



Upjohn Institute Press

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Chapter 6 (pp. 141-176) in:
How Do We Spend Our Time?: Evidence from the American Time Use Survey
Jean Kimmel, ed.
Kalamazoo, MI: W.E. Upjohn Institute for Employment Research, 2008
DOI: 10.17848/9781435667426.ch6

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Day, Evening, and Night Workers

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Anne Polivka

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During the last several decades, dramatic shifts have occurred in the timing of economic activity. Grocery stores have extended their hours, mail orders for merchandise can be placed any time of day, and financial markets' hours have expanded with the increased electronic linkage of markets. Further, with the rising globalization of markets and the increasing demand for around-the-clock medical care necessitated by the aging of the U.S. population, it is likely that the expansion of the time frame in which economic activity takes place will continue. Some of the increase in economic activity conducted in these expanded hours has been accomplished through automated processes; however, much of this expanded activity continues to be done by people. Estimates from a supplement to the Current Population Survey indicate that in May 2004, almost 15 percent of full-time wage and salary workers usually worked a nondaytime shift (U.S. Department of Labor 2005).

This chapter uses data from the American Time Use Survey (ATUS) to examine how working atypical hours—evening and night shifts—affects the activities in which individuals engage and the amount of time they spend interacting with others. Part of the concern about evening and night shifts is that they may cause individuals who work these times to be less integrated with their communities and thus to have a noncongruent role in society. This lack of integration and incongruity arises, Dunham (1977) and more recently Hamermesh (1999) argue, because there are segments of the day that have fixed social value that cannot be easily changed. Most communities are oriented to some degree to a day

schedule, thus businesses, recreational facilities, and governmental institutions are more likely to be open during daytime hours. In addition, social events, organizational meetings, volunteer activities, and school events are more likely to be scheduled during periods of time when the majority of workers—day workers—are available. Brown (1975) discusses having “culturally sanctioned” time available for social activities as being critical to one’s integration into society. Individuals employed on evening shifts may have this time blocked off by working, while individuals working night shifts may have this culturally sanctioned time blocked off by sleeping. Consequently, working an evening or night shift could cause these workers to be out of sync with society. Similarly, evening and night workers may have fewer hours to spend with their spouses and a smaller number of nonwork hours when their children are at home and awake. In short, working an evening or night shift could interrupt the rhythms of life, and this disruption could raise the economic costs of working an atypical schedule. The assumption that these costs exist has long been the basis for the argument that non-day workers should receive a premium for working hours outside the standard social norm (Alexander and Apraos 1956; Kostiuk 1990).

On the other hand, if the time spent in various activities and interacting with others does not vary significantly by when individuals work, then the unattractiveness and costs of being a nonday worker—the disamenity of being an evening or night worker—could be small. Further, if the increased provision of services in nonstandard hours and advances in technology, such as the Internet or digital video recorders, have decreased the fixed temporal aspects of various activities, then the premium that might be paid for working a nonday schedule to offset the disamenities of this work schedule may have fallen over time. A decline in this premium, in turn, could have contributed to the rise in earnings inequality that has been observed in the United States since the early 1990s.

Given these opposing views of the potential costs of working atypical hours, it is important to compare across people on different shifts the amount of time spent in various activities and in interactions with others. These comparisons could shed light on the economic consequences of being a nonday worker and have important implications for social policies that could be adopted to accommodate evening and night workers.

The comparison also could provide some insights into whether the cost of working a nonday schedule has decreased over time, if it is established that activities that were thought to be rare or nonexistent during certain times of the day 25 years ago are now found to be prevalent.

BACKGROUND AND PREVIOUS RESEARCH

Although the term “24/7” has only recently entered our vernacular, nonday shift work has been an established employment practice for decades. Initially, nonday work schedules were adopted to meet the demands of the continuous manufacturing production process that arose in the early 1900s. Shift work’s prevalence and acceptance was enhanced during the 1940s when around-the-clock schedules were needed to meet war-time production requirements (Dunham 1977). More recently, the increase in women’s participation in the paid labor market and the concomitant transition of the U.S. economy toward a “24/7” service economy has maintained the demand for shift workers (Beers 2000; Presser 1995).

In the 1960s and 1970s, workers’ responses to working nonday schedules were the subject of considerable research. Much of this research was case study analysis that focused on the physical and psychological health effects of working nonday schedules. For example, extensive research was conducted on the effects of working a night or rotating schedule on sleeping and eating disorders (Bryden and Holdstock 1973; Dunham 1977; Kleitman 1963; Tasto et al. 1978; Zedeck, Jackson, and Summers 1983). In general, these biologically based studies found that working a non-standard shift increased sleep disruptions, decreased the quality of sleep, raised the probability of experiencing gastrointestinal disorders, and caused chronic malaise. To a lesser extent, some of the 1960s studies also examined the effect of shift work on individuals’ social interactions, and a few studies found that there were disruptions (e.g., Mott et al. 1965).

In the 1980s, studies of shift workers concentrated on the effect of working a nonday schedule on family dynamics and the division of labor within families. Staines and Pleck’s (1984, 1986) studies of single

mothers and married couples in 1977 found that nonday shift work was associated with problems scheduling family activities, higher levels of work/family conflicts, difficult family adjustments, and degradation in the quality of family life. White and Keith's (1990) national survey of married couples interviewed in 1980 and again in 1983 also found a modest negative effect of working a nonday schedule on the quality of a marriage. Further, White and Keith observed that having one spouse working a nonday schedule significantly increased the likelihood of divorce over this three-year period, even though the current effect on the quality of marriage was modest.

Using the 1979 Panel Survey of Dynamics, Morgan (1981) found that among working parents with children under the age of 12, over one-fourth reported that their means of obtaining child care was to work a different shift than their spouses. Presser (1986), using the Current Population Survey's 1982 Fertility Supplement to examine women aged 18–44, found that although marriage decreased the probability of women working a nonday schedule, the care of children by relatives—particularly fathers—was substantially larger when mothers worked a nonday shift rather than a day schedule. With regard to the division of labor within families, Presser's (1988, 1994) analyses of dual-earner married couples (using data that she collected in 1986 and 1987) indicated that having one spouse work a nonday schedule increased the total amount of housework done by both husbands and wives.

In the late 1990s and early 2000s, there were relatively few studies of the effects of working a nonday schedule, and what analysis was conducted concentrated on the demographic characteristics of shift workers, the expansion of day schedules to earlier and later in the day, the comparison of the incidence of shift work across countries, and indirect assumptions about how shift workers were spending their time (Hamermesh 1996, 1998, 1999; Presser 1995; Presser and Gornick 2005). Recently there has been an upsurge in the analysis of the effect of working nonstandard hours on care provided to children both in the United States and Canada (Bianchi, Wight, and Raley 2005; Connelly and Kimmel 2008; Rapoport and LeBourdais forthcoming). However, this work has focused on various aspects of child care, and the Connelly and Kimmel piece concentrated on the effect of working hours on the margin of the normal workday rather than shift schedules per se.

The ATUS provides a unique opportunity to examine, across a wide variety of people and a broad range of activities, how individuals on different types of shifts spend their time on the days they work. Using ATUS data, it is possible to document the incidence and characteristics of those working a nonday schedule, and to explore whether individuals on various work schedules engage in different types of activities. In addition, examination of ATUS data will provide up-to-date answers to questions about whether workers on nonday schedules spend more or less time with family and friends, and if the “quality” of time spent together is equal across shifts.

DATA DESCRIPTION AND DEFINITIONS

Data Source

As is discussed in more detail in other chapters of this book, the ATUS is a nationally representative monthly survey that collects information on how individuals in the United States age 15 and older spend their time. The information on how individuals use their time is collected in phone interviews during which respondents sequentially described each of their primary (or main) activities, along with the activities’ durations. Each of these activities is subsequently coded into one of over 400 detailed activity categories. A comparison of the time spent in these activities across workers on different shifts, using ATUS data collected in 2003 and 2004, will provide information about the economic costs of working an atypical schedule.¹

A salient feature of the ATUS for this analysis is that in addition to collecting information about what an individual was doing, the survey collects information on who was in the room or accompanying the individual during each activity, unless the activity was sleeping, grooming, or working a job at an individual’s workplace. Using this “who” information in combination with individuals’ recorded activities, it is possible to construct a measure both of the amount of time spent with friends and family members, and a measure of the proportion of time that individuals spent with their friends and family members engaging

in specific activities. By comparing these measures, it is possible to gain additional insights into the cost of being a nonday worker.

Definition and Classification of Individuals' Work Shifts

The ATUS does not specifically ask individuals if they worked a day, evening, or night shift. However, using the ATUS information about when throughout the day individuals worked and the duration of their work spells, individuals can be classified as day, evening, or night shift workers. To be consistent with previous research (Hedges and Sekscenski 1979; Presser 1994; Wight, Raley, and Bianchi 2007), for the analysis in this chapter individuals are classified based on when they worked the majority of their hours. Specifically, those who worked half or more of their total hours between 8 a.m. and 4 p.m. were classified as day workers, those who worked half or more of their hours between 4 p.m. and midnight were classified as evening workers, and those who worked half or more of their hours between midnight and 8 a.m. were classified as night workers.² Using the majority of hours worked as the metric to classify individuals into shifts avoids difficulty in determining what are normal daytime starting times and avoids asymmetries that could arise between full-time and part-time workers.

To avoid classifying individuals based on supplemental activities that they did related to their work, only the hours that individuals worked at their place of employment were included in the determination of an individual's shift. Individuals' work activities that were not conducted at their place of employment (such as high school teachers grading papers at home) were excluded because individuals probably have more control over when these "extra" hours were worked, and the inclusion of these hours might bias workers' shift classification. The analysis in this chapter also was restricted to those who were age 16 and older, had only a single job, and were wage and salary workers (self-employed workers were excluded). Based on these criteria, 8,322 observations were used in the estimates presented below. Of these 8,322 observations, 6,891 were people classified as day workers, 920 were evening workers, and 511 were night workers.

ESTIMATES OF THE PROPORTION AND CHARACTERISTICS OF WORKERS IN VARIOUS SHIFTS

Table 6.1 contains weighted estimates of the proportion of workers classified as day, evening, or night workers generated using the ATUS data, along with selected demographic and job characteristics of workers in these shifts.³ According to these estimates, almost one in five wage and salary workers worked a nonday schedule, with 11 percent working an evening shift and 6 percent working a night shift.⁴

The ATUS estimates also indicated that these nonday workers tend to be younger and poorer, and are more likely to be black and less-educated than day workers.⁵ For example, a little more than 20 percent of evening workers and 17 percent of night workers were from families whose incomes were less than \$20,000 a year, compared to only 10 percent of day workers. Almost 27 percent of evening workers were in the leisure and hospitality industry and 17 percent were in retail trade—two industries that tend to disproportionately employ low-skill, low-wage workers. In contrast, only 5 percent and 11 percent of day workers were employed in these two industries, respectively.

The ATUS estimates do indicate that those working an evening shift were much more likely to be enrolled in school than those working a day or night shift (26 percent of evening workers compared to only 8 percent of day workers and 10 percent of night workers), suggesting that evening work may provide a means for individuals to combine schooling and work, which in turn could make higher education accessible for some who might not otherwise be able to afford it. This suggests that for some shift workers their current economic status may only be temporary. In general, however, the descriptive statistics indicate that those working a nonday schedule tend to come from more economically disadvantaged situations than do those who work a day schedule.

If the analysis presented in the rest of the chapter supports the hypothesis that nonday workers spend less time in activities that could be beneficial to their health and welfare and/or spend less time interacting with others, this could indicate that these workers are incurring significant cost by working a nonday schedule. In turn, the statistics presented in this section describing who works as evening and night workers indi-

Table 6.1 The Proportion and Characteristics of Wage and Salary Workers in Day, Evening, or Night Shifts (%)

Variables	Day workers	Evening workers	Night workers
Proportion of workers	83.6	10.9	5.5
Sex			
Male	53.3	57.7	64.9
Female	46.7	42.3	35.1
Race			
White	84.4	80.7	77.2
Black	10.1	14.7	17.8
Asian	3.5	3.5	2.1
Other	2.0	1.1	2.9
Ethnicity			
Non-Hispanic	87.0	83.3	88.4
Hispanic	13.0	16.7	11.6
Age			
16–19	2.8	17.9	4.5
20–24	8.8	16.3	9.3
25–29	11.0	12.8	10.9
30–54	62.3	42.1	60.9
55–59	8.4	4.5	8.1
60–64	4.0	2.8	3.2
65 + years	2.8	3.5	3.1
Education			
Less than high school	10.7	24.5	14.6
High school diploma	31.0	32.2	38.8
Some college	26.6	29.0	34.1
College degree	20.6	11.1	10.5
Advance degree	11.1	3.2	2.0
Enrolled in school			
Yes	8.4	26.2	9.5
No	91.6	73.8	90.5
Marital status			
Single	40.4	63.2	49.2
Married	59.6	36.8	50.8

(continued)

Table 6.1 (continued)

Variables	Day workers	Evening workers	Night workers
Child in the household ^a (including siblings)			
No child	55.5	53.0	58.3
Child present	44.5	47.0	41.7
Parent (child in household) ^b			
Not a parent	61.7	72.9	67.4
Parent	38.4	27.1	32.7
Parent (household and non) ^c			
Not a parent	60.9	71.5	66.1
Parent	39.1	28.5	33.9
Number of children in household ^a			
None	55.5	53.0	58.3
One	19.3	22.2	17.2
Two	16.5	16.1	15.5
Three	6.4	6.3	6.1
Four	1.8	1.7	2.6
Five or more			
Family income (\$)			
5,000–9,999	3.1	7.2	4.2
10,000–19,999	7.2	13.0	12.6
20,000–29,999	10.3	13.7	19.3
30,000–49,999	23.4	23.8	24.3
50,000–74,999	24.5	19.2	25.2
75,000 and over	31.5	23.1	14.4
Industry			
Agriculture, forestry, fishing, & hunting	1.1	0.4	0.7
Mining	0.5	0.0	0.4
Construction	7.5	1.1	2.5
Manufacturing	14.7	12.6	24.7
Retail trade	11.3	16.9	12.7
Wholesale trade	3.5	2.3	2.6
Transportation and utilities	5.1	4.9	12.2

(continued)

Table 6.1 (continued)

Variables	Day workers	Evening workers	Night workers
Industry			
Information	2.8	2.4	3.2
Financial activities	8.3	3.8	2.5
Professional and business services	8.6	6.0	6.5
Educational and health services	21.0	15.6	18.8
Leisure and hospitality	5.4	26.6	6.7
Other services	5.2	3.9	0.7
Public administration	5.0	3.6	5.8
Occupation			
Management business & financial	16.3	3.9	4.2
Professional and related	22.5	11.3	12.1
Service	12.0	36.9	21.6
Sales and related	9.0	14.8	8.9
Office and administrative support	15.4	9.5	13.4
Farming, fishing, and forestry	0.9	0.1	0.4
Construction and extraction	6.2	1.2	5.5
Installation, maintenance, and repair	4.7	1.2	5.5
Production	7.5	10.5	19.9
Transportation	5.6	10.6	12.5

^a Since people age 16 and older can be surveyed, the estimate of workers who have children in the household under the age of 18 can include younger siblings.

^b The estimate of workers who are parents (child in the household) is restricted to those who are a parent or a stepparent of child under 18 years old who is residing in the household.

^c The estimate of workers who are parents (household and nonhousehold children) includes those who are a parent or a stepparent of a child residing in the household under the age of 18 and those who are parents or a stepparent of a child under the age of 18 who is not currently residing in the household (e.g., a noncustodial parent).

cate that if such costs do exist, they are likely borne by some of the most vulnerable or disadvantaged segments of U.S. society.

COMPARISON OF THE ACTIVITIES OF DAY, EVENING, AND NIGHT WORKERS

To explore whether working a nonday schedule alters workers' activities, the average amount of time within the 24-hour period between 4 a.m. and 4 p.m. spent by day, evening, and night-shift workers in various activities are estimated. If an individual did not spend any time within the 24-hour period in a specified activity, the person is included in the averages with a recording of zero hours in the activity. Table 6.2 contains the estimates of the average amount of time workers on various schedules spent in 21 major activities. In addition, to examine specific activities that may be disrupted by working a nonday schedule and to provide more information about changes nonday workers may have made to accommodate these schedules, the average number of hours that day, evening, and night workers spent in four more detailed activities are listed in Table 6.2. These detailed categories are the average number of hours spent Sleeping; Watching Television; Participating in Sports and Exercising; and Traveling to, from, or for Work. The Sleeping category is further divided into time actually spent sleeping (Asleep) and time spent trying to sleep (Sleeplessness).

To facilitate the comparison of the amount of time that day, evening, and night workers spent in various activities, the discussion of the 21 major activities and four more detailed activities is divided into five broad areas: 1) activities related to individuals' health, 2) activities related to the maintenance of a residence and care of family members, 3) activities related to the purchase of goods and services, 4) activities done in individuals' leisure, "free" time, and 5) other activities that may be specifically related to individuals' job schedules and the characteristics of day, evening, or night workers.

Table 6.2 Average Hours per Day Spent in Specified Activity, by Worker's Shift Categorization (2003 and 2004 data combined, based on a 24-hour day, wage and salary workers with only one job)

Variables	All	Day shift	Evening shift	Night shift
Personal care	8.45	8.38	8.78	8.80
Sleeping	7.63	7.57	7.90	8.08
Asleep	7.61	7.55	7.89	8.05
Sleepless	0.02	0.02	0.02	0.03
Household activities	0.96	0.93	1.03	1.18
Caring for and helping household members	0.35	0.35	0.28	0.34
Caring for and helping non-household members	0.08	0.08	0.07	0.14
Education	0.18	0.10	0.82	0.15
Consumer purchases	0.21	0.20	0.23	0.30
Professional and personal care services purchases	0.05	0.04	0.07	0.07
Household services purchases	0.01	0.01	0.01	0.01
Government services use and civic obligations	0.00	0.00	0.01	0.01
Eating and drinking	1.03	1.07	0.81	0.88
Socializing, relaxing, and leisure	2.83	2.79	2.80	3.37
Watching television	1.69	1.68	1.56	2.07
Sports, exercise, and recreation	0.19	0.19	0.19	0.17
Participating in sports, or exercise	0.16	0.16	0.18	0.16
Religious and spiritual activities	0.04	0.04	0.05	0.11
Volunteer activities	0.07	0.07	0.03	0.05
Telephone calls	0.08	0.07	0.11	0.11
Traveling	1.34	1.35	1.31	1.24
Traveling to, from or for work	0.68	0.70	0.58	0.54

(continued)

Table 6.2 (continued)

Variables	All	Day shift	Evening shift	Night shift
Working at job (at place of work)	7.85	8.03	7.11	6.70
Other income-generating activities	0.01	0.01	0.02	0.07
Job search	0.00	0.00	0.01	0.00
Work activities direct part of job	0.00	0.00	0.00	0.00
Work-related activities (except exercising as part of job)	0.01	0.01	0.02	0.01
Uncodeable	0.07	0.07	0.10	0.06

Time Spent in Activities Related to Individuals' Physical Health

The early concern surrounding evening and night work was that it would disrupt individuals' schedules in a manner that would adversely affect their health. There was particular concern that nonday schedules would affect both the quantity and quality of individuals' sleep. Contrary to these expectations, the ATUS estimates presented in Table 6.2 indicate that, at least with regard to the amount of time spent sleeping, these concerns are unfounded. On average, the ATUS estimates show that night workers slept a half hour more on the days that they worked than did day workers, while evening workers slept about 18 minutes longer than day workers. Further, to the extent that it is completely reported, the ATUS data indicate that night and evening workers were no more likely to spend large amounts of time trying to sleep when they could not than were day workers.

The estimates presented in Table 6.2 also indicate that working a nonday schedule does not influence the amount of time individuals spent exercising or participating in sports—another set of activities that generally is considered healthy. Regardless of their shift, workers on average spent very little time exercising on the days that they worked—less than 12 minutes a day. Estimates of the proportion of day, evening, and night workers who actually engaged in these activities also indicate

few differences by shift. Only 15 percent of day workers, 12 percent of evening workers, and 12 percent of night workers participated in sports or exercised on their workdays.

In contrast, the estimates in Table 6.2 indicate that working a non-day schedule does affect the amount of time individuals spent eating. On the days that they work, evening workers spent approximately 18 fewer minutes and night workers spent approximately 12 fewer minutes eating than did day workers. Further investigation is necessary to determine whether the smaller amount of time spent eating by evening and night workers is due to fewer meals being eaten or less time being spent eating the same number of meals. To provide some insights into whether less healthy types of food are being eaten, there also needs to be a comparison by shift of where meals are being eaten and the proportion of time spent “snacking” as opposed to eating full meals. However, the smaller amount of total time spent eating by evening and night workers at least initially indicates that working one of these nonstandard shifts could be somewhat detrimental to people’s physical health.

Time Spent in Household Activities and Caring for People

Concerns about the health effects of working a non-day schedule center around the notion that working an evening or night shift disrupts the rhythm of life and the timing of normal activities in which most everyone participates. Alternatively, individuals working non-day schedules may have different functional roles within their families than do day workers, and differences in the amount of time spent in various activities by non-day workers may reflect these different roles rather than disruptions caused by the work schedule.

A set of activities that might be particularly reflective of different functional roles are those related to the maintenance of a residence and care of family and friends. Consistent with the existence of different family roles and with evening and night workers playing a larger role in the running of their households, the ATUS estimates in Table 6.2 indicate that non-day workers spent more time in household chores such as cleaning, laundry, preparing food, gardening, and paying bills than did day workers. Night workers, on average, spent about 12 minutes longer on household chores than did day workers, and evening workers

spent approximately 6 minutes longer.⁶ Interestingly, the larger amount of time spent by nonday workers on household chores was observed for both male and female workers, although, within shifts, women spent more time on household chores than did men. Specifically, among men, day workers spent 43 minutes, evening workers spent 47 minutes, and night workers spent 62 minutes in household chores. Among women, day workers spent 71 minutes, evening workers spent 81 minutes, and night workers spent 89 minutes on household chores.

The amount of time that day, evening, and night workers spent caring for household and nonhousehold members on their workdays was less consistent with the notion that nonday workers were more responsible for running the household and the care of family members. In fact, evening workers were estimated to spend approximately 6 minutes less than day workers caring for others in the household (20 minutes versus 26 minutes), while the amount of time that day and night workers spent per day caring for others was very similar. When the analysis was restricted to parents with children in the household under the age of 18, day and evening workers were estimated to spend the same amount of time caring for household members (49 minutes), while night workers who were parents were estimated to spend only an extra 4 minutes per day caring for household members (53 minutes).

Time Spent Purchasing Goods and Services

Differences in the amount of time workers on various schedules spend purchasing goods and services also could be reflective of different functional roles in the family. However, to the extent that people can shop only when stores are open, different amounts of time spent shopping could indicate disruptions caused by nonday schedules.

The estimates in Table 6.2 do not support the hypothesis that working a nonday schedule prevents people from spending time shopping. When time spent purchasing consumer goods, professional and personal care services, and household services is combined, the ATUS estimates indicate that evening workers spent almost four minutes longer and night workers spent almost eight minutes longer purchasing goods and services than did day workers. Perhaps the slightly larger amount of time spent shopping by evening and night workers is related to these

workers having to spend more time shopping because they are not able to shop at conveniently grouped or efficiently laid out places. However, the estimates of the time spent on household chores and care for friends and family suggest that the increased time spent shopping by nonday workers is probably more indicative of differing household responsibilities. It also could indicate that households with members on different schedules optimally choose to have someone shop when stores are less crowded. At a minimum, these ATUS estimates do not seem to suggest that working a nonday schedule unduly disrupts the purchase of goods and services.

Time Spent in Leisure, “Free” Time Activities

Individuals can spend their nonwork free time in a myriad of ways, and it can be difficult to choose how to group these activities together. In this section the amount of time individuals spent socializing, relaxing, and in leisure activities is combined with the time individuals spent in volunteer and religious activities. Examination of the total amount of time workers spend in these leisure, “free” time activities will provide insights into whether working a nonday schedule infringes on workers’ ability to relax and spend time in pleasurable nonwork activities. Differences in specific activities under the broad rubric of leisure time activities are also examined so as to obtain additional clues into whether someone has to alter activities to fit a nonday schedule. For example, for workers to devote part of their socializing and leisure time to attending parties or volunteering at their children’s schools, they need to synchronize their schedules with the relevant segments of society, while relatively little coordination is necessary for an individual to watch TV.

The ATUS estimates in Table 6.2 indicate that night workers spent approximately 38 more minutes in leisure time activities on the days that they worked than did day or evening workers. But, all workers, regardless of their shift, spent a large proportion of their leisure time watching television, with night workers spending a slightly larger fraction of their relaxation time watching television than other types of workers. On days that they worked, night workers on average spent 2.1 hours watching television, which is approximately 23 minutes more than day workers and 31 minutes more than evening workers spent watching

television. If time spent watching TV is removed, then the amounts of time day, evening, and night workers spent in leisure activities were more comparable. However, even excluding time spent watching television, night workers were still estimated to spend 11 more minutes, and evening workers were estimated to spend 8 more minutes in leisure time activities than were day workers.

Given the estimates in this subsection, it is clear that in general one's overall assessment of what the different amounts of time that day, evening, and night workers spent in leisure time activities indicate about the ability of individuals on nonday schedules to integrate into society and the cost of working a nonday schedule largely hinges on one's feelings about television viewing. Evening and night workers spent slightly more time in leisure time activities when time watching TV was excluded, which could indicate that working a nonstandard schedule could facilitate participating in leisure time activities on work days. Still more than half of workers' leisure time, regardless of their shift, was spent watching television. To the extent that watching television is a pleasurable, restful activity, the finding that night workers spent more time viewing television compared to workers on other shifts suggests that working a night schedule actually increases the amount of time workers spend unwinding and relaxing. On the other hand, to the extent that watching television compensates night workers for other activities in which they are not able to participate, the greater amount of TV viewing by night workers would not be completely positive.

Time Spent in Other, Selected Activities

Among the wide variety of activities in which individuals can participate during the course of the day, some might be considered primarily self-improving investments in oneself, while others might be considered primarily nuisance activities that have to be engaged in as a part of the society in which we live. Educational activities fall into the first category, while time spent traveling to, from, and for work tends to fall into the latter category.

The estimates in Table 6.2 show particularly dramatic differences in the amount of time evening workers spent in educational activities compared to night and day workers. On average, on days that they also

worked, evening workers spent approximately 49 minutes in educational activities, which includes attending classes either for a degree or just for personal interest. In contrast, both day and night workers, including those who did not participate in educational activities at all, spent less than 10 minutes in educational activities. The dramatically larger amount of time evening workers spent in educational activities reflects at least in part the fact that a significantly larger proportion of evening workers were enrolled in school than were either day or night workers. However, when the sample is restricted to just those enrolled in school, evening workers were still estimated to spend significantly more time in educational activities than day workers (177 minutes versus 53 minutes).⁷

Consistent with there being more traffic congestion during standard rush hour times, both evening and night workers were estimated to spend less time traveling to work compared to day workers. On average, day workers were estimated to spend 42 minutes commuting to and from work (or in other work-related travel), while evening workers spent 35 minutes and night workers spent a little more than 32 minutes in work-related travel.

The differences in the amount of time spent in educational activities and work-related travel by those on nonday schedules compared to day workers could be indicative of the benefits of working an evening or night shift. Specifically, working an evening schedule could free up time to attend classes and participate in educational activities when they are often offered, thus making obtaining a postsecondary degree economically feasible for some individuals. A reduction in commuting time to work could allow more time for other more productive or enjoyable activities and perhaps could reduce the stress involved in commuting.

Overall, the estimates of the amount of time individuals on different shifts spend in various activities do not seem to indicate that working either an evening or a night shift is particularly disruptive of the normal activities of individuals' lives or their integration into society, with perhaps the exception of the amount of time spent eating. Indeed, at least on their work days, the evidence presented in this section indicates that working an atypical shift may be slightly beneficial to workers given that evening and night workers spend somewhat more time in leisure time activities and less time commuting. Many of the other differences

in the amount of time that day, evening, and night workers spend on various activities seem more reflective of the different functional roles these workers may have within their households rather than an intrinsic effect of working a nonday schedule.

TIME SPENT INTERACTING WITH OTHERS

The previous section found that individuals on evening and night shifts spent close to the same amount of time in various activities as day workers. However, this by itself does not necessarily imply that workers on atypical schedules are well integrated into society and that they are not bearing undue costs from working a nonday schedule. For example, a night worker could spend an hour alone eating and another hour alone playing solitaire, whereas a day worker could spend an hour eating with his children and an hour playing cards with his wife. One of these workers might be considered to be quite isolated from society, while the other might be considered well integrated. The estimate of the amount of time spent in an activity provides no indication of whether the activity was done jointly with others or at least with other people around.

To address concerns about the ability of evening and night workers to interact with others and correspondingly their potential estrangement from society, this section examines estimates of the average amount of time workers on various schedules spent alone, with friends, with a spouse (if married), and with their children (if a parent with a child under age 18 in the household). To account for possible relationships between the characteristics of workers and the amount of time they spent interacting with others, and demographic differences in the workers on various shifts, multivariate regression models also were estimated.⁸ However, these multivariate results are not presented or discussed in the text unless they suggest that the findings observed in the descriptive statistics are largely due to the differing characteristics of workers on various shifts. The total amount of time individuals spent alone and interacting with others provides another measure of the potential differential cost of being a nonday worker.

Time Spent Alone

The summary estimates in Table 6.3 indicate that working an evening or night shift might increase people’s isolation from society, since workers on both of these shifts were estimated to spend more time alone. Compared to day workers, night workers on average spent almost 40 more minutes alone on days that they worked, while evening workers spent almost 60 more minutes alone. Even married night and evening workers were estimated to spend 31 and 41 more minutes alone, respectively, than married day workers. The additional time evening and night workers spent alone represents a considerable proportion of the time these workers were awake and not working. Evening workers were estimated to spend 48 percent of such hours alone, while night workers were estimated to spend 45 percent of this time alone. In comparison, day workers were estimated to spend 40 percent of the time that they were not working or asleep by themselves.

Time Spent with Friends

The summary estimates in Table 6.3 indicate that evening workers spent approximately 19 more minutes in the company of friends than did day workers, while night workers spent approximately 12 minutes

Table 6.3 Hours Spent in the Company of Others, by Worker’s Shift

Variables	All	Day shift	Evening shift	Night shift
Time alone	3.46	3.33	4.23	3.95
Time with friends	0.51	0.46	0.77	0.66
Time with family members	2.76	2.84	2.02	3.11
Time with spouse (if spouse present in the household)	2.75	2.79	2.04	3.16
Time alone with spouse (if spouse present in the household)	1.66	1.68	1.31	1.73
Time with children (if parent and a child is in the household)	3.02	2.96	3.02	4.07
Time with children (including siblings, if a child is in the household)	2.86	2.87	2.44	3.64

more with friends. However, in the multivariate analysis that included controls for other factors, night workers were not estimated to spend significantly more time with friends, while evening workers were estimated to spend significantly less time with friends than comparable day workers. The difference between the summary descriptive statistics and the multivariate analysis controlling for other factors reflects the fact that, on average, those enrolled in school, younger workers, and those working part time were estimated to spend more time with friends. The estimates in Table 6.1 indicate that evening workers were more likely to possess each of these characteristics. Therefore, the multivariate analysis implies that there is nothing intrinsic per se about working an evening schedule that would encourage or permit individuals to spend more time with friends. Rather, it is the characteristics of those who work evenings that were causing these workers to appear to spend more time with friends. Indeed, the multivariate analysis indicates that compared to similar day workers, working an evening schedule disrupts workers' ability to interact with their friends.

Time Spent with Children

The estimates presented earlier, in the section titled "Comparison of the Activities of Day, Evening, and Night Workers," of the amount of time individuals spent in activities related to the care of household members indicate that workers who were parents spent comparable amounts of time caring for other household members regardless of their shifts. However, individuals could be with their children and not be actually involved in an activity that involves caring for them (as defined by the ATUS). For example, if everyone in the family were sitting at the table eating together, the time spent eating reported in Table 6.2 would not be reported as time providing care to family members, nor would it reflect that this was an activity done with others present.

The estimates in Table 6.3 of the amount of time that day, evening, and night workers who were parents had their children physically with them provide a more complete measure of the amount of time parents are aware of and interacting with their children, and a partial measure of the degree of involvement workers on various schedules may have in family life. In turn, the estimates of the amount of time parents spent

with their children also could provide hints as to whether individuals on various schedules have different functional roles in the family.

The estimates in Table 6.3 indicate that among parents with children in the household, night workers were estimated to spend significantly more time with their children than day workers. Parents who worked at night were estimated to spend 67 more minutes with their children than day workers. This additional time represents approximately 12 percent of the time night workers were awake and not working. The greater amount of time that parents who worked at night spent with their children existed even when the analysis was restricted to married workers. Married night workers who were parents were estimated to spend a little more than 4 hours with their children on the days that they worked, while married day workers who were parents spent less than 3 hours with their children.

In the aggregate descriptive statistics, evening workers who were parents were estimated to spend approximately the same amount of time with their children as day workers, but in the multivariate analysis, which controls for other factors, evening workers were estimated to spend almost 15 minutes less with their children than comparable day workers. The multivariate analysis also indicates that married evening workers who were parents spent less time with their children than comparable married day workers who were parents, but the evidence is not as strong.⁹

Time Married Workers Spent with Their Spouses

Similar to the estimates of the amount of time workers on various shifts spent with their children, the estimates in Table 6.3 indicate that, compared to married day workers, married night workers spent more time with their spouses, while married evening workers spent less time in the company of their spouses. Night workers who were married spent 22 more minutes with their spouses than did married day workers, although very little of this additional time was spent alone with their spouses (3 minutes).

Married evening workers, in contrast, spent 45 fewer minutes with their spouses than married day workers. Further, the smaller amount of time that evening workers spent with their spouses translated into 22

fewer minutes than married evening workers spent with their spouses alone without anyone else around, compared to married day workers.

Overall, the estimates in this section suggest that working an evening shift, and to a lesser extent a night shift, may reduce an individual's ability to be integrated into society. Evening workers were estimated to spend significantly more time alone, and, controlling for workers' age and school enrollment (among other factors) less time with their friends on the days that they worked. This lack of interaction time seems to indicate that there is a cost to working an evening shift. In addition, the estimates of the amount of time that workers on various shifts spend with family members indicate that being an evening worker may put a strain on family dynamics. Married evening workers were estimated to spend less time with their spouses, while parents who worked an evening shift were estimated to spend less time with their children. The smaller amount of time evening workers spend with their children suggests that evening workers are at home a smaller proportion of the time when their family members are also at home and awake. In turn, this suggests that the reduced time spent with children by parents who work in the evening could reflect a way that families with two individuals in the labor market balance the demands of employment and child care requirements. Whatever the cause, the smaller amount of time evening workers spend with their children and spouses seems to further indicate that working an evening shift is imposing a cost on these workers.

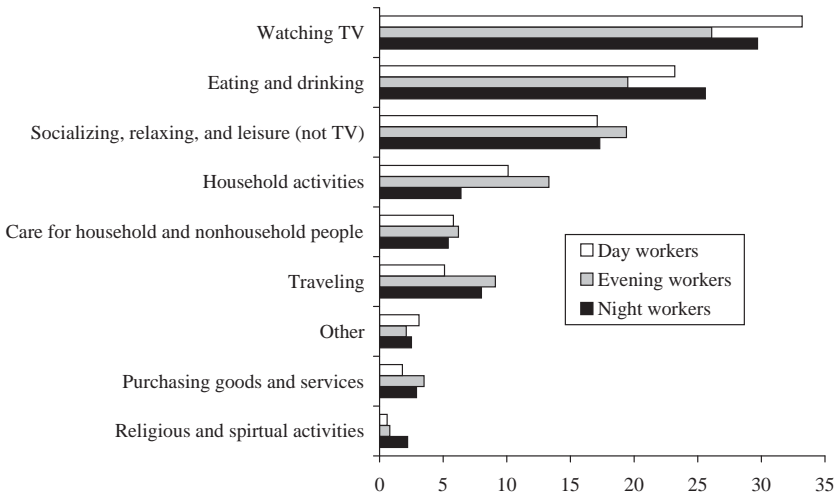
Night workers also were estimated to spend slightly more time alone, which could indicate that these workers are less integrated into society. However, in contrast to evening workers, night workers were estimated to spend significantly more time with their spouses and children than comparable day workers. These estimates suggest that, contrary to some previous research, being a night worker may increase marital stability and raise the quality of family dynamics. At a minimum there is no indication that working a night shift increases the economic cost of employment, at least with regard to the amount of time spent by parents with their children and married individuals with their spouses.

PROPORTION OF TIME WITH OTHERS SPENT IN VARIOUS ACTIVITIES

To obtain an even more complete picture of the degree to which workers are potentially integrated into society, it is important to examine what people are doing when they are together. The assessment of the quality of time people spend together by only examining what they are doing necessarily involves normative judgments. However, the classification of activities such as housecleaning, cooking, and shopping as lower quality and the classification of activities such as eating out, attending parties, and watching television as higher quality is consistent with household production theory and the division of people's time into work, nonmarket work, and leisure (Aguilar and Hurst 2007). For example, using this type of scheme, if an evening worker spent the majority of time with his spouse cleaning house and traveling to and from the grocery store, while a day worker spent the majority of the time with her spouse eating dinner and watching a movie, one would conclude that the "quality" of time that the day worker spent with her spouse was higher than the "quality" of time the evening work spent with his spouse.

To obtain a measure of what individuals were doing when they were in the company of family and friends, and to assess at least partially the quality of this time spent together, the proportion of time that married individuals spent with their spouses and the proportion of time all workers spent with friends in various activities were estimated. To complete the analysis, the proportion of time individuals spent engaged in various activities while alone also was estimated.

Figure 6.1 presents the proportion of time that married workers on different shifts spent with their spouses in various activities, while Figure 6.2 presents the proportion of time spent with friends, and Figure 6.3 presents the proportion of time alone that was spent in various activities. In these figures, any activity that was less than 1 percent was combined into a single Other category, and several related categories were combined into a single broad category. (For example, Consumer Purchases, Purchases of Professional and Personal Care Services, and Purchases of Household Services were combined into a single Purchasing Goods and Services category).¹⁰

Figure 6.1 Proportion of Time with Spouses in Various Activities (%)

Proportion of Time with Spouses Spent in Various Activities

Examination of the proportion of “spousal time” that workers spent engaged in various activities reveals some interesting and striking differences among workers on various schedules, particularly between evening workers and workers on other schedules. Combining the proportion of time spent in household activities, care for individuals, purchase of goods and services, and travel under the broader rubric of home production, Figure 6.1 indicates that married evening workers spent 32 percent of the time that they were with their spouses engaged in these home production type activities. In contrast, day workers and night workers spent only 23 percent of the time they were with their spouses engaged in these home production activities.¹¹ Further, the greater proportion of time spent in home production activities primarily came at the expense of activities that generally are considered more pleasurable. Combining the proportion of the time spent with one’s spouse in socializing, relaxing, and leisure activities; watching television; and eating and drinking, it is estimated that both day and night workers spent approximately 73 percent of their time with their spouses in such activities, while evening workers spent only 65 percent of the time with their spouses in these

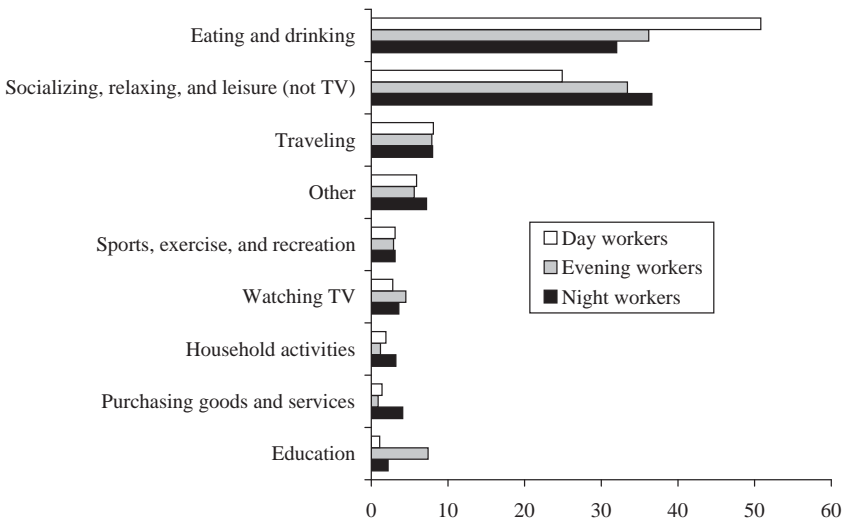
more pleasurable activities. The greater proportion of time that evening workers were with their spouses that was spent in home production activities—and the smaller proportion of time together that was spent in primarily pleasurable or relaxing activities—seem to indicate that not only do evening workers spend less time with their spouses than day workers, as was noted in the previous section, but the proportion of the time that evening workers spend with their spouses may be of lower quality.

Proportion of Time with Friends Spent in Various Activities

The descriptive statistics indicate that both evening and night workers spent more time with friends than day workers, but Figure 6.2 indicates that evening and night workers spent a smaller proportion of this additional time in what might be considered enjoyable activities. Combining the proportion of time with friends spent eating and drinking; watching television; socializing, relaxing, and in other leisure activities except watching television; and in sports, exercise, and recreational activities, it is estimated that day workers spent almost 82 percent of their time with friends in these activities, while evening workers spent 77 percent and night workers spent 75 percent of their time with friends in these activities. It also is interesting to note that within this time that was spent with friends in pleasant, enjoyable activities, day workers spent a significantly larger proportion—51 percent—of their time with friends eating compared to evening workers (36 percent) and night workers (32 percent). The smaller proportion of time with their friends that evening and night workers spent eating suggests that working during the dinner time may be disruptive to these workers' socializing. At a minimum, these estimates suggest that working an evening or night schedule requires these workers to spend their time with friends differently than day workers.

Figure 6.2 does indicate, however, that the smaller proportion of time with friends spent in activities that are primarily considered pleasurable is largely offset for evening workers by a larger proportion of time with friends spent in educational activities and for night workers by a larger proportion of time with friends spent in household activities and purchasing goods and services.¹² Since time spent in educational

Figure 6.2 Proportion of Time with Friends Spent in Various Activities (%)



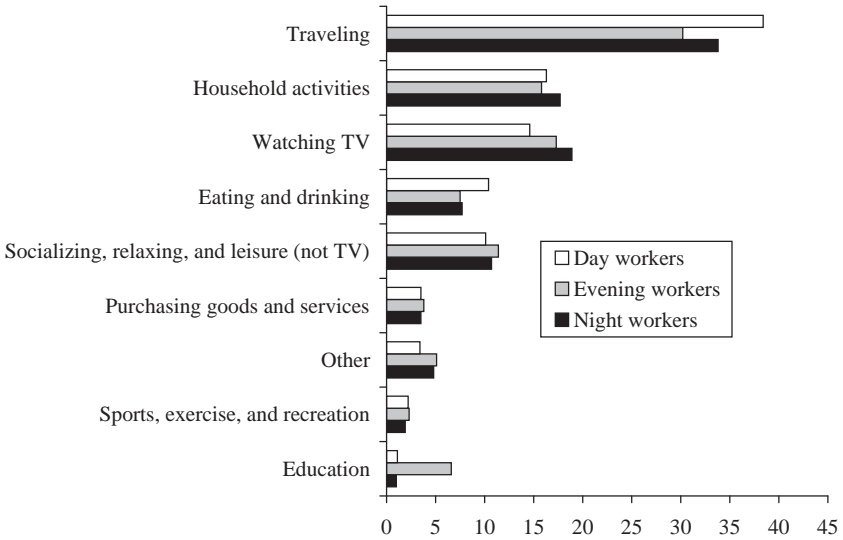
activities can be considered self-improving, and time spent with friends shopping could at least sometimes be considered enjoyable socializing, the differences in the proportion of time with friends that day, night and evening workers spent in various activities do not provide any clear indication that—at least with regards to these proportions—working a nonstandard shift reduces the quality of time spent together.

Proportion of Time Alone Spent in Various Activities

The aggregate estimates indicate that both evening and night workers spent more time alone than day workers. This may indicate that these workers are more isolated from society than day workers. To obtain a better sense of this, it is necessary to examine what day, evening, and night workers were doing during the time they were alone.

Figure 6.3 indicates that a strikingly large proportion of the time individuals were alone was spent traveling to, from, or for work, regardless of their work shift. Figure 6.3 also indicates, however, that evening and night workers spent a smaller proportion of their time alone commuting and traveling for work than did day workers. Day workers on

Figure 6.3 Proportion of Time Alone Spent in Various Activities (%)



average spent 38 percent of the time that they were alone commuting or in work-related travel. In comparison, evening workers spent 30 percent of their time alone and night workers spent 34 percent of their time alone in work-related travel. The smaller proportion of their time alone that evening workers spent traveling is absorbed, at least partially, by evening workers spending more of their time alone in educational activities and watching television. For night workers, the smaller proportion of time alone that was spent traveling was absorbed by watching TV by oneself. Evening workers spent about 7 percent of the time that they were alone in educational activities compared to only 1 percent of the time day and night workers were alone. Night workers were estimated to spend 19 percent of their time alone watching television, compared to evening workers who spent approximately 17 percent of their time alone watching television and day workers who spent about 15 percent of their time alone this way.

Overall, the estimates in this section do not provide a clear indication of the quality of the increased time that evening and night workers spend alone. Spending more of one’s time alone in educational activities indicates that this time alone was being put to good use. The reduction

in the proportion of time alone spent commuting and in work-related travel also would imply that the quality of evening and night workers' time alone was higher than that of day workers. The larger proportion of time alone that night and evening workers spent watching television, however, may counteract some of these positive effects, particularly if evening and night workers are watching television alone in lieu of interacting with others.

CONCLUSION

The purpose of this research was to compare how and with whom people on various work shifts spend their time. Information concerning differences in the amount of time spent on certain activities and in interactions with others, and the "quality" of time that people spend together, could help establish whether there is a cost to working a nonday schedule.

The evidence seems to indicate that there is an economic cost to workers and their families of having an evening schedule. For example, evening workers were estimated to spend less time eating than were day workers, which could adversely affect evening workers' health if they more often ate fast food or snacked in lieu of eating a full meal. Probably even more important to their quality of life and family dynamics, evening workers were estimated to spend more time alone, less time with family members (both those residing inside and outside of their households), less time with their spouses if they were married, and less time with their children if they were parents. After controlling for other factors such as a worker's age and whether an individual was enrolled in school, evening workers also were estimated to spend less time with their friends. These estimates indicate that the cost of working an evening schedule could be high.

Further, the estimates indicate that not only did evening workers spend less time with their spouses, but also the quality of time that they did spend together appears to be lower. Compared to married day workers, married evening workers spent a larger proportion of the time they were with their spouses doing what typically are considered to be

unpleasant, obligatory home production activities, such as household chores and shopping, and a smaller proportion of their time together in more pleasurable activities, such as eating and drinking, or socializing and relaxing.

The higher costs of working an evening schedule could be partially offset by the finding that evening workers were estimated to spend a larger proportion of their nonwork time in educational activities and less time commuting to, from, or for work. In fact, working an evening schedule may permit some workers to attend school who otherwise might be financially unable to do so. Overall, however, it seems unlikely that the benefits of working an evening schedule completely offset the costs.

In contrast, the costs of working a night schedule do not appear to be as high. On the one hand, night workers were estimated to spend more time alone and less time eating than day workers, both of which suggest that working a night schedule could be somewhat costly and could be indicative of night workers being less well integrated into society. At the same time, the research presented in this chapter indicates that night workers spent less time commuting to work and more time relaxing, although much of this additional relaxation time was spent watching television. In terms of family dynamics, night workers spent more time with their families, particularly their children if they were parents, but also with their spouses if married. The estimates of the proportion of time spent in various activities while with one's spouse also indicate that the "quality" of time that day and night workers spent with their spouses was fairly equivalent. These latter estimates suggest that having a night schedule might decrease some of the costs of working, increase marital stability, and improve family dynamics.

It is important to note that from the research presented in this chapter, it is impossible to determine the amount of time evening or night workers might have spent with their families if they had worked during the day instead. As was hinted at in the discussion of the amount of time workers devoted to household activities, workers on nonday schedules may play a different functional role in their households than do day workers, and working a nonday schedule may be a way for individuals to both fulfill their functional roles within their households and to work. The multivariate analysis briefly discussed here takes into

account some of the compositional differences in workers in the various shifts, but to obtain an even broader picture of the costs of working a nonday schedule it is important to explore why workers are working the schedules that they are. Yet another line of research that it will be necessary to undertake to obtain a complete picture is what individuals on various shifts do on their days off, since on workdays the time available for nonwork activities is constrained for all individuals regardless of their shift.

Research done in the 1970s suggests that public laws such as the Fair Labor Standards Act encouraged employers to substitute shift schedules for longer daily or weekly work schedules. This occurred, it is argued, because the laws required employers to pay a wage premium for workweeks and days in excess of prescribed standards, but did not require a premium to be paid for working 8 hours on an evening or night shift (Hedges and Sekscenski 1979). Despite the caveats about the evidence presented here and the advisability of undertaking additional research, the analysis presented in this chapter strongly suggests that if the need for evening and night workers expands with changes in the U.S. economy, consideration should be given to who will accept these jobs and the costs that accepting these jobs might impose on workers and their families.

Notes

The views expressed in this chapter are solely those of the author and do not represent the opinions or policies of the Bureau of Labor Statistics.

1. The ATUS is a continuing survey, but data from subsequent years are not used in this analysis.
2. There were a few instances in which workers did not work at least half of their hours in one of these time intervals or when a worker's time was evenly split between two or three of these intervals. In these instances, workers were coded based on when they worked the majority of their hours, using an algorithm based on their starting and stopping times combined with their duration of work, or in a few rare instances by visual inspection. The few individuals who were observed to work almost continuously around the clock were excluded from the analysis. To avoid issues of potential asymmetry in work duration, for individuals whose last activity was recorded as working, the work event was allowed to extend beyond 4 a.m. of the interview day for classification as a day, evening, or night worker. Experimentation indicates that truncating individuals' work hours at 4 a.m. of the

interview day would not substantially alter the proportion of workers classified as day, evening, or night workers.

3. To account for the stratified sample design of the ATUS and the oversampling of blacks, Hispanics, those working on weekends, and those with children, sample weights were used in all of the analysis presented in this chapter.
4. Unpublished work by the author presented at the ATUS Early Results conference in December 2005 (Polivka 2005) indicate that there is a great deal of concordance between the ATUS estimates of the number of wage and salary workers working day, night, and evening shifts and estimates derived from the 2004 supplement to the CPS about individuals' work schedules.
5. To account for the fact that several characteristics could be related (for example, younger workers probably are also more likely to be enrolled in school and less likely to be married or working full time), a standard multinomial logit model where the dependent variable was being either a day, evening, or night worker also was estimated. However, since the coefficient estimates and corresponding estimated marginal effects generated from this multivariate model generally accorded well with the descriptive statistics, the results from the multinomial model are not reported. The multinomial results are available from the author on request.
6. Analysis restricted to full-time workers also indicated that full-time nonday workers spent more time in household activities than day workers who worked full time.
7. These differences could reflect differences in the days of the week individuals are working or the level of schooling; however, multivariate regression analysis controlling for school enrollment, the number of hours worked, and worker's age, among other factors, still indicate that evening workers spend significantly more time in educational activities than do day workers.
8. In the multivariate analysis the total amount of time or the proportion of non-work time individuals spent alone and interacting with friends, spouses, and children were the dependent variables. Variables included in the models as explanatory variables included controls for workers' age, gender, race, educational attainment, marital status, marital status interacted with gender, annual family income, whether an individual was of Hispanic origin, whether an individual was enrolled in school, the presence of children in the household, the number of children in the household and the age of the youngest child if children were present in the household. Some models also included workers' industries and occupations as controls, but the results for the other explanatory variables did not vary much when workers' industries and occupations were included in the model.
9. The evidence is weaker because the coefficient was only statistically significant at an 11 percent level instead of the standard of at least 10 percent, but the lower significance level could be at least partially due to the relatively small sample size of married evening workers with children. When 2003 and 2004 data were combined, there were only 148 (unweighted) married evening workers who had a child under the age of 18.

10. Sixteen observations were deleted from this analysis due to data inconsistencies in the sample.
11. It is important to note that the time married individuals spend in an activity provides no indication of what their spouses were doing at the same time. The ATUS only collects information about what the respondent was doing; it does not collect information about what other individuals who were present were doing. Consequently, it would be incorrect to assume that just because evening workers spent more time in home production activities when they were with their spouses that their spouses were also engaged in home production and that evening workers were thus getting assistance from their spouses in these home production activities.
12. All workers, regardless of their shift, spent approximately 8 percent of the time that they were with their friends traveling to, from, or for work.

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How Do We Spend Our Time?

Evidence from the American Time Use Survey

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Editor

2008

W.E. Upjohn Institute for Employment Research
Kalamazoo, Michigan

Library of Congress Cataloging-in-Publication Data

How do we spend our time? : evidence from the American time use survey /

Jean Kimmel, editor.

p. cm.

Includes bibliographical references and index.

ISBN-13: 978-0-88099-337-1 (pbk. : alk. paper)

ISBN-10: 0-88099-337-5 (pbk. : alk. paper)

ISBN-13: 978-0-88099-338-8 (hardcover : alk. paper)

ISBN-10: 0-88099-338-3 (hardcover : alk. paper)

1. Time management—United States. I. Kimmel, Jean.

HD69.T54H665 2008

650.1'10973—dc22

2008024108

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Cover design by Alcorn Publication Design.

Index prepared by Diane Worden.

Printed in the United States of America.

Printed on recycled paper.