

Patterns and Predictors of Alcohol Use in Male and Female Urban Police Officers

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In a large sample of urban police officers, 18.1% of males and 15.9% of females reported experiencing adverse consequences from alcohol use and 7.8% of the sample met criteria for lifetime alcohol abuse or dependence. Female officers had patterns of alcohol use similar to male officers and substantially more than females in the general population. Critical incident exposure and posttraumatic stress disorder (PTSD) symptoms were not associated with level of alcohol use. Greater psychiatric symptoms were related to adverse consequences from alcohol use. There was a noteworthy gender by work stress interaction: greater routine work stress related to lower current alcohol use in female officers. (Am J Addict 2010;20:21–29)

One of the important occupational hazards of police work is frequent exposure to traumatic incidents and the resulting risk of developing symptoms of posttraumatic stress disorder (PTSD). A strong body of empirical evidence demonstrates that rates of alcohol use disorders are significantly higher in individuals with PTSD, compared with trauma-exposed individuals without PTSD, and nonexposed community samples, raising concerns about PTSD-related alcohol comorbidity in police officers. In a nationally representative sample of American adults, among those with a lifetime history of PTSD, an estimated 52% of men and 28% of women have a history of comorbid alcohol abuse or dependence.¹ Military personnel with combat-related PTSD have even higher rates of comorbidity. The National Vietnam Veteran's Readjustment Study reported that 73% of Vietnam veterans with current combat-related PTSD met criteria for comorbid alcohol abuse/dependence at some point after developing PTSD.² Further support for a PTSD-substance abuse association is provided in studies of civilians presenting with current substance use disorders, in which the estimated rates of PTSD vary from 20–59%.³

There is a dearth of high-quality empirical data on patterns of alcohol use in police officers despite the fact that anecdotal evidence suggests alcohol abuse and dependence are a significant concern in this population. Earlier studies have estimated that up to 25% of officers have serious problems with alcohol.^{4–6} Van Raalte⁷ found that 40% of 200 informally surveyed officers had used alcohol on duty. Hurrell and colleagues⁸ estimated that 23% of officers had serious alcohol problems, and that 10% had serious drug problems. Although these studies suggest there may be a high prevalence of problematic alcohol use in this population, they have been criticized for having low response

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rates, using limited sampling techniques, not quantifying use, and other methodological problems.⁹

No large-scale empirical studies have been published in the past 20 years examining the prevalence of alcohol use among police officers in the United States. However, a few large studies have been conducted in other parts of the world in the last several years. In a large urban police sample ($n = 852$) from Australia, Richmond et al.¹⁰ reported that 48% of male officers and 40% of female officers said that they drank excessively or engaged in binge drinking, or hazardous or harmful drinking in the previous 3 months. These categorizations of drinking behavior were defined as follows: (1) "excessive drinking" was defined as 9+ drinks in a row for men and 7+ drinks in a row for women, at least two times a month; (2) hazardous drinking was defined as 28–42 drinks per week for men and 14–21 drinks per week for women; (3) harmful drinking was defined as 43+ drinks per week for men and 22+ drinks per week for women. A more recent study from across Australia ($n = 4,193$), recruited through a state police organization utilized the Alcohol Use Disorders Identification Test (AUDIT) and reported that 33% of male officers and 24% of female officers reported harmful consumption (AUDIT score = 8–12).¹¹ AUDIT scores that indicated likely alcohol dependence (score = 13+) were reported in 3% of male officers and 2.5% of female officers.

The most recent published study of alcohol use in a large sample of police officers ($n = 2,372$) was conducted in Norway and recruited participants through a police union.¹² The frequency of alcohol problems in this sample was much lower than in the large Australian studies. The investigators used a nine-item version of the AUDIT, with a score greater than or equal to 6 indicating "somewhat hazardous" drinking. In their sample, 17.7% of male officers and 9.1% of female officers met this criteria.

Prediction of alcohol use in police officers is also an understudied area of research. The inherently stressful work of police service has been suggested to be an important contributor to alcohol use. In a cross-sectional study of police officers recruited from police organizations in New York State, Violanti et al.⁶ assessed predictors of the degree of agreement with the statement "I have used alcohol to relieve the stress of police work." They identified general distress as the single best predictor in explaining officers' coping-related alcohol use. Obst et al.⁹ examined duration of service, age, and gender as predictors of alcohol use in a longitudinal study of Australian officers recruited from a police academy. Younger recruits reported higher levels of risky alcohol use and percent of recruits reporting at-risk drinking was higher at the 6- and 12-month assessments than at entry to the academy. In contrast to most other studies, there were no gender differences on drinking variables. The authors interpreted the results as an indication that police training "enculturates" recruits into a police culture that encourages alcohol use.

The purpose of the present study was to examine the drinking patterns of a large sample of urban police officers and to identify specific predictors of alcohol use. Predictors focused on demographics, cumulative critical incident exposure, routine nontraumatic work environment stressors, peritraumatic responses, PTSD symptom levels, and general psychiatric distress in accounting for patterns of current alcohol use. We hypothesized that officers would report substantial rates of problematic drinking and that problematic drinkers would endorse greater levels of traumatic exposure and higher levels of posttraumatic stress symptoms.

METHOD

Recruitment Procedures

Police officers were recruited from the Oakland and San Jose, California and New York City police departments (participation of the departments included an agreement that data would not be disaggregated by site—including city and department) as part of a larger study examining critical incident and routine work environment stressors, posttraumatic stress responses, and risk and resilience factors in urban police officers.^{13–19} Only urban departments were included in an effort to recruit a sample more highly exposed to traumatic incidents. Police officers were identified through computerized personnel records. All participants received letters of invitation from their police commissioner, their police union, and our project team along with a reply form. Recruitment efforts were limited to these letters of invitation, with approach procedures to invited officers being uniform across departments. The study team contacted persons who mailed back an affirmative postcard. One thousand two hundred officers indicated willingness to participate and were sent surveys; of these, 747 returned surveys including written informed consent and were reimbursed \$100 for participation. To ensure confidentiality, each participant was assigned a numeric code, which was used on each measure as the sole means of identification. As an added precaution, a Federal Certificate of Confidentiality was issued by the National Institute of Mental Health. All 747 surveys were completed more than a year prior to the World Trade Center attacks of September 11, 2001.

Measures

The participants completed a survey booklet consisting of two general sections. The first section included a number of measures assessing demographics, health and general psychiatric symptoms, social support, alcohol and drug use, and tendency to answer items in a socially desirable way. A second section of the booklet asked each participant to describe the "one critical incident from your police service that has been the most troublesome, disturbing, or distressing to you" (hereafter referred to as the index

event). Several instruments then asked about reactions to the index event as well as about related symptoms of PTSD. The specific instruments included in the booklet are as follows:

Substance Use Inventory (SUI)

The Substance Use Inventory (SUI) (see Appendix) is an eight-item self-report questionnaire that assesses how many days in the past week a person consumed alcohol, how many drinks per day a person usually consumed in the past week, the maximum number of drinks consumed on any one occasion in the past 30 days, and the number of days in the past 30 days a person used each of the following: marijuana, cocaine, amphetamines, heroin or other opiates, or prescription drugs without a doctor's order. It was used in an earlier study of emergency services personnel to determine patterns of substance use following the 1989 Bay Area earthquake and other routine critical incident stressors.²⁰ Because of extremely low endorsement on the nonalcohol substance use items in the present study, only alcohol use items were analyzed. To correspond with cut points recommended by the National Institute on Alcohol Abuse and Alcoholism (NIAAA), "at-risk" drinking was defined as greater than 2 drinks per day or greater than 14 drinks per week for men, and greater than 1 drink per day or 7 drinks per week for women.²¹ Two outcome variables were derived from the SUI: at-risk alcohol use in the past week, and binge alcohol use in the past month.

Michigan Alcoholism Screening Test (MAST)

The Michigan Alcoholism Screening Test (MAST)^{22,23} is a self-report instrument originally designed as a brief screening measure for lifetime alcohol-related problems. The following cut points are recommended for a diagnosis of probable alcohol use disorder: "not alcoholic, 0–4; maybe alcoholic, 5–6; alcoholic, 7 or more." The MAST has shown very good internal consistency ($\alpha = .95$) and validity in a nonclinical sample.²⁴ Scores above the recommended cut score of 6 indicate significant lifetime adverse consequences from alcohol use, while the optimal cut score used to identify lifetime DSM-III alcohol abuse and dependence has been determined to be 12 to 13.²⁴

Social Desirability Scale (SDS)

The Social Desirability Scale (SDS)²⁵ is a short form of the Marlowe-Crowne Social Desirability Scale, designed to measure a tendency to endorse self-report items in ways that will elicit the approval of others. This instrument has been used to characterize response biases in a previous study of PTSD.²⁶

Critical Incident History Questionnaire (CIHQ)

The Critical Incident History Questionnaire (CIHQ)^{13,27} assesses officers' ratings of the number of times they were exposed over the course of their careers as police officers to

each of 34 police-related critical incidents (eg, being present when a fellow officer was killed, being shot at, making a mistake that led to the serious injury or death of a bystander). Respondents also estimate the degree of difficulty an average officer would have in coping with each event. In the present study, the cumulative exposure score for each participant was derived by weighting the frequency of exposure to each event by the average difficulty rating for that event, then summing over all events.

Peritraumatic Dissociative Experiences Questionnaire (PDEQ)

The Peritraumatic Dissociative Experiences Questionnaire (PDEQ)^{28,29} is a 10-item questionnaire that assesses the extent to which the respondent experienced dissociative responses (eg, altered time perception, depersonalization, derealization, and disorientation) during or immediately following a critical incident. Participants were instructed to rate peritraumatic dissociation symptoms associated with their self-identified index event.

Mississippi Scale – Civilian Version (MS-CV)

The Mississippi Scale for Combat-Related Posttraumatic Stress Disorder³⁰ is a frequently used instrument that assesses cumulative intrusion, avoidance, and hyperarousal responses as well as other PTSD-related symptoms since the time of a traumatic event. The civilian version of this scale was used in the present study to measure cumulative PTSD symptoms in response to the index event.

Hopkins Symptom Checklist 90-Revised (SCL-90-R)

The Hopkins Symptom Checklist 90-Revised (SCL-90-R)³¹ is a standard self-report measure of general psychiatric symptoms experienced within the past 7 days. The Global Severity Index, which has been found to have good criterion related validity, was used in this study as a measure of general psychiatric symptoms.

Work Environment Inventory (WEI)

The Work Environment Inventory (WEI)¹⁷ is a measure of routine work stress, and includes 68 items capturing generic, discrimination, and police specific stressors. The measure shows good internal consistency (Cronbach's alpha for the 68-item scale was .92, average inter-item correlation was .15), moderate predictive validity to psychiatric symptoms as measured by the SCL-90-R ($r = .46$), and PTSD symptoms as measured by the Mississippi Scale ($r = .39$) and Impact of Event Scale-R subscales (r 's = .26 to .30).

RESULTS

Sample

As noted above, of the 1,200 officers who indicated a willingness to participate, 747 returned the self-report

TABLE 1. Summary demographics of full sample compared to substance use inventory respondents

	Full sample (<i>N</i> = 712)*	SUI respondents (<i>N</i> = 363)*	SUI respondents vs. nonrespondents
Gender (%)			
Male	78.5	78.0	$\chi^2 (1, N = 712) = .03, ns$
Female	21.5	22.0	
Ethnicity (%)			$\chi^2 (3, N = 707) = 39.24, p < .001$
Caucasian	44.4	34.3	
African American	22.2	24.9	
Hispanic	26.2	29.4	
Other	7.2	11.4	
Education (%)			$\chi^2 (4, N = 704) = 10.98, p < .05$
Up to 12th grade	3.8	3.1	
H. S. diploma	27.6	23.5	
A. A. degree	33.2	36.9	
Bachelor's degree	31.8	33.5	
Advanced degree	3.5	3.1	
Relationship status (%)			$\chi^2 (2, N = 705) = 2.88, ns$
Married/Partnered	69.2	72.1	
Single	20.6	18.2	
Divorced	10.2	9.8	
Annual income (%)			$\chi^2 (4, N = 708) = 6.04, ns$
Up to \$15,000	0.0	0.0	
\$15,001 to \$30,000	0.6	0.8	
\$30,001 to \$50,000	11.3	10.5	
\$50,001 to \$70,000	36.6	33.1	
\$70,001 to \$90,000	24.7	25.7	
\$90,001 and above	26.8	29.8	
Age: <i>M</i> (<i>SD</i>)	37.1 (6.8)	36.8 (6.8)	$t (706) = .96, ns$
Years of service: <i>M</i> (<i>SD</i>)	12.6 (6.6)	12.3 (6.7)	$t (652) = 1.32, ns$

*Because of sporadic nonresponses for some of the demographic variables, *N*s vary from 654 to 712 for the full sample and from 358 to 363 for the SUI respondents.

questionnaire booklet (62.2%). Of the 747 respondents, nine were excluded from the present study because they failed to report their gender, and an additional 26 were excluded because they did not complete either of the alcohol use measures examined in the present study. Thus, the sample size for the current study is 712. Summary demographics are presented in Table 1.

Response Rates

Response rates were high for the individual self-report questionnaires, including 93.1% for the MAST. The one exception was our measure of current alcohol and drug use, the SUI, for which there was a lower response rate (49.2%). Twenty-six participants (3.5% of the sample) did not complete either questionnaire.

There was no relationship between gender and likelihood of completing the SUI. Caucasians showed a lower response rate (39.5%) than African Americans (56.7%), Hispanics (57.3%), and the "Other" ethnic group (80.4%), $\chi^2 (3, N = 707) = 39.2, p < .001$. Also, those with lower levels of education were significantly less likely to complete

the SUI questionnaire than were those with higher levels of education, chi-square (4, *N* = 704) = 10.98, *p* < .05.

Psychiatric Symptoms

Approximately 20% of the participants exhibited general psychiatric symptom levels above threshold for psychiatric outpatient case determination, based on a recommended cut score (T score greater than 63) for the SCL-90-R.³¹ Based on a recommended cut score of 94 on the Mississippi Scale,³⁰ 3.5% of the participants reported symptom levels consistent with a current diagnosis of PTSD related to their self-identified worst critical incident in police service, and based on a cut score of 84, an additional 3.5% had symptom levels consistent with current subsyndromal PTSD. We also found that Hispanic American officers evidenced greater levels of PTSD symptoms than both European American and African American officers.¹³ These ethnicity effects were small but persisted even after controlling for differences in other variables such as social desirability. We found no gender differences in PTSD symptom levels.

Lifetime Alcohol Use

Noteworthy percentages of both male and female officers had scores indicating lifetime adverse consequences from alcohol (males = 20.1%, females = 18.0%). Approximately 7.8% of officers had scores that indicated probable lifetime alcohol abuse or dependence. There were no associations between continuous MAST scores and respondent demographics, including age, years of service, gender, ethnicity, or education.

Current Alcohol Use *At-Risk Alcohol Use*

Eleven percent of male officers and 15.9% of female officers were classified in the current at-risk category. In the group classified as at risk, the average number of drinks in the prior week was 35.31 (standard deviation = 42.45, median = 22.50) for males and 17.08 (standard deviation = 13.65, median = 10.00) for females. By comparison, in the group not classified as at risk, the average number of drinks in the prior week was 3.07 (standard deviation = 3.82, median = 2.00) for males and 1.45 (standard deviation = 1.83, median = 0.50) for females. We also found that a noteworthy 3.4% of male officers and 3.7% of female officers reported consuming more than 28 drinks in the week prior to assessment.

Female officers were as likely as male officers to have used alcohol in the past week (58.2% vs. 61.3%, $\chi^2 [1, N = 363] = 0.24; p = .62$). Group differences in number of drinks in the past week were tested using a Mann-Whitney non-parametric test because of the skewed distributions of this variable. There was no significant difference between male and female officers in the number of drinks consumed in the past week (medians = 2 and 1; $z = -1.70; p = .09$).

Those with a high school level of education or less were more likely to have engaged in at-risk drinking in the past week (17.5%) compared to those with 2–4 years of college education (14.1%) or those with graduate degrees (6.7%), linear association $\chi^2 (1, N = 363) = 6.41; p < .01$. No other demographic variables were related to at-risk drinking in the past week, including no gender by ethnicity interactions.

Binge Drinking

Binge drinking was defined as consumption, over the past 30-day period, of five or more drinks on a single occasion for men, and four or more drinks on a single occasion for women.³² Allowing for differences including time of consumption, gender, and weight, all of which influence blood alcohol levels, this is approximately the amount needed to raise the average person's blood alcohol concentration to about .10%, the level at which intoxication is likely to occur. Relatively high rates of binge drinking were reported in both male and female officers, with a nearly equivalent 37.2% of males and 36.6% of females having had an episode of binge drinking within the past 30 days.

There were no significant gender, ethnicity, or education differences in likelihood of binge drinking and no gender by ethnicity interactions.

Predictors of Lifetime Alcohol-Related Problems

For the sample as whole, lower educational attainment ($r = -.10, p < .05$), greater routine work environment stress ($r = .17, p < .01$), greater current general psychiatric symptoms ($r = .18, p < .01$), and higher scores on the Mississippi PTSD scale ($r = .13; p < .01$) were related to higher scores on the MAST. There was no significant differences in MAST scores between men and women (for men, $M = 4.6, SD = 5.5$; for women, $M = 3.8, SD = 5.4; t [681] = 1.63, p = .10$), nor did gender enter into any significant interactions with other predictor variables.

Predictors of Current Alcohol Use

Table 2 displays correlations between predictor variables and at-risk and binge alcohol use. Higher scores on lifetime alcohol-related problems as assessed by the MAST were associated with greater levels of at-risk drinking in the past week and binge drinking in the past month among both men and women. The hypotheses that higher levels of cumulative critical incident exposure and higher levels of PTSD symptoms would be associated with higher levels of current alcohol use were tested using logistic regression modeling. At-risk drinking and binge drinking were moderately correlated with each other ($r = .38$), and weakly to moderately correlated with lifetime alcohol-related problems as determined by MAST total scores ($r = .28$ with binge drinking and $r = .38$ with at-risk drinking). For the sample as a whole, scores on the CIHQ and the Mississippi Scale were not associated with levels of current alcohol use. Higher scores on the SCL-90-R Global Severity Index scale were weakly associated with higher levels of at-risk drinking ($r = .11, p < .05$). None of the predictor variables was significantly correlated with the likelihood of having had a binge episode in the past month.

We were struck by the finding that female officers in this sample drink as much as their male counterparts, and substantially more than women in the general population. For this reason we conducted post hoc analyses to examine the correlations between predictors and drinking outcomes separately by gender (Table 2). There were gender differences in the magnitude and in the direction of associations between some predictors and alcohol use. We constructed a logistic regression model to account for at-risk alcohol use that included all candidate predictor variables as well as interactions of these variables with gender. Predictors entered into the model were all variables that showed a significant univariate relationship with either alcohol use variable, for either gender. In univariate analyses ethnicity, years of service, marital status, and PTSD symptoms (Mississippi Scale) were not significantly related to alcohol use in either men or women, and were excluded. The final

TABLE 2. Spearman's Rho correlation coefficients between current alcohol use (derived from the substance use inventory) and predictor measures*

	Substance use inventory					
	Combined sample (<i>N</i> = 363) [†]		Men (<i>N</i> = 284) [†]		Women (<i>N</i> = 79) [†]	
	At-risk alcohol use (ARAU)	Binge alcohol use (BAU)	ARAU	BAU	ARAU	BAU
ARAU	–	–	–	–	–	–
BAU	.38‡	–	.40‡	–	.36‡	–
MAST	.34‡	.22‡	.41‡	.40‡	.31‡	.31‡
CIHQ	.07	.02	.02	.01	.26§	.06
MC-CV	.08	.01	.08	.01	.03	.03
PDEQ	.01	.05	.01	.07	.05	–.03
SCL (GSI)	.11§	.10	.13§	.13§	–.03	–.01
WEI	.06	.09	.15§	.15§	–.18	–.09
SDS	–.06	–.07	–.12§	–.09	.13	.01

Note: ARAU = at-risk alcohol use in the past week; BAU = binge alcohol use in the past month; MAST = Michigan Alcoholism Screening Test; CIHQ = Critical Incidents History Questionnaire; MC-CV = Mississippi Combat Scale – Civilian Version; PDEQ = Peritraumatic Dissociative Experiences Questionnaire; SCL (GSI) = SCL-90-R General Symptom Index Score; WEI = Work Environment Inventory; SDS = Marlowe-Crowne Social Desirability Index.

*Correlations are with each measure's total score.

[†]Due to missing data, *N*s range from 357 to 363 for the combined sample, from 265 to 284 for men, and from 78 to 79 for women.

‡*p* < .01; §*p* < .05.

TABLE 3. Summary of logistic regression model of at-risk alcohol use in the past week in 352 police officers

Predictor	Coefficient β (s.e. β)	Odds ratio (95% CI)	Wald χ^2 (df = 1)	<i>p</i>
Gender *	–.09(1.37)	.91(.06–13.34)	.00	.948
Education level	–.54(.22)	.58(.38–.90)	5.91	.015
Critical incident exposure	.05(.21)	1.05(.70–1.57)	.05	.819
Work environment stress	.38(.24)	1.46(.91–2.35)	2.48	.115
General psychiatric symptom level	.11(.19)	1.12(.77–1.63)	.33	.567
Social desirability scale score	–.27(.20)	.77(.52–1.14)	1.75	.186
Gender by education	.02(.45)	1.02(.42–2.48)	.00	.958
Gender by critical incident exposure	.93(.50)	2.54(.96–6.70)	3.52	.061
Gender by work environment stress	–1.59(.64)	.20(.06–.71)	6.26	.012
Gender by general psychiatric symptom level	.83(.49)	2.29(.87–6.04)	2.81	.094
Gender by social desirability	.59(.46)	1.81(.73–4.46)	1.65	.199
Constant	–.63(.64)			

*Gender is coded as 0 for men and 1 for women.

regression model included educational attainment, CIHQ, WEI, General Psychiatric Symptom Levels (SCL-90), and SDS. Mean scores on these predictors were 18.3 (SD = 7.9) for the CIHQ, 5.8 (SD = 0.5) for the WEI, 0.39 (SD = 0.42) for the SCL-90 GSI, and 8.2 (SD = 2.9) for the SDS. Men and women did not differ significantly on any of the predictors.

Table 3 summarizes the logistic regression model. Odds ratios (ORs) for continuous variables are presented in terms of the standardized variables, in order to allow meaningful comparisons of differently scaled variables. For education, which is treated as a categorical variable, the OR represents the change in risk from one educational category (eg, high school diploma) to the next (eg, A.A. degree). All predic-

tors were entered simultaneously into the model. The ORs therefore represent the unique effect of each predictor in explaining the outcome variable, simultaneously controlling for all other predictor variables in the model.

The strongest predictor of current at-risk alcohol use in the sample as a whole was educational attainment, with a standardized OR of 0.58. Each increase from one educational category to the next higher category was associated with a 42% reduction in the odds, or a 33% reduction in the probability, of engaging in at-risk alcohol use. The other significant effect in the logistic model was the Gender by Work Environment Stress interaction term, OR = 0.20, χ^2 (1, *N* = 352) = 6.26, *p* = .012. To understand this interaction, we repeated the logistic regression separately for

men and women. For men, the relationship between routine work stress and at-risk drinking was not significant, $OR = 1.46$, $\chi^2(1, N = 278) = 2.48$, $p = .115$. This is the same as the simple effect of work environment stress shown in Table 3, because male gender was coded as the reference group. Women, in contrast, showed a significant effect of routine work environment stress in the opposite direction, $OR = 0.30$, $\chi^2(1, N = 74) = 4.23$, $p < .05$. In other words, women showed a 70% lower odds of at-risk drinking with each increase of one standard deviation in WEI score. Routine work environment stress was the only predictor to show a qualitatively different relationship to at-risk drinking for women compared to men.

For binge drinking, none of the predictors or interactions was statistically significant. Analyzing the data separately for men and women, we found that educational attainment was the only significant predictor of at-risk drinking, and only in men, $OR = 0.74$, $\chi^2(1, N = 278) = 4.39$, $p < .05$.

DISCUSSION

In this sample of urban police officers we found by NIAAA standards that approximately 11% of males and 16% of females had engaged in at-risk levels of alcohol use during the previous week, while over one-third of male and female officers reported a binge drinking episode at some time during the past month. A noteworthy 3.4% of male and 3.7% of female officers reported consuming more than 28 drinks in the past week. In addition, 18% of males and 16% of females reported significant lifetime histories of adverse social and interpersonal consequences related to alcohol use, with 7.5% reporting MAST scores consistent with a lifetime DSM diagnosis of alcohol abuse or dependence. As expected, alcohol use and MAST scores were related, with those in the current at-risk alcohol use category having experienced more lifetime negative consequences from alcohol.

Overall, these data suggest that the police officers in this sample were more likely to engage in a binge-drinking episode than the general population, with female officers being two to three times as likely. Much caution should be taken when making comparisons between these data obtained from large urban centers on the coasts and national epidemiology data, as location, urban/rural living, and sampling strategies may confound the gender patterns with other demographic variables. However, it is interesting to contrast these results with findings in the general population where females report lower levels of drinking than males and have lower rates of alcohol use disorders. Data from the 1999 National Household Survey on Drug Abuse (NHSDA)³³ indicated that 57% of males and 42% of females aged 26 or older reported "any alcohol use" in the *past month*, compared to the 61% of male officers and 58% of female officers in this sample who reported any alcohol

use in the *past week*. Despite the shorter time frame in the current study, female officers were more likely to report any alcohol use than the women in the NHSDA ($\chi^2(1, N = 82) = 6.12$, $p < .05$). Although the NHSDA did not assess number of drinks per week, an epidemiological study³⁴ classified approximately 12% of males and 3% of females over the age of 18 as at-risk drinkers, using a greater than 14 drinks per week standard for both males and females. Male officers in the current study had similar rates (11%), but female officers were 1.6 times more likely to have had greater than 14 drinks in the past week (5%).

Contrary to our hypotheses, for the sample as a whole neither cumulative duty-related critical incident exposure nor current PTSD symptom levels were associated with current alcohol use. In fact, in the combined sample, only educational attainment was significantly related to either at-risk alcohol use in the past week or binge drinking in the past month. We did find a positive association between cumulative PTSD symptoms to the officers' single most disturbing critical incident as assessed by the Mississippi Scale and greater lifetime alcohol-related problems as determined by the MAST. It is possible that the MAST may have been more sensitive to the cumulative effects of career PTSD symptoms in police service than our measures of current drinking. Alternatively, alcohol-related problems occurring prior to police service (eg, during high school) are also captured by the MAST and might constitute a risk factor for later critical incident stress-related PTSD symptoms during police service. Prospective studies of police academy recruits, assessed for alcohol-related problems prior to police service, and followed longitudinally for emergent alcohol-related problems and PTSD symptoms during police service, are required to clarify this question.

Because our findings suggest that female officers drink more than women in the general population, we examined current alcohol use separately by gender. For males, we found lower educational attainment to be the only significant predictor of at-risk alcohol use, while no such relationship was found for female officers. A gender-specific relationship between alcohol use and lower educational attainment in males is consistent with previous findings in the substance abuse literature.³⁵

Conversely, routine workplace stress did not predict drinking levels in male officers but female officers were significantly *less* likely to drink under conditions of *greater* workplace stress. A review of the literature on occupational risk factors for drinking reported that alcohol availability, job dissatisfaction, job stress, and a subculture that views at-risk drinking as an acceptable norm have all been found to be significant predictors of alcohol use.³⁶ In a study of working adults, dangerous working conditions and a culture endorsing and facilitating drinking were the most significant predictors of having an alcohol problem.³⁶ Job stress was a lesser, but also significant predictor. Besides the possibility of gender differences in utilizing different coping mechanisms, female police officers are working in a

traditionally male-dominated environment where drinking may be an acceptable or culturally influenced norm. The current study's finding of increased drinking in female officers with lower workplace stress may reflect an interesting paradox: lower workplace stress may be associated with greater acculturation within a work environment in which social drinking among coworkers is not only accepted but may be actively encouraged as a rite of membership. Women officers who rate their work environment as less stressful may be those who are more strongly acculturated to male officer norms, including drinking. Police psychologists and veteran officers have provided anecdotal evidence of culturally facilitated after-work ritual social drinking.³⁷ This finding may have important implications for female police officers struggling for acceptance in a male-dominated occupation. Alternatively, in a male-oriented work culture, women officers may perceive themselves to be under greater pressure to prove their competence. As workplace demands increase they may decrease their drinking to ensure that performance does not suffer. It is equally possible that as work stress increases, female officers decrease their social interactions with male counterparts out of concern that they will be perceived as "weak." Prospective studies of alcohol use patterns in male and female officers are required to clarify this finding.

Although there are ample anecdotal and theoretical reasons to suspect that alcohol is a problem among police officers, the scientific literature is underdeveloped. While the present study was designed to address methodological concerns raised by earlier studies, our study has several important limitations as well. As noted above, the study is cross-sectional in design, limiting causal inference. We did not employ a national probability sampling strategy for all Americans in law enforcement, limiting generalizability of our findings to police officers working in diverse settings and limiting inferences in comparing our findings with published surveys of drinking patterns in the general population. We also do not have data on the number of officers who declined to participate, which prevents us from reporting overall response rate.

Response rates to the substance use questionnaires and the limited geographical area sampled limits the degree to which we can infer that the sample reflects the total police officer population. In addition, approximately half of the current alcohol use data were missing in the sample due to the low response rates to the SUI. Although the instructions for the SUI specifically asked the participants to fill in "0" if they had not used alcohol or drugs in the time period specified, it is possible that some abstainers may have simply skipped the questionnaire completely. It is also possible that some officers either did not consider themselves to have a problem, or were reluctant to answer detailed questions regarding their current drug and alcohol use out of concern for confidentiality, and made a conscious decision to skip this portion of the survey. The low response to the SUI compared to the high response to the MAST may in-

dicate an openness to disclose lifetime consequences due to alcohol use, but a reluctance to respond to questions about current alcohol use embedded in a questionnaire that also asked about current illicit drug use. Low response rates are a common problem for research in assessing drinking levels,³⁸ with underestimation and underreporting of current drinking levels likely being the rule rather than the exception. This is particularly true for groups like air traffic controllers, pilots, physicians, active duty military personnel, police officers, and others who may be concerned about damaging their careers by disclosing current alcohol and drug use, even with stringent safeguards and assurances of confidentiality.

Clearly, more research is needed to delineate the patterns and predictors of alcohol use in police officers. In order to disentangle cause and effect relationships obscured in cross-sectional studies, such as work stress related gender differences in drinking patterns, we require prospective studies of police academy recruits as they enter police service, coupled with longitudinal designs permitting repeat assessments during police service in addition to surveying drinking behavior prior to joining the police force. The current findings strongly suggest that alcohol use in female officers is as an area for future study. The present study also underscores the importance of education, screening, and early intervention to help police officers manage work environment stressors and general psychiatric distress, in order to minimize their reliance on alcohol to cope with the formidable challenges of a high-risk occupation.

Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

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APPENDIX

Substance Use Inventory

INSTRUCTIONS: This questionnaire asks about how often you use alcohol or other drugs. If you have not used some of these drugs at all during the time period specified, please write “0”.

1. **IN THE PAST 7 DAYS**, how many cigarettes have you smoked per day?
2. **IN THE PAST 7 DAYS**, how many days have you used alcohol?
 - a. How many drinks of alcohol did you usually have in one day?
 - i. (a drink is 12 oz. beer, 4 oz. wine, 1 oz. liquor)
3. **IN THE PAST 30 DAYS**, what is the maximum number of drinks you had on any one occasion?

DURING THE PAST 30 DAYS, how many days have you used:

4. Marijuana
5. Cocaine
6. Amphetamines
7. Heroin or other opiates
8. Prescription drugs without a doctor's order