Association of Peritraumatic Dissociation With Symptoms of Depression and Posttraumatic Stress Disorder

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Abstract

Aim—In this study, we evaluated whether peritraumatic dissociation (PD) was associated with symptoms of depression and posttraumatic stress disorder (PTSD), and whether this association was modified by trauma prior to police work.

Method—Symptoms of depression, PTSD, peritraumatic dissociative experience (PDE), and trauma prior to police work were measured using the Center for Epidemiologic Studies Depression scale, PTSD Checklist–Civilian, PDE questionnaire, and the Brief Trauma questionnaire, respectively, in 328 police officers. Separate regression models were used to assess if either symptoms of depression or PTSD were associated with PD stratified by prior trauma. Means were adjusted for race, number of drinks per week, and smoking.

Results—PD was associated with symptoms of PTSD and depression (β = 0.65, $p < .001$ and β = 0.27, $p < .001$, respectively). PD was positively associated with symptoms of PTSD regardless of prior trauma (β = 0.61, $p < .001$ (without prior trauma), 0.75, $p < .001$ (with prior trauma). In contrast to PTSD, depression symptoms were significantly associated with PD scores in individuals with prior trauma (β = 0.47, $p < .001$), but not in individuals without prior trauma (β = 0.13, $p = .165$).

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Limitations—This is a cross-sectional study. Outcomes were obtained via self-report and were not clinically diagnosed. Aspects of both the trauma event as well as the symptoms and severity of PD may have introduced recall bias.

Conclusion—These results add to the literature indicating that PD plays a role in symptoms of PTSD and depression and how prior trauma may modify this relationship.

Keywords

depression; PTSD; posttraumatic stress disorder; peritraumatic dissociation; prior trauma

Police officers have higher rates of posttraumatic stress disorder (PTSD) and depression than the general population (Carlier, Lamberts, & Gersons, 1997; Gersons, 1989; Robinson, Sigman, & Wilson, 1997). Although both peritraumatic dissociation (PD) and prior trauma are independently associated with PTSD and depression, prior trauma may modify the association between PD and PTSD or depression, further increasing the risk of these disorders in officers. Determining if prior trauma in police officers moderates the association between PD and PTSD or PD and depression, may also help to clarify the etiology of PTSD or depression in this high-risk population, furthering our understanding of who may be at the greatest risk.

PTSD and depression are serious psychological disorders that can occur following exposure to one or more traumatic events (Hodgson & Webster, 2011; Johnson, Pike, & Chard, 2001; Marmar, Weiss, Metzler, & Delucchi, 1996; Marmar et al., 1999). Police officers are repeatedly exposed to traumatic events across their working lives, including motor vehicle accidents, armed conflicts, and witnessing violent death (Marmar et al., 2006). For this reason, rates of PTSD and depression may be higher in police officers than in the general population (Carlier et al., 1997; Gersons, 1989; Robinson et al., 1997). Furthermore, police officers with PTSD or depression are at an increased risk for negative health issues such as cardiovascular disease and gastrointestinal disorders, comorbid psychological conditions as well as suicidal ideation and suicide (Danese et al., 2008; Gupta, 2013; Maia et al., 2007; Martin, Marchand, & Boyer, 2009; Sareen et al., 2007; Slavich & Irwin, 2014; Suls & Bunde, 2005). Understanding risk factors that may interact to increase an officers' risk of developing PTSD or depression is an important step to not only prevent and treat these psychological conditions, but to also reduce or prevent concomitant negative psychological and biological consequences.

Nijenhuis and Van der Hart (2011) define dissociation in trauma as "a division of an individual's personality, that is, of the dynamic, biopsychosocial system as a whole that determines his or her characteristic mental and behavioral actions." PD is dissociation that occurs at the time of the trauma (Candel & Merckelbach, 2004). PD phenomenology is thought to occur when an individual's ability to cope with a traumatic event is overwhelmed (Birmes et al., 2003; Blanchard et al., 1996; Bryant, 2005, 2007; Marmar et al., 1996; Marmar et al., 1999). It has been described as an alteration in time or place and individuals often report feelings of depersonalization, altered perceptions of pain, feeling disconnected, or tunnel vision. It is thought to protect individuals from overwhelming distress during trauma (Dalenberg & Carlson, 2012; Marmar, Weiss, & Metzler, 1997; Parlar, Frewen,

Oremus, Lanius, & McKinnon, 2016) and is associated with increased hypothalamic–pituitary–adrenal axis reactivity as well as impaired performance on measures of executive functioning, memory, and verbal recollection (Parlar et al., 2016). Similar responses have been noted in individuals with PTSD and depression as well as individuals who have reported childhood trauma (Molina-Serrano, Linotte, Amat, Souery, & Barreto, 2008). It has been suggested that the presence of PD and concomitant neurological changes may increase an individual's risk of PTSD or depression (Hodgson & Webster, 2011; Inslicht et al., 2010; Johnson et al., 2001; Marmar et al., 1996; Ozer, Best, Lipsey, & Weiss, 2003). However, these relationships are inconsistently shown, possibly due to risk factors that modify the relationship between PD, PTSD, and depression (Molina-Serrano et al., 2008). Prior trauma may be one of these risk factors. It is an excellent candidate, because it is independently associated with PD, PTSD, and depression (Breslau, Chilcoat, Kessler, & Davis, 1999; Breslau, Pe-terson, & Schultz, 2008; DiGangi et al., 2013; Komarovskaya et al., 2014; Ozer et al., 2003; Youngner et al., 2012).

Following a traumatic event, rates of PTSD and depression have been found to be higher in first responders who have reported prior trauma (Breslau et al., 1999; Breslau et al., 2008; Komarovskaya et al., 2014; Nolen-Hoeksema & Morrow, 1991; Ozer et al., 2003). Paramedics who reported a previous history of childhood abuse and neglect were more likely to report feelings of depression and acute stress after responding to a critical incident (Maunder, Halpern, Schwartz, & Gurevich, 2012). In 441 Mississippi officers and firefighters who worked during Hurricane Katrina, PD, PTSD, and depression were associated with early-life victimization (Komarovskaya et al., 2014). A direct relationship between family history of drug and alcohol abuse and anxiety/mood disorders was found with PD and an indirect relationship with PTSD (Inslicht et al., 2010). Among individuals with depression, dissociative symptoms occurred significantly more often in individuals who reported prior trauma than those who didn't (Molina-Serrano et al., 2008). Although these results indicate an interrelationship between prior trauma, PD, PTSD, and depression, to the best of our knowledge, none of these studies evaluated whether prior trauma modified the relationship between PD and symptoms of PTSD, or PD and symptoms of depression in police officers. This is an important step toward increasing our understanding of the etiology of PTSD and depression, to increase our ability to identify officers at greatest risk, and to improve our ability to treat and prevent PTSD and depression in this population.

In the present study we examined whether PD is associated with symptoms of depression and PTSD, and if this association was modified by prior trauma in police officers. Our hypothesis was that symptoms of PTSD and depression would be higher in officers who reported prior trauma relative to those who did not.

Materials and Method

Participants and Procedure

The Buffalo Cardio-Metabolic Occupational Police Stress (BCOPS) study was a cross-sectional study conducted between 2004 and 2009. This study was designed to investigate the association between police stressors and physiological and psychological health consequences. All 710 Buffalo, New York active-duty police officers were asked to

participate. No specific inclusion criteria were used other than the participant had to be a sworn police officer and sign an informed consent. Female officers who were pregnant at the time of the examination were excluded ($n = 2$), because a state of pregnancy changes all of the normal physiological measures. The State University of New York at Buffalo served as the data-collection site. Details of the study design are described elsewhere (Violanti et al., 2006). Briefly, officers completed self- and interviewer-administered questionnaires to provide information on demographic characteristics, lifestyle behaviors, psychological measures, and medical history. The PDE and Brief Trauma Questionnaires (PDEQ, BTQ; Marmar et al., 1997; Derogatis & Melisaratos, 1983, respectively) were not introduced into the study until 6 months after the study was initiated. Therefore, of the 464 officers who completed this study, 136 officers were missing PD, PTSD, or prior trauma data and were excluded from the analyses. With the exception of age, the 136 missing officers did not differ significantly from the officers who were included in the study on any of the study variables. The mean age of the study population was 41.6 years old ($SD = 8.9$) compared with 43.4 years ($SD = 7.4$; $p = .03$) in the missing officers. The State University of New York at Buffalo and the United States Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health Human Subjects Review Board approved the study.

Measures

Assessment of PTSD symptoms—PTSD symptoms were measured using the Posttraumatic Stress Disorder Checklist–Civilian version (PCL-C; Weathers, Litz, Herman, Huska, & Keane, 1993). The PCL-C consists of 17 questions that evaluate the presence of PTSD symptoms over the last month on a 5-point scale ranging from 1 (*not at all*) to 5 (*extremely*). The symptoms are based on the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM–IV*) symptom categories of re-experiencing, avoidance, and hyperarousal (American Psychiatric Association, 1994). An overall symptom-severity score is calculated by summing the scores for each question (range = 17–85); higher scores indicate more symptoms of PTSD. In this study, the mean PTSD symptom scores were 26.4 ($SD = 8.0$) for female officers and 26.0 ($SD = 9.2$) for male officers, with a Cronbach's α of 0.89.

Assessment of symptoms of depression—Depressive symptoms were measured using the Center for Epidemiological Studies–Depression scale (CES-D; Radloff, 1977). The CES-D is a short scale used to measure the symptoms of depression in the general population. It consists of 20 items rated on a 4-point scale according to how often the symptom occurred in the past 7 days: 0 (*rarely or none of the time, less than 1 day*), 1 (*some or little of the time, 1–2 days*), 2 (*occasionally or a moderate amount of the time, 3–4 days*), and 3 (*most of the time, 5–7 days*). Scores for the CES-D range from 0 to 60, with higher scores indicating more symptoms of depression. An overall depressive symptom score is calculated by summing the scores for each question. In this study, the mean CES-D symptom scores were 7.75 ($SD = 6.4$) for female officers and 7.40 ($SD = 6.6$) for male officers, with a Cronbach's of α 0.89.

Assessment of Peritraumatic Dissociation Experience—The PDEQ (Marmar et al., 1997) consists of 10 questions designed to measure state dissociation. It assess an individual's experiences and reactions, such as depersonalization, out-of-body experiences, altered perceptions of pain, or feeling disconnected during and immediately following their most recent traumatic event or critical incident (Marmar et al., 1997). On a 5-point scale ranging from 1 (*not at all true*) to 5 (*extremely true*) officers were asked to respond to statements such as "I had moments of losing track of what was going on," "I 'blanked out' or 'spaced out' or in some way felt that I was not part of what was going on," or "I felt confused; that is, there were moments when I had difficulty making sense of what was happening" (Marmar et al., 1997). An overall PDEQ score is calculated by summing the scores, with higher scores indicating more symptoms. In this study, the mean PDEQ scores were 15.0 ($SD = 6.0$) for female officers and 13.7 ($SD = 5.0$) for male officers, with a Cronbach's α of 0.89.

Assessment of prior trauma—A modified version of the BTQ was used for this study (Derogatis & Melisaratos, 1983). This assessment was used because it includes an explicit assessment of PTSD Criterion A1, it has been shown to be related to higher dissociation scores, and because it is brief. The BTQ assesses 10 different traumatic events such as combat, serious car accident, natural or technological disaster, life-threatening illness, physical assault, unwanted sexual contact, and being seriously injured. For this study, the BTQ was modified in two ways; the first was that the introduction was changed from "The following questions ask about events that may be extraordinarily stressful or disturbing for almost everyone" to "Prior to coming into police work, have you had experiences in your life which you would consider traumatic?" Second, the question asking "Has a close family member or friend died violently for example, in a serious car crash, mugging, or attack?" was omitted and an open-response item included, which allowed the officers to describe any other traumatic event not otherwise listed. For all other questions, the officers were asked to respond either *yes* or *no*. If the officers responded yes to any of the questions, or listed an event in the open-response question, they were counted as having had a trauma prior to police work; otherwise they were counted as not having a trauma prior to police work. In this study, the mean number of prior traumas reported by female officers was 0.95 ($SD = 1.4$) and 1.2 ($SD = 1.5$) for male officers. The Cronbach's α was 0.89.

Assessment of Covariates

Basic demographic characteristics, lifestyle behaviors, and medical history were collected through self- and interviewer-administered questionnaires and physical examination. Marital status originally consisted of six categories that were ultimately combined into three groups (single, divorced, and married). Educational status was elected from eight choices that ranged from "less than 12 years of school" to "graduate degree." To permit adequate numbers in each category, these eight choices were collapsed into only two levels, 12 years/GED and 12 years/GED. Although ethnicity could be selected from six different categories (e.g., no, not Spanish/Hispanic/Latino/Latina; yes, other Spanish/Hispanic/Latino/Latina) and race from 15 different categories (e.g., Caucasian, Black or African American, American Indian, or Alaskan Native, Asian Indian, Chinese, Samoan), all the officers selected either Caucasian, African American, or Hispanic. Due to small numbers, and to

protect participant confidentiality, the Caucasian and Hispanic groups were combined. Officer rank included police officer, sergeant/lieutenant, captain/detective, and other, but was collapsed into two categories: police officer and other due to small numbers. Previous military history was collected as either *yes* or *no*. Smoking status was collected as *former*, *current*, or *never*.

Statistical Analysis

Descriptive statistics were used to characterize the study population. Regression models were used to assess if PD was associated with either symptoms of PTSD or symptoms of depression. An interaction test was used to assess Effect Modification × Prior Trauma in the associations between PD and PTSD and PD and depression. Stratification by prior trauma was used to present the results.

Confounders were identified based on the literature, or because they were associated with both the dependent and independent variables. Race, sex, number of alcoholic drinks per week, and smoking were identified as potential confounders and all models were adjusted for these confounders.

Results

The mean age of the police officers is 41.6 ($SD = 8.9$) and the average years served on the force is 14.4 ($SD = 8.4$) years. Seventy-six percent of the population is male. Approximately 72% of officers were of the rank "police officer" (see Table 1). Eighty percent of the population was Caucasian/Hispanic and 20% African American. Most of the officers obtained at least a high school education (89.7%); most of them did not have military experience (72.4%). On average, they drank five ($SD = 8.2$) alcoholic beverages per week (see Table 1).

After adjusting for covariates, PD was positively associated with symptoms of PTSD ($\beta = 0.65$, $p < .001$) and depression ($\beta = 0.27$, $p < .001$); as PD increased, so too did symptoms of PTSD and depression (see Table 2). Stratification of the models evaluating the association between PD, symptoms of PTSD, and depression by the presence or absence of trauma prior to police work indicated that prior trauma did not moderate the effect of PD on symptoms of PTSD, but did moderate the effect of PD on symptoms of depression (see Table 3). PD scores were positively associated with symptoms of PTSD in officers with ($\beta = 0.75$, $p < .001$) and without trauma prior to police work ($\beta = 0.61$, $p < .001$), which indicated that the association between PD and PTSD is not dependent on trauma prior to police work. In contrast to PTSD, PD scores were only significantly associated with symptoms of depression in officers with trauma prior to police work ($\beta = 0.47$, $p < .001$), but not in individuals without trauma prior to police work ($\beta = 0.13$, $p = .17$; see Figure 1). This indicates that trauma prior to police work does have a moderating effect on the association between PD and symptoms of depression. These results are further supported by the interaction results, which indicate that the effect of PD on symptoms of PTSD did not differ by the presence or absence of trauma prior to police work ($p = .185$), while the effect of PD on symptoms of depression did differ by the presence or absence of trauma prior to police work ($p < .001$).

Discussion

We evaluated whether PD was associated with PTSD and depression and if this relationship was modified by trauma that took place prior to police work. First, we found that as PD increased, so too did both symptoms of depression and PTSD. Second, we found that trauma prior to police work moderated the effect of PD on symptoms of depression, but not PTSD.

Our findings are similar to previous studies that have reported associations between PD and PTSD and PD and depression (Hodgson & Webster, 2011; Inslicht et al., 2010; Johnson et al., 2001; Marmar et al., 1996; Ozer et al., 2003; Weiss, Marmar, Metzler, & Ronfeldt, 1995). Marmar et al. (1996, 1999) reported that PD was significantly associated with PTSD after controlling for factors such as level of exposure, distress, locus of control, and social support. Similarly, Johnson, Pike, and Chard, (2001) found a relationship between PD and both PTSD and depression.

Unlike our study, previous research has principally focused on evaluating the association between prior trauma and PTSD mediated by PD or trait dissociation (Inslicht et al., 2010; McCaslin et al., 2006). Using path analysis, Inslicht et al. (2010) found neither direct nor indirect effects when they evaluated if PD mediated the relationship between prior civilian trauma and PTSD in police recruits. In contrast, McCaslin et al. (2006) found that both trait dissociation and PD were important mediators between prior trauma and PTSD. When the relationship between PD, trait dissociation, and PTSD were evaluated, PD did not fully mediate the relationship between trait dissociation and PTSD, indicating that trait dissociation may be as important as PD in the relationship between prior trauma and PTSD (McCaslin et al., 2006). Future studies could evaluate this question.

Dissociative symptoms have been found to occur in individuals with depression, particularly among individuals with a history of trauma (Molina-Serrano et al., 2008). These symptoms may be associated with neurocognitive dysfunction, particularly with memory and attention (Parlar et al., 2016). These researchers did not consider any association of PD and prior trauma with PTSD. Therefore, future longitudinal research is needed to clarify these relationships. Furthermore, because it is not standard to assess PD with depression, and because impaired neurological function may negatively impact treatment, assessing PD in officers who report depression may facilitate treatment (Parlar et al., 2016).

Strengths of this study include a high response rate, use of standardized protocol and measures, as well as investigation of a unique occupational cohort. However, several limitations should be kept in mind while interpreting the results of this study. Our study was cross-sectional, and as such, we cannot show any direction of causation. Information on PD, PTSD, and depression was obtained via self-report and was not clinically diagnosed, so lacked the clinical objectivity that might have helped participants more accurately assess and report their symptoms. Further, police officers may be reluctant to report symptoms of PTSD and depression; therefore the type and or severity of symptoms may be underreported (Gilmartin, 2002; Wester, Arndt, Sedivy, & Arndt, 2010). Another limitation is that some officers may have forgotten aspects of both the trauma event as well as the symptoms and severity of PD. This may have introduced recall bias into our results (Candel &

Merckelbach, 2004). The results should not be generalized to all workers, but may be generalizable to other police departments of similar geographic location and size.

These results indicate that prior trauma modifies the association between PD and depression. Because PD is rarely assessed in individuals with depression and may impact treatment, these results could have implications for clinicians working with police officers who experience symptoms of depression, particularly in those who report prior trauma (Parlar et al., 2016).

Acknowledgments

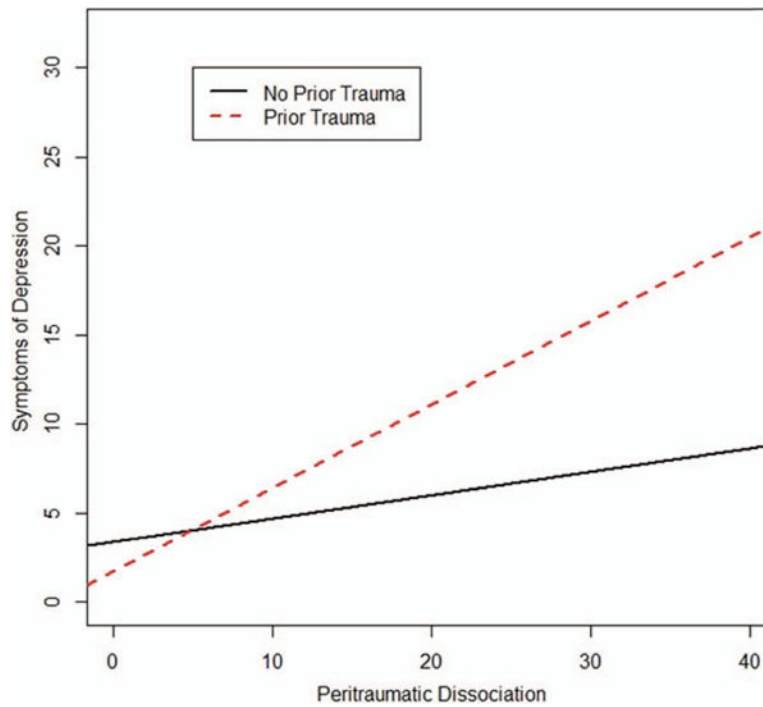## References

American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th. Washington, DC: Author; 1994.

Birmes P, Brunet A, Carreras D, Ducasse JL, Charlet JP, Lauque D, Schmitt L. The predictive power of peritraumatic dissociation and acute stress symptoms for posttraumatic stress symptoms: A three-month prospective study. The American Journal of Psychiatry. 2003; 160:1337–1339. [PubMed: 12832251]

Blanchard EB, Hickling EJ, Taylor AE, Loos WR, Forneris CA, Jaccard J. Who develops PTSD from motor vehicle accidents? Behaviour Research and Therapy. 1996; 34:1–10. [PubMed: 8561759]

Breslau N, Chilcoat HD, Kessler RC, Davis GC. Previous exposure to trauma and PTSD effects of subsequent trauma: Results from the Detroit Area Survey of Trauma. The American Journal of Psychiatry. 1999; 156:902–907. http://dx.doi.org/10.1176/ajp.156.6.902. [PubMed: 10360130]

Breslau N, Peterson EL, Schultz LR. A second look at prior trauma and the posttraumatic stress disorder effects of subsequent trauma: A prospective epidemiological study. Archives of General Psychiatry. 2008; 65:431–437. http://dx.doi.org/10.1001/archpsyc.65.4.431. [PubMed: 18391131]

Bryant RA. Predicting posttraumatic stress disorder from acute reactions. Journal of Trauma & Dissociation: The Official journal of the International Society for the Study of Dissociation. 2005; 6:5–15. http://dx.doi.org/10.1300/J229v06n02_02.

Bryant RA. Does dissociation further our understanding of PTSD? Journal of Anxiety Disorders. 2007; 21:183–191. http://dx.doi.org/10.1016/j.janxdis.2006.09.012. [PubMed: 17097264]

Candel I, Merckelbach H. Peritraumatic dissociation as a predictor of post-traumatic stress disorder: A critical review. Comprehensive Psychiatry. 2004; 45:44–50. http://dx.doi.org/10.1016/j.comppsych.2003.09.012. [PubMed: 14671736]

Carlier IV, Lamberts RD, Gersons BP. Risk factors for posttraumatic stress symptomatology in police officers: A prospective analysis. Journal of Nervous and Mental Disease. 1997; 185:498–506. http://dx.doi.org/10.1097/00005053-199708000-00004. [PubMed: 9284863]

Dalenberg C, Carlson EB. Dissociation in posttraumatic stress disorder: Part II. How theoretical models fit the empirical evidence and recommendations for modifying the diagnostic criteria for PTSD. Psychological Trauma: Theory, Research, Practice, and Policy. 2012; 4:551–559. http://dx.doi.org/10.1037/a0027900.

Danese A, Moffitt TE, Pariante CM, Ambler A, Poulton R, Caspi A. Elevated inflammation levels in depressed adults with a history of childhood maltreatment. Archives of General Psychiatry. 2008; 65:409–415. http://dx.doi.org/10.1001/archpsyc.65.4.409. [PubMed: 18391129]

Derogatis LR, Melisaratos N. The Brief Symptom Inventory: An introductory report. Psychological Medicine. 1983; 13:595–605. http://dx.doi.org/10.1017/S0033291700048017. [PubMed: 6622612]

DiGangi JA, Gomez D, Mendoza L, Jason LA, Keys CB, Koenen KC. Pretrauma risk factors for posttraumatic stress disorder: A systematic review of the literature. Clinical Psychology Review. 2013; 33:728–744. http://dx.doi.org/10.1016/j.cpr.2013.05.002. [PubMed: 23792469]

Gersons BP. Patterns of PTSD among police officers following shooting incidents: A two-dimensional model and treatment implications. Journal of Traumatic Stress. 1989; 2:247–257. http://dx.doi.org/10.1002/jts.2490020302.

Gilmartin, KM. Emotional survival for law enforcement: A guide for officers and their families. San Diego, CA: Praeger; 2002.

Gupta MA. Review of somatic symptoms in post-traumatic stress disorder. International Review of Psychiatry. 2013; 25:86–99. http://dx.doi.org/10.3109/09540261.2012.736367. [PubMed: 23383670]

Hodgson RC, Webster RA. Mediating role of peritraumatic dissociation and depression on post-MVA distress: Path analysis. Depression and Anxiety. 2011; 28:218–226. http://dx.doi.org/10.1002/da.20774. [PubMed: 21328635]

Inslicht SS, McCaslin SE, Metzler TJ, Henn-Haase C, Hart SL, Maguen S, Marmar CR. Family psychiatric history, peritraumatic reactivity, and posttraumatic stress symptoms: A prospective study of police. Journal of Psychiatric Research. 2010; 44:22–31. http://dx.doi.org/10.1016/j.jpsychires.2009.05.011. [PubMed: 19683259]

Johnson DM, Pike JL, Chard KM. Factors predicting PTSD, depression, and dissociative severity in female treatment-seeking childhood sexual abuse survivors. Child Abuse & Neglect. 2001; 25:179–198. http://dx.doi.org/10.1016/S0145-2134(00)00225-8. [PubMed: 11214810]

Komarovskaya I, Brown AD, Galatzer-Levy IR, Madan A, Henn-Haase C, Teater J, Chemtob CM. Early physical victimization is a risk factor for posttraumatic stress disorder symptoms among Mississippi police and firefighter first responders to Hurricane Katrina. Psychological Trauma: Theory, Research, Practice, and Policy. 2014; 6:92–96. http://dx.doi.org/10.1037/a0031600.

Maia DB, Marmar CR, Metzler T, Nóbrega A, Berger W, Mendlowicz MV, Figueira I. Post-traumatic stress symptoms in an elite unit of Brazilian police officers: Prevalence and impact on psychosocial functioning and on physical and mental health. Journal of Affective Disorders. 2007; 97:241–245. http://dx.doi.org/10.1016/j.jad.2006.06.004. [PubMed: 16859752]

Marmar CR, McCaslin SE, Metzler TJ, Best S, Weiss DS, Fagan J, Neylan T. Predictors of posttraumatic stress in police and other first responders. Annals of the New York Academy of Sciences. 2006; 1071:1–18. http://dx.doi.org/10.1196/annals.1364.001. [PubMed: 16891557]

Marmar, CR., Weiss, DS., Metzler, TJ. The Peritraumatic Dissociative Experiences Questionnaire. In: Wilson, JP., Keane, TM., editors. Assessing psychological trauma and PTSD. New York, NY: Guilford Press; 1997. p. 144-167.

Marmar CR, Weiss DS, Metzler TJ, Delucchi K. Characteristics of emergency services personnel related to peritraumatic dissociation during critical incident exposure. The American Journal of Psychiatry. 1996; 153:94–102. http://dx.doi.org/10.1176/ajp.153.7.94. [PubMed: 8659646]

Marmar CR, Weiss DS, Metzler TJ, Delucchi KL, Best SR, Wentworth KA. Longitudinal course and predictors of continuing distress following critical incident exposure in emergency services personnel. Journal of Nervous and Mental Disease. 1999; 187:15–22. http://dx.doi.org/10.1097/00005053-199901000-00004. [PubMed: 9952249]

Martin M, Marchand A, Boyer R. Traumatic events in the workplace: Impact on psychopathology and healthcare use of police officers. International Journal of Emergency Mental Health. 2009; 11:165–176. [PubMed: 20437847]

Maunder RG, Halpern J, Schwartz B, Gurevich M. Symptoms and responses to critical incidents in paramedics who have experienced childhood abuse and neglect. Emergency Medicine Journal. 2012; 29:222–227. http://dx.doi.org/10.1136/emj.2010.099838. [PubMed: 21422029]

McCaslin SE, Rogers CE, Metzler TJ, Best SR, Weiss DS, Fagan JA, Marmar CR. The impact of personal threat on police officers' responses to critical incident stressors. Journal of Nervous and Mental Disease. 2006; 194:591–597. http://dx.doi.org/10.1097/01.nmd.0000230641.43013.68. [PubMed: 16909067]

Molina-Serrano A, Linotte S, Amat M, Souery D, Barreto M. Dissociation in major depressive disorder: A pilot study. Journal of Trauma & Dissociation. 2008; 9:411–421. http://dx.doi.org/10.1080/15299730802139311. [PubMed: 19042786]

Nijenhuis ER, van der Hart O. Dissociation in trauma: A new definition and comparison with previous formulations. Journal of Trauma & Dissociation. 2011; 12:416–445. http://dx.doi.org/10.1080/15299732.2011.570592. [PubMed: 21667387]

Nolen-Hoeksema S, Morrow J. A prospective study of depression and posttraumatic stress symptoms after a natural disaster: The 1989 Loma Prieta Earthquake. Journal of Personality and Social Psychology. 1991; 61:115–121. http://dx.doi.org/10.1037/0022-3514.61.1.115. [PubMed: 1890582]

Ozer EJ, Best SR, Lipsey TL, Weiss DS. Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. Psychological Bulletin. 2003; 129:52–73. http://dx.doi.org/10.1037/0033-2909.129.1.52. [PubMed: 12555794]

Parlar M, Frewen PA, Oremus C, Lanius RA, McKinnon MC. Dissociative symptoms are associated with reduced neuropsychological performance in patients with recurrent depression and a history of trauma exposure. European Journal of Psychotraumatology. 2016; 7:29061. http://dx.doi.org/10.3402/ejpt.v7.29061. [PubMed: 26927902]

Radloff LS. The CES-D Scale: A self-report depression scale for research in the general population. Applied Psychological Measurement. 1977; 1:385–401. http://dx.doi.org/10.1177/014662167700100306.

Robinson HM, Sigman MR, Wilson JP. Duty-related stressors and PTSD symptoms in suburban police officers. Psychological Reports. 1997; 81:835–845. http://dx.doi.org/10.2466/pr0.1997.81.3.835. [PubMed: 9400075]

Sareen J, Cox BJ, Stein MB, Afifi TO, Fleet C, Asmundson GJ. Physical and mental comorbidity, disability, and suicidal behavior associated with posttraumatic stress disorder in a large community sample. Psychosomatic Medicine. 2007; 69:242–248. http://dx.doi.org/10.1097/PSY.0b013e31803146d8. [PubMed: 17401056]

Slavich GM, Irwin MR. From stress to inflammation and major depressive disorder: A social signal transduction theory of depression. Psychological Bulletin. 2014; 140:774–815. http://dx.doi.org/10.1037/a0035302. [PubMed: 24417575]

Suls J, Bunde J. Anger, anxiety, and depression as risk factors for cardiovascular disease: The problems and implications of overlapping affective dispositions. Psychological Bulletin. 2005; 131:260–300. http://dx.doi.org/10.1037/0033-2909.131.2.260. [PubMed: 15740422]

Violanti JM, Burchfiel CM, Miller DB, Andrew ME, Dorn J, Wactawski-Wende J, Trevisan M. The Buffalo Cardio-Metabolic Occupational Police Stress (BCOPS) pilot study: Methods and participant characteristics. Annals of Epidemiology. 2006; 16:148–156. http://dx.doi.org/10.1016/j.annepidem.2005.07.054. [PubMed: 16165369]

Weathers, F., Litz, B., Herman, D., Huska, J., Keane, T. The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility. Paper presented at the Annual Convention of the International Society for Traumatic Stress Studies; San Antonio, TX. 1993 Oct. Retrieved from http://www.ptsd.va.gov/professional/pages/assessments/ptsd-checklist.asp

Weiss DS, Marmar CR, Metzler TJ, Ronfeldt HM. Predicting symptomatic distress in emergency services personnel. Journal of Consulting and Clinical Psychology. 1995; 63:361–368. http://dx.doi.org/10.1037/0022-006X.63.3.361. [PubMed: 7608348]

Wester SR, Arndt D, Sedivy SK, Arndt L. Male police officers and stigma associated with counseling: The role of anticipated risks, anticipated benefits and gender role conflict. Psychology of Men & Masculinity. 2010; 11:286–302. http://dx.doi.org/10.1037/a0019108.

Youngner CG, Burton MS, Price M, Zimmerman L, Kearns MC, Houry D, Rothbaum BO. The contributions of prior trauma and peritraumatic dissociation to predicting post-traumatic stress disorder outcome in individuals assessed in the immediate aftermath of a trauma. Western Journal of Emergency Medicine. 2012; 13:220–224. http://dx.doi.org/10.5811/westjem.2012.3.11777. [PubMed: 22900118]

Figure 1.
Effects of peritraumatic dissociation and prior trauma on symptoms of depression. An interaction test was used to assess how prior trauma might have modified the association between peritraumatic dissociation and symptoms of depression. Here, the regression coefficients are plotted showing that peritraumatic dissociation scores were significantly associated with symptoms of depression in officers with trauma prior to police work (β = 0.47, $p < .001$), but not in officers without trauma prior to police work ($\beta = 0.13$, $p = 0.16$; interaction $p = .001$). These results indicate that the association between peritraumatic dissociation and symptoms of depression is dependent on prior trauma. See the online article for the color version of this figure.

Table 1

Associations of Selected Characteristics of the Study Population With Gender

Characteristics	All (*n* = 328) *M* ± *SD*	Female (*n* = 79) *M* ± *SD*	Male (*n* = 249) *M* ± *SD*
Age	41.6 (8.9)	40.8 (6.8)	41.9 (9.5)
Years of service	14.4 (8.4)	12.3 (6.5)	15.1 (8.8)
Drinks per week	5.02 (8.2)	3.84 (6.4)	5.40 (8.7)
Sleep quality	6.57 (3.3)	6.96 (3.6)	6.44 (3.2)
PCL-C	26.1 (8.9)	26.4 (8.0)	26.0 (9.2)
CES-D	7.49 (6.5)	7.75 (6.4)	7.40 (6.6)
Prior trauma	1.15 (1.5)	.95 (1.4)	1.21 (1.5)
PD	14.0 (5.3)	15.0 (6.0)	13.7 (5.0)
	N (%)	*N* (%)	*N* (%)
Race/ethnicity			
Caucasian/Hispanic	251 (79.7)	59 (75.6)	192 (81.0)
African American	64 (20.3)	19 (24.4)	45 (19.0)
Education			
12 years/GED	33 (10.3)	4 (5.1)	29 (12.0)
12 years/GED	286 (89.7)	74 (94.9)	212 (88.0)
Marital Status			
Single	37 (11.6)	16 (20.5)	21 (8.7)
Married	231 (72.4)	45 (57.7)	186 (77.2)
Divorced	51 (16.0)	17 (21.8)	34 (14.1)
Military experience			
No	231 (72.4)	67 (85.9)	164 (68.1)
Yes	88 (27.6)	11 (14.1)	77 (31.9)
Rank			
Police officer	231 (72.4)	65 (83.3)	166 (68.9)
Other [*]	88 (27.6)	13 (16.7)	75 (31.1)
Smoking status			
Current	58 (18.2)	23 (30.2)	35 (14.5)
Former	76 (23.9)	22 (29.0)	54 (22.3)
Never	184 (57.9)	31 (40.8)	153 (63.2)

Note. PCL-C = Posttraumatic Stress Disorder Checklist–Civilian; CES-D = Center for Epidemiological Studies–Depression scale; PD = peritraumatic dissociation.

[*] Other includes sergeant, lieutenant, captain, detective, and other.

Table 2

Association Between Peritraumatic Dissociation With Posttraumatic Stress Disorder Symptoms and Symptoms of Depression

	Peritraumatic Dissociation		
Condition	Model 1 β (*p* value)	Model 2 β (*p* value)	Model 3 β (*p* value)
PTSD	.69 (<.001)	.72 (<.001)	.65 (<.001)
Depression	.31 (<.001)	.31 (<.001)	.27 (<.001)

Note. Model 1: unadjusted; Model 2: adjusted for race; Model 3: adjusted for race, sex, number of drinks per week, and smoking status.

Table 3

Association Between Peritraumatic Dissociation With Posttraumatic Stress Disorder Symptoms and Symptoms of Depression Stratified by Prior Trauma

	Peritraumatic Dissociation		
Prior Trauma	**Model 1 β** (*p* value)	**Model 2 β** (*p* value)	**Model 3 β** (*p* value)
NO			
PTSD	.66 (<.001)	.62 (<001)	.61 (<.001)
Depression	.17 (<.041)	.15 (<.083)	.13 (<.165)
YES			
PTSD	.68 (<.001)	.84 (<.001)	.75 (<.001)
Depression	.43 (<.001)	.51 (<.001)	.47 (<.001)

Note. Model 1: unadjusted; Model 2: adjusted for race; Model 3: adjusted for race, sex, number of drinks per week, and smoking status.

Interaction *p* values adjusted for race, sex, number of drinks per week, and smoking status: Prior Trauma × PTSD (*p* = .185); Prior Trauma × Depression (*p* < .001).