



VETERANS AND VIOLENCE PART I: FORENSIC PSYCHOLOGICAL AND NEUROPSYCHOLOGICAL EVALUATIONS OF VETERANS WITH POSTTRAUMATIC STRESS DISORDER AND TRAUMATIC BRAIN INJURY

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INTRODUCTION

As a result of the pervasiveness of polytrauma experienced in soldiers serving in Operation Enduring Freedom (OEF-Afghanistan) and Operation Iraqi Freedom (OIF), and the recent homicides and violent offenses committed by returning veterans from the Middle East that have gained national attention, there is growing concern of their adjustment to civilian life. Of concern is their risk of future mental health problems, substance abuse, psychosocial adjustment, and risk for suicide, violence, and homicide.

The objective of this two-part article is to discuss the nature and prevalence of traumatic brain injury (TBI) and posttraumatic stress disorder (PTSD) in active military and veterans as well as the forensic psychological and neuropsychological assessment of these conditions in legal matters.

In Part I, the author will highlight the cumulative effects of traumatic brain injury and PTSD on the brain and their relationship to substance abuse and addiction, violence, and ultimately homicidal behavior.

In Part II, the author will apply the forensic assessment of military servicemen/women with TBI and PTSD to legal

issues in criminal cases in both Texas and federal courts. The reader should also appreciate that the information in this article also is relevant to civilian PTSD, TBI, and violent offenses.

NATURE AND PREVALENCE OF TBI IN IRAQ AND AFGHANISTAN VETERANS

There is a growing concern regarding combat-related traumatic brain injury in the current conflicts of OEF and OIF. Traumatic brain injury is a common consequence of modern warfare. In these Middle Eastern conflicts, the blast injury has arisen as a new mechanism of brain injury. Blast induced brain injury can cause high rates of sensory impairment, pain issues, and polytrauma including serious brain and medical injuries as well as PTSD.

Recently, the Joint Theater Trauma Registry analyzed wounding patterns and mechanisms of combat wounds from the current conflicts and found an increase in numbers of injuries to the

head and neck region in the current OEF and OIF conflicts.¹

A recent study found that 88% of combat-related traumatic brain injuries involved exposure to explosions (improvised explosive devices - IED's, mortar, mine, and rocket-propelled grenades).²

A study from the Defense and Veterans Brain Injury Center of returning soldiers treated at Walter Reed Army Medical Center indicated that about 60% of those injured by explosion while deployed had a TBI (44% mild TBI, 56% moderate to severe TBI).³ Most of these TBIs occurred when an external force significantly disrupted brain function often with evidence of a period of loss of consciousness (LOC) or alteration in consciousness, including possible confusion and disorientation, as well as loss of memory (amnesia) for events immediately before, during, or after the injury.

When considering combat specific traumatic brain injuries, data from the Navy-Marine Corps Combat Trauma Registry for OIF revealed that being wounded in action was associated with more severe traumatic brain injury (skull fracture in 26% of cases), injury to more areas of the body (polytrauma), and a higher rate of evacuation.⁴ A recent set of studies of combat injured service members receiving inpatient care at VA polytrauma rehabilitation centers indicated that 97% had a TBI, more than half experienced mental health symptoms including depression and PTSD, as well as issues related to pain.⁵

Studies have shown that the overall rate of deployment related TBI is more significant and about twice as frequent than non-deployed personnel. TBI screening of specific military populations soon after return from deployment have found rates between 15% and 23% for TBIs.⁶ The majority of deployed head injuries are mild in nature related to concussions including alteration of consciousness rather than a complete loss of consciousness or posttraumatic amnesia, yet many veterans returning to the U.S. continue to experience persistent post concussive symptoms.⁷

THE NEUROPSYCHOLOGY TBI

Traumatic brain injuries vary between mild, moderate, and severe and about 80% of all TBIs are mild in severity. Mild concussive injuries are the most common type of TBI, and repetitive concussive injuries are a major focus of military medicine due to their prevalence. While moderate and severe TBIs often have structural injury which can be seen in neuroimaging (MRI, CT scan), complicated mild TBIs often have structural injury and abnormal neuroimaging while uncomplicated and mild TBIs such as concussions often do not have structural injuries revealed on imaging.

Those at risk for mild TBI include the following:

1. Young men ages 15 to 24 years of age.
2. Individuals of low socioeconomic status.
3. Individuals who have reckless lifestyles including substance abusers.

4. African/American and minority status individuals.
5. Individuals living in high crime areas.
6. Individuals with a history of ADHD, low IQ, and/or substance abuse.

Many veterans qualify for a number of these demographic risk factors prior to their admission to the military. The factors most significant in differentiating severities of traumatic brain injury include acute injury characteristics such as duration of unconsciousness and amnesia as well as neurological status in areas of motor function, verbal responding, and response to external commands and stimuli.⁸

Neuropsychological and emotional sequelae or effects after TBI germane to post-concussive syndrome include the following:

1. Disorientation and confusion.
2. Attention, concentration, and processing speed deficits.
3. Short-term memory deficits.
4. Executive functioning deficits.
5. Fatigue and lethargy, lack of motivation.
6. Sleep disturbance.
7. Delayed motor/verbal responses.
8. Language/communication deficits.
9. Substance abuse.
10. Depression.
11. Irritability and aggression.
12. Impulsivity.
13. Problems with balance
14. Headaches and chronic pain.
15. Impaired hearing and vision
16. Sensitivity to light and noise
17. Difficulties in word finding
18. Personality changes
19. Social isolation

Recent studies of Army soldiers specify that most brain injuries are mild in severity and blasts were by far the most common mechanism of injury (88%).⁹ Researchers concluded that TBI may result from primary, secondary or tertiary effects of blast exposure which refer to the direct effects and injuries of the blasts.¹⁰

Chronic traumatic encephalopathy (CTE) has become popular in the literature of athletic concussions, and this type of brain injury may also be related to veterans with a history of multiple concussions or subconcussive blows to the head.

Importantly, blast exposed veterans report higher levels of PTSD than those with non-blast mild traumatic brain injuries, and therefore a history of polytrauma is common in many veterans exposed to Middle East war related combat.¹¹

DSM-5 AND TBI

The DSM-5¹² added a mild neurocognitive disorder associated with traumatic brain injury diagnosis which is caused by an impact to the head or other mechanisms of rapid movement or displacement of the brain in the skull as can happen with blast injuries. The mild neurocognitive disorder diagnosis includes primarily evidence of modest

cognitive decline from a previous level of performance in one or more cognitive domains (complex attention, executive function, learning and memory, language, perceptual-motor, or social cognition) based on concern of the individual, a knowledgeable informant, or the clinician that there has been a mild decline in cognitive function; and a modest impairment in cognitive performance, preferably documented by standardized neuropsychological testing or, in its absence, another quantified clinical assessment. The cognitive deficits do not interfere with capacity for independence in everyday activities (i.e., complex instrumental activities of daily living such as paying bills or managing medications are preserved, but greater effort, compensatory strategies, or accommodation may be required).

In contrast, major neurocognitive disorder is characterized by a significant decline from a previous level of performance and the cognitive deficits must result in a need for assistance with complex instrumental activities of daily life, such as paying bills or managing medications, or otherwise interfere with independence.

PREVALENCE OF PTSD IN VETERAN POPULATIONS

The psychiatric condition of PTSD has long been a significant hallmark of the psychological effects of war. War related PTSD includes a history of witnessing and/or experiencing traumatic events that led to several cognitive, emotional, and behavioral effects at the time of and following the traumatic event(s).

For decades, PTSD was considered more of a psychiatric rather than a neuropsychiatric disorder. Not until recently has there been more of a focus on the structural and functional brain effects of PTSD. In fact, PTSD is associated with regional alterations in brain structure and function that contribute to symptoms of neurocognitive deficits associated with the disorder. A recent meta-analytic study found significant neurocognitive effects associated with PTSD with the largest in verbal learning, followed by speed of information processing, then attention/working memory, followed by verbal memory.¹³

Researchers estimate the prevalence of PTSD to be about 9% at pre-deployment with post-deployment rates of 12% and 18% for OEF and OIF troops.^{xii} Reservists and National Guard members have often been found to have a higher probable PTSD prevalence than active duty soldiers. The following risk factors place individuals including military personnel at risk for PTSD:

1. History of childhood trauma and adversity.
2. Witnessing others wounded or killed.
3. Lower IQ.
4. Low socioeconomic status.
5. Family history of psychiatric illness.

Number one is a notable risk factor, as early trauma is predictive of later trauma.

DSM-5 AND PTSD

The DSM-5 made thoughtful revisions for the assessment of veterans, especially those who commit violent offenses. The diagnosis continues to include exposure to actual or threatened trauma, presence of intrusive symptoms, persistent avoidance of stimuli associated with the traumatic event, negative alterations in cognitions and mood associated with the traumatic event, and marked alterations in arousal and reactivity associated with the traumatic event. The changes in arousal and reactivity include irritable or aggressive behavior and reckless self-destructive behavior that are significant alterations and are related to physiological reactions and potential aggression and violent acts by veterans.

The DSM-5 PTSD diagnostic criteria are below:

A. Exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways:

1. Directly experiencing the traumatic event(s).
2. Witnessing, in person, the event(s) as it occurred to others.
3. Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of actual or threatened death of a family member or friend, the event(s) must have been violent or accidental.
4. Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse).

- Note: Criterion A4 does not apply to exposure through electronic media, television, movies, or pictures, unless this exposure is work related.

B. Presence of one (or more) of the following intrusion symptoms associated with the traumatic event(s), beginning after the traumatic event(s) occurred:

1. Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s).
- Note: In children older than 6 years, repetitive play may occur in which themes or aspects of the traumatic event(s) are expressed.

2. Recurrent distressing dreams in which the content and/or effect of the dream are related to the traumatic event(s).

- Note: In children, there may be frightening dreams without recognizable content.

3. Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.)

- Note: In children, trauma-specific reenactment may occur in play.

4. Intense or prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).

5. Marked physiological reactions to internal or

external cues that symbolize or resemble an aspect of the traumatic event(s).

C. Persistent avoidance of stimuli associated with the traumatic event(s), beginning after the traumatic event(s) occurred, as evidenced by one or both of the following:

1. Avoidance of or efforts to avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).

2. Avoidance of or efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).

D. Negative alterations in cognitions and mood associated with the traumatic event(s), beginning, or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:

1. Inability to remember an important aspect of the traumatic event(s) (typically due to dissociative amnesia and not to other factors such as head injury, alcohol, or drugs).

2. Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world (e.g., "I am bad," "No one can be trusted," "The world is completely dangerous," "My whole nervous system is permanently ruined").

3. Persistent, distorted cognitions about the cause or consequences of the traumatic event(s) that lead the individual to blame himself/herself or others.

4. Persistent negative emotional state (e.g., fear, horror, anger, guilt, or shame).

5. Markedly diminished interest or participation in significant activities.

6. Feelings of detachment or estrangement from others.

7. Persistent inability to experience positive emotions (e.g., inability to experience happiness, satisfaction, or loving feelings).

E. Marked alterations in arousal and reactivity associated with the traumatic event(s), beginning, or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:

1. Irritable behavior and angry outbursts (with little or no provocation) typically expressed as verbal or physical aggression toward people or objects.

2. Reckless or self-destructive behavior.

3. Hypervigilance.

4. Exaggerated startle response.

5. Problems with concentration.

6. Sleep disturbance (e.g., difficulty falling or staying asleep or restless sleep).

F. Duration of the disturbance (Criteria B, C, D, and E) is more than 1 month.

G. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

H. The disturbance is not attributable to the physiological effects of a substance (e.g., medication, alcohol)

or another medical condition.

I.

Specify whether:

With dissociative symptoms: The individual's symptoms meet the criteria for posttraumatic stress disorder, and in addition, in response to the stressor, the individual experiences persistent or recurrent symptoms of either of the following:

1. Depersonalization: Persistent or recurrent experiences of feeling detached from, and as if one were an outside observer of, one's mental processes or body (e.g., feeling as though one were in a dream; feeling a sense of unreality of self or body or of time moving slowly).

2. Derealization: Persistent or recurrent experiences of unreality of surroundings (e.g., the world around the individual is experienced as unreal, dreamlike, distant, or distorted).

• Note: To use this subtype, the dissociative symptoms must not be attributable to the physiological effects of a substance (e.g., blackouts, behavior during alcohol intoxication) or another medical condition (e.g., complex partial seizures).

Specify if:

With delayed expression: If the full diagnostic criteria are not met until at least 6 months after the event (although the onset and expression of some symptoms may be immediate).

As can be seen, the PTSD diagnosis reflects the DSM's emphasis with veterans, and highlights autonomic arousal symptoms that may be related to aggression to people, irritability, recklessness, self-destructive behavior, hypervigilance, and paranoia. Further, the issue of dissociation explained below is important to consider and analyze, as many offenders have out of mind/body states that occur during their aggressive acts.

POLYTRAUMA/COMPLEX TRAUMA

Critical to examinations of military defendants is the issue of polytrauma. Many servicemen experienced numerous (poly) life-threatening traumatic events which have adversely affected their physical, psychological, emotional, behavioral, and cognitive functioning and well-being. Many military defendants possess a history of risk factors before military service, including a history of trauma, and specifically polytrauma and complex trauma. The cumulative effects of multiple traumatic events take a toll on an individual who may return to a high stress environment when they return to civilian life.

Complex trauma is the exposure to traumatic stressors including poly-victimization, life-threatening accidents or disasters, and interpersonal losses. Complex trauma often is related to deficits in attachment/bonding to parent(s), abuse and/or neglect, and adversely affects early childhood biopsychosocial development placing the youth at risk for a range of serious problems (e.g., depression, anxiety, oppositional defiance, risk taking, substance

abuse) and may lead to aggression. It is also associated with an extremely problematic combination of persistently diminished adaptive arousal reactions; episodic maladaptive hyperarousal; impaired information processing and impulse control; self-critical and aggression-endorsing cognitive schemas; and peer relationships that model and reinforce disinhibited reactions, maladaptive ways of thinking, and aggressive, antisocial, and delinquent behaviors.¹⁴

It is imperative to appreciate the military veteran and the pride of the profession and impact of peer influence. Many veterans returning from foreign wars tend to be loyal to their country and their service and desire to return to action. Subsequently, they often minimize and or completely deny any symptoms of PTSD and TBI, as they do not want to put their service and chance to return to war in jeopardy. Further, they often have never been examined for TBI and PTSD issues while in theatre and emphasize loyalty and duty rather than self-care.

Similarly, while the government offers TBI and PTSD screening upon return from war, many servicemen refuse such assessments and there is a peer influence quality to this refusal of assessment and treatment as they do not want to be perceived as emotionally or physically weak. Many also want to pursue other positions, posts, or governmental agency duties and positions and do not want to have any mental health assessment records following them. Unfortunately, instead of being on the road to healing through proper assessment and treatment, they tend to turn to alcohol and drugs as a numbing coping and self-medication effect.

The returning veteran with a history of polytrauma/complex trauma often will ignore, minimize, and/or lack insight into their affected emotional, cognitive, and behavioral functioning and unfortunately will not be identified and/or seek appropriate treatment and rehabilitation.

COMORBIDITY OF TBI AND PTSD

The term comorbidity relates to the simultaneous presence of two chronic diseases, conditions, or illnesses in a patient, meaning that the individual is experiencing more than one condition at the same time.

The Rand study of post Iraqi military deployment (OIF) reported a high rate of co-occurrence between a history of mild TBI, PTSD, and depression. Of those experiencing a mild TBI, about

33-44% had overlapping PTSD or depression. On examination of multiple potential predictors of PTSD, researchers found only combat intensity and mild TBI with loss of consciousness were associated with PTSD.¹⁵ The authors found that PTSD is strongly associated with mild traumatic brain injury in that 43.9% of soldiers reporting loss of consciousness from TBI met the criteria for PTSD.

Mild TBI may diminish the capacity to employ

cognitive resources that would normally be engaged in problem-solving and regulating emotions after trauma, thereby leaving an individual more susceptible to PTSD and related problems.¹⁶

Ultimately, mild TBI likely increases the chance of developing PTSD. Critical to the issue of comorbidity and the co-occurrence of mild TBI and PTSD in veteran populations, is the additional prevalence of major depression and substance abuse and addiction. PTSD and depression are related to violence towards self, including suicide, and violence towards others.

SUBSTANCE USE AND PTSD/TBI

Unfortunately, many veterans have both PTSD and TBI and are at more significant risk for using and abusing substances due to the aggregate effect of having both disorders. Critical to the mental health assessment of the veteran, is a dual-diagnostic consideration with emphasis not only on chronic history of substance use but also of PTSD and trauma. Anger, hostility, and violence have cognitive, affective, and behavioral components which are related to the effects of PTSD, TBI, depression, and substance use. The use of substances is a coping mechanism to curb the negative emotional states that veterans often suffer. Substances, especially depressants such as alcohol, are often utilized to self-medicate the often hyperaroused emotional and cognitive state that is related to PTSD.

Combat exposure and history of childhood abuse appear to manifest their influence on criminal and aggressive behavior through increase in substance use and mental health problems.¹⁷ It is critical for the mental health examiner to assess not only the PTSD but the prevalence and severity of depression and addiction.

Research has documented a strong relationship between co-occurring PTSD and substance use problems in civilian and military populations of both genders.¹⁸ Similarly, there are high rates of PTSD among veterans seeking substance use treatment because those with PTSD are likely to use and abuse substances to cope with her emotional and psychological trauma. In fact, men with PTSD are five times more likely to have a substance use disorder compared to the general population. Patients with substance use disorders and PTSD may be at high risk for relapse, and their relapses may be triggered, in part, due to the trauma reminders and cues.

Similarly, traumatic brain injury is also common among those who misuse substances.¹⁹ Alcohol and drug abuse are major risk factors for those with TBI. A recent summary of studies of those with non-penetrating TBIs with and without substance use disorders revealed that those with both TBI and substance use disorder had poor neuroradiological outcomes, including reduced hippocampal and gray matter volumes, and enlarged cerebral ventricles. Executive function and memory were moderately affected, but attention and reasoning were not. Emotional functioning was worse in those with both TBI and substance use versus TBI only.²⁰

Unfortunately, the neurobiology of substance use and misuse also affects critical frontolimbic brain systems involved that are some of the same brain areas affected by traumatic brain injury and PTSD.²¹

NEUROPSYCHOLOGICAL ASSESSMENT OF VETERANS

When considering neuropsychological assessment of veterans, the neuropsychologist will evaluate relevant areas:

1. Auditory and visual attention.
2. Processing speed and working memory.
3. Auditory/verbal memory and visual memory.
4. Executive functioning (planning, reasoning, mental set shifting, problem solving, mental flexibility, disinhibition, and impulse control)
5. Visuospatial constructional abilities and sensory perception.
6. Language abilities.
7. Intelligence.
8. Emotional intelligence.
9. PTSD and psychological functioning.
9. Cognitive effort.

The brain behavior functions that are affected in PTSD and TBI are often very similar. When considering neuropsychological testing of TBI, obviously the specific area injured in the brain impacts the area of functional deficit. Severe TBI's involve considerable forces, often through blasts in war producing widespread cellular death and dysfunction with clear global neurocognitive functional consequences. Traumatic brain injury affects the cognitive, emotional, psychological, and physical functioning of an individual.

Of particular interest is the observation that the orbital prefrontal cortex and related circuitry are vulnerable to damage associated with TBI which likely account for the prevalence of executive deficits after TBI and contributes to the high rates of behavioral and emotional dysregulation.²²

Neuropsychological testing of TBI often indicates deficits in attention, processing speed, executive functioning, and memory loss.

Similarly, there is a growing body of evidence that suggests that neurocognitive alterations occur in PTSD patients.²³ Individuals with PTSD often perform less proficiently on learning and memory tasks with impairments more frequently found in the verbal memory domain.²³ Attention and executive functioning impairments are often indicated in those with PTSD.²⁵ PTSD is also characterized by impaired executive dyscontrol including increased perseveration and poor inhibition of inappropriate responses. Veterans often perform more poorly on continuous performance tasks that measure sustained visual attention as well as on tasks of working memory.

When considering brain structure, the hippocampus and the medial prefrontal cortex are often less responsive in those with PTSD leading to decreased inhibition of the

amygdala. Amygdala hyper-reactivity is thought to account for heightened behavioral arousal and exaggerated responses to stimuli that are perceived to be associated with danger or threat which can often lead to aggressive or violent acts.

VIOLENCE IN VETERANS

Veterans returning from deployment are at risk to have a number of risk factors related to psychosocial adjustment and potential future violence:

1. Histories of childhood abuse and neglect.
2. Lower socioeconomic status.
3. Potential lower levels of intelligence.
4. Lower rank.
5. Histories and current status of substance abuse and dependence.
6. Prevalence of mental health issues including PTSD, depression, suicidal, and paranoid thinking.
7. History of TBI and other medical problems.
8. Frequent history of exposure to and proficiency in weapons.
9. Prevalence of social isolation and interpersonal/marital dysfunction when returning from war.
10. Unemployment and homelessness.

These risk factors can act in a cumulative manner in that the more risk factors that one is exposed to, the more likely a negative outcome.

Arrests in veterans are found to be significantly related to younger age, male gender, having witnessed family violence, prior history of arrests, alcohol and/or drug misuse, and PTSD with high anger/irritability more so than even the presence of combat exposure or TBI.²⁶

Critically to this population, a polytrauma clinical triad (PTSD, TBI, and chronic pain) can be linked to suicidal ideation and violent impulses.²⁷ In fact, suicidal ideation and violent impulses are correlated with PTSD, as well as the combination of TBI and PTSD, pain intensity and interference, drug abuse, and major depressive disorder.

Aggressive behaviors are common amongst veterans with PTSD, and within the first year after deployment, 48% of returning veterans with PTSD reported engaging in physical aggression and 20% reported in engaging in severe violence.²⁸

Factors associated with physical aggression among U.S. Army Soldiers studied from surveys collected six months post-deployment measuring overt aggressive behavior found that aggressive behavior was associated with:²⁹

Highest level of combat intensity

2. Misuse of alcohol
3. Diagnosis of PTSD
4. TBI
5. Depression
6. Prior altercation with significant other
7. Lowest rank (E1-E4)

There were a relatively higher number of minor and severe physical overt aggressive actions reported among soldiers who were previously deployed, notably highest

among deployed soldiers reporting the highest levels of combat intensity. Soldiers screening positive for the misuse of alcohol were also significantly more likely to report relatively higher levels of physical aggression.

In a recent study, a large percentage of previously deployed soldiers reported aggressive behaviors after returning home, for example, they: “get angry with someone and kick, smash, or punch something” (43%), “threaten someone with physical violence” (38%), or “get into a fight with someone and hit the person” (18%).³⁰ Studies have focused on spousal aggression which found the prevalence to be significantly higher among soldiers than their civilian counterparts.³¹ The leading reason is the prevalence of the condition of PTSD. The condition of PTSD is related to not only aggression, but violent thoughts, ownership of a deadly weapon, paranoia, and tendency to have intoxicated states.

Research has revealed heightened aggressive behavior among veterans with PTSD.³² There are higher rates of aggressive behaviors seen in those with PTSD compared to those without PTSD (13.3 violent acts in the prior year compared to 3.54 acts for the prior year).³³

Studies of veterans demonstrate a positive relationship between combat exposure and measures of aggression as combat may model and reinforce violence. Combat exposure, PTSD symptoms, and participation in killing have significant effects on aggressive behavior in veterans, especially violence to self, spouse, and others. PTSD is correlated with an onset of destruction of property, violence to persons, violent threats, ownership of multiple firearms, knives, aiming guns at family members, considering suicide with firearms, and loading guns with the purpose of suicide in mind.³⁴ These facts suggest a tendency for veterans to be at risk to be violent towards self and others.

A recent study examined the risk of recidivism among justice-involved veterans.³⁵ They found substance abuse and indicators of antisociality were linked to justice involvement in veterans, yet the evidence for negative family/marital circumstances and lack of positive school and work involvement as risk factors was mixed. PTSD and traumatic brain injury, particularly when combined with anger and irritability issues, may be veteran-specific risk factors for violent offending. Other violence risk factors include combat exposure and PTSD, TBI, and homelessness/poverty.

The authors emphasized that combat exposure PTSD is particularly relevant with a history of violent offending among veterans, especially if they are exacerbated by other factors such as substance abuse and anger. They noted that traumatic brain injury is often associated with problematic behavioral and personality changes including impulsivity, aggression, low frustration tolerance, and problem-solving deficits.

The authors cited the most recent estimates indicate that ten percent of those incarcerated in federal prison have a history of U.S. military service.³⁶

Another study examined PTSD symptoms in family versus stranger violence in Iraq and Afghanistan veterans.³⁷

Of those veterans studied, 13% reported aggression toward a family member and 9% toward a stranger during the one-year study period.

PTSD AND VIOLENCE

Three domains of functioning are influenced by PTSD symptoms including cognition, physiological arousal, and emotions. Changes in cognition include flashbacks such as altered consciousness. Traumatized individuals tend to misperceive threat towards themselves or others in their environment. They often hold extreme beliefs about justice based on their traumatic experiences. They may believe in a need for retribution to remedy perceived wrongdoings and disregard authority or display an indifference in the law because of prior perceived and actual abuse by authority figures.

Heightened psychophysiological arousal includes evidence of anger and irritability such as hyperarousal symptoms producing the survival response of fight or flight when faced with situations perceived to be dangerous. Hypervigilance includes the person always being on guard and suspicious of their environment even to the point of having paranoid thoughts. Exaggerated startle response may include the person reacting instinctively or impulsively to threatening stimuli. Emotional reactions include psychological distress in which individuals with PTSD have heightened stress influencing their mental ability to make well-reasoned responses. Heightened emotions are often common with those with PTSD including elements of anxiety, fear, anger, shame, and depression and ultimately substance abuse to deal with these emotions.

Emotional numbing symptoms of PTSD may include diminished empathy for the victim, lack of remorse, and difficulties appreciating the severity and consequences of one's behaviors. Furthermore, while many veterans attempt to escape and avoid distressing and trauma related thoughts, images, and negative emotions, this suppression increases sympathetic activation, ultimately making it more difficult for veterans to regulate and control emotions when they are triggered.³⁸

It is imperative for the forensic expert and attorney to appreciate how PTSD is specifically related to emotional and behavioral dysregulation as an underlying mechanism of impulsive aggression.³⁹

Veterans with PTSD have heightened neural and physiological responses to both trauma-related and neutral stimuli, indicating they have difficulties distinguishing between safe and potentially unsafe (trauma-related) people and places.⁴⁰ Unfortunately, many veterans return from deployment and continue to interpret environmental events and people as dangerous, unsafe, and threatening, and their emotional regulation resources are overtaxed, and emotions may be difficult to control.⁴¹ The condition of PTSD places a veteran at risk to be in a state of hyper-aroused activation and to misperceive an environmental event as stressful and threatening leading them to react in an impulsive and

aggressive manner.

PTSD symptoms are particularly relevant for understanding violence risk.⁴² Re-experiencing symptoms such as flashbacks have some connection with aggression. They stress the dissociative nature and detachment from reality that may be involved with violence as a sufferer of PTSD may commit an act of aggression while re-experiencing the trauma. In fact, re-experiencing and flashback-type symptoms recently have been reported to be positively related to aggressive or impulsive behavior.⁴³ Numbing symptoms and avoidance may also be strong predictors of violence.⁴⁴ Escape avoidance and emotionally distancing from others have been shown to be positively related to aggression and hostility. Excitation and hyperarousal response-like symptoms are also related to violence.⁴⁵

Those with PTSD are typically physiologically aroused and will have an intensified state of anger and aggression. Physical reactions to triggers from the trauma including elevated heart rate, sweating, and physical tension are related to a high rate of aggression. Hypervigilance and paranoia, even to a level of psychosis, are not uncommon. Hyperarousal and dissociation type psychotic symptoms may place an individual at risk for aggression due to the connection of paranoia and threat/control override symptoms that appear in psychotic disorders. Misperceived threats and paranoia are significant to a risk of violence.

When considering neuropsychological aspects of the cognition of PTSD and risk for violence, it is noted that the need for physiological arousal and stimulation may lead to reckless and aggressive behavior. Many combat veterans return to the U.S. and have become accustomed to the variability in stress, action, and stimulation that combat brings them. This heightened stimulation changes the structure and function of the brain in areas critical to impulse control. Ultimately, they return to the U.S. with a “need for speed” in that their brain’s structure and functioning has changed, and they crave stimulation and arousal that they have been accustomed to in war and are prone in reacting recklessly and impulsively.

TBI AND VIOLENCE

Traumatic brain injury is a complex injury resulting from an external force that often results in a change in brain function. Aggression is a common neuropsychiatric sequelae of TBI, and again a relationship between TBI and aggression has been found in veterans.⁴⁶ A recent neuroimaging study found a difference between men and women with TBI and aggression, such that male veterans with TBI reported significantly more physical aggression, revenge planning, and urges to engage in physical violence.⁴⁷

Acute post-concussive aggression and violence is often referred to as behavioral dyscontrol (including hesitation, impulsivity, disinhibition, restlessness, irritability, mood lability, and explosive behavior).

Posttraumatic aggression is often reactive in nature

pertaining to the organic aggressive syndrome which describes aggressive behavior that is reactive and typically provoked, even by trivial stimuli. Such aggression is non-reflective, unplanned, non-instrumental with no clear objective, and is typically impulsive, explosive, occurring acutely without buildup, and is often egodystonic in nature in that the individual did not intend on the violent act, it was more impulsive, and the offender feels bad about their behavior.⁴⁸

In contrast, posttraumatic aggression may also be considered as instrumentally objective in motive, being purposeful but unplanned, such as responding to perceived threat or acting in self-defense. Both types of aggression are consistent with TBI and PTSD.

The neuroanatomy of aggression considering traumatic brain injury includes primarily the frontal and temporal lobes, which are susceptible to injury and damage from contact and forces to which the brain is subjected during biochemical trauma.⁴⁹

Traumatic brain injury is known to tear, shear, and strain brain neurons and injure white matter in a number of important areas that relate to brain behavior function, including potentially most importantly, executive functioning.

The frontal lobes are the last area of the brain to develop and are crucial in higher order cognitive processes pertaining to the regulation of emotion and behavior. Critical areas of the prefrontal cortex are responsible for executive functioning pertaining problem solving, planning, sequencing and processing information, abstraction, considering of consequences, judgment, inhibition, learning from punishment and considering behavioral risk and reward, and empathy for example. Biochemical neurotransmitters of the brain in the frontal lobe areas may be negatively altered and are related to mediation and balance of cognition and emotional behavior.⁵⁰

Neuropsychological components of violence in veterans, deficits in information processing and the activation of highly arousing emotional memory networks associated with combat trauma leave veterans at risk for aggression. Response information as part of an activated memory structure toward perceived threat can trigger a survival mode of functioning which can include aggressive responding. Many veterans experience an arousal regulation deficit in which they cannot regulate their psychophysiological arousal and are at risk for physical acting out when feeling threatened.⁵¹

PTSD, TBI, THE BRAIN, AND VIOLENCE

When considering both PTSD and TBI and neuropsychological functioning, studies of aggression and violent behavior are focused primarily on the frontal, prefrontal, and temporal brain regions.

Prefrontal regions are involved in modulating and controlling emotional interpersonal behaviors and

inhibiting temporal lobe areas especially the amygdala and other limbic regions involved in expression of aggressive drives.⁵²

Research has revealed that PTSD and persistent post-concussive symptoms from TBI are related to most forms of partner and non-partner aggression.⁵³ In another study, veterans with TBI and concurrent anger/irritability were more likely to be arrested than those with TBI but without concurrent anger and irritability.⁵⁴

Furthermore, veterans with history of PTSD and/or TBI are at risk for volumetric measures of brain magnetic resonance imaging (MRI) with decreased hippocampal and amygdala (limbic system) volumes compared to controls as well as reduced blood flow in the frontal (executive) and temporal areas. All these brain regions are critical in neurocognitive functioning related to memory formation, executive functioning, emotional and behavioral dysregulation, and violence.

A recent study looked at long term associations among PTSD symptoms, traumatic brain injury, and neurocognitive functioning in Army soldiers deployed to the Iraq war.⁵⁵ They found that increases in PTSD symptom severity at different intervals post-deployment were associated with poor verbal and/or visual recall and memory at the end of each interval and less efficient reaction time at post-deployment. Traumatic brain injury was associated with adverse PTSD symptom outcomes at both post-deployment and long-term follow-up. The authors found that longitudinal and long-term relationships among PTSD symptoms, TBI, and neurocognitive decrements may be due to sustained emotional and neurocognitive symptoms over time.

Importantly, PTSD should be considered as a neurobiopsychosocial disorder involving alterations in neural and brain functioning. PTSD may erode and break down potentially resilient enhancing cognitive resources such as learning and memory as the PTSD symptoms increase in severity. The more severe the PTSD condition is, the more likely it will lead to neurocognitive and emotional impairments. Additionally, having a history of traumatic brain injury also will aggravate PTSD symptomatology.

In another recent study, the author researched variables explaining cognitive complaints among OEF/OIF/OND veterans with a remote history of blast-wave mild traumatic brain injury.⁵⁶ Despite good prognosis with mild TBI, at least a third of veterans with a history of mild TBI reported post-concussive symptoms inclusive of cognitive complaints. While veterans typically rated executive functioning prior to deployment as intact, over 80% rated their post mild TBI executive function problems as clinically significant. The authors found that current PTSD symptoms were associated with self-reported decline in executive functioning. While veterans often will rate their neurocognitive functioning as significantly impaired post head injury, even with intact neuropsychological testing results, the neurocognitive complaints are often subsumed within the symptoms of

PTSD, since PTSD symptoms typically account for most of the perceived and functional neurocognitive decline in veterans.⁵⁷

The prevalence of traumatic brain injury in offender populations is quite significant and prison studies consistently indicate that approximately 50% of offenders have self-reported histories of traumatic brain injury with evidence of loss of consciousness.⁵⁸ Similarly, the prevalence of posttraumatic stress disorder is quite high in the offender population, with up to 27% for male and 38% for female prison populations having the disorder.⁵⁹ It should be noted that many servicemen who experience mild TBI also experience PTSD and neurocognitive deficits may stem from both, but they are more consistently accounted for through the PTSD lens.

Veterans are at risk for a number of mental health problems such as PTSD, alcohol and drug abuse, head injuries, and there is a cumulative risk to violence with the collection of those disorders affecting one's cognitive, emotional, and behavioral functioning. Imperative to the assessment of active military and veterans in relationship to risk and violence, veterans are at jeopardy for a number of mental health concerns and polytrauma. The polytrauma combination of PTSD, TBI, pain intensity, as well as substance abuse and major depressive disorder leave veterans at serious risk for suicidality, violence, and homicidality.⁶⁰

While it is vital for the forensic expert to have a good handle on risk factors for violence in veterans, they also must have an appreciation of the protective mechanisms relevant to the prevention of violence and aggression in veterans.⁶¹ Many of these factors include steady work, resilience, social support, report of no physical pain, ability for self-care, healthy sleep, perceived self-determination, and having needs met. Therefore, emphasis on VA rehabilitation programs and interventions to reduce homelessness, retrain veterans for civilian work, enhance financial literacy, and improve social supports are likely to reduce violence among veterans. Obviously, many veterans have a multitude of risk factors and therefore require a variety of rehabilitative efforts.

FIGHT/FLIGHT

The fight/flight sensory perception>emotional>and behavioral response system is critical to the veteran who has PTSD and or TBI history and their legal defenses.

Humans, like all species, have self-protective mechanisms to help us survive. Our fight/or/flight response system is based on a survival mechanism that allows people to react quickly to acute life-threatening situations and is designed to mobilize our brain and body to fight an enemy, run from an avalanche, or freeze to hide from a predator. There are a host of hormonal and neurophysiological affects and responses that interact to assist someone in fighting the threat or fleeing to safety.

Our brain sometimes misinterprets safe situations as

dangerous and can set off false alarms. When the amygdala, our brain's watch dog, senses danger, our body enters survival mode quicker than our rational mind can react, trying to figure out why we feel in mortal danger.

Individuals with chronic PTSD and/or traumatic brain injuries can misperceive and overreact to stressors that may not be life threatening. The heart of the limbic and emotional system of the brain is the amygdala, which plays significant roles in emotional responses (fear, anxiety, and depression), as well as development of emotional memories and decision making. It is essentially an alarm system that processes threat and danger.⁶² In distress it sends a message to the hypothalamus, which is a command center of the brain.

When considering the brain structure and function in the fight/flight response system, the hypothalamus of the brain as a command center that communicates with the rest of the body through the automatic nervous system (sympathetic and parasympathetic nervous systems). The sympathetic nervous system functions as if it was a gas pedal in the car triggering the fight or flight response leading to heightened arousal to perceived dangers while the parasympathetic nervous system is the brakes and is described as the "resting and digesting" response system that calms the body down after the danger leaves. There are a number of hormones that are active in this alarm, gas, and brake system.

Many military veterans and criminal defendants in general have evidence of PTSD and traumatic brain injuries, and chronic substance use and intoxicated states at the time of violent offenses that compromise and haywire this fight/flight threat response neuropsychiatric system. There may be a number of symptoms and functional impairments that forensic psychological and neuropsychological examinations can detect regarding the psychiatric diagnoses and brain injuries that must be explored in the context of the situation, environment, and perception of the defendant at the time of their aggressive act.

Both PTSD and TBI symptoms and impairments can lead to a dysfunctional brain. Emotional trauma through PTSD and traumatic brain injuries can place a brain at risk for an overstimulated amygdala and highly alert system perceiving threat everywhere, along with a damaged and dysfunctional frontal lobe system that impedes proper executive functioning regarding problem solving, planning, appreciation of consequences, and impulse control for example. Unfortunately, substances such as methamphetamine, alcohol, and other drugs critically affect brain reward systems that are in part the same areas that are affected and damaged by PTSD and TBI.⁶³ Therefore, there often is a triple threat in violent offense cases regarding PTSD and trauma, brain dysfunction, and the acute and chronic effects of substance use.

Part II of this article in the next edition of the Voice will address forensic psychological and neuropsychological evaluations in military cases with PTSD and TBI. I will

examine legal defenses that may be applicable in state and federal cases as well as mitigation and treatment issues with the veteran.

ENDNOTES

1. Taber, K., & Hurley, R. (2010). OEF/OIF Deployment Related Traumatic Brain Injury. National Center for PTSD. Vol. 21(1).
2. Garneau, M. R., Woodruff, S. I., Dye, J. I., Mohrle, C. R., & Wade, A. L. (2008). Traumatic brain injury during Operation Iraqi Freedom: Findings from the United States Navy-Marine Corps Combat Trauma Registry. *Journal of Neurosurgery*, 108, 950-957.
3. Okie, S. (2005). Traumatic brain injury in the war zone. *New England Journal of Medicine*, 352, 2043-2047.
4. Galarneau, M. R., Woodruff, S. I., Dye, J. I., Mohrle, C. R., & Wade, A. L. (2008). Traumatic brain injury during Operation Iraqi Freedom: Findings from the United States Navy-Marine Corps Combat Trauma Registry. *Journal of Neurosurgery*, 108, 950-957.
5. Sayer, N. A., Chiros, C. E., Sigford, B., Scott, S., Clothier, B., Pickett, T., et al. (2008). Characteristics and rehabilitation outcomes among patients with blast and other injuries sustained during the Global War on Terror. *Archives of Physical Medicine and Rehabilitation*, 89, 163-170.
6. Hoge, C. W., McGurk, D., Thomas, J. I., Cox, A. I., Engel, C. C., & Castro, C. A. (2008). Mild traumatic brain injury in U.S. soldiers returning from Iraq. *New England Journal of Medicine*, 358, 453-463. Schwab, K. A., Ivins, B., Cramer, G., Johnson, W., Sluss-Tiller, M., Kiley, K. et al. (2007). Screening for traumatic brain injury in troops returning from deployment in Afghanistan and Iraq: Initial investigation of the usefulness of a short screening tool for traumatic brain injury. *Journal of Head Trauma Rehabilitation*, 22, 377-389.
7. Lew, H. I., Otis, J. D., Tun, C., Kerns, R. D., Clark, M. E., & Cifu, D. X. (2009). Prevalence of chronic pain, posttraumatic stress disorder, and persistent post concussive symptoms in OIF/OEF veterans: Poly-trauma clinical triad. *Journal of Rehabilitation Research and Development*, 46, 697-702.
8. McCrae, M. Mild traumatic brain injury and post concussion syndrome. The new evidence base for diagnosis and treatment. New York: Oxford University Press (2008).
9. Terrio, H., Brenner, I. A., Ivins, B. J., Cho, J. M., Helmick, K., Schwab, K. et al. (2009). Traumatic brain injury screening: Preliminary findings in a US Army Brigade Combat Team. *Journal of Head Trauma Rehabilitation*, 24, 14-23.
10. Taber, K., Warden, D., Hurley, R. (2006). Blast-related traumatic brain injury: What is known? *The J. of Neuropsychiatry and Clinical Neurosciences*, Vol. 18, 141-145
11. Belanger HG, Kretzmer T, Yoash-Gantz R, Pickett T, Tupler LA. (2009). Cognitive sequelae of blast-related versus other mechanisms of brain trauma. *J Int Neuropsychol Soc*. 2009 Jan;15(1):1-8.
12. (American Psychiatric Association, 2013)
13. Scott et al. The Quantitative Meta-Analysis of Neurocognitive Functioning. *Psychological Bulletin*. 2015. Vol. 141, num 1. 105-140
14. Ford, J., Chapman, J., Connor, D., & Cruise, K. (2007). Complex trauma and aggression in secure juvenile justice settings. *CRIMINAL JUSTICE AND BEHAVIOR*, Vol. 39, No. 6, June 2012, 694-724
15. Hoge CW, McGurk D, Thomas JL, Cox AL, Engel CC, Castro CA: Mild traumatic brain injury in US soldiers returning from Iraq. *N Engl J Med* 2008; 358:453-463
16. McDermott, W. F. (2012). Understanding combat related post-traumatic stress disorder. Available from <http://www.eblib.com>
17. Hourani, Laurel L.; Williams, Jason; Lattimore, Pamela K.; Trudeau, James V.; Van Dorn, Richard A. Psychological Model of Military Aggressive Behavior: Findings From Population-Based Surveys.
18. Hoge, C.W., Castro, C.A., Messer S.C., McGurk, D. Cotting, D.I. & Koffman, R.L. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine*, 351, 13-22.
19. Parry-Jones, B. L., Vaughan, F. L., & Miles Cox, W. (2006). Traumatic brain injury and substance misuse: A systematic review of prevalence and outcomes research (1994 -2004). *Neuropsychological Rehabilitation*, 16, 537-560. <http://dx.doi.org/10.1080/09602010500231875>.
20. Unsworth, DJ. Traumatic Brain Injury and Alcohol/Substance Abuse/A Bayesian Meta-Analysis Comparing the Outcomes of People Without a History of Abuse. *Journal of Clinical and Experimental Neuropsychology*. 9 Nov 2016, 39(6):547-562
21. The Neurobiology of Substance Use, Misuse, and Addic-

- tion. 2016. <https://addiction.surgeongeneral.gov/sites/default/files/chapter-2-neurobiology.pdf>
22. Elbogen, EB & Johnson, Sally. Criminal Justice Involvement of Trauma and Negative Affect in Iraq and Afghanistan War Era Veterans. *Journal of Consulting and Clinical Psychology*. (2012) Vol. 80, No. 6, 1097–1102.
 23. Bigler ED: Neuropsychology and clinical neuroscience of persistent post-concussive syndrome. *J Int Neuropsychol Soc* 2008;14:1–22
 24. Sbordone, R.J., Saul, R.E., & Purisch, A.D. (2007). *Neuropsychology for psychologists, health care professionals, and attorneys* (Third Edition). Boca Raton, Florida, CRC Press.
 25. Vasterling JJ, Duke LM, Brailey K, Constans JI, Allain AN, Sutker PB. Attention, learning, and memory performances and intellectual resources in Vietnam veterans: PTSD and no disorder comparisons. *Neuropsychology*. 2002 Jan; 16(1):5-14.
 26. Isaac CL, Cushway D, Jones G. (2006). Is posttraumatic stress disorder associated with significant deficits in episodic memory. *Clin Psychol Rev*. 2006 Dec;26(8):939-55.
 27. Elbogen, E. B., Johnson, S. C., Wagner, H. R., Sullivan, C., Taft, C. T., & Beckham, J. C. Violent Behaviour and Post-traumatic Stress Disorder in US Iraq and Afghanistan Veterans. *British Journal of Psychiatry*, (2014) 204, 368–375. <http://dx.doi.org/10.1192/bjp.bp.113.134627>.
 28. Blakey, Shannon M.; Wagner, H. Ryan; Naylor, Jennifer; Brancu, Mira; Lane, Lane, Sallee, Meghann; Kimbrel, Nathan. VA Mid-Atlantic MIRECC Workgroup, and Eric B. Elbogen. Chronic Pain, TBI, and PTSD in Military Veterans: A Link to Suicidal Ideation and Violent Impulses? Department of Psychology and Neuroscience, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina. Veterans Affairs Mid-Atlantic Mental Illness Research, Education and Clinical Center, Durham, North Carolina. ‡ Durham VA Medical Center, Durham, North Carolina. § Department of Psychiatry and Behavioral Sciences, Duke University Medical Center, Durham, North Carolina.
 29. Elbogen, E. B., Johnson, S. C., Wagner, H. R., Sullivan, C., Taft, C. T., & Beckham, J. C. Violent Behavior and Post-traumatic Stress Disorder in US Iraq and Afghanistan Veterans. *British Journal of Psychiatry*, (2014) 204, 368–375. <http://dx.doi.org/10.1192/bjp.bp.113.134627>
 30. Gallaway, M.S., Fink, D.S., Millikan, A.M., & Bell, M.R. (2012). Factors associated with physical aggression among US army soldiers. *Aggressive Behavior*, Vol 38, 357–367.
 31. 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 2 and 12 months following combat in Iraq. *Arch Gen Psych* 67:614– 623.
 32. Bohannon JR, Dosser DA, Eugene LS. 1995. Using couple data to determine domestic violence rates: An attempt to replicate previous work. *Violence Vict* 10:133–141. Heyman RE, Neidig PH. 1999. A comparison of spousal aggression prevalence rates in U.S. Army and civilian representative samples. *J Consult Clin Psych* 67:239–242
 33. Protective Mechanisms and Prevention of Violence and Aggression in Veterans Eric B. Elbogen University of North Carolina–Chapel Hill and the Durham VA Medical Center, Durham, North Carolina Sally C. Johnson and Virginia M. Newton University of North Carolina–Chapel Hill Christine Timko VA Palo Alto Healthcare System, Palo Alto, California and Stanford University School of Medicine Jennifer J. Vasterling VA Boston Healthcare System, Boston, Massachusetts and Boston University School of Medicine Lynn M. Van Male VHA Office of Public Health and Oregon Health & Sciences University H. Ryan Wagner and Jean C. Beckham Durham VA Medical Center, Durham, North Carolina, MidAtlantic Mental Illness Research Education and Clinical Center, Durham, North Carolina, and Duke University Medical Center.
 34. Elbogen, E. B., Johnson, S. C., Wagner, H. R., Sullivan, C., Taft, C. T., & Beckham, J. C. Violent Behaviour and Post-traumatic Stress Disorder in US Iraq and Afghanistan Veterans. *British Journal of Psychiatry*, (2014) 204, 368–375. <http://dx.doi.org/10.1192/bjp.bp.113.134627>.
 35. Freeman, T., Roca, V. (2001). Gun use, attitudes toward violence, and aggression among combat veterans with chronic posttraumatic stress disorder. *Journal of Nervous and Mental Disease*, 189(5)317-320.
 36. McFall, M., Fontana, A., Raskind, M., Rosenheck, R. (1999). Analysis of violent behavior in Vietnam combat veteran psychiatric inpatients with posttraumatic stress disorder. *Journal of Traumatic Stress*, 12(3), 501-517.
 37. Blonigen, D. M., Bui, L., Elbogen, E., Blodgett, J. C., Maisel, N. C., Midboe, A. M., et al. (2016). Risk of recidivism among justice-involved veterans: A systematic review of the literature. *Criminal Justice Policy Review*, 27(8), 812–837.
 38. Greenberg GA, Rosenheck RA. Jail incarceration, homelessness, and mental health: a national study. *Psychiatr Serv*. 2008;59(2):170–177
 39. Sullivan CP, Elbogen EB. PTSD symptoms and family versus stranger violence in Iraq and Afghanistan veterans. *Law Hum Behav*. 2014;38(1):1–9
 40. Robertson, T., Daffern, M., & Bucks, R. S. (2012). Emotion Regulation and Aggression. *Aggression and Violent Behavior*, 17, 72–82. <http://dx.doi.org/10.1016/j.avb.2011.09.006>.
 41. Chemtob, C. M., Novaco, R. W., Hamada, R. S., & Gross, D. M. (1997). Cognitive-behavioral treatment for severe anger in posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology*, 65, 184–189.
 42. Fabian, J. (2010). Neuropsychological and neurological correlates in violent and homicidal offenders: A legal and neuroscience perspective. *Aggression & Violent Behavior*, Vol. 15(3), 209–223.
 43. Shiroma, E., & Pickelsimer, E. (2010). Prevalence of traumatic brain injury in an offender population: a meta - analysis. *J. Correct Health Care*, Vol. 16(2), 147–159.
 44. VA/DoD Clinical Practice Guideline and Management of Post-traumatic Stress. Department of Veterans Affairs, Department of Defense
 45. Miles, Shannon R.; Sharp, Carla; Teten Tharp, Andra; Standford, Matthew S.; Stanley, Melinda; Thompson, Karin E.; Kent, Thomas A. Emotion Dysregulation as an Underlying Mechanism of Impulsive Aggression: Reviewing Empirical Data to Inform Treatments for Veterans who Perpetrate Violence.
 46. Weber, D. L. (2008). Information Processing Bias in Post-traumatic Stress Disorder. *Open Neuroimaging Journal*, 2, 29–51. <http://dx.doi.org/10.2174/187444000802010029>.
 47. Robertson, T., Daffern, M., & Bucks, R. S. (2012). Emotion Regulation and Aggression. *Aggression and Violent Behavior*, 17, 72–82. <http://dx.doi.org/10.1016/j.avb.2011.09.006>.
 48. Sullivan CP, Elbogen EB. PTSD symptoms and family versus stranger violence in Iraq and Afghanistan veterans. *Law Hum Behav*. 2014;38(1):1–9; Hellmuth JC, Stappenbeck CA, Hoerster KD, Jakupcak M. Modeling PTSD symptom clusters, alcohol misuse, anger, and depression as they relate to aggression and suicidality in returning U.S. Veterans. *Journal of Traumatic Stress*. 2012;25(5):527–534.
 49. Friel A, White T, Hull A. Posttraumatic stress disorder and criminal responsibility. *J Forensic Psychiatry Psychol* 19: 64–85, 2008
 50. McFall ME, Wright PW, Donovan DM, Raskind M. Multidimensional assessment of anger in Vietnam veterans with posttraumatic stress disorder. *Compr Psychiatry*. 1999;40(3):216–220.
 51. Sullivan CP, Elbogen EB. PTSD symptoms and family versus stranger violence in Iraq and Afghanistan veterans. *Law Hum Behav*. 2014;38(1):1–9
 52. Mendez, Anthony; Owens, M.F.; Jimenez, E.E.; Peppers, D.; Licht, E.A. Changes in Personality after Mild Traumatic Brain Injury from Primary Blast vs. Blunt Forces. *Brain Injury*, 27, 10–18
 53. McGlade, E., Rogowska, J., & Yurgelun-Todd, D. (2015). Sex Differences in Orbitofrontal Connectivity in Male and Female Veterans with TBI. *Brain Imaging and Behavior*, 9, 534–549.
 54. Silver, JM. Pharmacotherapy of Post-Traumatic Cognitive Impairments. *Behav Neurol*. 17:25-42, 2006
 55. Douglas, David. Neuroimaging of Traumatic Brain Injury. *Medical Sciences*, 2019, 7, 2-19
 56. Arciniegas DB, Topkoff J, Silver Jm. Neuropsychiatric Aspects of Traumatic Brain Injury. *Curr Treat Options Neurol* 2:169–86, 2002
 57. Chemtob, C. M., Novaco, R. W., Hamada, R. S., & Gross, D. M. (1997). Cognitive-behavioral treatment for severe anger in posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology*, 65, 184–189.
 58. Morris, D. H., Spencer, R. J., Winters, J. J., Walton, M. A., Friday, S., & Chermack, S. T. (2019). Association of persistent postconcussion symptoms with violence perpetration among substance-using veterans. *Psychology of Violence*, 9(2), 167–176.
 59. Vasterling, J. J., Jacob, S., Rasmusson, A. (2018). Traumatic brain injury and posttraumatic stress disorder: Conceptual, diagnostic, and therapeutic considerations in the context of co-occurrence. *Journal of Neuropsychiatry and Clinical Neurosciences*, 30(2), 91–100.
 60. Elbogen, EB & Johnson, Sally. Criminal Justice Involvement of Trauma and Negative Affect in Iraq and Afghanistan War Era Veterans. *Journal of Consulting and Clinical Psychology*. (2012) Vol. 80, No. 6, 1097–1102.
 61. Vasterling JJ, Aslan M, Lee LO, et al. Longitudinal Associations among Posttraumatic Stress Disorder Symptoms, Traumatic Brain Injury, and Neurocognitive Functioning in Army Soldiers Deployed to the Iraq War. *J Int Neuropsychol Soc*. 2018;24(4):311-323.

62. Karr, Justin. What Variables Explain Cognitive Complaints Among OEF/OIF/OND Veterans with a Remote History of Blast-Related Mild Traumatic Brain Injury. *The Score*. April 2019

63. Brenner, L. A., Ivins, B. J., Schwab, K., Warden, D., Nelson, L. A., Jaffee, M., & Terrio, H. (2010). Traumatic brain injury, posttraumatic stress disorder, and

postconcussive symptom reporting among troops returning from Iraq. *The Journal of Head Trauma Rehabilitation*, 25(5), 307-312. <https://doi.org/10.1097/HTR.0b013e3181cada03>



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VETERANS AND VIOLENCE PT. 2: FORENSIC PSYCHOLOGICAL AND NEUROPSYCHOLOGICAL EVALUATIONS OF VETERANS WITH PTSD AND TBI

BY JOHN MATTHEW FABIAN

LEGAL APPLICATIONS AND IMPLICATIONS

Part I of this article was run in the October 2020 issue. Part II of this article focuses on the application of forensic psychological and neuropsychological evaluation to veterans with PTSD and TBI.

Forensic neuropsychology is defined as the application of neuropsychological assessment and the examination of brain behavior relationships to criminal or civil litigants. Forensic neuropsychologist experts provide reliable valid assessment and data about the relationship between neurocognitive dysfunction and neuropathology and the behavioral and/or cognitive issues related to legal questions in court proceedings.

Neuropsychological assessment is very sensitive to brain function and dysfunction and can be helpful in determining forensic/legal issues. Similarly, the forensic psychologist examines psychological and psychiatric functioning of an individual and applies this clinical assessment to forensic and legal issues. The forensic neuropsychologist who also practices as a forensic psychologist will often integrate a nexus between psychological and neuropsychological brain function/dysfunction, psychiatric diagnosis, and specific symptoms to the violent act.

In addition to the forensic neuropsychological assessment of veterans to examine brain function and dysfunction, the forensic neuropsychologist will often assist in integrating their brain behavior data with neuroimaging. Structural and function neuroimaging is useful in further assessing the specific locations of the brain that may be low in volume and density. In these cases, the PTSD and TBI conditions and their effects on an individual's neuropathology are often cited in the limbic system and amygdala and hippocampus as well as the prefrontal cortex. Ideally, the neuropsychological assessment will be correlated with the neuroimaging findings (executive functioning deficits in the prefrontal cortex and attention, memory, and behavioral dysregulation, attention, and paranoia in the limbic system).

The forensic neuropsychological assessment in veterans in criminal cases may include the following legal referral questions:

1. Competency to stand trial
2. Not guilty by reason of insanity
3. Diminished capacity
4. Voluntary intoxication and diminished capacity
5. Self-defense
6. Mitigation for plea negotiation and/or sentencing
7. Issues relating to future dangerousness, lack thereof, and violence and sexual violence risk assessment and risk management

I will address some of these forensic legal issues concerning veterans, PTSD, and TBI below.

The forensic neuropsychological assessment of veterans may ultimately focus on the prevalence and cumulative impact of co-occurring neuropsychological and psychiatric conditions including PTSD, TBI, depression, and substance intoxication/addiction on the veteran's mental state at the time of the violent act(s). The forensic neuropsychologist may also offer valuable insight into the complex emotional, behavioral, and neuropsychological effects and function of brain injury and PTSD in relation to a veteran's propensity for violence.

Issues related to behavioral dyscontrol, impulsivity, dissociation, paranoia, suicidality, and intoxication are germane to both TBI, PTSD, and other comorbid conditions that are prevalent with intense combat related military service.

Three major areas of forensic assessment with TBI and PTSD in military related criminal justice cases include diminished capacity, self-defense, insanity, and mitigation. Essentially, all these forensic referral questions address the defendant's mental state at the time of the offense.

DIMINISHED CAPACITY

In military cases, the effects of TBI and or PTSD on one's emotional, behavioral, and cognitive functioning can be applied to the mens rea elements of a violent crime.

Diminished capacity in criminal cases is typically recognized as whether the defendant, due to mental disease and/or defect, had the capacity to form the requisite mental state constituting a crime. This proposition is supported by opinions issued from the Courts of Appeal.

In *Jackson v. State*,¹ diminished capacity was presented as a failure-of-proof claim. The prosecution failed to prove that the defendant had the required state of mind at the time of the offense. To counter the prosecution's evidence of the defendant's culpable state of mind, the defense may present evidence that the defendant has mental or physical impairments or abnormalities and that some of his abilities are lessened in comparison to someone without such problems.

Evidence of mental disease or defect that directly rebuts a particular mens rea necessary for the charged offense can be



presented by either lay or expert witnesses. In *Lizcano v. State*,² the Court recognized diminished capacity with mental health testimony only if it negates any mens rea element. The defense must make a showing of a connection between the defendant's psychological and neuropsychological functioning and how impairments could negate a mens rea element.

In *Lizcano*, the defendant was charged with the offense of capital murder in the shooting death of a police officer. During trial, the trial court excluded evidence related to the defendant's mental health. On appeal, the defendant argued that the excluded mental health testimony was relevant as to whether, because of mental disease or delusion, the defendant believed he was not shooting at a uniformed police officer. He further argued that evidence of how paranoid delusions may distort a person's auditory and visual perceptions is admissible as it relates to the defendant's intent to shoot a police officer. The Court found there was no suggestion in the trial record that the excluded testimony had anything to do with delusions. Instead, the court concluded the excluded testimony suggested general limitations in cognitive ability and intoxication at the time of the offense as well as general deficits in adaptive functioning. The excluded testimony had relevance only as to whether the defendant's mental functioning was below normal to some degree. There was no evidence showing a connection between the defendant's generally low level of mental functioning and his knowledge during the commission of the offense that the victim was a police officer.

In *State v. Ruffin*,³ Ruffin was charged with aggravated assault after shooting at police officers. At the time of the shooting, he believed the officers were trespassers and Muslims rather than police officers. At trial, the psychologist for the defense testified that Ruffin suffered from delusions and opined that he was suffering from psychotic symptoms such as auditory and visual hallucinations at the time of the offense. The trial court found the testimony of the psychologist was relevant and admissible to rebut the mens rea element of the offense. In essence, the Court emphasized that any expert testimony regarding diminished capacity and mens rea issues during the guilt and innocence phase of the trial must not only focus on mental illness, psychiatric symptoms, level of functioning, and possible brain damage and dysfunction, but there must also be a showing of how those symptoms and impairments specifically negate the defendant's mens rea.

Similarly, in *Nikmanesh v. State*,⁴ the Court of Appeals found the trial court did not err in excluding psychiatric evidence where expert testimony concerning the defendant's behavior, depressive disorder, and obsessive-compulsive disorder could only offer an explanation or motive for his actions but could not negate intent for an offense of murder.

Ultimately, diminished capacity mental health testimony not directly rebutting intent will not be admitted in Texas courts.⁵ An expert witness in a case where PTSD and TBI are present must not only present testimony on symptoms of psychiatric disorder and neurocognitive impairments of brain disorder but apply this information to the defendant's incapability of forming intent to commit the act or incapability of acting with

knowledge of their conduct and its consequences.⁶ Presenting expert testimony only on symptoms, conditions, diagnoses, and impairments without applying this data to the defendant's mental state at the time of the offense(s), and specifically to their intent, will not be permitted.

Information as to mitigating mental state evidence of PTSD and/or TBI in military and civilian cases can assist the trier of fact in appreciating the defendant's mental state and history. In many violent murder and assault cases defendants have a profound history of abuse, neglect, early trauma, and complex trauma suffered through childhood, histories of psychiatric disorders, and dual-diagnostic disorders with chemical dependency and addiction. The military servicemen and women who commit violent crimes often have these same traumatic and dysfunctional histories, but they also may have military trauma histories related to PTSD and brain injury.

Additionally, in cases with genuine military-based trauma often suffered and acquired through combat, the trier of fact may recognize mitigating factors regarding service to country. Reporting this trauma through presentation of forensic expert reports is also bolstered by providing the trier of fact with VA and military records which may provide even more legitimacy of the trauma.

CASE STUDIES

In a case of diminished capacity, this author examined a 22-year-old non-military defendant charged with two counts of aggravated assault of a public servant with a deadly weapon and evading arrest/detention in a motor vehicle. The defendant's father had a traumatic brain injury causing him severe anger problems, and he physically abused the defendant. The defendant also had prior acts of violence towards family members. The defendant suffered from a childhood history of ADHD and early behavioral problems, and there were early concerns about autism spectrum disorder. Once he reached adulthood, he was more floridly psychotic with a schizophrenia diagnosis and experienced auditory hallucinations and paranoid delusions.

The evening of the offense, the defendant was paranoid and psychotic and was audio and video recording family members due to his paranoia. Arguing ensued between the defendant and his father and grandfather, and the defendant yelled out that he had to leave because of the demons. He ran out of the house, got into a car, and started driving in an acute psychotic state. The family had called 911, and the police responded immediately. The defendant was driving erratically, and the officer perceived the defendant driving toward him and felt threatened, attempted to stop the car by moving to the other lane, and ultimately steered his vehicle toward the defendant's car, ramming it to its halt. The officer got out of the car and grabbed the defendant's passenger door handle when the defendant failed to follow the officer's commands. The officer fired his weapon twice as the defendant's vehicle approached him.

During a 702⁷ hearing at the guilt/innocence phase of the trial, the author's testimony addressed the defendant's mental state at the time of the alleged offense. The defendant was significantly compromised by his mental conditions related to schizoaffective disorder bipolar type, active paranoid delusions,

auditory hallucinations, PTSD, and ADHD. Also present was the hyperarousal and fight/flight phenomenon. These disorders would impair an individual's cognitive functioning, ultimate problem solving, and decision-making skills in a time of heightened stress, extreme paranoia, and perceived threat. The testimony was admitted by the court to inform the jury as to how these psychiatric symptoms collectively negated the defendant's mental state to commit aggravated assault against a police officer.

In another Texas case, this author examined a 61-year-old Vietnam veteran charged with online solicitation of a minor under age 14. He served one tour in Vietnam where he witnessed and experienced significant war-related trauma, and as a result, there was evidence of PTSD and severe alcoholism, depression, and anxiety. There was also evidence of childhood neurodevelopmental disorder. He had treatment and disability through the VA for mental health conditions. He suffered one traumatic brain injury after the war from an assault and another when he was hit by a car. The trial court judge held a 702 hearing and allowed mental health testimony regarding the defendant's mental state and intent as to following through with solicitation type text messages to a minor girl. Essentially, the author examined and testified to significant brain dysfunction, neurocognitive and neurodevelopmental disorders, coupled with his mental illness and how these disorders in collection compromised his mental state and negated his intent regarding solicitation, as well as testimony regarding his intent in carrying out any type of sexual acts with the victim.

SUDDEN PASSION, MANSLAUGHTER, AND CRIMINAL HOMICIDE

Another area of criminal law where PTSD and TBI evidence may apply is in the defense of criminal homicide (Texas Penal Code §19.01).⁸ "Criminal Homicide" covers the offenses of Murder (§19.02), Capital Murder (§19.03), Manslaughter (§19.04), and Criminally Negligent Homicide (§19.05).

Pursuant to §19.02, a person commits the offense of murder if he:

1. Intentionally or knowingly causes the death of an individual;
2. Intends to cause serious bodily injury and commits an act clearly dangerous to human life that causes death of an individual; or
3. Commits or attempts to commit a felony, other than manslaughter, and in the course of an in furtherance of the commission or attempt, or in the immediate flight from the commission or attempt, he commits or attempts to commit an act clearly dangerous to human life that causes the death of an individual.

Murder is a first-degree felony with a range of punishment of 5-99 years or Life in the Texas Department of Corrections (TDC). Should the defense prove the defendant acted with "sudden passion" the jury may sentence the defendant as if it were a second-degree felony, which has a range of punishment of 2-20 years in TDC. "Sudden passion" means passion directly caused by and arising out of provocation by the individual killed or another acting with the person killed, which passion arises at the time of the offense and is not solely the result of former provocation.

Critical to murder cases is an instruction for manslaughter. Under §19.04, a person commits the offense of manslaughter if he recklessly causes the death of an individual. Mental health and brain behavior-based PTSD and TBI evidence may apply to negate a defendant's intentionally or knowingly causing the death of an individual. The conditions, symptoms, and impairments of PTSD and TBI apply well with reckless behavior. Per §6.03(c), a person is reckless when they are aware of the risks surrounding their conduct and of the results that could occur but consciously disregard that awareness. Importantly, the risk must be of such a nature and degree that its disregard constitutes a gross deviation from the standard of care that an ordinary person would exercise under all the circumstances as viewed from the actor's standpoint. The crime does not require an element of premeditation, intent, or knowledge, only that a person is reckless.

PTSD and TBI can affect several critical domains of functioning at or around the time of violent acts leaving an individual vulnerable to misperceiving provocation, overreacting, and becoming impulsive and reckless in their reactions and behavior. Some of these domains include cognition, emotion, behavior, and physiological arousal. PTSD and TBI can also dramatically affect the way an individual perceives, processes, and responds to people and situations. These conditions place individuals at risk for paranoia, impulsivity, deficient problem solving, and deficits in cool reflection with poor appreciation of consequences.

Critical neural circuitry areas of the brain and in particular, the areas regarding impulse control, learning from experience, problem solving, and decision making are especially susceptible to PTSD and TBI. An individual with PTSD and/or TBI, but especially both together, can misperceive threat and provocation due to a number of issues including paranoia, deficient emotional processing, and behavioral regulation.

SELF-DEFENSE

Another area of mental state evidence and the law in which psychological and neuropsychological evidence can be considered is self-defense.⁹ Under Texas Penal Code 9.31, self-defense can be invoked when "a person is justified in using force against another when he believes the force is immediately necessary to protect himself against the other's use or attempted use of unlawful force." Self-defense is an affirmative defense, and the defendant bears the burden of production. He must present some evidence of a specific apparent danger and that the use of force or deadly force was reasonable and necessary to avoid the danger.¹⁰ The reasonableness of the actor's belief that force or deadly force is immediately necessary is judged from the standpoint of an ordinary person under the same circumstances as the actor. A person "has a right to defend from apparent danger to the same extent as he would had the danger been real; provided that he acted upon a reasonable apprehension of danger as it appeared to him at the time."¹¹ The defense attorney may argue that their client's PTSD, complex trauma, or TBI related brain damage/dysfunction are circumstances that must be considered by the trier of fact in a self-defense case.

A veteran suffering from PTSD/TBI is at particular risk

to have a compromised fight/flight system. Evidence of complex trauma and PTSD place a veteran at risk to misperceive threat, to be constantly on edge, hypervigilant, and in an over-stimulated and impulsive state. Those with TBI often have faulty brakes to balance the impulsive threat response system.

CASE STUDY

In a self-defense trial, this author examined a 74-year-old Vietnam veteran charged with murder. The defendant was accused of murdering his neighbor who was also a Vietnam veteran, and with whom for several years, he shared a chronic tumultuous history. The defendant perceived death threats from the neighbor, and on the day of the shooting, he said the victim assaulted him on his own property by punching and striking him multiple times. He also perceived the victim pulling out a weapon (an aluminum cane) and threatening the defendant and yelling that he wished the defendant would die. While the defendant was trying to retreat, the victim continued punching him, which led to a mutual fight. There was a verbal and physical argument over the weapon. While the victim was beating him with the cane, the defendant pulled out a gun and shot and killed the victim. During my examination the defendant said, "When I pulled the trigger I was in fear for my life."

The defendant had a history of trauma prior to his war experiences which led to his PTSD symptoms. His biological father had a history of alcohol use and abuse and died of cirrhosis of the liver when the defendant was age 6. The defendant then lived in an extremely dysfunctional household with his mother, who had evidence of mental illness, and his grandparents. The defendant only completed ninth grade, and he had problems with school achievement. The defendant served as a combat infantry soldier in both the Korean and Vietnam wars. He completed one tour in Korea and three tours in Vietnam, where he earned a Bronze Star and Purple Heart. During his tours of duty, he suffered severe traumatic stress including being shot at, witnessing people getting killed, killing others in the line of duty, and experiencing traumatic brain injury. The veteran did not receive any assessment or treatment for his PTSD during either war.

When he returned to the United States, he had florid PTSD symptoms and evidence of domestic violence with his wife and extreme difficulties with chronic intrusive memories, flashbacks, and nightmares. He worked as a security guard in a prison where he experienced further trauma and multiple concussions. He qualified for a dual-diagnosis condition as he became an alcoholic when returning from Korea and was chronically drinking until age 65 when finally, he gained sobriety. He received full disability from the VA for PTSD and other medical conditions.

The neuropsychological assessment conducted indicated mild to moderate neurocognitive deficits in several areas including memory, executive functioning, and attention. He qualified for evidence of PTSD, major depressive disorder, and mild to major neurocognitive disorder due to traumatic brain injury and other vascular medical risk factors, as well as the chronic effects of alcohol use on brain functioning.

The court requested a 702 hearing, and the author testi-

fied in this hearing that the defendant was suffering from severe PTSD and a mild to moderate neurocognitive disorder due to traumatic brain injuries and a dementing condition as well as an early neurodevelopmental disorder, and further, that these conditions ultimately affected his mental state at the time of the offense, particularly regarding a self-defense claim.

The trier of fact then must consider evidence relevant to the *same circumstances of the actor*. Accordingly, the trial court found this author's testimony admissible as applied to the defendant and agreed that despite the ordinary person standard, the jury should be allowed to specifically hear testimony as to the same circumstances as the actor (defendant's mental, psychiatric, and neuropsychiatric conditions, evidence of psychiatric symptoms and brain dysfunction that included executive functioning impairments pertaining to problem solving and impulse control ultimately detrimentally impacting his fight/flight response system).

INSANITY

Under Texas Penal Code § 8.01, "it is an affirmative defense to prosecution that, at the time of the conduct charged, the actor, as a result of severe mental disease or defect, did not know that his conduct was wrong." The term "mental disease or defect" does not include an abnormality manifested only by repeated criminal or otherwise antisocial conduct."¹²

In Texas, the wrongfulness standard is typically a cognitive knowing standard and does not include the emotional and affective standard used in federal insanity law. Regarding the latter, the Insanity Defense Reform Act (IDRA) of 1984 reads, "at the time of the commission of the acts constituted in the offense, as a result of a severe mental disease or defect, they were unable to appreciate the nature and quality or wrongfulness of their acts."¹³ This statute does have some potential consideration of affective and emotional states related to mental illness and does remove the volitional component that the American Law Institute (ALI) insanity defense has regarding the defendant lacking the capacity to conform their conduct to the law.¹⁴ Both the IDRA and ALI insanity tests open the door to emotional and volitional issues that the typical cognitive "knowing wrongfulness" test lacks.

Due to the narrow cognitive knowing of wrongfulness test, it is difficult to prevail on many insanity defense cases. Typically, an individual who does not know right from wrong will be in a psychotic, manic/psychotic, or demented mental state at the time of the offense. Concerning PTSD, if an individual is in a profound dissociative state with potential evidence of depersonalization and/or derealization, there may be a better chance for an insanity defense. When an individual is dissociating and has recurrent feelings of being detached and dissociated from one's body mind processes, usually with the feeling of being outside of themselves, including being an observer of one's life or being detached from one's body/mind feelings and/or sensations, they may have a compromised capacity in knowing the wrongfulness and illegality of their offenses.

Depersonalization is when an individual feels detached from one's body, mind, feelings, and/or sensations, while derealization occurs when an individual feels detached from their

surroundings, such as people, objects, events, and they perceive things as being unreal. When these two symptom clusters of depersonalization and derealization occur together the individual may feel detached from their own self and perceive that things are unreal. These severe dissociative traits are close in replica of a psychotic disorder such as schizophrenia in which an individual has hallucinations or delusions and they lack contact from reality. In essence, the symptoms of depersonalization and derealization may lead an individual to not perceive that they are in contact with reality. Further, in many cases of PTSD, the defendant will suffer from other psychiatric disorders and/or TBI which may have a cumulative effect with the PTSD symptoms on their overall functioning and capacity in knowing the wrongfulness of their acts.

In *Kemp v. State*,¹⁵ a Vietnam veteran shot his wife in bed and pled not guilty by reason of insanity. He stated that he was dreaming of being surrounded by Viet Cong, and this dreaming episode certainly would have been an intrusive symptom of PTSD. The defense did not prevail, and the defendant appealed. The Wisconsin Supreme Court ordered a new trial in the interest of justice on the single issue of the defendant's special plea of not guilty by reason of insanity or lack of mental responsibility at the time of the act. The doctor called by the defendant and two court appointed witnesses all testified that the defendant was legally insane, and two doctors called by the state stated they could not form an opinion, while one doctor called for the state testified that he did not have an opinion but that maybe the defendant did lack mental responsibility.

In cases like this, the most ideal insanity case with PTSD should include the defendant experiencing a dissociative traumatic type episode that is reminiscent of a prior trauma experience. A defendant who commits a violent act who is dissociating at the time of the offense would have an enhanced defense if he were perceiving a similar trauma that he had experienced before. In essence, the trauma at the time of the instant offense ideally will be reminiscent of the earlier trauma(s).

In a case closer to home in the Lonestar State, American Sniper Chris Kyle was shot and killed by Eddie Ray Ruth. The defendant was a former Marine who had been given a diagnosis of PTSD and spent time in several hospitals being treated for mental illness and was even prescribed antipsychotic medication. Mr. Ruth also used a not guilty by reason of insanity defense. His defense included his portrayal of being in a psychotic episode when he shot and killed Kyle in Littlefield at a gun range in February of 2013. Ruth's insanity defense failed, and he was sentenced to life in prison without parole. The failure of the defense was due in part to the defendant's problems with drugs and alcohol and because the State's experts opined that he was exaggerating mental illness during the examinations.

MITIGATION OF MILITARY AND CIVILIAN PTSD AND TBI

Perhaps the most common process of utilizing forensic psychological and neuropsychological evidence of PTSD and TBI in military and non-military civilian cases is through mitigation evaluations/packages provided to the prosecution, court, and/or jury through forensic reports and/or testimony. Mitigating evi-

dence about a defendant's background, character, and characteristics of his offense is relevant because, pursuant to "evolving standards of decency" in our society, such factors speak to one's moral culpability.¹⁶

Mitigation evaluations are utilized by the defense to provide the prosecution information outside of the criminal offenses and can be used to educate them as to the defendant's background history, ultimately relating to moral culpability. These evaluations often assist the defense in the plea negotiation process.

In the absence of specific direction and guidance from statutes or sentencing guidelines, numerous federal and state decisions have recognized PTSD as a mitigating factor when the offender is a military veteran.

In *Porter v. McCollum*,¹⁷ the United States Supreme Court held that the lawyer's failure to present evidence of PTSD connected to military service during the sentencing phase of a capital case constituted ineffective assistance of counsel. The Court emphasized the importance of recognizing the defendant's service to his country, "Our nation has a long tradition of affording leniency to veterans and recognition of their service, especially for those who fought on the front lines." The Court also associated the concepts of PTSD in military service, "the relevance of...combat experience...is that the jury might find mitigating the intense stress and mental and emotional toll that combat took on the offender." Also emphasized, was the importance of the defendant's military service as a part of a general policy relevant to leniency to war veterans while recognizing the psychological trauma stemming from combat experience, the latter which could have diminished the offender's capacity to form the requisite intent in committing the crime.

In the *United States v. Brownfield*,¹⁸ a federal judge in a non-capital case sentenced the defendant to five years of probation and ordered a psychiatric evaluation for a military-based PTSD condition and explained that the case involved issues the federal sentencing guidelines do not address regarding the criminal justice system's treatment of returning veterans who have served in Afghanistan and Iraq.

When considering non-capital federal cases, U.S.S.G. § 5K2.0 allows departure from the sentencing minimums for "extraordinary mental condition." In federal court, diminished capacity is identified pertaining to a reduced sentencing under the federal sentencing guidelines rather than a formal defense during the guilt/innocence phase of a trial. According to the § 5K2.13 diminished capacity policy statement, it provides for a downward departure if: 1) the defendant committed the offense while suffering from a significantly reduced mental capacity; 2) the significantly reduced mental capacity contributed substantially to the commission of the offense.

Further, the advisory guidelines also note downward departure may be warranted based on military service, U.S.S.G. § 5H1.11-Military service may be relevant in determining whether a departure is warranted, if the military service, individually or in combination with other offender characteristics, is present to an unusual degree and distinguishes the case from the typical cases covered by the guidelines. A downward departure may be pur-

sued pertinent to mental and emotional conditions, U.S.S.G. § 5H.13. According to § 5H.13, mental and emotional conditions may be relevant in determining whether a departure is warranted, as such conditions, individually or in combination with other offender characteristics, present to an unusual degree and that distinguish a case from the typical cases covered by the guidelines. In certain cases, downward departure may be appropriate to accomplish a specific treatment purpose (this could be related to a veteran obtaining specialized PTSD and/or TBI veteran-based treatment). Mental and emotional conditions could be relevant in determining the conditions of probation with supervised release; e.g., participation in a mental health program. Therefore, there are different avenues in federal court to argue downward departure pertaining to special veteran circumstances.

When returning veterans with no prior criminal history run afoul of the law federal judges have the power pursuant to 18 U.S.C. §3553(a) to structure sentences that facilitate rehabilitation and reintegration.

In *United States v. Cantu*,¹⁹ the Ninth Circuit held that combat-related PTSD was the type of “mental condition” that would qualify a defendant for a downward departure for “diminished capacity” under U.S.S.G. §5K2.13. The Ninth Circuit had little difficulty concluding that PTSD is a qualifying disorder for “diminished capacity”:

Cantu’s post-traumatic stress disorder is a grave affliction. Its effect on his mental processes is undisputed. He has flashbacks to scenes of combat. He suffers nightmares, intrusive thoughts[,] and intrusive images. He is anxious, depressed, full of rage, markedly paranoid, and explosive at times.

The psychologist’s report shows that Cantu’s condition interfered substantially with his ability to make reasoned decisions, causing him to fixate on weapons and rely on them for feelings of personal safety and security. Cantu’s impairment is more than sufficient to make him eligible for a reduction in sentence under §5K2.13.²⁰ The Court went on to explain that “the disorder need be only a contributing cause, not a but-for cause or a sole cause of the offense.” This policy statement, since amended, now requires that the disorder “substantially contribute” to defendant’s commission of the offense. If a departure is warranted under this policy statement, the extent of the departure should reflect the extent to which the reduced mental capacity contributed to the commission of the offense.

This author examined a defendant who was charged in federal court with multiple counts of bank robbery. The defendant graduated from college and served as a front-line medic in the military and experienced/witnessed profound war related trauma, IED blasts, murders, killings, and earned numerous decorated medals from his service in Afghanistan and Iraq. When he returned to the United States, he experienced profound PTSD, major depression, and an inpatient psychiatric hospitalization. He exhibited significant neuropsychological impairments despite strong verbal and overall IQ scores. He became addicted to opiates, alcohol, and cannabis in addition to his impairments due to PTSD. He also had a history of concussions pre-dating his military service.

CASE STUDY

The defendant went on a bank robbery spree and described his motive as to achieve a euphoria and “wanted to feel something” like he felt in Iraq. He did not appear to be planning the offenses, but his motivation was again to achieve a sense of euphoria and rush. There was a disconnect between his emotions, thoughts, and behaviors, which certainly was related to his chronic PTSD condition.

When holding up the bank tellers he lacked an appreciation as to how his behaviors affected others as he focused only on the stimulating, arousing, and inebriating effects that his actions had on him. He had a gun in the bank and said, “It did not seem like a gun or weapon...it was like a TV remote...I was programmed to not feel emotion due to my war experiences...I eventually did not feel anything...I never considered what I did was really terrorizing anyone.” His impaired ability to feel, regulate, and process his emotions probably led to a diminished empathy for the victims and deficits in feeling remorse as well as a compromised ability to appreciate the severity and consequences of his behaviors.

While he understood the wrongfulness of his behaviors, he had difficulty appreciating the quality of his behaviors pursuant to the Federal Insanity Defense Reform Act (IDRA). In particular, he lacked an emotional appreciation of how his behaviors were affecting others. The defendant had suffered from flashbacks involving alteration of consciousness, and he believed he was re-experiencing a traumatic situation when he was committing the bank robberies. These flashbacks, along with nightmares and intrusive memories, led to heightened emotional stress and to low autonomic activity.

While the defense did not raise an insanity defense, they did focus on his PTSD, major depressive conditions, and the neurocognitive deficits from the PTSD condition that placed him at risk for a diminished ability to choose and completely refrain from his behaviors. He was stimulation-seeking, reckless, impulsive, and found himself escalating these behaviors in frequency closer in time to the arrest.

Despite his intelligence, the veteran’s PTSD condition had altered the functional and neural circuitry of his brain. The neuropsychological assessment revealed significant attention, memory, and executive deficits leaving him impulsive, seeking sensation and intense adrenaline producing experiences with deficits in regulating behavior and appreciating the consequences of his behaviors onto others.²¹

This defendant was experiencing heightened emotions, including anxiety, fear, guilt, depression, anger, shame, and he would suffer acute emotional reactions when he was exposed to reminders of his wartime traumatic events. Consequently, he utilized drugs to combat and self-medicate these negative emotions focusing his use on opiates to numb his hyper-aroused and traumatic states.

Ultimately, under USSG § 5K2.0 federal law allows departure from the sentencing minimums for “extraordinary mental conditions.”²² The federal district court recognized this forensic psychological and neuropsychological data in the form of a sentencing mitigation package and sentenced him to 108 months

despite him committing up to 12 bank robberies within a six-week span.

BRIEF NEUROSCIENCE ADMISSIBILITY ISSUES

Forensic psychological and neuropsychological assessment, the specific testing and results, and testimony related to forensic legal issues such as first phase mental state evidence and mitigation are typically admissible. Courts will admit evidence deemed “relevant” as defined by Texas Rule of Evidence 401, which states that “Relevant evidence” means evidence having any tendency to make the existence of any fact that is of consequence to the determination of the action more or less probable than it would be without the evidence. However, Rule 403 allows a trial court to exclude relevant evidence if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, misleading the jury, or by consideration of undue delay, waste of time, or needless presentation of cumulative evidence.

Although forensic psychological and neuropsychological assessment techniques themselves are typically admitted, the application of psychiatric diagnosis, functional neuropsychological and psychological impairments and symptoms, and their relationship to mental state evidence obviously can be contested by legal parties. The defense must be clear in a 702 hearing how mental health evidence, especially diagnostic symptoms and functional impairments, relate to the specific legal issue(s) in mind such as negating intent related to mens rea and diminished capacity or the standard of ordinary person in a self-defense claim. There should be a nexus between the diagnostic symptoms, functional capacity and impairments, and the law.

NEUROIMAGING

While there appear to be more objections to the admissibility of neuroimaging cases in criminal court, neuroimaging evidence can be considered in both PTSD and traumatic brain injury. Neuroimaging in non-murder cases may not be as technically specific and intricate as in murder and death penalty cases in large part due to cost and funding. The most useful neuroimaging techniques include voxel-based morphometry (VBM) (volumetric MRI) functional magnetic resonance imaging (fMRI), PET scan, and diffuse tensor imaging (DTI).

In its basics, neuroscientists can measure focal brain volumes with VBM which is an MRI technique that allows for the investigation of focal differences in brain anatomy.²³ Essentially, a brain’s image is divided into hundreds of thousands of cubes, and a computerized algorithm quantifies total brain tissue, including gray and white matter and water. The individual’s brain data is then statistically compared with data derived from normal control subjects without neurological and psychiatric disorders and impaired cube brain tissue data.

With DTI, this is an MRI neuroimaging technique examining the location, orientation, and variations in the brain’s white matter tracts which is important in examining how critical areas of the brain are interconnected. The DTI specifically looks at brain fiber tracks and neural circuitry that connects a variety of brain regions and offers data as to the integrity or damage of these fibers.²⁴ These brain fiber tracks are needed in processing and communicating information to other areas of the brain.

fMRI is an imaging tool for determining which regions of the brain are working, their efficiency by detecting changes associated with cerebral blood flow, especially during cognitive tasks.

PET scan is a neuroimaging test that includes the use of tracers which are attached to compounds such as glucose which is the main fuel of the brain. The PET scan can detect which areas of the brain are utilizing glucose at the highest rates and which ones are deficient or impaired.²⁵

There are a number of studies addressing the neuroimaging in posttraumatic stress disorder.²⁶ These studies have indicated the amygdala, hippocampus, and medial prefrontal cortex, including the anterior cingulate in PTSD. These areas of the brain are critical for emotional and fear/threat processing, paranoia, traumatic memories, planning, decision making, processing of emotions, and language for example. It is these areas that are often victimized by traumatic brain injury especially the prefrontal cortex, and there can be a double dose effect with a veteran or civilian with both PTSD and TBI.

The trial court will often have a 702 hearing in which the forensic neuropsychologist will testify about the defendant’s background history, psychosocial and mental health background, the nature of the psychological and neuropsychological testing especially related to function impairments, as well as psychiatric diagnoses. The court will allow the forensic psychologist and neuropsychologist to testify about the defendant’s behaviors, including violence, as well as the forensic legal issues concerning the insanity, diminished capacity, mitigation, etc. The trier of fact may also allow the forensic neuropsychologist (not psychologist) to testify to neuropsychological testing data, brain behavior relationships, including the criminal and violent behavior, as well as the relationship between the neuropsychological testing results and the neuroimaging. The neuropsychologist can testify to not only the brain functions related to the tests themselves but also what regions of the brain the tests may measure. Similarly, the forensic neuropsychologist can testify to the connections between the neuropsychological testing results and to the neuroimaging results, as well as potentially to the psychiatric diagnoses and the neuroimaging results.

Neuroscientific experts, such as neurologists, neuroscientists, and neuroradiologists will specifically be allowed to testify as to the neuroimaging process and results, as well as neuropathology, but courts often will not allow these experts to delve into criminal behavior or forensic issues as to insanity or diminished capacity.

In a death penalty case this author examined, the defendant was a former police officer who served six tours as a civilian in a Middle East war zone where he suffered brain injury and later suffered from symptoms of PTSD. The defendant’s mental state deteriorated over time when returning to the United States on leave. He continued to become more impulsive and rageful in benign events, he misperceived threats, and was involved in a road rage incident. The other party to the road rage called the sheriff’s department who attempted to arrest the defendant following the road rage incident. The sheriff tried to gain entrance into the defendant’s home, and the defendant overreacted to his

misperceived threat and shot and killed the sheriff.

The neuroimaging data indicated brain damage and shrinkage that could be a consequence of TBI, seizure disorder, PTSD, and/or delusional disorder.

Psychological testing results yielded conditions consistent with clinical interview and background information relevant to PTSD and delusional disorder. Neuropsychological testing revealed evidence of significant brain dysfunction consistent with PTSD, traumatic brain injury, and an early dementing condition. There was a complete alignment between the structural neuroimaging data and the functional neuropsychological assessment data explaining an ultimate subcortical-cortical process of reactive aggression and violence.

Essentially, the defendant was in a constant state of paranoia and misperceived threat, was impulsive and easily angered, and was cognitively deteriorating. He had a fight/flight condition regarding his brain neural circuitry and function. The forensic psychological and neuropsychological information and testimony was put forth in the mitigation phase of the court case rather than the guilt-innocence phase, ultimately yielding a life without parole outcome.

VIOLENCE RISK ASSESSMENT AND RISK MANAGEMENT

Veterans returning for war are at risk for criminal justice involvement, as well as trauma.²⁷ Veterans with probable PTSD or TBI who reported anger and/or irritability are more likely to be arrested than other veterans, and they are at higher risk for aggression and violence.

As part of a mitigation package, the defense may also request a violence risk assessment and risk management examination by the forensic psychologist/neuropsychologist. This violence risk assessment may be relevant to cases including other assault and violent non-murder cases. The forensic psychologist/neuropsychologist conducting risk assessment should certainly have a handle and experience relevant to the proper examination of violence risk assessment.

A solid mitigation package is not only useful in figuring out and assessing what is wrong with the defendant, what psychiatric disorders they have, and how their brain is functioning, but also helpful on what to do with a defendant pertinent to risk management issues. Services and plans, living situations, personal and social support, as well as potential stressors need to be considered in this examination process.

It is important to emphasize a focused and specialized risk assessment for violence with military veterans.²⁸ Forensic evaluation should consider a dispositional, historical, clinical, and contextual risk factor analysis and assessment.

Dispositional factors are basic demographics related to risk of violence and can include young age, male status, personality traits, aggressive attitudes, and low intelligence.

Historical factors may include pre-deployment violence and criminal offenses, history of domestic violence, history of child abuse, witnessing domestic violence as a youth, dysfunctional family of origin, substance use, violent events experienced during deployment, and combat exposure.

Clinical factors can include PTSD and prior trauma, high

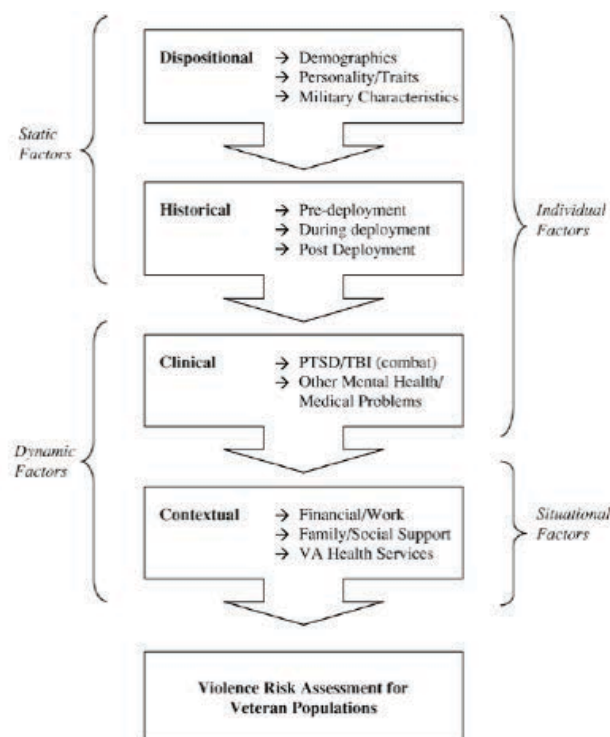


Fig. 1. Risk domains for assessment of violence risk among Veterans.

PTSD symptom severity, TBI, substance use, low intelligence, depression, suicidality, and in particular the PTSD symptoms of irritability, low frustration tolerance, and hyperarousal.

Contextual factors also may include single marital status, unemployment, financial difficulties, relationship problems, and newer marriages.

TREATING THE VETERAN

There are a number of treatments to assist the veteran returning from combat. Obviously, there are a number of conditions to treat and especially are related to polytrauma (PTSD, TBI, chronic pain, and mental illness, especially major depressive disorder and substance dependence). Importantly, the potential of addressing impulsive aggression in treatment is critical through building emotional regulation skills with both individual and group therapies. Psychological treatment options may include skills, training, and affective interpersonal regulation, cognitive behavioral therapy, and dialectical behavioral therapy. Psychiatric medication management is often necessary to treat psychiatric and brain disorder symptoms affecting emotional, behavioral, and cognitive functioning.

CONCLUDING REMARKS

This article has addressed the unique issue of examining military motivated murder and violence. The information above in both Parts I and II, especially related to the assessment and diagnosis of PTSD and TBI, certainly can be applied to civilian cases, too. Further, the author cannot overemphasize the prevalence of early childhood trauma and the comorbidity of chemical dependency in military and civilian PTSD and TBI cases.

Along these lines, this author sets forth a tri-diagnosis phenomenon that includes not only the typical dual-diagnosis and presence of psychiatric disorder and mental illness with chemical dependency and addiction, but as a third component of

brain dysfunction, which often is present in these cases pertaining to traumatic brain injury and/or neurodevelopmental disorders present in offenders (early disorders of compromise in brain development, i.e., learning disorder, ADHD, intellectual disability, and autism spectrum disorder).

The attorneys and court systems involved in these cases certainly have a heavy hand in dealing with such complexities in human behavior, brain behavioral relationships, and evidentiary tools such as neuroimaging when considering guilt, innocence, and moral culpability issues when working with these populations.

In some Texas jurisdictions there are veteran treatment courts²⁹ that allow for specialized handling for veterans involved in criminal court cases that consider coordinated systems of court supervised treatment that ensures accountability while empowering veterans to become an integral and productive member of their community. The veteran's court dockets often provide programs that utilize evidence-based practices that assist veterans in getting mental health and chemical dependency treatment and vocation and employment training and experiences while providing risk management and rehabilitative efforts with an ultimate goal of preventing re-offending.

The expert and lawyer should attempt to consult with the U.S. Department of Veteran Affairs and the Veteran's Justice Outreach Program which is designed to avoid the unnecessary criminalization of mental illness and extended incarceration among veterans by ensuring that eligible, justice involved veterans have timely access to Veterans Health Administration (VHA) services. Veteran's Justice Outreach specialists can provide direct outreach assessment and case management for justice involved veterans in local courts and jails and liaison with the local justice system partners.³⁰ Along these lines, veteran treatment courts are another viable option to assess and monitor the criminogenic and mental health, as well as chemical dependency treatment needs for veterans involved in the criminal justice system.

Impervious to assessment and management of risk is the consideration of the tri-diagnosis related to mental illness and frequently PTSD, major depression, with co-occurring substance dependence, and TBI. The potential mediating influence of substance use, mental health, and combat and other trauma experiences has significant implications for preventing criminal aggressive behavior among U.S. active duty military personnel.³¹

Ultimately, the Global War on Terrorism has had great consequences on the mental health of troops returning to the U.S. post-war service. The risk of experiencing psychiatric, neurological, and chemical dependency issues is profound and ultimately places the veteran in jeopardy of committing violent acts and landing in the criminal justice system. Proper forensic mental health assessment is vital for the best representation and equitable treatment of the veteran.

ENDNOTES

1. Jackson v. State, 160 S.W.3d 568 (Tex. Crim. App. 2005).
2. Lizcano v. State, 2010 Tex. Crim. App. Unpub. LEXIS 270.
3. Ruffin v. State, 270 S.W.3d 586, 596-97 (Tex. Crim. App. 2008)
4. Nikmanesh v. State, 2017 Tex. App. LEXIS 6051
5. State v. Perales, 2020 Tex. App. Lexis 75.
6. Brown v. State, 2014 Tex. App. LEXIS 8189

7. RULE 702. TESTIMONY BY EXPERT WITNESSES. A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue.
8. <https://statutes.capitol.texas.gov/Docs/PE/htm/PE.19.htm>
9. <https://statutes.capitol.texas.gov/SOTWDOcs/PE/htm/PE.9.htm>
10. <https://lawofselfdefense.com/jury-instruction/tx-31730limitations-on-self-defense/>
11. Broussard v. State, 809 S.W.2d 556, 559
12. <https://statutes.capitol.texas.gov/Docs/PE/htm/PE.8.htm>
13. <https://www.justice.gov/archives/jm/criminal-resource-manual-634-insanity-defense-reform-act-1984>
14. United States v. Brawner, 471 F.2d 969 (D.C. Cir. 1972)
15. Kemp v. State, 211 N.W. 2d 793 (Wis. 1973).
16. Penry v. Lynaugh, 409 U.S. 302 (1989).
17. Porter v. McCollum, 130 S. Ct. 447 (2009).
18. United States v. Brownfield, No. 08-cr-00452-JLK, slip op. at 28 (D. Colo. Dec. 18, 2008).
19. United States v. Cantu, 12 F.3d 1506 (9th Cir. 1993).101
20. United States v. Cantu, 12 F.3d 1513 (9th Cir. 1993).
21. Horner, M., & Hammer, M. (2002). Neurocognitive functioning in posttraumatic stress disorder. *Neuropsychology Review*, Vol. 12(1). Vasterling, J., et al. Attention, learning, and memory performances, and intellectual resources in Vietnam veterans: PTSD and no disorder comparisons. *Neuropsychology*, Vol. 16(1).
22. <https://guidelines.ussc.gov/gi/%C2%A75K2.0>
23. Voxel-Based Morphometry. Voxel based morphometry (VBM) is a technique using MRI that allows investigation of focal differences in brain anatomy, using the statistical approach of parametric mapping. *Handbook of Clinical Neurology*. 2014.
24. Alexander, Andrew I; Lee, Jee Eun; Lazar, Mariana; Field, Aaron S. Diffusion Tensor Imaging of the Brain. An introduction to fMRI. April 2015. doi: 10.1007/978-1-4939-2236-9_5.
25. PET Imaging in Neurology. Karl F. Hubner Department of Radiology, University of Tennessee Medical Center, Knoxville, Tennessee.
26. Bremner, M.D., J. Douglas. Neuroimaging in Posttraumatic Stress Disorder and Other Stress-related Disorders. *Neuroimaging Clin N Am*. Author manuscript; available in PMC 2009 Aug 19. Published in final edited form as: *Neuroimaging Clin N Am*. 2007 Nov; 17(4): 523-ix. doi: 10.1016/j.nic.2007.07.003.
27. Elbogen, EB & Johnson, Sally. Criminal Justice Involvement of Trauma and Negative Affect in Iraq and Afghanistan War Era Veterans. *Journal of Consulting and Clinical Psychology*. (2012) Vol. 80, No. 6, 1097-1102.
28. Elbogen, Eric B.; Fuller, Sara; Johnson, Sally C.; Brooks, Stephanie; Kinneer, Patrick; Calhoun, Patrick S.; Beckham, Jean C. Improving Risk Assessment of Violence Among Military Veterans: An Evidence-based Approach for Clinical Decision-making.
29. <https://www.texvet.org/vetcourts-tx>
30. <https://www.va.gov/HOMELESS/VJO.asp>
31. Hourani, Laurel L.; Williams, Jason; Lattimore, Pamela K.; Trudeau, James V.; Van Dorn, Richard A. Psychological Model of Military Aggressive Behavior: Findings From Population-Based Surveys.



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