

The Needs of Others: Gender and Sleep Interruptions for Caregivers

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Received wisdom, some sociological theory and a handful of qualitative studies suggest that the “night shift” of caregiving work that interrupts sleep is a burden borne disproportionately by women. However, there is no broadly representative evidence to substantiate claims about who takes the night shift in contemporary American households. Analyses using data from the nationally-representative 2003–2007 American Time Use Surveys show that net of age, paid work commitment, partnership status and the presence and age of dependents, working mothers were significantly and substantially more likely to get up for the night shift than working fathers. These results suggest that the sleeping hours, which make up a third of every day, are an understudied but important site for micro-level processes that reflect and reproduce gender stratification.

Introduction

Received wisdom, some sociological theory and a handful of qualitative studies suggest that the “night shift” of caregiving work that interrupts sleep is a burden borne disproportionately by women. However, there is no broadly representative evidence to substantiate who takes the night shift in contemporary American households. A more representative view is important because interruptions for the night shift could make sleep less restorative if they reduce time spent in deep (slow wave) sleep (Dzaja, Arber et al. 2005). Adequate sleep is a basic human need that influences performance and productivity (Biddle and Hamermesh 1990; Horne 1988) as well as mental and physical health (Novati, Roman et al. 2008; Spiegel, Knutson et al. 2005). Moreover, while responsibility for the night shift may mark an important source of gender stratification in its own right, it also could contribute to inequality in more commonly studied domains, such as earnings or career advancement. Demanding nighttime caregiving responsibilities for infants and small children are concentrated at an important period in men’s and women’s career trajectories. If women take the night shift routinely during this period, inadequate sleep could endanger their productivity and opportunities at work. A more comprehensive examination of who gets up to respond to the needs of others thus provides a novel lens on social processes that play out nightly in the household but that reflect and influence broader patterns of gender stratification.

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The vast majority of sleep studies has been conducted by biomedical researchers and has focused on individual behaviors and physiological risk factors, but an emerging body of research suggests that gendered social role responsibilities also condition access to adequate sleep. Competing theoretical frameworks used to explain time use during the waking hours suggest several broad hypotheses that can also be applied to gender differences in responsibility for the nighttime needs of others for physical, medical or other types of care. One explanation is compositional; women may report more interrupted sleep for caregiving because their individual and family characteristics, social roles and time availability differ from men's. For example, if women are more likely than men to have very young children in the home, the care and feeding demands they face during the sleeping hours may be greater. Another perspective suggests that gendered expectations for the type and intensity of care provided to dependents could mean more sleep interruptions for women, even among adults who have the same work and family responsibilities. A final possibility is that the gender gap varies according to the relative resources of partners in a couple, with the less advantaged partner of either sex taking on the night shift of caregiving.

A handful of qualitative sociological studies have shown that women take on more of the caregiving than men during the sleeping hours (Hislop and Arber 2003; Maume, Sebastian and Bardo 2009b; Venn, Arber, Meadows and Hislop 2008), but like much of the extant social scientific research on sleep, these qualitative studies are based on small and selective samples. They cannot provide a representative view of the gender gap in responsibility for the night shift among adults from across the population, nor can they be used to assess explanations for the gendered division of labor during the sleeping hours, because they lack adequate numbers of men and women who have similar characteristics, role responsibilities and resources. I address these limitations by assessing the distribution and characteristics of interrupted sleep for caregiving using data from the American Time Use Survey, a very large, nationally-representative sample of time diaries collected from American adults from 2003 through 2007. Results confirm that women were significantly and substantially more likely than men to interrupt their sleep for the night shift of caregiving, suggesting that the sleeping hours, which make up a third of every day, are an understudied but important site for micro-level processes that reflect and reproduce gender inequality.

Background

Prior Research on Sleep

Extant research on sleep and gender has focused mainly on sleep quantity and quality and has shown that overall, women report longer average sleep durations than men (Basner, Fomberstein et al. 2007; Chatzitheochari and Arber 2009; Hale 2005; Krueger and Friedman 2009; Lauderdale, Knutson et al. 2006; Robinson and Godbey 1997). However, women also report poorer quality sleep than men (Arber, Bote and Meadows 2009; Kutner, Bliwise and Zhang 2004; Maume, Sebastian and Bardo 2009a). To explain these differences, many biomedical sleep studies have discussed variation by sex in physi-

ological and hormonal characteristics, or the greater prevalence among women of chronic health conditions that are linked to longer or poorer quality sleep (Chen, Kawachi et al. Lee 2005; Dzaja et al. 2005). Psychological research also shows that women have higher levels of depression and anxiety, both associated with poorer sleep quality (Piccinelli and Wilkinson 2000), though poorer sleep quality among women is evident even when sex differences in psychiatric morbidity are controlled (Lindberg, Janson et al. 1997; Zhang and Wing 2006). A few biomedical studies based on very small and non-representative samples have demonstrated that women rise more often than men to provide nighttime care to infants (e.g., Gay, Lee and Lee 2004), but these studies have not focused on the way gendered social roles shape such sleep interruptions.

More recently, the physiological and individualistic explanations for sex differences that prevail in biomedical sleep research have been addressed by studies that consider how social factors influence sleep duration and quality. While social scientists recognize the importance of underlying biological predictors and individual behaviors that influence sleep hygiene, some have begun to look at how gendered differences in the distribution of key adult social roles and expectations for fulfilling those roles shape differences in men's and women's sleep duration and quality (Arber, Hislop and Williams 2007). Most centrally, sleep must compete for the available time in any day with the responsibilities associated with paid work and parenting (Basner et al. 2007; Biddle and Hamermesh 1990; Burgard, Ailshire and Hughes 2009; Krueger and Friedman 2009). Using a large sample from the U.S. National Health Interview Study, Krueger and Friedman (2009) show that sleep duration decreases as paid work hours increase, that parents sleep less than adults without children, and that married adults are more likely to sleep an optimal amount (7-8 hours) than to report excessively long or short sleep times. In a recent study of retail food workers in the United States, Maume and colleagues (2009a) found that women experienced significantly more sleep disruption than men due to poor sleep quality or because of interruption by a family member. About 45 percent of the gap was due to compositional differences between men and women in work and family roles and in health, while 55 percent was attributed to "...gendered reactions to the work-family situations that men and women occupy."

Getting up to take the night shift of caregiving represents an even clearer expression of the way that gendered expectations influence sleep, because it is not shaped by physiological factors such as circadian rhythms or health conditions to the same degree as are sleep duration and quality. The handful of available sociological studies show that gender is a powerful predictor of accommodating others' needs during sleep, and that it exerts an influence through social role-related behavior. A qualitative study of 48 midlife English women found that they felt and accepted their gendered roles as caregivers and the associated "responsibility" to worry about children and ageing parents that led to regular disruptions in their sleep (Hislop and Arber 2003). A study of 31 British couples found that wives' sleep was more compromised than husbands' by their partners' snoring (Venn 2007). Another study based on interview data and audio diaries of 26 couples with children in the United Kingdom showed that women were

more likely to rise in the middle of the night to do emotional work for children and other family members, regardless of their employment status (Venn, Arber, Meadows and Hislop 2008). Maume and colleagues (2010) conducted a qualitative study of 25 blue-collar, dual earner U.S. couples with children living in the home. They also found that men's sleep was privileged over women's, and that gendered work-family responsibilities prevailing in the daytime hours carried over into the nighttime, with women much more likely to experience delayed sleep, early awakenings and interrupted sleep to care for household members.

This emerging social scientific evidence highlights social roles and gendered responsibilities and offers rich evidence of the interpersonal negotiations and societal expectations shaping perceived responsibility for the night shift. However, the handful of studies focusing on interrupted sleep for caregiving has used small and selective samples, limiting their ability to provide an accurate assessment of gender stratification in the distribution of night shift responsibilities in the broader range of contemporary American households. Additionally, without large samples of men and women who have the same roles and responsibilities, it is not possible to evaluate alternative hypotheses about gender differences in the nature and extent of night shift caregiving.

Gender, Social Roles and Sleep Interruption

Several theoretical frameworks suggest at least three explanations for a gender difference in interrupted sleep for caregiving: a compositional explanation, a gendered expectations explanation, and a relative resources explanation. A compositional explanation suggests that women take the night shift more than men because there are gender differences in the likelihood of holding particular combinations of roles as workers, partners and parents. Generally used to explain behavior during the waking hours, the time availability perspective suggests that because men spend more time in paid work, they have less time to do caregiving; the related specialization hypothesis suggests that women have the time and incentive to specialize in caregiving and unpaid work (Becker 1991[1981]). In addition, women are more likely than men to live in households with young children or dependent adults, and are more likely to be single parents (Bianchi and Casper 2000), so they may be more likely to face the needs of others during the night. This compositional explanation would suggest a first hypothesis:

Hypothesis 1: Net of paid work commitment, partnership status and the presence and age of dependents, there is no gender difference in the likelihood of interrupted sleep for caregiving.

A compositional explanation for gender stratification of the night shift may need adjustment for biological realities, however. The risk for interrupted sleep, and the tasks required of the caregiver, will vary with changing needs of dependents, and women and men may not be perfect substitutes for each other when it comes to some forms of caregiving. In particular, mothers who breastfeed will be more likely to face

a disproportionate burden of interrupted sleep. Nonetheless, the night shift extends far beyond the average duration of exclusive breastfeeding among American women; one estimate of the median duration is 19 weeks (Fein and Roe 1998). While infants wake most frequently during the night, an estimated 23 to 33 percent of 1- to 2-year-old children still awaken during the night (Ferber 1995), and older dependents may also need care. Except in the specific case of direct and exclusive breastfeeding in early infancy, men potentially could substitute for women as providers of nighttime physical and medical care. A compositional explanation should thus accommodate a gender gap in responsibility for the night shift in the first months of a child's life, with mothers performing more care to the extent that they are breastfeeding. However, according to the a compositional explanation this gap would disappear as the tasks required of a night time caregiver become gender neutral, leading to a second hypothesis:

Hypothesis 2: Net of paid work commitment and partnership status, women will be more likely than men to report interrupted sleep if there is a young child in the home, but no more likely otherwise.

Challenging such an explanation, some sociologists argue that accounting for compositional differences in the lives and responsibilities of men and women is insufficient, and that gendered expectations about responsibility for caregiving and/or relative resource differences between male and female partners also matter. Gender theorists have argued that regardless of their social role responsibilities, women face “gendered time constraints” and will spend more time than men on female-typed tasks such as housework and childcare (Bianchi, Milkie, Sayer and Robinson 2000; Hochschild and Machung 2003). Some sociologists argue that gender asymmetry in unpaid labor is maintained by practices and beliefs associated with “doing gender,” such that certain frequently needed and repetitive tasks like cooking, cleaning or caring for children are understood and practiced as “women’s work.” (West and Zimmerman 1987)

Following these lines, Venn and colleagues (2008) argue that responsibility for the night shift of caregiving work represents a “fourth shift” of emotional and physical care that is unequally shared by parents. In addition to the “first shift” of paid work and the “second shift” of unpaid household work, emotion work during the waking hours represents a “third shift” of labor that involves thinking about and worrying for family members and anticipating their physical and emotional needs (Hochschild 1983, 1997). Venn and colleagues (2008) propose that there is also a “fourth shift” of emotional labor—a continuation into the sleeping hours of the emotion work parents feel during the waking hours. They argue that women take the fourth shift more often because they expect, and are expected, to be the primary nighttime caregivers, regardless of their other duties. They also showed that when fathers took the “fourth shift” of nighttime emotional labor, it was to worry about the safety of older children who were staying out late, rather than to perform more frequently required tasks such as feeding or providing physical care for children (Venn, Arber, Meadows and Hislop 2008).

At the same time, taking on caregiving work is an act influenced by a complex combination of factors that also include women's claims over this realm of activity as an expression of their identities. Some research has suggested that women may act as "gatekeepers" for family work by setting up high standards and insisting on differentiated male and female realms, which can inhibit paternal involvement in housework and childcare (Allen and Hawkins 1999), and maternal gatekeeping could extend to the night shift. It is also possible that mothers may willingly monopolize responsibility for primary caregiving when an infant is very young, but are never able to renegotiate their responsibility for taking the night shift, even when the child's needs could be met by the father. Recent research on the shifting norms of fatherhood suggests that while men are becoming more involved in parenting, they may still feel that their major role is that of breadwinner, rather than caretaker (Fox, Bruce and Combs-Orme 2000). Moreover, a handful of qualitative studies suggests that because of their normative status as primary earner, men's sleep may be "protected" from interruption more than women's sleep (Hislop and Arber 2003; Maume, Sebastian and Bardo 2009b; Venn, Arber et al. 2008). Arguments and evidence supporting the gendered perspectives and maternal gatekeeping arguments thus suggest that women will be more likely than men to take on the bulk of the second shift of unpaid work during the day (Hochschild and Machung 2003) as well as the night shift of caregiving, regardless of their other role responsibilities. This leads to a third hypothesis:

Hypothesis 3: Net of age, paid work commitment, partnership status and the presence and age of dependents, women will be more likely to report interrupted sleep for care work.

A final possibility is that the gender difference in the likelihood of getting up from sleep to provide care will vary across couples, depending on the relative resources of partners. Relative resources arguments about the division of household labor suggest that the partner who holds more resources will have more power to avoid unwanted tasks (Bittman, England et al. 2003); these could include caregiving responsibilities during the day or night. Women typically have fewer financial resources than their partners, and also average fewer hours of paid work than men do during the child-bearing years, which could explain why they are more likely to take the night shift. However, among couples in which the female partner has relatively more resources, the burden of interrupted sleep may not fall disproportionately to women, leading to a final hypothesis:

Hypothesis 4: Individuals with fewer resources than their partners will be more likely to report interrupted sleep for care work, compared with individuals who have relatively more resources.

Data and Methods

Data

These analyses use the American Time Use Survey, a representative sample of the non-institutionalized population ages 15 and older conducted annually since 2003 by the U.S. Census Bureau. Respondents are interviewed for ATUS two to five months after they rotate out of the Current Population Survey, completing a phone interview about their time use after receiving mail notification of the survey and the nature of the questions they will be asked. In the interview, respondents report on their “diary day,” which starts at 4 a.m. the previous day and ends at 3:59 a.m. on the interview day, therefore nearly all adults had at least two different distinct sleep periods. From these interview data, researchers can obtain data on the minutes of time spent in up to 400 distinct activities. I use pooled ATUS interview waves conducted from 2003 through 2007, obtaining a total sample of 72,922 respondents. Response rates were 57.8 percent in 2003, 57.3 percent in 2004, 56.6 percent in 2005, 55.1 percent in 2006, and 52.5 percent in 2007. Analysis of these response rates, which are typical of time use studies (Chatzitheochari and Arber 2009), has shown that busy people appear to be no less likely to respond to the ATUS, although people who are weakly integrated into their communities appear to be less likely to respond (Abraham, Maitland and Bianchi 2006).

Analyses focused on working-age individuals likely to have family responsibilities, so I dropped respondents younger than 18 or older than 64 years of age ($N = 16,079$), and those for whom ATUS staff had identified data quality issues ($N = 694$) or for whom information on analysis variables was missing ($N = 6$), resulting in a final analytic sample of 56,143 respondents. In multivariate analyses I restrict the sample to employed parents ($N = 22,669$), or employed and partnered parents ($N = 18,211$).

Measures

Sleep Interruption

I constructed a dichotomous indicator of *interrupted sleep* to measure “night shift” caregiving by inspecting the detailed data for respondents who reported at least three spells of sleeping activity in their 24-hour diary day. Inspection of records with fewer sleep spells suggests that very few, if any, of those respondents interrupted their sleep for caregiving. Individuals who reported getting up to provide physical, medical or other forms of care to a household member after they had gone to sleep for their main sleep period (usually in the evening) or in the hours before rising for their main activities (usually in the early morning) were coded as having interrupted sleep. For descriptive analysis, I collapsed caregiving activities performed during sleep interruptions into seven broad categories, using the slightly more detailed categories under which they were coded by ATUS: physical care for a child, medical care for a child, talking or listening to/teaching/playing with a child, physical care for an adult, medical care for an adult, preparation or presentation of food, and travel or other activity (e.g., travel to pick up children, care provision not elsewhere classified). Appendix A displays the

illustrative diary day of one respondent, a 37-year-old mother who had a partner and was not employed, who was coded as having two spells of interrupted sleep that totaled 21 minutes, both of which were spent providing physical care to a child.¹

Other Measures

Paid work time includes time spent working, in work-related activities, other income-generating activities, in job search and interviewing, and in travel related to work (range: 0-675 minutes, average: 264). Paid work time was obtained for the diary day and minutes were top-coded at the 95th percentile of the overall distribution to reduce the influence of outliers, a strategy used by other studies that employ time use data (e.g., Mattingly and Bianchi 2003). I use the time use categorization employed in Bureau of Labor Statistics calculations, which includes the travel time related to paid work. *Employment status* was coded 1 if, in the week preceding the ATUS interview, the respondent did any work at all for pay or profit, worked at least 15 hours without pay in a family business or farm, had a job or business from which they were temporarily absent, or were unemployed and looking for work or temporarily laid off.² Employment status was coded 0 if the respondent was not employed or unemployed, but was retired, disabled, in school, keeping house, or was convinced that he or she was unlikely to find work (i.e., a discouraged worker). *Partnership status* was coded 1 if the respondent was living with a spouse or unmarried partner in the household and 0 otherwise. *Spouse's employment status* was coded in the same fashion as the respondent's employment status. A six-category indicator of partnership/employment characteristics was created to combine measures of the respondent's employment status, his or her partnership status, and the employment status of the partner, if one was present.

The *age of the youngest child* in the household was measured using categories for under 1 year of age, 1-2 years, 3-5 years, 6-17 years and no children in the household; the *number of children* in the household was measured using categories for none, one, two, three, and four or more. I examined *female sex* as the focal predictor, and *age* and *age-squared* indicators were used in multivariate analyses. *Race/ethnicity* distinguishes white, black, and other/multiple race individuals from Hispanic respondents, who can be of any race. A marker of *educational attainment* distinguishes respondents with a high school diploma/GED or less schooling from those with some college or more schooling. *Relative educational attainment* of the respondent and his or her partner was assessed by comparing categories for less than high school, high school diploma/GED, some college, and bachelor's degree or more (same, partner more, partner less). *Relative hours worked* and *relative wages* were calculated based on usual hours worked per week and weekly wages (in hundreds of dollars) of respondents and their partners (partner more, partner same or less, unclear).³ I also control for survey year (2003-2007) and whether the diary day fell on a weekend day or a holiday. As typical for research using time diary data, I control for the number of activities on the diary day, top-coded at the 95th percentile of the distribution (range: 5-37, average: 20).

Analytic Strategy

Descriptive statistics and figures were generated to show the distribution of sleep interruptions for caregiving. P-values denoting statistical significance of the differences between respondents who reported interrupted sleep vs. those who did not (for Table 1) or between men and women (for tables 2 and 3) were obtained from weighted regression models with the variable in question (or each category of the variable) as the dependent variable and interrupted sleep as the sole independent variable. A series of logistic regression models was used to test hypotheses about predictors of sleep interruptions. All analyses were conducted using Stata/SE 10.0 (StataCorp 2007) and survey weights provided by ATUS that account for oversampling of certain subgroups and of weekend days, and for differential response rates.

Results

Table 1 presents descriptive statistics for respondents overall and by interrupted sleep status. Figures shown are weighted means with standard deviations in parentheses, or weighted percentages.

Table 1 shows that 1.7 percent of the ATUS sample (1,189 respondents) reported interrupted sleep on their diary day. Respondents who took the night shift of caregiving worked fewer minutes on the diary day than those who did not (139 vs. 266 minutes), were much more likely to be part of a dual-income couple or to be the stay-at-home partner in a couple household, and were much less likely to be single and employed. Those reporting interrupted sleep were also much more likely to have young children in the home; for example, 46 percent reported a child under age 1 as the youngest in the household, compared to 3 percent of those who did not report taking the night shift. Respondents reporting interrupted sleep were more likely to be female and were younger, better-educated, more likely to earn less and work fewer hours than their partner, and reported more activities on the diary day.

Figure 1 illustrates the strongly patterned variation in night shift responsibilities as social role obligations change over the life course. Figures shown are means and 95 percent confidence intervals, calculated using the standard error of the mean estimate, and illustrate the proportion of ATUS respondents reporting interrupted sleep by age (Panel A), by the age of the youngest child in the household among those with any children (Panel B), and by the total number of children residing in the household (Panel C). Figures are presented for men on the left and women on the right of each panel.

Panel A of Figure 1 demonstrates the gendered nature of night shift caregiving, with a substantial gender gap apparent during the prime childbearing and child rearing years of the 20s and 30s. In their mid-30s, about 7 to 8 percent of women reported interrupted sleep for care of a household member on their diary day, compared to about 2 to 3 percent of men. Panels B and C show that the presence and age of children in the household strongly conditions the likelihood of interrupted sleep, but does not account for the gender gap. Panel B shows that 1 in 4 mothers of children younger than 1 year old reported interrupted sleep for caregiving, compared to fewer than 1 in 10 men with

Table 1: Descriptive Statistics for Sociodemographic and Diary Day Characteristics of Respondents Overall and by Interrupted Sleep Status

	Overall	Not Interrupted	Interrupted	p-value
% Interrupted sleep for caregiving	1.69	—	—	—
Minutes of paid work on diary day ^a	264.2 (270.8)	266.4 (271.0)	138.7 (225.0)	<.001
Partner/ Employment Characteristics %				
Dual income couple	40.1	39.9	49.1	<.001
Respondent employed, partner not employed	11.7	11.8	7.9	.003
Respondent not employed, partner employed	8.4	8.2	25.6	<.001
Respondent employed, no partner	30.0	30.3	10.0	<.001
Respondent not employed, partner not employed	3.3	3.3	3.5	.789
Respondent not employed, no partner	6.5	6.6	3.9	.006
Youngest Child's Age %				
Less than 1 year	4.0	3.2	46.1	<.001
1-2 years	7.1	6.8	23.3	<.001
3-5 years	7.2	7.2	9.7	<.001
6-17 years	20.2	20.4	10.4	.002
No children in household	61.5	62.4	10.7	<.001
Number of Children in Household %				
None	61.5	62.4	10.7	<.001
One	15.6	15.3	34.1	<.001
Two	14.9	14.6	32.3	<.001
Three	5.9	5.8	15.1	<.001
Four or more	2.1	2.0	7.8	<.001
% Female	50.8	50.3	82.2	<.001
Age	40.2 (12.9)	40.3 (12.9)	33.7 (8.8)	<.001
Race/ Ethnicity %				
White	69.4	69.4	71.5	.237
African American	11.3	11.4	9.5	.140
Other/ Multiple race	5.2	5.2	5.3	.863
Hispanic-any race	14.1	14.1	13.7	.795
Educational attainment: % some college or more	56.1	56.0	64.7	<.001
Relative Education %				
Partner has less	21.4	21.4	20.5	.001
Partner has same	55.1	55.1	55.4	<.001
Partner has more	23.5	23.5	24.1	<.001
Relative Wages %				
Partner earns same or less	39.2	39.6	22.6	.001
Partner earns more	38.2	37.7	59.5	<.001
Not clear	17.4	17.5	13.8	.429
Both not in labor force	5.2	5.3	4.1	.789
Relative Hours Worked %				
Partner works same or less	56.2	56.8	33.6	<.001
Partner works more	33.3	32.7	58.6	<.001
Not clear	5.2	5.3	3.8	.857
Both not in labor force	5.2	5.3	4.1	.789
Year %				
2003	19.5	19.5	22.8	.012
2004	19.9	19.8	24.9	.001
2005	20.1	20.0	20.4	.817
2006	20.1	20.2	16.8	.028
2007	20.4	20.5	15.1	.001

Table 1 continued

	Not			p-value
	Overall	Interrupted	Interrupted	
Weekend day or holiday	29.7	29.7	27.0	.053
Total # activities on diary day ^a	19.8 (7.40)	19.7 (7.33)	27.6 (7.51)	<.001
N	56,143	54,954	1,189	

Source: American Time Use Survey (2003-2007)

Note: Figures shown are weighted means with standard deviations in parentheses or weighted percentages. P-values denoting statistical significance of difference by interrupted sleep status were obtained from weighted linear regression models with the variable in question as the dependent variable and interrupted sleep as the sole independent variable (for continuous variables) or separate weighted logistic regression models for each category of categorical variables with interrupted sleep as the sole predictor.

^aDistribution top-coded at 95th percentile of overall ATUS 2003-2007 distribution.

a child of the same age. This gender gap persists for those with pre-school aged children but is much smaller or nonsignificant when children are older, and the likelihood of interrupted sleep is relatively low after children reach school age. Panel C suggests that while having any children raises the likelihood of interrupted sleep, the magnitude of the difference created by additional children after the first is smaller than the dramatic variation evident by the age of the youngest child. Women with four or more children are more likely to report interrupted sleep than those with one to three children, but only about 2 percent of respondents have four or more children. Because it is the stronger predictor of night shift sleep interruption, from this point forward I focus on the age of the youngest child in the household rather than the number of children.

In Table 2, the percentage of respondents who took the night shift is compared for men and women with the same sets of roles. The top rows of Table 2 show the figures for the overall sample by sex and by the employment status of the respondent and of his or her spouse, with separate categories for respondents without a spouse or partner. Subsequent rows further subdivide these groups by the age of the youngest child in the household.

Table 2 shows that overall, women are more likely than men to report interrupted sleep regardless of their social roles. Among those who are employed and have an employed partner, about 3.2 percent of women compared to .9 percent of men took the night shift of caregiving, a statistically significant difference. A significant gender gap is present for the overall sample across all six categories of worker and partner characteristics. Three other conclusions can be drawn from Table 2. First, subsequent rows demonstrate that the likelihood of interrupted sleep varied dramatically by the age and presence of children in the household, but mothers' greater likelihood of taking the night shift persists regardless of their employment and partnership characteristics in nearly all categories. For example, among respondents with children less than a year

Figure 1. Sleep Interruption by Respondent's Sex and Age, Age of Youngest Child in the Household, and Total Number of Children in the Household

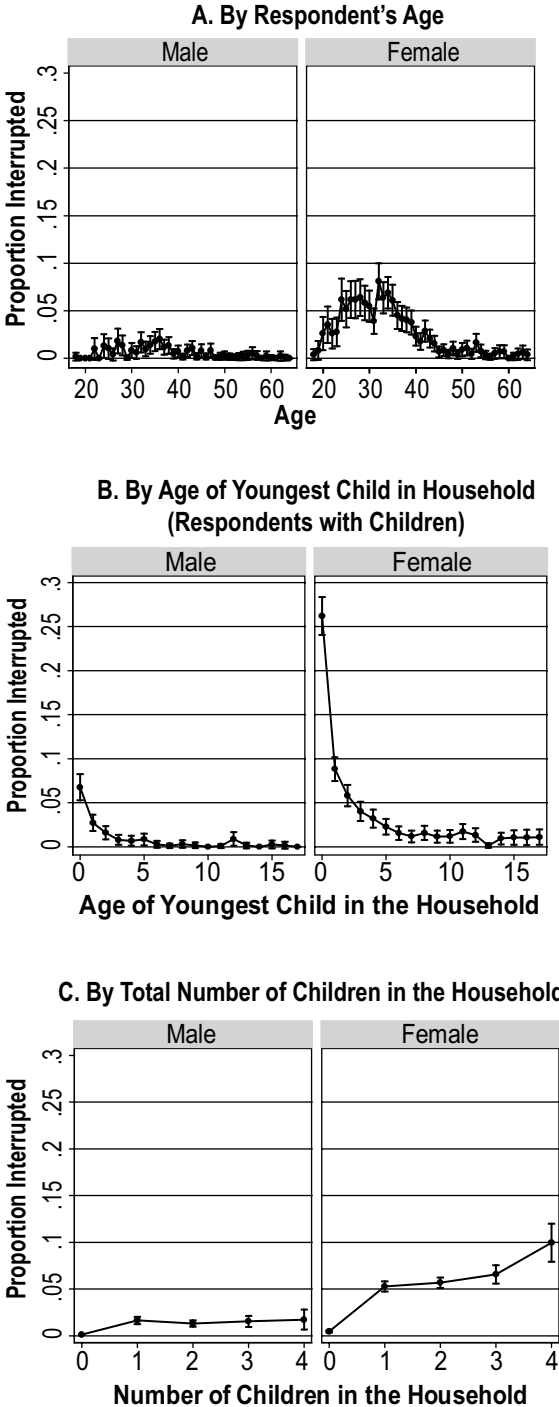


Table 2. Percent Reporting Interrupted Sleep by Sex, Employment and Partnership Characteristics and Age of Youngest Child in Household

	Respondent Employed				Respondent Not in Labor Force					
	Partner Not in Labor Force		No Partner		Partner Employed		Partner Not in Labor Force			
	N	%	N	%	N	%	N	%		
Overall	10,107	.93	4,620	.96	7,096	.09	596	.57	1,503	.23
Men	11,946	3.17	1,553	1.67	10,135	1.04	4,266	6.17	1,032	2.59
Women	<.001		.045		<.001		<.001		.022	
p for diff										
Child <1	498	10.60	468	4.35	25	4.53	16	4.78	9	.00
Men	642	32.03	58	28.27	181	17.73	482	29.87	24	45.17
Women	<.001		<.001		.073		.044		n/a	
p for diff										
Child 1-2	1,111	2.34	817	2.52	46	.00	38	8.57	18	3.80
Men	1,294	9.82	103	4.70	441	5.13	842	8.59	47	1.28
Women	<.001		.264		n/a		.995		.448	
p for diff										
Child 3-5	1,267	1.07	749	.51	121	.00	54	.98	23	.00
Men	1,463	3.06	120	5.41	660	3.66	696	4.02	47	2.25
Women	.001		.001		n/a		.164		n/a	
p for diff										
Child 6-17	3,645	.33	1,255	.07	570	.20	187	.00	74	3.59
Men	4,352	.92	369	1.17	2,414	1.21	1,182	2.39	114	6.75
Women	.004		.001		.019		n/a		.552	
p for diff										
No Children	3,586	.17	1,331	.24	6,334	.07	460	.00	472	.19
Men	4,195	.63	903	.12	6,439	.22	1,064	.79	800	1.09
Women	.032		.432		.056		n/a		.046	
p for diff										

Source: American Time Use Survey (2003-2007)

Note: N = 56,143. P-values for the statistical significance of sex differences were obtained from weighted logistic regression models predicting interrupted sleep among respondents in a particular worker/partner/parent category, with sex as the sole predictor.

old, 32 percent of women in dual-earner couples reported interrupted sleep, compared to about 11 percent of their male counterparts. The comparable figures were 28.3 and 4.4 percent, respectively, among respondents who were the sole breadwinner in a couple. They were 17.7 and 4.5 percent for single mothers and fathers, respectively, and 29.9 and 4.8 percent for stay-at-home mothers and fathers, respectively. Among working adults with older children, the gender gap in taking the night shift was not as pronounced but was statistically significant in all but one case.

Second, Table 2 shows that interrupted sleep was rare among respondents who have no children in the household. The bottom rows show that 1 percent or less of these respondents got up for the night shift of caregiving; women got up more than men in most categories, but these differences were small and often not significant. A final finding from Table 2 is that relatively few respondents with young children in the household were not in the labor force, with the exception of stay-at-home mothers who had a partner working for pay. Among the parents who did not work, it is difficult to assess the significance of any gender gap in interrupted sleep because there are so few men in these categories.

Table 3 provides more information about the tasks performed by men and women who reported taking the night shift. The first set of rows shows the figures for all respondents who reported interrupted sleep, while subsequent sets show the figures disaggregated by the age and presence of children. Row percentages for different types of care do not sum to 100 percent because some respondents reported more than one incident of interrupted sleep during their diary day, and reported different activities for different incidents.

Table 3 shows that among those respondents who took the night shift, there was little evidence of gender stratification in the kinds of care provided, and that interrupted sleep was largely tied to the basic needs of young children. There were few gender differences in the types of care provided, although in some comparisons no men reported the rarer activities, making women by default more likely to perform them. Overall, the major influence of sex appears to occur at the point of getting up or not, rather than distinguishing the types of care provided. Moreover, physical care for a child was overwhelmingly the most common activity, accounting for about 83 percent of all interruptions, and it was even more dominant among parents with a young child. Medical care for a child and physical care for an adult were reported by about 6 to 8 percent of caregivers overall, while 3 percent or fewer reported other activities with a child, medical care for an adult, preparing or presenting food, or traveling or other activities. These activities change somewhat as children age, with medical care for a child much more common for those with toddlers or older children, for example, and care for an adult rare among those with young children. While respondents with none of their own biological children in the household still performed some childcare (probably for others' children, such as grandchildren), more of them reported physical and medical care of adults.⁴

Descriptive analyses have revealed the overwhelming concentration of sleep interruptions among parents with children living in the household, and have shown that

Table 3: Percent Reporting Different Types of Caregiving among Those With Interrupted Sleep by Sex, and Age of Youngest Child in Household

	N	Physical Care: Medical Care:		Physical Care: Adult		Talk/ Teach/ Play with Child		Medical Care: Adult		Prepare/ Present Food		Travel/ Other Activity	
		Child	Child	Adult	Adult	Child	Child	Adult	Adult	Adult	Adult	Adult	Adult
Overall													
% Men	184	82.5	6.3	6.8	2.1	6.8	2.1	2.1	.3	1.5			
% Women	1,005	83.3	7.8	6.9	3.0	6.9	3.2	3.2	2.5	1.0			
p for diff		.831	.469	.993	.478	.993	.532	.532	.031	.493			
Child <1													
% Men	68	99.0	0	0	.7	0	0	0	.6	1.0			
% Women	459	99.2	2.1	.7	.6	.7	0	0	2.4	.5			
p for diff		.846	—	—	.956	—	—	—	.218	.631			
Child 1-2													
% Men	53	91.5	6.2	1.7	.6	1.7	0	0	0	0			
% Women	241	87.5	14.0	.6	2.2	.6	1.7	1.7	2.0	0			
p for diff		.364	.073	.463	.234	.463	—	—	—	—			
Child 3-5													
% Men	22	66.3	26.7	0	9.8	0	0	0	0	0			
% Women	119	79.0	18.6	2.6	6.3	2.6	0	0	3.2	2.1			
p for diff		.272	.441	—	.668	—	—	—	—	—			
Child 6-17													
% Men	20	84.4	12.4	0	6.7	0	0	0	0	6.0			
% Women	119	56.8	12.7	14.7	14.3	14.7	0	0	3.2	3.5			
p for diff		.033	.968	—	.335	—	—	—	—	.638			
No Children													
% Men	21	25.5	8.9	45.1	1.2	45.1	15.0	15.0	0	4.2			
% Women	67	31.3	4.5	46.3	.7	46.3	28.6	28.6	2.1	1.2			
p for diff		.649	.518	.947	.652	.947	.288	.288	—	.383			

Source: American Time Use Survey (2003-2007)

Note: N = 1,189. P-values for the statistical significance of gender differences were obtained from weighted logistic regression models predicting types of tasks performed during interrupted sleep with sex as the sole predictor.

Table 4: Odds Ratios from Logistic Regression Models Predicting Interrupted Sleep among Working Parents

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Main Effect		Main Effect		Main Effect		Main Effect		Main Effect	
Female	1.96*** (1.52-2.53)	—	2.12*** (1.62-2.76)	—	1.94*** (1.49-2.52)	—	2.45*** (1.85-3.24)	—	5.60* (1.46-21.51)	—
Partner/ Employment Characteristics ^a										
Partner not employed	—	.965 (.682-1.37)	—	.972 (.687-1.38)	—	.868 (.604-1.25)	—	.868 (.604-1.25)	.713 (.439-1.16)	1.66 (.838-3.29)
No partner	—	.542*** (.408-.720)	—	.550*** (.412-.732)	—	.817 (.602-1.11)	—	.817 (.602-1.11)	.416 (.124-1.39)	2.15 (.619-7.48)
Minutes of paid work	—	—	—	.999*** (.998-.999)	—	.999*** (.998-.999)	—	.999*** (.998-.999)	1.00 (.998-1.00)	.999 (.997-1.00)
Youngest child 0-2 years	—	—	—	—	—	8.91*** (6.99-11.3)	—	8.91*** (6.99-11.3)	8.79*** (5.20-14.9)	1.02 (.564-1.83)
Age	.873*** (.852-.894)	.874*** (.854-.895)	.875*** (.854-.896)	.875*** (.854-.896)	.875*** (.854-.896)	.951*** (.929-.973)	.951*** (.929-.973)	.951*** (.929-.973)	.963* (.932-1.00)	.979 (.936-1.03)
Age-squared	.997*** (.995-1.00)	.998* (.996-1.00)	.998** (.996-1.00)	.998** (.996-1.00)	.998** (.996-1.00)	.998** (.996-1.00)	.998** (.996-1.00)	.998** (.996-1.00)	1.00 (.996-1.00)	.998 (.994-1.00)
Race/ Ethnicity ^a										
African American	.628* (.427-.924)	.763 (.516-1.13)	.754 (.509-1.12)	.754 (.509-1.12)	.831 (.554-1.25)	.831 (.554-1.25)	.831 (.554-1.25)	.831 (.554-1.25)	.822 (.549-1.23)	—
Hispanic	.637* (.449-.906)	.659* (.465-.935)	.663* (.468-.939)	.663* (.468-.939)	.735 (.514-1.05)	.735 (.514-1.05)	.735 (.514-1.05)	.735 (.514-1.05)	.742 (.522-1.06)	—
Other/ Multiple race	.892 (.600-1.33)	.904 (.606-1.35)	.912 (.611-1.36)	.912 (.611-1.36)	.841 (.557-1.27)	.841 (.557-1.27)	.841 (.557-1.27)	.841 (.557-1.27)	.840 (.554-1.27)	—
Education: some college or more	1.65*** (1.31-2.08)	1.61*** (1.28-2.03)	1.64*** (1.30-2.07)	1.64*** (1.30-2.07)	1.27 (.99-1.62)	1.27 (.99-1.62)	1.27 (.99-1.62)	1.27 (.99-1.62)	1.14 (.696-1.86)	1.18 (.674-2.08)
Survey year	.891*** (.835-.951)	.892*** (.835-.952)	.894*** (.838-.954)	.894*** (.838-.954)	.876*** (.820-.936)	.876*** (.820-.936)	.876*** (.820-.936)	.876*** (.820-.936)	.850** (.753-.959)	1.04 (.903-1.20)
Weekend/ Holiday day	1.12 (.936-1.34)	1.11 (.930-1.33)	.806 (.640-1.01)	.806 (.640-1.01)	.794 (.627-1.01)	.794 (.627-1.01)	.794 (.627-1.01)	.794 (.627-1.01)	1.03 (.533-1.99)	.716 (.353-1.45)

Total # activities	1.09*** (1.08-1.11)	1.09*** (1.08-1.11)	1.08*** (1.07-1.10)	1.08*** (1.07-1.10)	1.10*** (1.07-1.13)	.974 (.943-1.01)
Log likelihood	-2.709.0	-2.695.5	-2.672.8	-2.430.2		-2.420.8

Source: American Time Use Survey (2003-2007)

Note: N = 22,669. Figures shown are odds ratios with 95 percent confidence intervals in parentheses. All t-tests are two-sided.

^aOmitted categories for categorical variables are: partner is employed and white race.

* p < .05 ** p < .01 *** p < .001

physical care for children dominates the workload among these respondents, so for the multivariate analyses I return to the outcome indicator of any interrupted sleep. To enable a robust estimate of the gender gap in interrupted sleep based on comparisons of sufficient numbers of men and women who hold the same social roles and responsibilities, I focus on employed parents in the Table 4 analyses. Thus, these results do not apply to two important groups in the population: adults who have children under 18 in the household, do not work for pay, and who have a relatively high burden of interrupted sleep for caregiving (N = 514 men and 4,165 women), and those who have no children under 18 living with them and report very little sleep interruption for caregiving (N= 13,591 men and 15,204 women). Table 4 presents the results of logistic regression models predicting interrupted sleep among working parents, among whom 1.5 percent of men and 5 percent of women reported interrupted sleep for caregiving. Table 4 shows odds ratios with 95 percent confidence intervals in parentheses below them, with the log-likelihood values presented at the bottom of the table.

Model 1 in Table 4 shows that net of socio-demographic characteristics and conditions of the diary day, women had odds of interrupted sleep about twice as great as those of men. When partner’s employment characteristics are added in Model 2, the odds ratio for females relative to males rises to 2.1. Single, working parents were significantly less likely (OR: .54) to take the night shift, compared to parents in dual-income couples. Controlling for minutes of paid work on the diary day in Model 3 reduces the odds ratio for females vs. males to 1.9, although it remains substantial and statistically significant. The likelihood of interrupted sleep fell significantly as the minutes of paid work on the diary day rose.

The addition of a categorical indicator of the age of the youngest child in the household in Model 4 strongly improves the fit of the model, showing the overwhelming influence of child’s age on the burden of night shift caregiving. In Model 4, the odds ratio for female vs. male rises to 2.5, and partner’s employment and presence are no longer significant predictors. Compared to parents with older children, those with a child 2 years old or younger had odds of interrupted sleep almost nine times greater. Model 5 adds interactions between the predictors and female sex, with the exception of the race/ethnicity

Table 5: Odds Ratios from Logistic Regression Models Predicting Interrupted Sleep among Working Parents with a Partner, Controlling for Relative Resources

	Model 1	Model 2	Model 3
Female	2.52*** (1.89-3.37)	2.47*** (1.83-3.34)	2.52*** (1.83-3.45)
Partner not employed	.879 (.609-1.27)	.822 (.565-1.20)	.820 (.571-1.18)
Partner's Relative Education ^a			
Partner has less education	.852 (.658-1.10)	—	—
Partner has more education	1.28 (.939-1.75)	—	—
Partner's Relative Wages ^a			
Partner has higher wages	—	.926 (.694-1.24)	—
Relative wages unclear	—	.920 (.672-1.26)	—
Partner's Relative Work Hours ^a			
Partner works more hours	—	—	.900 (.680-1.19)
Relative hours unclear	—	—	.667 (.414-1.07)
Minutes of paid work	1.00** (.999-1.00)	1.00** (.998-1.00)	1.00*** (.998-1.00)
Youngest child 0-2 years	10.05*** (7.59-13.3)	10.05*** (7.59-13.3)	10.03*** (7.58-13.3)
Age	.958*** (.936-.982)	.959*** (.936-.982)	.959*** (.936-.982)
Age-squared	1.00 (.997-1.00)	1.00 (.997-1.00)	1.00 (.997-1.00)
Race/ Ethnicity ^a			
African American	.793 (.451-1.39)	.787 (.448-1.38)	.785 (.444-1.39)
Hispanic	.800 (.535-1.20)	.771 (.518-1.15)	.768 (.517-1.14)
Other/ Multiple race	.774 (.498-1.21)	.779 (.500-1.21)	.772 (.495-1.20)
Education: some college or more	1.45* (1.08-1.94)	1.28 (.969-1.70)	1.29 (.973-1.70)
Survey year	.892** (.831-.957)	.895** (.834-.961)	.893** (.832-.959)
Weekend/ Holiday day	.840 (.649-1.09)	.825 (.636-1.07)	.813 (.626-1.06)
Total # activities	1.08*** (1.07-1.10)	1.08*** (1.07-1.10)	1.08*** (1.07-1.10)
Log likelihood	-1,955.29	-1,958.84	-1,957.41

Source: American Time Use Survey (2003-2007)

Note: N = 18,211. Figures shown are odds ratios with 95 percent confidence intervals in parentheses. All t-tests are two-sided.

^aOmitted categories for categorical variables are: partner has equal education, partner earns lower wages, partner works fewer hours and white race.

*p < .05 **p < .01 ***p < .001

categories, as there were too few cases of interrupted sleep among the smaller groups of non-whites to support interaction terms. None of these interaction terms were statistically significant, leading to a preference for the more parsimonious Model 4.

As a final test of the gender difference in interrupted sleep, Table 5 presents the results of logistic regression models estimated on a sample restricted to employed parents with a partner, for whom relative resources could be compared and among whom 1.6 percent of men and 5.5 percent of women reported interrupted sleep for caregiving.

Model 1 in Table 5 considers the relative educational attainment of each partner, Model 2 considers relative wages, and Model 3 considers relative hours worked. We also tested for gender interactions with all independent variables in these models except race/ethnicity (not shown), but none were significant. The models in Table 5, which replicate Model 4 from Table 4, show that accounting for partners' relative resources did not alter the conclusion that working mothers have odds of interrupted sleep about 2.5 times greater than those of their male counterparts.⁵

Discussion

This study provides the first nationally-representative evidence to substantiate gender stratification in responsibility for the night shift of caregiving work in contemporary American households. A large sample from the American Time Use Study allowed for comparison of men and women with similar social roles and responsibilities, making it possible to evaluate different explanations for a gender gap in interrupted sleep for caregiving. Women could appear to bear an unequal burden because of compositional differences, if they have different personal characteristics and work-family responsibilities than men do. Alternatively, women may take on more night shift caregiving even if they have the same roles and responsibilities as men, if they are responding to gendered expectations or have fewer relative resources than their partners.

Compositional differences are clearly part of the explanation, because these results illustrate how the needs of others during the nighttime hours vary substantially over midlife. However, the results best supported the third study hypothesis, showing that women were significantly and substantially more likely than men to interrupt their sleep for the night shift even net of differences in their own and their dependents' characteristics. In particular, net of socio-demographic characteristics, paid work commitment, partnership status, and the presence and age of dependent children, working mothers faced odds of getting up for the night shift about 2.5 times greater than those of working fathers. Moreover, the greater burden of interrupted sleep for working mothers did not appear to be a function of their relative resources compared to their partners' resources, whether education, wages or work hours were considered.

Taken together, these results provide novel support for the gendered expectations perspective on men's and women's time use, complementing the large body of sociological evidence for gender stratification in caregiving and other unpaid work during the waking hours. For example, studies have shown that women do at least twice as much child care as men during the waking hours (Aldous, Mulligan and Bjarnason 1998;

Robinson and Godbey 1997; Sayer 2005), and the results presented here suggest that among working parents, mothers' burden of interrupted sleep is about twice as great as that of fathers. However, the overall impact of this aspect of gendered inequality is smaller than in other domains, such as housework or wages, because it is so concentrated among parents of very young children. For example, Table 2 shows that among those in dual-earner households, almost a third of mothers with a child under 1 year of age reported interrupted sleep for caregiving on the diary day, compared to about 1 in 10 comparable fathers, marking both a large gender difference and a substantial proportion affected. However, among all dual-earner couples, only about 3 percent of women and 1 percent of men took the night shift of caregiving—a similar ratio, but a relatively small overall population fraction affected.

Overall, these results revealed that interrupted sleep for caregiving occurred largely to accommodate the needs of young children, though it was also reported at low levels by adults with older or no children in the household. The night shift burden is greatest for adults with children under 3, and especially for those with infants. This finding is relatively simple to explain, given the intense feeding and care needs of very young children and their still evolving sleep patterns. Interestingly, the one finding that did not support the gendered expectations perspective was the general lack of gender differences in the types of care provided by the men and women who did get up to take the night shift. Even among those with very young children, men and women who got up appeared to be relatively interchangeable as caregivers. However, the level of detail available in the ATUS data to characterize tasks performed during interrupted sleep—especially regarding feeding responsibilities—was insufficient to allow a full examination of potential gender differences in the nighttime care given by parents. Future research focusing on new parents and distinguishing further between the activities coded in ATUS as “physical care” for children would allow investigators to better distinguish the importance of breastfeeding and other specific caregiving activities in shaping mothers' and fathers' responsibilities in the first few months of a child's life.

These findings provide novel evidence that women experience more interrupted sleep for caregiving than men, even when they share the same characteristics and responsibilities, but the underlying mechanisms that create and maintain this disparity cannot be elucidated with these data. It is not possible to adjudicate between choice and constraint—to identify how much of the gender difference is due to women claiming responsibility for caregiving as a strategy to manage their identities as mothers vs. that due to their inability to shift the burden of care to someone else. Moreover, it is not possible to incorporate biological or developmental arguments using these time use data, although they could also help to explain the findings. For example, research using brain imaging shows that neural responses to a child's cries vary by sex and parental status (e.g., Sander, Frome and Scheich 2007), but I found no studies examining differential ability to perceive a child's cries during sleep. Additionally, a child's preferences for a mother's attention that develop in early life could override parents' negotiations over who should get up, if only her presence will “solve the problem” and ensure an efficient return to sleep.

It is very challenging to untangle these potential biological and developmental explanations from the gendered expectations explanation, because they are likely to amplify one another (Bird and Rieker 2008). For example, if a mother is more likely to rise early in an infant's life because of her unique ability to breastfeed, habituation to her attention could shape a child's preferences and her and her partner's expectations about who is responsible and capable of taking on the night shift in ways that reinforce gendered expectations. An enhanced sense of responsibility could potentially engender a reinforcing attentiveness to the particular sounds of that child's activities, even during sleep. In future studies, it would be very useful to explore whether and how negotiations about caregiving that take place between mothers and fathers of infants are revisited after a child ceases breastfeeding, and whether caregiving tasks become more gender neutral. It would also be useful to assess actual demands from dependents that occur at night and differential physiological responsiveness during sleep of each partner in a couple, to see if this varies substantially and consistently by sex or if it varies across partners or over the life course as social role-based responsibilities change. Finally, it would be useful to assess how these decisions are shaped by broader social structures. For example, what are the effects of family policies such as maternity and paternity leave on parents' decisions to take or share the night shift? In models not shown, I found that respondents on parental leave from work were much more likely to take the night shift, although this only reduced the gender gap marginally, but further research is needed.

Despite the strength and novelty of these findings, other limitations of these data and analyses should also be considered. The ATUS data are cross-sectional; longitudinal data that capture the timing of births, changes in work participation or work schedules and use of family leave policies, for example, would be helpful to provide a stronger view of the processes creating the patterns revealed in this research. Also, there is scant information in ATUS about the objective needs of dependents. A dependent household member with a serious health condition or disability may require substantially more care during the night, and these needs would persist over time. Finally, the ATUS data were not designed for sleep research, so there may be underreporting of interrupted sleep for care work, and more direct and detailed questions about the night shift would be useful to refine the coding assignments used here. Also, there may be considerable underreporting of sleep interruptions that did not involve actually rising from bed. Extant qualitative research has focused on a broader notion of a "fourth shift" of nighttime care work that spans both physical care and emotion work, and could also include activities such as lying in bed worrying about a family member (Hislop and Arber 2003; Venn, Arber, Meadows and Hislop 2008). As Venn and colleagues (2008:84) put it, "...Thinking about, being alert to and recognizing the needs and wants of those you care for is a feeling which is not just related to the physical expression of care, such as... giving a child a bottle of milk at night." The indicator of interrupted sleep used here has the benefit of being relatively objective and is appropriate given the time diary data, but future research using in-depth interviews could be more sensitive to the emotional labor component of nighttime caregiving.

A final limitation is that the present analyses characterize the “gender gap” in a manner similar to other studies, but this gap is derived from comparisons of individuals with similar role characteristics, rather than from comparisons of the behaviors of members of cohabiting couples. Individuals may not enter into relationships with persons who match them exactly on role characteristics, so the difference between partners in the likelihood of taking the night shift would be a more accurate marker of the outcome of their negotiations, at least for people in cohabiting relationships. Studies using data on couples might find different results, but there are not large, nationally-representative data sources that catalogue interrupted sleep for both partners in American households.

Even given the limitations of the data used here, these findings show that gendered expectations seem to shape responsibility for the night shift. Despite this, interventions to improve sleep generally target individual health behaviors, such as alcohol, tobacco or caffeine use, or suggest improved sleep routines, but do not take gendered social role responsibilities like parenthood into account (Venn, Arber, Meadows and Hislop 2008). New data collections using diverse methodological approaches will be necessary to further refine understanding of the processes by which gendered expectations shape negotiations about and fulfillment of night shift responsibilities, and how social, developmental and biological pathways intersect or amplify one another. Future studies could also connect gender stratification in nighttime family responsibilities with the ways it influences status attainment at work. Such new research will be critical for improving sleep interventions as well as bringing a heretofore ignored third of every day into consideration in sociological assessment of the micro-level processes that reflect and reproduce gender stratification across multiple social contexts.

Notes

1. About 4.8 percent of these respondents, including the one in Appendix A, reported gaps in the diary day during which they did not remember what activities took place. Multivariate models that included a count of these gaps produced results unchanged from those presented here.
2. Results were unchanged if only respondent who were employed and had been at work during the past week were considered “employed.”
3. Relative hours worked were coded as unclear if the partner worked variable hours, while relative wages were coded as unclear if the respondent was self-employed or if the partnership began after the final CPS interview and before the ATUS interview.
4. Other descriptive analyses (not shown) showed that among those who reported interrupted sleep, the total number of sleep interruptions and the total duration of time spent awake were greatest for those with children younger than a year old. Mothers appeared to spend a few more minutes awake than fathers among parents with children under the age of three, but the overall patterns in the frequency and duration of the night shift were very similar to patterns in the measure of any night shift caregiving used here.
5. Sensitivity analyses included a more detailed coding for education and a control for occupational status (professional or managerial versus other occupation), but these changes did not alter the main results, and the gender gap in sleep interruption did not

vary by education or occupational status. I also estimated models that included indicators of total sleep time and whether the respondent napped, to account for differences in the total distribution of sleep across the day, and models with controls for the respondents' disability status two to five months prior to the ATUS diary day, to assess whether major differences in health and ability shaped the gender gap. I re-estimated the models using usual hours of paid work rather than minutes of paid work on the diary day, and estimated models that adjusted for the partner's usual number of hours of work. None of these changes altered the conclusions presented here.

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Appendix A. Diary Day Activity Record for a 37 Year Old Female Not in the Labor Force with a Partner and a Child in the Household

Activity	Start	End	Duration of Interruptions	Count of Interruptions
Sleeping	4:00:00	5:30:00	—	0
Washing, dressing, and grooming oneself	5:30:00	6:15:00	—	0
Physical care for household children	6:15:00	6:45:00	—	0
Food and drink preparation	6:45:00	7:00:00	—	0
Physical care for household children	7:00:00	7:20:00	—	0
Kitchen and food clean-up	7:20:00	7:35:00	—	0
Interior cleaning	7:35:00	8:20:00	—	0
Laundry	8:20:00	8:40:00	—	0
Playing with household children, not sports	8:40:00	9:10:00	—	0
Household and personal organization and planning	9:10:00	9:30:00	—	0
Travel related to caring for and helping household children	9:30:00	9:40:00	—	0
Attending household children's events	9:40:00	10:40:00	—	0
Travel related to caring for and helping non-household children	10:40:00	10:45:00	—	0
Dropping off or picking up non-household children	10:45:00	10:46:00	—	0
Travel related to caring for and helping non-household children	10:46:00	10:56:00	—	0
Food and drink preparation	10:56:00	11:26:00	—	0
Physical care for household children	11:26:00	11:46:00	—	0
Physical care for household children	11:46:00	12:16:00	—	0
Kitchen and food clean-up	12:16:00	12:36:00	—	0
Television and movies (not religious)	12:36:00	12:56:00	—	0
Sleeping	12:56:00	13:26:00	—	0
Playing with household children, not sports	13:26:00	14:26:00	—	0
Gap or can't remember	14:26:00	17:00:00	—	0
Socializing and communicating with others	17:00:00	17:30:00	—	0
Food and drink preparation	17:30:00	17:45:00	—	0
Socializing and communicating with others	17:45:00	17:50:00	—	0
Eating and drinking	17:50:00	18:05:00	—	0
Travel related to religious or spiritual practices	18:05:00	18:15:00	—	0
Attending religious services	18:15:00	19:45:00	—	0
Travel related to religious or spiritual practices	19:45:00	19:55:00	—	0
Socializing and communicating with others	19:55:00	20:00:00	—	0

Physical care for household children	20:00:00	20:30:00	—	0
Physical care for household children	20:30:00	20:40:00	—	0
Interior cleaning	20:40:00	20:45:00	—	0
Washing, dressing, and grooming oneself	20:45:00	21:00:00	—	0
Physical care for household children	21:00:00	21:05:00	—	0
Physical care for household children	21:05:00	22:05:00	—	0
Physical care for household children	22:05:00	22:10:00	—	0
Physical care for household children	22:10:00	22:30:00	—	0
Sleeplessness	22:30:00	23:00:00	—	0
Sleeping	23:00:00	1:00:00	—	0
Physical care for household children	1:00:00	1:01:00	0:01:00	1
Sleeping	1:01:00	3:00:00	—	1
Physical care for household children	3:00:00	3:20:00	0:20:00	2
Sleeping	3:20:00	5:30:00	—	2

Source: Author's coding of ATUS 2003-2007 diary data.

