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The Long-Term Effects of Caregiving on Women's Health and Mortality

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Abstract

Caregivers experience numerous mental and physical health effects from the stress of providing care, but we know little about whether these problems persist in the long term and whether long-term effects differ across caregiving contexts. Using the National Longitudinal Survey of Mature Women, we examine the relationship between caregiving and long-term patterns of depressive symptoms, functional limitations, and mortality. We also explore the health effects of caregiving in-home versus out-of-home and by caregiver/care-recipient relationship. Analyses show that in-home spousal and parental caregiving predict increased depressive symptoms and functional limitations in the long term but are unassociated with mortality, while caregiving out-of-home is unassociated with later depression and functional limitations but predicts lower risk of mortality. This study highlights the usefulness of approaching stressful experiences like caregiving from the life course perspective, viewing them as processes that unfold over time within specific contexts and may carry delayed or cumulative consequences.

Keywords

Aging; caregiving; depression; health

The U.S. health care system relies heavily on unpaid care to meet the health needs of the ill and disabled. In 2009, the value of that care was estimated at \$450 billion, a value far greater than the \$361 billion spent on Medicare that year (Feinberg & Choula, 2012). Most adults provide care at some point in their lives and many do so multiple times, but women are especially likely to provide unpaid care. National estimates are that about 60 percent of unpaid caregivers are women (NAC, 2015). Women are more likely to help with personal care, devote more hours of care each week, spend more years providing care, and perform more care tasks than men (Pinquart & Sorensen, 2006). As the population ages, life

expectancy increases, and U.S. family sizes decline after reaching a mid-20th century peak, the demand for unpaid caregivers of both genders is expected to grow.

How does this unpaid work affect the person providing care? While caregiving experiences may be rewarding, there is also no question that they can be stressful, and negative physical and mental health consequences of caregiving are well documented (for reviews, see: Pinquart & Sorensen, 2003, 2007; Vitalino et al., 2003). However, our knowledge about the relationship between caregiving and health needs elaboration. We address three underexplored issues in this paper. First, we know relatively little about how caregiving experiences are related to long-term health trajectories as caregivers themselves enter old age. Secondly, our understanding of how caregiving contexts affect the caregiving-health relationship is limited, including information about where caregiving occurs and who is being cared for. Finally, the role of factors that select people into caregiving as well as those that may explain the negative health effects of caregiving after it occurs, such as bereavement, have been under-explored.

In this paper, we integrate insights from the life course perspective with theory about the stress process to address these gaps. We use data from National Longitudinal Survey of Mature Women (NLS-MW) merged with mortality data from the National Death Index and Social Security Death Index to study the long-term health consequences of providing care. After assessing the range of women's caregiving experiences over a five-year period in midlife, we examine the relationships between these experiences and depressive symptoms and functional limitations over the following 14 years, and all-cause mortality over the following 23 years. We also assess how variations in the contexts of caregiving experiences condition their affect on health, including whether care is co-residential and the caregiver's relationship to the care recipient. Because our data cover such a long period of time, we are able to account for health and other factors that select women into caregiving, as well as to explore the effects of bereavement when parents or a spouse dies—both of which also are likely to shape late-life health trajectories. Our findings highlight the utility of integrating stress process and life course frameworks in research related to families and health, showing that the effects of stressful role experiences should be considered over the long-term and within their specific contexts.

Background

As a consequence of the extended life expectancy in the U.S., more adults are living with chronic illnesses or disabilities (CDC, 2014), and much of the responsibility for caring for this population has fallen to informal caregivers. Recent national research estimates that 18.2 percent of U.S. adults are caregivers, most of whom provide care to a relative with a long-term physical health problem (NAC, 2015). Caregivers supply an average of over 24 hours of help a week on a broad range of tasks, including assistance with transportation and household tasks, basic activities of daily living like bathing or dressing, and increasingly, even nursing tasks such as administering injections or catheter maintenance (NAC, 2015). Considering the comprehensive scope of these potential demands, it may come as little surprise that 38 percent of caregivers perceive their caregiving activities as stressful (NAC, 2015). Often conceptualized as a chronic stressor, caregiving has direct stressful effects as

well as negative effects on other areas of caregivers' lives (Pearlin et al., 1990). The well-being of those who provide this important social resource has thus often been framed as a public health concern (e.g., Schulz & Sherwood, 2008).

Approaching caregiving as a stressful role experience, several decades of research have documented its negative mental and physical health effects (for reviews see Pinquart & Sorensen, 2003, 2007; Vitaliano et al., 2003). While these findings are compelling, a number of areas where our understanding of the caregiving-health relationship needs elaboration persist. The life course paradigm, which views life experiences as dynamic processes that unfold over time within personal and historical contexts (Elder, Crosnoe & Johnson, 2003), can be used to supplement our knowledge about caregiver health in three specific ways addressed in our paper.

First, viewing stressful role experiences like caregiving through the lens of the life course perspective compels us to consider how these experiences impact health not only in the short-term, but also as caregivers age and develop care needs of their own. Compared to research on short-term health effects, we know little about the long-term health trajectories associated with providing care (Schulz & Sherwood, 2008). The few studies that have investigated longer term health effects have found that some physical health problems, such as cardiovascular disease and mobility limitations, continue to be more prevalent among older caregivers up to eight years after caregiving, but that caregivers may begin to experience reductions in their levels of stress and negative affect by three years post-caregiving (Capistrant et al., 2011; Fredman et al., 2008; Robinson-Whelen et al., 2001). While they thus offer an important glimpse at how persistent the health effects of caregiving may be, most of these studies focus on older caregivers, who may already be on their own trajectory of health decline (e.g., Capistrant et al., 2011; Fredman et al., 2008). It is important that we also understand how these experiences shape the health pathways of midlife caregivers, since caregiving is most common during this period (NAC, 2015).

Exploring these long-term health pathways may shed light on the emotional complexity of caregiving experiences. While the immediate caregiving experience is dominated by the stresses of providing care and having a sick loved one, over time, care providers may be more likely to experience benefits of providing care via the connections to family and friends that accompany caregiving. Research identifies several positive effects of caring, although they are often overshadowed by negative outcomes in studies comparing current caregivers and non-caregivers (e.g., Freedman et al. 2014, Marks et al., 2002). For instance, Marks and colleagues (2002) showed that while the mental health effects of transitioning to caregiving were largely negative for both women and men, some caregivers also experienced benefits, such as a heightened sense of purpose in life. Other research has shown that caregivers of both genders find the experience fulfilling and rewarding (Cohen et al., 2002) and that it improved their outlook on life (Tarlow et al., 2004). One analysis showed that caregiving for at least a year is associated with enhanced cognitive functioning among elderly women (Bertrand, 2012).

Additionally, considering the long-term effects of midlife experiences with caregiving may be particularly important for elaborating our knowledge about caregiver mortality. Since

many studies have shown that caregiving is associated with poorer health in the short term, one might expect that caregivers experience higher mortality rates than non-caregivers. However, evidence to support this possibility is limited to a few studies showing that both male and female caregivers with high caregiving strain have greater mortality risk five years later (Perkins et al., 2012; Schulz & Beach, 1999). Studies following caregivers for longer periods of time generally find that they have *lower* mortality rates than non-caregivers (Brown et al., 2009; Fredman et al., 2008; O'Reilly et al., 2008). For example, one analysis found that elderly male and female spousal caregivers who spent over 14 hours a week providing care were at 29 percent decreased risk of mortality compared to non-caregivers seven years later (Brown et al., 2009). Another study following elderly female caregivers for eight years found a lower mortality risk for low-stress caregivers, but not for those who had more stressful experiences (Fredman et al., 2010).

One explanation for these seemingly counter-intuitive findings is that since many of these studies focus on older adults, less healthy individuals have already selected out of these samples. However, at least one U.K. study found that caregivers have *poorer* health at baseline, and despite this fact, had lower mortality risk than non-caregivers over the next eight years (Ramsay et al., 2013). Evidence to date suggests that, while health does influence who becomes a caregiver, accounting for these selection processes does not explain caregivers' lower mortality (O'Reilly et al., 2008; Perkins et al., 2012; Ramsay et al., 2013). Considering selection into caregiving based on additional factors, such as social ties and engagement, may provide different results. Another possibility is that caregivers' lower mortality rates reflect the duration of the follow-up period, and that more positive effects of caregiving exert effects on health only over long periods of time. If this were true, we would also expect to see more positive effects appear when looking at health over longer windows. Finally, all-cause mortality may simply be affected by different aspects of the caregiving experience than health. Thus, it is possible that while caregiving has negative health effects in the short-term *and* over longer periods, these effects do not extend to mortality rates. Drawing on the life course paradigm, looking at even broader stretches of caregiver's lives may help unravel these possibilities.

A second way that the life course framework contributes to our understanding of the relationship between stressful role experiences and health is by drawing our attention to the individual and interpersonal contexts in which these experiences occur. Perhaps first and foremost, this point underscores the need to consider how a caregiver's personal characteristics shape caregiving experiences, one of the most salient of which is gender. As we have noted, the lion's share of caregiving work continues to fall to women, who are more likely than men to find themselves providing care for ill and disabled children, parents, and spouses (NAC, 2015). While caregiving is stressful for both genders, evidence also suggests that women are particularly burdened by these experiences (Pinquart & Sorensen, 2006). It is likely that female caregivers were especially more numerous and distressed than male caregivers among older cohorts, in which traditional gender role configurations were prevalent. With this in mind, we limit our focus to women in this study in order to hone in on two other important caregiving contexts.

One of these additional sources of variation is the setting in which women's primary care provision activities occur. More to the point, caregiving strains are likely especially intense for women who provide around-the-clock help to someone that they live with. Supporting this possibility, recent research indicates that co-residential caregivers have, on average, been providing care for longer periods, provide more hours of care, provide more assistance with basic activities of daily living, and are more likely to feel as though they have no choice in providing care than non-co-residential care providers (NAC, 2015). Cross-sectional analyses show that caregivers of both genders (but especially women) who live with care recipients have higher ratings of subjective burden, more depressive symptoms, and poorer self-rated health than caregivers who do not co-reside (Cohen et al., 2002; Kim et al., 2001; Pinquart & Sorensen, 2007; Solokolne et al., 2007). Aneshensel, Pearlin and Schuler (1993) also found that both female and male Alzheimer's caregivers experienced decreased role strain after their care recipient was institutionalized. To the extent that in-home caregiving is especially stressful, it is thus important to specify where caregiving occurs when considering its long-term health effects.

Another contextual difference in women's caregiving experiences that likely influences their effect on well-being is the relationship between the caregiver and care recipient. On the one hand, women who provide care to a husband may be particularly strained by caregiving experiences. Recent national research on caregivers indicates that spousal caregivers provide more hours of care than other types of caregivers, are the most likely type of caregiver to be co-residing with their care recipient, and are the most likely to not have help with care provision, with 78% being the sole providers of care to their spouse (NAC, 2015). Spousal caregivers are also older than those who care for some other friend or family member, and are thus more likely to be at risk of developing their own care needs (NAC, 2015). Consistent with the possibility that spousal caregiving is particularly stressful, a number of studies have shown that both male and female spousal caregivers experience fewer caregiving rewards and greater caregiver burden, as well as report poorer physical and mental health than other types of caregivers (Cohen et al., 1990; George & Gwyther, 1986; NAC, 2015; Pinquart & Sorenson, 2011; Raschick & Ingersoll-Dayton, 2004). Lee and colleagues (2003) found that women caring for husbands, but not parents, have higher risk of coronary heart disease four years after providing care.

Conversely, it is possible that women providing care to their or their husband's parents find caregiving experiences especially stressful, particularly since these women may have the additional burden of providing care to children and their families (e.g., Spillman & Pezzin, 2000). For instance, Lin and colleagues (2012) showed that parental caregivers, especially daughters, reported more negative experiences with caregiving than spousal caregivers, including loss of time for other activities, physical and emotional strains, and caregiver burnout. Another study similarly found that parental caregivers experience more burden than spousal caregivers (Young & Kahana, 1989). While there is less research supporting the possibility that parental caregiving has more negative health effects than other caregiving experiences, at least one study shows that symptoms of distress associated with parental caregiving are more prevalent for daughters than for sons (Cohen et al., 1990). Finally, although those providing care to a person other than a spouse or parent have rarely been

distinguished in the literature, evidence suggests that they encounter less caregiving stress than spousal and parental caregivers (Neal et al., 1997).

The third way in which we integrate theory on the stress process and the life course perspective to gain insight about the caregiving-health relationship is by acknowledging that the stressors of providing care are intertwined with other stressors that may generate negative health effects for some time after caregiving ends, including bereavement. That is, those caring for an ill and disabled adult are also more likely to experience the loss of a loved one, especially a spouse or parent. Some scholars have even suggested that much of the distress and negative health effects associated with caregiving are attributable to having a family member who is very ill, rather than the intrinsic burdens of care work (Amirkhanyan & Wolf, 2006); indeed, evidence shows that the death of an ill significant other increases one's own risk of illness (Christakis & Allison, 2006). Research shows that responses to bereavement among caregivers vary, but that over time, many recover and enjoy reduced levels of depressive symptoms (Aneshensel et al., 2004). Interestingly, in a study of widows and widowers, Schulz et al. (2001) find that the most negative effects of bereavement were for non-caregivers, whose spouse's deaths may be sudden, while strained caregivers do not experience decreases in well-being after their spouse's death. While evidence regarding the role of bereavement in the health effects of caregiving is varied, it is important to consider how these losses influence caregivers' long-term health trajectories.

Research Aims

Drawing on insights from the life course perspective along with predictions derived from work on the stress process, in this paper we extend research on caregiver well-being by exploring the relationship between women's caregiving experiences during midlife and long-term trajectories of depressive symptoms, functional limitations, and mortality. We also assess how these relationships vary across caregiving contexts, including where women are providing care, and differences between caregiving for a husband, parent, or other loved one. Finally, we assess the role of prior health, family, and community ties that may put some women at greater risk of caregiving, as well as the effects of parental and spousal losses, all of which are also likely to affect women's long-term health and mortality risks.

Consistent with prior research, we expect that women who are current or recent caregivers will initially be more depressed and report more functional limitations than those who have not provided care in the previous five years (Pavalko & Woodbury, 2000). Less prior work guides our expectations for whether health differences between caregivers and non-caregivers should decline as women age, although some evidence suggests that we should expect a more persistent for functional limitations than for depressive symptoms (Pavalko & Woodbury, 2000; Robinson-Whelan et al., 2001). We also expect that some of this health gap will be accounted for by bereavement among those who lost a spouse or parent. Based on prior research, we predict that caregivers will have lower mortality, with at least some of this difference explained by selection processes. In terms of caregiving contexts, we expect that the negative health effects of caregiving will be more pronounced for women providing co-residential care, which previous work suggests is especially intense and burdensome. By the same token, any mortality benefits of caregiving should be most pronounced for those

providing care outside the home. Among co-residential caregivers, wives who provide care are expected to be the most distressed and experience the greatest negative health effects of caregiving, followed by caregiving daughters, with those providing care to someone else in-home experiencing fewer negative health effects.

Data and Method

Sample

Data are from the National Longitudinal Survey of Mature Women (NLS-MW), a nationally representative sample of 5,083 women who were age 30–44 at baseline in 1967 who were re-interviewed regularly until 2003. Sponsored by the U.S. Department of Labor and conducted by the U.S. Census Bureau, the survey was designed to explore women's work and family patterns, but expanded over the years to encompass a broader range of questions, including those detailing health and well-being. Although response rates for the NLS-MW were strong, by 1984, attrition had reduced the sample to 3,422 women, or 71.3 percent of the non-deceased sample. The sampling frame was stratified to ensure a sufficient number of African-American respondents to support racial/ethnic comparisons; however, we excluded women in the "other" heterogeneous racial/ethnic category (N=48). With further restrictions due to missing data—primarily on health limitations and depressive symptoms prior to caregiving—our analytic sample sizes are 2,705 for depressive symptoms (over 88 percent of women interviewed when depressive symptoms were measured), 2,550 for functional limitations (more than 94 percent of the sample by the time functional limitations were measured), and 3,267 for mortality (over 95 percent of the sample present by 1984). We allow the sample sizes to vary across outcome since limiting analyses to those with non-missing data across the multiple time points for all outcomes would have made our sample highly selective. Because of this variation, however, it is important to note that the findings for one outcome may not be fully generalizable to the samples for other outcomes. Respondents missing data were, on average, somewhat older and more likely to have health limitations, less likely to be employed, and less likely to have been married before providing care; thus, our analyses may underestimate the effects of caregiving for older women in our sample as well as those who were less healthy and less socially connected in midlife.

Measures

Caregiving—The caregiving measures are based on responses to questions from the 1984, 1987 and 1989 waves of the NLS-MW. Starting in 1984 (when they were 47–61 years old), respondents were periodically asked about their caregiving activities inside and outside the home. We focus on caregiving between 1984 and 1989 because these years best capture midlife caregiving, which is when these experiences are most common (NAC 2015). Respondents were also asked about caregiving later in life, but we limit our analysis to this window since the duration of caregiving experiences averages about 4 years. Additional analyses (not shown) found that when we control for later life caregiving, our substantive findings for the long-term health and mortality effects of caregiving during midlife remain the same. Our analyses distinguish between in-home and out-of-home caregiving in because we expect that co-residential caregiving is particularly stressful.

For caregiving that takes place at home respondents were asked “Would you say that—week in and week out—you have the sole responsibility for caring for chronically ill and disabled persons in the household?” as well as to identify that member of their household if they responded “yes.” We created three variables from these questions: *Cared for spouse inside home*, *Cared for parent inside the home*, and *Cared for other inside the home*. Parental caregivers include women who were caring for their own parents at home as well as those who were caring for their spouse’s parent. We made these categories mutually exclusive, coding the 27 women who cared for more than one person in their home between 1984–1989 as spousal caregivers if they provided care to their husband and any other person. We then coded women who provided in-home care to a parent or parent-in-law in addition to some other person who was not their husband as parental caregivers. Finally, respondents who provided care to multiple persons in their home, but none of whom were a spouse or parent, are coded as other caregivers.

For caregiving outside the home, respondents were asked “Do you regularly spend time taking care of or helping a relative or friend who is not a household member?” from which a variable *Cared outside the household* was created for those who responded “yes” to this question at least once from 1984–1989. Data on the relationship between the caregiver and the recipient were not consistently available for outside-the-home caregiving. The inside and outside the home caregiving variables are mutually exclusive; those who reported giving care both inside and outside the home between 1984 and 1989 (N=178) were coded as caring inside the home. Analyses that kept those providing care both inside and outside the home as a separate category produced few differences and are available upon request from the authors.

Dependent Variables

Depressive symptoms: In 1989, 1995, 1997, 1999, 2001, and 2003, respondents were asked 7 items of the Center for Epidemiologic Studies Depression scale (CES-D; Radloff 1977). Examples of these items include questions about how often in the past week they were unable to shake the blues, felt that everything took extra effort, had restless sleep, or felt sad. Response categories for each item ranged from 0 (rarely) to 3 (most or all of the time), with CES-D scores for each year ranging from 0 to 21. The internal reliability of the scale in 1989 is .89.

Functional limitations: In 1995, 1997, 1999, 2001 and 2003 respondents were asked 17 questions designed to assess functional limitations derived from the Nagi index (1976). These items asked how much difficulty respondents encountered performing activities such as running a mile, walking across the room, sitting for two hours, lifting or stooping, and bathing or dressing without help. Response categories on these items range from 0 (not at all difficult) to 3 (very difficult/can’t do). A fifth response category, “don’t do,” was also included. The proportion of respondents answering “don’t do” varied considerably by the level of activity indicated by each item, with up to 50 percent of women responding that they “don’t” run a mile in 1995, while less than 1 percent responded that they “don’t” bathe themselves. Assuming that respondents who responded that they do not do certain activities find these activities difficult or impossible to do, we also assign these respondents a score of

3 on these items. The range of possible scores on these scales is 0–51 for each year, and the reliability coefficient for 1995 is .91.

Mortality: Until the survey ended in 2003, mortality information was recorded by NLS-MW interviewers when possible. In 2009 the second and third authors linked NLS-MW cases to death records via the Demographic Survey Division of the U.S. Census Bureau and the National Center on Health Statistics (NCHS) using respondents' Social Security numbers, complete names, and dates of birth as well as their sex and their race. Since 1979, the NCHS has maintained a complete database of death records as provided by state agencies. Almost 94 percent of the sample provided valid Social Security numbers through which they were successfully matched to these NCHS death records. Additional data on mortality from 2008–2012 were gathered from the Social Security Death Index. Of the 3,267 women in our analytic sample for mortality, 1,400 (42.85 percent) had died by 2012.

Risk Factors Selecting Women Into Caregiving: Prior Health & Social Engagement—Previous research has found that health predicts who becomes caregivers, although evidence about whether healthier individuals are more likely to provide care is equivocal (e.g., McCann et al., 2004; O'Reilly et al., 2012). Either way, these studies highlight the need to account for pre-caregiving mental and physical health. Noting the possibility that more socially engaged women are more likely to encounter situations where they are needed as caregivers, accounting for pre-caregiving social ties is also meaningful. Our models thus include several controls for respondents' health and social engagement (via volunteer status) before caregiving.

Depressed in 1981 is a dichotomous measure; those who responded that they “ever felt depressed or very unhappy in the past few weeks” received a score of 1 on this item.

Health limited/prevented work in 1982 is a dichotomous measure based on respondent's answers to questions about whether they had a health problem that “prevents you from working altogether” or “limits in any way the amount or kind of work you can do.” If respondents answered “yes” to either of these items, they received a score of 1.

Functionally limited in 1982 is a dichotomous measure based on respondents' reports of having a health problem that limited any of twelve activities, including items such as walking, using stairs or inclines, sitting for long periods, handling and hearing. Respondents who had difficulty with at least two items received a score of 1 on this measure.

Volunteered 1981 is a dichotomous variable created from affirmative responses to the question, “In the past 12 months, did you do any unpaid volunteer work?” We include this variable as a proxy for women's involvement in their communities prior to caregiving.

Risk Factors Selecting Women Into Caregiving: Family Relationships—An individual's family ties put them at greater risk of caregiving, but can also be protective of health, potentially obscuring causal relationships between caregiving experiences and health or mortality. Our analyses thus include several variables indicating the respondent's initial marital status, number of living parents and number of siblings.

Marital status 1982: Only married respondents are at risk of caregiving for a spouse. Our analyses thus control for pre-caregiving marital status, including *Divorced in 1982*, *Widowed in 1982*, and *Never married in 1982*, with *Married in 1982* as the reference group. Respondents who were cohabitating but had never been married are also coded as never married throughout.

Number of parents and in-laws living in 1981: Having living parents is another risk factor for caregiving. We created a variable that sums the number of parents and in-laws living in 1981, ranging from 0 (no living parents) to 4 (all parents and in-laws living).

Number of siblings: We also include a variable indicating the respondent's number of siblings. Respondents with more siblings may be at increased risk of caregiving for a sibling, but decreased risk of caring for a parent. This item was measured in 1977 and ranges from 0 to 22.

Marital Status Change and Death of Parents and In-laws

Marital status 1984–1989: We created dichotomous variables measuring marital status change during the caregiving window to include in analyses for depressive symptom and functional limitation trajectories. These include *Stably unmarried*, *Marital loss* (all respondents who were married in 1984 but became widowed or divorced in 1987 or 1989), and *Marital gain* (respondents who were divorced, widowed, or never married in 1984 but married in 1987 or 1989). *Stably married* is the comparison category. Marital loss and gain variables are not mutually exclusive in the cases where respondents experienced both during this window (N=15).

Time-varying marital status: We also created a measure of marital status that varies by respondents' age to include in mortality analyses. For years in which respondents were not surveyed and when respondents were otherwise missing data on marital status, we imputed marital status from the most recent survey that the data were non-missing. Time-varying marital status includes *Divorced*, *Widowed*, and *Never married*, with *Married* as the comparison group.

Number of parents died by 1989: To explore whether changes in the number of parents and in-laws living affects the relationship between caregiving and health, we include a control for the number of parents that died between 1981 and 1989, which ranges from 0 to 4.

Sociodemographic and Control Variables—Analyses also control for respondents' age in 1982, race/ethnicity (African-American compared to white), educational attainment (0–6 years of schooling, 7–11 years, and 12 years compared to 13 or more years), and employment status in 1982 (employed full-time and employed part-time compared to all those who did not work for pay for at least two weeks during 1982). In supplemental analyses (available by request) we explored models including additional controls for occupational group at age 50, longest occupational group, logged income in 1982, and in mortality models, time-varying employment status. While these different measures of

women's employment and income predict health and mortality, their inclusion did not change our substantive findings with respect to caregiving, and many respondents are missing data on these items. Hence, we chose not to incorporate these measures into our final analyses in order to avoid creating additional selectivity in our analytic samples.

Analytic Approach

Linear growth curve models using multiple within-person observations are employed to estimate whether trajectories of depressive symptoms and functional limitations vary by earlier caregiving experiences. These models, which nest observations within individuals, allow us to assess differences at baseline as well as within-person changes in the relationship between predictors and outcomes over time. Likelihood ratio tests comparing unconditional means and unconditional growth models for each outcome show that including time as a fixed and random effect improves model fit. All respondents who had information from at least two waves for each outcome were included. Time is coded as zero at the first point the outcome was measured (1989 for CESD and 1995 for functional limitations). The first models for these outcomes include time and caregiving experiences only, adding interactions between caregiving and time in the second model. These models show the relationships between caregiving experiences and health before the addition of controls, as well as whether the relationship between these experiences and health is consistent, decreases, or increases over time. The third models add controls for sociodemographic and status characteristics that may also explain the relationship between caregiving and health. The fourth and fifth models add pre-caregiving health and social engagement to account for factors that may select women into caregiving as well as affect their health later in life. Finally, to help account for the possible intervening effects of bereavement on the caregiving-health relationship, the sixth models include controls for marital status change over the caregiving period as well as a count of deceased parents.

To explore differences in age-specific mortality based on caregiving experiences from 1984 to 1989, we employ Cox proportional hazards models (Cox 1972), which provide estimates of the hazard of death from age 45 to 90 based on model covariates. These models assume that the hazard of age-specific mortality is proportional to the baseline hazard, an assumption that we tested and validated by creating interactions between age and caregiving experiences, which were not significant in these models. The sequence of models for mortality is similar to those for health, with the first model including caregiving experiences only and the second model adding controls. The third model again adds baseline health and social engagement to account for selection into caregiving, and the fourth and final models include time-varying marital status, number of parents living before caregiving, and number of siblings, all of which may affect which women become caregivers as well as the effect of caregiving experiences on later health.

Results

Descriptive statistics for study variables by caregiving experiences from 1984–1989, as well as bivariate comparisons between caregivers and non-caregivers, are presented in Table 1. Table 1 first shows that 42.85 percent of the total sample had died by 2012 (when they were

aged 75–90), and that respondents' average scores were 3.86 on the scale of depressive symptoms in 1989 and 12.04 on the scale of functional limitations in 1995. Bivariate analyses indicate that out-of-home caregivers had lower mortality rates and fewer functional limitations in 1995 than non-caregivers. All women who provided in-home care had more depressive symptoms in 1989 and functional limitations in 1995 than non-caregivers, and women who were caring for someone other than a spouse or parent in the home had higher mortality rates than non-caregivers.

Also clear from Table 1 is that caregivers inside and outside the home differ from non-caregivers and from one another in many other ways. Out-of-home caregivers were younger than non-caregivers, while those who cared for a spouse in-home were older. Other in-home caregivers were more likely to be African-American compared to non-caregivers, though there are no other significant racial/ethnic differences by caregiving. Out-of-home caregivers were better educated than non-caregivers, while in-home caregivers of spouses or someone other than a spouse or parent had fewer years of education than non-caregivers. Fewer spousal and other in-home caregivers than non-caregivers were employed full-time in 1982, while more were unemployed, and more outside-home caregivers worked part time than non-caregivers.

Turning to differences in health, social integration, and family, we first see that other in-home caregivers were more likely to have been depressed in 1981 than non-caregivers. All in-home caregivers tended to have more pre-caregiving health problems than non-caregivers. By contrast, those who provided care outside of the home were less likely to have a health problem that limited or prevented work and less likely to be functionally limited during the years before caregiving was measured. All caregivers were more likely to have volunteered than women who did no care work between 1984 and 1989. Caregiving experiences also vary by marital status. Married women are at greater risk of caregiving both inside and outside the home, and in general, women with more living parents and fewer siblings are at greater risk of providing care.

Taken together, these bivariate analyses provide preliminary support for the hypothesis that the contexts and meanings of caregiving inside and outside the home differ. On many characteristics, women who provided care for a parent or parent-in-law were the most similar of any caregiving group to non-caregivers, while those who provided care to a spouse or other household member tended to be in poorer health, less educated, less likely to be employed, and less likely to be volunteers. In contrast, out-of-home caregivers tend to have more education, better health, and more social integration from marriage and volunteer work.

Depressive Symptoms

Table 2 shows fixed effects and covariance parameters for linear growth models regressing depressive symptoms from 1989–2003 on caregiving experiences from 1984–1989. The significant, positive fixed effects coefficient for time in Model 1 indicates that women's depressive symptoms increased over time. Model 1 also shows that co-residential caregivers have more depressive symptoms than non-caregivers. The random effect for time is significant based on likelihood-ratio tests, meaning that the change in depressive symptoms

over time varies across individuals. The one significant interaction for time and caregiving in Model 2 is for in-home parental caregivers, indicating that while this group has more depressive symptoms than non-caregivers in 1989, the gap decreases over time. In contrast, the higher levels of depressive symptoms among spousal and other in-home caregivers do not significantly decrease.

Additional controls in Model 3 show that women who are older and African-American women report more depressive symptoms than younger and white women. Consistent with prior research, more educated and employed women report fewer depressive symptoms than less educated and unemployed women. Including these controls reduces the positive relationship between giving in-home care to someone other than a spouse or parent and depressive symptoms to non-significance. Step-by-step analyses show that this drop-off in significance is explained by both race and education.

Model 4 adds measures for prior health and social engagement. Being depressed in 1981 and having a work-related health problem or being functionally limited in 1982 are robust predictors of more depressive symptoms later in life. While the significance of the coefficient for spousal caregiving is reduced, accounting for these measures does not explain the depressing effect of having cared for a spouse or parent. Model 5 shows that pre-caregiving marital status, number of living parents and number of siblings are not significantly associated with later depressive symptoms. Finally, controls for marital status change from 1984–1989 and deceased parents in Model 6 show that losing a spouse or a parent predicts increased depressive symptoms, but again these factors do not explain the positive relationship between in-home spousal or parental caregiving and depression. While the coefficient for in-home parental caregiving is larger than the term for spousal caregiving, supplemental analyses using parental caregivers as the comparison group (available on request) indicate that the relationship between providing care and depressive symptoms is not significantly different for these two groups.

Functional Limitations

Table 3 presents linear growth curve models for functional limitations. Model 1 indicates that, as we would expect in late life, functional limitations increased between each survey from 1995–2003. Model 1 also shows that those who provided care outside the home from 1984–1989 reported fewer functional limitations than non-caregivers, while in-home caregivers experienced more functional limitations. The rate of change is significant, meaning that change in functional limitations over time varies by person. Model 2 adds interaction terms for caregiving and time. Similar to depressive symptoms, while parental in-home caregivers have more functional limitations than non-caregivers in 1995, this difference shrinks over time, as their rate of increase in functional limitations is smaller than for non-caregivers. We do not, however, see a similar narrowing of the functional limitation gap for spousal or other in-home caregivers.

Control variables added in Model 3 show that older women, African-American women, those with less education and those who are unemployed have more functional limitations. Controlling for age, race, education and employment accounts for the fewer functional limitations experienced by non-co-residential caregivers as well as the higher level of

functional limitations among women caring for a spouse or other non-parent in the home. Supplemental analyses indicate that education is the main explanatory variable contributing to the decline in significance of these coefficients. Model 4 again adds health and prior social engagement, and shows that pre-caregiving depressive symptoms and physical health are positively related to later functional limitations, but these variables do not account for the higher functional limitations among parental in-home caregivers. None of the controls for pre-caregiving family relationships in Model 5 are significant, and neither marital change between 1984 and 1989 nor parental losses in Model 6 explain the positive relationship between caring for a parent in-home and functional limitations. Supplemental analyses indicate that the difference between parental and spousal in-home caregivers on this measure is not significant.

Mortality

Lastly, Table 4 shows hazard rate ratios from Cox proportional hazards models for age-specific all-cause mortality by 2012 predicted by caregiving experiences from 1984 to 1989. Model 1 shows that those who cared outside the home have 20.7 percent lower hazard of death than women who did not give care during this period, while women who cared for someone other than a parent or spouse inside the home had 33.2 percent higher hazard of having died. Despite the association of spousal and parental caregiving with physical and emotional health, neither type of care work is associated with mortality. Model 2 includes additional covariates and shows that, as we would expect, age, race, education and employment are all associated with mortality. Accounting for these characteristics makes the positive relationship between providing in-home care for someone other than a spouse or parent and mortality non-significant, which supplemental analyses show is explained by the inclusion of any of these covariates.

Model 3 examines whether the selection of healthier, more engaged women into caregiving outside the home accounts for the lower mortality risk of out-of-home caregivers. While physical health, work limitations and employment are associated with mortality, they do not explain the mortality benefit of outside caregiving. Likewise, the addition of family relationships in Model 4 shows that although being married, having more siblings, and reporting more living parents before caregiving are all associated with lower mortality, these factors also do not explain the lower risk of mortality among caregivers outside the home. After including all controls in Model 4, those who provided care outside of the household at some point between 1984 and 1989 still are found to have an 11.9 percent lower risk of death than non-caregivers.

Discussion

Our analyses make a number of contributions to knowledge about the relationship between caregiving and health by integrating life course and social stress perspectives to address three specific gaps in the research. First, our findings show that women's caregiving experiences at midlife do have long-term health consequences as they enter old age. More specifically, we find that both parental and spousal in-home caregivers have more depressive symptoms, and parental caregivers also have more functional limitations than non-

caregivers. Our analyses also indicate that, although the depressing effect of in-home parental care decreases slightly over time, the relationship between spousal care and depression is stable over the following 14 years, as is the relationship between parental care and functional limitations. By showing that these common caregiving experiences set women up for subsequent persistent health declines, our study adds an important piece of knowledge to existing work revealing the shorter-term health consequences of caregiving. Our findings also shed light on a seeming paradox concerning the effects of caregiving noted in prior literature (which find that despite poorer health, caregivers have lower mortality rates), showing that while negative health effects of caregiving persist over long periods of time, these do not translate into higher mortality risk. This finding holds even when we control for factors that may select women into caregiving and be associated with better health later in life, such as social engagement and family ties.

As described in the background, a second way we use the life course perspective to view stressful experiences in a way that adds to our understanding of caregiver well-being is by considering caregiving contexts. We find that the health effects of caregiving are contingent on where it occurs to the extent that there are negative health effects for in-home caregiving but positive effects for out-of-home caregiving. More specifically, while there are negative health effects for co-residential spousal and parental caregivers as noted, there are no such negative effects for out-of-home caregivers, who actually experience lower mortality rates than non-caregivers. This finding suggests that the puzzling pattern in prior work that caregivers have more health problems but lower mortality is at least partially attributable to heterogeneity in the caregiving experience. Out-of-home caregivers have lower mortality risk even when controlling for health, social engagement, and family ties before caregiving—factors that may select women into out-of-home care experiences but also decrease mortality. It is important to note a limitation of our data that may contribute to this finding; while in-home caregivers were asked whether they had “sole responsibility” for someone ill in their homes, out-of-home caregivers were asked if they “regularly spent time” caring for someone ill outside of their home, which may encompass an even broader and potentially less stressful range of caregiving activities. Additionally, it is of course possible that women who become non-co-residential caregivers share other qualities that contribute to lower mortality risk, such as personal resources like self-esteem and mastery. However, it is also important to consider the possibility that this type of caregiving has real benefits for mortality. Perhaps because out-of-home caregiving is less stressful than in-home caregiving, out-of-home caregivers are better able to reap the benefits of caregiving. We also find that the health effects of in-home caregiving vary by care recipient; while both parental and spousal in-home caregivers experience negative health effects, these effects do not appear to extend to those who provide in-home care for some other loved one. Future analyses should explore whether the health effects of out-of-home caregiving also differ by the caregiver/care-recipient relationship.

The third and final key way our study integrates stress process theory and the life course paradigm to improve our understanding of the relationship between caregiving and long-term health is by acknowledging that these effects are likely intertwined with bereavement. Our analyses show that while there are independent long-term health consequences to losing a spouse or parent, these losses do not explain the negative relationship between co-

residential spousal and parental caregiving and health among the women in our study. Thus, we conclude that the negative health effects of these caregiving experiences are not simply attributable to the stress of losing a loved one.

One key limitation of our study is that the measurement of caregiving is limited to a five-year window of time during midlife. Although research shows that most experiences with caregiving do not last longer than four years, and that caregiving is most common during this point of the life course (NAC, 2015), we do not know whether women were providing care before this time. This limitation makes it especially important that we control for baseline health and other characteristics that are likely influenced by women's prior care work. Some women also continue to provide care after the five-year window that is the focus on our study. In further analyses (not shown), we found that including information on caregiving to 2003 did not substantially change our findings, but it significantly reduces sample size and makes the sample far more selective. As more longitudinal data become available, analyses of the relationship between caregiving careers and health trajectories will elaborate offer great insight about what factors like the timing and duration of caregiving mean for women's long-term health.

Another limitation of these analyses is that our sample does not include men. While women are more likely to be caregivers than men, many men provide care as well, and the proportion of men doing so is on the rise (NAC, 2015). Short-term studies find that the burdens and rewards of caregiving, as well as its health effects, vary by gender (Pinquart & Sorensen, 2006). Similar long-term analyses of the health effects of caregiving for men will be important in order to elaborate our understanding of how gender impacts caregiving experiences.

Our study adds to research on caregiver well-being by showing that women's experiences with caregiving at midlife have long-term effects on their health as they enter old age. The findings also underscore how important caregiving contexts can be in determining the health effects of caregiving by showing that while co-residential caregiving shapes women's health trajectories in ways that may increase their own needs for care, women who provide care outside the home may enjoy longer lives. Even more broadly, our study illustrates the utility of viewing stressful family role experiences through the lens of the life course perspective, recognizing that these experiences have many antecedents and continue to have rippling effects as adults age.

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Table 1
Descriptive Statistics for Study Variables by Caregiving Experiences from 1984–1989

	Total (N=3267)	Non-Caregiver (N=1796)	Out-of-Home Caregiver (N=1012)	In-Home Caregiver		
				Cared for Spouse (N=219)	Cared for Parent (N=112)	Cared for Other (N=128)
Mortality by 2012 (% deceased)	42.85	44.21	37.15 *	48.40	50.00	53.12 *
Depressive symptoms 1989 (0–21) (N=2836)	3.86 (4.43)	3.63 (4.25)	3.66 (4.24)	4.83 * (4.75)	5.69 * (5.76)	5.36 * (5.55)
Functional limitations 1995 (0–51) (N=2512)	12.04 (9.67)	12.20 (9.66)	10.72 * (9.18)	14.58 * (10.00)	14.30 * (10.20)	15.00 * (10.97)
Age 1982 (45–59)	52.14 (4.37)	52.18 (4.44)	51.77 * (4.26)	52.93 * (4.33)	52.74 (4.10)	52.66 (4.31)
African-American (%)	26.84	26.67	24.11	31.96	31.25	38.28 *
Education						
0–6 years of education (%)	6.89	7.18	4.55 *	11.42 *	5.36	14.84 *
7–11 years of education (%)	34.50	35.58	29.05 *	46.12 *	29.46	46.88 *
12 years of education (%)	41.75	40.59	46.94 *	32.42 *	46.43	28.91 *
13+ years of education (%)	16.87	16.65	19.47	10.05 *	18.75	9.38 *
Employment status 1982						
Employed full-time (%)	40.50	41.59	40.91	33.33 *	44.64	30.47 *
Employed part-time (%)	15.79	15.37	18.48 *	11.87	10.71	11.72
Unemployed (%)	43.71	43.04	40.61	54.79 *	44.64	57.81 *
Depressed 1981 (%)	32.69	32.46	29.55	37.44	36.61	49.22 *
Health limited/prevented work 1982 (%)	30.88	31.57	25.59 *	39.27 *	33.93	46.09 *
Functionally limited 1982 (%)	30.46	31.35	25.79 *	39.27 *	30.36	39.84 *
Volunteered 1981 (%)	15.24	7.13	27.96 *	18.26 *	20.54 *	18.75 *
Marital status 1982						
Married (%)	74.78	71.71	77.47 *	97.72 *	66.96	64.06
Divorced (%)	10.25	11.53	9.49	2.28 *	13.39	9.38
Widowed (%)	11.05	12.58	9.88 *	0.00 *	8.93	19.53 *

	Total (N=3267)	Non-Caregiver (N=1796)	Out-of-Home Caregiver (N=1012)	In-Home Caregiver		
				Cared for Spouse (N=219)	Cared for Parent (N=112)	Cared for Other (N=128)
Never married (%)	3.92	4.18	3.16	0.00 [*]	10.71 [*]	7.03
Marital status 1984–1989						
Stably married (%)	64.80	62.92	68.77 [*]	72.60 [*]	58.04	52.34 [*]
Stably unmarried (%)	24.95	27.56	23.62 [*]	0.91 [*]	33.93	32.03
Marital loss (%)	8.20	7.41	5.93	25.11 [*]	5.36	10.94
Marital gain (%)	1.81	2.06	1.38	1.83	0.89	2.34
Number of parents living 1981 (0–4)	1.13 (1.02)	1.03 (1.00)	1.31 [*] (1.06)	1.05 (0.94)	1.55 [*] (0.78)	0.85 [*] (0.88)
Number of parents died by 1989 (0–4)	0.62 (0.77)	0.61 (0.78)	0.66 (0.78)	0.59 (0.71)	0.74 (0.77)	0.52 (0.70)
Number of siblings (0–22)	4.13 (3.18)	4.24 (3.19)	3.89 [*] (3.13)	4.46 (3.11)	3.46 [*] (3.13)	4.60 (3.44)

^{*} = Significantly different from non-caregivers, $p < .05$, two-tailed tests.

Table 2

Fixed Effects & Covariance Parameters for Linear Growth Models Regressing CES-D 7 in 1989–2003 on Caregiving in 1984–89 (N=2705)

<i>Fixed Effect</i>	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Time	0.039 *	0.018	0.049 *	0.024	0.049 *	0.024	0.052 *	0.024	0.052 *	0.024	0.052 *	0.024
Out-of-home caregiver 1984–1989	–0.156	0.138	–0.207	0.158	–0.007	0.152	0.129	0.146	0.121	0.146	0.157	0.146
In-home spousal caregiver 1984–1989	1.133 ***	0.256	1.267 ***	0.284	0.884 ***	0.272	0.803 **	0.253	0.746 **	0.255	0.698 **	0.256
In-home parental caregiver 1984–1989	1.160 **	0.344	1.933 ***	0.395	2.044 ***	0.379	1.928 ***	0.355	1.900 ***	0.357	1.941 ***	0.356
In-home other caregiver 1984–1989	0.952 **	0.338	0.869 *	0.387	0.308	0.373	0.102	0.350	0.115	0.350	0.122	0.349
Out-of-home caregiver 1984–1989 * Time			0.024	0.039	0.025	0.039	0.023	0.039	0.023	0.039	0.024	0.039
In-home spousal caregiver 1984–1989 * Time			–0.069	0.065	–0.073	0.064	–0.071	0.064	–0.070	0.064	–0.070	0.064
In-home parental caregiver 1984–1989 * Time			–0.342 **	0.114	–0.332 **	0.114	–0.320 **	0.113	–0.321 **	0.113	–0.319 **	0.113
In-home other caregiver 1984–1989 * Time			0.105	0.111	0.107	0.111	0.112	0.111	0.112	0.111	0.115	0.111
Age 1982			0.027 *	0.014	0.014	0.009	0.484	0.011	0.011	0.014	0.005	0.014
African-American			0.552 **	0.145	0.239	0.134	0.283	0.136	0.258	0.136	0.258	0.136
Education (Comparison: 13+ years)												
0–6 years of education			3.027 ***	0.280	2.309 ***	0.258	2.402 ***	0.265	2.333 ***	0.264	2.333 ***	0.264
7–11 years of education			1.918 ***	0.178	1.418 ***	0.164	1.486 ***	0.170	1.450 ***	0.170	1.450 ***	0.170
12 years of education			0.714 ***	0.163	0.643 ***	0.149	0.668 ***	0.151	0.659	0.150	0.659	0.150
Employment status 1982 (Comparison: Not working)												
Employed full time			–0.847 ***	0.131	–0.275 *	0.125	–0.254 *	0.128	–0.249 *	0.127	–0.249 *	0.127
Employed part time			–0.495 **	0.171	–0.052	0.159	–0.057	0.159	–0.060	0.158	–0.060	0.158
Depressed 1981					1.595 ***	0.119	1.615 ***	0.119	1.617 ***	0.119	1.617 ***	0.119
Health limited/prevented work 1982					1.040 ***	0.147	1.048 ***	0.147	1.062 ***	0.147	1.062 ***	0.147
Functionally limited 1982					1.371 ***	0.145	1.379 ***	0.146	1.368 ***	0.145	1.368 ***	0.145
Volunteered 1981					–0.137	0.153	–0.143	0.153	–0.204	0.153	–0.204	0.153
Marital status 1982 (Comparison: married)												
Divorced							–0.200	0.185	–0.288	0.185	–0.288	0.294

<i>Fixed Effect</i>	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Widowed									-0.261	0.188	-0.365	0.315
Never married									-0.050	0.280	-0.202	0.375
Number of parents living 1981									-0.009	0.061	-0.135	0.079
Number of siblings									-0.027	0.018	-0.028	0.018
Marital status 1984–1989 (Comparison: stably married)												
Stably unmarried											0.220	0.276
Marital loss											0.580**	0.203
Marital gain											-0.442	0.436
Number of parents died by 1989											0.266**	0.099
<i>Random Effect</i>												
Intercept variance	8.587	0.388	8.557	0.387	7.452	0.358	5.813	0.314	5.803	0.314	5.739	0.313
Rate of change	0.185	0.025	0.177	0.024	0.178	0.024	0.175	0.024	0.175	0.024	0.175	.024
Residual variance	8.850	0.137	8.855	0.137	8.860	0.137	8.869	0.137	8.869	0.137	8.869	0.137
Log likelihood	-36871.592		-36862.148		-36699.081		-36455.532		-36453.067		-36443.678	

*
=p<.05,

**
=p<.01,

=p<.001

Table 3

Fixed Effects & Covariance Parameters for Growth Models Regressing Functional Limitations in 1995–2003 on Caregiving in 1984–89 (N=2550)

<i>Fixed Effect</i>	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Time	0.912 ***	0.049	0.951 ***	0.067	0.943 ***	0.067	0.939 ***	0.066	0.939 ***	0.066	0.939 ***	0.066
Out-of-home caregiver 1984–1989	–1.335 ***	0.390	–1.226 **	0.402	–0.490	0.379	–0.210	0.356	–0.202	0.357	–0.188	0.359
In-home spousal caregiver 1984–1989	1.907 **	0.722	1.850 *	0.740	0.585	0.692	0.232	0.632	0.284	0.638	0.302	0.642
In-home parental caregiver 1984–1989	2.312 *	0.989	2.794 **	1.018	3.063 ***	0.954	2.864 ***	0.872	2.815 ***	0.879	2.839 ***	0.880
In-home other caregiver 1984–1989	2.609 **	0.955	2.208 *	0.989	0.424	0.930	0.058	0.854	0.037	0.855	0.049	0.856
Out-of-home caregiver 1984–1989 * Time			–0.118	0.107	–0.117	0.107	–0.117	0.106	–0.118	0.106	–0.118	0.106
In-home spousal caregiver 1984–1989 * Time			0.063	0.181	0.061	0.180	0.062	0.179	0.061	0.179	0.061	0.179
In-home parental caregiver 1984–1989 * Time			–0.613 *	0.312	–0.606 *	0.312	–0.592	0.310	–0.591	0.310	–0.590	0.310
In-home other caregiver 1984–1989 * Time			0.370	0.307	0.349	0.307	0.353	0.305	0.351	0.305	0.350	0.305
Age 1982					0.296 ***	0.038	0.231 ***	0.034	0.231 ***	0.037	0.228 ***	0.037
African-American					2.458 ***	0.401	1.717 ***	0.363	1.737 ***	0.370	1.723 ***	0.037
Education (Comparison: 13+ years)												
0–6 years of education					8.397 ***	0.770	6.299 ***	0.700	6.491 ***	0.717	6.488 ***	0.719
7–11 years of education					5.058 ***	0.491	3.626 ***	0.446	3.792 ***	0.463	3.799 ***	0.464
12 years of education					1.900 ***	0.450	1.591 ***	0.405	1.675 ***	0.408	1.683 ***	0.409
Employment status 1982 (Comparison: Not working)												
Employed full time					–2.748 ***	0.361	–0.650	0.338	–0.778 *	0.346	–0.768 *	0.347
Employed part time					–2.438 ***	0.470	–0.839 *	0.429	–0.859 *	0.430	–0.854 *	0.430
Depressed 1981							1.622 ***	0.324	1.629 ***	0.325	1.631 ***	0.325
Health limited/prevented work 1982							4.143 ***	0.401	4.128 ***	0.401	4.134 ***	0.401
Functionally limited 1982							5.026 ***	0.395	4.971 ***	0.396	4.983 ***	0.396
Volunteered 1981							–0.049	0.417	–0.032	0.418	–0.044	0.421
Marital status 1982 (Comparison: married)												
Divorced									0.705	0.504	0.829	0.812

<i>Fixed Effect</i>	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Widowed												
Never married												
Number of parents living 1981												
Number of siblings												
Marital status 1984–1989 (Comparison: stably married)												
Stably unmarried												
Marital loss												
Marital gain												
Number of parents died by 1989												
<i>Random Effect</i>												
Intercept variance	66.847	2.378	66.811	2.376	56.401	2.091	44.251	1.757	44.102	1.754	44.136	1.756
Rate of change	2.615	0.179	2.598	0.178	2.591	0.178	2.563	0.176	2.563	0.176	2.564	0.176
Residual variance	24.555	0.448	24.552	0.447	24.573	0.448	24.626	0.449	24.626	0.449	24.626	0.449
Log likelihood	−37629.696		−37625.499		−37402.633		−37137.139		−37134.922		−37134.349	

*
=p<.05,**
=p<.01,***
=p<.001

Table 4

Hazards Ratios from Cox Proportional Hazards Models of Mortality Based on Caregiving 1984–1989
(N=3267)

	M1	M2	M3	M4
Out-of-home caregiver 1984–1989	0.793 ***	0.854 **	0.865 *	0.881 *
In-home spousal caregiver 1984–1989	1.128	0.989	0.982	0.969
In-home parental caregiver 1984–1989	1.187	1.179	1.160	1.120
In-home other caregiver 1984–1989	1.332 *	1.143	1.109	1.070
Age 1982		1.055 ***	1.049 ***	1.034 ***
African-American		1.391 ***	1.329 ***	1.238 ***
Education (Comparison: 13+ years)				
0–6 years of education		1.494 ***	1.322 *	1.280
7–11 years of education		1.651 ***	1.532 ***	1.553 ***
12 years of education		1.299 **	1.270 **	1.285 **
Employment status 1982 (Comparison: Not working)				
Employed full time		0.810 ***	0.940	0.861 *
Employed part time		0.751 ***	0.852 *	0.827 *
Depressed 1981			0.988	0.974
Health limited/prevented work 1982			1.454 ***	1.448 ***
Functionally limited 1982			1.189 **	1.142 *
Volunteered 1981			1.056	1.090
Time-varying marital status (Comparison: Married)				
Divorced				1.729 ***
Widowed				1.533 ***
Never married				1.844 ***
Number of parents living 1981				0.935 *
Number of siblings				0.980 *
Log-likelihood	–10973.058	–10872.378	–10838.985	–10796.634
Degrees of freedom	4	11	15	20

*
=p<.05,

**
=p<.01,

=p<.001