, participants might be asked to estimate the time of a sibling's death within certain time ranges (e.g., 5–10 years ago). This would have permitted some assessment of the effects of time since death on the study variables. Finally, it is felt that elders' poor memory of the time of a sibling's death is attributable to the perceived rapidity of time's passage in old age and does not imply poor memory of other aspects of the sibling relationship or sibling death on which symbolic attachment depends.

Obviously, a number of important factors contribute to depressive symptomatology in old age (Blazer, 2003). However, the results of the present study suggest that the death of siblings and its influence on death fear, as well as the closeness of sibling relationships, also play a part in explaining depressive symptoms. If so, these effects of sibling relationships need to be considered in a broader framework along with other family variables as factors in depressive symptomatology. Depression in old age must be understood within a situational context which includes such things as death fear and sibling relationships.

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