Depressive Symptoms Among Police Officers: Associations with Personality and Psychosocial Factors

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Abstract

Protective psychosocial factors may reduce the risk of stress-related illnesses in policing. We assessed the association between protective factors and depressive symptoms among 242 police officers. Participants were from the Buffalo Cardio-Metabolic Occupational Police Stress (BCOPS) Study (2004–2014). Coping, hardiness, personality traits, and social support were assessed at baseline. Depressive symptoms were measured at baseline and follow-up using the Center for Epidemiologic Studies-Depression (CES-D) scale. The relationship between protective factors and the rate of change in depressive symptoms was assessed using linear regression. Logistic regression evaluated associations between protective factors and new-onset depression. Of participants free of depression at baseline, 23 (10.7%) developed probable depression during the follow-up. Odds of new-onset depression increased with increasing neuroticism (adjusted odds ratio [OR_{ADJ}] = 1.22, 95% confidence interval [CI], 1.11–1.35) and passive coping (OR_{ADJ} = 2.07, 95% CI, 1.06–4.03). Increasing agreeableness (OR_{ADJ} = 0.87, 95% CI, 0.78–0.96) and conscientiousness (OR_{ADJ} = 0.90, 95% CI, 0.84–0.98) were associated with decreased odds of new-onset depression. New-onset depression was not significantly associated with other coping subscales, hardiness, or social support. There were no significant associations between protective factors and change in depressive symptom scores. This study suggests certain personality characteristics and passive coping may be associated with increased odds of new-onset depression in police officers.

Keywords

Depression; Personality; Hardiness; Coping; Police officers

Introduction

Major depression affects more than 15 million US adults in a given year, a figure that corresponds to about 6.7% of all US adults (National Institute of Mental Health n.d.). The estimated cost of depression in the USA was $210.5 billion in 2010, including workplace, direct, and suicide-related costs (Greenberg et al. 2015). Policing is a high-stress occupation with an estimated 806,400 police officers in the USA in 2014 (Bureau of Labor Statistics 2015). Police work involves exposure to psychologically challenging and dangerous events that may increase the risk of stress-related health problems, including depression and other mental health disorders. However, not all individuals who are exposed to traumatic events develop psychological symptoms, perhaps in part due to certain protective factors. Positive outcomes after exposure to traumatic events or stressful environments may be possible if police officers develop and use psychological skills to manage these events (Arnetz et al. 2013). Previous research suggests that a range of psychosocial factors, commonly referred to as resilience, can contribute to an individual's ability to cope with and recover from a negative life exposure (Iacoviello and Charney 2014). Examples of these factors include optimism, active coping skills, social support, and physical health (Iacoviello and Charney 2014). Determining whether protective factors such as personality, hardiness, coping, and social support can decrease a police officer's risk of developing depression is an important step toward preventing such psychological disturbances and promoting resilience in this population.

Accumulating evidence from longitudinal studies and reviews suggest that certain dimensions of personality may predict both new onset depression and change in depressive symptoms (Hakulinen et al. 2015; Kendler et al. 2006; Klein et al. 2011; Kotov et al. 2010; Noteboom et al. 2016). Current evidence suggests that higher levels of neuroticism and lower levels of extraversion and consciousness are associated with depressive symptoms (Hakulinen et al. 2015; Kendler et al. 2006; Klein et al. 2011; Koorevaar et al. 2013; Noteboom et al. 2016). Results regarding the possible associations between other personality dimensions (e.g., agreeableness and openness) and depressive symptoms have been mixed (Kotov et al. 2010). A meta-analysis of 175 predominantly cross-sectional studies found that high neuroticism and low conscientiousness were associated with depressive, anxiety, and substance-use disorders (Kotov et al. 2010). Low extraversion was associated with these disorders in a majority of the studies included in the meta-analysis. However, there was little association between openness and these disorders. Agreeableness was negatively associated only with substance use disorders (Kotov et al. 2010). A more recent meta-analysis of 10 prospective cohort studies, found that high neuroticism, low extraversion, and low conscientiousness were associated with an increased risk of depressive symptoms at follow-up (Hakulinen et al. 2015).

Hardiness is a complex personality trait that reflects an individual's ability to withstand stressful situations or traumatic events and has been associated with resilience, high performance, and good health even in high-stress occupations (Andrew et al. 2008; Bartone 1999, 2007). For example, results from a study of military personnel suggest that hardiness may mitigate the negative effects of war-related stress and other stressful life events on mental health in this population (Bartone 1999). Similarly, hardiness was inversely associated with psychological distress in a sample of officers from the Buffalo, New York Police Department (Andrew et al. 2008).

A growing body of evidence also suggests that social support aids in promoting good physical and mental health (Cadzow and Servoss 2009; Gariépy et al. 2016; Ozbay et al. 2007; Schwarzer et al. 2014). Collectively, findings from multiple studies indicate that high levels of social support can help improve resiliency, protect against psychological disorders associated with exposures to combat trauma, and reduce morbidity and mortality in a range of populations, while low levels of social support have been associated with the onset and relapse of depression (Boscarino 1995; Cigrang et al. 2014; Ozbay et al. 2007; Paykel 1994; Schwarzer et al. 2014).

Research on coping indicates potentially significant impacts on stress-related health problems and has led to intervention strategies designed to improve coping skills (Sinclair et al. 2016; Taylor and Stanton 2007). For instance, a cross-sectional study found that police officers who rely on negative or avoidant coping mechanisms often report higher levels of perceived work stress and negative health outcomes, suggesting that interventions focused on effective coping strategies and resilience may aid in reducing police stress (Gershon et al. 2009). After controlling for neuroticism, a study of twins found that individuals with high levels of resilient coping had lower depression scores following a traumatic exposure (Sinclair et al. 2016).

However, while a number of studies have suggested that certain personality characteristics and other psychosocial factors may mitigate the adverse effects of stressful exposures on mental health outcomes, research regarding the association of these factors to risk for depression in police officers remains sparse. The goal of this study is to assess the relationship between specific psychosocial factors at baseline to new onset depression and change in depressive symptoms in a cohort of police officers. We hypothesized that active coping, hardiness, and social support at baseline will be inversely associated with change in depressive symptoms and new-onset depression at follow-up, and that passive coping will be positively associated with these outcomes. We also hypothesized an inverse association between certain personality dimensions (extraversion, openness, agreeableness, and conscientiousness) and depression, and a positive association between neuroticism and depression.

Methods

Study Population

Participants for this study were drawn from the Buffalo Cardio-Metabolic Occupational Police Stress (BCOPS) Study cohort, 2004–2014. A collaboration between the National

Institute for Occupational Safety and Health (NIOSH) and the State University of New York at Buffalo (SUNY), the BCOPS Study is a longitudinal population-based investigation designed to identify patterns of stress response in the high-stress occupation of police work. Data have been collected on multiple indicators, including biomarkers of stress, subclinical cardiovascular disease, body composition indicators, and associated psychosocial factors. The Institutional Review Board at the State University of New York (SUNY) at Buffalo approved the study.

The original BCOPS cohort (2004–2009) included 464 active-duty and retired officers, of whom 281 completed the follow-up study (2011–2014) (Violanti et al. 2006). Our study sample includes 242 police officers (71.5% men) who had complete data on both depressive symptoms and protective factors (Fig. 1). The average follow-up period was 6.92 ± 0.97 years. This sample was used to examine the association of baseline protective factors to change in depressive symptoms during the follow-up. The relationship between protective factors and the development of new-onset depression was examined in 214 officers who were free of depression at baseline.

Outcome Measures: Change in Depressive Symptoms and New-Onset Depression

The primary outcome variables were change in depressive symptoms from baseline to follow-up and new-onset depression. Depressive symptoms were measured using the Center for Epidemiological Studies-Depression scale (CES-D) (Radloff 1977). The CES-D was administered at both the baseline and follow-up exam and includes 20 items measuring the frequency of symptoms in the past 7 days. Each item has four possible responses: 0 [rarely or none of the time (less than 1 day)], 1 [some or a little of the time (1–2 days)], 2 [occasionally or a moderate amount of time (3–4 days)], and 3 [most or all of the time (5–7 days)]. Total scores range from 0 to 60; higher scores indicate higher levels of distress (Radloff 1977).

Change in depressive symptoms over the follow-up was defined as the rate of change (arithmetic difference divided by length of follow-up for each participant). New-onset depression was defined as having a CES-D score below 16 at baseline and 16 or above at follow-up. A CES-D score of 16 is a standard cut point indicating a clinically significant level of psychological distress (Radloff 1977).

Protective Factors

Coping—Coping was measured using the Brief COPE, a 28-item questionnaire designed to assess coping strategies used by individuals in response to stress (Carver 1997). The Brief COPE assesses 14 subscales of coping: active coping, acceptance, behavioral disengagement, denial, emotional support, humor, instrumental support, planning, positive reframing, religion, self-blame, self-distraction, substance use, and venting (Carver 1997). All items are scored using a 4-point scale [0 ("not done at all"), 1 ("done a little bit"), 2 ("done a medium amount"), and 3 ("done a lot")]; the score for each subscale is calculated as the summed scores of the two relevant items (Carver 1997). Based on a factor analysis by Andrew et al. (2013), the 14 subscales can be grouped into three theoretically meaningful summary variables: (1) active coping (acceptance, active coping, positive reframing, and

planning aspects), (2) passive coping (behavioral disengagement, denial, self-blame, and venting), and (3) support seeking (emotional support and instrumental support). The three summary variables were calculated by adding the relevant subscale scores and dividing by the number of subscales used to calculate each summary variable. These summary variables demonstrated good internal consistency based on findings of a previous BCOPS study, with alpha coefficients ranging from 0.70 to 0.79 for each of the three summary variables (Andrew et al. 2013).

Hardiness—Psychological hardiness was measured using the 15-item Dispositional Resilience Scale (DRS-15) (Bartone 2007). Hardiness includes three positive components: commitment, control, and challenge. Commitment is the ability to find meaning and purpose in stressful situations. Control is the tendency to believe in one's own ability to manage stressful situations. Challenge pertains to the ability to recognize that stressful situations are opportunities to learn and grow. Each item has four possible responses: 0 (not true at all), 1 (a little true), 2 (quite true), and 3 (completely true). The hardiness scale showed high reliability with a test-retest coefficient of 0.78 in a sample of military academy cadets (Bartone 2007).

Personality—Personality was measured using the NEO Five Factor Inventory (NEO-FFI), a 60-item questionnaire designed to measure the five personality dimensions in the five-factor model of personality (Costa and McCrae 2009). The NEO-FFI has five subscales: neuroticism, extraversion, openness, agreeableness, and conscientiousness (Costa and McCrae 2009). Each subscale is based on 12 items. All items use a five-point scale ranging from 0 (strongly disagree) to four (strongly agree). Twenty-seven (27) items are reverse-coded. Neuroticism measures the "tendency for an individual to experience negative affect" (Andrew et al. 2013, p. 4). Higher levels may result in difficulty adapting and coping with stressors. Extraversion is characterized by sociability, assertiveness, excitement, tendency to like engagement with large groups, and positive emotionality. Individuals with less extraversion may be reserved, even-paced, and independent. Openness is a tendency toward being open and curious to various experiences and ideas. Individuals with less openness may be more conventional, practical, and have focused interests whereas individuals with high openness may have more unconventional beliefs. Agreeableness is wanting to help others or being cooperative. Low agreeableness may refer to competitiveness, critical thinking, and interpersonal skepticism. Conscientiousness is being "purposeful, strong-willed, and determined" and being active in "planning, organizing, and carrying out tasks" (Costa and McCrae 2009, p. 16). The NEO-FFI has high factor correlations with the original 240-item NEO Personality Inventory (NEO-PI). The instrument has also illustrated high internal validity with high alpha coefficients in various adult populations (Costa and McCrae 2009).

Social Support—Social support was measured using the Social Provisions Scale, a 24-item questionnaire with items on a 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree) (Cutrona and Russell 1987). The Social Provisions Scale is designed to measure the various dimensions of social support provided by an individual's social relationships (Cutrona and Russell 1987). The scale has 6 subscales: guidance, reliable alliance, attachment, social integration, reassurance of worth, and opportunity for

nurturance. Guidance refers to advice or information. Reliable alliance is the assurance that other individuals can be counted on and relied upon for assistance. Attachment is the sense of security provided by emotional closeness. The sense of belonging to a group that is similar to oneself is captured by social integration. Reassurance of worth captures the recognition of one's value by others. Opportunity for nurturance refers to the sense that one is needed by others (Cutrona and Russell 1987). Each subscale is based on 4 items. The total score is the sum of all items. Higher scores indicate greater degrees of perceived support. The Social Provisions Scale subscales have shown high reliability, with coefficient alphas ranging from 0.65 to 0.76 in a sample of college students, public school teachers, and military hospital nurses (Cutrona and Russell 1987).

Statistical Analysis

Descriptive statistics were used to characterize the study population. Linear regression analysis was used to assess the association of protective factor scores to rate of change in depressive symptoms scores over time. Models were stratified by gender. Chi-square tests identified differences in the new onset of depression across tertiles of each protective factor. Logistic regression models were used to identify associations between protective factor scores and new-onset depression. Potential confounders were selected based on previous literature and/or observed associations with both the protective factors and change in depressive symptom scores ($p < 0.1$, Pearson's correlation). All models were adjusted for age, sex, education, and marital status. There was no adjustment for baseline depressive symptoms because significant correlation with the baseline protective factors might result in a spurious association (Glymour et al. 2005). Although significant gender interactions were present, stratification by gender in the logistic regression analyses was not possible due to small sample size.

Results

Our sample included 242 police officers (71.5% male) with an average follow-up of 6.92 ± 0.97 years. Participant characteristics are given in Table 1. Participating officers averaged 40.6 ± 7.3 years of age. The majority were Caucasian (80.3%) and married (73.1%), had never smoked (60.4%), reported at least some college education (91.7%), and held the rank of police officer (73.9%) (Table 1). As compared with the female officers, a significantly higher percentage of male officers were married (79.8 vs. 56.5%, $p = 0.001$), Caucasian (84.1 vs.71.1%, $p = 0.030$), and had never smoked (66.5 vs. 44.8%, $p = 0.009$). Additionally, men reported a higher average alcohol intake [mean (SD): 5.6 (8.2) vs. 3.0 (4.1) drinks per week, $p = 0.016$] and a lower average level of neuroticism [13.9 (6.7) vs 16.3 (6.9), $p = 0.014$], openness [23.2 (5.2) vs 26.2 (5.5), $p < 0.001$], and agreeableness [31.1 (5.3) vs 32.9 (4.9), $p = 0.015$] compared to females. A total of 214 police officers were free of depression at baseline, of whom 156 (72.9%) were male. This subsample did not differ from the original sample in demographics, lifestyle characteristics, or baseline protective factors. Correlations between baseline psychosocial factors and baseline depressive symptoms showed weak to moderate associations (Table 2). The strongest correlation was the positive correlation observed between baseline neuroticism and baseline depressive symptoms ($r = 0.56$, $p < 0.001$). In male officers, baseline depressive symptoms showed modest but

significant inverse correlations with both baseline support seeking ($r = -0.18$, $p = 0.017$) and baseline conscientiousness ($r = -0.34$, $p < 0.001$). In contrast, these psychosocial factors were not significantly correlated in female officers.

As illustrated in Table 3, there were no significant associations between baseline scores for the protective factors (or their subscales) and rate of change in depressive symptom scores over the follow-up period ($n = 242$). There were also no significant associations between baseline protective factor scores (or their sub-scales) and change in depressive symptom scores after exclusion of those with depression at baseline using the CES-D cut point ($n = 214$). Among those officers free of depression at baseline, 23 (10.7%) developed probable depression over the follow-up ($N = 214$). In the bivariate analyses, new onset of depression was significantly higher in officers in the highest tertile of neuroticism as compared with those in the low or medium tertiles of neuroticism ($p = 0.0003$; Fig. 2). There were no significant differences in the new onset of depression among tertiles of extraversion, agreeableness, conscientiousness, or openness in police officers (Fig. 2). There were no apparent associations between coping, hardiness, or social support and new-onset depression (data not shown).

Table 4 displays the associations of new-onset depression with personality dimensions and coping subscales. In the unadjusted model, the odds of new-onset depression increased with increasing neuroticism (OR = 1.19, 95% CI, 1.09–1.30). The association remained significant after adjustment for potential confounders. After adjustment, with each unit increase in neuroticism, there was a 22% increase in the odds of new-onset depression (OR_{ADJ} = 1.22, 95% CI, 1.11–1.35). Openness was significant in the unadjusted model only (OR = 1.09, 95% CI, 1.01–1.19). There was no significant association between agreeableness and new-onset depression in the unadjusted model. However, after adjustment, with each unit increase in agreeableness, there was a 13% decrease in the odds of new-onset depression (OR_{ADJ} = 0.87, 95% CI, 0.78–0.96). The odds of new-onset depression also decreased as conscientiousness increased (OR = 0.90, 95% CI, 0.84–0.97). After adjustment, there was a 10% decrease in the odds of new-onset depression with each unit increase in conscientiousness (OR_{ADJ} = 0.90, 95% CI, 0.84–0.98). There was no significant association between extraversion and new-onset depression.

Among the coping subscales, passive coping was positively associated with new-onset depression in the unadjusted model (OR = 1.84, 95% CI, 1.04–3.25). After adjustment, the odds of new-onset depression increased by a factor of 2.07 for each unit increase in passive coping (OR_{ADJ} = 2.07, 95% CI, 1.06–4.03). There were no significant associations between active coping and new-onset depression or support seeking and new-onset depression. New-onset depression was not significantly associated with baseline hardiness or social support scores.

Discussion

Research on the association between protective psychosocial factors and depression in the high-stress occupation of policing is limited, and longitudinal studies are lacking. In this prospective study of urban police officers, increased agreeableness and conscientiousness

were significantly associated with decreased odds of new-onset depression. Neuroticism and passive coping were associated with increased odds of new-onset depression. Our results also suggest that increased openness may also be associated with increased odds of new-onset depression, although significant only in the unadjusted analyses. This is an unexpected finding. New-onset depression was not significantly related to active coping, support seeking, hardiness, or social support, although the observed results were in the expected direction.

Our findings regarding the relation of personality dimensions to new-onset depression are broadly consistent with results from previous studies of police officers and other populations (Andrew et al. 2013; Kendler et al. 2006; Klein et al. 2011; Kotov et al. 2010; Noteboom et al. 2016; Vittengl 2017). In a meta-analysis of 175 personality studies, neuroticism had the strongest correlation to anxiety, depression, and substance use disorders, compared to the other Big Five personality dimensions (Kotov et al. 2010). Similar results were reported in another meta-analysis of 10 cohort studies where high neuroticism, low extraversion, and low conscientiousness were associated with increased risk of depressive symptoms at follow-up (Hakulinen et al. 2015). Additional studies also found that neuroticism predicted risk of new episodes of depression (Kendler et al. 2006; Noteboom et al. 2016). In agreement with findings from our longitudinal study, a previous cross-sectional investigation in the BCOPS cohort showed depressive symptoms to be positively associated with neuroticism and inversely associated with extraversion, agreeableness, and conscientiousness in both men and women (Andrew et al. 2013). Since neuroticism refers to the tendency to experience negative emotional affect in response to stressful situations, it is not surprising that individuals with high levels of neuroticism had an increased risk of depressive symptoms (Andrew et al. 2013). It, therefore, makes sense that low levels of neuroticism but high levels of extraversion, agreeableness, and conscientiousness may be protective of depressive symptoms. This was observed in a Dutch prospective study of 1085 adults that assessed the relation of personality traits and social support to depression (Noteboom et al. 2016). Although instruments differed from those used in our study, high extraversion, agreeableness, conscientiousness, and a larger support network were significantly associated with a reduced risk of depression in unadjusted models only (Noteboom et al. 2016). Noteboom et al. (2016) hypothesized that individuals who are more extraverted, agreeable, and conscientious have a tendency toward prosocial behavior, which may lead to more social support and positive experiences. This, in turn, may reduce the risk of developing new episodes of depression (Noteboom et al. 2016).

Findings regarding the association of openness to depression and depressive symptoms are limited. Prospective studies are lacking and results have been mixed. A recent cross-sectional investigation in the same BCOPS cohort (Andrew et al. 2013) indicated a marginally significant association between openness and depressive symptoms, but only in women. A cross-sectional study of 477 older Dutch adults found no relationship between openness and the diagnosis or severity of depression but findings did suggest a strong association between higher levels of openness and earlier age of onset of depression (Koorevaar et al. 2013). The authors reasoned that persons with higher levels of openness may be more curious and sensitive by nature and therefore may experience positive and negative events more intensely than others. This, in turn, may make these individuals more

prone to developing depressive symptoms after exposure to negative life events (Koorevaar et al. 2013). Openness was not significantly associated with new-onset depression after adjustment for age and sex in our study.

Although measures of hardiness, social support, and active coping were not significantly associated with new-onset depression in our study, results were in the expected direction. Previous studies have observed protective associations between these potential protective factors and adverse psychological outcomes. For example, findings from a study of Army Reserve personnel in the Persian Gulf War suggest that hardiness was protective against the negative effects of war-related stress (Bartone 1999). This may not be surprising given that hardy people have the tendency to find positive meaning in their work and therefore may be less vulnerable to psychological stress (Bartone 1999). Likewise, in a prior cross-sectional BCOPS study (1999–2000), the control and commitment dimensions of hardiness were inversely associated with depressive and PTSD symptoms; these associations were particularly pronounced in women (Andrew et al. 2008). The authors suggest that these results may mean that the overall trait of hardiness is not as effective in mitigating psychological distress as compared to individual dimensions (e.g., commitment and control). These results were confirmed in a follow-up cross-sectional BCOPS study (2004–2009) with a larger sample size. The challenge dimension of hardiness was significantly associated with depressive symptoms among men but not women. The commitment and control dimensions of hardiness were inversely associated with depression symptoms in both genders (Andrew et al. 2013).

A number of investigations have reported significant associations between coping styles and depression. Generally speaking, individuals with active coping styles are more likely to use strategies to confront a problem and modify the source of stress whereas passive or avoidant coping strategies are designed to keep individuals from directly addressing stressful events (Holahan and Moos 1987). Therefore, is it not surprising that active coping strategies including resiliency have been associated with lower levels of depression and perceived stress in several investigations (Andrew et al. 2013; Gershon et al. 2009; Sinclair et al. 2016; Taylor and Stanton 2007). As noted by Taylor and Stanton (2007), avoidance coping strategies may be successful in coping with short-term stressors but have generally been associated with increased adverse health outcomes. For example, in a cross-sectional study of the BCOPS cohort, Andrew et al. (2013) found that active coping was inversely associated with depressive symptoms in both men and women while passive coping was positively associated with depressive symptoms in both genders. Support seeking was not significantly associated with depressive symptoms in either gender (Andrew et al. 2013). In another study of 1072 urban police officers, researchers found that officers who used avoidant or negative coping styles reported higher perceived stress and, in turn, higher adverse health outcomes including depression compared to officers who used problem-solving coping mechanisms (Gershon et al. 2009). Another study of 3734 pairs of twins found that even after controlling for neuroticism, individuals with higher levels of resilient coping had lower depression scores after a traumatic experience (Sinclair et al. 2016). In our study, we found that passive coping was associated with increased odds of new-onset depression.

Evidence from epidemiological studies suggests that high levels of social support can improve resiliency and protect against the negative effects of stressful situations or traumatic events (Ozbay et al. 2007; Schwarzer et al. 2014). Social support may provide the opportunity for meaningful social interactions that help mitigate distress (Boscarino 1995). For example, in a recent study of New York police officers who responded to the 9/11 attack on the World Trade Center, the adverse effects of exposure on individual stress responses were significantly lower in those with high levels of social integration (Schwarzer et al. 2014). Similar results regarding social support have also been found in other populations. In a study of 2490 Vietnam veterans and 1972 non-Vietnam veterans, social support was negatively associated with current depression, post-traumatic stress disorder, and generalized anxiety (Boscarino 1995). Likewise, in a longitudinal study of U.S. Iraq War veterans, social support was strongly and inversely associated with subsequent decline in emotional and behavioral functioning (Cigrang et al. 2014). In a recent systematic review of 36 studies of adults, 89% of studies found a significant association between at least one aspect of social support and protection from depression (Gariépy et al. 2016). Results suggested that spousal support was most consistently associated with protection from depression in adults. This was followed by support from family, friends, and children. Furthermore, emotional support was most consistently associated with protection from depression in adults followed by instrumental support (Gariépy et al. 2016). In contrast to the findings of most previous studies, we did not find significant associations between depression and social support or active coping, possibly due in part to our small sample size. It is also possible that the police officers may have already derived the protective benefit of these potential protective factors prior to baseline measurement. This may explain why we did not see the expected significant associations between many of these protective factors and depression.

Among the strengths of this study are the unique occupational group being studied; the prospective, population-based design; and the use of a standardized study protocol. This study used well-validated instruments to collect information on a broad array of protective factors and depressive symptoms. Our study sample also included a high percentage of women officers, which is fairly uncommon in studies of police officers and permitted study of this gender minority in policing. Limitations of this study include the small sample size, which may have limited our power to detect associations. Coping, hardiness, personality dimensions, social support and depressive symptoms were assessed using self-report measures, which may have introduced information bias. For example, reluctance to report symptoms of depression may have resulted in misclassification, possibly biasing the results toward the null and attenuating the observed associations. The results from this cohort of police officers may not be generalizable to officers in other departments or locations, or to those in other high-stress occupations.

Conclusion

In this cohort of police officers, specific personality traits and passive coping were significantly associated with risk for new-onset depression. If findings of this study are confirmed in other longitudinal investigations, consideration of personality characteristics in the training and support of individuals in the highly demanding and stressful job of policing

may help inform intervention strategies designed to improve worker health and prevent depression in this and other high-stress occupations.

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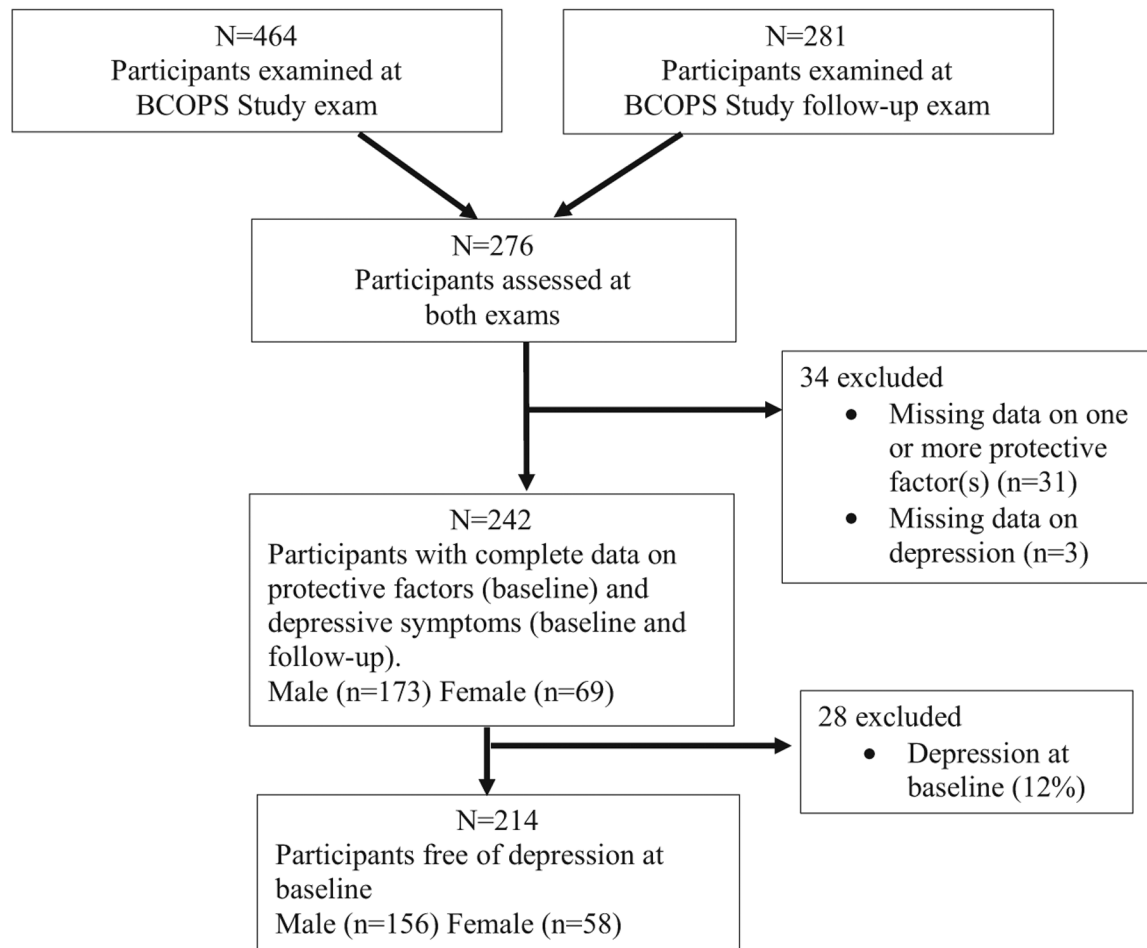
Fig. 1.
Study sample selection. This figure is a flow chart of the participants in this longitudinal
study designed to assess the association between protective factors and depressive symptoms
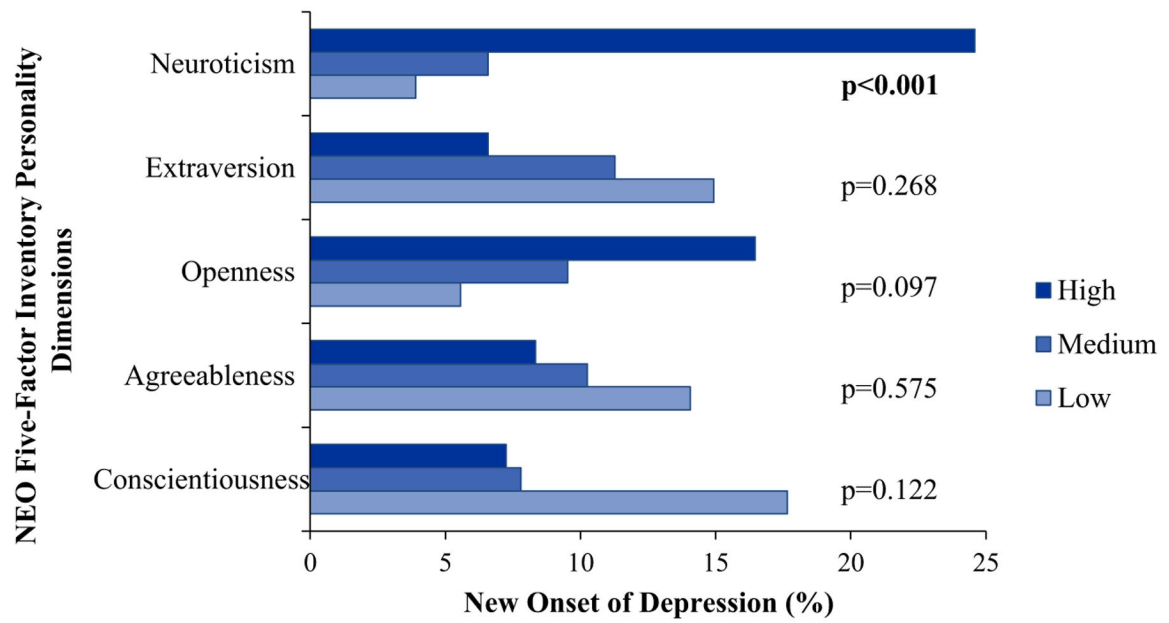
Fig. 2.
New onset of depression by personality dimension. This figure illustrates the new onset of depression, expressed as a percentage, across the five personality dimensions (neuroticism, extraversion, openness, agreeableness, and conscientiousness). The *p* values represent omnibus chi-square values from Fisher's exact test

Table 1

Demographic, lifestyle, and physiological characteristics among officers stratified by gender

Characteristics	Total (*N* = 242) N (%)	Female (*N* = 69) N (%)	Male (*N* = 173) N (%)	*p* value[a]
Marital status				
Single	32 (13.22)	16 (23.19)	16 (9.25)	
Married	177 (73.14)	39 (56.52)	138 (79.77)	
Divorced	33 (13.64)	14 (20.29)	19 (10.98)	0.001
Education				
High school/GED	20 (8.30)	4 (5.80)	16 (9.30)	
College, < 4 years	128 (53.11)	40 (57.97)	88 (51.16)	
College, ≥ 4 years	93 (38.59)	25 (36.23)	68 (39.53)	0.583
Smoking status				
Current	39 (16.25)	15 (22.39)	24 (13.87)	
Former	56 (23.33)	22 (32.84)	34 (19.65)	
Never	145 (60.42)	30 (44.78)	115 (66.47)	0.009
Years of service				
0–9	80 (33.20)	26 (37.68)	54 (31.40)	
10–14	52 (21.58)	16 (23.19)	36 (20.93)	
15–19	50 (20.75)	13 (18.84)	37 (21.51)	
20 or more	59 (24.48)	14 (20.29)	45 (26.16)	0.672
Rank				
Police officer	178 (73.86)	55 (79.71)	123 (71.51)	
Sergeant/lieutenant	31 (12.86)	8 (11.59)	23 (13.37)	
Captain/detective	32 (13.28)	6 (8.70)	26 (15.12)	0.358
Race				
Caucasian	192 (80.33)	49 (71.01)	143 (84.12)	
African-American	47 (19.67)	20 (28.99)	27 (15.88)	0.030
	Mean (SD)	Mean (SD)	Mean (SD)	
Age (years)	40.57 (7.34)	40.72 (6.42)	40.51 (7.69)	0.841
Alcohol (drinks/week)	4.83 (7.32)	3.03 (4.13)	5.55 (8.16)	0.016
Coping				

Characteristics	Total ($N = 242$) N (%)	Female ($N = 69$) N (%)	Male ($N = 173$) N (%)	p value[a]
Proactive coping	4.02 (0.94)	4.16 (0.92)	3.96 (0.95)	0.147
Passive coping	1.55 (0.75)	1.65 (0.72)	1.51 (0.75)	0.181
Support coping	3.45 (1.38)	3.96 (1.25)	3.25 (1.38)	< 0.001
Hardiness	28.59 (5.28)	28.55 (5.15)	28.61 (5.34)	0.941
Personality				
Neuroticism	14.57 (6.82)	16.28 (6.91)	13.90 (6.68)	0.014
Extraversion	28.77 (6.11)	28.78 (6.42)	28.76 (6.01)	0.982
Openness	24.06 (5.47)	26.22 (5.54)	23.20 (5.22)	< 0.001
Agreeableness	31.60 (5.21)	32.88 (4.89)	31.08 (5.26)	0.015
Conscientiousness	33.93 (6.18)	33.61 (5.78)	34.05 (6.34)	0.615
Social support	84.10 (8.84)	84.01 (8.46)	84.13 (9.01)	0.929
Depressive symptoms	7.79 (6.62)	8.75 (7.63)	7.40 (6.15)	0.152

[a] p values test for differences between gender and are from chi-square or Fisher's test for categorical variables or an ANOVA for continuous variables

Table 2

Correlations between baseline psychosocial factors and baseline depressive symptoms

Psychosocial factors	Depression					
	Total (N = 242)		Female (N = 69)		Male (N = 173)	
	r coeff	p value[a]	r coeff	p value[a]	r coeff	p value[a]
Coping						
Active coping	−0.24	< 0.001	−0.32	0.008	−0.22	0.003
Passive coping	0.38	< 0.001	0.51	< 0.001	0.31	< 0.001
Support seeking	−0.13	0.038	−0.11	0.347	−0.18	0.017
Hardiness	−0.37	< 0.001	−0.39	0.001	−0.36	< 0.001
Personality						
Neuroticism	0.56	< 0.001	0.52	< 0.001	0.58	< 0.001
Extraversion	−0.37	< 0.001	−0.25	0.042	−0.44	< 0.001
Openness	0.06	0.394	0.03	0.810	0.04	0.645
Agreeableness	−0.14	0.028	−0.19	0.115	−0.15	0.055
Conscientiousness	−0.26	< 0.001	−0.06	0.625	−0.34	< 0.001
Social Support	−0.30	< 0.001	−0.28	0.021	−0.32	< 0.001

[a]
p values were obtained from Pearson correlations

Table 3

Unadjusted and adjusted rate of change in depressive symptoms by protective factors

Protective factors	Unadjusted			Age-adjusted			Multivariable-adjusted[a]		
	B (SE)	p value	β	B (SE)	p value	β	B (SE)	p value	β
Total									
Coping									
Proactive coping	0.06 (0.08)	0.400	0.05	0.07 (0.08)	0.515	0.06	0.07 (0.08)	0.496	0.06
Passive coping	−0.12 (0.10)	0.223	−0.08	−0.11 (0.10)	0.383	−0.08	−0.09 (0.10)	0.511	−0.06
Support seeking	0.07 (0.05)	0.171	0.09	0.07 (0.05)	0.310	0.09	0.07 (0.05)	0.381	0.09
Hardiness	0.02 (0.01)	0.195	0.08	0.02 (0.01)	0.344	0.08	0.02 (0.01)	0.411	0.08
Personality									
Neuroticism	−0.01 (0.01)	0.196	−0.08	−0.01 (0.01)	0.367	−0.08	−0.01 (0.01)	0.448	−0.08
Extraversion	0.004 (0.01)	0.740	0.02	0.004 (0.01)	0.735	0.02	0.004 (0.01)	0.601	0.02
Openness	0.02 (0.01)	0.175	0.09	0.02 (0.01)	0.314	0.09	0.02 (0.01)	0.391	0.09
Agreeableness	−0.01 (0.01)	0.495	−0.04	−0.01 (0.01)	0.557	−0.05	−0.01 (0.01)	0.540	−0.05
Conscientiousness	−0.01 (0.01)	0.380	0.06	−0.01 (0.01)	0.531	−0.06	−0.01 (0.01)	0.509	−0.06
Social support	0.01 (0.01)	0.143	0.09	0.01 (0.01)	0.292	0.09	0.01 (0.01)	0.465	0.07
Male									
Coping									
Proactive coping	0.05 (0.08)	0.505	0.05	0.06 (0.08)	0.684	0.05	0.07 (0.08)	0.444	0.06
Passive coping	−0.14 (0.10)	0.177	−0.10	−0.13 (0.10)	0.372	−0.10	−0.10 (0.11)	0.405	−0.08
Support seeking	0.02 (0.06)	0.722	0.03	0.02 (0.06)	0.819	0.03	0.002 (0.06)	0.520	0.002
Hardiness	0.01 (0.01)	0.356	0.07	0.01 (0.01)	0.579	0.07	0.01 (0.01)	0.405	0.08
Personality									
Neuroticism	−0.02 (0.01)	0.086	−0.13	−0.02 (0.01)	0.218	−0.13	−0.02 (0.01)	0.284	−0.12
Extraversion	0.01 (0.01)	0.478	0.05	0.01 (0.01)	0.676	0.06	0.01 (0.01)	0.488	0.04
Openness	0.02 (0.01)	0.092	0.13	0.02 (0.01)	0.223	0.13	0.02 (0.01)	0.263	0.12
Agreeableness	−0.001 (0.01)	0.938	−0.01	−0.002 (0.01)	0.870	−0.01	−0.01 (0.01)	0.502	−0.03
Conscientiousness	−0.002 (0.01)	0.892	−0.01	−0.001 (0.01)	0.871	−0.01	−0.002 (0.01)	0.518	−0.01
Social support	0.01 (0.01)	0.411	0.06	0.01 (0.01)	0.641	0.06	0.003 (0.01)	0.503	0.03
Female									

Protective factors	Unadjusted			Age-adjusted			Multivariable-adjusted[a]		
	B (SE)	p value	β	B (SE)	p value	β	B (SE)	p value	β
Coping									
Proactive coping	0.06 (0.17)	0.717	0.04	0.08 (0.18)	0.781	0.05	0.03 (0.18)	0.500	0.02
Passive coping	−0.09 (0.22)	0.677	−0.05	−0.11 (0.22)	0.769	−0.06	−0.08 (0.22)	0.490	−0.04
Support seeking	0.19 (0.13)	0.139	0.18	0.18 (0.13)	0.327	0.17	0.15 (0.13)	0.356	0.14
Hardiness	0.03 (0.03)	0.351	0.11	0.03 (0.03)	0.569	0.11	0.02 (0.03)	0.436	0.09
Personality									
Neuroticism	−0.01 (0.02)	0.801	−0.03	−0.005 (0.02)	0.841	−0.02	−0.01 (0.02)	0.496	−0.03
Extraversion	−0.01 (0.03)	0.757	−0.04	−0.01 (0.03)	0.805	−0.04	−0.001 (0.03)	0.504	−0.003
Openness	−0.01 (0.03)	0.825	−0.03	−0.01 (0.03)	0.845	−0.02	−0.01 (0.03)	0.493	−0.04
Agreeableness	−0.04 (0.03)	0.186	−0.16	−0.06 (0.04)	0.202	−0.23	−0.05 (0.04)	0.317	−0.18
Conscientiousness	−0.03 (0.03)	0.216	−0.15	−0.04 (0.03)	0.372	0.16	−0.03 (0.03)	0.351	−0.14
Social support	0.03 (0.02)	0.176	0.16	0.02 (0.02)	0.390	0.16	0.02 (0.02)	0.433	0.10

[a] Adjusted for age, education, and marital status. Due to lack of significant associations, ANOVA/ANCOVA results are not shown

Table 4

Unadjusted and adjusted odds ratios for new-onset depression symptoms by continuous personality dimensions and coping subscales ($N = 214$)

Characteristic	Unadjusted		Age and sex adjusted		Multivariable-adjusted[a]	
	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI
Personality						
Neuroticism	1.189	1.091–1.297	1.198	1.090–1.317	1.221	1.106–1.349
Extroversion	0.937	0.865–1.015	0.937	0.863–1.017	0.915	0.837–1.001
Openness	1.094	1.010–1.185	1.067	0.980–1.161	1.081	0.987–1.184
Agreeableness	0.944	0.867–1.027	0.886	0.804–0.978	0.868	0.782–0.963
Conscientiousness	0.900	0.836–0.969	0.905	0.838–0.976	0.903	0.837–0.975
Coping						
Proactive coping	0.944	0.590–1.513	0.902	0.545–1.493	0.888	0.533–1.482
Passive coping	1.839	1.040–3.250	1.889	1.024–3.486	2.066	1.060–4.027
Support seeking	1.380	0.991–1.921	1.228	0.867–1.738	1.212	0.848–1.730

[a] Adjusted for age, sex, education, and marital status