



# Associations Between Police Work Stressors and Posttraumatic Stress Disorder Symptoms: Examining the Moderating Effects of Coping

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## Abstract

The role of coping in the association between stress and posttraumatic stress disorder (PTSD) is not clear. We investigated the effects of active and passive coping strategies on the associations between police stress (administrative and organization pressure, physical and psychological threats, and lack of support) and PTSD symptoms in 342 police officers. Linear regression model was used in the analyses. The association between physical and psychological stress and PTSD symptoms was stronger in officers who used lower active coping ( $B = 4.34, p < 0.001$ ) compared to those who utilized higher active coping ( $p_{\text{-interaction}} = 0.027$ ) ( $B = 1.79, p \leq 0.003$ ). A similar result was found between lack of support and PTSD symptoms ( $p_{\text{-interaction}} = 0.016$ ) (lower active coping,  $B = 5.70, p < 0.001$ ; higher active coping,  $B = 3.33, p < 0.001$ ), but was not significantly different comparing the two groups regarding the association between administrative and organizational pressure and PTSD symptoms ( $p_{\text{-interaction}} = 0.376$ ). Associations of total stress, administrative and organizational pressure, and physical and psychological stressors with PTSD symptoms were significantly stronger in officers who utilized higher passive coping ( $p_{\text{-interaction}} = 0.011, 0.030, \text{ and } 0.023$ , respectively). In conclusion, low active or high passive coping methods may exacerbate the effect of work stress on PTSD symptoms.

**Keywords** Coping · Police · Work stress · Posttraumatic stress disorder

## Introduction

As of 2014, there were approximately 807,000 police officers working in 17,985 departments throughout the USA. That number is expected to rise to 860,300 by 2026 (<https://www.bls.gov/ooh/protective-service/police-and-detectives.htm#tab-6>). Police officers are frequently exposed to routine work stressors and additionally to traumatic stress associated with harrowing incidents or situations.

## Distinguishing Routine Stress and Posttraumatic Stress in Police Work

The concept of stress is ambiguous in that exposure and response is contained in a single concept. This conceptual difficulty is a barrier to the study of environmental exposures classified as stressors. This becomes additionally complex when one seeks to distinguish various types of stressors. Such is the case involving “routine” versus “traumatic” police stressors (Lieberman et al. 2002). Traumatic stressors can appear as precursors to posttraumatic stress disorder (PTSD) (DSM-5, American Psychiatric Association 2013) and are sudden and disruptive, while routine stress may be considered chronic, building up cumulatively over time and producing a slow pathologic effect on persons (Miller 2013).

The experience of trauma is highly subjective depending on the person’s interpretation and perception of the incident (Weinberg and Gil 2016). However, the DSM-5 distinguishes PTSD from routine stress by defining it as “direct exposure to an event involving death, threatened death, serious personal

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injury or sexual violence” (DSM-5, American Psychiatric Association 2013). This is conceptually different from chronic routine stress in police work, which is based on other work-related factors. For example, lack of supervisor and coworker support, psychological and physical job demands, job insecurity, insufficient pay, and excessive paperwork have all been reported by officers. Police officers report that shift work and overtime are among the most difficult requirements of their job (Arter 2012; Liberman et al. 2002; Miller 2013; Pasillas et al. 2006; Shane 2010; Spielberger et al. 1981; Violanti et al. 2015). Added to this array of occupational exposures is the recent public loss of confidence in police integrity (President’s Task Force on Policing 2015).

### Associations Between Work Stressors and PTSD

Previous work has found an association between work stressors and PTSD. Liberman et al. (2002) found that officers who reported more work stressors also reported higher PTSD symptoms. In an analysis adjusting for gender, prior trauma, life events, and trauma exposure, Maguen et al. (2009) found that routine work stress was strongly associated with PTSD symptoms. Brough (2004) found that organizational and traumatic stress reactions were equally predictive of psychological strain but that organizational stressors predicted job satisfaction to a far greater extent than did trauma symptomatology. Carlier et al. (1997) found that dissatisfaction with organizational support correlated with the avoidance subscale of PTSD symptoms.

Organizational stressors which include the organizational setting or design (e.g., management-autonomy, flexibility, participation in decision making) may be a greater source of stress for police officers as they represent daily routines. However, they are less studied compared to operational stressors which dominate the literature. A recent study of police officers showed that two specific organizational stressors “fellow officers not doing their job” and having “inadequate or poor quality equipment” were among the top five of 60 most frequently occurring stressors (Violanti et al. 2006). A more detailed examination of the impact of operational versus organizational stressors on police performance (Shane 2010) showed that 45% of the variance in police performance is attributable to organizational stressors and the mean scores of organizational stressors were significantly higher compared to mean scores of operational stressors. A recent systematic review also revealed similar findings of the impact of organizational stressors on job stress and burnout (Finney et al. 2013).

Additionally, these findings suggest a theoretical theme in the development of PTSD. Rubin, Berstsen, and Bohni (2008) as well as Szabo, Warnecke, Newton, and Valentine (2017) suggest that the development of PTSD is based on memory associated not only with the traumatic event itself but also

with other stressful events not considered traumatic. This model suggests that many events perceived as stressful come together in memory to increase the risk for PTSD, as opposed to the cognitive model which is based primarily on the specific traumatic event (Ehlers and Clark 2000).

Traumatic events experienced by officers at work may lead to PTSD symptoms including re-experiencing the trauma, avoidance of reminders of the experience, negative cognitions and mood, arousal, sleep problems, and self-destructive behavior (DSM-5, American Psychiatric Association 2013). The development of PTSD is dependent on several dynamics. Certain factors such as social support subsequent to the trauma, individual resiliency, and post-trauma growth have been found reduce the risk of PTSD (Andrew et al. 2013; McCanlies et al. 2014; Paton and Norris 2014; Tedeschi and Calhoun 1996; Violanti 2014). Post-trauma growth describes a positive change that occurs in one’s life following a traumatic event (Lindstrom et al. 2013; Tedeschi and Calhoun 2011). Tedeschi and Calhoun (1996) suggest that growth occurs as a result of a changing world view following a traumatic event making one more resistant to future trauma (Lindstrom et al. 2013; Tedeschi and Calhoun 2011).

Conversely, peritraumatic experiences, prior trauma, and multiple traumatic experiences have been found to exacerbate PTSD risk (Marmar et al. 2006; McCanlies et al. 2014). PTSD rates in officers have been reported to be as low as 7% and as high as 19% (Carlier et al. 1997; Maia et al. 2007; Schutte et al. 2012; Violanti 2014).

The type of coping used by officers may be an important moderator of the association between routine police stress and PTSD symptoms in officers. The dominant approach used in stress research is based on the view that coping buffers the negative effects of stress on psychological well-being (Coyne and Downey 1991). The function of coping is to reduce stress and to adjust to negative environmental situations (Cohen and Lazarus 1979; Zeidner and Saklofske 1996). In this theoretical orientation, coping serves as a stressor-stress moderator and can change cognitive and behavioral efforts to reduce stress appraised as exceeding the person’s resources (Folkman and Lazarus 1991; Zeidner and Saklofske 1996). Coping affects outcomes through its impact on the characteristics of the stressor (Zeidner and Hammer 1990). Efficacious coping styles are important when dealing with stress and trauma. Previous work has shown that police officers often lack active coping styles, such as positive reframing and problem solving (Evans et al. 1993; Hart et al. 1995), and tend to rely more on passive coping, such as alcohol use and avoidance (Amaranto et al. 2003). Carver (1997) made a distinction between active and passive coping. Active coping styles are used to bring about change in the stressor, whereas passive coping styles are based more on maladaptive behavioral responses to the stressor (Lazarus 1993). Passive coping is generally not conducive to reducing stress or trauma (Arnetz et al. 2012).

Ménard and Arter (2013) suggest that police officers' psychological well-being is not solely related to the type of trauma but also to the coping methods and social support available to deal with them. Other factors may affect the choice of coping style. These authors found that officers with less experience may not have developed the appropriate coping skills to deal with the hazards of policing. The style of coping may therefore depend strongly on the situation encountered (Zeidner and Saklofske 1996). Webster (2013) suggests that in policing, it is the interaction of an individual's perception and the reality of the environment that shapes the experience of stress and the officer's ability to make a coping decision.

Anshel's (2001a, b) model of stress in law enforcement suggested that since police experience such a wide variety of stressors in their work, they must first make sense of the stressor and then decide which style of coping to use. The present study examined the potential moderating effects of coping on the association between police work stress and PTSD symptoms. We hypothesized that certain styles of coping, identified as active or passive by the Brief COPE scale (Carver 1997), will moderate this association differently. Three major categories of routine police work stress were included: administrative and organizational pressure, physical and psychological threats, and lack of support (Spielberger et al. 1981).

## Method

### Procedure

The data for the present cross-sectional study were from the Buffalo Cardio-Metabolic Occupational Police Stress (BCOPS) study, an ongoing longitudinal study with the primary focus of assessing whether police work-related stress was associated with subclinical cardiovascular diseases and metabolic outcomes. Active duty police officers from a large northeastern US police department ( $n = 710$ ) were invited to participate. Of those invited, 464 participants were examined between 2004 and 2009. Comparisons between the study population ( $N = 464$ ) and the target population ( $N = 710$ ) have been reported in a previous Buffalo Cardio-Metabolic Occupational Police Stress study (Hartley et al. 2011). The frequency distribution for age was 26.3 versus 28% older than 45 years, for sex was 26 versus 23% women, and for rank was 72 versus 71% patrol officers. The first follow-up study has been completed between 2010 and 2014 and the second follow-up is ongoing. Detail information on the BCOPS study design, objectives, study protocol, and data quality control has been described in the pilot study (Violanti et al. 2006). Briefly, the Center for Preventive Medicine, State University of New York at Buffalo, School of Public Health and Health Professions, Buffalo, NY, serves as the data collection site.

Self-reported data collection was administrated by trained staff, and clinical examinations or tests were performed following standard procedures in the protocol. The study was approved by the State University of New York at Buffalo Internal Review Board and the National Institute for Occupational Safety and Health Human Subjects Review Board.

### Participants

The data collected from the baseline (2004–2009) study ( $N = 464$ ) were used for the present analyses. Participants with incomplete data ( $n = 122$ ) were excluded, leaving a final sample size of  $n = 342$  (246 men, 96 women) for the present cross-sectional analyses. The participants excluded from analyses ( $n = 112$ ) were 28 retirees before examination and 94 officers with missing values for the Spielberger Stress Survey or the PCL-C screening. Of these 94 with missing data, 19 were new recruits who were still attending the police academy and therefore not eligible for completing the Spielberger Stress Survey. In addition, the PCL-C screening was added to the study after 41 officers had already completed all examinations, so these officers did not have an opportunity to respond to the PCL-C. This leaves only 34 officers who had incomplete responses to either the PCL-C or the Spielberger Police Stress Survey. We compared the characteristics between participants and nonparticipants and found that the participants who were included in the present analyses were younger, were more women, reported drinking less alcohol, had fewer years of police service, were more likely lower ranked, and were more likely to report smoking cigarettes, when compared with nonparticipants.

### Measures

Police stress was assessed using the Spielberger Police Stress Survey (Spielberger et al. 1981). This survey is a 60-item self-report questionnaire designed to assess acute and chronic stress in police officers. Each participant provided a rating of 1 to 100 for self-perceived severity for each of the 60 items (the higher the score, the more stressful the event was perceived) and estimated the frequency they experienced that event in the past year and past month. Spielberger and colleagues divided the 60 items into three stress subscales, i.e., administrative and organizational pressure (23 items), physical and psychological threats (24 items), and lack of support (13 items) using factor analysis. The administrative and organizational pressure-related stressors are public attitudes toward police officers, ineffectiveness of judicial system, effort-reward imbalance, etc. The physical and psychological threat-related items are dealing with death, injury, shooting and killing, insult from the public, etc. The lack of support-related stressors is political pressures and inadequate support within and outside the police department and strained

relationships with police and non-police friends. The frequency of each item was originally recorded as 0, 1, 2–5, 6–10, 11–24, and 25+ times in the past year and was converted into a continuous version with values of 0, 1, 3.5, 8, 17.5, and 25 in the present analyses. A stress index score was computed for the total stress and each subscale by averaging the products of the stress rating and frequency of occurrence in the past year for each item. These subscales were also used in the present study to examine whether the subscales were associated with PTSD. Martelli et al. (1989) found the Police Stress Survey to be valid and reliable and to differentiate between overall stress and organizational and physical/psychological danger with internal consistency reliabilities in the 1990s for both the total and subscales. In the present study, the Spielberger Police Stress Survey had a similar high internal consistency (the Cronbach's alpha = 0.98).

PTSD symptoms were assessed using the PTSD Checklist-Civilian version (PCL-C) developed by Weather and colleagues (Weathers et al. 1993). The PCL-C is a 17-item self-report rating scale instrument. Each item is assessed on a 5-point scale with values of 1 (not at all) to 5 (extremely) that refer to the degree to which they have been bothered by particular stressful life experiences occurring in the past month (e.g., repeated, disturbing memories, thoughts or images of stressful experiences). A PCL-C total score is obtained by summing the ratings of the 17 items. The PCL-C is a valid and reliable measure of PTSD with high internal consistency and good retest reliability (Conybeare et al. 2012).

The Brief COPE (Carver 1997), a 28-item questionnaire, was used to assess how police officers had been coping with stress in their lives. The rationale for using this instrument for the BCOPS study has been described previously (Andrew et al. 2013). Each item is evaluated at four levels from 1 to 4 (1 = I have not done this at all, and 4 = I have done this a lot) and was recoded from 0 to 3 for this study. The 28 items are collapsed into 14 subscales, with each subscale consists of two items to measure a particular positional coping style, i.e., active coping, planning, positive reframing, acceptance, humor, religion, using emotional support, using instrumental support, self-distraction, denial, venting, substance use, behavioral disengagement, and self-blame. Each subscale is computed by adding the scores of the two items. Three summary scales including active coping, passive coping, and support seeking were derived from a factor analysis presented in a previous study (Andrew et al. 2013). The score of active coping summary scale was the average of four subscale scores of acceptance, active coping, positive reframing, and planning. The score of passive coping summary scale was the average of behavioral disengagement, denial, self-blame, and venting. The score of support seeking summary scale was the average of the subscale scores of instrumental support and emotional support. These summary scales had good internal consistency with alpha coefficients ranging from 0.78 to 0.80 in the

present study. Additional demographic, lifestyle, and psychosocial characteristics were obtained from self-reported and interviewer-administered questionnaires. Alcohol consumption was derived from a dietary history and was expressed as number of drinks per week.

## Statistical Methods

Descriptive statistics were used to describe the study population. Tertiles were created for the mean indices for the total and three subscales of police stress (administrative and organizational pressure, physical and psychological threats, and lack of support). Analyses of variance (ANOVA) and covariance (ANCOVA) were used to estimate unadjusted and multivariable-adjusted mean values of the PCL-C total score across tertiles of the stress indices for descriptive purposes only and not for statistical inferences. Stress indices were transformed into standard scores (*z*-scores) and expressed as standard deviations from the mean. Age, gender, race/ethnicity, smoking, and alcohol consumption were included as potential confounders in the multivariable-adjusted models, based on the literature and/or their associations with stress and PCL-C total scores. For statistical inferences, simple and multiple regression models were fit to calculate regression coefficients beta (*B*) along with the standard error (SE) for beta and the reported *p* values for the relationship of total stress and stress subscales as continuous variables with PCL-C total score. Stratified analyses using the same simple and multiple regression models were performed for the three coping styles, but the significant moderations of active coping and passive coping were reported. The three coping style variables were dichotomized using their median values ( $\leq$  median vs.  $>$  median) to allow adequate sample size in each stratum. Similar stratified analyses were performed for men and women separately except that the variable sex was removed from the multiple linear regression models. Interactions were tested for continuous stress variables with dichotomized coping variables and with continuous coping variables in multiple regression models. The *p* values for the interactions involving continuous stress variables and dichotomized coping variables were reported. Statistical significance of a test was set at  $p < 0.05$ . All analyses were conducted using SAS 9.2 (SAS Institute, Cary, NC).

## Results

Demographic, psychosocial, and lifestyle characteristics of the study populations are presented in Table 1. Overall, about 89% of study participants had at least some college-level education. The majority were white (78%), patrol officers (75%), and nonsmokers (82% including never and former smokers). Male officers had lower prevalence of college-

**Table 1** Demographic, psychosocial, and lifestyle characteristics of the officers by gender, BCOPS study (*N* = 342)

Characteristic	Total ( <i>N</i> = 342)	Female ( <i>n</i> = 96)	Male ( <i>n</i> = 246)	<i>p</i> value
	Mean (SD)	Mean (SD)	Mean (SD)	
Age (years)	40.9 (6.6)	40.7 (6.1)	41.0 (6.8)	0.707
Alcohol (drinks/week)	4.9 (7.6)	3.7 (6.2)	5.3 (8.0)	0.051
Police service (years)	14.3 (6.7)	13.3 (6.2)	14.7 (6.8)	0.091
Coping				
Active coping	3.9 (0.9)	4.0 (0.9)	3.9 (0.9)	0.361
Passive coping	1.7 (0.8)	1.8 (0.7)	1.6 (0.8)	0.035
Spielberger Police Stress				
Total stress index score	310.5 (243.2)	319.8 (254.1)	306.8 (239.3)	0.656
Administrative and organizational pressure	337.1 (289.0)	335.7 (293.0)	337.7 (288.0)	0.955
Physical and psychological threats	305.1 (240.3)	323.0 (251.0)	298.1 (236.1)	0.389
Lack of support	272.7 (270.4)	284.8 (279.5)	267.9 (267.2)	0.604
PCL-C total score	26.2 (8.8)	26.9 (9.2)	26.0 (8.7)	0.386
	%	%	%	
Education				
High school/GED	11.3	4.2	14.1	0.030
College < 4 years	56.1	63.2	53.3	
College ≥ 4 years	32.6	32.6	32.6	
Race/ethnicity				
White/Hispanic	78.4	72.6	80.2	0.103
African American	21.6	27.4	19.8	
Rank				
Patrol officer	75.2	81.1	72.8	0.245
Sergeant/lieutenant	12.1	10.5	12.8	
Captain/detective/other executives	12.7	8.4	14.4	
Smoking status				
Current	17.9	28.3	14.0	< 0.001
Former	21.8	28.3	19.3	
Never	60.3	43.5	66.7	

*p* values for the difference between men and women were from chi-square for categorical variables and from *T*-test for continuous variables

BCOPS, Buffalo Cardio-Metabolic Occupational Police Stress; PCL-C, Post-traumatic Stress Checklist-Civilian version

level education and smoking compared with their female counterparts.

Table 2 shows the unadjusted associations between the stress scale and subscales and select descriptive characteristics. Age was negatively and significantly associated with physical and psychological threats. Length of police service was negatively and significantly associated with both the administrative and organizational pressure and physical and psychological threat stress subscales. Passive coping strategy was positively and significantly associated with the total and all three stress subscales. White officers had significantly higher stress scores (both total and subscales of stress) compared with their African American colleagues.

The total Spielberger stress score was significantly and positively associated with PCL-C total score independent

of demographic and lifestyle factors (Table 3). One standard deviation increase in the total stress index score was associated with a four-unit increase in the PCL-C total score ( $B = 3.86, p < 0.001$ ). Similar associations were observed between each of the three stress subscales and PCL-C total score:  $B = 3.43 (p < 0.001)$  for administrative and organizational pressure;  $B = 3.03 (p < 0.001)$  for physical and psychological threats; and  $B = 4.50 (p < 0.001)$  for lack of support.

Table 4 and Fig. 1 show the associations between stress indices and PCL-C total score stratified by active and passive coping styles. The test for interaction between the physical and psychological threat stress subscale and active coping style was statistically significant ( $p_{\text{interaction}} = 0.027$ ) in the multivariable-adjusted model. The positive association

**Table 2** Unadjusted associations of Spielberger stress index over past year with selected characteristics, BCOPS study (*N* = 342)

Characteristics	Total stress index score	Subscale stress index		
		Administrative and organizational pressure	Physical and psychological threats	Lack of support
Age (years)	− 0.09 (0.107)	− 0.10 (0.054)	− 0.11 (0.039)	0.02 (0.758)
Alcohol (drinks/week)	0.09 (0.111)	0.09 (0.109)	0.11 (0.040)	0.01 (0.826)
Police service (years)	− 0.11 (0.051)	− 0.11 (0.039)	− 0.16 (0.004)	0.03 (0.617)
Coping				
Active coping	− 0.01 (0.919)	− 0.02 (0.707)	− 0.004 (0.927)	0.02 (0.655)
Passive coping	0.36 (< 0.001)	0.34 (< 0.001)	0.30 (< 0.001)	0.36 (< 0.001)
Education				
High school/GED	231.9 (207.1)	237.0 (251.2)	223.1 (169.3)	238.0 (274.8)
College < 4 years	317.9 (258.1)	346.2 (301.2)	313.1 (257.1)	277.1 (289.8)
College ≥ 4 years	331.0 (226.6)	364.7 (277.4)	326.5 (226.9)	278.3 (235.2)
<i>p</i> value	0.087	0.059	0.064	0.699
Sex				
Females	319.8 (254.1)	335.7 (293.1)	323.0 (250.9)	284.8 (279.5)
Males	306.8 (239.3)	337.7 (288.0)	298.1 (236.1)	267.9 (267.2)
<i>p</i> value	0.656	0.955	0.389	0.604
Race/ethnicity				
White/Hispanic	341.8 (240.4)	375.2 (287.6)	334.9 (239.6)	294.9 (271.0)
African American	212.5 (233.8)	219.2 (270.3)	213.6 (222.3)	198.3 (262.7)
<i>p</i> value	< 0.001	< 0.001	< 0.001	0.007
Rank				
Patrol officers	315.7 (251.6)	341.3 (298.1)	317.9 (246.5)	266.0 (269.5)
Sergeant/lieutenant	329.7 (224.5)	362.6 (268.9)	325.1 (240.4)	278.9 (208.9)
Captain/detective/other executives	271.2 (215.2)	303.9 (261.8)	221.6 (185.4)	304.2 (328.6)
<i>p</i> value	0.479	0.634	0.045	0.685
Smoking status				
Current	413.8 (277.8)	460.6 (307.4)	402.1 (270.3)	352.9 (345.3)
Former	292.4 (227.7)	311.8 (275.9)	276.9 (223.5)	287.3 (250.2)
Never	291.6 (232.8)	316.7 (282.3)	291.2 (232.0)	246.9 (248.8)
<i>p</i> value	0.002	0.002	0.003	0.026

Values are Pearson correlation coefficients and *p* value for continuous variables and means and standard deviations for categorical variables  
 BCOPS; Buffalo Cardio-Metabolic Occupational Police Stress

**Table 3** Association of Spielberger stress index score and PCL-C total score in police officers, BCOPS study (*N* = 342)

Spielberger stress index score	<i>N</i>	PCL-C total score	
		Unadjusted	Adjusted <sup>†</sup>
Total stress			
[0–157.02]	114	22.43 (6.86)	22.71 (0.81)
[159.21–371.38]	114	25.66 (6.99)	25.46 (0.78)
[371.53–1195.42]	114	30.64 (10.24)	30.38 (0.78)
β (SE)		3.99 (0.43)	3.86 (0.44)
<i>p</i> value		< 0.001	< 0.001
Subscale			
Administrative and organizational pressure			
[0–147.93]	114	23.20 (7.35)	23.37 (0.83)
[148.70–389.46]	114	25.28 (6.55)	25.30 (0.79)
[390.67–1508.15]	114	30.25 (10.58)	29.91 (0.79)
β (SE)		3.52 (0.44)	3.43 (0.45)
<i>p</i> value		< 0.001	< 0.001
Physical and psychological threats			
[0–155.00]	114	23.32 (7.70)	23.61 (0.82)
[155.11–372.19]	115	25.15 (6.54)	25.22 (0.80)
[372.39–1210.00]	113	30.31 (10.37)	29.82 (0.81)
β (SE)		3.30 (0.44)	3.03 (0.46)
<i>p</i> value		< 0.001	< 0.001
Lack of support			
[0–110.77]	114	21.86 (4.29)	21.84 (0.77)
[110.91–286.73]	114	26.54 (8.73)	26.46 (0.77)
[288.46–1408.69]	114	30.33 (10.22)	30.35 (0.76)
β (SE)		4.55 (0.42)	4.50 (0.41)
<i>p</i> value		< 0.001	< 0.001

PCL-C; Post-traumatic Stress Checklist-Civilian version; BCOPS, Buffalo Cardio-Metabolic Occupational Police stress; SE, standard error

<sup>†</sup> Adjusted for age, sex, race/ethnicity, smoking status, and alcohol consumption

**Table 4** Associations between Spielberger index score over past year and PCL-C total score stratified by coping styles, BCOPS study ( $N = 342$ )

Spielberger stress index score	Active coping (median = 3.75)					Passive coping (median = 1.50)				
	≤ Median ( $n = 169$ )		> Median ( $n = 167$ )		Interaction $p$ value	≤ Median ( $n = 171$ )		> Median ( $n = 162$ )		Interaction $p$ value
	$\beta$ (SE)	$p$ value	$\beta$ (SE)	$p$ value		$\beta$ (SE)	$p$ value	$\beta$ (SE)	$p$ value	
<b>Total stress</b>										
Unadjusted	4.73 (0.61)	<0.001	3.10 (0.60)	<0.001	0.058	2.07 (0.38)	<0.001	4.20 (0.71)	<0.001	0.010
Adjusted <sup>†</sup>	5.00 (0.67)	<0.001	2.68 (0.60)	<0.001	0.057	2.14 (0.41)	<0.001	3.88 (0.75)	<0.001	0.011
<b>Subscale</b>										
<b>Administrative and organizational pressure</b>										
Unadjusted	3.88 (0.64)	<0.001	2.96 (0.61)	<0.001	0.298	1.81 (0.39)	<0.001	3.67 (0.72)	<0.001	0.029
Adjusted	4.02 (0.70)	<0.001	2.62 (0.62)	<0.001	0.376	1.89 (0.42)	<0.001	3.33 (0.78)	<0.001	0.030
<b>Physical and psychological threats</b>										
Unadjusted	4.20 (0.65)	<0.001	2.34 (0.59)	<0.001	0.035	1.64 (0.37)	<0.001	3.54 (0.75)	<0.001	0.025
Adjusted	4.34 (0.72)	<0.001	1.79 (0.60)	0.003	0.027	1.66 (0.40)	<0.001	3.11 (0.79)	<0.001	0.023
<b>Lack of support</b>										
Unadjusted	5.50 (0.59)	<0.001	3.56 (0.61)	<0.001	0.024	2.80 (0.42)	<0.001	4.35 (0.65)	<0.001	0.069
Adjusted	5.70 (0.61)	<0.001	3.33 (0.59)	<0.001	0.016	2.85 (0.45)	<0.001	4.27 (0.66)	<0.001	0.108

$\beta$  = regression coefficient, the increase in PCL-C total score related to one standard deviation of increase in stress index score

PCL-C, Post-traumatic Stress Checklist-Civilian version; BCOPS, Buffalo Cardio-Metabolic Occupational Police Stress; SE, standard error

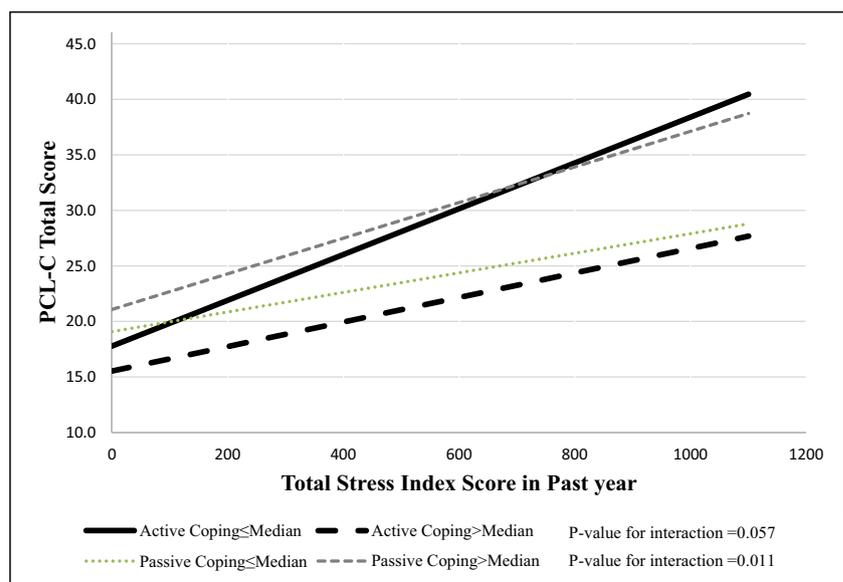
<sup>†</sup> Adjusted for age, sex, race/ethnicity, smoking status, and alcohol consumption

between this subscale and PCL-C was stronger in police officers who had a lower active coping score ( $B = 4.34, p < 0.001$ ) compared to those with a higher active coping score ( $B = 1.79, p = 0.003$ ). Similarly, a stronger multivariable-adjusted association between the lack of support and PCL-C was observed in the officers with a lower active coping score ( $B = 5.70, p < 0.001$ ) compared with those having a higher active coping score ( $B = 3.33, p < 0.001$ ). This difference in strength of association was reflected in the corresponding test for

interaction ( $p_{\text{interaction}} = 0.016$ ). A stronger association between administrative and organizational pressure and PCL-C in officers having a lower active coping score was not observed ( $p$  value for the interaction was 0.376).

The multivariable-adjusted associations of stress indices (total, administrative and organizational pressure, and physical and psychological threats) with PCL-C score were significantly stronger in officers who had a higher passive coping score than in those having a lower

**Fig. 1** Modification effects of active and passive coping skills on the multivariable-adjusted association between overall stressors and PTSD. Adjustments included age, sex, race/ethnicity, smoking status, and alcohol consumption. PCL-C, Post-traumatic Stress Checklist-Civilian version



passive coping score (Table 4). The magnitude of the differences in these associations was statistically significant ( $p_{\text{-interaction}} = 0.011, 0.030, \text{ and } 0.023$ , respectively) except the nonsignificant difference in the association between lack of support stress subscale and PCL-C (interaction  $p$  value = 0.108). Effect modification of active and passive coping styles in the stress-PTSD associations is depicted in Fig. 1.

The multivariable-adjusted analyses stratified by the median values of active and passive coping scores were reported separately for women and men. Among women, active coping style significantly modifies the association between lack of support stress subscale and PCL-C total score ( $p_{\text{-interaction}} = 0.044$ ). The positive association between lack of support and PCL-C score was stronger in officers who had a higher active coping score in than those having a lower active coping score. The passive coping style did not significantly modify the associations of total stress and any stress subscale with PCL-C total score.

Among men, the interaction tests were significant for active coping with total stress ( $p_{\text{-interaction}} = 0.033$ ), with physical and psychological threat stress subscale ( $p_{\text{-interaction}} = 0.027$ ), and with lack of support stress subscale ( $p_{\text{-interaction}} = 0.026$ ). The positive associations of total stress, physical and psychological threat stress subscale, and lack of support stress subscale with the PCL-C total score were stronger among officers having a lower active coping score than among those having a higher active coping score. The interaction tests were also significant for passive coping style with total stress ( $p_{\text{-interaction}} = 0.033$ ), administrative and organizational pressure stress subscale ( $p_{\text{-interaction}} = 0.027$ ), and physical and psychological threat stress subscale ( $p_{\text{-interaction}} = 0.026$ ). The positive associations of the total stress and the stress subscales with the PCL-C total score were stronger in officers who had a higher passive coping score than in those having a lower passive coping score.

## Discussion

The present study examined the association between police work stress and PTSD symptoms and the effect moderations of active and passive coping styles on this association. The total police stress score and each stress subscale were positively and significantly associated with PTSD symptoms after adjustment for age, gender, race/ethnicity, smoking status, and alcohol consumption. This result is consistent with that of Liberman et al. (2002) who found that police officers reporting more work stress also reported higher PTSD symptoms.

Active and passive styles of coping affected the association of work stress and PTSD symptoms differently. The association was significantly stronger among officers with lower active coping scores compared to officers with higher active

coping scores, and among officers having higher passive coping scores compared to lower passive coping scores. This result suggests that higher use of active but not passive coping helps to ameliorate this association. Higher use of passive coping (combination of behavioral disengagement, denial, self-blame, and venting) resulted in significantly stronger multivariable-adjusted associations between work stress (total, administrative and organizational pressure, and physical and psychological threats) and PTSD symptoms. The present results concur with previous findings, which suggest that active coping is more effective in ameliorating stress and passive coping may worsen the stressful situation (Carver 1997; Holahan and Moos 1987; Kring and Werner 2004).

The style of coping used in specific categories of work stress was interesting. The test for interaction between the physical and psychological threats and active coping style in the association with PTSD symptoms was statistically significant ( $p_{\text{-interaction}} = 0.027$ ) in the multivariable-adjusted model. The association between physical and psychological threat-induced work stress and PTSD symptoms was 2.4 times stronger in police officers who had a lower active coping score than in those having a higher active coping score. Thus, the use of active coping (combination of active acceptance, positive reframing, and planning) lessened the association of PTSD symptoms with dangerous physical and psychological threats in this sample of police officers. This result is interesting because dangerous situations in police work often involve traumatic situations, which can lead to PTSD symptoms or clinical PTSD. Higher use of active styles of coping found in this study supports the need for education and training in this kind of coping to help reduce the risk of PTSD in officers.

The association between lack of support at work and PTSD symptoms was also lowered by higher active styles of coping ( $B = 3.33, p < 0.001$ ) versus lower active styles ( $B = 5.70, p < 0.001$ ) suggesting that if officers who do not employ higher levels of active coping responses in response to lack of support may have increased PTSD symptoms. The lack of perceived support is one of the greatest risk factors for PTSD (Dougall et al. 2001; Ozer et al. 2003; Robinough et al. 2011). The presence of “negative social interactions” and poor quality of social interaction may be a stronger predictor of PTSD (Robinough et al. 2011). In line with this, police officers frequently comment that the police organization is unsupportive and that interactions are generally negative between line officers and administration (Violanti et al. 2006). Under such conditions, low active or high passive coping may worsen the effect of this work stress on PTSD (Carlier et al. 1997; Violanti et al. 2015).

Although our study suggests that a higher use of active coping works best for ameliorating PTSD symptoms associated with work stressors, it is not always possible to

definitively state that one style of coping works better than another due to the variety of situations encountered by police officers.

## Gender Differences

Overall, the effects of coping on the associations of total stress and stress subscales with PTSD symptoms were different in men and women in our study sample. Active coping significantly modified the associations of total stress, physical and psychological threats, and lack of support with PTSD symptoms in men but only significantly modified the association between lack of support and PTSD symptoms in women. Passive coping significantly modified the associations of total stress, administrative and organizational pressure, and physical and psychological threats in men but not in women. These results are consistent to those of previous research, which contends that while male and female officers may experience similar exposure to police stressors, the way in which they cope is different (Haarr and Morash 1999; He et al. 2002).

Other research has suggested that female officers were more likely to be married and report lower levels of stress because of the ready availability of close family support mechanisms (Patterson 2003). Studies on gender differences in coping stress are inconsistent. In the present study, female officers appear to use less effective types of coping with the stress (passive coping), but Taylor et al. (2000) concluded that women are more likely to “tend and befriend” than men, thus bringing into play a creation of social support networks to help protect against stress. According to Martin (1999), female officers have difficulty coping with stress in terms of “emotional labor” brought about by the male police culture. Coping strategies used by male police such as behavioral expectations, cultural formalities, humor, and off-duty social activities often place female officers in a coping dilemma.

Despite the theoretical separation of routine stress and trauma, distinctions remain suspect in police work. It is important to consider inter-individual differences in perceived stress and trauma. Stratton et al. (1984) reported that approximately one third of their sample of officers who had been involved in a shooting incident did not report this as being psychologically traumatic, one third found it to be slightly traumatic, and the final one third found it as being highly traumatic. The latency of a PTSD symptom onset and progression may vary by individuals. It has been reported from days to weeks following a traumatic event in general population (Iribarren et al. 2005). However, the police officers in the present study encounter physical and psychological threats (many are traumatic) on the daily or monthly basis. Therefore, obtaining the lag time of a PTSD symptom after being exposed to one event will be challenging. In addition, the lag time for a PTSD symptom onset following non-traumatic stressful events is not clear in the literature.

We did not empirically measure the influence of the informal police culture as it affects emotional responses of police officers to stress and trauma. We have instead focused on individual coping strategies. This may limit our results somewhat. However, other studies have found that the police culture can develop the social construction of emotion in officers when dealing with fearful exposures (Frewin et al. 2006; Pogrebin and Poole 1991). According to Wood (2004), police cultural influences of emotions are unique to police work. Similarly, Howard et al. (2000) proposed that the cultural aspects of policing construct emotions in such a way as to increase self-preservation. Such findings suggest that the informal police culture may directly or indirectly act as a coping strategy for officers. Dependence on culturally induced regulation of fear emotions may not be entirely synergistic with individual coping. Officers who rely on the culture to cope with stress and trauma are less likely to seek professional help in cases where their mental well-being is affected. Additionally, organizationally based programs, such as psychological debriefings, are not particularly endorsed by the police culture (Frewin et al. 2006). In time, the increased dependency on culturally based coping may take its psychological toll on officers (Progrebin and Poole 1991). As a result, many officers suffering from exposure to stress and trauma may not get the help that they need.

In sum, the results of this study suggest that work stress is significantly correlated with PTSD symptoms and that the choice of coping style is an essential skill that police officers should have to deal with array of stressors, namely more active and less passive styles.

The relevance of our results lies in the ability of both officers and police organizations to reduce stress to levels that can be effectively coped with. While inherent stress associated with danger is not possible to change, it is possible to reduce stress at the organizational level. This can be accomplished through various mechanisms. Our findings first suggest that training in coping styles should be included in police wellness programs at the basic academy and periodically at the in-service levels. Additionally, training should focus on recognition of life events outside of policing which may also increase stress (Patterson 2003). Marchand et al. (2015) suggested that police organizations could include training programs in coping strategies, especially more active styles. Arnetz et al. (2012) in a longitudinal police stress and trauma reduction intervention found significant changes in coping strategies from pre-training to 1-year follow-up. Coping strategies considered adaptive, such as active coping, positive planning, increased and maladaptive coping, such as self-blame, decreased over time.

In addition to training, organizational support in a psychological sense is crucial in helping officers deal with stressful and traumatic events. The police organization influences individual officers and can change pathogenic to adaptive

reactions. With increased organizational support, stressful events can lead officers to cope positively based on their own capabilities and available organizational support networks. Biggs and Brough (2017) have suggested that adopting a positive, supportive, and psychologically safe workplace is likely to facilitate stress management. Increasing officer resilience to stress through organizational support can help to ameliorate the effects of stress and provide additional resources for coping (Paton et al. 2003; Siebert 2002).

There are two important organizational aspects which help officers cope with job stress. First, empowerment within the context of the organization can act in promoting the ability to cope adaptively with stress. Empowerment is usually developed in work situations through processes of decision-making participation and delegation (Conger and Konungo 1988). Secondly, trust in supervisors and the organization when dealing with stress and trauma has been identified as a predictor of officer's ability to cope effectively with complex, high-risk events (Siegrist and Cvetkovich 2000).

Organizational support and the officer's ability to cope with stress are even more important in the present policing environment. As Brough et al. (2016) point out, lack of funding, reduced personnel, and the changing nature of policing have all contributed to the increased risk of psychological injury among officers. The present study may help in some small way police organizations and officers have better understand the need for support and enhancing their ability to cope with stress in this difficult occupation.

### Study Strengths and Limitations

The strengths of this study include a high response rate, use of standardized protocol and measures, and investigation of an occupation considered highly exposed to stress and trauma. However, there are several limitations. The study was cross-sectional and it is not possible to determine direction of the association or to imply causation. Assessment of stressors, PTSD symptoms, and coping strategies were obtained by self-report. As such police officers may be hesitant to report symptoms of PTSD or coping styles. Additionally, coping often is not readily identified from observable behaviors (Dewe and Guest 1990). The present results are from a single urban mid-sized police agency and may not be generalizable to other police departments of different geographic location and size.

This study suggests that the ability of officers to cope actively with work stress helps to reduce the risk of PTSD. Given that officers are generally exposed to both types of stress—work and traumatic stress—it is important that training early in the police career includes methods and strategies of coping. Teaching police recruits how to cope actively with situations will not only help them to do their work more

effectively but also enhance their psychological well-being under situations of daily and traumatic encounters. For officers who may tend to depend on passive styles of coping, awareness of those coping strategies and how one might change them is also an important topic for training. All of this is essential in today's policing environment.

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### Compliance with Ethical Standards

**Disclaimer** The findings and conclusions in the report have not been formally disseminated by the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, and should not be constructed to represent any agency determination or policy.

**Conflict of Interest** The authors declare that there are no conflicts of interest.

**Ethical Approval** The manuscript meets the required ethics of the journal.

**Informed Consent** Informed consent was obtained from the University at Buffalo, SUNY Internal Review Board and the NIOSH Internal Review Board.

### References

- Amaranto E, Steinberg J, Castellano C, Mitchell R (2003) Police stress interventions. *Br Treat Crisis Interv* 3:47–53
- American Psychiatric Association (2013) Diagnostic and statistical manual of mental disorders, Fifth Edition. American Psychiatric Association, Arlington
- Andrew ME, Mnatsakanova A, Howsare JL, Hartley TA, Charles LE, Burchfiel CM, McCanlies EC, Violanti JM (2013) Associations between protective factors and psychological distress vary by gender: the Buffalo Cardio-metabolic Occupational Police Stress study. *Int J Ment Health Human Resilience* 15:277–288
- Anshel MH (2001a) A conceptual model and implications for coping with stressful events in police work. *Crim Justice Behav* 27:375–400
- Anshel MH (2001b) Qualitative validation of a model for coping with acute stress in sport. *J Sport Behav* 24:223–246
- Arnetz BB, Arble E, Backman L, Lynch A, Lublin A (2012) Assessment of a prevention program for work-related stress among urban police officers. *Int Arch Occup Environ Health* 86:79–88. <https://doi.org/10.1007/s00420-012-0748-6123>
- Arter ML (2012) Applying general strain theory to policing: examining police stress. In: Territo L, Sewell JD (eds) *Stress management in law enforcement*, 3rd edn. Carolina Academic Press, Durham, pp 71–103
- Biggs A, Brough P (2017) The potential benefits of police culture and support and work outcomes among police officers. In: Burke RJ (ed) *Stress in policing: sources, consequences and interventions*. Routledge, New York, pp 309–322
- Brough P (2004) Comparing the influence of traumatic and organizational stressors on the psychological health of police, fire and ambulance officers. *Int J Stress Manag* 11:227–224

- Brough P, Brown J, Biggs A (2016) Toxic environments: occupational stress. In: Brough P, Brown J, Biggs A (eds) *Improving criminal justice workplaces translating theory and research into evidence-based practice*. Routledge, New York, pp 157–166
- Carlier IV, Lamberts RD, Gersons BP (1997) Risk factors for posttraumatic stress symptomatology in police officers: a prospective analysis. *J Nerv Ment Dis* 185:498–506
- Carver CS (1997) You want to measure coping but your protocol's too long: consider the Brief COPE. *Intern J Behav Med* 4:92–100
- Cohen F, Lazarus RS (1979) Coping with the stresses of illness. In: Stone GC, Cohen F, Adler NE, Associates (eds) *Health psychology—a handbook: theories, applications, and challenges of a psychological approach to the health care system*. Jossey-Bass, San Francisco, pp 217–254
- Conger JA, Kanungo RN (1988) The empowerment process: integrating theory and practice. *Acad Manag Rev* 13:471–482
- Conybeare D, Behar E, Solomon A, Newman MG, Borkovec TD (2012) The PTSD Checklist-Civilian Version: reliability, validity, and factor structure in a nonclinical sample. *J Clin Psychol* 68:699–713. <https://doi.org/10.1002/jclp.21845>
- Coyne JC, Downey G (1991) Social factors and psychopathology: stress, social support, and coping processes. *Annu Rev Psychol* 42:401–425
- Dewe PJ, Guest DE (1990) Methods of coping with stress at work: a conceptual analysis and empirical study of measurement issues. *J Organ Behav* 11:135–150. <https://doi.org/10.1002/job.4030110205>
- Dougall AL, Ursano RJ, Posluszny DM, Fullerton CS, Baum A (2001) Predictors of posttraumatic stress among victims of motor vehicle accidents. *Psychosom Med* 63:402–411
- Ehlers A, Clark DM (2000) A cognitive model of posttraumatic stress disorder. *Behav Res Ther* 38:319–345
- Evans BJ, Coman GJ, Stanley RO, Burrows GD (1993) Police officers' coping strategies: an Australian police survey. *Stress Med* 9:237–246
- Finney C, Stergiopoulos E, Hensel J, Bonato S, Dewa CS (2013) Organizational stressors associated with job stress and burnout in correctional officers: a systematic review. *BMC Public Health* 13:1–13. <https://doi.org/10.1186/1471-2458-13-82>
- Folkman S, Lazarus RS (1991) Coping and emotion. In: Monat A, Lazarus RS (eds) *Stress and coping: an anthology*. Columbia University Press, New York, pp 207–227
- Frewin K, Stephens C, Tuffin K (2006) Re-arranging fear: police officers' discursive constructions of emotion. *Pol Soc* 16:243–260. <https://doi.org/10.1080/10439460600811901>
- Haarr RN, Morash M (1999) Gender, race and strategies of coping with occupational stress in policing. *Justice Q* 16:303–336
- Hart PM, Wearing AJ, Healey B (1995) Police stress and well-being: integrating personality, coping and daily work experiences. *J Occup Organ Psychol* 68:133–156
- Hartley TA, Burchfiel CM, Fekedulegn D, Andrew ME, Violanti JM (2011) Health disparities in police officers: comparisons to the U.S. general population. *Int J Emerg Ment Health* 13:211–220
- He N, Zhao J, Archbold CA (2002) Gender and police stress: the convergent and divergent impact of work environment, work-family conflict, and stress coping mechanisms of female and male police officers. *Pol Soc: Int J Police Strateg Manag* 25:687–708
- Holahan CJ, Moos RH (1987) Risk, resistance, and psychological distress: a longitudinal analysis with adults and children. *J Abnorm Psychol* 96:3–13
- Howard C, Tuffin K, Stephens C (2000) Unspeakable emotion: a discursive analysis of police talk about reactions to trauma. *J Lang Soc Psychol* 19:295–314
- Iribarren J, Prolol P, Neagos N, Chiappelli F (2005) Post-traumatic stress disorder: evidence-based research for the third millennium. *eCAM* 2:503–512. <https://doi.org/10.1093/ecam/neh127>
- Kring AM, Werner KH (2004) Emotion regulation and psychopathology. In: Philipot P, Feldman RS (eds) *The regulation of emotion*. LEA, New York, pp 359–385
- Lazarus RS (1993) Coping theory and research: past, present, and future. *Psychosom Med* 55:234–247
- Liberman AM, Best S, Metzler TJ, Fagan JA, Weiss DS, Marmar CR (2002) Routine occupational stress and psychological distress in police. *Pol Soc: Int J Police Strateg Manag* 25:421–441
- Lindstrom CM, Cann A, Calhoun LG, Tedeschi RG (2013) The relationship of core belief challenge, rumination, disclosure, and sociocultural elements to posttraumatic growth. *Psychological Trauma: Theory, Research, Practice, and Policy* 5(1):50–55. <https://doi.org/10.1037/a0022030>
- Maguen S, Metzler TJ, McCaslin SE, Inslicht SS, Henn-Hasses C, Neylan TC, Marmar CR (2009) Routine work environment stress and PTSD symptoms in police officers. *J Nerv Ment Dis* 197:754–760
- Maia DB, Marmar CR, Metzler T, Nóbrega A, Berger W, Mendlowicz MV, Coutinho ESF, Figueira I (2007) Post-traumatic stress symptoms in an elite unit of Brazilian police officers: prevalence and impact on psychosocial functioning and on physical and mental health. *J Affect Disord* 97:241–245
- Marchand A, Boyer R, Nadeau C, Beaulieu-Prevost D, Martin M (2015) Predictors of posttraumatic stress disorder among police officers: a prospective study. *Psychological Trauma: Theory, Research, Practice, and Policy* 7:212–221
- Marmar CR, McCaslin SE, Metzler TJ, Best S, Weiss DS, Fagan J et al (2006) Predictors of posttraumatic stress in police and other first responders. *Ann N Y Acad Sci* 1071:1–18
- Martelli TA, Water LK, Martelli J (1989) The police stress survey: reliability and relation to job satisfaction and organizational commitment. *Psychol Rep* 64:267–273
- Martin SE (1999) Police force or police service? Gender and emotional labor. *Ann Am Acad Polit Soc Sci* 561:111–126
- McCanlies EC, Mnatsakanova A, Andrew ME, Burchfiel CM, Violanti JM (2014) Positive psychological factors are associated with lower PTSD symptoms among police officers: post Hurricane Katrina. *Stress Health* 30:405–415
- Menard KS, Arter ML (2013) Police officer alcohol use and trauma symptoms: associations with critical incidents, coping, and social stressors. *Int J Stress Manag* 20:37–56
- Miller, L. (2013). *Stress, traumatic stress, and posttraumatic stress syndromes*. In L Territo & J. D. Sewell (Eds.), *Stress management in law enforcement*, 3rd edition, Carolina Academic Press, Durham, pp. 9–36
- Ozer EJ, Best SR, Lipsey TL, Weiss DS (2003) Predictors of posttraumatic stress disorder and symptoms in adults: a meta-analysis. *Psychol Bull* 129:52–73
- Pasillas RM, Follette VM, Perumean-Chaney SE (2006) Occupational stress and psychological functioning in law enforcement officers. *J Pol Soc: Int J Police Strateg Manag* 21:41–53
- Paton, D. & Norris, K. (2014). Vulnerability to work-related posttraumatic stress: family and organizational influences. In J. M. Violanti (Ed.) *Dying for the job: police work exposure and health*. Charles C. Thomas, Springfield, (pp. 126–144). ISBN 9780398087722
- Paton D, Violanti JM, Smith LM (2003) Promoting capabilities to manage posttraumatic stress: perspectives on resilience. Charles C. Thomas, Springfield, pp 1–23
- Patterson GT (2003) Examining the effects of coping and social support on work and life stress among police officers. *J Crim Just* 31:215–226
- Pogrebin MR, Poole ED (1991) Police and tragic events: the management of emotions. *J Crim Just* 19:395–403
- President's Task Force on 21st Century Policing (2015) *Pillar one, building trust and legitimacy*. Washington, DC: Office of Community Oriented Policing Services, (p. 9–19)
- Robinaugh DJ, Marquesa L, Traeger LN, Marksa EH, Sung SC, Gayle Beck J, Pollack MH, Simon NM (2011) Understanding the relationship of perceived social support to post-trauma cognitions and post-traumatic stress disorder. *J Anxiety Disord* 25:1072–1078

- Rubin DC, Berstsen D, Bohni MK (2008) A memory based model of posttraumatic stress disorder: evaluating basic assumptions underlying the PTSD diagnosis. *Psychol Rev* 115:985–1011. <https://doi.org/10.1037/a0013397>
- Schutte N, Bar O, Weiss U, Heuft G (2012) Prediction of PTSD in police officers after six months—a prospective study. *Span J Psychol* 15(3): 1339–1348. [https://doi.org/10.5209/rev\\_sjop.2012.v15.n3.39419](https://doi.org/10.5209/rev_sjop.2012.v15.n3.39419)
- Shane JM (2010) Organizational stressors and police performance. *J Crim Just* 38:807–818
- Siebert A. (2002). How resilience works. Letter to editor. *Harvard Business Review*, July, p. 121
- Siegrist M, Cvetkovich G (2000) Perception of hazards: the role of social trust and knowledge. *Risk Anal* 20:713–720
- Spielberger, C. D., Westberry, L. G., Grier K. S. & Greenfield, G. (1981). The police stress survey: sources of stress in law enforcement. College of Social and Behavioral Sciences, University of South Florida Tampa, Florida 33620. Monograph Series Three: No. 6
- Stratton JG, Parker DA, Snibbe JR (1984) Post-traumatic stress: study of police officers involved in shootings. *Psychol Rep* 55:127–131
- Szabo YZ, Warnecke AJ, Newton TL, Valentine JC (2017) Rumination and posttraumatic stress symptoms in trauma-exposed adults: a systematic review and meta-analysis. *Anxiety, Stress, Coping* 30:396–414. <https://doi.org/10.1080/10615806.2017.1313835>
- Taylor SE, Klein LC, Lewis BP, Gruenewald TL, Gurung RAR, Updegraff JA (2000) Biobehavioral responses to stress in females: tend-and-befriend, not fight-or-flight. *Psychol Rev* 107(3):411–429
- Tedeschi RG, Calhoun LG (1996) The Posttraumatic Growth Inventory: measuring the positive legacy of trauma. *J Trauma Stress* 9:455–471
- Tedeschi RG, McNally RJ (2011) Can we facilitate posttraumatic growth in combat veterans? *Am Psychol* 66(1):19–24. <https://doi.org/10.1037/a0021896>
- Violanti JM (2014) Introduction to special issue: police stress and trauma: recent perspectives. *Int J Ment Health Human Resilience* 15:213–215
- Violanti JM, Burchfiel CM, Miller DB, Andrew ME, Dorn J, Wactawski-Wende J, Beighley CM, Pierino K, Joseph PN, Vena JE, Sharp DS, Trevisan M (2006) The Buffalo Cardio-Metabolic Occupational Police Stress (BCOPS) pilot study: methods and participant characteristics. *Ann Epidemiol* 16:148–156
- Violanti JM, Fekedulegn D, Hartley TA, Charles LE, Andrew ME, Ma CC, Burchfiel CM (2015) Highly rated and most frequent stressors among police officers: gender differences. *Am J Crim Justice* 41: 645–662. <https://doi.org/10.1007/s12103-016-9342-x>
- Weathers FW, Litz BT, Herman DS, Huska JA, Keane TM (1993) The PTSD Checklist (PCL): reliability, validity, and diagnostic utility. Paper presented at the Annual Meeting of International Society for Traumatic Stress Studies, San Antonio
- Webster JH (2013) Police officer perceptions of occupational stress: the state of the art. *Polic: Int J PolicStrateg Manag* 36:636–652
- Weinberg M, Gil S (2016) Trauma as an objective or subjective experience: the association between types of traumatic events, personality traits, subjective experience of the event, and posttraumatic symptoms. *J Loss Trauma: Int Perspect Stress Coping* 21:137–146
- Wood J (2004) Cultural change in the governance of security. *Policing & Society* 14:31–48
- Zeidner M, Hammer A (1990) Life events and coping resources as predictors of stress symptoms in adolescents. *Personal Individ Differ* 11:693–703
- Zeidner M, Saklofske DH (1996) Adaptive and maladaptive coping. In: Zeidner M, Endler NS (eds) *Handbook of coping: theory, research and applications*. Wiley, New York, pp 505–531