

Shift work and overtime across a career in law enforcement: a 15-year study

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Abstract

Purpose – To characterize changes in work hours across a career in law enforcement.

Design/methodology/approach – $N = 113$ police officers enrolled in the BCOPS cohort were studied. The police officers started their careers in law enforcement between 1994 and 2001 at a mid-sized, unionized police department in northwestern New York and continued to work at this police department for at least 15 years. Day-by-day work history records were obtained from the payroll department. Work hours, leave hours and other pay types were summarized for each calendar year across their first 15 years of employment. Linear mixed-effects models with a random intercept over subject were used to determine if there were significant changes in pay types over time.

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**Shared Senior Authorship

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Findings – A total of 1,617 individual-years of data were analyzed. As the police officers gained seniority at the department, they worked fewer hours and fewer night shifts. Total paid hours did not significantly change due to seniority-based increases in vacation time. Night shift work was increasingly in the form of overtime as officers gained seniority. Overtime was more prevalent at the beginning of a career and after a promotion from police officer to detective.

Originality/value – Shiftwork and long work hours have negative effects on sleep and increase the likelihood of on-duty fatigue and performance impairment. The results suggest that there are different points within a career in law enforcement where issues surrounding shiftwork and long work hours may be more prevalent. This has important implications for predicting fatigue, developing effective countermeasures and measuring fatigue-related costs.

Keywords Work schedule, Police, Sleep opportunity, Fatigue, Longitudinal, Shiftwork, Overtime

Paper type Research paper

Introduction

There are more than 750,000 full-time, sworn police officers in the United States employed at 18,000 different federal, state, county or local law enforcement agencies (Banks *et al.*, 2016). There is considerable variability in the work hour policies and procedures used by each agency to staff sufficient officers around-the-clock to meet demands for service. Despite this variability, shiftwork is required across agencies operating 24/7. Results from survey-based studies suggest that to help meet demands in this 24/7 operation, overtime is generally permitted and often unrestricted (Reaves, 2012), and there has been a shift away from traditional 8-h work schedules toward alternative schedules such as compressed workweeks (Amendola *et al.*, 2011). Outside of these hours with the law enforcement agency, secondary employment is generally permitted with restrictions on the number of hours or types of work (Reaves, 2012).

These studies and others have provided a general picture of the work hour policies and procedures used by law enforcement agencies and their temporal profiles. In doing so, the studies suggest a high prevalence of work schedules that limit sleep opportunities and challenge officers' ability to obtain sufficient sleep and maintain high on-duty alertness and performance (Charles *et al.*, 2007; Vila *et al.*, 2002; Vila, 2006). To date, however, these studies have largely not accounted for variability in the prevalence of shift work and long work hours within a law enforcement agency. Given departmental bidding processes, retirement packages based on highest or latest earnings, promotions, and other work hour policies and procedures, there may be different points within a career in law enforcement where shift work, long and irregular work hours and surrounding issues are more prevalent.

Better understanding the work hour policies and procedures used by law enforcement agencies, and the variability in work hours within an agency, should provide insight about how to improve work hour policies and procedures, mitigate fatigue and sustain around-the-clock performance in law enforcement. It also may help better measure the costs and consequences of different work-hour practices to inform public policy. This study characterizes changes in police officers' work hours across their careers at a mid-sized, urban police department and discusses possible implications for sleep and fatigue at different points in their careers. This view across the career course is important because it draws attention to the ways that daily work conditions influence the long-term evolution of an officer's behavior, health and wellness.

Methods

BCOPS study

Participants were police officers enrolled in the BCOPS study (Violanti *et al.*, 2006). The BCOPS study was a prospective study that investigated the associations between occupational stressors and the psychological and physiological health of police officers. All 710 sworn police officers employed by a mid-sized, unionized police department in northwestern New York were invited to participate. A total of 464 (65.4% response) police officers agreed to participate and completed their baseline examination between 2004 and 2009. Of the 464 police officers in the cohort, 281 completed a follow-up between 2011 and 2015, and 240 completed a second

follow-up between 2015 and 2019. The payroll department provided day-by-day work history records of the participants from 1994 to 2018. A written informed consent was collected from each participant. The study was approved by the Institutional Review Boards of the sponsored university and the National Institute for Occupational Safety and Health.

Policies and procedures

This study focuses on 113 individuals ($n = 34$ females) in the BCOPS study that started their careers as police officers at this mid-sized police department and continued to work at the same department for at least the next 15 years. This sample of police officers represents 15.9% of the sworn police officers employed by the police department when data collection started in 2004 and 24.9% of the sworn police officers in the BCOPS cohort.

Throughout the 15 years of employment, the police department's work hour policies and procedures remained largely the same. In brief, this includes a union-negotiated agreement that police officers are paid for at least 4h for court appearances. Court appearances occur during the daytime hours. Sick leave is accumulated at a rate of 11 h per month up to a maximum of 2,400 h; sick leave of three or more days requires a note from a physician. Vacation time increases with seniority, but unused vacation time is forfeited each year. Secondary employment is limited to 20 h per week. The predominant work schedule includes four consecutive 10 h early morning, morning, afternoon *or* night shifts followed by three or four consecutive days off. Fixed 8-h work schedules are occasionally used. The 8- and 10-h work schedules result in an average of 1,946.6 work hours over 243 or 195 workdays, respectively. Overtime is based on department needs; bidding and assignment of overtime are based on seniority. Shift differentials are provided for night shift work at a rate of 15 cents/hour. Pensions are based on the average hours worked over the three years with the highest earnings.

Study methodology

A total of 1,617 individual-years of data were analyzed. Using the day-by-day work history records, the following variables were summarized for each calendar year across each officer's first 15 years of employment: regular time, overtime, light duty, time in an acting (higher paying) position, court time, city or union business, shift differentials, military time, sick leave, personal leave, vacation time, duty disability, suspended with pay, and officer rank. Annual holiday pay was not included.

In addition to these variables, total work hours, total paid hours, short-term sick leave, long-term sick leave and estimated available sick leave were derived from the work history records. Total work hours was calculated as the sum of regular time, overtime, light duty, court time and city and union business. Total paid hours was calculated as the sum of total work hours, duty disability, personal leave, vacation time, sick leave and suspended-with-pay hours. Short-term sick leave was defined as taking less than three consecutive sick days. Long-term sick leave was defined as taking greater than or equal to three consecutive sick days. Available sick leave was estimated based on the rate at which it was accumulated (i.e. 11 h/month) and the total used. All extracted and derived variables were set to missing for the calendar year if payroll data were incomplete (i.e. ≥ 1 month without any entries except during duty disability leave).

Data analyses

Linear mixed-effects models with a random intercept over subject were used in unadjusted and adjusted analyses to determine whether each extracted and derived variable significantly changed across the fifteen years. This analytical approach accounts for repeated measures involving multiple subjects and between- and within-subject variability (Van Dongen *et al.*, 2004). The dependent variable in each analysis was one of the extracted or derived variables

from the work history data (e.g. overtime hours) and the predictor of interest was time (i.e. years policing as a continuous variable). The adjusted analyses included years policing (continuous variable), sex (categorical variable: male, female), age when hired by the police department (continuous variable) and two-way interactions between years policing and sex and years policing and age. In a secondary, exploratory analysis, we examined whether the prevalence of court hours was related to the prevalence of night shift work. Previous research suggests that night shift officers may be more likely to encounter and/or arrest perpetrators of more serious crimes and that work schedules that include both night shift work and daytime court hours could be linked to sleep loss and fatigue (Riedy *et al.*, 2018).

Results

Total work and leave

The police officers ($n = 113$) were on average 29 years old ($SD = 4.5$) when hired by the police department between 1994 and 2001 (see Table 1). To be expected, between 94.4 and 100% of the police officers had a modal shift duration of 10-h (see Figure 1). Across the 15 years, the police officers worked $1,771.21 \pm 422.60$ h each year (mean \pm SD), and they were paid for $2,134.77 \pm 237.29$ h each year (see Table 2, see Figure 2). This equates to 36.06 ± 8.13 work hours and 41.05 ± 4.56 paid hours per week. Total work hours significantly decreased, on average, by 22.0 h (0.42 h/week) each year (see Table 3). Female police officers were paid significantly fewer hours particularly early in their careers (see Table 4).

Shift work and court appearances

More than 45% of the police officers worked primarily night shifts at the beginning of their careers (see Figure 1). As the police officers continued to work at the police department, they

	<i>N</i> (%)
<i>Sex</i>	
Male	79 (69.9%)
Female	34 (30.1%)
<i>Ethnicity</i>	
Hispanic-American	2 (1.8%)
African-American	26 (23.0%)
European-American	84 (74.3%)
Unknown	1 (0.9%)
<i>Age group*</i>	
22–26	36 (31.9%)
27–31	44 (38.9%)
32–36	28 (24.8%)
37–41	3 (2.6%)
42+	2 (1.8%)
<i>Education</i>	
≤High school/GED	11 (9.7%)
College < 4 years	59 (52.2%)
College ≥ 4 years	43 (38.1%)
<i>Prior military experience</i>	
Yes	20 (82.3%)
No	93 (17.7%)

Note(s): *Age was analyzed as a continuous variable. *Abbreviations:* Number of the police officers (*N*), Percent of the police officers (%), General Educational Development (GED)

Table 1.
Demographic characteristics on date of hire

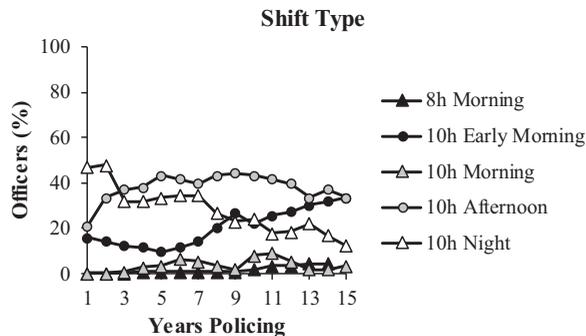
worked fewer night shifts and more early morning shifts, and 42.5% were promoted at least once to a higher rank (see Figure 3). After a promotion from police officer to detective, there was a further reduction in night shift work. Night shift hours and court hours significantly declined over the 15 years, particularly for male police officers who on average worked more of these hours than female police officers particularly early in their careers (see Figures 4–6). Secondary analyses suggest that the reduction in court hours across the years was related to a reduction in night shift work rather than an increase in years of experience ($F_{1,1500} = 387.42, p < 0.001$).

Regular time and overtime

Over the 15 years, the amount of regular time hours did not significantly change. Light duty hours increased over the 15 years for female police officers (see Figure 6). There were significant increases in overtime and overtime second shift differentials per the linear mixed-effects models (see Figure 4). The relationship between overtime and years policing, however, ended up being non-monotonic, with more overtime at the beginning and particularly the end of the 15 years (see Figures 4 and 7). Despite a significant interaction, this relationship persisted regardless of age when hired by the department. The substantial increase in overtime toward the end of the 15 years was driven by a three-fold increase in overtime after a promotion from police officer to detective. This initial increase in overtime after a promotion was followed by a reduction in overtime over the next five plus years.

Vacation and sick leave

Over the 15 years, there was a significant increase in vacation time. This was driven by three systematic increases in vacation time during the first ten years of employment including after the second, sixth and ninth calendar years (see Figure 5). Overall sick leave, short-term sick leave, and long-term sick leave did not significantly change across the years, while the estimated sick leave available to officers significantly increased and at a faster rate for those officers who started their careers as police officers at a younger age.



Note(s): The proportion of police officers each year with a modal shift of: (1) 8-h morning shifts: start at 7 or 8 a.m., end at 3 or 4 p.m.; (2) 10-h early morning shifts: start at 6 or 7 a.m., end at 4 or 5 p.m.; (3) 10-h morning shifts: start at 10 or 11 a.m., end at 8 or 9 p.m.; (4) 10-h afternoon shifts: start at 3 or 4 p.m., end at 1 or 2 a.m.; and (5) 10-h night shifts: start at 8 or 9 p.m., end at 6 or 7 a.m. Year 1 refers to the first full calendar year policing

Figure 1.
The proportion of police officers each year

	Hours (Mean ± SD)	Cases (Mean ± SD)*
<i>Totals</i>		
Total work hours	1771.21 ± 422.60	212.74 ± 61.88
Total paid hours	2134.77 ± 237.29	253.18 ± 46.81
<i>Work types</i>		
Regular time	1522.12 ± 333.14	156.58 ± 33.88
Overtime	34.38 ± 72.53	7.27 ± 12.58
Light duty	7.08 ± 54.62	0.88 ± 6.62
Court appearances [‡]	196.93 ± 175.55	46.90 ± 40.23
City or union business	10.70 ± 94.45	1.10 ± 9.49
<i>Other pay types</i>		
2nd shift differential [†]	1091.52 ± 709.78	111.66 ± 72.40
Overtime differential [†]	49.31 ± 80.58	12.47 ± 19.24
Acting time [§]	7.74 ± 94.62	0.80 ± 9.62
<i>Leave types</i>		
Vacation time	116.66 ± 48.46	11.78 ± 4.98
Personal leave	51.27 ± 15.59	8.32 ± 2.86
Military	9.16 ± 47.74	0.92 ± 4.79
Sick leave (Overall)	88.12 ± 88.83	8.87 ± 8.98
Duty disability	104.14 ± 295.85	11.14 ± 31.98
Suspended	3.38 ± 73.01	0.34 ± 7.30
<i>Derived leave types</i>		
Sick leave (Available)	440.42 ± 386.36	44.04 ± 38.64
Short-term sick leave	46.21 ± 49.29	4.65 ± 4.96
Long-term sick leave	41.91 ± 73.48	4.22 ± 7.44

Note(s): *For work types, leave types, and other pay types, cases represents the number of times a pay type was listed in the payroll each year. For short-term and long-term sick leave, cases represent the number of times short-term or long-term sick leave was taken each year. For sick leave (available), cases represents the number of estimated hours of sick leave that are available to the officer, with a maximum of 2,400 h; [‡]Per the union-negotiated court hour policy, police officers were paid at least four hours for a court appearance. [§]Police officers can receive additional pay (e.g. acting time) on top of the regular work hours; [†]Shift differentials are issued as additional pay for night shift work; *Abbreviations:* standard deviation (SD)

Table 2. Work characteristics across 15 Years of work

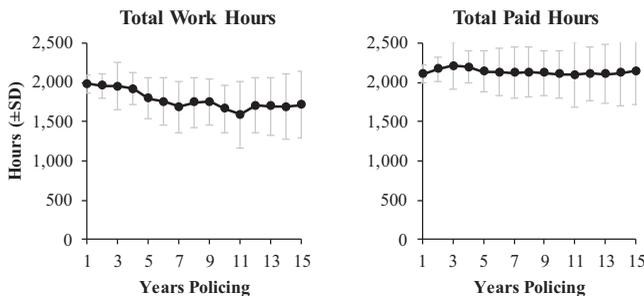


Figure 2. Average (±SD) total work hours (left) and total paid hours (right) for each year across the first fifteen years of 113 careers as police officers. Year 1 refers to the first full calendar year policing. *Abbreviations:* standard deviation (SD)

Other work and leave types

A significant main effect of sex on military hours simply reflected that there were more male police officers in the military (5.88% females; 22.78% males). Duty disability leave did not significantly change across the 15 years. Although there were significant predictors of suspension hours, time in acting positions and city/union business, these results appeared to

	<i>F</i> -value	DF	<i>p</i> -value	Estimate*
<i>Totals</i>				
Total work hours	117.93	1, 1503	<0.001	-21.98
Total paid hours	12.96	1, 1503	<0.001	-3.86
<i>Work types</i>				
Regular time	160.07	1, 1503	<0.001	-21.31
Overtime	20.96	1, 1503	<0.001	1.81
Light duty	25.84	1, 1503	<0.001	1.56
Court appearances	84.81	1, 1503	<0.001	-6.10
City or union business	17.68	1, 1503	<0.001	2.00
<i>Other pay types</i>				
2nd shift differential [†]	321.80	1, 1503	<0.001	-52.12
Overtime differential [†]	477.80	1, 1503	<0.001	7.91
Acting time	2.99	1, 1503	0.084	-0.93
<i>Leave types</i>				
Vacation time	3,220.09	1, 1503	<0.001	8.89
Personal leave	4.22	1, 1503	0.040	0.19
Military	3.79	1, 1503	0.052	-0.31
Sick leave (Overall)	7.87	1, 1503	0.005	1.35
Duty disability	18.18	1, 1503	<0.001	6.69
Suspended	6.59	1, 1503	0.010	1.01
<i>Derived leave types</i>				
Sick leave (Available)	960.42	1, 1503	<0.001	36.16
Short-term sick leave	4.86	1, 1503	0.028	-0.49
Long-term sick leave	19.72	1, 1503	<0.001	1.84

Table 3.
Work characteristics
across 15 Years of
work statistics –
unadjusted analyses

Note(s): *The estimate is the coefficient associated with the time variable (i.e. years policing) from the unadjusted mixed-effects linear regression models. For example, -21.98 indicates that for a one year increase in years policing, total work hours decreased by 21.98 h; [†]Shift differentials are issued as additional pay for night shift work; *Abbreviations:* degrees of freedom (DF)

be spurious (see [Figures 6 and 7](#)). Of the 1,617 years of data, only eight years of data from five police officers included suspension hours and only 21 years from 16 police officers included time in acting positions. For city/union business, all significant results were driven entirely by one police officer who worked between 1,400 and 2,010 h of city or union business during the last four of 15 years.

Discussion

This study examined changes in work hours across a career in law enforcement. 113 individuals that started their careers as police officers at a mid-sized, unionized police department in northwestern New York and continued to work at this police department for at least the next fifteen years were studied. The average annual work hours observed at the police department were comparable to national averages, with the police officers working 1,771 h each year and the national average being 1,779 h ([OECD, 2020](#)). The results corroborate previous research suggesting a high prevalence of shiftwork in law enforcement ([McMenamin, 2007](#)), with 46–68% of the police officers primarily working afternoon or night shifts each year.

There were different points in the officers' careers when shiftwork and long work hours were more prevalent. Shiftwork and long work hours were particularly prevalent at the beginning of their careers. During their first three years of employment, for example, the

	Years policing		Sex		Age		Years policing x sex interaction		Years policing x age interaction	
	F-value	p-value	F-value	p-value	F-value	p-value	F-value	p-value	F-value	p-value
<i>Totals</i>										
Total work hours	4.10	0.043	2.30	0.130	2.59	0.108	0.07	0.791	0.19	0.665
Total paid hours	0.02	0.902	7.97	0.005	1.46	0.227	5.14	0.024	0.28	0.597
<i>Work types</i>										
Regular time	3.27	0.071	0.21	0.645	0.61	0.437	0.92	0.340	0.02	0.889
Overtime	8.81	0.003	2.84	0.092	0.01	0.930	1.56	0.211	5.09	0.024
Light duty	0.25	0.618	0.70	0.402	0.56	0.456	8.47	0.004	2.19	0.139
Court appearances	0.84	0.360	12.28	0.005	1.91	0.167	9.47	0.002	0.07	0.785
City or union business	9.38	0.002	0.86	0.355	1.69	0.145	7.49	0.006	12.92	<0.001
<i>Other pay types</i>										
Second shift differential	0.49	0.484	10.73	0.001	0.15	0.702	45.24	0.022	3.52	0.061
Overtime differential	21.47	<0.001	0.05	0.815	0.84	0.358	0.14	0.705	1.91	0.170
Acting time	0.03	0.869	6.12	0.014	0.25	0.620	3.98	0.046	0.05	0.825
<i>Leave types</i>										
Vacation time	85.33	<0.001	<0.01	0.959	2.58	0.108	<0.01	0.972	0.64	0.423
Personal leave	0.01	0.927	0.95	0.329	0.01	0.929	0.58	0.448	0.21	0.651
Military	1.09	0.296	4.13	0.042	0.09	0.760	2.03	0.154	1.62	0.203
Sick leave (Overall)	0.47	0.495	<0.01	0.965	0.59	0.443	0.46	0.497	0.05	0.821
Duty disability	0.68	0.409	0.20	0.655	0.41	0.521	1.65	0.199	0.01	0.912
Suspended	8.69	0.003	0.30	0.581	1.32	0.252	1.61	0.205	7.31	0.007
<i>Derived leave types</i>										
Sick leave (Available)	66.22	<0.001	0.09	0.764	0.02	0.876	<0.01	0.986	13.71	<0.001
Short-term sick leave	2.04	0.154	0.32	0.573	0.22	0.638	0.22	0.642	1.20	0.274
Long-term sick leave	2.20	0.138	0.14	0.713	0.25	0.621	0.96	0.328	0.60	0.438

Note(s): *Degrees of freedom were 1, 1501 for each analysis and predictor. Regression coefficients are in table S1 of the supplemental materials; †Shift differentials are issued as additional pay for night shift work; *Abbreviations:* degrees of freedom (DF), linear regression estimate (estimate)

Table 4. Work characteristics across 15 Years of work statistics – adjusted analyses *

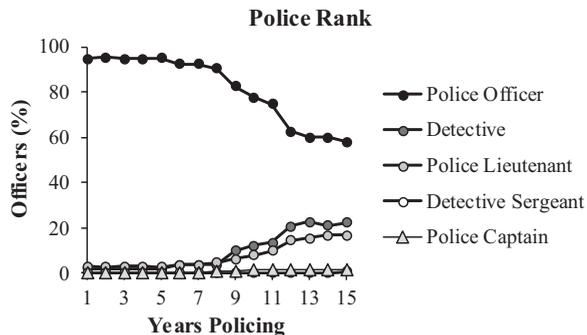
police officers worked an average of 1,965 h (*note*, this is near the 1,946.6 work hours per year resulting from the 8-h and 10-h work schedules). Of those work hours, 70% occurred during the nighttime hours and 11% were daytime court hours. As officers continued to gain seniority within the police department, a reduction in total work hours was counteracted by an increase in vacation time such that total work hours declined during the 15 years, but total paid hours did not. With the reduction in night shift work, there was an associated reduction in court hours. The increase in overtime shift differentials may suggest that any night shift work was increasingly in the form of overtime as the police officers rotated off the night shift.

Although total work hours and night shift work continued to decline over the 15 years, there was a relative peak in overtime and total work hours following a promotion from police officer to detective. This peak was followed by a steady decline in overtime during the next five-plus years, suggesting that both seniority within the police department and seniority within a rank influenced work hours. This assertion is supported by departmental seniority bidding policies. Overtime was offered to a senior off-duty police officer, detective, lieutenant, detective sergeant or captain (depending on rank). If overtime was not accepted, the opportunity would be passed down until it reached the least senior individual in that rank. The finding that overtime declined with time within a rank may suggest that the more senior officers were passing on overtime, thereby requiring the newly promoted officers to complete the overtime.

It remains to be determined whether additional peaks in overtime and total work hours would be observed later in the officers' careers including with higher promotions or prior to retirement to benefit pension contributions. Based on a subset of 63 police officers that retired during the BCOPS study, characterizing changes in work hours and leave hours from officers' hire date to retirement date requires an average of 30 years of data.

From a sleep and fatigue perspective, the prevalence of shiftwork and long work hours at the beginning of police officers' careers has implications for their sleep opportunities and on-duty fatigue and performance. As previously stated, 70% of the work hours occurred during the nighttime hours during the first three years, and 11% of the work hours were daytime court hours. Consistent with early reports on drivers of sleep loss and fatigue in law enforcement (Vila, 1996), results from secondary analyses of the Tired Cops study demonstrated that adding daytime court hours to a night shift work schedule significantly reduces sleep opportunities and increases the likelihood of on-duty fatigue and performance impairment (Riedy *et al.*, 2018). As the police officers continued to work at the department, the reduction in their work hours would increase the length of sleep opportunities, while their tendency to switch from night shifts to early morning or afternoon shifts would improve the quality of those sleep opportunities (e.g. Charles *et al.*, 2007; Pilcher *et al.*, 2000; Fekedulegn *et al.*, 2016). While police officers promoted to detective experienced a substantial increase in overtime, overtime hours were concentrated during the daytime hours, which would allow them to primarily sleep during the nighttime hours.

Figure 3. The proportion of individuals with the highest rank of police officer, detective, police lieutenant, detective sergeant or police captain each during their first 15 years in law enforcement. Year 1 refers to the first full calendar year policing



Generalizability

An important question is whether the results presented will generalize to other police departments given the substantial variability in work hour policies and procedures. For example, changes in overtime across a career with a given police department could depend on whether that police department uses a seniority-based bidding system and, if so, whether bidding is based on seniority within the department, rank, precinct and/or detail. Temporal profiles will vary based on shift start and end times; the local, social, economic and physical ecology and whether there are changes in work hour policies and procedures within the career. For example, in the present study, the police officers were hired after the police department switched from a rotating to fixed shift work schedule which compared to more

Shift work and overtime in law enforcement

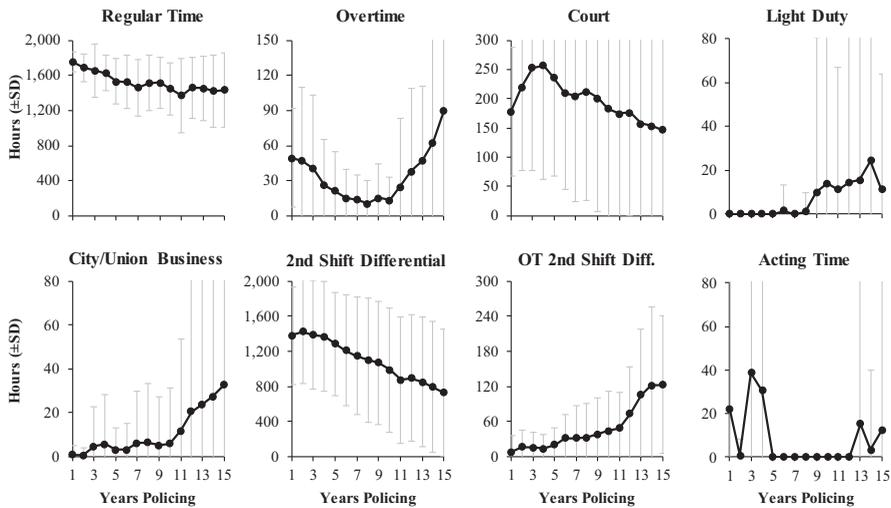


Figure 4. Average (\pm SD) work hours and shift differentials for each year across the first 15 years of 113 careers as police officers. Year 1 refers to the first full calendar year policing. Abbreviations: Differential (Diff), standard deviation (SD)

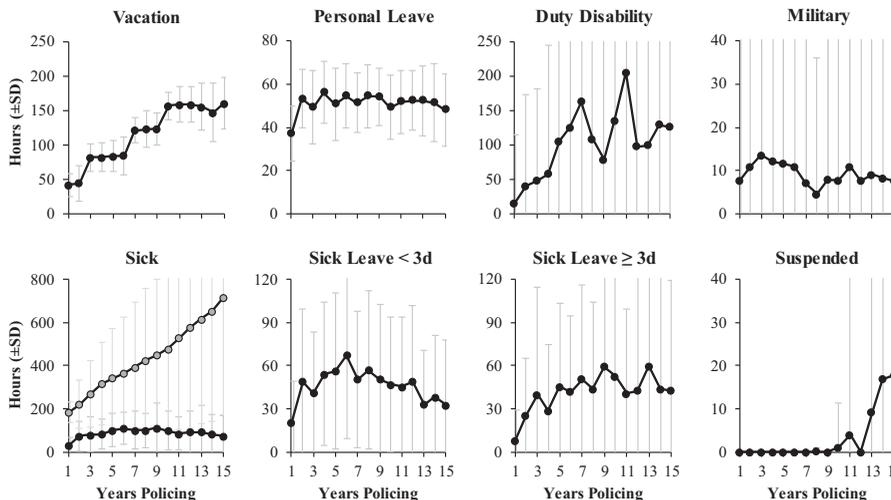


Figure 5. Average (\pm SD) leave hours for each year across the first 15 years of 113 careers as police officers. For sick leave, the plots are split into overall sick leave (black, bottom left), estimated available sick leave (gray, bottom left), sick leave less than three days and sick leave of at least three days. Year 1 refers to the first full calendar year policing. Abbreviations: days (d), standard deviation (SD)

senior officers at the police department would drive systematic differences in the changes in work and leave hours across their careers.

While temporal profiles will vary across police departments, there are a number of ways in which the police department used in this study employs policies and procedures representative of a large proportion of other police departments. To begin with, the department *must* employ shiftwork to provide police services to its community around-the-clock. It did this by using a work schedule that results in a compressed workweek – one in which officers work fewer than five days a week and more than eight hours a day (Amendola et al., 2011). Like most United States law enforcement agencies, sick leave and vacation time are guaranteed in compensation agreements. Furthermore, overtime is permitted; and secondary employment is permitted, but with some limits on work hours (Reaves, 2012). Like nearly all United States police departments with more than 500 officers, this department

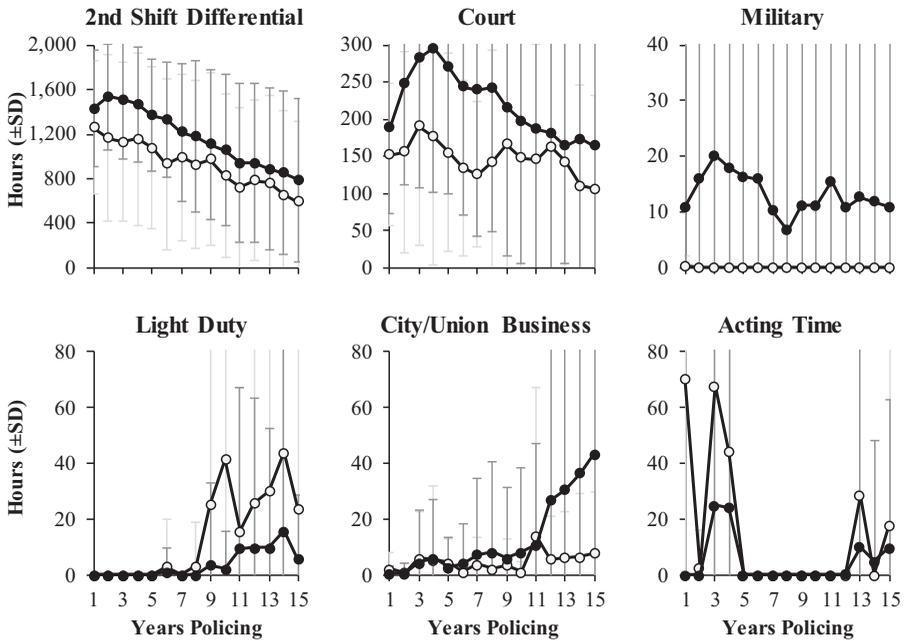


Figure 6. Average (±SD) transaction hours each year stratified by sex (females: gray; males: black) for the work hours, leave hours or other pay types with a significant effect of sex and/or a significant sex by years policing interaction. Year 1 refers to the first full calendar year policing. Abbreviations: standard deviation (SD)

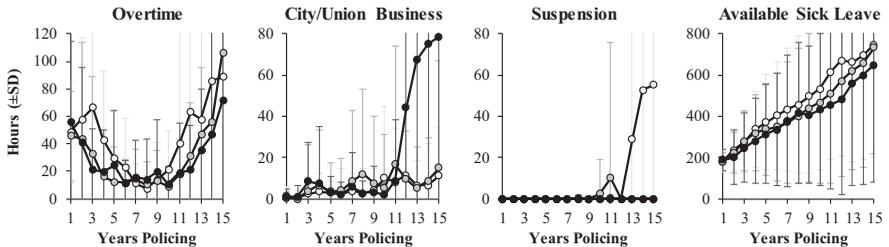


Figure 7. Average (±SD) transaction hours each year stratified by age (22-26 years: light gray; 27-31 years: gray; 32 years+: black) for the leave hours with a significant age by years policing interaction

Note(s): Age was analyzed as a continuous variable. Year 1 refers to the first full calendar year policing. Abbreviations: standard deviation (SD)

employed officers who were called to military duty (Reaves, 2012). And finally, this department has a police union (DeLord and York, 2017).

Implications for policy and research

Understanding that shiftwork, overtime and long work hours tend to be more prevalent during different points within officers' careers has a number of policy implications. In particular, it emphasizes the importance of providing fatigue management training to police recruits, refreshing that training early in their careers and again when they transition from patrol to detective work and similar assignments. Other countermeasures include having supervisors reinforce this training across the career course and developing scheduling and staffing practices that help officers minimize the impact of fatigue, shiftwork and long work hours on their performance, health and wellness.

Research suggests that biomathematical models of fatigue widely used in military and transportation settings can help mitigate fatigue-related risks and costs in an operation. These models have recently been applied to assess current and alternative work schedules in law enforcement, but additional research is needed to determine whether these models accurately predict group-level sleep and fatigue in law enforcement. Finally, recent longitudinal research has demonstrated that productivity and performance are dynamic across the course of a career in law enforcement (Desmond *et al.*, 2020). Additional research is needed to determine whether these dynamics are partially driven by changes in work hours, sleep-wake behaviors and fatigue.

Limitations

Despite the vast amount of data available, the study is not without limitations. The BCOPS dataset included 464 of the 710 sworn police officers employed by the police department in 2004. This study focused on 113 police officers hired between 1994 and 2001. Additional research is needed to characterize changes across an entire career and to determine whether the results generalize. Paid hours resulting from jury duty, annual holiday pay, bereavement leave, longevity pay, hazard duty pay and similar pay types were not examined. Furthermore, the discussion of sleep opportunities is strictly focused on work-rest schedules, and factors such as chronotype (i.e. a biological construct that describes diurnal preferences or times of day when they prefer to sleep or are most alert or energetic) and age are not discussed. Sleep and fatigue data were not collected across the entire study period, although 15 days of sleep data were collected during three waves of data collection. The number of court hours may be overestimated since police officers are paid for at least four hours for court appearances. While the payroll included paid sick leave, the amount of available sick leave was estimated.

Conclusions

Previous research has demonstrated a high prevalence of shiftwork and long work hours in law enforcement. Shiftwork and long work hours have been related to sleep loss, poor sleep quality and on-duty fatigue and performance impairment. The results from this longitudinal research suggest that there are different points within a career in law enforcement where shiftwork, long work hours and surrounding issues may be more prevalent. Night shift work was particularly prevalent at the beginning of a career and overtime at the beginning of a career and after a promotion from police officer to detective. This has important implications for predicting fatigue, developing effective countermeasures and measuring fatigue-related costs.

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Appendix

Supplementary materials are available online for this article.

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