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# Understanding and Treating Posttraumatic Stress Disorder (PTSD) in Veterans

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## Introduction

Public awareness of posttraumatic stress disorder (PTSD), particularly among veterans, has risen dramatically due to increased media attention. However, accurate knowledge about the diagnosis, functional impact, and treatment of PTSD is frequently lacking among the general population. The requirement of exposure to

a traumatic event that precipitates the development of symptoms makes PTSD unique among psychiatric disorders. However, while the majority of people will experience at least one potentially traumatic event in their lifetime, only a minority will go on to develop PTSD. Four clusters of symptoms characterize the current PTSD diagnosis: reexperiencing, avoidance, hyperarousal, and negative changes in cognitions (see Table 15.1 for specific diagnostic criteria). PTSD is often associated with profound difficulties in social, occupational, and physical health functioning and quality of life (e.g., Koenen et al. 2008; Schnurr et al. 2006; Zatzick et al. 1997).

Serving in the military, particularly in combat, can increase the likelihood of trauma exposure. Combat service has been associated with higher rates of PTSD, depression, and alcohol misuse (Hoge et al. 2004; Kang et al. 2003; Kulka et al. 1990). Potentially traumatic military and combat-related experiences can include events occurring during rigorous training, life-threatening situations, being physically injured, bearing witness to death and dying, death and injury of comrades, interpersonal violence (e.g., sexual harassment and assault), and participation in actions that result in the injury or death of another. This chapter will provide an overview of PTSD, military and combat-related aspects, and clinical guidelines and treatments.

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**Table 15.1** Core PTSD criteria clusters by version of DSM

Version of DSM			
DSM-III	DSM-III-TR	DSM-IV	DSM-5
A. Exposure to a stressor that would cause significant distress in majority of people	A. Exposure to a stressor unusual for most humans to experience and that would be significantly distressing to most people	A. Exposure to a traumatic stressor (witnessed, experienced, or learned about) and experienced intense emotional distress (fear, horror, helplessness)	A. Exposure to a traumatic stressor (witnessed, experienced, or learned about) that involved risk for or actual death, severe injuries, or sexual assault
B. Reexperiencing symptoms related to trauma (1+ of 3 criteria)	B. Reexperiencing symptoms related to trauma (1+ of 4 criteria)	B. Reexperiencing symptoms related to trauma (1+ of 5 criteria)	B. Intrusive symptoms related to trauma (1+ of 5 criteria)
C. Numbing symptoms and reduced interactions with external world after trauma (1+ of 3 criteria)	C. Avoidance of trauma-related stimuli and numbing symptoms (3+ of 4 criteria)	C. Avoidance of trauma-related stimuli and numbing symptoms (3+ of 7 criteria)	C. Avoidance of trauma-related stimuli symptoms (1+ of 2 criteria)
D. Hyperarousal and reactivity present after trauma (2+ of 6 criteria)	D. Hyperarousal and reactivity present after trauma (2+ of 6 criteria)	D. Hyperarousal and reactivity present after trauma (2+ of 5 criteria)	D. Negative changes in thoughts and mood starting or worsening after trauma (2+ of 7 criteria)
			E. Hyperarousal and reactivity starting or worsening after trauma (2+ of 6 criteria)

*DSM-III* criteria (p. 238), *DSM-III-R* (pp. 250–251), *DSM-IV-TR* criteria (pp. 467–468), and *DSM-5* criteria (pp. 271–280). *DSM-IV-TR* and *DSM-5* criteria exclude criteria specific to children and adolescents

## Historical Overview of PTSD

### Conceptual Precursors

Although the PTSD diagnosis did not enter the *DSM* until its third edition in 1980, the concept of maladaptive posttraumatic reactions can be traced back to at least the ancient Greeks. Drawing attention to the similarities between post-deployment reactions some veterans face and the experiences of select characters in the ancient Greek epic poems the *Iliad* and the *Odyssey*, psychiatrist Jonathan Shay (King et al. 1999; Shay 1994) makes a compelling case for viewing ancient Greek warriors from a modern-day lens. However, the recognition of such a postwar or posttraumatic syndrome has only recently been examined from a psychological standpoint. Over two millennia later, in the American Civil War, “soldier’s heart” (or Da Costa’s syndrome) was observed as a condition characterized by cardiac abnormalities such as

palpitations, chest pain, and difficulty exerting energy (Renshaw 2011).

Eventually professionals began to view this condition as more psychological in nature. The attention to trauma in psychiatry first gained significance through Pierre Janet’s (1889) book, *L’automatisme psychologique*, in which he explored how trauma can lead to severe dissociated states (van der Kolk et al. 1989). In World War I, the term “shell shock” referred to a collection of symptoms displayed by soldiers exposed to explosions from artillery rounds, combat weaponry, or other explosives (Renshaw 2011). Some of these soldiers expressed severe anxiety symptoms, others were dissociative or mute, and others had primarily psychosomatic complaints. Debate raged about whether there was an underlying physical origin of these symptoms, but many soldiers’ claims for disability, in Britain at least, were approved.

By World War II, phrases such as “combat fatigue,” “combat stress reaction,” and “battle neurosis” began replacing older terms as common vernacular for similar syndromes. Still, the symptoms

and theories behind these conditions remained diverse and little understood. One camp argued for physiological underpinnings, whereas others blamed mental processes. Edward Strecker, an American psychiatrist and consultant to the military, even blamed mothers for weakening their sons with letters from home that undermined their motivation for combat (Koenen et al. 2003). The US military leadership did not know what to think of these soldiers. Unfortunately, in 1943, Army General George Patton infamously struck in anger two Army soldiers suffering from “exhaustion” at a military medical facility (McCarthy and Petrakis 2010). Though his superior General Dwight Eisenhower, future president of the United States, made him apologize, the incident became emblematic of how some in the military view soldiers with less visible wounds. These attitudes and controversies continued into the Korean and Vietnam wars.

Treatments for these war-related conditions were as diverse as the theories of etiology. Generally afflicted soldiers were sent to a medical facility. Military psychiatrists were trained to treat combat fatigue or neurosis with a variety of methods ranging from rest to more invasive treatments like sodium amytal (a barbiturate derivative now known as amobarbital) and even electric shock in more severe cases (for a historical training video, see Pittman et al. 2012).

### Case Study

Former US Army Staff Sergeant (Sgt.) Darren Smith (pseudonym) had just started his second semester at the local community college, after recently separated from military service. Although only 26 years old, Darren had already seen and dealt with situations that required him to take on a tremendous amount of responsibility. During his combat deployment in Afghanistan, he faced a number of situations where he or one of his comrades could have been injured or killed, including exposure to an improvised explosive device (IED) that hit his Humvee. He had needed to be aware, careful, and disciplined in his job to make

sure that he was an asset to his team, not placing anyone else at risk. He had been in ambiguous situations where he was unsure of the best option but needed to make a decision. He made the best decision he could at the time but still sometimes pondered whether he could have done something different, if another decision would have been the better one.

Darren was unprepared for the anxiety and edginess he experienced soon after separation from the military, and he felt it even more acutely on the crowded busy campus. He wondered why he was unable to sleep until late hours at night, sometimes not falling asleep at all, and disturbed by the nightmares that would sometimes wake him once he did manage to fall asleep. Memories from his deployment often replayed in his mind, and he had trouble pushing them aside. He found himself easily angered by other students in his classes, who were texting or not pulling their weight during group assignments. He was determined to achieve his goal to transfer to a 4-year school and graduate in a healthcare-related area, as he wanted to pursue a career where he could make a difference in the lives of people. He was careful to turn in assignments on time, and he studied hard for his tests; however, he had trouble focusing during class and remembering information. There were even times he had to abruptly get up and leave the classroom, triggered by something someone said—usually about politics, war, or veterans. Finally, there were times that feelings of anxiety and depression became overwhelming, and he was unable to leave his apartment for the day or days at a time.

His grades during his first semester had been disappointing and he was at risk of academic probation. He wondered how much longer he would be able to continue to keep it together with little sleep and the frequent and vivid intrusive memories. Darren wasn't sure what was wrong with

him. He felt alone and missed the camaraderie of the military. Darren had heard of posttraumatic stress and he thought perhaps this was what he had. He wondered whether he should talk to someone, such as a doctor, but was ambivalent, as he had been able to handle worse situations and felt like he should be able to handle this on his own as well.

## Modern Conceptualizations and Diagnosis

In 1980, the American Psychiatric Association published the first criteria for the newly coined posttraumatic stress disorder in the *DSM-III*. Criterion A, the traumatic event, was defined as “a recognizable stressor that would evoke significant symptoms of distress in almost everyone” (p. 238) and was described as “generally outside the range of usual human experience” (p. 236). The symptom criteria set the stage for decades of the three cluster conceptualization of PTSD: (1) reexperiencing, (2) avoidance and numbing, and (3) hyperarousal and hypervigilance (though not initially labeled as such). *DSM-III* also introduced subtypes and specifiers—acute (onset of symptoms within 6 months of trauma and present for less than 6 months), chronic (symptoms lasting longer than 6 months), and delayed (onset at least 6 months after trauma). *DSM-III-R* (American Psychiatric Association 1987) added greater specification of Criterion A with examples. *DSM-IV* and its text revision (*DSM-IV*, American Psychiatric Association 1994, 2000) attempted to address continued Criterion A controversy by removing the language “outside the range of usual human experience” and adding requirements of emotional reactions during the trauma of intense fear, helplessness, or horror. Changes to this definition raised rates of meeting the trauma criterion by 22 % (Jakupcak et al. 2009).

In 2013, the current *DSM-5* made significant changes to the PTSD diagnosis (American

Psychiatric Association 2013). First, it separated PTSD from the anxiety disorder section and created a new domain on trauma- and stress-related disorders. Criterion A was tweaked again by clarifying specific types of trauma that would or would not count (e.g., voluntarily watching violent YouTube videos does not count as traumatic, no matter how horrific) and removing the emotional reaction requirements. Importantly, the three clusters of symptoms were divided into four clusters: (1) intrusion, (2) avoidance, (3) negative alterations in cognition or mood, and (4) arousal and reactivity. The delayed onset specifier was maintained and joined by a “with dissociative symptoms” one. For a comparison of the various *DSM* criteria for PTSD, see Table 15.1.

Importantly, the PTSD diagnosis has had a fair share of criticisms over the years (Bodkin et al. 2007; Rosen and Lilienfeld 2008; Rosen et al. 2008, 2010) (cf., Yehuda and McFarlane 2009). Even Robert Spitzer, one of the architects of the *DSM-III* (APA 1980) that introduced PTSD, has recognized how controversial it has been in terms of its uniqueness (high comorbidity), specific criteria, overall validity, and use in practice (Spitzer et al. 2007).

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## Epidemiology of PTSD

### Prevalence

Understanding the epidemiology of PTSD is an ongoing and vital task for researchers (Blanco 2011). In the first National Comorbidity Survey with a general US population sample, lifetime exposure to *DSM-III-R*-defined trauma was 55.7 % (60.7 % in men, 51.2 % in women), and the lifetime prevalence of PTSD was 7.8 % (5.0 % in men, 10.4 % in women) (Kessler et al. 1995). In a replication using *DSM-IV* criteria, lifetime PTSD prevalence was similar at 6.8 % (3.6 % in men; 9.7 % in women), and unlike the first study, the replication reported 12-month prevalence, which was at 3.6 % (1.8 % in men, 5.2 % in women) (Kessler et al. 2005; National Comorbidity Survey 2005).

In military and veteran populations, studies have shown a greater prevalence of PTSD and a reduced gender difference. Three large studies have looked at PTSD by era (see Table 15.2). The National Vietnam Veterans Readjustment Study (NVVRS) conducted in the 1980s (thus on *DSM-III* criteria) found a lifetime prevalence of 30.9 % in men and 26.9 % in women veterans (Kulka et al. 1988, 1990). At the time of the study, 15.2 % of male and 8.1 % of female veterans were diagnosed with PTSD. Marmar et al. (2015) conducted a follow-up study of veterans who had participated in the NVVRS, the National Vietnam Veterans Longitudinal Study (NVVLS). Over two decades following the original study, a significant number of male and female veterans continued to meet criteria for a full diagnosis or subthreshold PTSD symptoms (11.2 % and 8.7 %, respectively). Among deployed Gulf War veterans, Kang et al. (2003) found 12.1 % met the cutoff score based on self-reported symptoms. This was a threefold increase of risk compared to non-deployed Gulf War era veterans. For Operation Enduring Freedom/Operation Iraqi Freedom veterans, the most recent era of combat veterans, a similar current prevalence rate of PTSD (13.8 %) has been reported (Tanielian and Jaycox 2008). Predominately male (over 75 %), risk by gender for the Gulf War and Operation Enduring Freedom/Operation Iraqi Freedom veteran samples was not reported. More recently, a meta-analysis of 33 studies involving 4,945,897 veterans estimated PTSD prevalence to be 23 % among Operation Enduring Freedom, Operation Iraqi Freedom, and

Operation New Dawn veterans (Fulton et al. 2015).

## Risk and Resilience Factors

Research has identified multiple risk and resilience factors for the development of PTSD. These factors include characteristics of the trauma survivor, his or her reactions, and the event itself. For one, risk factors for higher trauma exposure, such as gender, age, socioeconomic status, and area of residence (violent neighborhoods, war-torn countries), tend to overlap with risk factors for developing PTSD (e.g., Gapen et al. 2011; Johnson and Thompson 2008; Norris et al. 2002). Of factors preceding the trauma, meta-analyses have shown female gender, family history of mental illness, previous trauma exposure, prior adjustment, adverse childhood events (particularly abuse), and lower socioeconomic status to be correlated with PTSD (Brewin et al. 2000; Ozer et al. 2003). The most powerful predictors were related to current factors—trauma severity, perceptions of life threat, and emotional intensity. The strongest predictor overall was whether the individual dissociated during or in the immediate aftermath of the trauma (Ozer et al. 2003).

Interestingly, military and veteran samples showed several differences in the Brewin et al. (2000) meta-analysis. The following characteristics were stronger risk factors for PTSD in military populations: younger age, lack of education, minority ethnicity, other adverse child-

**Table 15.2** Major representative studies of deployed military veterans' rates of PTSD

Study	Era	PTSD diagnosis	Assessment method	Sample size
Kulka et al. (1990)	Vietnam	Lifetime: 30.9 % (men); 26.9 % (women)	Multi-method composite diagnosis	2348–3016 (68.7 % male)
		Current: 15.2 % (men); 8.5 % (women)		
Kang et al. (2003)	Gulf War	Current: 12.1 %	Self-report (PCL)	11,441 (81.4 % male)
Tanielian and Jaycox (2008)	Iraq and Afghanistan	Current: 13.8 %	Self-report (PCL)	1965 (88.5 % male)

PCL PTSD Checklist

hood experiences, trauma severity, and lack of social support. Unlike in the civilian samples, gender was not associated with risk in military and veteran samples.

The above meta-analyses unfortunately omitted other important factors such as attachment, personality, and genetic variables that have also been shown to play important roles. First, attachment variables, especially considering their relation to childhood experiences, social support, and beliefs about oneself and others, may be potentially important factors to consider in the context of PTSD. While attachment insecurity may act as a risk factor (Benoit et al. 2010; Besser et al. 2009; Scott and Babcock 2010), it can also result from trauma exposure (Bogaerts et al. 2008; Cloitre et al. 2008; Sandberg et al. 2010; Twaite et al. 2004). One clear connection between attachment and PTSD lies in how they both involve social cognition and object relations—namely, views and representations of self and others (Westen 1991). One recent study found that object relation variables of self-esteem and qualitative representations of others partially mediated the relationship between adult attachment and PTSD symptoms (Ortigo et al. 2013). These theoretical and empirical connections among attachment, social cognition, and PTSD have led some theorists to incorporate attachment-based frameworks into treating trauma (Allen 2005; Stein and Allen 2007).

Second, of the personality characteristics identified, general negative emotionality, lack of constraint, and unstable self-esteem have been implicated in risk for PTSD and its comorbid disorders (e.g., Kashdan et al. 2006; Miller 2003; Miller et al. 2006). Finally, and likely intersecting with attachment and personality factors, genetic influences and gene-environment combinations have been identified as risk factors (e.g., Binder et al. 2008; Gillespie et al. 2009; Heim et al. 2009; Jovanovic and Ressler 2010; Norrholm and Ressler 2009). In sum, findings have generally supported the role of main effect and interactions among genetic, biological, environmental, and individual difference variables in how an individual responds to trauma and their subsequent risk for PTSD.

Veteran-specific research has also looked at risk factors. Using data from the National Vietnam Veterans Readjustment Study (NVVRS), Kulka et al. (1988, 1990) summarized that the most consistent prewar risk factors for PTSD development included the number of problem behaviors in childhood, antisocial personality disorder (before age 18), lower socioeconomic status in family of origin, and family history of mental illness. Controlling for these factors reduced the observed greater risk for PTSD in African-American and Latino American service members, but it did not completely eliminate this observed difference. In a reanalysis of the data, King et al. (1999) found an important gender difference. For men, war zone stressors (e.g., perceived threat, atrocities) were most predictive of PTSD, but for women, postwar factors (e.g., social support) were most important. In a longitudinal study of Vietnam veterans, Koenen et al. (2003) found predictors of a more chronic course of PTSD included high combat exposure, reports of negative community response returning from deployment, ethnic minority status, depression symptoms, and anger. Social support was again found as a protective factor.

In looking at more limited variables in a Gulf War sample, Kang et al. (2003) found greater risk for female, ethnic minority, and older veterans as well as those that had experienced multiple forms of combat stress. For Operation Enduring Freedom/Operation Iraqi Freedom veterans, one study found that combat experiences and perceived threat predicted PTSD and that low pre-deployment preparedness resulted in higher perceived life threat across levels of actual combat experience (Renshaw 2011). Increased risk for PTSD has also been associated with longer deployments and higher levels of combat exposure (Schell and Marshall 2008). Finally, Ramchand et al. (2015) conducted an extensive review of studies of risk factors among veterans who served in Afghanistan and Iraq, finding generally that individuals with lower levels of education and younger age, higher combat exposure and more deployments, and deployment-related injury were at increased risk for PTSD. Moreover, pre-deployment and deployment factors found to be of

importance in this review included prior stressors and childhood adversity, preparedness for and leadership during deployment, concerns for family during deployment, and social support.

### **Type of Traumatic Stressor**

The type of trauma experienced is also a crucial variable in predicting risk for PTSD. In addition to life-threatening stressors, several types of events particular to military and combat service have gained attention as important to consider. These include the death or injury of military comrades which can lead to profound grief, participation in or witnessing events that conflict with one's morals and values (i.e., moral injury), and military sexual trauma (MST) (see for review McCaslin et al. 2015).

**Loss of Comrades** Bonds formed during military training and combat are uniquely strong. These bonds, including a strong sense of responsibility for one's comrades, are cultivated during military and combat service (Papa et al. 2008). Thus, losses of comrades can profoundly impact service members, resulting in symptoms of post-traumatic stress and grief for years and even decades following the death. Significant numbers of combat veterans experience such losses. Between 63 and 80 % of US service members who served in Afghanistan and Iraq reported knowing someone who had been seriously injured or killed, and a smaller (20–25 %) but significant number reported having a buddy shot or hit close by (Thomas et al. 2010; Hoge et al. 2004; Toblin et al. 2012).

Notably high levels of grief symptoms, distinct from symptoms of PTSD and depression, have been reported in samples of Vietnam veterans who had lost comrades during their military service (Pivar and Field 2004). Indeed, levels of grief reported by these veterans were comparable to individuals who had recently experienced the death of a spouse. Grief symptoms can manifest in various ways and have been associated with poorer physical health, occupational functioning, sleep disturbance, fatigue, and pain—including musculoskeletal and back pain and headaches (Toblin et al. 2012). In addition to

loss-related grief symptoms, veterans may also experience feelings of guilt for surviving when their comrade did not and/or self-blame stemming from a belief that the death was preventable (Currier and Holland 2012).

**Moral Injury** Exposure to or participation in events that conflict with one's core values and moral beliefs has been shown to increase the risk for PTSD over and above exposure to other combat stressors (Currier et al. 2013; Litz et al. 2009). Exposure to these kinds of stressors has been termed "moral injury," and research on this phenomenon has dramatically increased during the past decade. The types of events that can lead to moral injury are broad, including betrayal by others (e.g., leaders and peers), participation in events that lead to the injury or death of civilians or enemy combatants, helplessness in the face of suffering, and situations that present an ethical or moral dilemma for service members (see Litz et al. 2009; Maguen and Litz 2012 for reviews; Currier et al. 2013; Stein et al. 2012). In one study of veterans who had served in Afghanistan and Iraq, the most common types of experiences endorsed were betrayal from leaders and of personal values, overly harsh treatment of civilians, and survivor guilt (Currier et al. 2013). Other surveys of this era of service members found that approximately half reported directing fire at or shooting enemy combatants and witnessing ill or injured women or children whom they were unable to help (50 % and 48 % to 60 %, respectively), approximately a third reported responsibility for the death of an enemy combatant (23–32 %), and over 5–9.7 % reported responsibility for the death of a noncombatant (Thomas et al. 2010; Hoge et al. 2004).

Moral injury can lead to psychiatric symptoms including feelings of shame and guilt, and functional difficulties, as well as having profound existential and spiritual impact (e.g., loss of meaning). Killing or injuring others in the context of combat has been associated with increased PTSD symptoms among veterans who have served in Iraq and Afghanistan, over and above exposure to other combat stressors (Currier et al. 2013; Maguen et al. 2010, 2013;

Litz et al. 2009 for review). Stein et al. (2012) examined the relationship of the type of moral injury event with symptom type. The authors reported that reexperiencing symptoms were best predicted by moral injury acts committed by the individual, whereas state anger was most related to acts committed by others, such as enemy violence or betrayal. Litz et al. (2009) discussed the cognitive processes related to the development of moral injury, suggesting that the morally injurious events do not fit with preexisting moral schemas, resulting in emotional responses to the event.

Assessment instruments have been developed that can assist the clinician in better understanding the veteran's experience. These include the Moral Injury Events Scale (Nash et al. 2013) and the Moral Injury Questionnaire – Military Version (Currier et al. 2013). An eight-step treatment for moral injury was proposed by Litz et al. (2009). The treatment addresses various components including cognitive processing, therapeutic alliance, education, and other areas such as social connection and self-forgiveness.

**Military Sexual Trauma (MST)** Military sexual trauma (MST) is a term that refers to potentially traumatic events such as sexual harassment and assault. The Department of Veterans Affairs (VA) definition of MST is the following: “psychological trauma, which in the judgment of a VA mental health professional, resulted from a physical assault of a sexual nature, battery of a sexual nature, or sexual harassment which occurred while the Veteran was serving on active duty or [on] active duty for training” (US Code 1720D of Title 38) (see for review McCaslin et al. 2015). Sexual harassment events include a range of behaviors such as offensive sexual comments and display of pornographic materials. MST can occur at any point in military training and service, not only during combat service. Military sexual trauma has been associated with increased risk for physical health problems (Frayne et al. 1999; Kimerling et al. 2007; Kimerling et al. (2010) Turchik et al. 2012); psychological problems including PTSD, depression, anxiety, substance use disorders, and sexual dysfunction (e.g., Kang et al. 2005; Kimerling et al. 2007, 2010; Turchik

et al. 2012; Yaeger et al. 2006); and other functional impairments (Skinner et al. 2000).

Annual prevalence rates of sexual assault within the military have been estimated at 6.8 % in females and 1.8 % for male service members. Rates of sexual harassment were reported to range between 9–31% for women and 3–7% for men, depending on the type of harassment (Lipari et al. 2008). Although a greater percentage of women report such events than men, the actual numbers impacted are equivalent because of the higher percentages of men serving in the military. Rates of MST are likely underreported because of barriers to reporting MST within the military. These barriers include the potential repercussions of reporting an incident perpetrated by a fellow service member who may be higher in rank or against fellow comrades from the same unit and the stigma associated with such events (e.g., perceptions that the individual should have been able to stop or may have contributed to the event; Turchik and Wilson 2010). Turchick and Wilson (2010) discussed the factors that can contribute to difficulties in recognizing and reporting sexual harassment and assault while serving in the military. In particular, the authors noted that the interaction between having a minority of women (approximately 20 %) service members and a strong masculine orientation can lead to an environment that condones such behaviors.

## Resilience

Resilience, in addition to risk, is also essential to understand. Meta-analyses have identified perceived social support to be a strong predictor of decreased likelihood of PTSD development (Brewin et al. 2000; Ozer et al. 2003). Level of perceived social support has been found to prospectively predict the development of PTSD (Dinenberg et al. 2014). Cross-sectional and longitudinal studies have shown social support also predicts greater likelihood for recovery from PTSD (Charuvastra and Cloitre 2008). Similarly, just as insecure attachment is a risk factor, secure attachment can be protective (Ortigo et al. 2013). Additional factors found in previous studies to be related to resilience include optimism, cognitive flexibility, and active coping skills (for review, see Iacoviello and Charney 2014).



Resilience to trauma, though, may be conceptually broader than simply not developing PTSD. Some individuals experience personal growth as well, not just despite of but *because* of experiencing a trauma (Pals and McAdams 2004; Wilson 2006). Tedeschi et al. (1998) coined the term “posttraumatic growth” (PTG) to describe any positive psychological changes such as “an increased appreciation for life in general, more meaningful interpersonal relationships, an increased sense of personal strength, changed priorities, and a richer existential and spiritual life” (Tedeschi and Calhoun 2004, p. 1). Previous research has reported mixed findings regarding the relationship of posttraumatic growth to PTSD, with various studies reporting a linear relationship (For review see Shakespeare-Finch and Lurie-Beck 2014). Moreover, some research has suggested that this relationship may be curvilinear, with highest levels of posttraumatic growth developing when PTSD symptoms are moderate (e.g., Butler et al. 2005; McCaslin et al. 2009). Finding meaning from the trauma can be a fundamental component of posttraumatic growth. If posttraumatic growth exists (for a critical review, see Zoellner and Maercker 2006), then its predictors may have both overlapping and independent factors compared to PTSD.

### Comorbidity of PTSD

Comorbidity of PTSD with other disorders is a complex issue that involves distinguishing between truly co-occurring disorders and seemingly comorbid conditions that are due to symptom overlap (Keane and Wolfe 1990). The overlap of PTSD symptoms with other disorders is particularly problematic for some critics (Bodkin et al. 2007; Rosen and Lilienfeld 2008). They argue that instead of a discrete disorder, current PTSD criteria just collect various reactions people may have after a trauma. PTSD’s high comorbid rates with mood and anxiety disorders (e.g., major depressive disorder, phobias, generalized anxiety, and panic disorder), substance abuse, and personality pathology (Deering et al. 1996; Keane and Wolfe 1990; Southwick et al. 1993)

point to this issue. Nevertheless, comorbidity is an issue for many psychiatric conditions.

In veteran populations, PTSD is also highly comorbid with other conditions. The National Vietnam Veterans Readjustment Study (NVVRS) (Kulka et al. 1988) showed higher rates of mood and anxiety disorders in male and female Vietnam veterans, but one of the highest comorbid conditions was lifetime alcohol use disorder—almost three-quarters of the male Vietnam veterans with PTSD had met criteria for alcohol dependence or abuse in their lifetime. For Operation Enduring Freedom/Operation Iraqi Freedom veterans, Tanielian and Jaycox (2008) narrowed in only on depression, traumatic brain injury (TBI), and PTSD and reported that the 13.8 % of Operation Enduring Freedom/Operation Iraqi Freedom veterans who had PTSD included 5.5 % who likely had all three conditions, 3.6 % with PTSD and depression, 1.1 % with PTSD and TBI, and 3.6 % with only PTSD. In another sample of Operation Enduring Freedom/Operation Iraqi Freedom veterans, Pittman et al. (2012) reported a high correlation ( $r = 0.77$ ) between PTSD symptoms and depression symptoms. A similarly high correlation between PTSD symptoms and depression was found in recent studies of Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn Veterans (e.g., McCaslin et al. *in press*; Larson and Norman 2014). Unfortunately, screening positive for PTSD is associated with a fourfold increase in risk for suicidal ideation as well (Jakupcak et al. 2009).

### Biology of PTSD

Since PTSD as a diagnosis emerged in the late 1970s, researchers have been working to better understand its pathophysiological and neurological underpinnings. Given the devastating impact that trauma symptoms can have on functioning and well-being, both for the person living with PTSD and others in their life such as significant others and family members, much attention has been given to identifying predictive and diagnostic PTSD biomarkers. This is especially true for military populations where

trauma is often a necessary and unavoidable consequence of war. However, identifying relevant biomarkers is difficult because many studies cannot disentangle whether a biological abnormality is a risk factor for developing PTSD or a consequence of the disorder or of the trauma itself. Nevertheless, predicting who might be more susceptible to developing PTSD is particularly salient for military populations where a predictive biomarker would have significant value. In addition, psychophysiological and neurological indices of resilience to the development of PTSD could be beneficial and facilitate interventions aimed at preventing PTSD in vulnerable populations.

### Neuroanatomy

Research generally points to three areas of the brain implicated in the development and maintenance of PTSD: the amygdala, hippocampus, and prefrontal cortex. The amygdala is relevant to PTSD due to its role in the formation and storage of emotion-laden memories, including fear-based memories. Probably not surprisingly, research consistently shows that amygdala abnormalities are present with PTSD (e.g., Huang et al. 2014), although at this time, research has not yet disentangled whether this is a cause or a consequence of PTSD. The hippocampus is another important brain region due to its role in the consolidation of memories, with a number of studies demonstrating that veterans with PTSD have smaller hippocampi and impaired hippocampal functioning, with some research suggesting that this is both a risk factor (e.g., Gilbertson et al. 2002) and a consequence of PTSD (Woon et al. 2010). Research also points to reductions in the size and impairment of functioning of the prefrontal cortex (e.g., Arnsten et al. 2015), which is the part of the brain that assists with making decisions and with planning behavior. It is important to note that cortisol, adrenaline, and noradrenaline, which will be discussed in subsequent sections, all play a critical role in these areas of the brain for the formulation of emotional memories, including trauma-related memories.

### Autonomic Dysregulation

Dysregulation of both the sympathetic nervous system (SNS) and the parasympathetic nervous system (PNS) has been implicated in military-related PTSD. These two branches of the autonomic nervous system (ANS) exert influence over the organs of the body, maintaining important bodily functions and assisting in adaptive responding to changes in the environment, including stressful situations. The sympathetic nervous system is particularly important for quickly responding to threatening situations through catecholamine release (e.g., adrenaline and noradrenaline) in what is called the fight-or-flight response, which is an automatic response that maximizes the likelihood of successfully handling a physically dangerous situation. It thus makes sense that abnormalities in this defense mechanism could be either a cause or a consequence of PTSD. Indeed, some evidence suggests that a particularly heightened sympathetic nervous system response immediately following the trauma could be a risk factor for developing PTSD (e.g., Apfel et al. 2011), in addition to contributing to PTSD symptomatology, which has informed some pharmacologic interventions for PTSD (e.g., Boehnlein and Kinzie 2007). Consistent with these findings, elevations in cardiovascular indices have been observed in combat veterans with PTSD, which is particularly important given the higher risk of developing cardiovascular issues such as heart disease in this population (e.g., Coughlin 2011).

The literature on parasympathetic nervous system activity has been less extensive. The parasympathetic nervous system is under the control of the vagus nerve, which influences the heart and every bodily organ to maintain homeostasis. The parasympathetic nervous system controls the restorative features of the autonomic nervous system and has been called the rest-and-digest response (in direct contrast to the fight-or-flight response of the sympathetic nervous system). Although still in preliminary stages, some studies suggest that veterans with PTSD might have lower than normal basal levels of parasympathetic activity (e.g., Lakusic

et al. 2007) and might not show typical autonomic nervous system responses to stressful situations (e.g., Sahar et al. 2001). It is important to note that not all findings have been consistent across the autonomic nervous system literature for PTSD, which might be attributable to individual differences in other factors that influence autonomic functioning.

### **Neuroendocrine Functioning**

The hypothalamic-pituitary-adrenal (HPA) axis produces and excretes cortisol, which is often called “the stress hormone” because of its role in facilitating the body’s adaptive response to a stressor. When faced with a threat of some kind, the body must maximize the use of energy and resources to most effectively cope with the stressor, and the HPA axis plays a central role in this process. It is important to note that although cortisol is central to the body’s stress response, it is also important for a variety of other important processes, with levels naturally waxing and waning across the day in a predictable pattern (also called the “diurnal rhythm”). In general, findings for cortisol related to a diagnosis of PTSD have been extremely mixed, with studies showing higher or lower than normal levels of cortisol, as well as both an exaggerated and blunted diurnal pattern. However, somewhat consistently, veterans with PTSD generally show a blunted response (e.g., Wahbeh and Oken 2013) but not always. A recent meta-analysis is suggestive that depression might be exerting an influence on these findings (Morris et al. 2012), but in general, more research is needed to disentangle the literature on cortisol in PTSD and evaluate the effects of other potential contributors to aberrant cortisol activity. It is possible that cortisol plays an indirect role in the onset and maintenance of PTSD through increased inflammation in the body, which has been noted in a number of studies identifying inflammatory biomarkers in veterans with PTSD (see Zoladz and Diamond 2013, for a review).

### **PTSD Assessment and Treatment**

Given the high rates of comorbidity and often profound psychosocial consequences of PTSD

among veterans, conducting a comprehensive assessment is essential prior to commencing treatment. Such an assessment should include information about military background and experience, and it should elicit information about PTSD-related conditions and functioning. Moreover, co-occurring physical conditions should be assessed. The co-occurring presence of chronic pain and traumatic brain injury (TBI) is of particular importance to inquire about during the assessment process. During the recent conflicts in Afghanistan and Iraq, the use of improvised explosive devices (IEDs) by the enemy and increased survival rates for veterans with severe injuries due to better protective gear and medical care have led to an increase in co-occurring PTSD, pain, and TBI—indeed, these particular injuries have been coined the “signature wounds” of this era of veterans (Clapp et al. 2010; Girona et al. 2006; Sharp and Harvey 2001). Providing referrals for these co-occurring cognitive and physical conditions is extremely important in ensuring that patients receive needed comprehensive care.

### **Best Practices for Clinical Care**

The VA/DoD Clinical Practice Guidelines for The Management of Posttraumatic Stress were first developed in 2004 as a collaborative effort between the Department of Veterans Affairs (VA) and the Department of Defense (DoD) to guide healthcare professionals who treat veterans or military personnel with acute stress and PTSD. The guidelines were updated in 2010 and then again in 2017 to reflect the current state of the literature. The working group, which consisted of researchers and expert clinicians in the area of trauma as well as experts in relevant fields and specialties, used review of empirical evidence and expert consensus to formulate a set of clinical practice guidelines (CPGs) to guide clinical decision-making when treating military trauma populations.

The guideline discusses a range of best practices for the ongoing assessment and management of acute stress responses and PTSD. This encompasses appropriate screening, assessment, diagnosis, treatment, and follow-up for trauma-related symptoms and common comorbid

conditions within a collaborative care model for medical and mental health treatment settings. Each practice is given a rating using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system (Andrews et al. 2013). Evidence is weighed based on factors such as the quality of the research (e.g., randomized controlled trial versus uncontrolled trial), number of available studies, relative benefit versus harm to the patient, and alignment with patient and provider preferences and values. Recommendations are then made based on the strength and direction of the evidence either for or against the practice and are provided on a continuum as follows: (1) “strong for,” (2) “weak for,” (3) “no recommendation for or against,” (4) “weak against,” and (5) “strong against.”

The guidelines also include algorithms for facilitating care, including for acute stress reaction/disorder, assessment and diagnosis of PTSD, and management of PTSD. Recommendations are provided for pharmacotherapy and psychological interventions, as well as complementary and integrative treatments and other types of adjunctive approaches. Practices are presented within the context of time since the trauma and include early preventative interventions and interventions for PTSD. The guidelines address common comorbidities and co-occurring concerns that influence the overall patient presentation and can interfere with treatment outcome, such as substance use issues, chronic pain, persistent sleep difficulties, and relationship distress. It is important to remember that the clinical practice guidelines are intended to guide clinical decision-making within the context of good clinical judgment regarding specific patient needs and preferences. Prior to treating veterans with PTSD, it is suggested that providers consult the clinical practice guidelines to become familiar with recommended treatments. Further, it is extremely important that clinicians become familiar with military culture and context. The military has a distinct culture, and within this larger umbrella, there are unique cultural aspects of each military branch. The Department of Veterans Affairs and Department of Defense have developed online resources that provide education about military

culture (see Table 15.3). Understanding the unique aspects of military culture can help the clinician to better appreciate the veteran’s experience, can improve therapeutic alliance, and can lead to a more accurate and comprehensive treatment formulation.

### **Exposure-Based Treatments for PTSD**

The most recommended individual behavioral treatments highlighted in the clinical practice guidelines for PTSD are based on cognitive behavioral principles and employ some component of exposure (i.e., actively talking or writing about the traumatic event). These include prolonged exposure (PE) (Foa et al. 2007) and cognitive processing therapy (CPT) (Resick and Schnicke 1993), both treatments that have been formally disseminated (“rolled out”) in VA Medical Centers across the nation. Fear conditioning models provide the basis for exposure-based therapies. Fear conditioning has been proposed as a main process by which PTSD symptoms develop (e.g., Orr et al. 2000). Generally, fear conditioning draws on behavioral principles wherein an individual learns to pair an aversive stimulus with neutral stimulus. For example, when a stressor occurs, this constitutes an unconditioned stimulus (UCS) which leads to an unconditioned response (UCR) of anxious arousal and fear. The stimuli and cues that were present in the environment at the time of the stressful or traumatic event then become associated with this event (conditioned stimulus, CS) and also elicit anxious arousal and fear (conditioned response, CR). If a veteran was in danger and witnessed his comrades killed in combat, the sensory contextual cues in the environment (e.g., what was seen, heard, felt) at the time of the event may become associated with a sense of fear and danger. After separating from the military, these contextual cues (e.g., what was seen, such as type of landscape, and heard, such as explosions or screaming) can themselves elicit anxious arousal or other emotions even in the absence of the original stressor. Even thoughts about the traumatic event may trigger intense emotional reactions. The experience of these intense emotional

**Table 15.3** Websites, mobile applications (apps), and web-based trainings for patients and providers (Websites active at time of publication)

	Veterans	Providers
Websites: education and resources	National Center for PTSD: public <a href="http://www.ptsd.va.gov/public/index.asp">http://www.ptsd.va.gov/public/index.asp</a>	National Center for PTSD: providers <a href="http://www.ptsd.va.gov/professional/index.asp">http://www.ptsd.va.gov/professional/index.asp</a> Community provider toolkit <a href="http://www.mentalhealth.va.gov/communityproviders">www.mentalhealth.va.gov/communityproviders</a> Center for deployment psychology <a href="http://deploymentpsych.org/">http://deploymentpsych.org/</a>
Mobile applications	PTSD coach <a href="http://www.ptsd.va.gov/public/materials/apps/PTSDCoach.asp">http://www.ptsd.va.gov/public/materials/apps/PTSDCoach.asp</a> Mindfulness coach <a href="http://www.ptsd.va.gov/public/materials/apps/mobileapp_mindfulness_coach.asp">http://www.ptsd.va.gov/public/materials/apps/mobileapp_mindfulness_coach.asp</a>	Cognitive processing therapy (CPT) coach <a href="http://www.ptsd.va.gov/public/materials/apps/cpt_mobileapp_public.asp">http://www.ptsd.va.gov/public/materials/apps/cpt_mobileapp_public.asp</a> Prolonged exposure (PE) coach <a href="http://www.ptsd.va.gov/public/materials/apps/pecoach_mobileapp-public.asp">http://www.ptsd.va.gov/public/materials/apps/pecoach_mobileapp-public.asp</a>
Online trainings	PTSD coach online <a href="http://www.ptsd.va.gov/public/treatment/cope/index.asp">http://www.ptsd.va.gov/public/treatment/cope/index.asp</a>	Military culture training <a href="http://deploymentpsych.org/military-culture">http://deploymentpsych.org/military-culture</a> Skills Training in Affective and Interpersonal Regulation (STAIR) <a href="http://www.ptsd.va.gov/apps/STAIR/STAIROrientation/wrap_menupage.htm">http://www.ptsd.va.gov/apps/STAIR/STAIROrientation/wrap_menupage.htm</a> Cognitive processing therapy (CPT) and prolonged exposure (PE) training <a href="http://deploymentpsych.org/online-courses">http://deploymentpsych.org/online-courses</a>

reactions can be extremely disruptive and can then lead the individual to avoid thoughts, places, people, and activities that have potential to elicit these reactions. Treatments such as cognitive processing therapy and prolonged exposure aim to create new learning through “exposing” the individual to the trauma in a safe environment and through providing space and tools for the individual to process through (e.g., cognitive restructuring) the event. These treatments can promote a better understanding of the event and disentangle the contextual cues and thoughts from the traumatic event itself, such that it no longer elicits such intense emotional reactions (i.e., fear extinction)—enabling individuals to engage more fully in life. Recent research has found greater fear conditioning in women (Inslicht et al. 2013). As noted earlier, women have been found to develop PTSD at higher rates than men, and the authors propose that differences in fear conditioning may be one mechanism through which women are at higher risk (Inslicht et al. 2013).

While cognitive processing therapy (CPT) and prolonged exposure (PE) have been shown to be effective in treating PTSD in veterans

(Department of Veterans Affairs & Department of Defense 2010), not all veterans will necessarily be a match for the treatments or may not want to start with a treatment that requires a focus on the traumatic event. Cognitive processing therapy has also been shown to be effective even without the trauma exposure component (Resick et al. 2008), making this an attractive option for some veterans. Further, recent research has shown that for individuals with emotional regulation difficulties, providing a course of treatment focused on building emotional regulation skills may increase the acceptability and effectiveness of subsequent trauma-focused treatment (Cloitre 2015). One such treatment is Skills Training in Affective and Interpersonal Regulation Narrative Therapy (STAIR; Cloitre et al. 2006). This treatment targets the development of emotional regulation skills and increased social connectedness. Dialectical behavior therapy (DBT; Linehan 1993) is another stage-based skills building treatment shown to be helpful for individuals with a more complex presentation (Landes et al. 2013). As noted earlier, PTSD is often comorbid with other conditions such as

depression. Acceptance and commitment therapy (ACT) is a widely used treatment for depression for civilians and has been shown to reduce symptoms of anxiety and depression in veterans (e.g., Walser et al. 2013).

Veterans with PTSD report more psychosocial functioning difficulties including poorer family relationships (Koenen et al. 2008) and higher rates of divorce and separation (Riggs et al. 1998; Cook et al. 2004). Given the important role of social connectedness and support in recovery from PTSD and in various domains of functional improvement, family and peer support interventions are important to consider, in addition to individual or group psychotherapies. Including a family or peer component to a veteran's treatment plan has been found to be acceptable to many veterans and may increase engagement in psychotherapy (e.g., Khaylis et al. 2011; Jain et al. 2013).

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## Conclusion

Posttraumatic stress disorder (PTSD) is regarded as a “signature wound” of combat service among the most recent cohort of veterans who served in Afghanistan and Iraq. While a minority will develop a full diagnosis of PTSD, even subthreshold levels of symptoms can be destructive to veterans' social, occupational, and health functioning. Moreover, without intervention, symptoms can endure throughout one's lifetime. Recent decades have seen a proliferation in PTSD research and treatment development. There are now evidence-based treatments that have promised to alleviate PTSD symptoms and to improve the quality of life of those who have survived often profoundly difficult events during military service. It is a privilege to serve the men and women who have served our country, and they are owed the very best treatment and support that can be provided.

## Key Concepts

1. While more than half of the general population will experience a potentially traumatic event in their lifetime, only a minority will develop posttraumatic stress disorder (PTSD).

Reported rates of PTSD are higher among veteran samples.

2. Risk factors for PTSD include trauma/event characteristics (e.g., level of trauma exposure), demographic and biological variables (e.g., gender, age, previous trauma exposure, history of mental illness), and psychosocial variables (e.g., social support).
3. Military sexual trauma (MST) and moral injury have been found to be predictive of PTSD in veteran samples and require additional attention during treatment.
4. Clinical practice guidelines (CPGs) are valuable in providing information about the recommended treatments for PTSD including evidence-based treatments such as prolonged exposure (PE) therapy, cognitive processing therapy (CPT), and eye movement desensitization and reprocessing (EMDR) therapy.

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## References

- Allen JG (2005) Attachment in coping with trauma: hope through understanding. American Psychiatric Publication, Washington, DC
- American Psychiatric Association (1980) Diagnostic and statistical manual of mental disorders, 3rd edn. American Psychiatric Association, Washington, DC
- American Psychiatric Association (1987) Diagnostic and statistical manual of mental disorders, 3rd edn. American Psychiatric Association, Washington, DC
- American Psychiatric Association (1994) Diagnostic and statistical manual of mental disorders, 4th edn. American Psychiatric Association, Washington, DC
- American Psychiatric Association (2000) Diagnostic and statistical manual of mental disorders, 4th edn. American Psychiatric Association, Washington, DC
- American Psychiatric Association (2013) Diagnostic and statistical manual of mental disorders, 5th edn. American Psychiatric Association, Washington, DC
- Andrews J, Guyatt G, Oxman AD, et al. (2013) GRADE guidelines: 14. Going from evidence to recommendations: The significance and presentation of recommendations. *J Clin Epidemiol* 66(7):719–725
- Arnsten AF, Raskind MA, Taylor FB, Conner DF (2015) The effects of stress exposure on prefrontal cortex: translating basic research into successful treatments for post-traumatic stress disorder. *Neurobiol Stress* 1:89–99
- Apfel BA, Otte C, Inslicht SS, McCaslin SE, Henn-Haase C, Metzler TJ, Makotkine I et al (2011) Pretraumatic prolonged elevation of salivary MHPG predicts

- peritraumatic distress and symptoms of post-traumatic stress disorder. *J Psychiatr Res* 45:735–741
- Benoit M, Bouthillier D, Moss E, Rousseau C, Brunet A (2010) Emotion regulation strategies as mediators of the association between level of attachment security and PTSD symptoms following trauma in adulthood. *Anxiety, Stress Coping* 23(1):101–118
- Besser A, Neria Y, Haynes M (2009) Adult attachment, perceived stress, and PTSD among civilians exposed to ongoing terrorist attacks in Southern Israel. *Personal Individ Differ* 47(8):851–857
- Binder EB, Bradley RG, Liu W, Epstein MP, Deveau TC, Mercer KB, ..., Ressler KJ (2008) Association of FKBP5 polymorphisms and childhood abuse with risk of posttraumatic stress disorder symptoms in adults. *J Am Med Assoc* 299(11): 1291–1305
- Blanco C (2011) Epidemiology of PTSD. In: Stein DJ, Friedman MJ, Blanco C (eds) *Post-traumatic stress disorder (evidence and experience in psychiatry, volume 24)*. Wiley-Blackwell, Oxford, pp 49–74
- Bodkin JA, Pope HG, Detke MJ, Hudson JI (2007) Is PTSD caused by traumatic stress? *J Anxiety Disord* 21(2):176–182. <https://doi.org/10.1016/j.janxdis.2006.09.004>
- Boehnlein JK, Kinzie JD (2007) Pharmacologic reduction of CNS noradrenergic activity in PTSD: the case for clonidine and prazosin. *J Psychiatr Pract* 13:72–78
- Coughlin SS (2011) Post-traumatic stress disorder and cardiovascular disease. *Open Cardiovasc Med J* 5:164–170
- Bogaerts S, Daalder AL, Van Der Knaap LM, Kunst MJM, Buschman J (2008) Critical incident, adult attachment style, and posttraumatic stress disorder: a comparison of three groups of security workers. *Soc Behav Personal Int J* 36(8):1063–1072
- Brewin CR, Andrews B, Valentine JD (2000) Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *J Consult Clin Psychol* 68:748–766. <https://doi.org/10.1037//0022-006X.68.5.748>
- Butler LD, Blasey CM, Garlan RW, McCaslin SE, Azarow J, Chen XH, ..., Spiegel D (2005) Posttraumatic growth following the terrorist attacks of September 11, 2001: cognitive, coping, and trauma symptom predictors in an internet convenience sample. *Traumatology* 11(4): 247
- Charuvastra A, Cloitre M (2008) Social bonds and posttraumatic stress disorder. *Annu Rev Psychol* 59:301–328. <https://doi.org/10.1146/annurev.psych.58.110405.085650>
- Clapp JD, Masci J, Bennett SA, Beck JG (2010) Physical and psychosocial functioning following motor vehicle trauma: relationships with chronic pain, posttraumatic stress, and medication use. *Eur J Pain* 14:418–425
- Cloitre M (2015) The role of emotion regulation in adult responses to traumatic stress. Symposium presented at the 31st annual meeting of the International Society for Traumatic Stress Studies (ISTSS), New Orleans, LA
- Cloitre M, Cohen LR, Koenen KC (2006) *Treating survivors of childhood abuse: psychotherapy for the interrupted life*. The Guilford Press, New York
- Cloitre M, Stovall-McClough C, Zorbas P, Charuvastra A (2008) Attachment organization, emotion regulation, and expectations of support in a clinical sample of women with childhood abuse histories. *J Trauma Stress* 21:282–289. <https://doi.org/10.1002/jts.20339>
- Cook JM, Riggs DS, Thompson R, Coyne JC, Sheikh JI (2004) Posttraumatic Stress Disorder and current relationship functioning among World War II ex-prisoners of war. *J Fam Psychol* 18:36–45
- Currier JM, Holland JM (2012) Examining the role of combat loss among Vietnam War veterans. *J Trauma Stress* 25:102–105
- Currier JM, Holland JM, Drescher K, Foy D (2013) Initial psychometric evaluation of the moral injury questionnaire-military version. *Clin Psychol Psychother*. <https://doi.org/10.1002/cpp.1866>
- Deering CG, Glover SG, Ready D, Eddleman HC, Alarcon RD (1996) Unique patterns of comorbidity in posttraumatic stress disorder from different sources of trauma. *Compr Psychiatry* 37(5):336–346
- Department of Veterans Affairs & Department of Defense (2010) VA/DoD clinical practice guideline for management of post-traumatic stress. [http://www.healthquality.va.gov/ptsd/cpg\\_PTSD-FULL-201011612.pdf](http://www.healthquality.va.gov/ptsd/cpg_PTSD-FULL-201011612.pdf)
- Dinenberg RE, McCaslin SE, Bates MN, Cohen BE. (2014) Social support may protect against development of posttraumatic stress disorder: Findings from the Heart and Soul Study. *American Journal of Health Promotion*. 28(5):294–7
- Foa E, Hembree E, Rothbaum B (2007) *Prolonged exposure therapy for PTSD: emotional processing of traumatic experiences*. Oxford University Press, Oxford
- Frayne SM, Skinner KM, Sullivan LM, Tripp TJ, Hankin CS, Kressin N, Miller D (1999) Medical profile of women veterans administration outpatients who report a history of sexual assault occurring while in the military. *J Womens Health Gend Based Med* 8(6):835–845
- Fulton JJ, Calhoun PS, Wagner HR, Schry AR, Hair LP, Feeling N, Elbogen E, Beckham JC (2015) The prevalence of posttraumatic stress disorder in Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) veterans: a meta-analysis. *J Anxiety Disord* 31:98–107
- Gapen M, Cross D, Ortigo KM, Graham A, Johnson E, Evces M, ..., Bradley B (2011) Perceived neighborhood disorder, community cohesion, and PTSD symptoms among low-income African Americans in an urban health setting. *Am J Orthopsychiatry*, 81(1): 31–37
- Gilbertson MW, Shenton ME, Ciszewski A, Kasai K, Lasko NB, Orr SP, Pittman RK (2002) Smaller hippocampal volume predicts pathologic vulnerability to psychological trauma. *Nat Neurosci* 5:1242–1247
- Gillespie CF, Phifer J, Bradley B, Ressler KJ (2009) Risk and resilience: genetic and environmental influences on development of the stress response. *Depress Anxiety* 26(11):984–992

- Gironda RJ, Clark ME, Massengale JP, Walker RL (2006) Pain among veterans of Operations Enduring Freedom and Iraqi Freedom. *Pain Med* 7:339–343
- Heim C, Bradley B, Mletzko TC, Deveau TC, Musselman DL, Nemeroff CB, ..., Binder EB (2009) Effect of childhood trauma on adult depression and neuroendocrine function: sex-specific moderation by CRH receptor 1 gene. *Front Behav Neurosci* 3:1–10
- Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, Koffman RL (2004) Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *N Engl J Med* 351:13–22
- Huang M, Yurgil KA, Robb A, Angeles A, Diwaker M, Risbrough VB, Nichols SL et al (2014) Voxel-wise resting-state MEG source magnitude imaging study reveals neurocircuitry abnormality in active-duty service members and veterans with PTSD. *NeuroImage: Clin* 5:408–419
- Iacoviello BM, Charney DS (2014) Psychosocial facets of resilience: implications for preventing posttrauma psychopathology, treating trauma survivors, and enhancing community resilience. *J Psychotraumatology* 5:23970
- Inslicht SS, Metzler TJ, Garcia NM, Pineles SL, Milad MR, Orr SP, Marmar CR, Neylan TC (2013) Sex differences in fear conditioning in posttraumatic stress disorder. *J Psychiatr Res* 47:64–71
- Jakupcak M, Cook J, Imel Z, Fontana A, Rosenheck R, McFall M (2009) Posttraumatic stress disorder as a risk factor for suicidal ideation in Iraq and Afghanistan war veterans. *J Trauma Stress* 22(4):303–306. <https://doi.org/10.1002/jts.20423>
- Jain S, McLean C, Adler EP, Lindley SE, Ruzek JI, Rosen CS (2013) Does the integration of peers into the treatment of adults with posttraumatic stress disorder improve access to mental health care? A literature review and conceptual model. *J Trauma Stress Disord Treat* 2:1–9
- Janet P (1889) *L'automatisme psychologique: Essai de psychologie experimentale sur les formes inferieures de l'activite humaine*. Felix Alcan, Paris
- Johnson H, Thompson A (2008) The development and maintenance of post-traumatic stress disorder (PTSD) in civilian adult survivors of war trauma and torture: a review. *Clin Psychol Rev* 28(1):36–47
- Jovanovic T, Ressler KJ (2010) How the neurocircuitry and genetics of fear inhibition may inform our understanding of PTSD. *Am J Psychiatr* 167(6):648–662
- Kang HK, Natelson BH, Mahan CM, Lee KY, Murphy FM (2003) Post-traumatic stress disorder and chronic fatigue syndrome-like illness among Gulf War veterans: a population-based survey of 30,000 veterans. *Am J Epidemiol* 157(2):141–148. <https://doi.org/10.1093/aje/kwf187>
- Kang H, Dalager N, Mahan C, Ishii E (2005) The role of sexual assault on the risk of PTSD among Gulf War Veterans. *Ann Epidemiol* 15(3):191–195
- Kashdan TB, Uswatte G, Steger MF, Julian T (2006) Fragile self-esteem and affective instability in posttraumatic stress disorder. *Behav Res Ther* 44(11):1609–1619
- Keane TM, Wolfe J (1990) Comorbidity in post-traumatic stress disorder: an analysis of community and clinical studies. *J Appl Soc Psychol* 20:1776–1788
- Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE (2005) Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry* 62(6):593–602. <https://doi.org/10.1001/archpsyc.62.6.593>
- Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson C (1995) Posttraumatic stress disorder in the National Comorbidity Survey. *Arch Gen Psychiatry* 52(12):1048–1060
- Khaylis A, Polusny MA, Erbes CR, Gewirtz A, Rath M (2011) Posttraumatic stress, family adjustment, and treatment preferences among National Guard soldiers deployed to OEF/OIF. *Mil Med* 176:126–131
- Kimerling R, Gima K, Smith MW, Street A, Frayne S (2007) The Veterans Health Administration and military sexual trauma. *Am J Public Health* 97:2160–2166
- Kimerling R, Street A, Pavao J, Smith M, Cronkite R, Holmes T, Frayne S (2010) Military-related sexual trauma among Veterans Health Administration patients returning from Afghanistan and Iraq. *Am J Public Health* 100:1409–1412
- King DW, King LA, Foy DW, Keane TM, Fairbank JA (1999) Posttraumatic stress disorder in a national sample of female and male Vietnam veterans: risk factors, war-zone stressors, and resilience-recovery variables. *J Abnorm Psychol* 108(1):164–170. <https://doi.org/10.1037/0021-843X.108.1.164>
- Koenen KC, Stellman JM, Stellman SD, Sommer JF Jr (2003) Risk factors for course of posttraumatic stress disorder among Vietnam veterans: a 14-year follow-up of American legionnaires. *J Consult Clin Psychol* 71(6):980–986. <https://doi.org/10.1037/0022-006X.71.6.980>
- Koenen KC, Stellman SD, Sommer JF, Stellman JM (2008) Persisting posttraumatic stress disorder symptoms and their relationship to functioning in Vietnam veterans: a 14-year follow-up. *J Trauma Stress* 21:49–57
- Kulka RA, Schlenger WE, Fairbank JA, Hough RL, Jordan BK, Marmar CR, Weiss DS (1988) Contractual report of findings from the National Vietnam Veterans Readjustment Study. Research Triangle Institute, Research Triangle Park
- Kulka RA, Schlenger WE, Fairbank JA, Hough RL, Jordan BK, Marmar CR, Weiss DS (1990) Trauma and the Vietnam war generation: report of findings from the National Vietnam Veterans Readjustment Study. Brunner/Mazel, New York
- Lakusic N, Fuckar K, Mahovic D, Cerovec D, Majsec M, Stancin N (2007) Characteristics of heart rate variability in war veterans with post-traumatic stress disorder after myocardial infarction. *Mil Med* 172:1190–1193
- Landes SJ, Garovoy ND, Burkman KM (2013) Treating complex trauma among veterans: three stage-based treatment models. *J Clin Psychol In Session* 69:523–533



- Larson GE, Norman SB (2014) Prospective prediction of functional difficulties among recently separated veterans. *JRRD* 51:415–428
- Linehan MM (1993) Cognitive-behavioral treatment of borderline personality disorder. The Guilford Press, New York
- Lipari RN, Cook PJ, Rock LM, Matos K (2008) 2006 gender relations survey of active duty members. Department of Defense Manpower Data Center, Arlington
- Litz BT, Stein N, Delaney E, Lebowitz L, Nash WP, Silva C, Maguen S (2009) Moral injury and moral repair in war veterans: a preliminary model and intervention strategy. *Clin Psychol Rev* 29:695–706
- Maguen S, Lucenko BA, Reger MA, Gahm GA, Litz BT, Seal KH, Marmar CR (2010) The impact of reported direct and indirect killing on mental health symptoms in Iraq war veterans. *J Trauma Stress* 23:86–90
- Maguen S, Litz B. Moral injury in veterans of war. *PTSD Res Quart.* 23(1):1–6. See more at: <http://www.psychiatrictimes.com/articles/reactivation-ptsd-symptoms-resulting-sandy-hook-media-exposure/page/0/2#sthash.jNdeIlvy.dpuf>. 2012.
- Maguen S, Madden E, Bosch J, Galatzer-Levy I, Knight SJ, Litz BT, McCaslin SE (2013) Killing and latent classes of PTSD symptoms in Iraq and Afghanistan veterans. *J Affect Disord* 145:344–348
- Marmar CR, Schlenger W, Henn-Haase C, Qian M, Purchia E, Li M, ..., Kulka RA (2015) Course of post-traumatic stress disorder 40 years after the Vietnam War: findings from the National Vietnam Veterans Longitudinal Study. *JAMA Psychiatry* 72(9): 875–881
- McCarthy E, Petrakis I (2010) Epidemiology and management of alcohol dependence in individuals with post-traumatic stress disorder. *CNS Drugs* 24(12):997–1007. <https://doi.org/10.2165/11539710-000000000-00000>
- McCaslin SE, de Zoysa P, Butler LD, Hart S, Marmar CR, Metzler TJ, Koopman C (2009) The relationship of posttraumatic growth to peritraumatic reactions and posttraumatic stress symptoms among Sri Lankan university students. *J Trauma Stress* 22(4):334–339
- McCaslin SE, Maguen S, Metzler T, Bosch J, Neylan TC, Marmar CR (2016) Assessing posttraumatic stress related impairment and well-being: The Posttraumatic Stress Related Functioning Inventory (PRFI). *J Psychiatr Res* 31;72:104–11
- McCaslin SE, Turchik JA, Hatzfeld JJ (2015) Considerations in the treatment of veterans with post-traumatic stress disorder. Evidence based treatments for trauma-related psychological disorders. Springer International Publishing, 413–430
- Miller MW (2003) Personality and the etiology and expression of PTSD: a three-factor model perspective. *Clin Psychol Sci Pract* 10:373–393
- Miller MW, Vogt DS, Mozley SL, Kaloupek DG, Keane TM (2006) PTSD and substance-related problems: the mediating roles of disconstraint and negative emotionality. *J Abnorm Psychol* 115(2):369–379
- Morris MC, Compas BE, Garber J (2012) Relations among posttraumatic stress disorder, comorbid major depression, and HPA function: a systematic review and meta-analysis. *Clin Psychol Rev* 32:301–315
- Nash WP, Marino Carper TL, Mills MA, Au T, Goldsmith A, Litz BT (2013) Psychometric evaluation of the moral injury events scale. *Mil Med* 178:646–652
- National Comorbidity Survey (Producer) (2005) NCS-R appendix tables: table 1. Lifetime prevalence of DSM-IV/WMH-CIDI disorders by sex and cohort. Table 2. Twelve-month prevalence of DSM-IV/WMH-CIDI disorders by sex and cohort. Retrieved from <http://www.hcp.med.harvard.edu/nsc/publications.php>
- Norrholm SD, Ressler KJ (2009) Genetics of anxiety and trauma-related disorders. *Neuroscience* 164(1):272–287
- Norris FH, Friedman MJ, Watson PJ, Byrne CM, Diaz E, Kaniasty K (2002) 60,000 disaster victims speak: part I. An empirical review of the empirical literature, 1981–2001. *Psychiatry: Interpersonal Biol Processes* 65(3):207–239
- Orr SP, Metzger LJ, Lasko NB, Macklin ML, Peri T, Pitman RK (2000) De novo conditioning in trauma-exposed individuals with and without posttraumatic stress disorder. *J Abnorm Psychol* 109(2):290
- Ortigo KM, Westen D, DeFife JA, Bradley B (2013) Attachment, social cognition, and posttraumatic stress symptoms in a traumatized, urban population: evidence for the mediating role of object relations. *J Trauma Stress* 26:1–8. <https://doi.org/10.1002/jts.21815>
- 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. <https://doi.org/10.1037/0033-2909.129.1.52>
- Pals JL, McAdams DP (2004) The transformed self: a narrative understanding of posttraumatic growth. *Psychol Inq* 15:65–69
- Papa A, Neria Y, Litz B (2008) Traumatic bereavement in war veterans. *Psychiatr Ann* 38:686–691
- Pittman JOE, Goldsmith AA, Lemmer JA, Kilmer MT, Baker DG (2012) Post-traumatic stress disorder, depression, and health-related quality of life in OEF/OIF veterans. *Qual Life Res* 21(1):99–103. <https://doi.org/10.1007/s11136-011-9918-3>
- Pivar IL, Field NP (2004) Unresolved grief in combat veterans with PTSD. *J Anxiety Disord* 18:745–755
- Ramchand R, Rudavsky R, Grant S, Tanielian T, Jaycox L (2015) Prevalence of, risk factors for, and consequences of posttraumatic stress disorder and other mental health problems in military populations deployed to Iraq and Afghanistan. *Curr Psychiatry Rep* 17:37
- Renshaw KD (2011) An integrated model of risk and protective factors for post-deployment PTSD symptoms in OEF/OIF era combat veterans. *J Affect Disord* 128(3):321–326. <https://doi.org/10.1016/j.jad.2010.07.022>
- Resick PA, Galovski TE, Uhlmansiek MOB, Scher CD, Clum GA, Young-Xu Y (2008) A randomized clinical

- trial to dismantle components of cognitive processing therapy for posttraumatic stress disorder in female victims of interpersonal violence. *J Consult Clin Psychol* 76(2):243
- Resick PA, Schnicke MK (1993) Cognitive processing therapy for rape victims: a treatment manual. Sage, Newbury Park
- Riggs DS, Byrne CA, Weathers FW, Litz BT (1998) The quality of the intimate relationships of male Vietnam veterans: problems associated with posttraumatic stress disorder. *J Trauma Stress* 11:87–101
- Rosen GM, Lilienfeld SO (2008) Posttraumatic stress disorder: an empirical evaluation of core assumptions. *Clin Psychol Rev* 28(5):837–868
- Rosen GM, Lilienfeld SO, Frueh BC, McHugh PR, Spitzer RL (2010) Reflections on PTSD's future in DSM-V. *Br J Psychiatry* 197(5):343–344
- Rosen GM, Spitzer RL, McHugh PR (2008) Problems with the post-traumatic stress disorder diagnosis and its future in DSM-V. *Br J Psychiatry* 192(1):3–4
- Sahar T, Shalev AY, Porges SW (2001) Vagal modulation of responses to mental challenge in posttraumatic stress disorder. *Biol Psychiatry* 49:637–643
- Sandberg DA, Suess EA, Heaton JL (2010) Attachment anxiety as a mediator of the relationship between interpersonal trauma and posttraumatic symptomatology among college women. *J Interpers Violence* 25(1):33–49
- Scott S, Babcock JC (2010) Attachment as a moderator between intimate partner violence and PTSD symptoms. *J Fam Violence* 25:1–9. <https://doi.org/10.1007/s10896-009-9264-1>
- Schell TL, Marshall GN (2008) Survey of individuals previously deployed for OEF/OIF. *Invisible Wounds of War*, 87
- Schnurr PP, Hayes AF, Lunney CA, McFall M, Uddo M (2006) Longitudinal analysis of the relationship between symptoms and quality of life in veterans treated for posttraumatic stress disorder. *J Consult Clin Psychol* 74:707–713
- Shakespeare-Finch J, Lurie-Beck J (2014) A meta-analytic clarification of the relationship between posttraumatic growth and symptoms of posttraumatic distress disorder. *J Anxiety Disord* 28(2):223–229
- Sharp TJ, Harvey AG (2001) Chronic pain and post-traumatic stress disorder: mutual maintenance? *Clin Psychol Rev* 21:857–877
- Shay J (1994) *Achilles in Vietnam: Combat trauma and the undoing of character*. New York, NY: Scribner
- Skinner KM, Kressin N, Frayne S, Tripp TJ, Hankin CS, Miller DR, Sullivan LM (2000) The prevalence of military sexual assault among female Veterans' Administration outpatients. *J Interpers Violence* 15(3):291–310
- Southwick SM, Yehuda R, Giller EL Jr (1993) Personality disorders in treatment-seeking combat veterans with posttraumatic stress disorder. *Am J Psychiatr* 150(7):1020–1023
- Spitzer RL, First MB, Wakefield JC (2007) Saving PTSD from itself in DSM-V. *J Anxiety Disord* 21:233–241
- Stecker T, Shiner B, Watts BV, Jones M, Conner KR (2013) Treatment-seeking barriers for veterans of the Iraq and Afghanistan conflicts who screen positive for PTSD. *Psychiatr Serv* 64:280–283
- Stein H, Allen JG (2007) Mentalizing as a framework for integrating therapeutic exposure and relationship repair in the treatment of a patient with complex posttraumatic psychopathology. *Bull Menn Clin* 71(4):273–290
- Stein NR, Mills MA, Arditte K, Mendoza C, Borah AM, Resick PA, Litz BT (2012) STRONGSTAR consortium. A scheme for categorizing traumatic military events. *Behav Modif* 36:787–807
- Tanielian T, Jaycox L (eds) (2008) *Invisible wounds of war: psychological and cognitive injuries, their consequences, and services to assist recovery*. RAND Corporation, Santa Monica
- Tedeschi RG, Calhoun LG (2004) Posttraumatic growth: conceptual foundations and empirical evidence. *Psychol Inq* 15(1):1–18
- Tedeschi RG, Park CL, Calhoun LG (eds) (1998) *Posttraumatic growth: positive changes in the aftermath of crisis*. Lawrence Erlbaum, Mahwah
- Thomas JL, Wilk JE, Riviere LA, McGurk D, Castro CA, Hoge CW (2010) Prevalence of mental health problems and functional impairment among active component and National Guard soldiers 3 and 12 months following combat in Iraq. *Arch Gen Psychiatry* 67:614–623
- Toblin RL, Riviere LA, Thomas JL, Adler AB, Kok BC, Hoge CW (2012) Grief and physical health outcomes in US soldiers returning from combat. *J Affect Disord* 136:469–475
- Turchik JA, Pavao J, Nazarian D, Iqbal S, McLean C, Kimerling R (2012) Sexually transmitted infections and sexual dysfunctions among newly returned veterans with and without military sexual trauma. *Int J Sex Health* 24:45–59
- Turchik JA, Wilson SM (2010) Sexual assault in the US military: a review of the literature and recommendations for the future. *Aggress Violent Behav* 15:267–277
- Twaite JA, Rodriguez-Srednicki O (2004) Childhood sexual and physical abuse and adult vulnerability to PTSD: the mediating effects of attachment and dissociation. *J Child Sex Abuse* 13:17–38. [https://doi.org/10.1300/J070v13n01\\_02](https://doi.org/10.1300/J070v13n01_02)
- van der Kolk BA, Brown P, van der Hart O (1989) Pierre Janet on post-traumatic stress. *J Trauma Stress* 2:365–378
- Wahbeh H, Oken BS (2013) Salivary cortisol lower in posttraumatic stress disorder. *J Trauma Stress* 26:241–248
- Walser RD, Karlin BE, Trockel M, Mazina B, Taylor C (2013) Training in and implementation of acceptance and commitment therapy for depression in the veterans health administration: therapist and patient outcomes. *Behav Res Ther* 51:555–563
- Westen D (1991) Social cognition and object relations. *Psychol Bull* 109:429–455. <https://doi.org/10.1037//0033-2909.109.3.429>

- Wilson JP (2006) Introduction and overview: a positive psychology of trauma and PTSD. In: Wilson JP (ed) *The posttraumatic self: restoring meaning and wholeness to personality*. Routledge, New York, pp 1–7
- Woon FL, Sood S, Hedges DW (2010) Hippocampal volume deficits associated with exposure to psychological trauma and posttraumatic stress disorder in adults: a meta-analysis. *Prog Neuro-Psychopharmacol Biol Psychiatry* 34:1181–1188
- Yaeger D, Himmelfarb N, Cammack A, Mintz J (2006) DSM-IV diagnosed posttraumatic stress disorder in women veterans with and without military sexual trauma. *J Gen Intern Med* 21(Suppl 3):S65–S69
- Yehuda R, McFarlane AC (2009) PTSD is a valid diagnosis: who benefits from challenging its existence? *Psychiatr Times* 26(7):31
- Zatzick DF, Marmar CR, Weiss DS, Browner WS, Metzler TJ, Golding JM, ..., Wells KB (1997) Posttraumatic stress disorder and functioning and quality of life outcomes in a nationally representative sample of male Vietnam veterans. *Am J Psychiatr* 154(12): 1690–1695
- Zoellner T, Maercker A (2006) Posttraumatic growth in clinical psychology – a critical review and introduction of a two component model. *Clin Psychol Rev* 26(5):626–653
- Zoladz PR, Diamond DM (2013) Current status on behavioral and biological markers of PTSD: a search for clarity in a conflicting literature. *Neurosci Biobehav Rev* 37:860–895