

**Shift Work and Participation in
Social, Recreational or Exercise Activities**

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BLS
Policy

Shift Work -- Context

Shift Work has a Long History

- **Arose to Meet the Demands of Continuous Manufacturing Production Processes**
- **WW I and WW II War-time Production Needs Increased Acceptance (especially for women)**
- **Current 24-7 Service Oriented Economy Maintaining Demand for Non-Day Workers**

Shift Work -- Context

Previous Analysis

- **1950's**
 - **Theory of the Firm and Existence of Wage Premiums for Non-Day Work**
- **1960's and 1970's**
 - **Physical Effects on Sleeping and Eating**
 - **Effects on Social Interactions**
 - **Management Issues such as Worker Moral, Worker Turnover and Optimal Work Schedules**
- **1980's and 1990's**
 - **Effects on Family Dynamics**

Shift Work and ATUS Data

ATUS Data Provides the Opportunity to

- **Examine How Individuals on Various Schedules Spend Their Time On Days That They **Worked****

ATUS Data in Combination with Data from the May 2004 CPS Supplement on Work Schedules Provides the Opportunity to

- **Examine How Individuals on Various Schedules Spend Their Time On Days That They **Did Not Worked****
- **Examine How Spouses of Shift Workers vs. Spouses of Non-Shift Workers Use Their Time**

Shift Work and ATUS Data (continued)

Can Use These Data to Address Many Questions

Does Working a Non-Day Schedule Affect Health Related Activities such as

- **Amount of Time Sleeping**
- **Amount of Time Eating**
- **Amount of Time Exercising or in Sports**
- **Amount of Time Watching Television**

Does Working a Non-Day Schedule Affect Time Spent in Community Type Activities such as

- **Attending Events (Social, Artistic or Sporting)**
- **Volunteering**

Shift Work and ATUS Data (continued)

Can Use These Data to Examine

Whether Working a Non-Day Schedule Affects Social Interactions such as the

- Amount of Time Individuals Spend Alone**
- Amount of Time Individuals Spend With Friends**
- Amount of Time Individuals Spend With Family**
- Amount of Time Individuals Spend With Their Spouse (if Married)**
- Amount of Time Individuals Spend With Their Children (if have children)**

Whether Dual Earning Families are Using Shift Work to Balance Family Demands such as Child or Elder Care

Answers to These Questions Have Implications For

- **The Economic Costs and Effects of Being a Non-Day Worker**
 - **Increases in Earnings Inequality if the Cost and Corresponding Wage Premium has Declined**
 - **Additional Burden on Low Skill Workers if Costs Are Large**
- **Policy Proposals Concerning**
 - **Provision of Affordable Child Care**
 - **Extension of Overtime Laws to Cover Time of Work**

Key Aspects of ATUS Data For This Analysis

- **ATUS Uses “Retired” CPS Cases**
 - **Means Can Match A Subset of ATUS Data to Data Collected in CPS Supplements**
 - e.g. For CPS Households Whose Last CPS Interview Was in May, June, July or Aug. 2004; Can Match ATUS and CPS Work Schedule Supplement Data**
- **ATUS Records Where an Activity Was Done**
 - **Means Can Count Time Only At An Individual’s Work Place When Classifying Work Shift**

Key Aspects of ATUS Data For This Analysis (continued)

- **ATUS Records Who Respondent Was With For Every Activity (except sleeping, grooming, personal care and working)**
 - **Means Can Construct Measures of Time With Others**
- **ATUS Collects Rudimentary Labor Force Information for Spouses of ATUS Respondents**

Data Restrictions For This Analysis

- **Wage and Salary Workers Only
(Self-Employed Excluded)**
- **Single Job Holders Only
(Multiple Job Holders Excluded)**
- **For Analysis of Activities On Days Individuals
Worked**
 - **2003 and 2004 ATUS Data Were Pooled Together**
 - **8,322 Observations**
- **For Data from May 2004 CPS Supplement**
 - **49,868 Observations**

Classification Scheme As Day, Evening Or Night Workers

In ATUS

- Can Only Classify Individuals Who Work On the Day About which They Were Interviewed**
- Classified Based On When Individuals Worked the Majority of Their Hours**

1/2 or More Hours

- 8 am to 4 pm - Defined as Day Worker**
- 4 pm to Midnight - Defined as Evening Worker**
- Midnight to 8 am - Defined as Night Worker**

Classification Scheme As Day, Evening Or Night Workers

In CPS

-- Individuals Are Asked Both

- Their Start and Stop Times on Most Days**
- Their Classification of a Shift as Day, Evening, Night, Rotating, Split, Irregular or Other**

Classification Scheme As Day, Evening Or Night Workers

In CPS

- Based on Start and Stop Times Can Classify Individuals on When Individuals Worked the Majority of Their Hours**
 - Information missing for about 22% of individuals whose starting, stopping or both times varied**

- Constructed a Combination Classification Scheme**
 - Use “when majority of hours were worked”, when starting and stopping times available**
 - Use respondent’s classification when both starting and stopping times not available**

Comparison of the ATUS and CPS Estimates

Percentage of Workers Classified as Day, Evening, Night or Other				
Worker Classification	CPS Combined Classification	CPS Just Hours	CPS Respondent Report	ATUS Data
Day Workers	82.3%	86.7%	82.4%	83.6%
Evening Workers	8.8%	9.5%	6.8%	10.9%
Night Workers	3.2%	3.7%	3.1%	5.5%
Others	5.7%	--	7.7%	--

Comparison of the Characteristics of Workers in Various Shifts Between the ATUS and the CPS

Fair Amount of Consistency in Average Personal and Job Characteristics of Shift Workers Between the CPS and the ATUS

- **Non-Day Workers Disproportionately Black and Male**

	<u>Day</u>	<u>Evening</u>	<u>Night</u>
•• Black			
CPS	11%	17%	18%
ATUS	10%	15%	18%
•• Male			
CPS	51%	54%	57%
ATUS	53%	57%	65%

Comparison of the Characteristics of Workers in Various Shifts Between the ATUS and the CPS (cont.)

- **Non-Day Workers Disproportionately Low Income and Low Educational Attainment**

		<u>Day</u>	<u>Evening</u>	<u>Night</u>
<ul style="list-style-type: none"> •• Household Income \$50,000 or more 	CPS	57%	44%	43%
	ATUS	56%	42%	40%
<ul style="list-style-type: none"> •• High School Diploma or Less 	CPS	42%	56%	53%
	ATUS	41%	58%	51%

Comparison of the Characteristics of Workers in Various Shifts Between the ATUS and the CPS (cont.)

- **Evening Workers Disproportionately Enrolled in School**

	<u>Day</u>	<u>Evening</u>	<u>Night</u>
•• Attending School			

CPS	3%	26%	4%
ATUS	4%	22%	4%

- **Evening Workers Disproportionately in Leisure and Hospitality, and Retail Trade Industries;
Night Workers Disproportionately in Manufacturing and somewhat Transportation and Utilities Industries**
- **Only Exception to Strong Consistency is Proportion of Respondents with Children**

Comparison of the Characteristics of Workers in Various Shifts Between the ATUS and the CPS (cont.)

- **Overall Non-Day Workers were Younger, Poorer, More Black and Less Skilled than Day Workers**
- **Consistency of Workers' Characteristics in Various Shifts Between the ATUS and the CPS Reassuring**
 - **Workers' Shifts Correctly Classified in ATUS**
 - **Subsequent Analysis of How Shift Workers Use Their Time is Appropriate**

Comparison of Selected Individuals' CPS and ATUS Shift Classifications

To Verify Classifications

- **Match**
 - **CPS Employed Individuals in 4th through 8th Interview in May 2004 Who Answered to the Supplement to**
 - **ATUS Respondents Who Worked on Day About Which They Were Interviewed**
- **Restrict Sample Further to Those Who Said They Had the Same Employer in their Last CPS Interview and the ATUS**
- **871 Observations - Combined CPS Classification Scheme**
711 Observation – Just CPS Hours Classification Scheme

Comparison of Selected Individuals' CPS and ATUS Shift Classifications

How CPS Shift Workers Were Classified in the ATUS				
		ATUS		
	Total	Day Worker	Evening Worker	Night Worker
CPS Combined Classification				
Day Worker	100%	93.8%	3.3%	2.9%
Evening Worker	100%	40.7%	55.9%	3.4%
Night Worker	100%	6.9%	6.9%	86.2%
Other	100%	66.7%	20.0%	13.3%
CPS Just Using Times				
Day Worker	100%	95.6%	1.9%	2.5%
Evening Worker	100%	40.0%	56.0%	4.0%
Night Worker	100%	7.4%	3.7%	88.9%

Comparison of Time Spent In Activities On Days Worked of Day, Evening and Night Workers

Time Spent in Activities Potentially Affecting Ones Health

- **Time Sleeping**

Non-Day Workers Did NOT Sleep Less than Day Workers

- Night Workers Slept **30 Minutes More**
- Evening Workers Slept **18 Minutes More**

- **Time Watching Television**

- Night Workers Spent **24 More Minutes Watching Television than did Day or Evening Workers (2.1 Hours)**

Comparison of Time Spent In Activities On Days Worked of Day, Evening and Night Workers

Time Spent in Activities Potentially Affecting Ones Health

- **Time Spent Exercising**

- **Day, Evening, and Night Workers All Spent Less Than 12 Minutes on Work Days Exercising**

- **Time Spent Eating**

- **Compared to Day Workers, Evening and Night Workers Spent About 18 Fewer Minutes on Work Days Eating**

Comparison of Time Spent In Activities On Days Worked of Day, Evening and Night Workers

Time Spent in Community Type Activities

- **Time in Volunteer Activities**
 - **All Types of Workers Spent 4 Minutes or Less in Volunteer Activities on Their Work Days**
 - **Evening Workers Spent Even Less Time (approximately 2 minutes)**
- **Time Attending Social, Sporting or Artistic Events**
 - **All Types of Workers Spent Relatively Little Time, Evening Workers Even Less Time**
 - **Day and Night Workers Approximately 7 minutes**
 - **Evening Workers Less than 4 minutes**

Comparison of Time Spent In Activities On Days Worked of Day, Evening and Night Workers

Time Spent Interacting With Others

- **Time Alone**

Non-Day Workers Spent More Time Alone

- **Night Workers 40 Minutes More (3.95 Hours)**
- **Evening Workers 55 Minutes More (4.23 Hours)**

- **Time Spent With Friends**

- **Evening Workers Spent Approximately 19 Minutes
More With Friends**

Comparison of Time Spent In Activities On Days Worked of Day, Evening and Night Workers

Time Spent Interacting With Others

- Time Spent with Family, Spouses and Children

Evening Workers Spent Less Time Than Day Workers

Night Workers Spent More Time Than Day Workers

-- Evening Workers

50 Fewer Minutes With Family

45 Fewer Minutes With Spouses (if Married)

15 Fewer Minutes With Children (if present)

-- Night Workers

16 More Minutes With Family

22 More Minutes With Spouses (if Married)

46 More Minutes With Children (if present)

Comparison of Time Spent In Activities On Days Worked of Day, Evening and Night Workers

Time Spent in Other Selected Activities

- **Time Spent in Commuting To Work and Other Work Related Travel**

Evening and Night Workers Spent Less Time Commuting

- Day Workers – 42 minutes on average
- Evening Workers – 35 minutes
- Night Workers -- 32 minutes

- **Time Spent in Household Activities**

**Night Workers Spent More Time Than Evening Workers,
Evening Workers Spent More Time Than Day Workers**

Comparison of Time Spent In Activities On Days Worked of Day, Evening and Night Workers

Time Spent in Other Selected Activities

- **Time Spent in Educational Activities**

**Evening Workers Spent Dramatically More Time In
Educational Activities Compared to Day or Night Workers**

- **Day Workers – 6 minutes on average**
- **Evening Workers – 49 minutes**
- **Night Workers -- 9 minutes**

OLS Estimates of Time Use on Days Worked by Day, Evening and Night Shift Workers

- **Dependent Variables**

- **Time Spent in an Activity or Interacting Directly**

- **Proportion of Non-Work Time Spent in an Activity or Interacting**

OLS Estimates of Time Use on Days Worked by Day, Evening and Night Shift Workers

- **Control Variables**
 - **Personal Characteristics (Age, Race, Gender, Hispanic, Educational Attainment)**
 - **Other Uses of Time (Hours Worked for Direct Estimate, Whether Enrolled in School)**
 - **Family Characteristics (Marital Status, Marital Status*Gender, Household Income, Presence of Children, Number of Children, and Age of Youngest Child)**

OLS Estimates of Time Use on Days Worked by Day, Evening and Night Shift Workers

- **Control Variables**
 - **Models Restricted to Married Individuals**
 - **Whether Spouses Was Employed**
 - **Whether Spouse Was Employed Full-time**
 - **Spouses Employment Status*Shift Status**
 - **Industry and Occupation of Employment to Control for Unobserved Heterogeneity (Results similar so not reported separately)**
 - **Work Related Travel Time Models Included Whether Lived in an Urban Area or Not**

OLS Estimates of Time Use on Days Worked by Day, Evening and Night Shift Workers

OLS Estimates Very Consistent with Descriptive Averages

EXCEPT

- **Time Spent Watching Television**

**Night Workers Were Not Estimated To Spend
Significantly More Time Watching T.V.**

**-- Blacks and Those Living in Households With Incomes
Between \$20,000 and \$29,000 Did Spend Significantly
More Time Watching T.V.**

- **These More Likely To Be Night Workers**
OLS Estimates of Time Use on Days Worked
by Day, Evening and Night Shift Workers

EXCEPTIONS (Continued)

- **Time Spent With Friends**

Evening Workers Were Not Estimated To Spend Significantly More Time With Friends

- **Actually Evening Workers Spent Significantly Less Time With Friends Controlling for Other Factors**
- **Younger Workers Spent Significantly More Time With Friends**
- **Those Enrolled in School Spent Significantly More Time With Friends**

OLS Estimates of Time Use on Days Worked by Day, Evening and Night Shift Workers

Other Models of Interest

- **Time Spent In Educational Activities**

**Evening Workers Spent More Time In Educational
Activities Even Controlling For School Enrollment, Age
and Presence of Children**

OLS Estimates of Time Use on Days Worked by Day, Evening and Night Shift Workers

Other Models of Interest

- **Time Spent With Children**

In Models that included the Interaction of Evening and Night Shift Categorization with Spouses Employment Status,

- **Evening Workers Whose Spouses Worked Full-time Spent About 55 Minutes Less Time With Their Children**

- **For Night Workers Coefficient Estimates for the Indicator Variable Interacted with Spouses Employment Status and Whether Spouse Worked Full-Time Positive, Jointly Significant**

- **Indicative of balancing child care and income needs**

Time Spent In Activities on Workers' Non-Work Days (“Days Off”)

Analysis of Shift Workers' Activities on Work Days Only Provides a Partial Picture

- **Activities on Work Days May Be Somewhat Constrained For All Individuals Regardless of Work Shift**
- **Interesting to Know Whether Working a Non-Day Shift Disrupts or Alters People Activities on Their “Days Off”**

To Examine Shift Workers' Activities on Their Non-Work Days

- **Match ATUS Data for Those Who**
 - **Were Employed in the Last 7 Days**
 - **Had the Same Employer as in the Last CPS**
 - **Did Not Work On Day About Which Were Interviewed**

To

- **Individuals' Combined Shift Classification from the May 2004 CPS Supplement**
- **843 Observations**
 - **Evening and Night Samples Small, So View Results Cautiously**

Comparison of Time Spent In Activities On Non-Work Days (“Days Off”) of Evening and Night Workers

Time Spent in Activities Potentially Affecting Ones Health

- **Time Sleeping**

Night Workers Sleep Less than Day or Evening Workers

- **Day Workers Appear to “Catch-Up” on Sleep on Their Days Off**
- **Day Workers Sleep 1 ½ Hours Longer on Non-work Days Compared to Their Work Days**

**Comparison of Time Spent In Activities
On Non-Work Days (“Days Off”)
of Evening and Night Workers**

Time Spent in Activities Potentially Affecting Ones Health

- **Time Watching Television**
 - **Night Workers Spent More Time Watching Television than did Day or Evening Workers**
 - **But Similar to Work Days, Estimate Was Not Significant In OLS Regression**

Comparison of Time Spent In Activities On Non-Work Days (“Days Off”) of Evening and Night Workers

Time Spent in Activities Potentially Affecting Ones Health

- **Time Exercising**

- **Day Workers Participated in Sports and Exercise More than Evening or Night Workers, For Longer Durations**

- **Time Eating**

- **Evening and Night Workers Spent Less Time Eating Than Did Day Workers**

Comparison of Time Spent In Activities On Non-Work Days (“Days Off”) of Evening and Night Workers

Time Spent in Community Type Activities

- **Time in Volunteer Activities**

No Group of Workers Spent Much Time In Volunteer Activities, But More Time on Non-Work Days Than On Work Days

- **Time Attending Events**

Day Workers On Their “Days Off” On Average Spent About 10 Minutes Longer Attending Events Than Did Evening or Night Workers

Comparison of Time Spent In Activities On Non-Work Days (“Days Off”) of Evening and Night Workers

Time Spent Interacting With Others

- **Time Alone**

- **Night Workers Spent Approximately 1 ½ Hours More Time Alone Did Day or Evening Workers**

- **Time With Family**

- **Evening Workers Spent Less Time With Family Members, Spouses and Children On Their Off Days**

- **Night Workers Spent More Time With Family Members, Spouses, and Children**

OLS Estimates of Time Use on Workers' Non Work Days by Day, Evening and Night Shift Workers

- **Many Coefficient Estimates Not Statistically Significant, But Do Have The Same Sign As Indicated By Differences in the Descriptive Statistics**
- **Evening and Night Workers Spent Significantly Less (At the 10% Level) Time Eating Than Did Day Workers**
 - **Approximately 25 Minutes Less**
- **Night Workers Spent Significantly More Time In The Company of Their Spouse on Their Days Off**
 - **Time With Children Estimated To Be More Also, But Not Significant**
- **Evening Workers Estimated to Spend Significantly Less Time With Family, More Time With Friends**

Conclusions

- **Distribution and Characteristics of Workers in Various Shifts Fairly Similar Between The ATUS and The CPS**
- **Cost of Being a Non-Day Worker Results Are Mixed**
 - **Non-Day Workers Do Not Appear To Sleep Less, or Watch T.V. Less Once Other Factors Are Controlled for On Either Their Work Days or Days Off**
 - **Non-Day Workers Do Spend Less Time Eating Than Day Workers On Both Work and Non-Work Days**

Conclusions (Continued)

- **Cost of Being a Non-Day Worker (continued)**
 - **Evening Workers Spend More Time Alone On Work Days, Night Workers Spend More Time Alone On Non-Work Days**
 - **Evening Workers Spend Less Time With Family, Spouses and Children On Both Their Work and Non-Work Days**
 - **Night Workers Spend More Time With Family Members, Spouses and Children**

Conclusions (Continued)

- **Differences In Time Evening and Night Workers Spend With Family May Be The Result of Dual Earner Families Trying To Balance Their Work Time and Child Care Needs**
- **Will Continue Research Into How Spouses of Non-Day Workers Use Their Time Using Matched May 2004 CPS Supplement and ATUS Data**