

Research Article

# Time Use and Experienced Wellbeing of Older Caregivers: A Sequence Analysis

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## Abstract

**Background and Objectives:** The diminished wellbeing of caregivers is well documented, but studies typically draw upon coarse measures of time use and thus provide limited understanding of the role of specific care activities in the daily lives of care providers. This study uses time diary data to explore whether there are signature care patterns throughout the day and whether these care patterns have implications for caregivers' experienced wellbeing.

**Research Design and Methods:** Using a national sample of 511 time diaries from older caregivers in the Disability and Use of Time supplement to the Panel Study of Income Dynamics, we examine minutes of care provided on the prior day, overall and for four broad care categories (household, personal care, transportation, and visiting), and patterns of care over the day, the latter based on sequence and cluster analysis.

**Results:** Older caregivers spend on average 2.3 hr providing care to another adult on care days. Caregiving follows a roller-coaster pattern over the day, peaking at mealtimes. Sequence analysis suggests five distinctive caregiving patterns, which vary by both demographic characteristics of the caregiver (gender, work status) and care arrangement type (relationship to recipient, whether sole caregiver to recipient). The 40% who provide only marginal assistance of about 1 hr report lower experienced wellbeing than the 28% who provide sporadic assistance with a mix of activities for about 2 hr.

**Discussion and Implications:** A substantial share of older caregivers provides only 1 hr of assistance on a given day but appears to be at risk for reduced wellbeing. Better understanding of the reason for their marginal involvement and reduced wellbeing is warranted.

**Keywords:** Caregiving, Time use, Wellbeing

Unpaid caregivers, most often family members, provide the bulk of assistance with daily activities to adults living with physical or cognitive disabilities (Schulz & Eden, 2016). Some of the more common activities include household chores (e.g., preparing meals, laundry), personal and medical care (e.g., bathing, dressing, medications), companionship (e.g., visiting, socializing), and transportation (e.g., to the doctor or errands). At least one-third of informal caregivers are adults aged 65 years and older, although much of what is known

about time spent caregiving focuses on older recipients rather than providers of such care (Schulz & Eden, 2016). For instance, analysis of the American Time Use Study (ATUS) found that adult caregivers provide assistance to older adults for about 3.2 hr per day (Bureau of Labor Statistics, 2015) and analysis of the National Study of Caregiving (NSOC) found that adults care for older adults who have limitations in daily activities for an average of 2.5 hr per day (Wolff, Spillman, Freedman & Kasper, 2016). Diminished wellbeing

of caregivers continues to be an important focus of the caregiver literature (Adelman, Tmanova, Delgado, Dion, & Lachs, 2014) and time spent caregiving is widely considered an objective measure of burden (Savundranayagam, Montgomery, & Kosloski, 2011).

The stress process model provides a conceptual framework for studying caregiver strain, by delineating both the direct and indirect effects of this potential stressor on wellbeing (Pearlin, Lieberman, Menaghan, & Mullan, 1981; Pearlin, Mullan, Semple, & Skaff, 1990). The immediate demands of providing care are conceptualized as the primary stressor, which may trigger secondary stressors such as time conflicts between caregiving and other demands, or strained relationships between caregiver and recipient. Conceptual models also suggest that the emotional impact of a stressor depends on the material and interpersonal resources one has to cope. For instance, care demands that exceed one's coping resources (e.g., needing to provide caring all day) or exacerbate one's vulnerabilities (requiring care at times of day when fatigue is most likely to occur) may be especially distressing. Attributes of the experience also matter. For instance, experiences that are monotonous may be less enjoyable than those that vary day to day. Alternatively, experiences that are less controllable and predictable may induce more emotional strain than those that are routine.

Most studies of the personal impact of caregiving use relatively coarse measures of time spent providing care, typically a yes/no dichotomy or the number of hours that one provided care in a typical or recent week or month (Zarit & Zarit, 2015). Such measures fail to capture precisely how time is spent over the day. As such, they are susceptible to both under- and over-estimation errors. Caregivers may underestimate hours if they do not perceive their usual household activities as care (Bittman, Fast, Fisher, & Thomson, 2004) or may overestimate hours if they perceive care activities as socially desirable (Brenner, 2011). With the coarse measurement approach, it is also difficult for caregivers to distinguish time spent on different types of activities. Consequently, connections between time spent caregiving and caregiver wellbeing have been difficult to identify (Pinquart & Sorensen, 2004).

A further reason for weak or inconsistent linkages between caregiving time and wellbeing reflects the fact that most studies rely on decontextualized wellbeing measures that ask respondents to recall their overall wellbeing over a reference period (e.g., the past week, 2 weeks, or month). Such evaluative measures implicitly involve comparing oneself to some standard (e.g., a peer group, an earlier time period, or expectations for oneself). Theoretical writings and empirical studies of time use and subjective wellbeing suggest that transient or momentary measures of wellbeing such as daily mood are more responsive than evaluative wellbeing (e.g., depressive symptoms over multiple weeks or life satisfaction measures) to the activities that make up daily life, including caregiving (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004).

Diary-based methods that capture both time use and momentary wellbeing over 24-hr periods overcome the limitations of studies that use aggregated measures of time use and decontextualized wellbeing. Because participants in daily diary studies are asked to recall what they were doing on the previous day, specific activities are clearly delineated and household activities carried out for others can be distinguished. Moreover, diaries are less susceptible than aggregated measures to biases associated with social desirability (Brenner, 2011). Likewise, this approach can be used to measure experienced wellbeing, which captures positive and negative emotions experienced during daily life activities (National Research Council, 2013).

Daily diary methods are ideal for identifying signature types of care patterns through the day that may be especially consequential for experienced wellbeing. Yet, time diary analyses of caregiving have been limited. A recent analysis of ATUS, for example, documented somewhat lower experienced wellbeing among adults providing elder care compared with those not providing care, but that analysis did not distinguish the contributions of particular care activities (He, Weingartner, & Sayer, 2018). Another study of older caregivers found that household chores such as meal preparation, laundry, and cleaning—but not caregiving per se—were associated with women's poorer experienced wellbeing, but that study did not examine patterns of activities through the day (Freedman, Cornman, & Carr, 2014).

In this study, we use time diary data from a national sample of older adults to explore patterns of informal caregiving and experienced wellbeing over one 24-hr period. Using the 2013 Disability and Use of Time (DUST) supplement to the Panel Study of Income Dynamics (PSID), we construct the total amount of care on the prior day, and the type of care given (household, personal care, transportation, and visiting) for each 15-min interval. Using sequence and cluster analysis (Abbott & Tsay 2000), we seek to identify signature patterns of care over the day. This novel statistical approach is increasingly being used with time diary data to simultaneously characterize type and timing of activities (Flood, Hill, & Genadek, 2018; Glorieux, Laurijssen, Minnen, & van Tienoven, 2010; Helgren, 2014). We then draw upon theoretical models of stress and coping to explore the link between caregiver type and experienced wellbeing. We anticipate that patterns encompassing less pleasant and less predictable care activities, more persistent care over the day, and care later in the day may be associated with lower experienced wellbeing. All analyses are adjusted for additional aspects of the caregiving experience (i.e., being the sole care provider, relationship to care recipient, and duration of caregiving) that may confound the associations among care minutes, specific activities performed, and experienced wellbeing. We also control for age, gender, and paid employment status as each is a documented correlate of both caregiving and emotional wellbeing (see Schulz & Eden, 2016 for review).

## Data and Methods

### Data

We use the 2013 DUST supplement to the PSID. The PSID began in 1968 with a sample of approximately 5,000 families and is the longest running longitudinal study of a representative sample of families in the United States. The sample grows over time as adult children who form their own independent households become eligible sample members. Interviews have been conducted annually through 1997 and biennially thereafter. Through 2013, reinterview rates were consistently 95% or higher.

Following the 2013 PSID interview, the DUST supplement was administered to household heads who were aged 60 years or older by the end of 2012 (born 1952 or earlier). In couple-headed households, both individuals were eligible if either spouse/partner was aged 60 years or older. Each respondent and, if married or cohabiting, his or her spouse/partner, was interviewed twice by telephone about one randomly selected weekday and one randomly selected weekend day. For couples, spouses/partners were interviewed (separately) about the same randomly selected day. The response rate was 71.7% (1,217 households completed at least one interview out of 1,698 eligible households). Overall, 1,776 respondents completed 3,505 diaries.

### Analytic Sample

The analytic sample consists of 511 diary days on which we identified at least one care activity, as described in the next section. These diary days were provided by 351 caregivers, 160 of whom provided care on both of their diary days. Diary-level weights that take into account differential probabilities of selection of individuals and diary days as well as differential nonresponse are provided on the public use files. When weighted using diary-level weights, the sample represents the daily experience of adults aged 60 years and older and their spouses who provided care on the previous day. See [Freedman and Cornman \(2015\)](#) for a detailed description of the sample and weighting construction.

### Time Spent Caregiving

The DUST instrument included a telephone-based diary interview followed by supplemental questions about care provided yesterday. Modeled after the ATUS, the diary interview asked about all activities occurring on the previous day, beginning at 4 a.m. and continuing until 4 a.m. the morning of the interview. For each activity, the respondent reported what they were doing, for how long, where they were, with whom they were doing the activity, who else was there, and for household and care activities for whom the activity was carried out.

Caregivers were identified using two approaches, which we refer to as self-identified and assigned status ([Supplementary Figure 1](#)). *Self-identified* status was based

on information about care the respondent provided after the diary was completed ( $N = 332$  diaries). Respondents were asked if they spent time yesterday assisting, caring for, or looking after another adult, aged 18 years or older, who needs help with daily activities. Those who replied yes were asked to identify the care recipient, to estimate the amount of time spent caring yesterday and the length of time they had been caring, and to report whether they were the sole care provider or if someone else helped. We included in the analytic sample diaries of self-identified caregivers for which at least one care activity for the care recipient previously identified was reported on the prior day. For those who did not qualify as self-identified caregivers, we assigned the status of caregiver if: (a) the respondent answered that they carried out household activities (laundry, cleaning house/make dinner, shopping, home maintenance, or bills and banking) in the last 7 days because of a spouse or partner's health; and (b) at least one care activity on the diary day involved care for the spouse or partner ( $N = 179$  diaries).

For all caregivers, care was defined as the set of activities in the following four categories: (a) household activities (e.g., meal preparation, laundry, indoor/outdoor cleaning, home repairs, shopping) done for the care recipient; (b) physical care provided to the care recipient; (c) visiting or socializing with the care recipient, and (d) transporting or waiting for the care recipient. We summed for the 24-hr period time spent in any care activity and for each of the categories of care activities. We considered only main activities in this categorization; secondary activities (defined as activities carried out at the same time as the main activity but not the primary focus of the respondent) did not have details about for whom or with whom the activity was carried out.

### Caregiver Experienced Wellbeing

For up to three randomly selected diary activities, respondents were asked to report how intensely they felt five emotions—calm, happy, sad, frustrated, and worried—using a scale from 0 (not at all) to 6 (very strong). Other studies suggest this information can be combined to form a single valid scale reflecting wellbeing ([Krueger et al., 2009](#); [Lee, Hofferth, Flood, & Fisher, 2016](#); [Lucas, Freedman, & Carr, 2018](#)), so we averaged each of the five emotions over the three activities, reverse-coding the negative emotions so that a higher score reflects better wellbeing. We then combined each of these average emotions into a single score (Cronbach's  $\alpha = 0.86$ ). We opted for a single scale rather than two scales reflecting positive and negative emotions because psychometric analyses suggest that for these specific items separate positive and negative affect scales are very highly correlated and have limited incremental predictive validity compared to the combined measure ([Lucas et al., 2018](#)).

## Control Variables

For models predicting caregiver wellbeing we created several descriptors of the care arrangement that are likely to be confounders (i.e., related to both care type and caregiver wellbeing). We also included these variables in models predicting caregiver type. We focus on variables previously shown to be related to caregiving outcomes that reflect aspects of the care arrangement and caregiver demographics. The first indicator combines information on the caregiver's relationship to and coresidence status with the care recipient, which were highly correlated. We formed three categories: spouse or partner (nearly all of whom were coresident), other nonresident adult, other coresident adult. For self-identified caregivers, we also created an indicator of whether anyone else helped the care recipient and the number of years for which the respondent had been providing care to the recipient. For the latter, eight cases were missing information on duration; so, we imputed the mean number of years ( $M = 9$ ). Because this information was only available for self-identifying caregivers, we also created an indicator of whether the caregiver was self-identified (64%) or assigned caregiver status (36%). We also consider a limited number of demographic factors that have been especially important in prior research in predicting care intensity and likely to be related to wellbeing: caregiver age, gender, and whether the caregiver also reported working for pay on the diary day.

## Statistical Approach

### Descriptive Analyses

We first examined the distribution of caregiver characteristics and mean minutes of care provided over the diary day, overall and by the four designated activity categories. We tested for differences across caregiver subgroups using  $t$  tests, and report  $p$ -values  $\leq .10$  (due to the somewhat limited sample size). We also calculated the percentage of caregivers engaged in each care activity yesterday (household activities, personal care, transportation, visiting) by groups, reporting chi-square and  $t$  tests for subgroup differences. All descriptive analyses used diary-level weights that take into account nonresponse as well as differential selection probabilities of weekdays and weekend days.

### Sequence and Cluster Analyses

We created ordered indicators of care for each 15-min interval in the diary day and then grouped caregivers by type using sequence and clustering analysis (Abbott & Tsay, 2000). Each interval (starting at 4:00 a.m. and ending at 4:00 a.m. the next day) was coded into one of five activities: not care, household care for care recipient, physical care of care recipient, visiting/socializing with care recipient, transportation of care recipient. If more than one activity fell in a given interval (e.g., household 10 min and visiting 5 min), we assigned the activity with the largest

number of minutes in the interval. We examined frequencies and concentrations of these sequences (Brzinsky-Fay, Kohler, & Luniak, 2006).

We then performed a sequence analysis, by comparing each observed sequence to every other observed sequence and calculating the shortest or minimal distance between sequences using optimal matching (Brzinsky-Fay et al., 2006). The distance between two sequences is calculated by summing the changes that need to be made in order to make two sequences the same. Two types of changes are possible: an activity may be added or dropped (e.g., insertion or deletions, which shift the timing of the activity) or the type of activity may be changed (substitution). In sequence analysis, the analyst must specify the "cost" associated with each type of change. There is no statistical test for establishing the correct cost; we instead rely on theoretical grounds for establishing these costs and then empirically examine the relationship between two alternative approaches and wellbeing. Because our focus was on caregiving, we specified costs that made substitution between noncare and care activities more costly than substitutions among different types of care (4 vs 2). We also set the insertion-deletion cost low relative to the substitution cost (0.5), so preference was given to preserving type of activity over exact time of day in calculating distance. In sensitivity analyses, we used alternative assumptions that set the insertion-deletion costs higher (half the maximum substitution cost or 2), which gives less preference to preserving type of activity and more to preserving time of day.

We performed a hierarchical cluster analysis using these distance measures in order to cluster the sequences into groups, which we refer to as caregiver types. After reviewing a plot of grouped distances (called a dendrogram; see [Supplementary Figure 2](#)) and sample sizes for each cluster, we identified five caregiver types. For each group, we examined the proportion providing each care activity (household work, physical care, visiting/socializing, transportation) by time of day and mean minutes over the day.

### Predictors of Caregiver Type and Experienced Wellbeing

We ran a set of polytomous (nonordered) multinomial logistic regression models that predicted caregiver type, setting the reference group for the outcome to the most common type, marginal caregivers. Models included both care arrangement descriptors (relationship, whether self-identified, whether only caregiver, duration) and demographic characteristics (age, gender, work status on diary day). To address our second major aim, documenting the relationship between caregiver type and experienced wellbeing, we estimated ordinary least square regression models. The baseline model included caregiver type alone and the full model also included controls for caregiver and demographic characteristics. This set of models provided comparisons of wellbeing levels between each type of caregiver versus sporadic caregivers (the omitted category). We then ran identical models that included noncaregivers as the

omitted category ( $n = 3,474$  after omitting 31 diaries with missing data) so that we could compare experienced well-being of caregivers (by type) to noncaregivers. In sensitivity analyses we replaced caregiver type with minutes yesterday spent in each type of care to evaluate whether the sequence analysis provided insights beyond minutes. All models were weighted using a diary-level weight and standard errors adjusted to account for the complex survey design.

## Results

### Sample Characteristics

A weighted distribution of sample characteristics and mean hours of care provided are shown in Table 1. Both men and women spend 2.3 hr a day on average providing care on care days. Slightly higher estimates are evident for those ages 60–69 (2.5 hr), who did not work for pay yesterday (2.4 hr), who self-identify as caregivers (2.5 hr), and who are the sole care provider to the recipient (3.0 hr). For the

subset of 332 self-identified caregivers for whom we had both global and diary-based estimates of hours of care provided, the diary-based estimate was about an hour lower than the global estimate (2.3 hr vs 3.3 hr; data not shown).

### Minutes by Care Activity

Care minutes vary considerably across the four categories of activities. Caregivers spend about 1 hr each day on helping with household tasks, about 30 min visiting and providing transportation to those that they care for, and about 10 min providing personal care. However, these general patterns vary based on caregiver characteristics (Table 1). Women spend more time than men providing the recipient help with household tasks (75 vs 47 min) and less time visiting with the recipient (21 vs 34 min). Compared to caregivers who worked for pay on the prior day, caregivers who did not work spend twice as much time providing help with household tasks (73 vs 37 min).

**Table 1.** Weighted Percent Distribution of Caregiver Characteristics and Time Spent Providing Care Yesterday ( $n = 511$ )

	Time Spent Caring Yesterday					
	Distribution	Any care	Household Work	Physical Care	Visiting	Transportation
	Percent/Mean	Mean Hours	Mean Minutes			
Gender						
Male	44.1	2.3	57.4	7.8	33.8	38.9
Female	55.9	2.3	75.1*	10.5	21.0**	33.4
Age						
48–59	7.6	2.0	59.2	9.4	26.8	22.9
60–69	48.4	2.5*	66.2	11.7	36.1	38.1
70+	44.0	2.1	69.8	6.7	16.2	35.5
Mean age	69.5	--				
Worked for pay yesterday						
Yes	15.2	1.8	36.6	7.3	34.5	29.5
No	84.9	2.4*	72.8***	9.7	25.2	36.9
Self-identified caregiver						
Yes	64.2	2.5	72.4	13.8	29.8	36.4
No	35.8	1.9***	58.1	1.3***	21.0	34.8
Who R cares for						
Spouse	58.8	2.3	77.3	7.0	20.3	33.8
Other, nonresident adult	33.2	2.2	43.1***	8.2	39.3***	43.8
Other, coresident adult	8.0	2.7	94.2	30.5**	20.8	17.2**
R provides all care <sup>a</sup>						
Yes	39.6	3.0	101.3	20.0	19.3	40.1
No	60.4	2.2***	53.5***	9.7**	36.7**	33.9
Number years provided care <sup>a</sup>						
LT 1 year	31.3	2.6	60.7	9.6	38.6	46.5
1–3 years	25.4	2.5	62.3	24.6**	27.5	33.3
4–10 years	24.4	2.6	82.3	8.9	29.9	32.0
11+ years	18.9	2.5	92.5*	12.5	18.3**	29.3
All	--	2.3	67.3	9.3	26.6	35.8

Note: <sup>a</sup>Among those who are self-identified caregivers.

\*\*\* $p < .01$ ; \*\* $p < .05$ ; \* $p < .10$  for  $t$  test for differences across subgroups, which compare means to first category in each group.

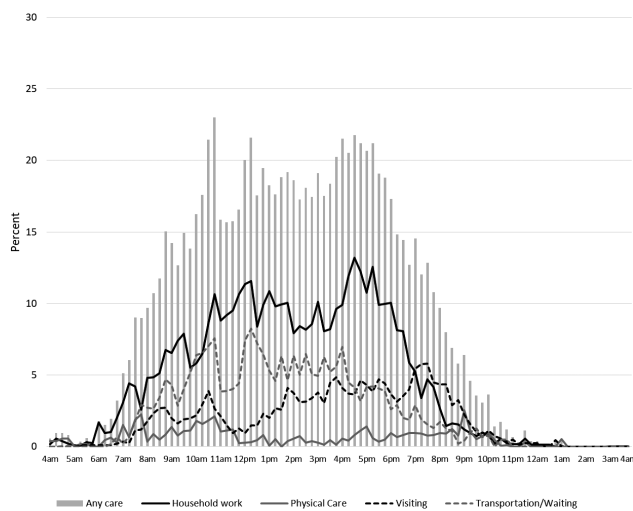
Those who self-identify as caregivers spend more time on personal care (14 vs 1 min), relative to those whom we identified as caregivers based on their reports of weekly activities. We also detect differences by relationship to care recipient. Caregivers to noncoresident adults spend less time providing help with household tasks and more visiting time than caregivers to spouses and coresident adults, who provide much more physical care yet less transportation than spousal caregivers. Caregivers who identify themselves as the only care provider spend about twice as much time on household work and physical care, and half as much time visiting as those who were part of a care network. Long-term caregivers (11 or more years) provide more assistance with household tasks and less time visiting, relative to shorter-term caregivers.

### Any Care and Care Activity Over the Day

Participation in care follows a roller-coaster pattern over the day (Figure 1). Participation in care increases steadily from 4 through 10 a.m. and declines steadily after 5 p.m. The highest percentages of caring coincide roughly with mealtimes (10 a.m., 12 p.m., and 5 p.m.). Focusing on the different types of activities, participation in household work peaks mid-day and in the late afternoon; transportation/waiting peaks mid-day; visiting increases through the day and peaks in the evening; and physical care peaks at 8 a.m., 11 a.m., and 9 p.m., and is lower at other times of day.

### Sequence and Cluster Analysis of Care Type

Five care types (clusters of individuals) were found in all (see Figure 2). In this figure, each panel represents a different care type (cluster) and each line represents a different care activity. The largest cluster (40%) consisted of what we refer to as marginal caregivers, who provided



**Figure 1.** Percentage providing any care and type of care activity by time of day ( $n = 511$ ).

only short bursts of care; 28% were what we refer to as sporadic caregivers who provide assistance with a mixture of activities; 18% provided a moderate amount of care consisting mainly of household work and transportation; 5% provided persistent care throughout the day consisting of mainly transportation and visiting; and a final group provided persistent care consisting of mainly household tasks (8%). [Supplementary Table 1](#) shows minutes by care activity for each caregiving type, which range from an average of less than one hour for a marginal caregiver to 441 min (more than 7 hr) for a caregiver classified as helping with transportation/visiting persistently over the day.

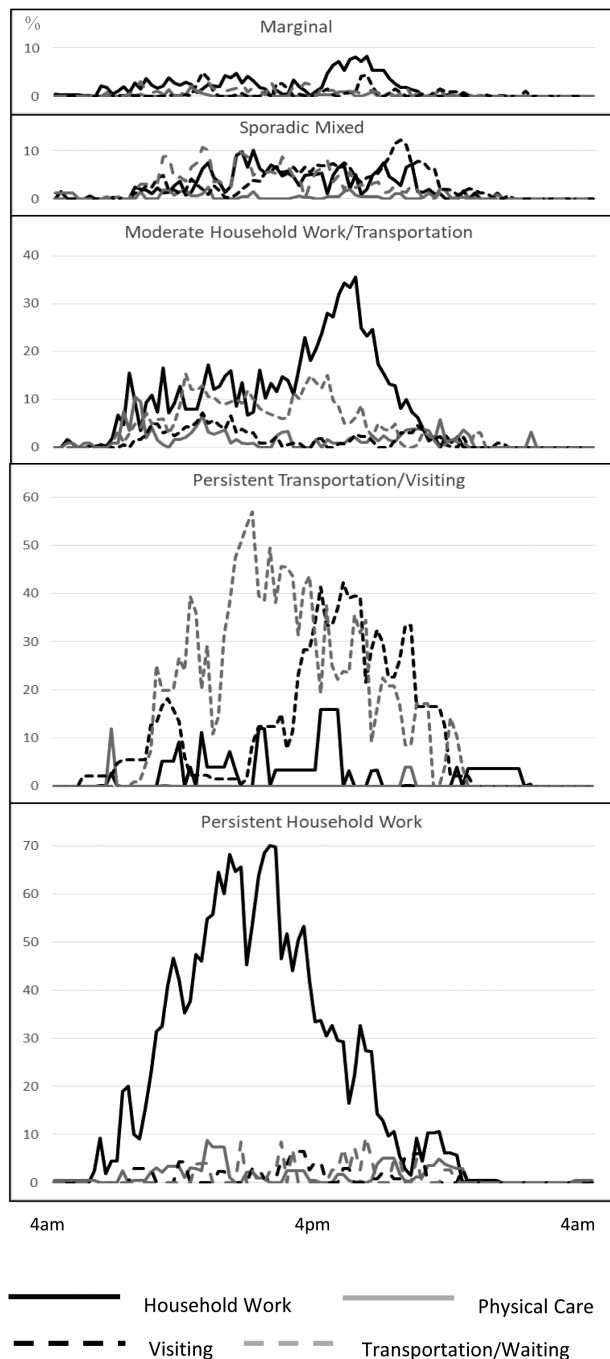
### Models Predicting Caregiving Type

[Table 2](#) reports relative risk ratios from multinomial logistic regression models predicting type of caregiving cluster. Older caregivers are less likely to provide persistent help with transportation/visiting than to provide sporadic care. Caregivers who worked for pay on the prior day are more likely than those who did not work to provide moderate assistance with household work/transportation or persistent assistance with household work. Caregivers who are the recipients' only source of care have much higher odds of being in each of the caregiver groups (except persistent transportation/visiting), relative to being a marginal caregiver.

### Models Predicting Experienced Wellbeing

Among caregivers, type of caregiving is associated with experienced wellbeing (first two columns, [Table 3](#)). Compared with sporadic, mixed activity caregivers (who have the highest wellbeing), marginal caregivers have worse wellbeing, before and after controlling for characteristics of the caregiver and care situation. The two persistent care groups have even larger negative coefficients for wellbeing but these are not statistically significant. In addition, providing care to a coresident adult who is not a spouse and caring for 1–3 years (vs <1 year) is associated with higher wellbeing and being an only caregiver associated with lower wellbeing. Despite these relationships, only a small amount of variance in experienced wellbeing is accounted for in the full model ( $r^2 = .07$ ).

In models with noncaregivers as the reference group, marginal and persistent household work caregivers have lower wellbeing than noncaregivers. Once caregiver and care arrangement characteristics are included in the model, the precision of the coefficients is reduced so coefficients are no longer significant even at  $p = .10$ . Nevertheless, there is a general pattern toward more persistent caregivers having lower wellbeing. Other caregiver characteristics associated with lower wellbeing include being female, working on the prior day and being a sole caregiver; characteristics associated with



**Figure 2.** Percentage providing care by time of day and caregiver type ( $n = 511$ ).

higher wellbeing include caring for a coresident adult other than one's spouse and for 1–3 years (vs less than 1 year).

### Sensitivity Analyses

When we gave more consideration to time of day and less to type of care activity when creating care types, we found four instead of five types (Supplementary Figure 3). The first two care types were similar to the original sequence analysis: marginal caregivers (39%) and sporadic caregivers conducting mixed care activities (39%). However, the

two remaining clusters consisted of persistent care with mixed activities, with the timing rather than the type of care differing: 12% provided persistent care throughout the day; and 10% provided persistent care concentrated toward the morning hours. Like the original analysis, care type is related to whether the caregiver worked for pay on the prior day and whether the person is the sole caregiver; however, gender but not age is predictive of caregiver type (Supplementary Table 2). Finally, relative to noncaregivers, marginal caregivers have lower wellbeing before but not after controlling for caregiver and care situation characteristics (Supplementary Table 3). When we re-estimated wellbeing models replacing caregiver type with hours yesterday spent in each type of care, we found these intensity measures did not predict wellbeing (Supplementary Table 4).

### Discussion

Using a national sample of older adults and unique time diary data designed to study caregiving, we demonstrated that caregivers on average spend 2.3 hr per day caring for another adult on days when care is provided. This estimate is similar to those based upon monthly reports from NSOC, which suggest adults care for older adults who have limitations for about 2.5 hr per day (Wolff et al., 2016). However, the estimate differs from reports based on ATUS, which found adults provide elder care for about 3.2 hr per day (Bureau of Labor Statistics, 2015). It is difficult to sort out why our estimates differ, since the criteria for defining both care givers and recipients differ, as does the method of ascertainment of care activities, but we suspect the latter is important. Specifically, ATUS asks individuals who report spending time on the prior day providing elder care—care or assistance for an adult who needed help because of a condition related to aging—to identify which activities constituted such care, whereas our approach included specific activities that we preclassified as constituting care. Nearly all the difference between the estimates in this analysis and ATUS' elder care estimates (52 out of 56 min) is accounted for by ATUS' inclusion (and our exclusion) of watching TV, eating/drinking, working for pay, and unclassified activities as care activities (data not shown).

In addition, with the DUST sample we found global reports of care provided on the prior day to be about an hour higher than diary-based estimates. We cannot pinpoint the extent to which individuals fail to report caregiving activities during the daily diary or misperceive or inflate the time dedicated to caregiving, but the direction is consistent with research by Brenner (2011), which demonstrates social pressure to over-report positively-valued activities relative to diary measures. As we have demonstrated, unlike the global measures, the detailed diary data are valuable in that they permit further disaggregation by intensity of caregiving and the specific kinds of activities that were performed over the day.

**Table 2.** Predictors of Caregiver Type: Relative Risk Ratios from Multinomial Logit Models

Variables	vs Marginal caregiver			
	Sporadic, mixed activities	Moderate, household work/ transportation	Persistent, transportation/ visiting	Persistent, household work
Female	0.79 (0.21)	1.31 (0.46)	0.44 (0.24)	1.34 (0.66)
Age	0.98 (0.02)	0.99 (0.02)	0.94** (0.03)	1.01 (0.02)
Worked yesterday	0.65 (0.24)	0.29** (0.14)	1.16 (0.80)	0.09*** (0.07)
Self-identified caregiver	0.98 (0.53)	2.04 (1.31)	1.70 (1.85)	2.04 (1.71)
Who provided care to (vs nonresident adult)				
Other, coresident adult	0.53 (0.32)	2.51 (1.46)	0.87 (1.01)	2.30 (1.74)
Spouse	0.57 (0.26)	1.50 (0.82)	0.75 (0.60)	1.14 (0.67)
R is only caregiver	2.14* (0.95)	2.83** (1.38)	1.84 (1.21)	4.06*** (2.19)
Number of years provided care (vs <1 year)				
1–3 years	0.85 (0.41)	0.98 (0.53)	0.48 (0.40)	0.39 (0.32)
4–10 years	0.89 (0.39)	0.55 (0.30)	0.56 (0.49)	0.99 (0.71)
11+ years	1.06 (0.59)	1.20 (0.68)	0.20 (0.25)	1.05 (0.77)
Constant	4.33 (5.31)	0.29 (0.44)	12.23* (18.09)	0.05* (0.09)

Note:  $n = 511$ .

\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .10$ .

**Table 3.** Predictors of Caregiver Experienced Wellbeing: Coefficients from OLS Regression Models

	Model number			
	(1)	(2)	(3)	(4)
Caregiver type				
Not a caregiver	--	--	Ref	Ref
Marginal	-0.15 (0.11)	-0.19* (0.11)	-0.18** (0.08)	-0.21 (0.16)
Sporadic, mixed activities	Ref	Ref	-0.04 (0.07)	-0.03 (0.18)
Moderate, household work/transportation	-0.08 (0.13)	-0.10 (0.13)	-0.11 (0.11)	-0.12 (0.21)
Persistent, transportation/visiting	-0.31 (0.28)	-0.31 (0.30)	-0.35 (0.27)	-0.32 (0.34)
Persistent, household work	-0.44 (0.28)	-0.40 (0.26)	-0.48* (0.27)	-0.44 (0.29)
Female		0.06 (0.10)		-0.06* (0.03)
Age		-0.01 (0.01)		-0.00 (0.00)
Worked yesterday		-0.00 (0.10)		-0.17*** (0.04)
Self-identified caregiver		0.35 (0.28)		-0.11 (0.18)
Who provided care to (vs nonresident adult)				
Other, coresident adult		0.36*** (0.13)		0.35*** (0.12)
Spouse		0.15 (0.15)		0.03 (0.14)
R is only caregiver		-0.38*** (0.15)		-0.35** (0.14)
Number of years provided care (vs < 1 year)				
1–3 years		0.33** (0.15)		0.33** (0.15)
4–10 years		0.20 (0.15)		0.21 (0.15)
11+ years		0.18 (0.23)		0.20 (0.23)
Constant	5.22*** (0.07)	5.45*** (0.46)	5.25*** (0.02)	5.41*** (0.16)
N	511	511	3,474	3,474
R-squared	0.02	0.07	0.01	0.02

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

Using sequence and cluster analysis, we found five distinct types of caregivers distinguished by both intensity and activities performed over the day. The odds of being a particular type of caregiver varied by both demographic characteristics of the caregiver (gender, work status) and

the type of arrangement (relationship, whether only caregiver to recipient). The relationship between caregiver type and wellbeing is weak, although two patterns of interest emerged. Older adults who provide marginal assistance amounting to about an hour on average on a given day



report worse wellbeing than those who are involved in a mix of activities for about 2 hr a day. We also detected a trend toward persistent caregivers reporting worse wellbeing, although these groups are small and findings not statistically significant after controls introduced. Sensitivity analyses suggest that time of day is not as important as type of activity and that these findings do not seem to be simply a reflection of minutes spent providing assistance.

This study has several limitations. Our analysis is cross-sectional and does not allow us to explore the processes through which changes in care demands influence caregiver wellbeing. Longitudinal data are needed to better understand, for example, if older adults who provide only marginal care do so because their underlying low wellbeing prevents them from more frequent or varied engagement in caregiving. In addition, our analytic sample consists of older adults and their spouses, so we cannot generalize to the experience of younger caregivers. Finally, our analysis was exploratory and we could not test hypotheses about the role of a number of factors that have been shown to be important predictors of caregiver wellbeing. We were not able to incorporate, for example, the extent or severity of needs of the care recipient or stratify results by gender. Fuller tests of hypotheses about caregiver experiences and wellbeing await the availability of diary-based caregiver data that are linked to details about both the caregiver and care recipient. Although not currently available, such data have recently been collected for a national sample of more than 2,000 caregivers as part of the 2017 National Study of Caregiving, a supplement to the National Health and Aging Trends Study.

Nevertheless, our study offers clues into caregiving's link to wellbeing and how it varies by the daily caregiving experience. Somewhat surprising was the finding that those who are only marginally involved report worse wellbeing than those with sporadic involvement with a mix of different activities. The statistical significance of this finding may be an artifact of the larger sample sizes for these two groups relative to the other three identified. The general pattern we observed was toward worse wellbeing for those providing only marginal care and for those providing more persistent household and transportation care relative to a group providing sporadic assistance with mixed activities. Although the caregiver burden literature has tended to focus on primary caregivers providing substantial amounts of care hours, our analysis suggests that marginal caregivers may also be at risk for reduced wellbeing. Interventions that focus on how to integrate caregiving into the competing time demands of later life, or that provide skills assistance for those with limited exposure to caregiving tasks may be a useful direction for future research.

Finally, our findings provide the most detailed portrait to date of the daily rhythms and patterns of older adults' caregiving. Research on caregiving has evolved from using a single dichotomous indicator of caregiver status, to more sophisticated measures capturing total number of hours

dedicated to caregiving each week or perceived stressfulness of caregiving (Pearlin et al., 1990). Our work extends these measures further by exploiting daily diary data to delineate how caregiving hours are allocated over the course of a day, and how those hours are distributed across different care activities, underscoring the value of daily data for caregiving research.

## Supplementary Data

Supplementary data are available at *The Gerontologist* online.

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## Conflicts of Interest

None declared.

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