Parent Care and the Stress Process:
Findings From Panel Data

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Objectives. The purpose of this study was to test with panel data an extended model of the stress process recognizing the separate effects of a parent's need for care and an adult child's caring activities.

Methods. Using data from the 1996, 1998, and 2000 waves of the Health and Retirement Study, we estimated nonlinear mixed models of mental health outcomes. We assessed mental health for separate samples of 3,350 men and 3,659 women by using an 8-item scale of depressive symptoms. We also explored the sensitivity of results to alternative measures and model specifications.

Results. We found that female, but not male, caregivers whose parents needed care exhibited adverse mental health consequences. However, we found that, generally, both male and female noncaregivers whose parents needed care were more likely to report symptoms of depression than were noncaregivers without disabled parents. Additional findings suggest that the stress process is still more complex among married couples.

Discussion. This study distinguishes the outcomes of parental care needs from those attributable to caregiving activities. Adverse psychological outcomes appear to be dispersed throughout the family. To focus narrowly on active caregivers is to underestimate the social burdens of disability at older ages.

A SUBSTANTIAL body of research addresses the mental health consequences of providing informal care to disabled elders. Theoretical contributions have identified various stressors, rewards, and family roles as aspects of the caregiving process, and numerous empirical studies have presented evidence of the adverse effects of being a caregiver. Although recognizing that an older parent or spouse's disability is itself an independent disturbance acting throughout the family (Brody, Hoffman, Kleban, & Schoonover, 1989; Schulz, O'Brien, Bookwala, & Fleissner, 1995), most empirical literature confines its attention to consequences among active caregivers only. In some cases, studies have also examined adaptations to the death of the care recipient. Researchers have directed much less attention beyond caregiver–care recipient dyads.

The general stress and adaptation literature, which provides a foundation for much caregiver stress research, views stress as a complex process with interrelated domains of sources, mediators, and manifestations (Pearlin, 1989; Pearlin, Lieberman, Menaghan, & Mullan, 1981). Caregiving stressors are defined as difficulties created by care demands that are disruptive for a caregiver insofar as they exceed the individual's ability to adapt (Aneshensel, Pearlin, Mullan, Zarit, & Whitlatch, 1995). Researchers have differentiated between primary stressors (e.g., the care recipient's impaired condition or the caregiver's subjective emotional reaction to it) and secondary stressors (problems arising as a result of caregiving but outside of caregiving roles; Aneshensel et al.). Although this theory clearly identifies parental disability as one of the stressors associated with caregiving, researchers have not yet fully explored its effect on family members other than those involved in direct care provision.

Although researchers have directed much attention towards stressors and their negative consequences, being a caregiver can produce psychological benefits as well as costs. Caregivers report multiple enjoyable aspects of care, such as enhanced caregiver–care recipient relationships, personal growth, caring self-competence, increased understanding of the aging process, satisfaction with social involvement, and ability to provide good care (for a meta-analysis, see Pinquart & Sörensen, 2004). Raschick and Ingersoll-Dayton (2004) found that adult children who provided care to their parents experienced more rewards than did spousal caregivers. A "unified model" linking caregiver stress to health outcomes, discussed in Schulz, Gallagher-Thompson, Haley, and Czaja (2000, 33–60), incorporated both adverse and positive responses to caregiving, suggesting that physical and mental health outcomes represented net responses to these opposing forces.

Although past work has often focused on the individual caregiver rather than the whole family (Gatz, Bengtson, & Blum, 1990), more recent studies have viewed caregiving as a family-system problem. Caregiving affects all members of a family network by diverting a caregiver's time away from other family members, changing the family's lifestyle and conditions, producing feelings of guilt, and engendering conflict over the care arrangements (Brody et al., 1989; Gatz et al.; Strawbridge & Wallhagen, 1991; Toseland, Smith, & McCallion, 1995). Although this theory has implications for noncaregiving family members, this group has not been a particular focus of caregiving research.

In Amirkhanyan and Wolf (2003), we found evidence of *noncaregiver stress*, manifested as a decline in emotional health associated with an older parent's need for care and distinct from an adult child's caregiving activities. Our analysis of cross-

sectional data from the 1992 Health and Retirement Study (HRS), which collected data from caregivers and noncaregivers with different patterns of parental care needs, allowed us to separate the psychological outcomes of parental disability from those impacts uniquely attributable to caregiving activities. Our findings suggested that it may not have been caring itself, but rather one's parent's *need* for care, that produced the adverse mental health consequences of caregiving discussed in the past research.

The literature on caregiver stress continues to grow, but investigators continue to overlook the separate contributions to health outcomes made by a loved one's care needs and one's response to those needs. For example, Dunlop, Song, Lyons, Manheim, and Chang's (2003) analysis of 1996 HRS data compared the prevalence of major depression between respondents who did and did not help their parents with basic daily activities. Similarly, Chumbler, Pienta, and Dwyer (2004) used 1992 HRS data in order to compare the depression scores of adult children caring for, and not caring for, older parents. Both studies found elevated levels of depression among caregivers (although in the latter study, this finding emerged only among respondents with a living father); neither study, however, included controls for parents' needs for care.

Our 2003 study is subject to the usual problems associated with use of cross-sectional data, particularly that of omitted-variable bias. For example, intergenerational correlations in health might lead to a common dependence of parental care needs and one's own poor mental health on omitted factors. Furthermore, various selection mechanisms might lead individuals with a predisposition to the manifestations of stress to adopt, or to persist in, parent-care activities. Accordingly, the goal of the present study is to provide a methodologically more rigorous validation of the model proposed and tested in our previous work. Specifically, we address the missing-variable problems by applying a random-effects estimator to panel data from later waves of the HRS. We also explore the sensitivity of our basic findings to several alternative measures and model specifications.

METHODS

Study Design and Data Source

Our data came from the HRS, an ongoing panel study that began in 1992 and that collects a broad range of demographic, health, and economic data. Respondents were originally from the 1931–1941 birth cohort, and respondents from additional birth cohorts were added later (for an overview of the HRS, see University of Michigan [n.d.]). Our analysis used data from Waves 3, 4, and 5 (1996, 1998, and 2000) of the HRS. We chose these waves based on changes that study organizers made to the data collection instruments throughout successive waves of interviewing. Specifically, the questions used to form the depression scale changed from Wave 1 to Wave 2 and have since remained fixed, while the questions on care provided to parents changed from Wave 1 to Wave 2, and again from Wave 2 to Wave 3, thereafter remaining fixed. Wave 3 of the HRS included the cohort of persons born between 1931 and 1941 (and, if married, their spouses), but starting in 1998 this sample was supplemented with persons born before 1931 or between

Table 1. CES-D Question Wording and Response Patterns, by Gender

	Percent Responding "Yes"	
Question	Men	Women
Much of the time during the past week …		
… you felt **depressed**.	11.4	16.1
… you felt that everything you did was an **effort**.	20.0	22.5
… your **sleep** was restless.	26.4	33.0
… you were **happy** (coded 1 = no, 0 = yes).	10.6	13.0
… you felt **lonely**.	10.3	15.0
… you **enjoyed** life (coded 1 = no, 0 = yes).	5.8	8.6
… you felt **sad**.	12.7	20.4
… you could not get **going**.	15.4	21.0

Notes: CES-D = Center for Epidemiologic Studies–Depression scale. Unless otherwise noted, coded 1 = yes, 0 = no. Bolded words correspond to the variable names used in our presentation of results in Table 2.

1942 and 1947 (and their spouses). We excluded age-ineligible spouses as well as respondents currently living in a nursing home (or whose spouse is living in a nursing home) from this analysis. However, we did include the characteristics of age-ineligible respondents as spousal variables. In addition, we excluded respondents with no surviving parents (and, if married, parents-in-law). We note below additional inclusion conditions and their implications for sample size.

Dependent Variable

Our measure of psychiatric morbidity was a variation on the Center for Epidemiologic Studies–Depression (CES-D) scale, which was designed to measure depressive symptoms by emphasizing their subjective and affective elements (McDowell & Newell, 1996; Radloff, 1977). Beginning with Wave 2, the HRS adopted an 8-item battery of CES-D items, with each item limited to two response categories (yes and no). Six of the 8 CES-D items indicate the presence of depression, and 2 indicate its absence. The lead-in question for this version of the CES-D reads as follows: "Now think about the past week and the feelings you have experienced. Please tell me if each of the following was true for you much of the time during the past week. Much of the time during the past week, …." Table 1 contains the 8 items that are then presented to respondents (bolded words in the table correspond to the variable names used in our presentation of results in the next section). Table 1 also shows the percentages of men and women who gave positive responses (after recoding, as appropriate) to each item. This 8-item scale has been used in several published studies of mental health based upon HRS data (Gallo, Bradley, Siegel, & Kasl, 2000; Siegel, Bradley, Gallo, & Kasl, 2003, 2004). Gallo and colleagues assessed its reliability and validity using 1992 and 1994 HRS data and concluded that it has acceptable measurement properties. Although the existing caregiving literature discusses many positive aspects of caregiving, measures of psychological benefits of caring are not available in the HRS. The measure of emotional health used in this study thus captures the net effect of all negative and positive impacts of caregiving.

The CES-D items were not administered to proxy respondents (Wallace et al., 2000). For this reason, more than 1,200

sample individuals are missing a depression score. We used logistic regression in order to identify the salient characteristics of the missing-data cases; the results (not shown) indicated that individuals with missing CES-D responses were principally older husbands with poor self-reported health. None of the explanatory variables associated with caregiver activities or with needs for care were significantly related to the absence of the CES-D items. We did not introduce any explicit controls for this selectivity in the results reported here.

Independent Variables

Need.—We constructed variables that indicated whether at least one of the respondent's parents or, for married persons, parents-in-law, "need[ed] any help with basic personal needs like dressing, eating, or bathing," or, due to a health condition, could not "be left alone for an hour or more." This information, which came from two separate HRS questions, captured a relatively severe level of parental disability, reflecting either a limitation in the ability to perform activities of daily living (ADLs) or a significant cognitive limitation. Beginning in 1998, the HRS added a third question, "Has a doctor ever said that your [mother/father/mother-in-law/father-in-law] has a memory-related disease?" This permitted a broadened measure of the parental need for care, especially care needs associated with cognitive decline (Ory, Hoffman, Yee, Tennstedt, & Schulz, 1999).

Caregiver.—Starting with Wave 3, the HRS asked respondents if they (or their spouses) had spent a total of 100 or more hours since the previous interview (or in the past 2 years) helping parents or parents-in-law with basic personal activities like dressing, eating, and bathing. Investigators asked participants who responded affirmatively to specify (for themselves and their spouses, separately) the number of hours spent helping each parent or parent-in-law. We have coded as caregivers people who had spent a total of at least 200 hours (rather than the 100 hours built into the question) providing care during the 2-year reference period. We made this choice in order to produce comparability with our past work (Amirkhanyan & Wolf, 2003), in which we had coded as caregivers individuals who had provided at least 100 hours of care during a 12-month period. According to Soldo and Hill (1995), the HRS adopted the 100-hour minimum threshold in the 1992 interview in order to filter out low-intensity (e.g., 1 or 2 hours per week) caring activities. Implicit in that design decision was an assumption that care hours were evenly distributed throughout the 12-month period, an assumption that may have been incorrect; we discuss this problem in more detail later. Nevertheless, by imposing the 200-hour minimum threshold in the current analysis, we identify as caregivers those whose average care intensity is comparable to that used in our earlier research.

Respondents who could not or would not specify a precise number of hours—about half of all reported caregivers—were further prompted by investigators to indicate whether their care amounted to more or less than 200 hours, and, if more than 200 hours, whether it was more or less than 500 hours. Using these bracket questions, we were able to classify nearly all caregivers as either low-intensity (i.e., providing fewer than 500 hours of care) or high-intensity caregivers (i.e., providing 500 hours

or more of care). We also created separate indicators of the provision of care to one's own parents and to one's parents-in-law.

The activities mentioned in the HRS question that we used to code our need variable (i.e., dressing, bathing, and eating) were identical to those mentioned in the question upon which we based our caregiver variable. An additional HRS question asked whether respondents helped parents ". . . with other things such as household chores, errands, transportation, etc." The tasks mentioned in this question fall into the category of instrumental ADLs (IADLs), and we used this item to code an IADL caregiver variable. The HRS does not, however, include a question aimed at detecting parents' needs for IADL assistance.

Each member of a couple could be coded as a caregiver, allowing us to include a spouse caregiver variable in the analysis, as well. This variable was 0 by definition for single respondents. Similarly, we constructed sibling (or spouse's sibling) caregiver variables, which indicated whether any of the respondent's (or spouse's) siblings had helped their respective parents with basic personal needs in the past 2 years. The HRS questionnaire does not impose a minimum on the hours-of-help question as it pertains to siblings. As an additional measure of "care by others," we included variables indicating whether the respondent's parent or parent-in-law was institutionalized at the time of the interview.

The need variable described in the preceding section refers to parents alive at the time of the interview, whereas the caregiver variables just described refer to individuals who had provided care to currently living, or to recently deceased, parents or parents-in-law at any time during the 2-year period preceding the interview. In order to avoid falsely coding as a caregiver a respondent who had provided care to a surviving parent judged not to need it, we eliminated from the sample any respondents who had experienced the death of a parent (or parent-in-law) during the 2-year reference period. However, that restriction did not completely eliminate problems caused by changing levels of care intensity within the 2-year period. Some people coded as caregivers may have provided all of their care hours early in the 2-year period, and none recently, whereas others who adopted the caregiver role shortly before the interview may not yet have reached the 200-hour threshold. We coded participants in the former group as caregivers (but arguably should not have done so), whereas we did not code those in the latter group as caregivers (but surely should have done so). Despite these ambiguities, researchers have used the HRS parental-care variable in several published papers (e.g., Chumbler, Pienta, & Dwyer, 2004; Dunlop et al., 2003; Dunlop, Lyons, Manheim, Song, & Chang, 2004; Killian, Turner, & Cain, 2005; Lee, Walker, & Stroup, 2001; Reid & Hardy, 1999). The problems outlined here will tend to bias downward any adverse effects of providing care, because recent (yet currently inactive) caregivers would presumably be less depressed than current caregivers. We conducted an auxiliary analysis intended to assess the adequacy of our caregiver variable, and we report our findings from that analysis in the next section.

Additional variables.—We created dummy variables reflecting the respondent's current health (poor health) and disability status (disabled). We coded the poor health variable as 1 if a respondent rated his or her health as fair or poor (rather than

excellent, very good, or good). The disabled variable indicated whether the respondent, when answering a question about employment status, stated that he or she was "disabled and unable to work." We used analogous variables in order to describe the health and disability status for married respondents' spouses.

Indicators of the respondent's marital status included in the analysis were: divorced or separated, widowed, and never married. Two dummy variables represented educational attainment: whether the person had received a high school diploma or passed an equivalency test, and whether the respondent had earned a college degree or higher. Other covariates describing respondents' demographic characteristics were age, number of children, and two dummies indicating respondents being African American or Hispanic. Wealth was a household-level variable that measured total net worth, including both housing and non-housing equity.

Estimation

The measurement properties of our dependent variable, in combination with the presence of repeated individual-level outcome measures, presented special modeling and estimation problems. Some past research employing the short form of the CES-D as used by the HRS has retained the full range of scale values (integers ranging from 0 through 8) while adopting an estimation approach that treated this inherently discrete variable as though it were continuous (Gallo et al., 2000; Siegel et al., 2003, 2004). However, the distribution of the variable was extremely skewed, with a modal value of 0. Imposition of a logarithmic transformation (of the original score, to which is added a small constant) is inadequate for producing a symmetric distribution (Siegel et al., 2004). Commonly used regression-type models for count data (e.g., Poisson or negative-binomial models) are inappropriate because such models impose no upper bound on the value of the count variable, yet the short form of the CES-D has an upper bound of 8. Moreover, models for count data implicitly assume that all counted items are identically distributed. Yet, the marginal distributions of the eight CES-D items reported in Table 1 strongly indicate the inappropriateness of such an assumption. For men, the percentage of affirmative responses ranged from 6% to 26%, whereas for women it ranged from 9% to 33%. Some researchers have recoded the underlying 8-item score into a dichotomous indicator according to a severity threshold (Blustein, Chan, & Aguilar, 2004; Mojtabai & Olfson, 2004; Nygaard, Turvey, Burns, Crischilles, & Wallace, 2003); this approach, however, entails the loss of a substantial amount of information.

In order to address these issues, we modeled the CES-D score using a nonlinear mixed model. Our model contained both item-level and time-period fixed effects, along with a four-component random effect. In particular, we modeled individual i's response to CES-D item j at time t, Y_{ijt}, using a binary logistic regression:

$$\text{logit}(\Pr[Y_{ijt} = 1]) = \alpha_{1j} + \alpha_2 T_2 + \alpha_3 T_3 + \beta' X_{it} + u_i + e_{it}. \quad (1)$$

In Equation 1, the variables T_2 and T_3 are dummy variables indicating data from the 1998 ($t = 2$) and 2000 ($t = 3$) interviews, respectively. Thus, the constants α_{1j} ($j = 1, \ldots, 8$) represent item-specific intercepts in time period 1 (1996), while

α_2 and α_3 are time-period fixed effects that apply equally to all outcomes. Note that a single parameter vector (β) represents the effects of explanatory variables (X_{it}) on all eight CES-D items. We model the random effects u_i and e_{it} ($t = 1, 2, 3$) as independent normally distributed effects with variances to be estimated. We interpret u_i as a measure of fixed personality traits that manifest themselves in a tendency to respond to all eight CES-D items more (or less) positively than expected, conditional on the measured explanatory variables X_{it}, while each of the period-specific random effects e_{it} are interpreted as transitory influences on the CES-D items. For example, short-term work- or family-related stressors salient during a respondent's 1996 interview, but not in either 1998 or 2000, may produce a tendency to respond to all eight CES-D items more (or less) positively than would be expected given both the contemporaneous measured variables X_{i1} and the permanent random effect u_i. We estimated the model using aML software (Lillard & Panis, 2003).

RESULTS

We first present results from a "basic" model—a repeated-measures counterpart to the approach taken in Amirkhanyan and Wolf (2003)—and then from three variations on that basic model. Table 2 shows descriptive statistics for the sample used in the basic model, along with estimated parameters of the model. The number of distinct men (women) appearing in the analysis is 3,350 (3,659); because each can appear once, twice, or three times depending on the vital status of his or her parents in each wave, the number of observations contributed by these samples is larger (6,290 and 6,927, respectively). Each time he or she is observed, a respondent supplies 8 outcome measures, so the overall sample sizes for the regressions are quite large.

The need and care variables in combination identified four distinct groups: (a) noncaregivers whose parents do not need care (the reference group); (b) caregivers whose parents are not reported to need care; (c) noncaregivers whose parents do need care; and, finally, (d) caregivers whose parents need care. Our analysis used a set of dummy variables that distinguished among the cells of this two-way categorization. Women were more than twice as likely as men to care for parents, regardless of whether the parent receiving the care had been judged by the respondent not to need it (1.2% vs 0.5%) or to need it (6.1% vs 2.8%). Around 31% of both the men and the women in this sample had one or more living parents or parents-in-law that reportedly needed care, but for whom these men and women were not themselves providing such care.

The regression results shown in Table 2 generally support the findings from our previous study. For both men and women, it appeared to be stressful *not* to provide care when one's parent needed it—we found, in other words, evidence of significant noncaregiver stress. The odds of an affirmative response to a CES-D item rose slightly more for women (odds ratio = 1.26) than for men (odds ratio = 1.16) in this situation. Among women, but not men, there was also a significant increase in the odds of reporting depressive symptoms if they were caring for a parent with care needs. Although the point estimates imply that being a caregiver is more stressful than not being a caregiver, conditional on a parent's need for care, we failed to find significant differences between the regression coeffi-

Table 2. Selected Sample Means and Coefficients for Basic Model

Variable	Men			Women		
	M (%)	Coefficient	SE	M (%)	Coefficient	SE
Need = no, care = yes	0.5	0.002	0.401	1.2	0.126	0.222
Need = yes, care = no	31.7	0.149	0.068*	30.7	0.229	0.068***
Need = yes, care = yes	2.8	0.353	0.203	6.1	0.414	0.119***
IADL caregiver	52.9	−0.029	0.074	55.5	0.004	0.067
Spouse is caregiver	4.7	−0.222	0.168	2.5	-0.015	0.195
Sibling is caregiver	9.9	0.000	0.096	12.5	0.063	0.082
Sibling-in-law is caregiver	8.7	0.134	0.108	6.8	0.151	0.109
Parent is institutionalized	7.1	0.094	0.118	8.3	−0.028	0.111
Parent-in-law is institutionalized	5.4	−0.061	0.138	5.6	−0.012	0.128
Fixed effects						
Year = 1998		0.295	0.077***		0.493	0.070***
Year = 2000		0.345	0.098***		0.417	0.087***
Depressed		−2.492	0.339***		−2.462	0.361***
Effort		−1.540	0.336***		−1.830	0.359***
Sleep		−0.996	0.335**		−0.986	0.358**
Happy		−2.600	0.339***		−2.840	0.360***
Lonely		−2.639	0.339***		−2.587	0.360***
Enjoyed		−3.461	0.341***		−3.496	0.359***
Sad		−2.314	0.339***		−2.021	0.360***
Get going		−1.993	0.338***		−1.966	0.358***
Random effects:						
σ_u		1.262	0.037***		1.270	0.037***
σ_{e1}		0.965	0.074***		1.211	0.067***
σ_{e2}		0.960	0.061***		1.018	0.054***
σ_{e3}		0.922	0.065***		1.146	0.055***
Number of individuals		3,350			3,659	
Number of observations		6,290			6,937	
Number of outcomes		50,320			55,496	

Notes: IADL = instrumental activity of daily living; SE = standard error.
*$p < .05$; **$p < .01$; ***$p < .001$.

cient on the "need = yes, care = yes" variable and that on the "need = yes, care = no" variable. For women, for example, the test statistic (formed using the covariance matrix of regression coefficients) was $t = 1.202$ ($p = .23$). Thus, whereas for women (but not men) we found evidence of caregiver stress, the observable manifestations of that stress were not statistically different from those of noncaregiver stress. We found no mental health effects of providing IADL assistance; or of the care activities of spouses, siblings, or siblings-in-law; nor did we find any effects of parental institutionalization.

In most cases, coefficients on covariates included in these equations (which are not shown here but are available upon request) accorded with past research: Depression scores fell with age and education, rose in response to disability or poor health, and were higher among unmarried than married individuals. The item-specific intercepts also exhibited considerable variability, as we would have anticipated based upon the means shown in Table 1 (likelihood-ratio tests overwhelmingly rejected an equality constraint on the intercepts, with χ^2

statistics of 2,033 and 2,556 for the men's and women's models, respectively). The results also indicated that a good deal of the pattern of CES-D responses was associated with unmeasured factors, represented by the random effects u_i and $e_{1i} - e_{3i}$. Each of these random effects was estimated with a high degree of precision. Moreover, in any given year slightly more than half of the variability in unmeasured factors was due to permanent factors.

As noted earlier, our indicator of caregiver status missed some current caregivers, those who had moved into the caregiver role shortly before the interview and had not yet reached the 200-hour threshold embedded into our caregiver variable. It also included as caregivers some persons who had occupied that role within the past 2 years, but not at or immediately prior to the time of interview. For both of these reasons, any estimated impacts of caring on CES-D scores (through either the "need = no, care = yes" or the "need = yes, care = yes" pathways) may be biased downward. As a test of the adequacy of our caregiver variable, we estimated a conventional model of caregiver stress: In this model, we controlled for caregiver status but not for parental need, producing a regression-adjusted difference in depressive responses between caregivers and noncaregivers (all other control variables appeared in these models). In this version of the model, the estimated increase in the log odds of a positive response was 0.189 for men ($SE = 0.188$; $p = .315$), 0.231 for women ($SE = 0.105$; $p < .05$), and 0.237 in a model that pooled men and women, with an additional control for gender ($SE = 0.089$; $p < .01$).

For an external point of comparison to these estimated effects, we used results obtained in the meta-analysis reported by Pinquart and Sörensen (2003). Integrating findings from 43 separately published articles, Pinquart and Sörensen found a mean effect size of 0.29 standard deviations on depression scores among adult child caregivers; the lower and upper bounds of the 95% confidence interval for this estimate were 0.10 and 0.48, respectively. We then applied Chinn's (2000) method in order to convert our estimates to effect sizes; Chinn's method (which entails dividing the log-odds coefficient by a scale factor of 1.81) produced an effect size of 0.128 for women and 0.131 for men and women combined. Both estimates lie within the interval estimate for caregiver effects reported by Pinquart and Sörensen (2003). The latter comparison was undoubtedly more valid, because Pinquart and Sörensen did not stratify their results by caregiver gender. Although this comparison did not prove that the HRS caregiver variable was free of measurement error, it did lend support to its use as an indicator of caregiving status in an impact analysis such as ours.

The remaining tables report results from three variations on our basic model; in each case we report only the key parameters representing the need and care effects. Table 3 shows the consequences of distinguishing between low-intensity (from 200 to 500 hours) and high-intensity (500 hours or more) caregiving. These findings used slightly smaller samples, because we omitted from the analysis caregivers for whom we could not assign intensity categories. The mean values shown indicate that women were more likely to be in the high-intensity category (77% of all female caregivers) than were men (71% of all male caregivers). The care-intensity distinction did not alter the findings shown in Table 2: We found statistically significant noncaregiver stress for both men and women, but

Table 3. Alternative Model I: Low- vs High-Intensity Care Effects

	Men			Women		
Variable	M (%)	Coefficient	SE	M (%)	Coefficient	SE
Need = no, care = yes	0.5	−0.012	0.401	1.2	0.128	0.221
Need = yes, care = no	31.6	0.141	0.068*	30.6	0.233	0.068***
Need = yes, care = low	0.8	0.330	0.293	1.4	0.599	0.225**
Need = yes, care = high	2.0	0.350	0.230	4.6	0.364	0.131**
Number of individuals		3,348			3,657	
Number of observations		6,281			6,911	
Number of outcomes		50,248			55,288	

Note: SE = standard error.
*$p < .05$; **$p < .01$; ***$p < .001$.

Table 4. Alternative Model II: Broader Measure of Need

	Men			Women		
Variable	M (%)	Coefficient	SE	M (%)	Coefficient	SE
Need = no, care = yes	0.5	0.397	0.485	1.0	−0.107	0.325
Need = yes, care = no	35.2	0.141	0.075	33.9	0.173	0.072**
Need = yes, care = yes	3.2	0.340	0.226	6.8	0.471	0.128***
Number of individuals		2,954			3,241	
Number of observations		4,605			5,159	
Number of outcomes		36,840			41,272	

Note: SE = standard error.
**$p < .01$; ***$p < .001$.

we found significant caregiver stress for women only. And, although the point estimates on low- and high-intensity caregiving were larger than the coefficient on "need = yes, care = no" for women, those two coefficients were not significantly different from each other nor were they significantly different from the "need = yes, care = no" coefficient.

Table 4 shows the consequences of using the broader measure of care needs found in the 1998 and 2000 waves of HRS data. The broader need variable added very few cases of otherwise undetected parental need for care, however (and did so mainly in the "need = yes, care = no" category). For women, the findings agreed with those already reported. However, for men, we no longer found evidence of noncaregiver stress.

Finally, Table 5 shows the results after having employed separate need and care variables for the respondent's parents and parents-in-law. Because these models were intended to get at possible own-parent versus parent-in-law effects, we limited the analysis to married men and women (the number of men and women differed, however, due to the fact that spouses with out-of-range years of birth were excluded from the study). Except for the "need = yes, care = no" variables, the means were quite small. Unsurprisingly, women who provided care to their own parents represented the most common caregiving situation. However, it is interesting to note that married men were almost as likely to care for their parents-in-law as for their own parents, and married women were about as likely as their husbands to care for their husbands' parents. Only 2 of the 12 regression coefficients shown in Table 5 were statistically different from zero at the $p = .05$ level: It appeared that husbands' mental health was adversely affected by having parents-in-law with care needs yet not being involved in caring for them. Among married women, we found statistically significant evidence of caregiver stress but not of noncaregiver stress with respect to their own parents' needs.

Discussion

The adverse mental health consequences of providing care to a disabled or frail elderly family member are well established in the literature. Our goal in the present study was to investigate an additional possibility, namely the consequences of *not* providing care when a close family member needs it. Our findings generally suggest that having a parent with serious care

needs produces adverse mental health consequences, especially for women. The exception to this pattern occurred in the model that used separate controls for parents' and parents-in-law's need and care, applied to married men and women only (Table 5). In that case, we found evidence of noncaregiver stress for men (but only with respect to their wives' parents) and of caregiver stress for women (but only with respect to their own parents). Such findings suggest that it may be worthwhile to further explore the subtle differences in the effects of various caregiving arrangements involving own parents and in-laws. Specifically, it may be interesting to examine whether men are negatively affected by in-laws' care needs when their wives are involved in caregiving. This could be done by adding interaction effects (for example, Own care for own parents × Spousal care for in-laws; Own care for in-laws × Spousal care for own parents; and others) to our third model. The sample size available for the present study does not allow us to address this level of complexity. Moreover, our objectives in the present study were more limited in scope, namely to demonstrate using panel data that being a noncaregiver and having a disabled parent or parent-in-law can produce adverse mental health outcomes similar to those of caregivers.

Our results were generally consistent with those found in our earlier cross-sectional analysis (Amirkhanyan & Wolf, 2003). Both studies call into question the interpretations of much prior empirical research on caregiver stress. In the typical study, a researcher compares the mean depression score in a sample of caregivers to that in a matched comparison group of noncaregivers. In the comparison group, the potential care recipients are presumably in good health and are not disabled. With such a research design, interpretation of between-sample differences is problematic: The difference could arise because caregiving is stressful, or it could arise because having a close family member with care needs is stressful. Our use of a sample of persons at risk of being caregivers, while controlling for the various need and caring situations, supports the latter interpretation.

As noted earlier, the HRS data introduce some unavoidable measurement problems into our analysis. Principal among these is a timing problem, due to the fact that the need and outcome variables were contemporaneous with the interview, whereas the care variable pertained to a 2-year reference period. The most important of our findings, namely the pervasiveness of noncaregiver stress, is probably the least affected by this problem. Someone who has provided fewer than 200 hours of care over a 2-year period is surely not a caregiver, unless they took on the caregiver role just before the interview. This type

Table 5. Alternative Model III: Parent and Parent-in-Law Effects

	Men						Women					
	Own Parents			Parents-in-Law			Own Parents			Parents-in-Law		
Variable	M (%)	Coefficient	SE	M (%)	Coefficient	SE	M (%)	Coefficient	SE	M (%)	Coefficient	SE
Need = no, care = yes	0.4	0.504	0.429	0.3	−0.132	0.624	1.0	0.051	0.287	0.4	0.331	0.371
Need = yes, care = no	16.4	0.093	0.102	17.9	0.195	0.088*	17.3	0.163	0.102	16.7	0.163	0.105
Need = yes, care = yes	1.4	0.373	0.284	1.3	0.172	0.269	4.0	0.436	0.173*	1.2	0.210	0.319
Number of individuals	3,009						2,820					
Number of observations	5,591						5,153					
Number of outcomes	44,728						41,224					

Note: SE = standard error.
*$p < .05$.

of measurement error tends to bias towards zero any estimated impacts; our results on noncaregiver stress, however, were nearly always statistically significant. For individuals coded as caregivers, the measurement error problems were probably more serious, at least in a relative sense in view of the fact that many more observations appeared in the "need = yes, care = no" than in the "need = yes, care = yes" category. Here, again, measurement error will tend to produce a downward bias in estimated effects. Accordingly, our findings that caregiver stress is not larger than noncaregiver stress (with the one exception mentioned earlier) should be treated cautiously. And, despite the potential—and untestable—measurement-error problems, our estimate of the relative size of caregiver and noncaregiver depression scores fell within the range of impacts reported in a recent and comprehensive meta-analysis (Pinquart & Sörensen, 2003).

Although the caregiver stress literature has shown that women experience more caregiving costs than do men (Raschick & Ingersoll-Dayton, 2004; Yee & Schulz, 2000), our results suggest that women may also experience higher costs of being noncaregivers. This result raises questions about the consequences of gender-specific role expectations among women. Relationships between adult children and their parents are often shaped by two apparently conflicting sets of norms: obligation and independence (Lye, 1996). Research has shown that gendered expectations of such obligations treat as equitable caregiving arrangements with overinvolved women and under-involved men (Ingersoll-Dayton, Neal, Ha, & Hammer, 2003). Consequently, women whose behaviors are at odds with a prevailing ideology that views them as natural caregivers (Hooyman & Gonyea, 1995) may suffer when they fail to take on caregiving duties.

The existing literature on the stress process provides a basis for interpreting our findings concerning noncaregiver stress. Past research has shown that caregivers report rewards as well as stressors associated with providing personal care. Thus, the negative effect of the primary stressor, parental need, among noncaregivers is not mediated by any rewards associated with the provision of care. In addition, among noncaregivers the parent's needs for help dressing, eating or bathing are likely to be met by other formal or informal sources. Researchers have found that if siblings provide care, such situations can lead to family conflicts over caregiving arrangements; the primary caregiver's strain may, as well, be radiated to other family members (Gatz et al., 1990; Strawbridge & Wallhagen, 1991; Toseland et al., 1995). If non-familial sources provide the care,

noncaregiver stressors may include the fear of inadequate quality of care or the feeling of guilt for not being able to ensure a family-based end-of-life environment for a parent.

Finally, our findings point to the diffusion of negative consequences of parental disability, manifested throughout the family network, and touching not only the children but also the children-in-law of the elders affected. There is a growing interest in the costs of disease and disability at the national and international level (e.g., Murray et al., 2002). For one component of that cost—the adverse mental health consequences of caring for a disabled parent—the usual focus on the active caregiver appears to be too narrow. In fact, we have found only limited evidence that active caregivers are worse off than other members of their families. The costs, in other words, are experienced throughout the family group. To focus narrowly on active caregivers is to underestimate the social burdens of disability and poor health at older ages. Moreover, interventions that reduce stress among active caregivers may, as well, produce social benefits among family members not actively engaged in providing care. Thus, investigators may underestimate both the social costs of old-age disability and the social benefits of programs that improve functioning when research is too narrowly focused. These results should be recognized in efforts to design interventions on behalf of caregivers and to evaluate the effectiveness and societal benefits of such interventions.

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