

PREDICTING CLINICAL OUTCOMES IN OEF/OIF/OND VETERANS WITH THE
POLYTRAUMA CLINICAL TRIAD

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OEF/OIF/OND VETERANS

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Abstract

Since 2001, well over 2.1 million U.S. military personnel have served during Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), and Operation New Dawn (OND) (Elder, 2015). During the OEF/OIF/OND era, traumatic brain injuries (TBI) have become a hallmark injury of returning veterans in addition to posttraumatic stress disorder (PTSD) and chronic pain (Mott, Mondragon, Hundt, Beason-Smith, Grady, & Teng, 2014). Approximately 20% of OEF/OIF/OND veterans meet the criteria for having polytrauma and estimates of 6-8% have what is known as the polytrauma clinical triad (PCT) which is co-occurring PTSD, TBI, and chronic pain (Cifu, Taylor, Carne, Bidelspach, Sayer, Scholten, & Campbell, 2013). Numerous randomized clinical trials have shown that cognitive processing therapy (CPT) and prolonged exposure (PE), two evidence-based treatments for posttraumatic stress disorder (PTSD), are equally effective at improving PTSD symptoms. The present study aims to shed light on predicting clinical outcomes for OEF/OIF/OND veterans with PCT who have engaged in CPT or PE. Whether or not CPT and PE are effective treatments, for veterans with PCT, at reducing self-reported PTSD, depression, anxiety, alcohol use, and pain symptoms is measured using changes in total scores on the PTSD Checklist Military Version (PCL-M), Beck Depression Inventory-II (BDI-II), Beck Anxiety Inventory (BAI), Alcohol Use Disorders Identification Test (AUDIT-C), and the Defense and Veterans Pain Rating Scale (DVPRS) scores. This study was completed via retrospective review of approximately 2,100 electronic medical record charts. The final cohort included in this study was comprised of 140 veterans in individual therapy utilizing CPT or PE through the Veterans Health Administration. Two-way RM-ANOVAs and RM-MANOVA were used to analyze the data in SPSS. Consistent with

previous findings, this study found that both CPT and PE are effective treatments for PTSD although treatment outcomes varied within and between groups when race/ethnicity were considered. The findings of the current study were consistent with previous literature and provide some initial data for understanding PTSD treatment outcomes with veterans with PCT.

Key words: polytrauma clinical triad, posttraumatic stress, brain injury, chronic pain, veterans

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Chapter I

Introduction

Since 2001, well over 2.2 million U.S. military personnel have served during Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), and/or Operation New Dawn (OND) (Elder, 2015). Approximately 15% of those who have experienced combat exposure in Iraq or Afghanistan are later formally diagnosed with posttraumatic stress disorder (PTSD) (Sundin, Fear, Iversen, Rona & Wessely, 2009). It is likely that this is a low estimate of the number of veterans who experience PTSD symptoms because only 1 in 2 veterans seeks treatment, especially those who are older in age or have a minority status (Friedman, 2015). These facts are alarming because of the high association between PTSD and other issues such as suicide, substance abuse, interpersonal relationship issues, homelessness, chronic unemployment, chronic health problems, substance abuse, early death, and co-morbidity with other mental health diagnoses (Bahraini, Breshears, Hernandez, Schneider, Forster, & Brenner, 2014). When a combination of these injuries or disorders occur, it is called polytrauma clinical triad (PCT) and one of the most common combinations that veterans have is PTSD, TBI, and chronic pain (Otis, McGlingchey, Vasterling, & Kerns, 2011).

The acts of terrorism that took place on U.S. soil on September 11, 2001 forever scarred the face of modern history, but more importantly, became a defining moment that changed the lives of many. On the morning of 9/11, 19 Islamic extremists with ties to al-Qaida, a terrorist organization which was headed by Osama bin Laden, hijacked four commercial airplanes. Two of the planes were flown into the Twin Tower's that had been iconic markers of New York's World Trade Center and skyline. A third plane was crashed into the Pentagon in Washington, D.C., and the fourth plane was destroyed in a field in Shanksville, Pennsylvania only after

passengers were able to derail the hijackers from executing their planned mission. Nearly 3,000 civilians lost their lives that day with lasting impacts on their family, friends, and an entire generation around the globe.

At the time of the attacks on 9/11, George W. Bush was serving as president and was faced with the monumental task of uniting the country in healing and in what became known as the War on Terrorism. Bush described his vision and purpose for the War on Terror that asserted that America would “pursue nations that provide aid or safe haven to terrorism. Every nation in every region now has a decision to make: Either you are with us or you are with the terrorists.” These sentiments would set the stage for a war that would last over a decade.

Operation Enduring Freedom (OEF; October, 2001 – December, 2014) is the official term used for the War in Afghanistan which falls under the umbrella of separate wars that collectively make up what is referred to as the Global War on Terror (GWOt). Operation Iraqi Freedom (OIF; March 2003 - November 2011) and Operation New Dawn (OND; September 2010 - December 2011) are the names of the other two major conflicts that are also under the umbrella of the GWOt. President Barack Obama and his administration coined the phrase “Operation New Dawn” as a reflection of the lesser role that U.S. military forces were to play. It is important to note that the servicemembers involved in the GWOt were all volunteer forces meaning that they were not drafted to serve in the wars. This has important implications because it meant that many servicemembers deployed multiple times during their service years which has had great impacts on various aspects of their health and functioning.

Operation Enduring Freedom started with the intentions of apprehending Osama Bin Laden, eradicating Al Qaeda, and seizing power from the Taliban. Spanning approximately 13 years, OEF is the longest campaign of the U.S. having deployed ground forces. OIF spanned

about 8 years and its initial goal was to find weapons of mass destruction and to capture and remove Saddam Hussein. In December 2003, during Operation Red Dawn, Saddam Hussein was captured by American forces and was later found guilty of crimes against humanity as well as several other crimes. Hussein was executed in 2006 and U.S. forces extended their mission in OIF to include nation-building and counterterrorism purposes. In late 2010, the Department of Defense (DoD) officially named these new efforts as Operation New Dawn. OEF ceased on December 28, 2014 under the Obama administration, but a new mission, Operation Freedom Sentinel (OFS) continued as well as Operation Inherent Resolve (OIR). OIR intended to continue efforts to resolve issues with military operations in Iraq and Syria involving the Islamic State of Iraq and the Levant.

A large number of OEF/OIF/OND veterans who returned home from deployment(s) face many forms of not only physical health issues, but have mental health concerns as well. One 2010 study reports finding that about 15% of those exposed to combat in Iraq or Afghanistan develop PTSD (Sundin, Fear, Iversen, Rona, & Wessely, 2010). To reiterate, this is likely a low estimate of the true number of veterans impacted by PTSD due to the fact that as many as 50% of veterans who experience negative mental health symptoms do not seek professional help. Thus, many never receive diagnoses or treatments and little is known about this cohort due to lack of available data.

An August 2015 Congressional Research Service Report provides a glimpse into the harrowing reality of the toll that the Global War on Terror has had on OEF/OIF/OND veterans. Using data available from October 7, 2001 through July 28, 2015 (date range that is closest to the dates used in the current study), 6,855 servicemembers died in hostile and non-hostile actions and an additional 52,351 were wounded in action. New annual cases (newly diagnosed) of

PTSD between 2000 and June 5, 2015 in servicemembers who had not previously deployed totaled 39,264 and in servicemembers who had deployed specifically during OEF/OFS/OIF/OND/OIR an astounding 138,197 new cases of PTSD were identified from the Defense Medical Surveillance System (DMSS). During this same time span, a total of 327,299 new traumatic brain injury (TBI) incidents occurred in deployed and non-deployed servicemembers combined with the majority of injuries meeting criteria for being mild, followed by moderate, not classifiable, and then penetrating or severe. All of this information leads to the issue at hand that OEF/OIF/OND veterans have unique sets of injuries related to war and many are victims of polytrauma. With large numbers of wounded current era veterans entering the VA healthcare system it is crucial to understand the unique needs and experiences of this population.

Perhaps the most poignant way to convey the striking significance of why studying the polytrauma clinical triad in OEF/OIF/OND veterans is critically important is to share the stories of those who have carried the burden of PCT. The first reflection comes from former Army Captain Darisse Smith. Captain Smith was deployed to Iraq from 2005-2006 as a Kiowa helicopter pilot. "I lived in pain the entire time that I was deployed. My lower back was hurting, mostly due to the vibrations of the aircraft I was flying and inadequate seating." Four back surgeries and one spinal stimulator implant later, Smith continues to struggle with chronic pain. Smith described how living with chronic pain led to the development of her PTSD and depression, "I swallowed lots of pills - OxyContin, Vicodin, all kinds of opiates - and I just hid all the negative emotions I was having. PTSD symptoms started to creep up, and I hid them with pills. Depression, thoughts of suicide, plans for suicide, very close to ending my life, and I just used pills against it." CPT Smith, now a civilian, was able to benefit from receiving effective interventions for her pain, depression, and PTSD. She states that, "I vowed to get the word out

about my personal story so that others facing similar troubles could be encouraged and so that medical professionals could see the impact of injury and mental illness.” Smith’s story is not unlike thousands of other stories from OEF/OIF/OND veterans that have yet to be shared and heard.

For more than a decade, chronic pain has been the most common reason for OIF and OEF medical evaluation. In a sense, the need to address and relieve chronic pain is what seems to get the first foot in the door in many cases of veterans who later acknowledge issues related to PTSD, depression, anxiety, suicide, or substance use. Of veterans that entered the VA system between 2005 and 2008, 48% reported chronic pain and spinal pain was the most common area of complaint. Although there are many possibly etiologies of chronic pain, there are some unique risk factors for members of the military such as carrying heavy packs, consistent high-impact physical exertion, being mobilized in combat or training exercises through rough terrain, lifestyle factors such as poor sleep, nutrition, stress, and the psychological risks of military service.

A second veteran’s story of polytrauma is that of Staff Sergeant Ben Ricard. Ricard’s life was changed when the Mine Resistant Ambush Protected (MRAP) vehicle he was driving hit a roadside improvised explosive device (IED). Ricard suffered significant injuries after being expelled from his vehicle. His injuries included two broken legs, a broken arm, a broken back, and a traumatic brain injury. He sought varying levels of treatment and completed his recovery process at the Richmond Veteran's Affairs Polytrauma Rehabilitation Center which is one of only five designated Polytrauma Rehabilitation Centers nested within the VA healthcare system throughout the U.S. Ricard shared that he found strength in numerous sources during his treatment and recovery including his family, military training, and his belief in himself. "I gradually got stronger. I was able to stand up. I was able to walk. I was able to hug my wife. I

was able to hold my kids. No matter how tough it is, it gets better. That's the toughest thing to deal with because it takes time and it takes patience."

Another Airman's mother recounted the experience of her son's non-hostile accident that caused him to spend over a year at a Polytrauma Rehabilitation Center, "David's accident has definitely colored our life with a different crayon... our life has not gradually changed, it has changed instantaneously and permanently." These sentiments echo the importance of the role that effective specialized interventions and polytrauma centers serve, as well as the necessity that strong systems of support play in the recovery process for veterans and their families.

The current study aims to focus on the use of evidence based treatments developed for use with patients with PTSD that may have beneficial implications for use with veterans with the polytrauma clinical triad. Because this study specifically utilizes these interventions that target PTSD, much of the information discussed will be concentrated on PTSD more so than other clinical indicators such as TBI, chronic pain, depression, anxiety, and substance use that will also be reviewed. Previous research has posited that polytrauma patients often experience a wide range of mental health symptoms, but when PTSD is present, it is like the driver of the bus and the other clinical symptoms are like the passengers that are driven or dictated by the actions of the driver (PTSD). It seems clear that there is often comorbidity and likely shared vulnerability between PTSD, chronic pain, and TBI. It is likely that factors such as sensitivity or tendencies towards anxiety and depression mediate and/or moderate the relationship and course of PTSD, chronic pain, and TBI. One recent study of OEF/OIF veterans from a polytrauma rehabilitation center found that 42% had the polytrauma clinical triad. Most notably from this study, it was found that it was more common for veterans in the sample to have all 3 diagnoses concurrently present than to have any one diagnosis in isolation. In many complex ways, these sets of

symptoms interact with and influence each other and more research is needed to understand the nature of their relationships.

Also of significance is the issue that many individuals who endure chronic pain and are diagnosed with PTSD endorse higher rates of prescription pain medication abuse as well as use of other substances (legal and illegal) to self-medicate or manage their symptoms. Many recent studies are exploring substance use in veteran populations and some have found that current era veterans with complaints of pain are significantly more likely to be prescribed opioid derived medications and to self-report risky use of such medications. Of further relevance to the present study, veterans who had been diagnosed with PTSD and were prescribed opioid pain medications were at higher risk for experiencing accidents, overdoses, and suicide. There is a clear and urgent need for interdisciplinary research and team approaches to clinical interventions to better serve veterans of the Global War on Terror.

Humans who have a history of exposure to traumatic stimuli have noted their experiences of PTSD symptoms for thousands of years. Not surprisingly, those who experience a traumatic event are at a higher risk for developing co-occurring issues such as traumatic brain injury and chronic pain (Bomyea, Risbrough, & Lang, 2012; Bremner, 2006; Halligan & Yehuda, 2000). The phenomenon that we now call posttraumatic stress is not new, but how we approach, study, and understand the clusters of symptoms that manifest during in this disorder has evolved rapidly over the past century. Researchers and practitioners have come to recognize that PTSD symptoms do not exist in a vacuum. The symptoms are correlated or connected to how other mental health factors influence the quality of life that that PTSD patients experience both daily and over their lifespan. Not only does PTSD affect patients who have experienced trauma, but it also has significant impacts on the lives of those who have relationships or interact with them.

As part of a concerted effort to better inform practitioners who treat the over 4 million veterans who use Veteran Affairs (VA) services, the VA has implemented initiatives to advance research and distribute evidence-based treatments (EBT's) for PTSD. The two most commonly used EBT's for PTSD include Cognitive Processing Therapy (CPT) and Prolonged Exposure (PE). Briefly, CPT is rooted in Cognitive Behavioral Therapy where clients recount their memories of trauma and then come up with more adaptive ways to process their memories and reactions to traumatic experiences (Jeffreys, Reinfeld, Nair, Garcia, Mata-Galan, & Rentz, 2014). PE was born out of behavioral theories that posit the necessity of re-experiencing traumatic memories so that habituation (reduction) of anxiety responses occur (Marks, Lovell, Noshirvani, Livanou, & Thrasher, 1998). Both CPT and PE fall under the umbrella of trauma-focused therapies because both require the client to confront their traumatic memories in and out of sessions.

To detail CPT a bit further, it is a manualized approach to working with clients with symptoms related to PTSD. There are currently 9 different ways that CPT may be delivered to clients in various forms including individual, group, abbreviated length, and versions that include modifications of activities such as written trauma accounts and worksheets. While it intends to assist clients with learning new more adaptive ways to process trauma, it has also been shown to be beneficial in relieving other symptoms such as depression and anxiety.

PE is different from CPT in that it is a distinctly behavioral treatment involving imaginal re-experiencing memories of trauma. The rationalization for this method is that continual exposure to the re-experiencing memories of traumatic event promotes habituation which may result in a reduction of responses such as anxiety and fear. Additionally, PE involves some in vivo activities that require the patient to gradually resume interactions or activities that they

typically avoid because they fear triggering unwanted symptoms. Patients learn that they are capable of managing their symptoms and are able to engage in daily activities with less distress.

CPT and PE share several common factors. For example, both approaches are highly focused on targeting relief from symptoms connected to traumatic events that the patient has experienced. Therefore, they both are considered to be trauma-focused therapies. They also require the therapist to deliver the treatment in a safe environment while maintaining a positive therapeutic alliance. These treatments both rely on the therapist being able to “sell” the rationale for the approaches to patients. That is to say that the provider needs to be able to explain a reasonable justification for why and how these trauma-focused interventions promote a change process to occur. The goals of the patient and therapist should also be in congruence with whichever approach is chosen.

A number of recent studies have found that CPT and PE are efficacious in treating PTSD (Benish, Imel, & Wampold, 2008). The outcome data indicate that based on meta-analytic results the two therapies both lead to decreases in PTSD symptoms for patients who complete the protocols (Bradley, Greene, Russ, Dutra, & Westen, 2005). However, a number of issues have been present in the design and methodology used to arrive at the results of many studies. For example, many studies have been randomized control trials which took place in highly controlled environments that lack the unpredictable nature of real world therapy. These studies that have been conducted in highly controlled settings allow for little variance in participants, therapist effects, or other factors that could confound or otherwise influence results in ways that would be more analogous to real world clinical settings. Other studies have used small sample sizes or very specific subjects in their samples. Some issues that commonly occur with these types of

sampling issues are that that the results become less generalizable or transferable to other populations or other settings.

Because the current study utilizes retrospective data collected in VA settings throughout the U.S. and used random selection of patient charts that met inclusion criteria, it increases the degree to which the results of this study may match real world settings with real patients of an increased number of race/ethnicities, genders, age, types of trauma, and other relevant patient level factors. It is very important that the current study includes an investigation of the effectiveness of CPT and PE for patients with different racial or ethnic backgrounds. A few studies have found conflicting information about the effectiveness of both treatments across different races or ethnicities (Alvarez, 2011; Walling, Suvak, Howard, Taft, & Murphy, 2012). A 2014 dissertation by Rutt did look at differences in the effectiveness of CPT and PE across racial/ethnic categories and found that “older veterans and Hispanic veterans had higher PCL scores at baseline.”. Rutt (2014) further noted that “veterans across all three racial/ethnic groups (Caucasian, African American, and Hispanic) experienced equivalent rates of symptom reduction” when taking into account therapist effects which were small, but statistically significant.

Few studies have emerged that specifically consider how veterans of the GWOt respond to CPT and PE. One specific study by Chard and colleagues did report that OEF/OIF veterans were more responsive to trauma-focused therapy than were Vietnam Veterans (Chard, Schumm, Owens, & Cottingham, 2010). Further research is needed to aid in pinpointing what factors such as age, type of trauma exposure, or other possible contextual variables may have contributed to this finding.

A final common issue with patients who start CPT or PE is that a significant number drop out of therapy before completion. A number of studies have begun to look at who drops out of therapy, when they drop out, and what changes in symptoms or clinical outcomes they were able to achieve by the time of termination. While the current study will not seek to specifically explore this special population of early terminators, the statistics regarding the high rate of dropouts from trauma focused interventions including CPT and PE are problematic and could be addressed in follow-up studies and with further research.

The current study was completed through the use of a retrospective chart review. The participants included GWoT veterans from OEF/OIF/OND whose service entry dates were between September 11, 2001 and September 11, 2015 inclusive. The 140 veterans included in the study represented a diverse sample of servicemembers who had participated in either CPT or PE from VA facilities located throughout the U.S. Veterans included in the study could not be in other concurrent modalities of therapy for other mental health diagnoses and this must have been the first time they had engaged in a trauma-focused therapy. The veterans must have met diagnostic criteria aligning with the polytrauma clinical triad and must have completed at least two of each of the following measures: PCL, BAI, BDI-II, AUDIT-C, and pain scale score. One administration of each measure must have been completed within 90 days of the first session of either CPT or PE and a second administration of each must of have been completed within 90 days of the final session of treatment. Because the researcher was specifically interested in predicting clinical outcomes, changes from pre-to-post treatment were measured using changes in scores on each of the measures. Statistical procedures used to analyze the data included descriptive statistics and multiple two-way RM-ANOVAs and RM-MANOVA. To date, no

other known studies have explored clinical outcomes of OEF/OIF/OND veterans with the PCT who have completed CPT or PE.

The next chapter offers a more in depth review of PCT, PTSD, depression, anxiety, substance use, and pain in OEF/OIF/OND veterans. Diagnostic criteria for these mental health disorders will be outlined and the two treatments included in this study, CPT and PE will also be reviewed in greater detail. This expansive amount of information will validate the necessity of the current study.

Chapter II

Review of the Literature

This literature review will include an exploration of polytrauma, PTSD, TBI, depression, anxiety, pain, and related issues in veteran populations. A brief history and diagnostic criteria of each symptom will be included. Additional information regarding epidemiology, prevalence, common comorbidities, and clinical significance will be detailed as well. Also included in this chapter will be two evidence based treatments for PTSD, cognitive processing therapy and prolonged exposure. The majority of the studies referenced will be from studies conducted with veterans although some studies may include different populations. There will be a short review of what is known about individual patient factors such as race/ethnicity, age, and gender and how these variables relate to specific PTSD treatment outcomes. Finally, some limitations of the current literature will be noted and a brief description of the current study will follow.

Polytrauma in OEF/OIF/OND Veterans

The term “polytrauma” refers to having multiple physical and/or psychological injuries co-occurring simultaneously (Otis, et al., 2011). One of the most common combinations of injuries in VA settings is PTSD, TBI, and chronic pain. This specific combination of diagnoses is referred to as the polytrauma clinical triad (PCT). Current research recommends that a team approach is carried out by specialists in their respective fields to treat clients with PCT (Sayer, Rettmann, Carlson, Bernardy, Sigford, Hamblen, & Friedman, 2009). Given the evolving nature of war as well as other military involvements, veterans who have served during the wars in Iraq and Afghanistan have distinctly different injuries than those who served in previous eras. TBI’s and other concussive disorders have become a hallmark injury associated with combat deployments over the past 15 years (Mott, Mondragon, Hundt, Beason-Smith, Grady, & Teng,

2014). Not surprisingly, the increase in TBI's is also positively correlated with co-morbid PTSD and/or chronic pain in veteran populations (Elder, 2015).

The exploration of the prevalence rate of the polytrauma clinical triad in OIF/OEF/OND veterans is still in its infancy stage. Several teams of researchers have published initial data based mainly on chart review information. Lew and colleagues (2009) reviewed the medical records of 340 OIF/OEF veterans seen at a VA Polytrauma Network Site and reported prevalence rates for chronic pain, PTSD, and persistent postconcussive syndrome (PPCS) to be present in 81.5%, 68.2%, and 66.8% of that sample respectively (Lew, Otis, Tun, Kerns, Clark, & Cifu, 2009). 42.1% of Lew et al.'s (2009) sample reported simultaneously co-occurring PTSD, chronic pain, and PPCS.

A more recent study by Cifu and colleagues (2013) reviewed the medical records of OEF/OIF veterans who received inpatient or outpatient care from the VA between 2009 and 2011 (Cifu, Taylor, Carne, Bidelspach, Sayer, Scholten, & Campbell, 2013). The researchers used International Classification of Diseases- 9th Revision- Clinical Modification codes to determine which patients had been diagnosed with TBI, PTSD, and/or pain. The number of veterans who were included as having received services during fiscal years 2009-2011 was 613,391. Approximately half (48.2%) reported no history of TBI, pain, or PTSD, meaning that the majority of veterans (51.8%) did have a history of TBI, pain, or PTSD. 6%, or 36,804 veterans had co-occurring TBI, pain, and PTSD diagnosed between 2009-2011. In other words, approximately 12,800 new cases of polytrauma (PTSD, brain injury, and pain) were diagnosed each year. One important limitation that both Lew et al. 2009 and Cifu et al. 2013 highlighted is that these data only represent information about veterans who sought services at VA facilities and not those who sought treatment elsewhere or did not seek treatment at all.

History and Definition of PTSD

PTSD was first added to the Diagnostic and Statistical Manual of Mental Disorders-Third Edition (DSM-III) in 1980 (Friedman, 2015). One of the key elements for PTSD originally was that the individual had to have experienced an exceptionally disastrous stressor such as war, torture, rape, a natural disaster, or have been involved in an accident (Kessler, Chiu, Demler, Merikangas, & Walters, 2005). Distress from experiencing “normal” stressors like divorce, losing a job, or illness were previously categorized under adjustment disorders. After much more additional research and debate, the criteria for PTSD in the current DSM-5 is quite different than it was originally. There are now 8 sets of criteria that must be evaluated when assessing for PTSD (American Psychiatric Association, 2013). Briefly, the 8 criteria are: (a) person has been exposed to a catastrophic event directly or indirectly; (b) having intrusive thoughts or memories; (c) avoidance or attempts to reduce exposure to stimuli that provoke memories of the trauma; (d) negative cognitions and mood disruptions or constrictions including dissociative states; (e) alterations in arousal or reactivity such as panic attacks or aggression; (f) symptoms persist for at least one month; (g) the person feels significant functional impairment; and (h) the symptoms are not due to medication, substance use, or other illness.

Arriving at the diagnostic criteria outlined above was not a short or simple process. There seemed to be a surge in literature noting the experiences of soldiers who had experienced or witnessed the horrors of World War I. Typically, these individuals were treated by medical doctors who were trained to treat physical injuries and had never before seen firsthand the devastating effects of war on mental health. “Shell shock” was the term first coined by a British military psychologist, Meyers (1915). Like the WWI physicians, Meyers believed that shell shock was the result of injuries, including internal injuries that were not visible, that caused

soldiers to report symptoms such as nightmares, delusions, and heightened startle reflexes. For several decades, soldiers that suffered from these symptoms were thought to have been lying or deceitful, cowardly, and unfit for duty.

Relatively few advancements towards understanding the nature of what we now call PTSD were made until the World War II (WWII) era. Although it may seem insignificant, shell shock became known as “combat fatigue” or “combat stress” around this time which marked a change towards recognizing the roll that combat played in the development of symptoms. The U.S. military began to develop methods and tools to psychologically screen individuals as a way to determine whether or not servicemembers were psychologically fit to continue duty (Lasiuk & Hegadoren, 2006a). One unfortunate outcome of this practice was a strong negative stigma that became associated with seeking mental health treatment for servicemembers. While this problem continues today, the DoD and VA healthcare systems are actively working towards reducing the stigma around mental health.

Presently, PTSD is classified as a trauma and stressor-related disorder in the DSM-5. To be diagnosed, an individual must meet the 8 criteria for PTSD. Criterion A is that a person must have been exposed to actual or threatened death, serious injury, or sexual violence. A person may meet this criteria if they have directly experienced the traumatic event, witnessed in person the traumatic event happen to another person, learned of an especially violent or traumatic event happening to a family member or close friend, or be continually exposed to traumatic events through experiences related to work (i.e. first responders, police officers, etc.). Criterion B is that one or more of the following must occur after the traumatic event: intrusive memories, distressing dreams related to the event, dissociative reactions, intense or prolonged psychological distress, or marked physiological reactions to cues that are associated with the traumatic event.

Criterion C involves experiencing persistent avoidance of stimuli associated with the traumatic event. Criterion D is having negative cognitions or mood which could include symptoms such as the inability to remember important aspects of the traumatic event, feeling detached from others, or the inability to experience positive emotions. Criterion E is changes in arousal and reactivity such as hypervigilance, irritability, being easily startled, having difficulty concentrating, or sleep disturbances. The criterion noted in B-E must have occurred for at least 1 month and cause clinically significant distress or impairment in social, occupational, or other important areas of daily life activities. And these symptoms must not be attributable to other factors such as substance use or another medical condition.

In recent decades, research has uncovered some findings about risk and prognostic factors for PTSD. Some pre-traumatic factors that increase an individual's risk for developing PTSD during their lifetime include having emotional problems before the age of 6 years, or having another mental health disorder such as panic disorder, depressive disorder, or obsessive-compulsive disorder. Many of these disorders impact similar brain regions associated with PTSD. People from lower socioeconomic backgrounds with lower education, and those who have a history of previous exposure to trauma are at increased risk for PTSD. Family dysfunction (especially during childhood), culture, lower intelligence, minority status, family psychiatric history, and poor social support are associated with increased likelihood and poorer outcomes for those who do later develop PTSD. Females, or those who identify their gender to be female have higher prevalence rates of PTSD. A few current studies are exploring if there are certain genotypes or other information contained in DNA that may serve as protective factors or increase risk for PTSD. The type and severity of trauma experienced greatly influences if or what PTSD symptoms occur afterwards. Cognitions such as thoughts or appraisals, coping

strategies, behaviors, and social support are important factors that may moderate adverse outcomes after trauma.

One crucial research project about the link between early life or pre-PTSD factors is the CDC-Kaiser Permanente Adverse Childhood Experiences (ACE) Study. The ACE Study (commonly referred to as ACEs) is foundational in its size and scope of investigating the long-term impacts of childhood abuse and neglect on health and well-being later in life. The study began in 1995 and over 17,000 individuals completed surveys which asked questions about their childhood experiences and current health and behavior. The researchers are continuing to update the medical status of the original and new study participants with an eye on morbidity and mortality related data.

The ACE study asked questions about the prevalence of three types of abuse; emotional, physical, and sexual. It also asked about household challenges such as substance use, violence, mental illness, access to basic needs including food and clean clothes, parental separation or divorce, and incarceration. Emotional and physical neglect were also inquired about. Total scores were out of 10 and scores of 4 or more indicate significant likelihood of some of the following developing throughout the lifespan: alcohol or illicit drug abuse, chronic obstructive pulmonary disease (COPD), depression, fetal death, heart disease, liver disease, poor work performance (loss of jobs and absences), poverty, intimate partner violence, sexually transmitted diseases, suicide attempts, smoking at an earlier age, lung disease, unintended pregnancies, and low academic achievement. A clear progression of such issues was noted beginning with adverse childhood events leading to disrupted neurodevelopment, impairments in social, emotional, and cognitive abilities. Once these impairments have occurred the frequency and severity of health-risk behaviors increased resulting in disease, disability, and significant social

problems. Finally, those with higher ACE scores were found to die earlier than those who had endorsed fewer than four adverse childhood events or conditions. Higher scores are associated with what clinicians and researchers call chronic complex PTSD meaning traumatic stress occurred over a long period of time and it is common that the individual has experienced multiple types of traumas. In the context of this study, veterans may have been pre-exposed to adverse childhood events such as physical or sexual trauma and then later exposed to further trauma including combat or military sexual trauma.

To recap, typical symptoms of PTSD include an experience of a traumatic event, intrusive symptoms, distress, avoidance, negative impacts on mood and relationships, hypervigilance, sleep disturbances, and difficulty with attention, memory, or concentration (Kessler et al., 2005; Shiromani, Rauch, & Pitman, 2009). Dissociative symptoms such as depersonalization or derealization may also occur. It is important to note that it is possible for delayed onset of symptoms to occur meaning that some people reports only a few of the criteria for PTSD immediately after the trauma and then months or years later experience enough symptoms to meet a full diagnosis (American Psychiatric Association, 2013).

In the U.S., the estimated lifetime prevalence rate of PTSD is 8.7%, but higher in certain subpopulations. The presentation of PTSD symptoms may vary based on an individual's unique interactions between their personal history, multicultural diversity traits, and other co-morbid conditions such as TBI and chronic pain. With a focus on current veteran populations, Magruder and Yeager's (2009) study that used a meta-analysis approach found that the prevalence of PTSD among Persian Gulf War veterans was reported to be between 1.9 and 24 percent. They also found that in OEF-OIF veterans, 4.7-19.9 percent acknowledged symptoms that met criteria for PTSD. It is important to note that this study found a wide range of possible PTSD prevalence

rates which is likely due to that fact that most of the studies included measured PTSD differently, collected data from veterans at different time points, and used varying sampling and statistical methods. Interestingly, Sundin et al. (2010) reported that the prevalence of PTSD prevalence was more common or higher if studies used anonymous surveys to collect data and that the severity of PTSD symptoms increased in months after returning from a deployment meaning that some individuals showed delayed onset. Of importance to the current study is the prevalence rate of PTSD among veterans who seek treatment within the VA healthcare system. Seal et al. (2009) is one of the more recent studies that found an estimated prevalence rate of PTSD within VA settings for veterans to be around 22 percent. With approximately 1 in 5 veterans endorsing or meeting criteria for a PTSD diagnosis, there is a clear need for continued research, prevention strategies, and improved treatments for PTSD in veteran populations.

PTSD and the Brain

Although not necessary to make a PTSD diagnosis, neurobiological research has pinpointed changes in the central and autonomic nervous systems of people who have experienced traumatic stress (Friedman, 2015). Central and automated nervous system changes manifest often as heightened startle reflexes and changes in sleep. Brain imaging technology has also shown that PTSD is associated with reduced volume of the hippocampus and anterior cingulate (Friedman, 2015; Shiromani et al., 2009). Additionally, functional magnetic resonance imaging (fMRI) demonstrates that traumatic stress often is linked with increased amygdala activity while simultaneously decreasing activity in the prefrontal cortex and hippocampus (Shiromani et al., 2009). These brain changes are likely part of the underlying mechanisms that affect post-trauma changes in thoughts and behaviors and could have further implications when TBI and/or chronic pain co-occur with PTSD.

Many researchers have attempted to examine the structural changes in the brain as they relate to PTSD. Most agree that the amygdala, medial prefrontal cortex, and hippocampus (including their subcomponents) are the most salient brain parts to understanding PTSD. Shin and colleagues (2006) used neuroimaging research to reveal heightened amygdala responsivity when PTSD-states were induced (Shin, Rauch, & Pitman, 2006). Increased amygdala activation also occurred when individuals were attempting to process trauma-unrelated affective information such as viewing non-threatening facial expressions. The volume of the medial prefrontal cortex in PTSD clients is smaller than those without PTSD and it is also less responsive when trauma-related states were induced. The final brain area that Shin et al. 2006 studied was the hippocampus. They found that the volume of the hippocampus in PTSD clients was smaller than non-PTSD clients. The hippocampus was also demonstrating less neuronal activity. These findings may suggest that caution should be used when selecting the most appropriate type of therapy for PTSD if a client also has a known history of TBI and reports chronic pain.

Similar to Shin et al.'s (2006) work, Stein and colleagues also studied whether or not trauma alters neuroanatomy noting that "it is generally widely accept that stress-induced elevations of glucocorticoids augment the extracellular accumulation of excitatory amino acids such as glutamate" which results in damage to the hippocampus (Stein, Hanna, Koverola, Torchia, & McClarty, 1997). This damage is evidenced by reduced cell sprouting and increased neuronal cell death in the hippocampus as well as function impairments related to learning and memory. In other words, chronic distress increases hormones that suppress the immune system leading to increased vulnerability to illnesses like ulcers, high cholesterol and diabetes. Chronic distress also makes it harder for the brain to process and store memories such as those from

trauma. Unprocessed or unfiled memories from trauma resurface as flashbacks or intrusive thoughts. Shin et al. (2006) reviewed several studies including Bremner's work showing that combat veterans with PTSD had reduced right-sided hippocampal volume which were associated with short term verbal memory deficits (Bremner, 2006; Bremner, Elzinga, Schmahl, & Vermetten, 2008). These findings are of particular importance for practitioners to consider when using a trauma-focused approach to therapy such as CPT or PE with clients who may have impairments in learning and memory brain structures. Brain structures involved in learning and memory are likely utilized during processing traumatic memories, thoughts, and emotions.

Finally, neuroanatomical topics covered in depth by Shin et al. (2006) included the components of the HPA axis. The hippocampus in PTSD is reduced in volume and activity which alters the ability to respond to stress and inhibits extinction. The amygdala increases in activity and size which increases hypervigilance, but decreases the ability to discriminate threats and non-threats. The cortex shows reduced prefrontal volume associated with the dysregulation of executive functions. The anterior cingulate shrinks in volume which impairs the extinction of fear responses, and there seems to be decreased medial prefrontal activation, but it is unclear what that specifically effects at this time. Consistent with the findings of other research presented, this study solidifies the importance of practitioners understanding the nature of how PCT impacts which therapies for PTSD might work best with each individual client and that psychotherapy in conjunction with pharmacotherapy may be most efficacious in real-world settings.

Seal and colleagues found that PTSD was the single most common mental health diagnosis in their study of over 100,000 OEF/OIF veterans (Seal, Bertenthal, Miner, Sen, & Marmar, 2007). Veterans with PTSD are at higher risk for other diagnoses such as depression,

chronic pain, substance use disorders, and other medical conditions (Morasco, Lovejoy, Lu, Turk, Lewis, & Dobscha, 2013). Additionally, patients who are diagnosed with PTSD not only are more likely to have chronic pain, but the severity of their pain and related impairments is higher than those without PTSD (Geisser, Roth, Bachman, & Eckert, 1996). One of the contributing factors for this finding is that those with PTSD, depression, and chronic pain often have significantly higher levels of maladaptive thought patterns, poor coping strategies, and unsupportive biopsychosocial environments (Alschuler & Otis, 2012). There is a large amount of overlap in symptoms relevant to PTSD, chronic pain, and brain injuries. Interventions targeted at reducing the symptoms related to one diagnoses such as PTSD may improve other conditions. This idea will continue to be developed throughout this paper.

Comorbidities of PTSD

It is often the case that people who have PTSD also have other comorbid diagnoses. In a study done by Kessler et al. (1995), as many as 90 percent of people in the general population who had been diagnosed with PTSD also met diagnostic criteria for at least one other mental health disorder during their lifetime. The most commonly reported co-occurring disorders were major depression, substance abuse including alcohol and/or drug abuse or dependence, and anxiety disorders. Magruder et al. (2005) explored this issue of comorbid disorders with PTSD in the VA system and uncovered similar findings. The most common diagnoses in addition to PTSD in their VA sample were major depression, alcohol and/or drug abuse or dependence, and anxiety disorders. This information highlights how PTSD can be a chronic and long term disorder that is often accompanied by other serious symptoms and diagnoses that may greatly impede on the quality of life experienced by those impacted.

To expand on how PTSD has been found to decrease quality of life, Schnurr et al. (2009) reported that OEF/OIF veterans who had been diagnosed with PTSD were much more likely than those without the diagnoses to be unemployed, homeless, report issues with interpersonal relationships, and be divorced. It is thought that veterans with PTSD may attempt to alleviate the psychological distress of PTSD and the associated symptoms through increased alcohol and substance use. Many studies have looked at drug and alcohol abuse and dependence in military populations. A common finding has been that around 25%-30% of active duty service members endorse hazardous drinking (Kessler et al., 1995; Hodge et al. 2007). Scott et al. (2013) also found that younger veterans and those who identified as male were at greater risk for alcohol dependence or risky drinking. This trend is alarming in light of other studies who have associated alcohol and substance use in veterans who have PTSD with higher rates of violent behaviors including domestic violence and higher rates of suicidal ideation (Guerra & Calhous, 2011; Zatzick et al. 1997).

Traumatic Brain Injury

Traumatic brain injuries present in a multitude of ways. There is no one clear definition of what a TBI is, but there is agreement that brain injuries occur on a spectrum of severity. The Department of Defense's 2007 definition from their Mild Traumatic Brain Injury Pocket Guide App offers a broad description of TBI's as being "traumatically induced structural injuries and/or physiological disruption of brain function as a result of an external force." External forces are understood to be things like being struck in the head by an external object, the head striking an object, brain accelerating or decelerating (whiplash) without direct external contact from an object, a foreign body penetrating the brain, or from forces generated by events such as blasts or explosions. The leading causes of TBI's in military populations include blasts, motor vehicle

accidents, fragments or shrapnel, and falls (Bahraini et al., 2014). To be considered a TBI, one of the following must occur: period of loss or decrease in level of consciousness (LOC); loss of memory for events before, during or after injury (post-traumatic amnesia); any alteration in mental state at the time of injury such as confusion or disorientation; neurological deficits such as weakness, loss of balance, changes in vision or other senses; or intracranial lesions. It is evident why differentiating between where symptoms that could overlap PTSD, TBI, or chronic pain pose a problem for those diagnosing and treating clients.

TBI is a common injury sustained in both civilian and military populations. Approximately 10 million new TBI's are diagnosed worldwide each year (Otis et al., 2011). Due to factors like lack of access to care and unreported cases, researchers estimate that the true number of new TBI's each year is closer to 42 million cases (Otis et al, 2011). TBI's have become a hallmark injury of veterans who have served in the military over the past few decades. This contributes to a significant portion of combat related disability and health care costs reported by the VA.

Furthermore, TBI's sustained during military service are often associated with PTSD so much so that distinguishing symptoms of TBI from PTSD have become increasingly difficult (Sayer et al, 2009). Over one-third of Iraq veterans with concussive syndromes also have PTSD or depression (Sayer et al, 2009). Elder (2015) by states that there is "limited/suggestive evidence that most of the shared symptoms [of TBI and PTSD] are accounted for by PTSD and not a direct result of TBI alone." Brenner and colleagues (2013) found that approximately 45% of Veterans who sought treatment from VA's had a likely history of at least one incident of TBI (Brenner, Homaifar, Olson-Madden, Nagamoto, Huggins, Schneider,...Corrigan, 2013).

Recent postmortem human studies have documented the impact of long-term inflammation associated with the occurrence of TBI up to 17 years after the injury occurred which has led to researchers believing that this may be a key factor in the development of mild cognitive impairments and dementias (Elder, 2015). In fact, multiple studies have found a two-fold increase in the risk of developing dementia in Veterans with PTSD (Elder, 2015). These findings suggest that developing and integrating mental health treatment approaches to address PTSD symptoms in clients who have a likely history of TBI may be of increasing importance in future Veteran populations as a potential way to disrupt the projection of conditions such as early onset dementias.

Chronic Pain

Literature on chronic pain offers an array of definitions for what chronic pain is. The most commonly used definition is from the International Association for the Study of Pain, which defines chronic pain as any pain that lasts beyond the “normal” healing phase of an injury (Apkarian, Baliki, & Geha, 2009). What constitutes a normal healing phase seems to be subjective and thus many practitioners use this idea loosely as one guideline to aid in determining if the pain is chronic or not given the context of each individual client’s presenting concerns. Other researchers have defined chronic pain as pain that persists for at least 3 months and it originally accompanied a disease or injury that has healed (Clark, Bair, & Buckenmaier, 2007; Girona, Clark, Massengale, & Walker, 2006). In other words, chronic pain could be defined as pain that continues to occur persistently for at least 3 months after an injury is considered to be healed.

Lew et al. (2009) discuss the significance of chronic pain in veteran populations, particularly those with combat related injuries. They report that the most common locations of

pain in veterans are the head, back, legs, and shoulders. Because chronic pain in veterans is often associated with another injury, disease, or mental health diagnosis, it often impacts additional areas of functioning which may result in disability. Some commonly reported areas of functional impairment in the literature include psychological distress, family or interpersonal discord, and vocational issues (Clark et al. 2007; Gironde et al. 2006; Lew et al 2009).

In 2011, the National Institute of Health reported that chronic pain can occur for a variety of reasons, such as: injury, illness, or other health problems. Since Veterans are a population that experiences a high rate of injury, it is logical that they also experience high volumes of chronic pain cases. In addition to pain, there are other symptoms associated with chronic pain, such as: fatigue, sleep disturbance, decreased appetite, and loss of mobility. These issues, when combined with TBI and PTSD to form the PCT, present challenges to addressing client concerns in any clinical setting. It is plausible that the longer someone has experienced chronic pain that different or more structures of the brain may be impacted as well. Finally, these findings speak to the overall point that one single area of the brain does not have one single function. In fact, where disorders such as chronic pain are concerned, many areas of the brain can be impacted at one time and can be nearly impossible to distinguish from the symptoms of other co-occurring disorders.

Honda, Maruta, and Takahashi (2007) examined blood flow variations in the brains of individuals with chronic pain to those who did not have chronic pain. The researchers used a device called a single-proton emission computed tomography (SPECT), which shows how blood is flowing to various organs in the body (Mayo Clinic, 2014). The study included 15 subjects who had been experiencing chronic pain from 6 months to 11 years (Honda et al., 2007). There were 7 males and 8 females ranging in age from 20-76 years old (average age 49.1 years). The

pain locations ranged from back, neck, knee, and other areas. Subjects in the study did not have any psychological disorders and were only taking medications specific to pain. Study participants were placed on bed rest and their brains were examined using the SPECT. The images from each scan were compared to another brain image of someone who was the same age but not diagnosed with a chronic pain disorder.

Images from the study were reviewed and showed reduced blood flow in 4 different areas of the brain: dorsolateral prefrontal area, medial prefrontal cortex, anterior cingulate gyrus, and orbital frontal cortex (Honda et al., 2007). The medial prefrontal cortex had reduced blood flow on both sides of the brain, while the other 3 brain areas had reduced flow primarily on the right side of the brain. The dorsolateral prefrontal area and medial prefrontal cortex had the most significant blood flow reduction. The reduced blood flow in these areas of the brain can have significant impacts on an individual especially in the area of mood, muscle control and movement, and cognition (Honda et al., 2007). A reduction in blood flow to the prefrontal area of the brain has been linked to depression. Along these lines, the reduced blood flow in the cingulate gyrus can impact movement and muscle control. Changes in mood, especially depression, and general cognition, can be particularly difficult to attribute to a single cause in PCT clients. In other words, it is often unclear if changes in symptoms or functioning such as mood and cognition are a result of PTSD, TBI, or chronic pain which makes choosing how to treat these issues especially cumbersome even when a team of specialists with access to top of the line resources is available.

Depression

Depression is one common symptom that occurs after an individual experiences trauma. Most describe depression as a prolonged experience of sadness or low mood with a loss of

interest and often includes changes in appetite, sleep, energy, thinking patterns including memory and attention, and disinterest in usual activities. Approximately 10% of Americans over the age of 18 are diagnosed with some type of depression each year (Kessler, Chiu, Demler, Merikangas, & Walters 2005). It is estimated that after a traumatic event, about 1 in 4 adults develop depression. For example, after the Oklahoma City bombing 23% of those who personally experienced the event met criteria for a depression related diagnoses separate from a PTSD diagnosis (North, Nixon, Shariat, Mallonee, McMillen, Spitznagel, & Smith 1999). PTSD and depression often co-occur at similar frequencies following a traumatic event. Individuals with PTSD are 3 to 5 times more likely to have depression than those without PTSD (Kessler, Sonnega, Bromet, Hughes, & Nelson 1995). According to the VA, as of December 2014, of the OEF/OIF/OND veterans that have accessed care through the VA, approximately 45% have met criteria for a provisional mental health diagnosis of depression. This is the second most common provisional diagnoses with PTSD being the most common.

Depression is unique from PTSD in that for some people it may seem to occur with no specific trigger whereas PTSD requires there to be a traumatic event first. It is possible to experience trauma and not develop PTSD, but develop depression instead. It is often difficult to tease apart whether symptoms are a function of PTSD or depression since there are often many that overlap between the diagnoses. This is one of the reasons why it is important for clinicians to understand both diagnoses and be able to treat both in effective and efficient manners.

Decades of research is available that goes into great depths to detail treatment options for depression. There are currently many different types of medications that are recommended for the treatment of depression as well as PTSD. Selective serotonin reuptake inhibitors (SSRIs) are an example of a class of medications that have been shown to be successful in reducing

depressive symptoms. A few commonly prescribed SSRIs include Zoloft, Lexapro, Paxil, and Prozac. SSRIs are intended to ease depressive symptoms. Antidepressants are another type of medication used to prevent depression and elevate mood. Some examples of antidepressant prescription medications include Wellbutrin, Effexor, and Cymbalta. Other natural remedies such as St. John's Wart, 5-HTP, and Omega-3 Fatty Acids are available as over-the-counter treatments for depression, but they are not approved or regulated by the Food and Drug Administration (FDA) and more research is needed on the use of these substances.

While some people prefer or respond well to medication alone, others are interested in therapy or a combination of medication plus therapy. Cognitive behavioral therapy (CBT) is an evidence based treatment backed by strong research findings for the treatment of depression. CBT helps patients to create more adaptive thinking patterns and often leads to behavioral activation changes as well. CBT has also been used effectively with PTSD patients and is similar to cognitive processing therapy (CPT) that is an evidence based psychotherapy for PTSD.

Anxiety

Until the DSM-V, Anxiety was included in the same section as PTSD. Not surprisingly, both disorders share many overlapping traits. In healthy individuals, some level of anxiety is beneficial because it is what alerts us to potential threats in the world around us and then through activating the nervous system informs us whether to go into fight or flight mode. Specific brain parts including the thalamus, visual cortex, and amygdala work together during periods of stress or anxiety. After the first rush of an initial detection of a potential threat, other parts of the brain also begin to increase in activity. Some of these regions include the cingulate gyrus (avoidance of pain), orbitofrontal cortex (reward and emotion), thalamus (sensory and motor signals),

caudate nucleus (movement, learning, and memory) and nucleus accumbens (reward and addiction) (Lambert & Kinsley, 2011).

In cases where PTSD and anxiety co-occur, high levels of anxiety are often noticed as avoidance behaviors and hyperarousal. Individuals may tend towards self-medicating to numb or reduce the distress caused by anxiety. It is not uncommon for those who suffer from anxiety to have issues with drug or alcohol abuse as they may be more prone to develop dependence if drugs or alcohol are used at times when they feel particularly anxious or distressed and the brain regions associated with learning, reward, and addiction are more active than other parts such as the prefrontal cortex that would be involved in rational decision making.

There are several types of anxiety disorders including Generalized Anxiety Disorder (GAD), phobias, and panic. The focus for this literature review will be geared towards GAD as it is most often the form of anxiety disorder that co-occurs with PTSD. GAD includes 6 diagnostic criteria: A) Obsessive anxiety and worry that occurs more days than not for at least 6 months about various events; B) The individual finds it difficult to control the worry; C) 3 or more of the following must occur more days than not for the past 6 months: restlessness/feeling on edge, fatigue, difficulty concentrating/memory issues, irritability, muscle tension, sleep disturbances; D) Symptoms cause clinically significant distress or impairment; E) The disturbances are not due to other substances or medical condition; F) The symptoms are not better explained by another mental disorder. Additionally, many people who experience this type of anxiety report somatic complaints and hyperarousal.

The prevalence rates for GAD in the general adult population in the U.S. are around 2.9% annually and 4-7% lifetime prevalence. Females are about twice as likely as males to develop an anxiety disorder. Caucasians of European descent report higher rates of GAD than non-

Europeans. The median age of onset for GAD is 30 years, but there is a wide variance in age of onset and the clinical expression of symptoms may vary greatly over time.

Some risk factors that have been correlated with GAD include behavioral inhibition, neuroticism, and avoidance. People who have faced adversities including low SES are at increased risk. It has been estimated that about one-third of GAD cases have genetic links that overlap with other issues such as neuroticism, and other anxiety and mood disorders. It is also important to note that many cultures report variations in the expression of anxiety. Of potential importance to this study, females with anxiety tend to also report unipolar depression, but males with anxiety tend to report more issues with substance use.

Alcohol and Substance Use

The results of several studies have found that around 40% of OEF/OIF veterans who seek services within the VA healthcare system screen positive for alcohol misuse which includes a range of severity from risky drinking to dependence. Younger servicemembers report heavier drinking and higher rates of alcohol dependence than older veterans. This finding is compounded by complicating issues including higher rates of history of traumatic brain injury that are found in veterans from the OEF/OIF era compared to veterans from previous eras. The misuse of alcohol has many negative impacts for those recovering from brain and/or bodily injury including slowed recovery from PTSD, financial and legal issues, increases in incidents of violence, oral cancers, diabetes, damage to brain functioning, and even early death.

Given the unique nature and hallmark injuries of war sustained by current era veterans, increasing rates of incidents of substance abuse such as the misuse of prescription opioids has become an alarming trend. Picket et al. (2015) reported that since 2008 there was a 76% increase in veterans with PTSD that reported a co-morbid substance use disorder. Picket et al.

(2015) also found that there was a 425% increase in reported anxiety disorders for active duty soldiers from 2000 to 2012 and that concurrently, 5 to 16 % of veterans were reporting levels of depression at or above diagnosable criteria. Of further concern was that about 7% of respondents reported that they had seriously considered suicide after joining the military.

Not all substances can be discussed within the limits of this paper, but alcohol is one of the most commonly used substance by veterans. Cigarettes or other tobacco products are also very commonly used, but rarely result in the types of consequences that alcohol or other illicit drugs do. The fact that alcohol is so heavily used by veterans is deserving of attention because alcohol is the fourth leading cause of preventable death in the US according to the National Highway Traffic Safety Administration. Furthermore, 31% of driving-related fatalities involve impairment by alcohol. Even worse, alcohol decreases insight and judgement abilities while increasing impulsivity and risk-taking behaviors. This is incredibly problematic when it comes to veterans with mental health diagnoses that increase the risk of suicide who drink alcohol and have access to firearms. Studies that have specifically looked at alcohol use among veterans consistently find that alcohol use is strongly associated with increased risk of interpersonal violence, health complications, and death (Savarese, Suvak, King, & King 2001).

The US is currently experiencing an opioid epidemic. The same misuse of prescription drugs like opiates has drastically increased in recent years. Opioids are one of the most addictive prescription drugs which are being prescribed at increasing rates to veterans for ailments like headaches and chronic pain (Macey, Morasco, Duckart, & Dobscha 2011). Bohnert, Ilgen, and Trafton (2014) found that over an 8 year span between 2001 to 2009, opioid prescriptions for veterans in the VA increased from 17% to 24%. During that same period, the number of pain medication prescriptions in total written by military physicians increased by over 400%. Nearly

1 in 5 veterans with a diagnosis of PTSD are prescribed opioids. About 12% of veterans with any mental health diagnosis are prescribed opioids compared to 6.5% of veterans with no mental health diagnosis. The combination of being a veteran with a mental health diagnosis, especially PTSD, and being prescribed opiate pain medication is predictive of an increase in likelihood of inpatient admissions, use of emergency department services, violence, legal problems, and many other consequences. Use of other types of illicit drugs among veterans is relatively the same as their civilian equivalents. About 4% of both populations report illicit drug use within the past month (Wagner, Harris, Federman, Dai, Luna, & Humphreys 2007). Marijuana is the most commonly reported type of illegal drug by veterans. About 3.5% of veterans report current past-month use of marijuana (Wagner et al. 2007).

Many veterans with PCT suffer from substance use disorders including the misuse of prescription drugs. The complex nature of the combination of PTSD and substance use can be very difficult to treat for medical and mental health professionals. Veterans often report using substances as a coping mechanism to avoid the reality of dealing directly with symptoms related to their PTSD, depression, pain, sleep disorders, and much else. Often, patients have noted that they will stop using substances when their other mental health symptoms have been treated first. For years, professionals have debated on whether it is best to address substance use or PTSD first. The answer that many have found after years of trial and adjustments is that the solution is often neither of those options.

New interventions like Seeking Safety or interdisciplinary methods have been developed which effectively target both substance use and trauma related symptoms at the same time. Herman's 3 stage of recovery from trauma are often used with veterans who have both PTSD and substance use. The first stage focuses on stabilization and safety and often involves a

treatment like Seeking Safety and/or dialectical behavior therapy. The second stage is one of recovery and mourning once stabilization has been consistently observed for a reasonable period of time. Evidence based psychotherapies such as eye movement desensitization (EMDR), CPT, or PE are used during stage two. The third stage is reconnecting with the world and engaging in meaningful activities once again. Many patients continue to engage in various forms of therapy during this third phase of treatment and often continue to do so periodically throughout their life.

Evidence Based Therapies for PTSD: CPT and PE

Cognitive Processing Therapy (CPT). Cognitive Processing Therapy (CPT) is an evidenced-based manualized treatment protocol developed for clients with PTSD and other related symptoms following traumatic events. According to the National Center for PTSD, Cognitive Processing Therapy is "one of the most well-researched cognitive approaches, has a primary focus on challenging and modifying maladaptive beliefs related to the trauma, but also includes a written exposure component and highly structured psychoeducational components" (Resick, Galovski, Uhlmansiek, Scher, Clum, & Young, 2008). It focuses on how the traumatic event is interpreted and handled by the affected individual. This is a highly structured treatment that is conducted as a 12 session protocol that can be done in individual sessions or group therapy with modifications.

Background on CPT.

CPT grew out of the need for better psychological interventions and understanding of the experiences of rape victims in the 1970's. Interestingly, it was around this time period that the act of raping a woman began to be chronicled as a way that males were able to hold on to political power. Susan Brownmiller's book, *Against our Will*, is a prime example of this enlightenment and led to women coming together to hold "speak outs" through new groups such

as the National Organization for Women. By the end of the 1970's it had become evident that rape culture that used to be rarely spoken about was a much larger and deeper issue than previously thought. The National Institute of Mental Health began to set aside millions of dollars in funding to support studies on rape. The initial studies that later led to the creation of CPT were funded by NIMH grants.

During the early stages of research with rape victims, longitudinal studies were used to examine the constructs of fear, depression, and anxiety. Brief behavioral interventions were used as well as stress inoculation training. Additional studies attempted to use assertiveness training as a way to counteract fear responses. When the DSM-III was published in 1980, rape was included in the anxiety disorders category under PTSD, but there were no existing measures of PTSD available that made it possible to compare pre-treatment to post-treatment symptom differences. Rape responses continued to be understood within the context of classical conditioning where the initial reaction to the trauma of rape resulted in a fear response which then led to a second-order response or conditioning that generalized the fear reaction to other triggers. Also of importance was the finding that escape and avoidant responses were hallmark behaviors associated with PTSD. During the mid-1980's, Foa and Kozak introduced the emotional processing theory of PTSD that was founded on Lang's (1977) theory involving fear networks that develop based on exposure to a traumatic stimulus that an individual has impactful responses to and assigns meaning to. The pioneering researchers of CPT did not accept the idea that PTSD was simply a fear/anxiety disorder. Instead, they sought to include cognitive theories to explain and treat PTSD. Progress on creating effective and well-researched interventions for PTSD was slow for several decades, but began to pick up pace by the 1990's.

Theories that Influenced CPT. Other important lines of research that influenced the development of CPT heavily focused on depression developing from lower levels of positive reinforcement, learned helplessness, and constructivist self-development theories of traumatic victimization. Essentially, there was a belief supported by available theories that people actively create their own personal realities based on how they think about their experiences or what meaning they construct from their life. The experience of trauma may markedly shift one's beliefs about themselves and the world around them. When trauma experiences can't be understood by existing schemas, people may either cognitively alter new information to assimilate it into their existing beliefs, or new learning occurs and is accommodated for.

Another unique factor that influenced or led to a different theoretical approach used in CPT is the broader range of emotions that are intended to be inclusively addressed in CPT. Since PTSD had been classified as an anxiety disorder until the DSM-5 was published in 2013, previous treatments for PTSD often focused almost exclusively on anxiety and fear. CPT aims to also address other emotions including guilt, shame, disgust, sadness, and the like. Several studies in the mid 1990's were finding that PTSD was not as centered around fear as previously thought. This was concluded by findings from studies that noted that not all traumas had equal effects in regards to fear. In fact, most people were able to recover from fear, but their other PTSD symptoms persisted that were associated with flashbacks, intrusive memories, nightmares, and avoidance. Fear did seem to be a better predictor of PTSD when the trauma experienced was interpersonal such as rape, but not when the trauma was from an impersonal event like a natural disaster.

Biological Model of PTSD and CPT. Advances in medical technology have had a great positive impact on the research and literature available surrounding brain science and PTSD.

Some of the most notable findings have come from gaining a greater understanding of the biological drivers of PTSD. Much of the research has centered on the role that the amygdala plays in triggering strong emotional responses in emergency situations. Numerous studies have also repeatedly found that the prefrontal cortex in those individuals diagnosed with PTSD tend to show diminished responsivity and are smaller in size. Combined, these findings give light to some of the ways in which CPT works to relieve symptoms.

The prefrontal cortex, the outer portion of the brain that sits directly behind the forehead, is typically the head of making decisions and sending control signals back to the amygdala. In an event where the prefrontal cortex has decided that the individual is in a threatening situation, it sends neurotransmitters to other areas of the brain to decrease processes like immune system functions or other physiological responses such as digestion. It effectively directs an increased amount of neurotransmitters to regions like the amygdala to trigger emotions necessary in the fight or flight response such as fear and anger. Normally, the prefrontal cortex is able to detect when the emergency is over with so that it can signal the amygdala to stop the fight or flight response and return to the normal state of parasympathetic functioning. However, many people with PTSD have amygdalas with higher levels of responsivity and at the same time their prefrontal cortex shows decreased activity. In a sense, their brain is stuck in a hypersensitive mode where the amygdala is continually telling the body to prepare for fight or flight and the prefrontal cortex is unable to send messages to regulate the undesired responses. The body has no way of then detecting when it is safe to return to a calm or more relaxed state. CPT aims to interrupt the cyclical dysfunctional patterns of communication between the prefrontal cortex and amygdala. In a sense, it re-trains the prefrontal cortex through the patient learning how to identify cognitive stuck points and respond in a more desirable way. Additionally, having the

patient process thoughts and emotional reactions to memories in a safe environment such as a therapy session provides the individual with healing and corrective learning experiences.

A 2003 study by Hariri and colleagues found that when participants were asked to use words to label objects or to describe what type of danger, natural or artificially created, an image was, the use of verbal language activated the prefrontal cortex and simultaneously there was a reduction in activation of the amygdala. This finding led to the specific ingredient of CPT that requires the patient to talk about their trauma history rather than have them imagine re-experiencing the traumatic event in therapy repeatedly. The theory about having clients talk about their trauma in CPT ties into cognitive therapy by using language to activate the prefrontal cortex, the amygdala should become less reactive allowing for cognitive restructuring of thoughts to occur. Additionally, CPT may help patients to build skills related to affect regulation, increased cognitive flexibility, and reexamining avoidance of thoughts and behaviors by targeting the prefrontal cortex and amygdala.

Research on CPT. Although Cognitive Processing Therapy has been modified slightly over the past few decades, it has continually been shown to produce effective outcomes. Several versions of CPT exist. Originally, CPT was 12 structured sessions which included both cognitive therapy and a written exposure portion. The written portion was later called a “written account” of a specific traumatic event. A dismantling study by Resick et al, 2008, reported that when CPT was used without including written accounts (CPT-C) it was just as effective as CPT that included having patients write written accounts of their trauma. Resick et al, 2008 also noted that CPT-C participants had faster rates of improvements and lower dropout rates when compared to CPT.

Prolonged Exposure

Background on Prolonged Exposure. Prolonged Exposure (PE) was first developed in the early 1990's by Foa, Rothbaum, Riggs, and Murdock (1991) and grew out of Foa and Kozak's Emotional Processing Theory (EPT). EPT focuses on how people form fear structures that allow them to avoid perceived danger or threats. Initially, PE was used as an intervention for rape victims that were seeking mental health services. The foundation of PE lies within behavioral psychology. Specifically, PE aligns with the beliefs that fear and other similar reactions are developed through classical conditioning. In other words, people form associations based on the stimuli that they encountered during times of trauma. PE goes further to assert that these undesired associations that are observed as symptoms of PTSD continue because of operant conditioning or negative reinforcement that is often perpetuated by avoidance and anxiety. Prolonged Exposure Therapy (PE) is an evidenced-based, manualized protocol for the treatment of PTSD. At its core, PE's primary mechanism of change is driven by emotional processing via in vivo exposures that occur in sessions by processing memories of traumatic events. Typically, PE is done in about 8 to 15 individual psychotherapy sessions that are 60 to 90 minutes long (Foa, 2011).

According to the Center for Deployment Psychology, "PE is based in Emotional Processing Theory, which posits that PTSD symptoms arise as a result of cognitive and behavioral avoidance of trauma-related thoughts, reminders, activities, and situations." PE helps interrupt and reverse this process by "blocking" cognitive and behavioral avoidance, introducing corrective information, and facilitating organization and processing of the trauma memory and associated thoughts and beliefs (Resick, Nishith, Weaver, Astin, & Feuer, 2002; Marks et al., 1998). The process of adapting new thought patterns is done through in vivo and imaginal exposure. One of the reasons this therapy may be so effective is the ways in which it

incorporates the major areas of the brain that are affected long-term by traumatic stress such as the amygdala, hippocampus, and the frontal/prefrontal cortex.

In in vivo exposures the client repeatedly engages in activities, situations, or behaviors that are avoided because of the trauma, but which are not actually dangerous. Over time, in vivo exposure lessens disproportionate fear, and other disturbing emotions, and facilitates the recognition that the avoided situations are not as dangerous as initially thought, and over time the client will find empowerment through learning from new experiences where they can effectively cope even when distressed (Foa and Rothbaum, 1998). Imaginal exposure involves repeatedly revisiting the traumatic experience in memory through the client imagining the experience while describing the event aloud in detail. The narrative is recorded, and the client listens to the recording between sessions. Revisiting the event in this way encourages re-processing of the trauma memory by activating the thoughts and emotions associated with the trauma in a safe environment.

PE Research. Many studies over the past two decades have shown that PE significantly reduces the symptoms of PTSD, as well as co-morbid symptoms of depression, anger and anxiety (Benish, Imel, & Wampold, 2008; Foa, Keane, Friedman, & Cohen, 2009; Ehlers, Bisson, Clark, Creamer, Pilling, Richards, ...Yule, 2010; Cusack, Jonas, Forneris, Wines, Sonis, Middleton, ...Gaynes, 2016). Many clients report and demonstrate that they are better able to differentiate between genuinely safe and unsafe situations, and experience improvements in their activities of daily functioning. Foa, Hembree, and Rothbaum (2007) noted that nearly all studies for more than 2 decades that considered other trauma-related issues such as anxiety, depression, anger, and guilt found that PE not only reduces PTSD symptoms, but those issues as well.

Comparing CPT and PE.

There are a few limitations that must be considered when implementing either CPT or PE with patients. Both of these interventions rely on the readiness of the patient to confront or approach their trauma-related memories while resisting avoidance behaviors. Since avoidance is often one of the biggest issues faced by those with PTSD, both CPT and PE are plagued by higher than desired dropout rates. It is critical that therapists assist patients by reinforcing that rationale for treatment and noting that the benefits of completing therapy outweigh the initial discomfort experienced.

Dropout rates for CPT and PE have varied greatly across studies because different researchers have operationally defined what treatment dropout is. The most stringent studies (such as Monson et al. 2006) define dropout as failure to complete the full protocol of therapy, but others are less restrictive and have defined dropout in terms of needing to have attended a certain percentage of sessions such as two-thirds (Jeffreys et al., 2014). Dropout rates for CPT tend to range between 20-32% (Monson et al., 2006; Jeffreys et al., 2014). Dropout rates for PE have ranged from 28-44% (Eftekhari et al., 2013; Jeffreys et al., 2014). While dropout rates are clearly problematic for both protocols, both typically produce clinically significant improvements when treatment is adhered to over time.

Both CPT and PE have shown great success in outcome research; thus, one logical research question involves whether one is more effective than the other. In a head-to-head comparison, CPT and PE were equally effective in treating PTSD and depression in female sexual assault survivors (Resick et al., 2002). A 2010 study by Chard et al., found that veterans from the OEF-OIF era were more responsive to trauma-focused therapy than Vietnam era veterans (Chard, Schumm, Owens, & Cottingham, 2010). A 2014 dissertation by Rutt replicated that CPT and PE are equally effective in reducing total PCL scores in veterans as well (Rutt,

2014). Thus, it is often left to the provider and client preferences which treatment should be used based on individual and contextual factors.

Much is still unknown about what treatments effectively work for PTSD and why they work. CPT and PE are considered evidence-based treatments for PTSD, but little is known about how these treatments impact neurochemical or other brain change aspects of clients. It seems that these therapies target many of the same brain areas and result in similar desired behavioral changes. There are potential benefits of using a trauma-focused PTSD therapy with PCT Veterans due to the overlapping nature of symptoms associated with PTSD, TBI, and chronic pain. The current proposed study will attempt to determine if CPT or PE is more effective at reducing PTSD scores as assessed using the PCL in a PCT Veteran sample.

Summary and Limitations of the Literature

The polytrauma clinical triad which includes co-occurring diagnoses of PTSD, brain injury, and chronic pain as a growing area of concern for OEF/OIF/OND veterans. Advances in technology such as improved body armor have saved countless lives during the current wars. This means that servicemembers are surviving injuries and traumas that they likely would not have during previous war eras. Fields in medical and psychological interventions are striving to adapt and create new interventions to save and improve the lives of those who are surviving such injuries. In the case of PCT, it is typical for individuals to receive multiple forms of care from interdisciplinary teams. One part of that team usually involves a clinician trained in psychological interventions such as cognitive processing therapy or prolonged exposure for PTSD.

It has been hypothesized that in PCT, PTSD is metaphorically driving the bus or the reason why symptoms relevant to the experience of trauma, brain injury, and chronic pain persist

even when other interventions such as prescription medications for pain or mood are utilized. While managing symptoms of pain while addressing PTSD symptoms may be important, some believe that the first line of defense should be to attempt to reduce the cognitive load an individual carries while trying to live with their PTSD symptoms as well as their other co-morbid diagnoses. There seems to be agreement in the literature that cognitive dysfunctions such as unworkable beliefs or other cognitive distortions are a theme that contributes to the persistence of symptoms in PCT patients.

The current study seeks to advance the understanding of PCT by targeting PTSD symptoms through CPT and PE. It is thought that if new and more effective or functional cognitive schemas can be adapted by patients to help reduce their PTSD symptoms that those schemas or skills may be transferable under a lesser degree of cognitive load once PTSD symptoms are alleviated to address the symptoms remaining which are associated with brain injury and/or chronic pain.

Research Questions & Hypotheses

This study was based on the following research questions and hypotheses:

Research Question 1. Are CPT and PE effective PTSD treatments for veterans with the PCT?

- Hypothesis 1: There will be no difference in post-treatment PTSD outcomes (PCL-M scores) within CPT and PE treatment conditions.
- Hypothesis 2: There will be no difference in post-treatment depression outcomes (BDI-II scores) within CPT and PE treatment conditions.
- Hypothesis 3: There will be no difference in post-treatment anxiety outcomes (BAI scores) within CPT and PE treatment conditions.

- Hypothesis 4: There will be no difference in post-treatment PTSD outcomes (AUDC scores) within CPT and PE treatment conditions.
- Hypothesis 5: There will be no difference in post-treatment PTSD outcomes (DVPRS scores) within CPT and PE treatment conditions.

Research Question 2. Is CPT or PE better as a treatment modality for veterans with the PCT?

- Hypothesis 1: There will be no difference in post-treatment PTSD outcomes (PCL-M scores) between CPT and PE treatment conditions.
- Hypothesis 2: There will be no difference in post-treatment depression outcomes (BDI-2 scores) between CPT and PE treatment conditions.
- Hypothesis 3: There will be no difference in post-treatment anxiety outcomes (BAI scores) between CPT and PE treatment conditions. Both treatments will result in significant reduction in anxiety symptoms over time.
- Hypothesis 4: There will be no difference in post-treatment alcohol use outcomes (AUDC scores) between CPT and PE treatment conditions.
- Hypothesis 5: There will be no difference in post-treatment pain outcomes (DVPRS scores) between CPT and PE treatment conditions.

Research Question 3. Are there differences in outcomes by race/ethnicity between CPT and PE?

- Hypothesis 1: There will be no differences within or between treatment groups when all 5 symptom scales and race/ethnicity are analyzed simultaneously.
- Hypothesis 2: There will be no difference in post-treatment PTSD outcomes (PCL-M scores) between CPT and PE treatment conditions by race/ethnicity.

- Hypothesis 3: There will be no difference in post-treatment depression outcomes (BDI-2 scores) between CPT and PE treatment conditions by race/ethnicity.
- Hypothesis 4: There will be no difference in post-treatment anxiety outcomes (BAI scores) between CPT and PE treatment conditions. Both treatments will result in significant reduction in anxiety symptoms over time by race/ethnicity.
- Hypothesis 5: There will be no difference in post-treatment alcohol use outcomes (AUDC scores) between CPT and PE treatment conditions by race/ethnicity.
- Hypothesis 6: There will be no difference in post-treatment pain outcomes (pain scale scores) between CPT and PE treatment conditions by race/ethnicity.

Chapter III

Methods

Based on the literature review presented, there is a clear and urgent need for further research on psychological interventions for the treatment of the polytrauma clinical triad (PCT) in veteran populations. It is thought that by aiming to reduce symptoms associated with posttraumatic stress that clients may be better able to recover from other injuries such as those sustained from a traumatic brain injury (TBI) or chronic pain. The two most commonly used trauma-focused evidence-based treatments (EBT's) for posttraumatic stress disorder (PTSD) in the VA include cognitive processing therapy (CPT) and prolonged exposure (PE). Although these interventions were not developed with the intention of being used specifically with PCT veterans, there may be benefits of using them with this population of patients who seek mental health services.

The current study analyzed retrospective existing data from OEF/OIF/OND Veterans who served between September 11, 2001 and September 11, 2015 and met diagnostic criteria of having the polytrauma clinical triad. The medical records of 2,173 veterans who met inclusion criteria for this study were reviewed. Information such as age, race/ethnicity, gender, and branch of service as well as survey data including scores on the PCL-M, BAI, BDI-II, AUDC, and pain scale scores were collected. The data were analyzed with the intention of looking for clinical outcomes as measured by changes in pre-treatment to post-treatment scores on the previously noted assessments. The information gained from the current study will be useful for clinicians to make better informed clinical decisions when choosing between using CPT or PE for patients with the polytrauma clinical triad based on patient factors like race/ethnicity and baseline conditions such as anxiety and alcohol use.

The purpose of the present study is to examine the following:

Research Question 1. Are CPT and PE effective PTSD treatments for veterans with the PCT?

- Hypothesis 1: There will be no difference in post-treatment PTSD outcomes (PCL-M scores) within CPT and PE treatment conditions.
- Hypothesis 2: There will be no difference in post-treatment depression outcomes (BDI-II scores) within CPT and PE treatment conditions.
- Hypothesis 3: There will be no difference in post-treatment anxiety outcomes (BAI scores) within CPT and PE treatment conditions.
- Hypothesis 4: There will be no difference in post-treatment PTSD outcomes (AUDC scores) within CPT and PE treatment conditions.
- Hypothesis 5: There will be no difference in post-treatment PTSD outcomes (DVPRS scores) within CPT and PE treatment conditions.

Research Question 2. Is CPT or PE better as a treatment modality for veterans with the PCT?

- Hypothesis 1: There will be no difference in post-treatment PTSD outcomes (PCL-M scores) between CPT and PE treatment conditions.
- Hypothesis 2: There will be no difference in post-treatment depression outcomes (BDI-2 scores) between CPT and PE treatment conditions.
- Hypothesis 3: There will be no difference in post-treatment anxiety outcomes (BAI scores) between CPT and PE treatment conditions. Both treatments will result in significant reduction in anxiety symptoms over time.
- Hypothesis 4: There will be no difference in post-treatment alcohol use outcomes (AUDC scores) between CPT and PE treatment conditions.

- Hypothesis 5: There will be no difference in post-treatment pain outcomes (DVPRS scores) between CPT and PE treatment conditions.

Research Question 3. Are there differences in outcomes by race/ethnicity between CPT and PE?

- Hypothesis 1: There will be no differences within or between treatment groups when all 5 symptom scales and race/ethnicity are analyzed simultaneously.
- Hypothesis 2: There will be no difference in post-treatment PTSD outcomes (PCL-M scores) between CPT and PE treatment conditions by race/ethnicity.
- Hypothesis 3: There will be no difference in post-treatment depression outcomes (BDI-2 scores) between CPT and PE treatment conditions by race/ethnicity.
- Hypothesis 4: There will be no difference in post-treatment anxiety outcomes (BAI scores) between CPT and PE treatment conditions. Both treatments will result in significant reduction in anxiety symptoms over time by race/ethnicity.
- Hypothesis 5: There will be no difference in post-treatment alcohol use outcomes (AUDC scores) between CPT and PE treatment conditions by race/ethnicity.
- Hypothesis 6: There will be no difference in post-treatment pain outcomes (pain scale scores) between CPT and PE treatment conditions by race/ethnicity.

Procedure

The study utilized retrospective data stored in the Corporate Data Warehouse (CDW), National Compensation and Pension Record Interchange (National CAPRI), and the Veterans Benefit Management System (VBMS) and was accessed through the VA Informatics and Computing Infrastructure (VINCI). The data were analyzed from a secure remote platform. The current study was exempt from requiring informed consent to access participants' medical

records. All procedures were approved by internal review boards of the VA Eastern Kansas Healthcare System and the University of Kansas Human Subjects Committee of Lawrence. The data were analyzed using SPSS Version 24 and Microsoft Excel. To protect confidentiality, all individually identifiable information was removed and data were stored on a secure VINCI drive that only the investigators had access to.

Patient Selection. The researchers requested data from the Department of Veterans Affairs (VA) Informatics and Computing Infrastructure (VINCI; U.S. Department of Veterans Affairs, 2014). The purpose of VINCI is to provide researchers with access to VA data while ensuring Veterans' privacy and data security. The researchers requested data for approximately 2,500 subjects who completed at least 2 Posttraumatic Stress Checklist's (PCL-M) within a 6 month period, and at least 2 of each of the following within a 6 month period: Alcohol Use Disorders Checklist (AUDC), Beck Anxiety Inventory (BAI), Beck Depression Inventory-II (BDI-II), and pain scale scores. Participants must have served only from September 11, 2001 to April 1, 2017, and their first service entry date was required to have been between September 11, 2001 and September 11, 2015. Veterans who had served prior to September 11, 2001 or had diagnoses related to psychosis were excluded from the study. The original data request returned a cohort of 458,728 individuals who met diagnostic criteria. Once the additional restricting criteria for assessments and service era dates were included, the potential electronic medical record files for individual patients decrease to 2,173 individuals.

All participants included in the study had received either CPT or PE in individual therapy and meet the criteria of having PCT by evidence of diagnoses including PTSD, a history of TBI or concussive syndrome, and chronic pain. These criteria were checked during chart review and those with missing data were able to be rejected while maintaining adequate statistical power.

Files were reviewed using ICD-9-CM Codes related to PTSD, TBI or brain injury, and chronic pain using the codes that Cifu, Taylor, Carne, Bidelsbach, Sayer, Scholten, and Campbell (2013) used. Only participants who complete either the CPT or PE protocol were included in the study. Completion status was determined from clinical notes during chart review and is operationalized below.

After gaining access to the VINCI database, researchers used the Statistical Package for the Social Sciences (SPSS) Version 23 to analyze the data. Initially, descriptive statistics were used to account for patient factors such as age, gender, race/ethnicity, marriage status, and service connection rating. Two-way ANOVAs were used to analyze the data to explore the hypothesized outcomes. The researchers considered the statistical findings after data analysis in context with other relevant information such as previous research findings when describing the findings of the current study.

The initial cohort of potential participants was 458,728 distinct individuals that met the diagnostic criteria for inclusion in the study. Out of these individuals, 29,888 had completed the PCL-M. 16,053 had completed both the PCL-M and BDI-II. 5,111 had completed the PCL-M, BDI-II, and BAI. 4,823 had completed the PCL-M, BDI-II, BAI, and AUDIT-C. A final reduction in potential charts to review was done by removing individuals who had served prior to September 11, 2001, left the service and then re-entered the service after September 11, 2001. The final cohort only included veterans who had entered service between September 11, 2001 and September 11, 2015 and had not served prior to September 11, 2001 so that the participants in this study would not have included veterans from any other eras except the Persian Gulf War and OEF/OIF/OND. This left 2,173 distinct individuals who met diagnostic criteria and had completed the measures needed for this study without missing data. Charts were randomly

assigned a number then reviewed at random until there were two equal groups. One group contained 70 individuals who had participated in CPT and the other was a group of 70 who had participated in PE. Using a third group as a control group was considered, but decided against during chart review because there were too many confounding variables such as having participated in another type of EBP for a mental health disorder and suicide attempts. Chart review was then completed to fill in data about type of treatment (CPT or PE) and to report changes in pain scale scores. The codes in the table below were used when requesting data on PCT patients based on Cifu et al.'s 2013 study.

Polytrauma diagnoses and associated International Classification of Diseases- 9th Revision-Clinical Modification (ICD-9-CM) codes

| Diagnosis | ICD-9-CM Code |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Traumatic Brain Injury | 310.2, 800.0-801.9, 803.0-804.9, 850.0-854.1, 905.0, 907.0, 950.1-950.3, 959.01, 959.01, 959.9, V15.52 |
| Posttraumatic Stress Disorder | 309.81 |
| Pain | |
| Back | 721.3x-721.9x, 722.2x, 722.30, 722.70, 722.80, 722.90, 722.32, 722.72, 722.82, 722.92, 722.33, 722.73, 722.83, 722.93, 724.xx, 737.1, 737.3, 738.4, 738.5, 739.2, 739.3, 739.4, 756.10, 756.11, 756.12, 756.13, 756.19, 805.4, 805.8, 839. 2, 839.42, 846, 846.0, 847.1, 847.2, 847.3, 847.9 |
| Neck | 721.0x, 721.1x, 722.0x, 722.31, 722.71, 722.81, 722.91, 723.xx, 839.0, 839.1, 847.0 |
| Headache/Migraine | 346.x, 307.81, 784.0, 339.xx |

Table 1. PCT codes

Participants

Demographics. The mean age of participants was 36.264 years with the mode being 34 years. Ages ranged from 26 to 54 years at the time their intervention began. The mean time in service was 35.129 months with a median of 33.50 months, and bi-modal of 14.0 and 16.0

months. Time in service ranged from 6 months to 91 months. There were 135 males and 5 females. Reported race/ethnicity were as follows: 77 white/Caucasian; 29 Black/African American; 15 Hispanic; 15 other/unknown; and 4 Asian/Pacific Islander. In the CPT group, there were: 36 Caucasian; 16 African American; 3 Asian/Pacific Islander; 11 Hispanic; and 4 Other/Unknown. In the PE group, there were: 41 Caucasian; 13 African American; 1 Asian/Pacific Islander; 4 Hispanic; and 11 Other/Unknown. 50 participants were married, 80 were single/never married, and 10 were separated or divorced. Percent Service Connected Disability Rating was also considered. The mean rating was 82.929, median was 90.000, and mode was 100.000. Disability ratings ranged from 10% to 100%.

Table 2. *Demographic of sample and descriptive statistics.* (N = 140)

| Variable | N | % | M | SD |
|-------------------------------|-----|------|-------|--------|
| Sex | | | | |
| Male | 135 | 96.4 | | |
| Female | 5 | 3.6 | | |
| Age (years) | | | 36.26 | 6.08 |
| Race/Ethnicity | | | | |
| Caucasian | 77 | 55 | | |
| CPT | 36 | 51.4 | | |
| PE | 41 | 58.6 | | |
| African American | 29 | 20.7 | | |
| CPT | 16 | 22.9 | | |
| PE | 13 | 18.6 | | |
| Asian/Pacific Islander | 4 | 2.9 | | |
| CPT | 3 | 4.1 | | |
| PE | 1 | 1.4 | | |
| Hispanic | 15 | 10.7 | | |
| CPT | 11 | 15.7 | | |
| PE | 4 | 5.7 | | |
| Other/Unknown | 15 | 10.7 | | |
| CPT | 4 | 5.7 | | |
| PE | 11 | 15.7 | | |
| Service Connection (% Rating) | | | 82.93 | 19.02 |
| 0 | 0 | 0 | | |
| 10 | 1 | .7 | | |
| 20 | 1 | .7 | | |
| 30 | 1 | .7 | | |
| 40 | 5 | 3.6 | | |
| 50 | 5 | 3.6 | | |
| 60 | 8 | 5.7 | | |
| 70 | 17 | 12.1 | | |
| 80 | 27 | 19.3 | | |
| 90 | 23 | 16.4 | | |
| 100 | 52 | 37.1 | | |
| Service in Months | | | 35.13 | 20.636 |
| Marital Status | | | | |
| Married | 50 | 35.7 | | |
| Single/Never Married | 80 | 57.1 | | |
| Separated/Divorced | 10 | 7.1 | | |

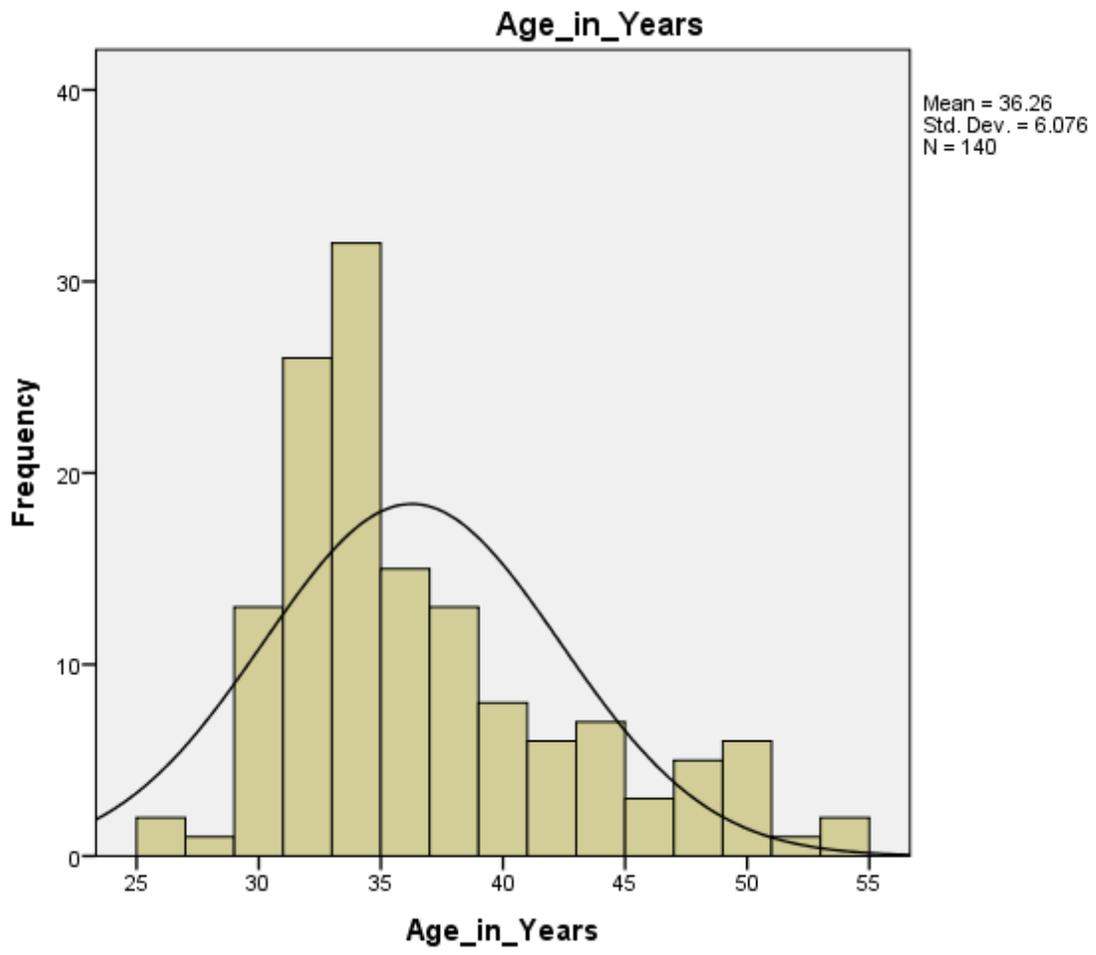


Figure 1. Age in years

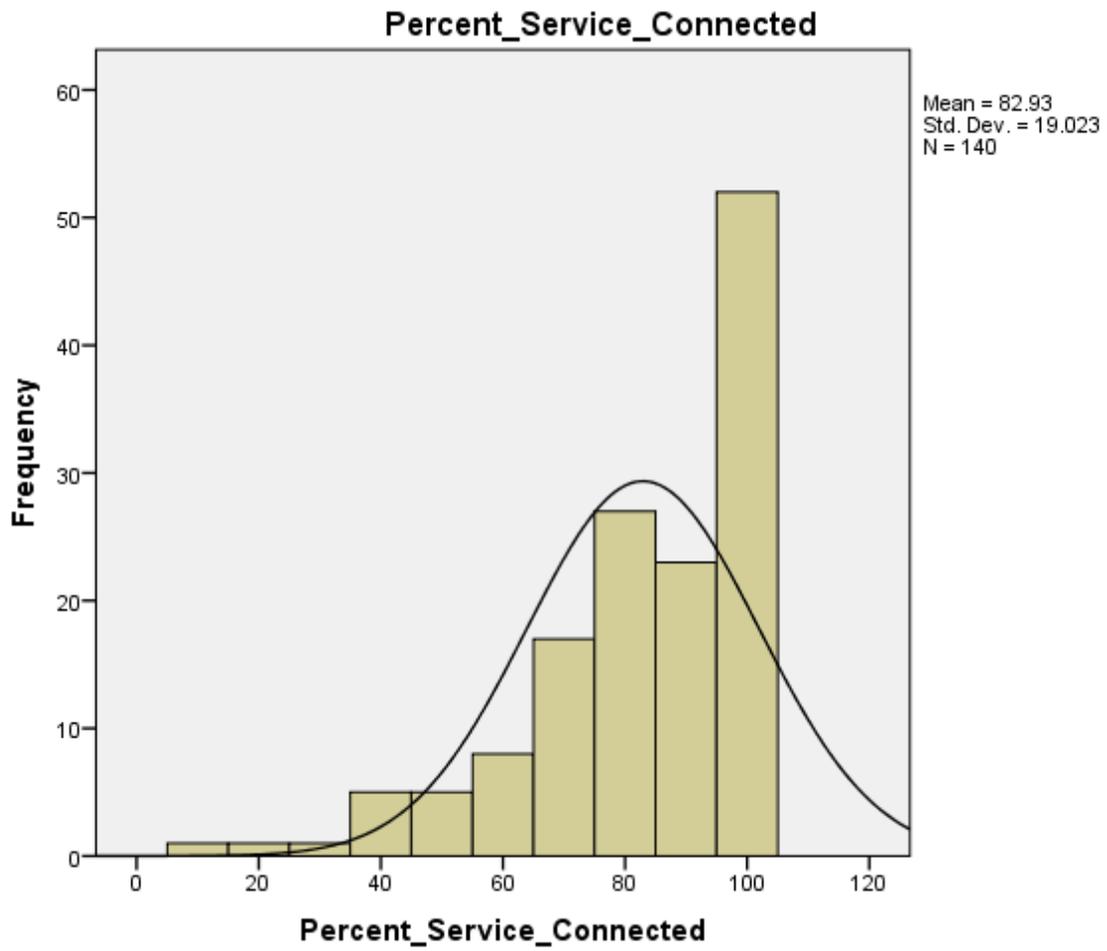


Figure 2. Percent service connected

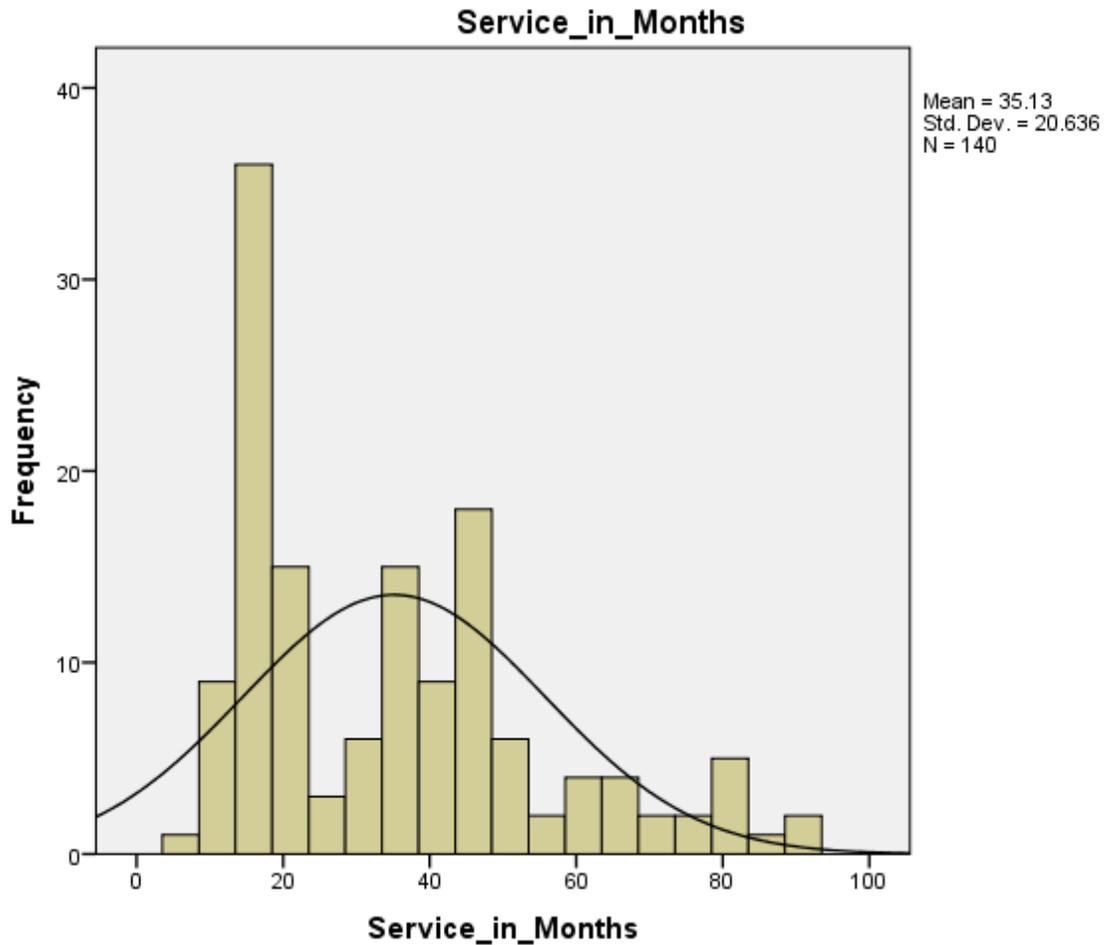


Figure 3. Service in months

Independent Variables

Type of treatment (CPT or PE), age, gender, and marital status will be treated as an independent variables. Race/ethnicity, time in service, and service connected rating will be considered independent variables as well.

Completion Status. Completion status was operationalized as a binary variable meaning that participants were either considered to have completed CPT or PE or had not. Because there are several variations of the protocols and previous studies have found that the greatest amount of change occurs within the first 6 sessions of the CPT protocol, to be included as a “completer”

in this study participants had to have completed at least 6 sessions of individual CPT. Yoder, Tuerk, Price, Grubaugh, Strachan, Myrick, and Acierno (2012) noted that some veterans improve rapidly during PE so in their study they defined PE completers as those who had completed at least 6 of the typical 12 sessions in the protocol. To be more stringent, the current study defined PE completers as those who attended at least 8 sessions. Patients who completed fewer than 6 sessions of CPT or 8 sessions of PE were considered non-completers and were therefore excluded from this study. Data was not collected on non-completers. Some previous studies such as Rutt (2014) looked at data about veterans who do not complete the CPT or PE protocol and Rutt also included therapist factors.

Symptom Changes Initial scores on the PCL-M, BAI, BDI-II, AUDIT-C, and pain scale score served as initial symptom severity measures for PTSD, anxiety, depression, alcohol use, and pain for each patient. The final score for each of these measures used was the score that was closest to the date they completed their CPT or PE protocol.

Age. Age was operationalized as the number of years old the patient was at the beginning of their CPT or PE treatment. Age was calculated using each patient's date of birth and subtracting that from the date of first CPT or PE session.

Treatment. The treatment modality for all patients was individual psychotherapy. Only patients who participated in CPT or PE were included. Patients were not excluded for being on prescription medications, but were excluded if there were engaged in other forms of psychotherapy.

Race/Ethnicity. Race/ethnicity was considered to be an independent variable and was divided into Caucasians, African Americans, Hispanics, and Other based on previous lines of research and the descriptive statistics observed in the current study.

Dependent Variables

Pre and posttest scores on the PCL, BAI, BDI-II, AUDC, and pain scale scores were used as the dependent variables.

PCL-M. The PCL-M is a self-report measure of PTSD symptoms that aligns with the Diagnostic and Statistical Manual of Mental Disorders 4th edition Text Revision (DSM-IV-TR) criteria for PTSD (Weathers, Litz, Herman, Juska, & Keane, 1993). Although the DSM-5 is currently in use, because this is a retroactive study the previous edition of the DSM-IV-TR and PCL-M have been selected for use in this study. The PCL contains 17 items that clients respond to on a 5-point Likert scale (1 = not at all; 2 = a little bit; 3 = moderately; 4 = quite a bit; 5 = extremely). A total score is derived by summing all of the items. Lower scores indicate less severe PTSD symptoms and higher scores indicate higher frequency or severity of PTSD symptoms. Thus, decreases in PCL-M scores over time have routinely been considered indication of reductions in frequency or severity of PTSD symptoms. The recommended cut-score to warrant a PTSD diagnoses was proposed as 50 to minimize false positives (Weathers et al. 1993) although scores of 36 or higher warrant further assessment in Veteran populations. To determine if a person has responded with improvements to treatment, the National Center for PTSD has recommended a decline of 5 points or more on the PCL while a decrease in 10 points would be considered clinically significant change. According to Blanchard and colleagues, the internal consistency for the PCL is $\alpha = .97$ and the test-retest reliability over one week is also high at ($r = .96$) (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996).

Beck Anxiety Inventory (BAI). The BAI is a self-report style screening measure for anxiety. It consists of 21 items that measure subjective and somatic symptoms that are commonly experienced by individuals with anxiety. Patients select a rating on a Likert style scale that best describes their symptoms. The scale ranges from 0 “not at all” to 3 “severely”. Individuals are asked to only think about how their symptoms have been within the past week. Beck and Steer (1993) established that the internal validity for the BAI is excellent at $\alpha = .92$ and its test-retest reliability is $r = .75$. Palmer et. al (2014) tested the psychometric properties of the BAI with veterans with polytrauma and found internal reliability of $\alpha = .92$. The mean score for polytrauma veterans was 16.54 (SD = 11.25; range = 0 – 47) in Palmer et. al’s (2014) sample.

Beck Depression Inventory-II (BDI-II). The BDI-II was used as a screening measure to assess for depressive symptoms in the polytrauma clinic. The screening measure consists of 21 items assessing affective, cognitive, and physiological symptoms associated with depression. The BDI-II is a self-report screening measure that asks the patient to evaluate symptoms based on a series of sentences (for each item) presented in ascending order from no symptoms (score of 0) to severe symptoms (score of 3). The patient is asked to rate symptoms in the context of experiences within the last 2 weeks. The instrument has been demonstrated to have good reliability and validity. Beck et al. (1996) reported that the BDI-II was found to have $\alpha = .92$ for outpatients and $\alpha = .93$ for college student samples and a test–retest reliability of $r = 0.93$ at one-week with an internal consistency $\alpha=.91$. Palmer et al. (2016) researched the psychometric properties of the BDI-II for veterans with polytrauma and found $\alpha = .93$ with a mean score was 21.20 (SD = 11.76; range = 0 – 51).

Alcohol Use Disorders Identification Test (AUDIT-C). The AUDIT-C is a validated three-item screen for alcohol misuse. The AUDIT-C is one of the most commonly used alcohol

use screening tools in the VA that can help identify patients who are high-risk drinkers or may have an alcohol use disorders (i.e., alcohol abuse or dependence). Alcohol use in previous studies has been defined by scores on the AUDIT-C. AUDIT-C items assess the frequency and quantity of typical drinking and the frequency of heavy episodic drinking. Patients respond using a Likert scale to three items: (1) how often they have a drink containing alcohol, (2) how many drinks containing alcohol they have in a typical day when drinking, and (3) how often they have six or more drinks on one occasion. AUDIT-C scores range from 0 to 12. Higher scores equate to greater levels of severity. Within the VA system, providers are notified by an electronic reminder to administer the AUDIT-C to all patients annually. It may be given to patients multiple times per year to assess ongoing concerns related to alcohol use. Previous studies have used the following ranges of scores to categorized patients into four risk groups: nondrinkers (score of 0), low-level drinkers (score of 1–4), moderate alcohol misuse (score of 5–7), and severe alcohol misuse (score of 8–12). Bush et al. (1993) reported that in men, scores equal to or greater than 4 on the AUDIT-C had a sensitivity of .86 and specificity of .72. Bradley et al. (2003) found in female veterans who reported scores equal to or greater than 3 had a sensitivity of .66 and specificity of .94. Previous literature agrees that the AUDIT-C is a valid and reliable measure for assessing alcohol abuse or dependence.

Defense and Veterans Pain Rating Scale (DVPRS). Pain scale scores were extrapolated during the clinical chart reviews. The pain scores used in the current study sometimes came from within the notes of the mental health provider, but sometimes were collected from the notes of medical providers that saw the patients in settings such as primary care at appointments that were closest to the start and end dates of either CPT or PE. The VA has pushed to include pain as the 5th vital sign over the past decade or so. While it has become

common practice for medical providers to ask patients to rate their pain at their appointments, it is still rare that mental health providers do so regularly. Nevertheless, the vast majority of providers ask about pain using a 10 point rating scale that patients are familiar with regardless of the healthcare setting. Patients who had clearly been asked to rate their current pain using a 10 point scale were included in this study.

The Department of Defense and VA adhere to the use of the Defense and Veterans Pain Rating Scale (DVPRS). The DVPRS uses the 10 point numerical rating scale and each point has a written description in the form of a functional statement about the intensity of the pain. For example, a “2” is “notice pain, does not interfere with activities” and a “7” is “[pain is] focus of attention, prevents doing daily activities”. If patients are shown the DVPRS, it includes 6 pictorial facial expressions matched to ranges of pain levels, is color coded, and has an alternate way to categorize the pain. This alternate way includes the descriptors of mild pain being rated 1-4, moderate pain as 5-6, and severe pain as 7-10.

The DVPRS 2.0 has consistently been found to be both reliable and valid for assessing pain in veteran populations. It does this by providing standard language and different modes to allow patients to communicate their pain levels to providers. Polomano, Galloway, Kent, Brandon-Edwards, Kwon, Morales, and Buckenmaier (2016) evaluated the current version of the DVPRS 2.0 which is an updated version from the DVPRS 1.0. When used with a sample of veterans that closely match the demographics of the current study, internal reliability was found to be Cronbach’s alpha = 0.871 and test-retest reliability was $r = 0.637$ to $r = 0.774$ when the additional 5 follow-up questions were used. These questions were not included as part of the current study. A qualitative component of Poloman et al.’s study found that 70.9% of

participants felt that the DVPRS was better than other pain rating scales they had been assessed using previously.

Ethical Issues

In the realm of clinical research, ethical issues are of the utmost importance. The primary ethical issues that were managed in the present study involved protecting the confidentiality and privacy of patients and their records. After approval from IRB processes, only the minimum of personally identifiable information (PII) was collected and remained within a secure VINCI server. As soon as was possible, PII was removed from the data so that it could no longer be connected to individuals. This was done to reduce the risk of breaching confidentiality. This study also was granted an exemption of informed consent. This was done because it would have been impractical to contact every potential participant to gain consent to use their records for chart review and could have had unintended effects if the individuals were currently in treatment. All individuals who utilize the VA healthcare system agree that their data may be used for research purposes.

Some PII such as social security numbers and date of birth were required in order to access the patients' charts. Once the chart reviews were complete, social security numbers were replaced by a study identification number and the social security numbers were deleted. Date of birth was used to calculate age to the nearest whole year. Once this calculation was complete for all participants the date of birth information was deleted.

Data Analysis

This study used descriptive statistics and repeated measures ANOVA (RM-ANOVA), two-way RM-ANOVA, and two-way repeated measures MANOVA (RM-MANOVA) to analyze

the data. The use of numerous t-tests were considered, but rejected as a means to reduce the potential of making type 1 errors. Additionally, considerations to sample size and lack of random assignment to treatment groups to compare data from pre-treatment to post-treatment points in time helped to determine which statistical tests would provide the most power and appropriately answer the research questions. Descriptive statistics were run to gain an understanding of who the participants in the sample were. Information about age, race/ethnicity, gender, service connection rating, and time in service were evaluated by gathering frequencies, percentages, mean, median, mode, and range. Analyzing within and between group differences for CPT and PE using the pre and post scores on the PCL-M, BDI-2, BAI, AUDC, and pain scale scores were run through two-way RM-ANOVAs and RM-MANOVA. Similar to t-tests, ANOVA is used to calculate the ratio of observed (actual) differences to differences expected due to chance. Using the F ratio allowed the researcher to look at the variance between and within groups. The current study only used pre and post-treatment data. Therefore, sphericity did not need to be evaluated as it was not necessary to have homogeneity of variance or covariance in this case. A p-value of .05 or below was considered statistically significant based on standard procedures used in social sciences research. Post-hoc analyses could not be conducted because only two treatment groups were used and at least 3 groups are needed. Future studies may consider using a waitlist or treatment as usual control group so that additional levels of analyses can be conducted.

Chapter IV

Results

Three main research questions were the foundation for this study. The first question was geared at gaining an understanding of the effectiveness of CPT and PE overall for veterans with PCT. This included looking at changes in symptoms related to PTSD, depression, anxiety, alcohol use, and pain. The second research question that came out of the data was about looking at differences in PTSD symptom outcomes between CPT and PE. The third research question meant to see if there were differences between and within CPT and PE on symptom outcomes by race/ethnicity. While many other research questions certainly could be answered by this data, they would be best answered through follow-up studies with additional literature reviewed to support the rationale of further inquiry. The remainder of this chapter will address the findings relevant to the current study's research questions and proposed hypotheses.

Research Question 1. Are CPT and PE effective PTSD treatments for veterans with the PCT?

- Hypothesis 1: There will be no difference in post-treatment PTSD outcomes (PCL-M scores) within CPT and PE treatment conditions.

The main effect within treatment groups was significant, $F(1,138) = 1152.186, p = .000, \eta_p^2 = .893$. Patients in both groups showed statistically significant improvements in PTSD symptoms. PTSD scores decreased in the CPT group from pretest ($M=56.086, SE=1.175$) to posttest ($M=40.543, SE = 1.101$). PCL-M scores decreased in the PE group from pretest ($M=52.800, SE=1.175$) to posttest ($M=38.271, SE=1.101$). This indicated both statistically and clinically significant improvements (reductions in) total PCL-M scores which equates to a decrease in PTSD symptoms. Most veterans in both treatment modalities started treatment with PCL-M scores in the moderate-severe or severe range, but by the end of treatment most were in

the moderate range. Both CPT and PE are effective treatments for PTSD with veterans with PCT.

- Hypothesis 2: There will be no difference in post-treatment depression outcomes (BDI-II scores) within CPT and PE treatment conditions.

The main effect within treatment groups was significant, $F(1,138) = 265.978, p = .000, \eta_p^2 = .658$. Patients in both groups showed statistically significant improvements in depression symptoms. Depression scores decreased in the CPT group from pretest ($M=32.700, SE=.939$) to posttest ($M=28.371, SE = .974$). BDI-II scores decreased in the PE group from pretest ($M=30.186, SE=.939$) to posttest ($M=18.229, SE=.974$). The initial mean BDI-II score in both groups were slightly above the cutpoint for severe depression symptoms. Those in the PE group averaged larger decreases in their BDI-II scores than those in the CPT group, but the patients in the CPT group typically entered treatment with higher scores on the BDI-II. Patients in the PE group had a mean decrease in depression of about 12 points going from severe range pre-treatment to mild or moderate ranges post-treatment. Those in the CPT group seemed to have more severe ratings of their depression and were more likely to have post-treatment BDI-II scores in the moderate or severe ranges. Both CPT and PE are effective PTSD treatments for veterans with PCT and the results of this study suggest that using PE rather than CPT for PCT patients with depression may be clinically indicated.

- Hypothesis 3: There will be no difference in post-treatment anxiety outcomes (BAI scores) within CPT and PE treatment conditions.

The main effect within treatment groups was significant, $F(1,138) = 102.610, p = .000, \eta_p^2 = .426$. Patients in both groups showed statistically significant improvements in anxiety symptoms. Observed initial scores on the BAI were higher for those who participated in CPT,

but both treatment groups experienced similar levels of pre to post treatment reductions in anxiety. Anxiety scores decreased in the CPT group from pretest (M=28.043, SE=1.346) to posttest (M=23.800, SE=1.080). Anxiety scores in the PE group decreased from pretest (M=25.286, SE=1.346) to posttest (M=20.957, SE = 1.080). This finding is consistent with reports from many clinicians who have observed that patients with greater severity of anxiety symptoms may have a preference to engage in CPT rather than PE. Higher rates of anxiety in PTSD patients are thought to correlate with increased rates of avoidance behaviors including avoidance of some of the elements of PE such as in vivo exposure exercises. Nevertheless, in the current study patients in both treatment modalities had decreases in BAI scores however mean scores tended to remain in the moderate symptom range from pre-treatment to post-treatment. Based on the findings of the current study, clinicians could expect the severity of anxiety symptoms to decrease irrespective of their choice of PTSD treatment modality between CPT and PE.

- Hypothesis 4: There will be no difference in post-treatment alcohol use outcomes (AUDC scores) within CPT and PE treatment conditions.

The main effect within treatment groups was significant, $F(1,138) = 33.873, p = .000, \eta_p^2 = .197$. Patients in both groups showed statistically significant improvements in alcohol use. Alcohol use scores decreased in the CPT group from pretest (M= 4.229, SD = 2.256) to posttest (M=3.686, SD = 1.620). AUDC scores decreased in the PE group from pretest (M=3.786, SD = 2.173) to posttest (M= 3.300, SD = 1.663). It must be noted that the psychometric properties for identifying patients with risky alcohol drinking patterns is different for males and females when using the AUDIT-C. In men, a score of 4 or more indicates hazardous drinking, but a score of 3

or more in women indicates hazardous drinking. The participants in the current study were nearly all men which may have influenced the findings.

Most providers will not facilitate EBP's for PTSD with patients who have moderate or more severe alcohol or substance use because of the impacts the substances have which detract from the likelihood of PTSD treatment being effective and may even increase the chances of exacerbating PTSD symptoms. Many PTSD patients use alcohol as a way to avoid experiencing intrusive memories. Patients who engaged in CPT were more likely to have entered treatment with higher AUDIT-C scores which were slightly above the cutpoint for hazardous drinking in men. Those in CPT had greater decreases in their AUDIT-C scores on average compared to PE participants. Both CPT and PE are effective PTSD treatments that are likely to also result in decreases in reported alcohol use.

- Hypothesis 5: There will be no difference in post-treatment pain outcomes (DVPRS scores) within CPT and PE treatment conditions.

The main effect within treatment groups was significant, $F(1,138) = 31.935, p = .000, \eta_p^2 = .188$. Patients in both groups showed statistically significant improvements in pain. Pain scale scores decreased in the CPT group from pretest ($M = 2.843, SD = 1.304$) to posttest ($M = 2.243, SD = 1.042$). Pain scale scores decreased in the PE group from pretest ($M = 2.457, SD = 1.539$) to posttest ($M = 1.971, SD = 1.116$). Participants in both CPT and PE typically reported a mean DVPRS score in the mild range (1-4) at pre-treatment and again at post-treatment. Qualitative subjective descriptions for the mild pain range include: (1) Hardly notice pain, (2) Notice pain, does not interfere with activities, (3) sometimes distracts me, and (4) Distracts me, can do usual activities. Patients in both treatment modalities tended to have mild chronic pain levels of pain at pre-treatment and the mean DVPRS score for both groups decreased by about .5 points from

pre to post treatment. This means that patients continued to experience mild chronic pain despite the statistically significant findings. Although data was not collected for the current study on which patients were prescribed pain medication or were having their pain managed by another provider, this would be important information to include in future studies. Both CPT and PE are effective PTSD treatments with PCT patients and are likely to also result in decreases in mild chronic pain ratings.

Research Question 2. Is CPT or PE better as a treatment modality for veterans with the PCT?

- Hypothesis 1: There will be no difference in post-treatment PTSD outcomes (PCL-M scores) between CPT and PE treatment conditions.

The main effect for treatment was not significant, $F(1,138) = 1.311, p = .254, \eta_p^2 = .009$. Both CPT and PE are equally effective PTSD treatments. A One-Way RM-ANOVA with Bonferonni's corrections compared the initial PTSD severity of those in the CPT group ($M = 56.08, SD = 10.1270$) and PE group ($M = 52.80, SD = 9.369$). There was not a significant difference between the groups and the post-treatment PTSD severity of those in the CPT group was ($M = 40.54, SD = 10.299$) and PE group ($M = 38.27, SD = 7.982$). CPT participants averaged a decrease in PCL-M score of 15.54 points and PE participants' average decrease was 14.53 points. Participants in both treatment groups had relatively equivalent decreases in PTSD symptoms.

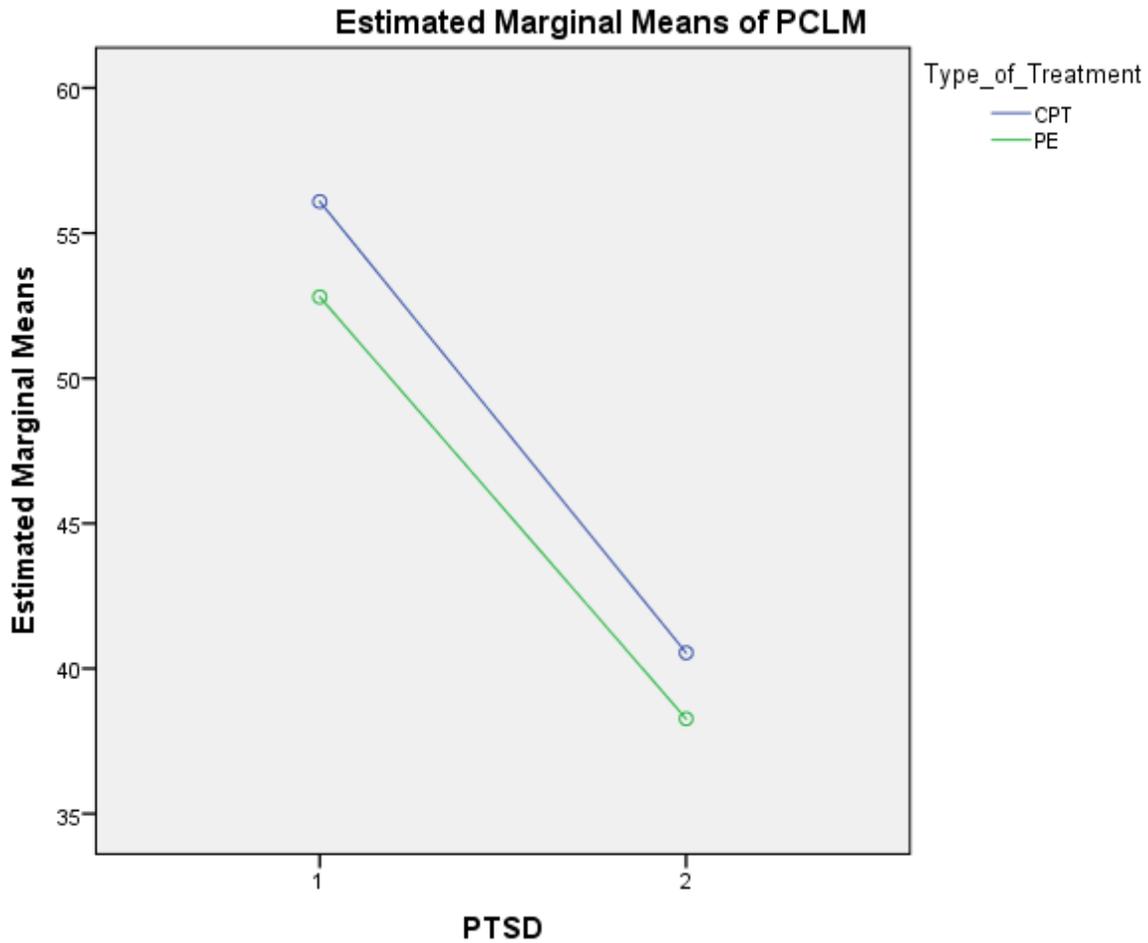


Figure 4. PCL-M changes by treatment

- Hypothesis 2: There will be no difference in post-treatment depression outcomes (BDI-2 scores) between CPT and PE treatment conditions.

The main effect for treatment was significant, $F(1,138) = 58.360, p = .000, \eta_p^2 = .297$. A One-Way RM-ANOVA with Bonferonni's corrections compared the initial depression severity of those in the CPT group ($M = 32.70, SD = 9.011$) and PE group ($M = 30.19, SD = 6.490$).

There was a significant difference between the groups and the post-treatment PTSD severity of those in the CPT group was ($M = 28.37, SD = 10.113$) and PE group ($M = 18.23, SD = 5.528$).

PE patients improved 11.96 points on average and CPT patients improved 4.33 points on

average. Those in the PE treatment condition had greater improvements or reductions in depressive symptoms compared to those in the CPT group.

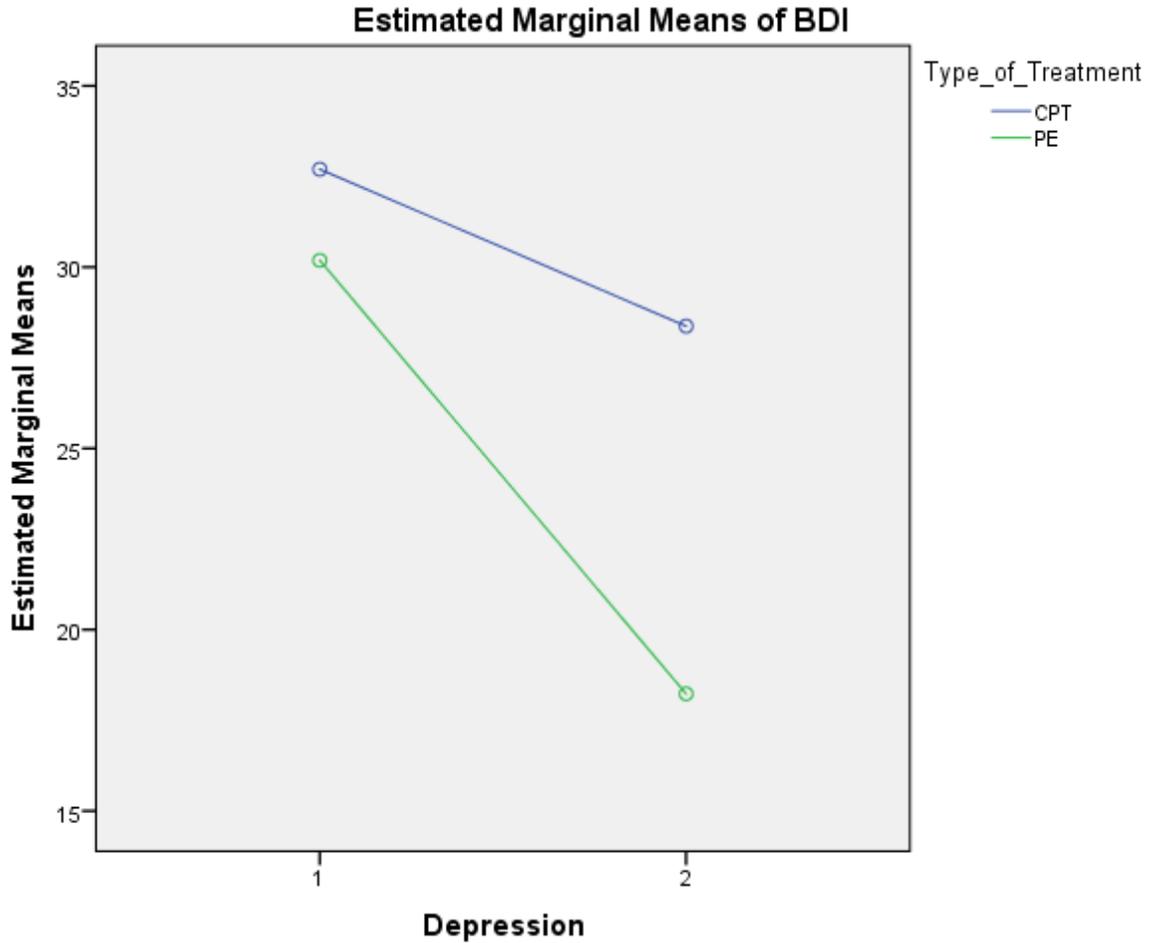


Figure 5. BDI-II changes by treatment

- Hypothesis 3: There will be no difference in post-treatment anxiety outcomes (BAI scores) between CPT and PE treatment conditions. Both treatments will result in significant reduction in anxiety symptoms over time.

The main effect for treatment was not significant, $F(1,138) = 2.799, p = .097, \eta_p^2 = .020$. A One-Way RM-ANOVA with Bonferonni's corrections compared the initial anxiety severity of those in the CPT group ($M = 28.04, SD = 11.789$) and PE group ($M = 25.29, SD = 10.717$).

There was not a significant difference between the groups and the post-treatment anxiety severity of those in the CPT group was ($M = 23.80$, $SD = 9.357$) and PE group ($M = 20.96$, $SD = 8.705$). Those in the CPT treatment group had an average reduction in their BAI score of 4.24 points and those in the PE group had an average reduction of 4.32 points. Reductions in anxiety symptoms were about the same in both treatment groups.

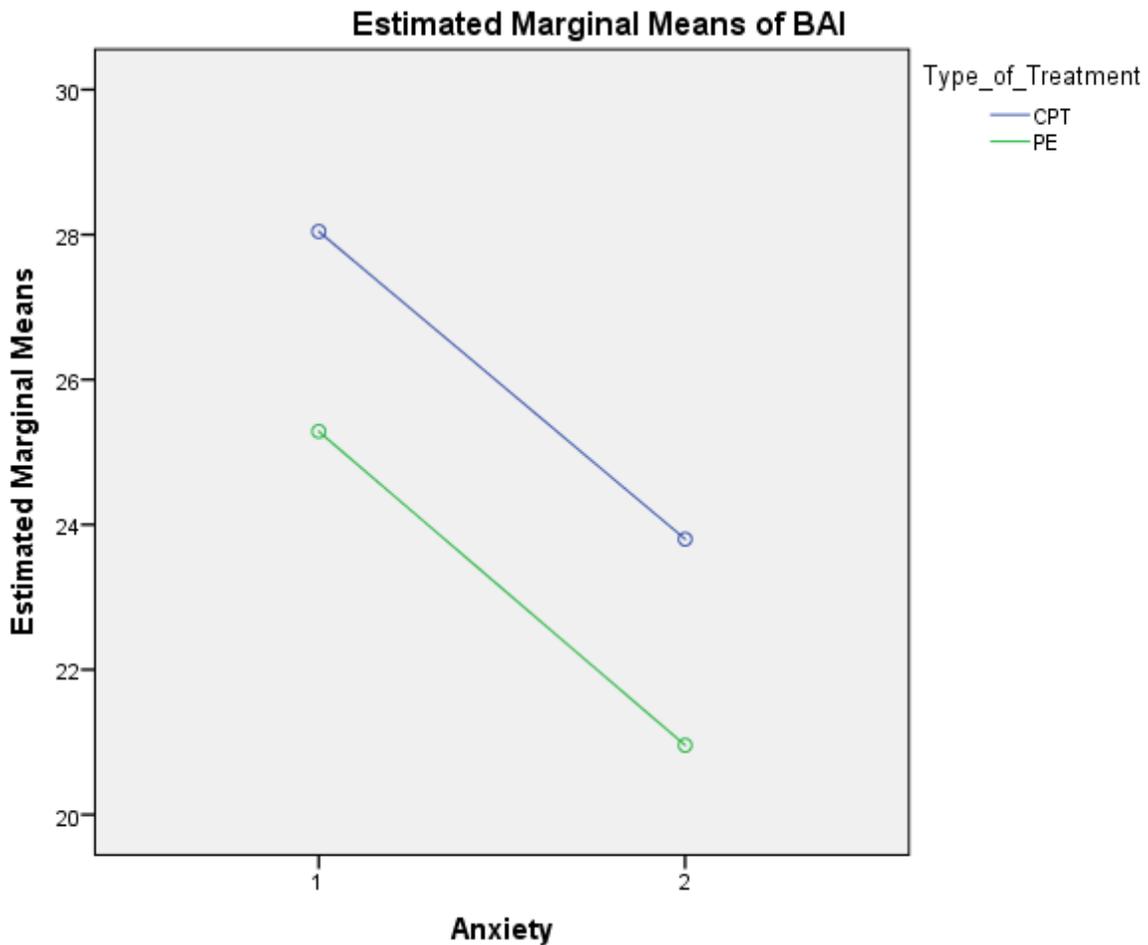


Figure 6. BAI changes by treatment

- Hypothesis 4: There will be no difference in post-treatment alcohol use outcomes (AUDC scores) between CPT and PE treatment conditions.

The main effect for treatment was not significant, $F(1,138) = .105, p = .747, \eta_p^2 = .001$. A One-Way RM-ANOVA with Bonferonni's corrections compared the initial alcohol use severity of those in the CPT group ($M = 4.23, SD = 2.260$) and PE group ($M = 3.79, SD = 2.173$). There was not a significant difference between the groups and the post-treatment alcohol use severity of those in the CPT group was ($M = 3.69, SD = 1.620$) and PE group ($M = 3.30, SD = 1.662$). Those in the CPT treatment group had an average reduction of .54 points and those in the PE group had an average reduction rate of .49 points. Reductions in alcohol use were about the same in both treatment groups.

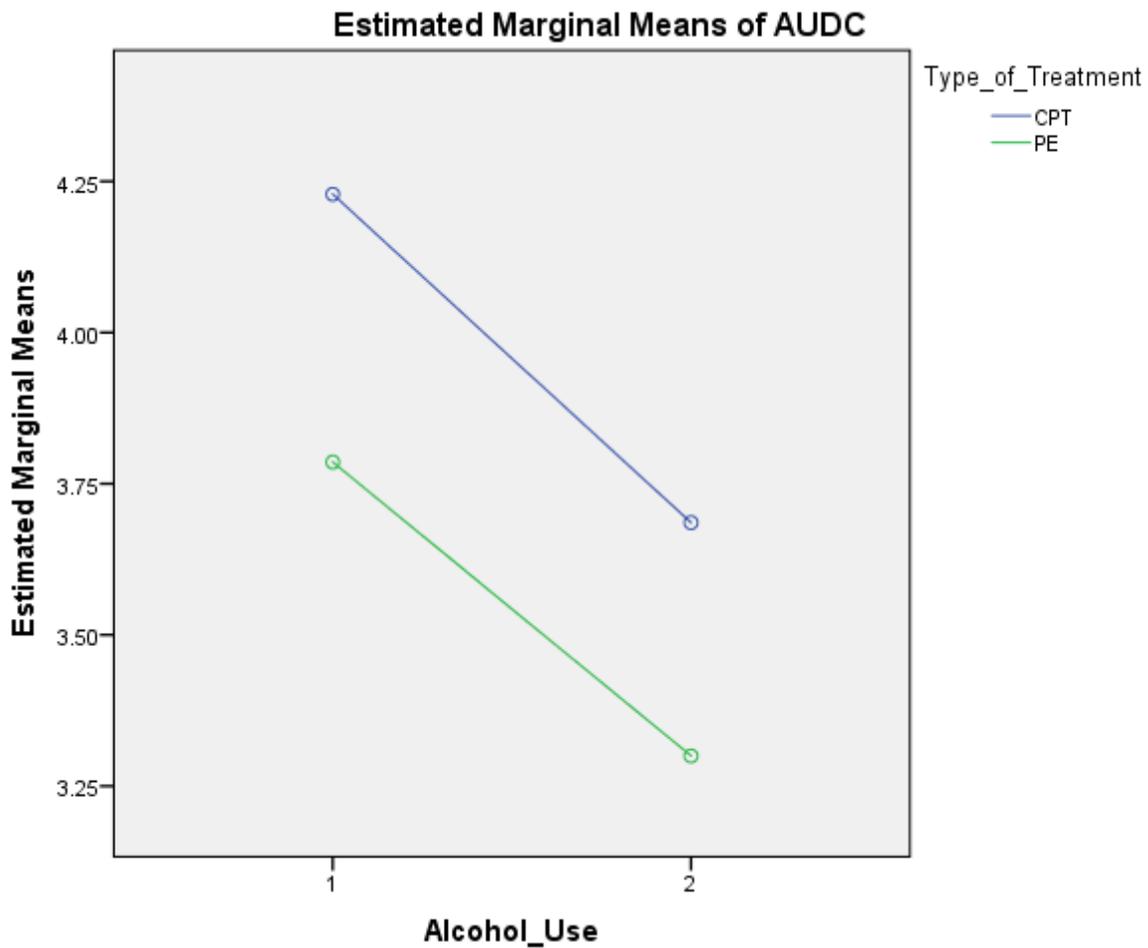


Figure 7. AUDIT-C changes by treatment

- Hypothesis 5: There will be no difference in post-treatment pain outcomes (pain scale scores) between CPT and PE treatment conditions.

The main effect for treatment was not significant, $F(1,138) = .354, p = .553, \eta_p^2 = .003$. A One-Way RM-ANOVA with Bonferonni's corrections compared the initial pain severity of those in the CPT group ($M = 2.84, SD = 1.304$) and PE group ($M = 2.46, SD = 1.539$). There was not a significant difference between the groups and the post-treatment pain severity of those in the CPT group was ($M = 2.24, SD = 1.042$) and PE group ($M = 1.97, SD = 1.116$). Average reduction rates in pain scores in the CPT group was .60 points and .49 points for those in PE. Reductions in pain symptoms were about the same in both treatment groups.

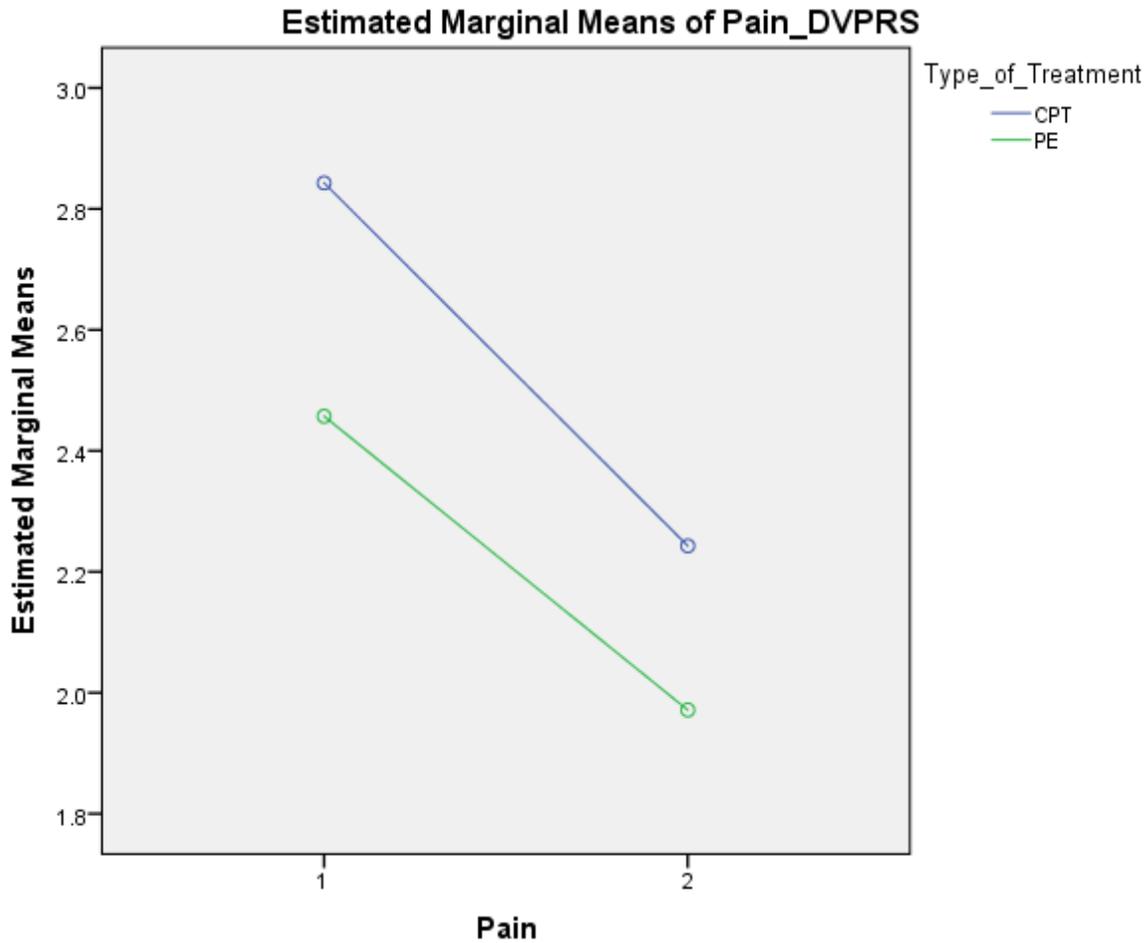


Figure 8. DVPRS change by treatment

Research Question 3. Are there differences in symptom outcomes by race/ethnicity between CPT and PE?

- Hypothesis 1: There will be no differences within or between treatment groups when all 5 symptom scales and race/ethnicity are analyzed simultaneously.

There was not a statistically significant interaction effect between race and type of intervention on the combined dependent variables, $F(20, 418.845) = 1.178, p = .269$; Wilks' $\Lambda = .834$. This is interpreted as there is not a statistically significant difference in treatment modality outcomes overall when all 5 symptom scales are considered at the same time and race/ethnicity

is accounted for. The overall RM-MANOVA showed that within treatment groups there are differences in symptom outcomes by race that approached statistical significance $F(20, 418.845) = 1.589, p = .052$; Wilks' $\Lambda = .785$. This is interpreted as there is not statistical significance within each treatment group when all 5 symptoms and race/ethnicity are accounted for at the same time. However, $p = .052$ approaches significance to a degree that it was decided that further interpretation included below would still hold clinical value.

- Hypothesis 2: There will be no difference in post-treatment PTSD outcomes (PCL-M scores) between CPT and PE treatment conditions by race/ethnicity.

Treatment effects within groups: $F(1, 130) = .451, p = .503, \eta_p^2 = .003$. There was not statistical significance on within subjects treatment effects.

Treatment modality effects between subjects: $F(1, 130) = .287, p = .593, \eta_p^2 = .002$. There was not statistical significance between subjects in different treatment modalities.

Race effects between subjects: $F(4, 130) = .567, p = .687, \eta_p^2 = .017$. There was not statistical significance between subjects by race.

Treatment modality by race interaction effects: $F(4, 130) = 1.374, p = .246, \eta_p^2 = .041$. There was not statistical significance of interaction effects between treatment modalities by race.

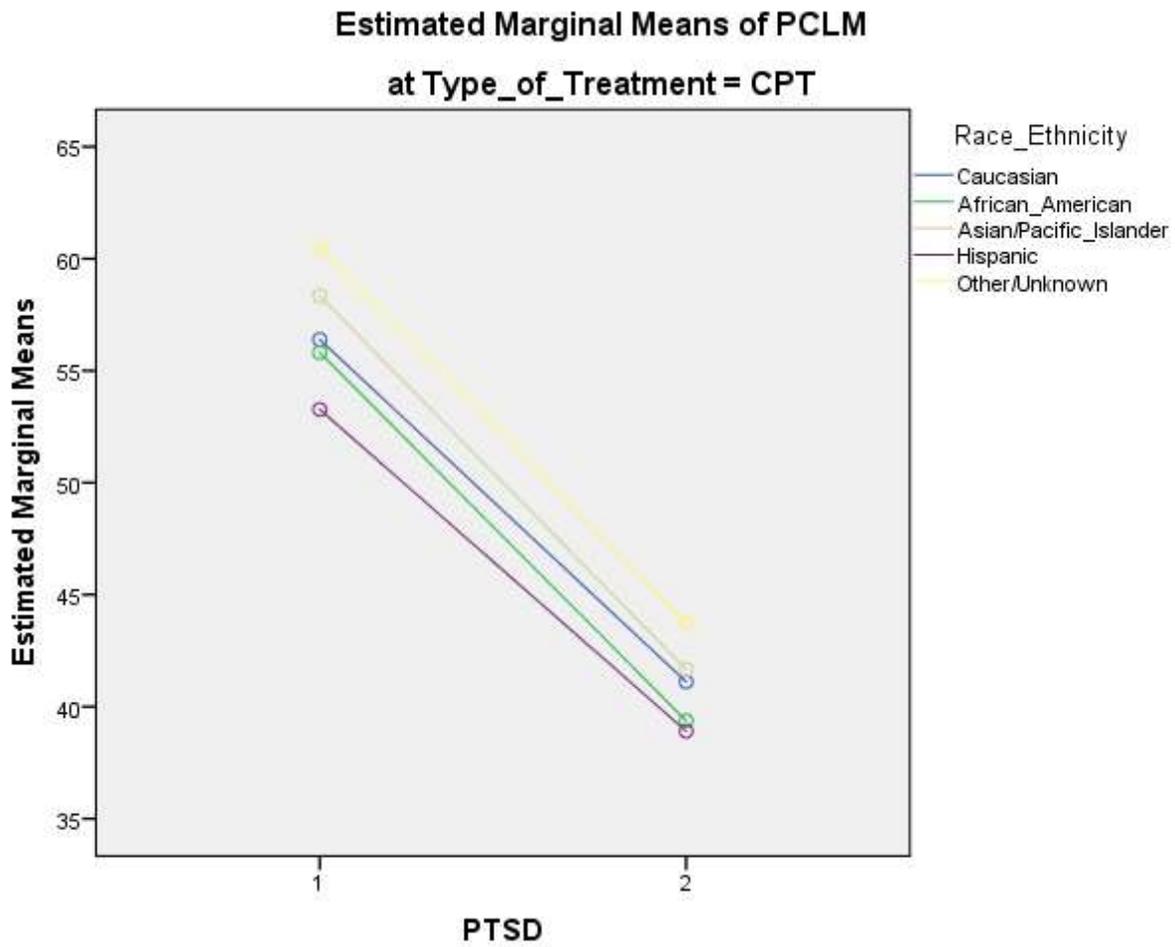


Figure 9. PCL-M changes by race/ethnicity in CPT

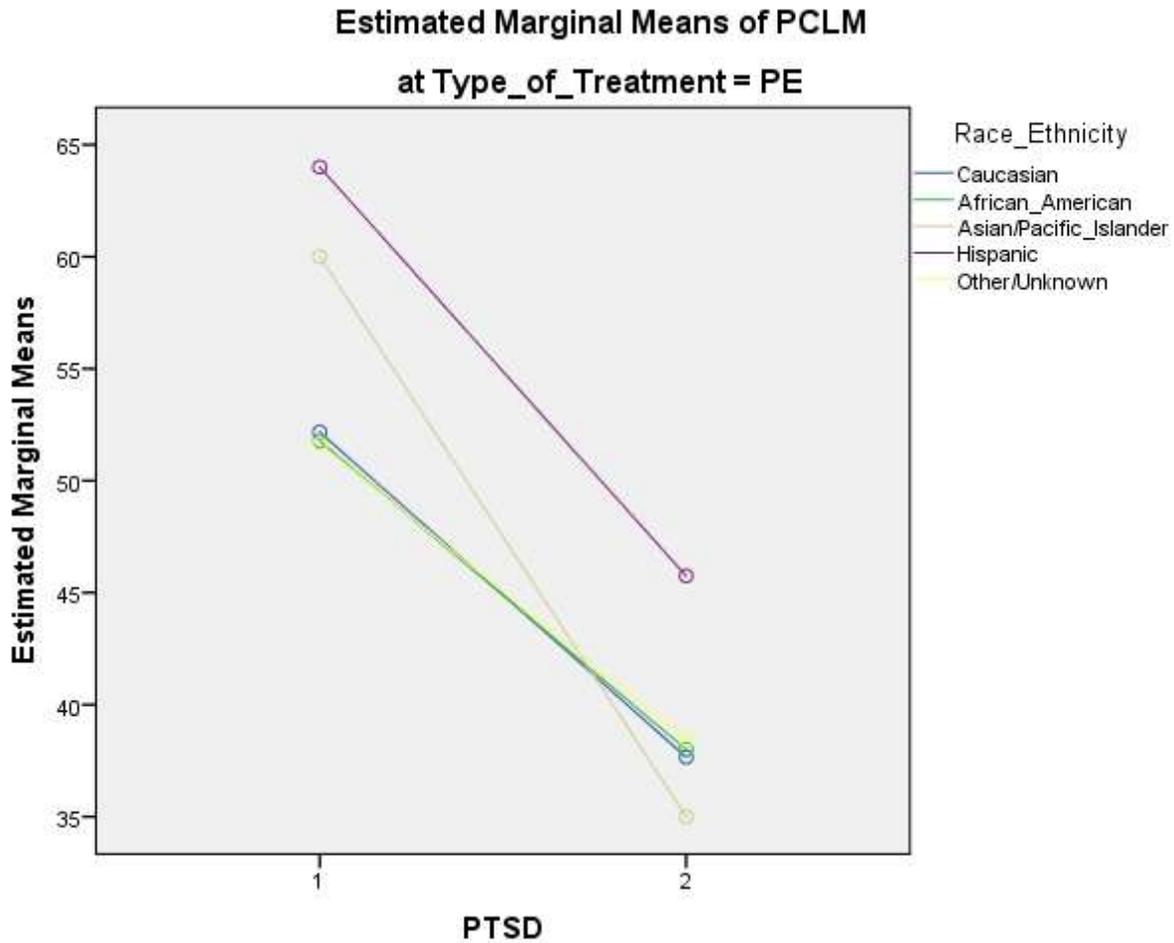


Figure 10. PCL-M changes by race in PE

- Hypothesis 3: There will be no difference in post-treatment depression outcomes (BDI-2 scores) between CPT and PE treatment conditions by race/ethnicity.

Treatment effects within groups: $F(1, 130) = 27.512, p = .000, \eta_p^2 = .175$. There was statistical significance on within subjects treatment effects.

Treatment modality effects between subjects: $F(1, 130) = 5.186, p = .024, \eta_p^2 = .038$. There was statistical significance between subjects in different treatment modalities.

Race effects between subjects: $F(4, 130) = .499, p = .773, \eta_p^2 = .014$. There was not statistical significance between subjects by race.

Treatment modality by race interaction effects: $F(4, 130) = .308, p = .872, \eta_p^2 = .009$. There was not statistical significance of interaction effects between treatment modalities by race.

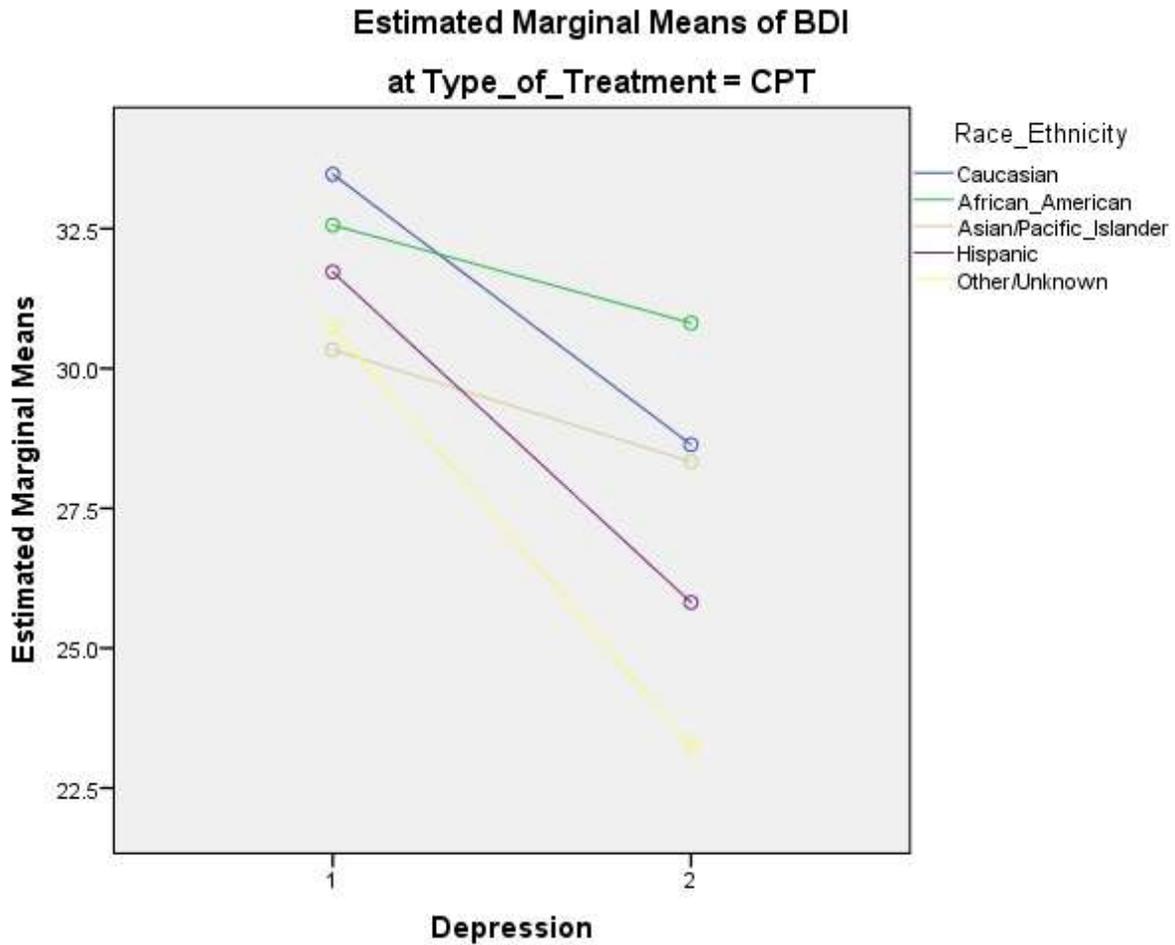


Figure 11. BDI-II changes by race in CPT

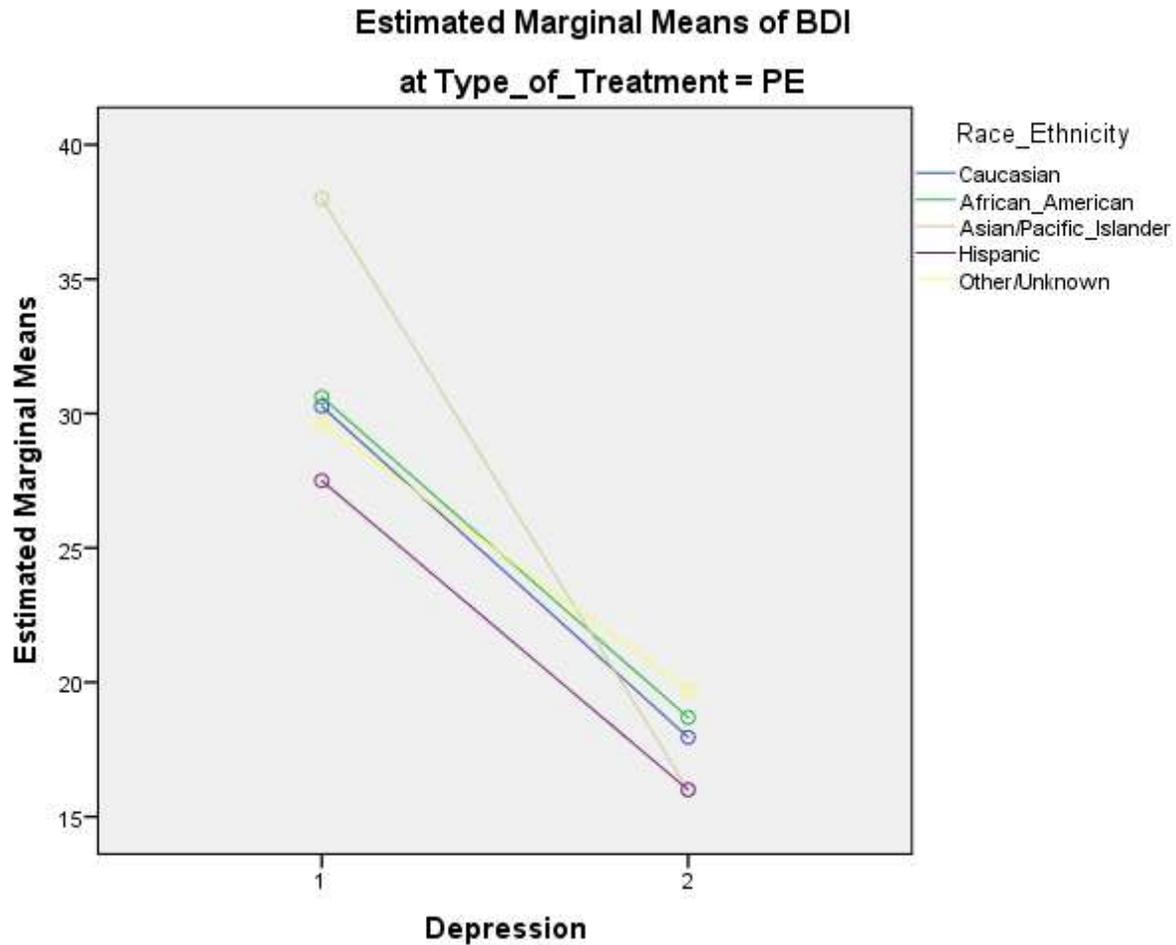


Figure 12. BDI-II changes by race in PE

- Hypothesis 4: There will be no difference in post-treatment anxiety outcomes (BAI scores) between CPT and PE treatment conditions. Both treatments will result in significant reduction in anxiety symptoms over time by race/ethnicity.

Treatment effects within groups: $F(1, 130) = 4.094, p = .045, \eta_p^2 = .031$. There was statistical significance on within subjects treatment effects.

Treatment modality effects between subjects: $F(1, 130) = .710, p = .401, \eta_p^2 = .005$. There was not statistical significance between subjects in different treatment modalities.

Race effects between subjects: $F(4, 130) = .446, p = .775, \eta_p^2 = .014$. There was not statistical significance between subjects by race.

Treatment modality by race interaction effects: $F(4, 130) = .248, p = .911, \eta_p^2 = .008$. There was not statistical significance of interaction effects between treatment modalities by race.

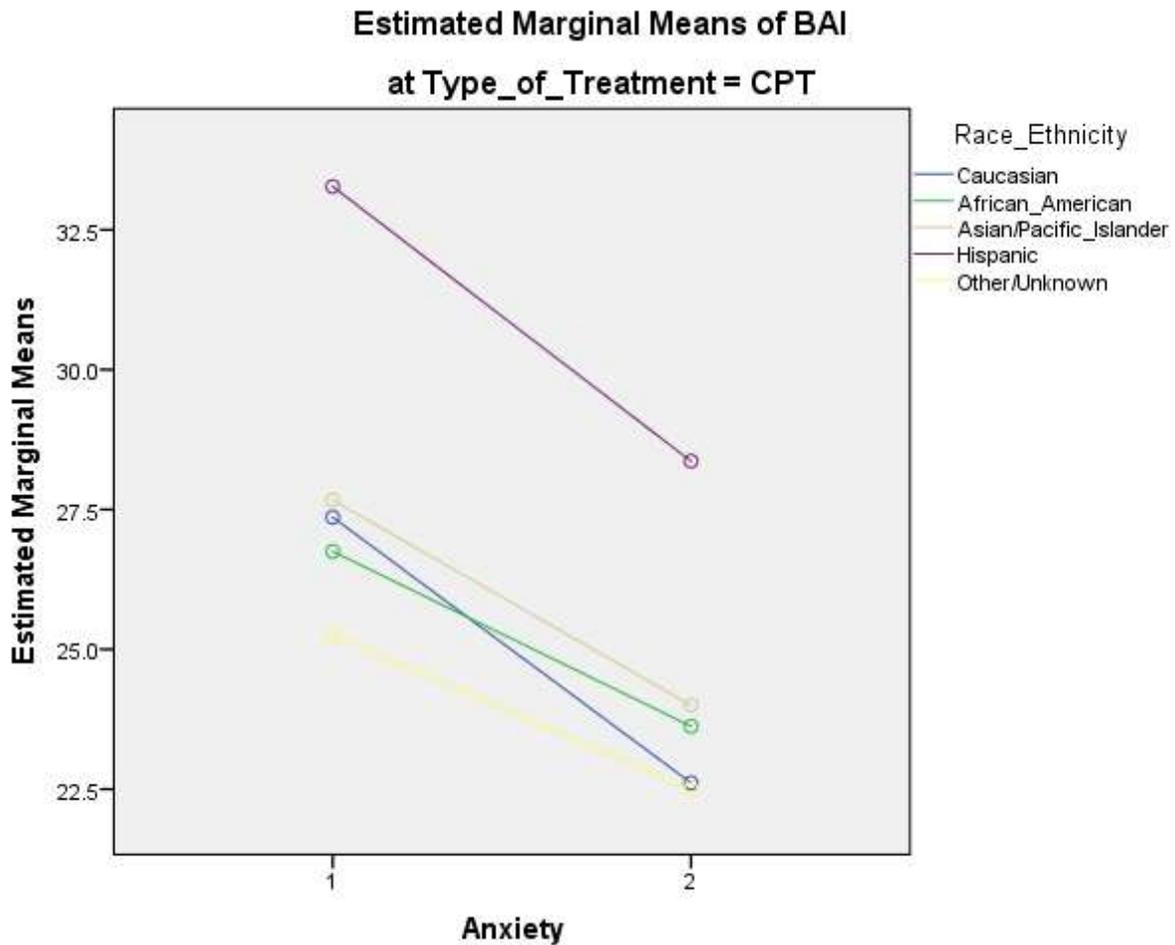


Figure 13. BAI changes by race in CPT

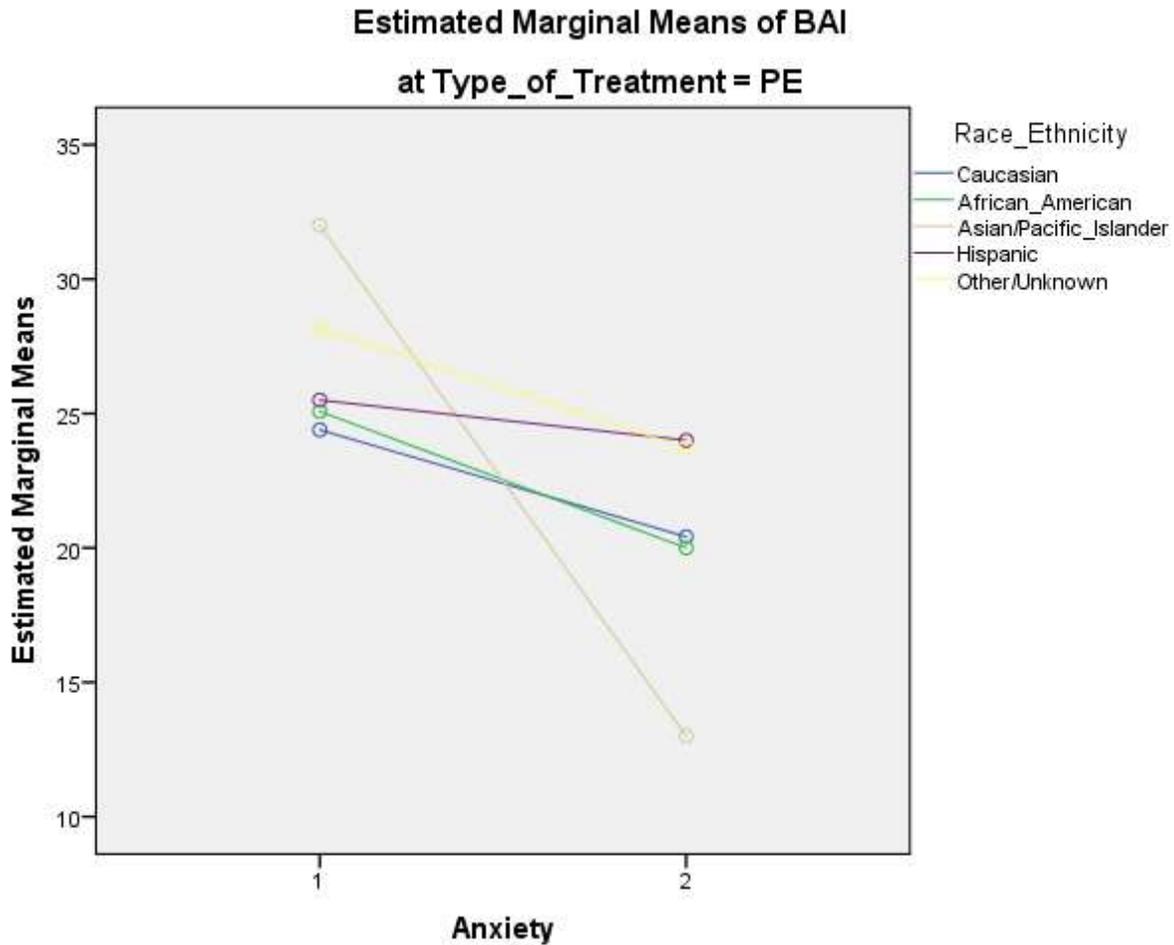


Figure 14. BAI changes by race in PE

- Hypothesis 5: There will be no difference in post-treatment alcohol use outcomes (AUDC scores) between CPT and PE treatment conditions by race/ethnicity.

Treatment effects within groups: $F(1, 130) = 1.157, p = .284, \eta_p^2 = .009$. There was not statistical significance on within subjects treatment effects.

Treatment modality effects between subjects: $F(1, 130) = .6387, p = .013, \eta_p^2 = .047$. There was statistical significance between subjects in different treatment modalities.

Race effects between subjects: $F(4, 130) = .1434, p = .226, \eta_p^2 = .042$. There was not statistical significance between subjects by race.

Treatment modality by race interaction effects: $F(4, 130) = 3.072, p = .019, \eta_p^2 = .086$.

There was statistical significance of interaction effects between treatment modalities by race.

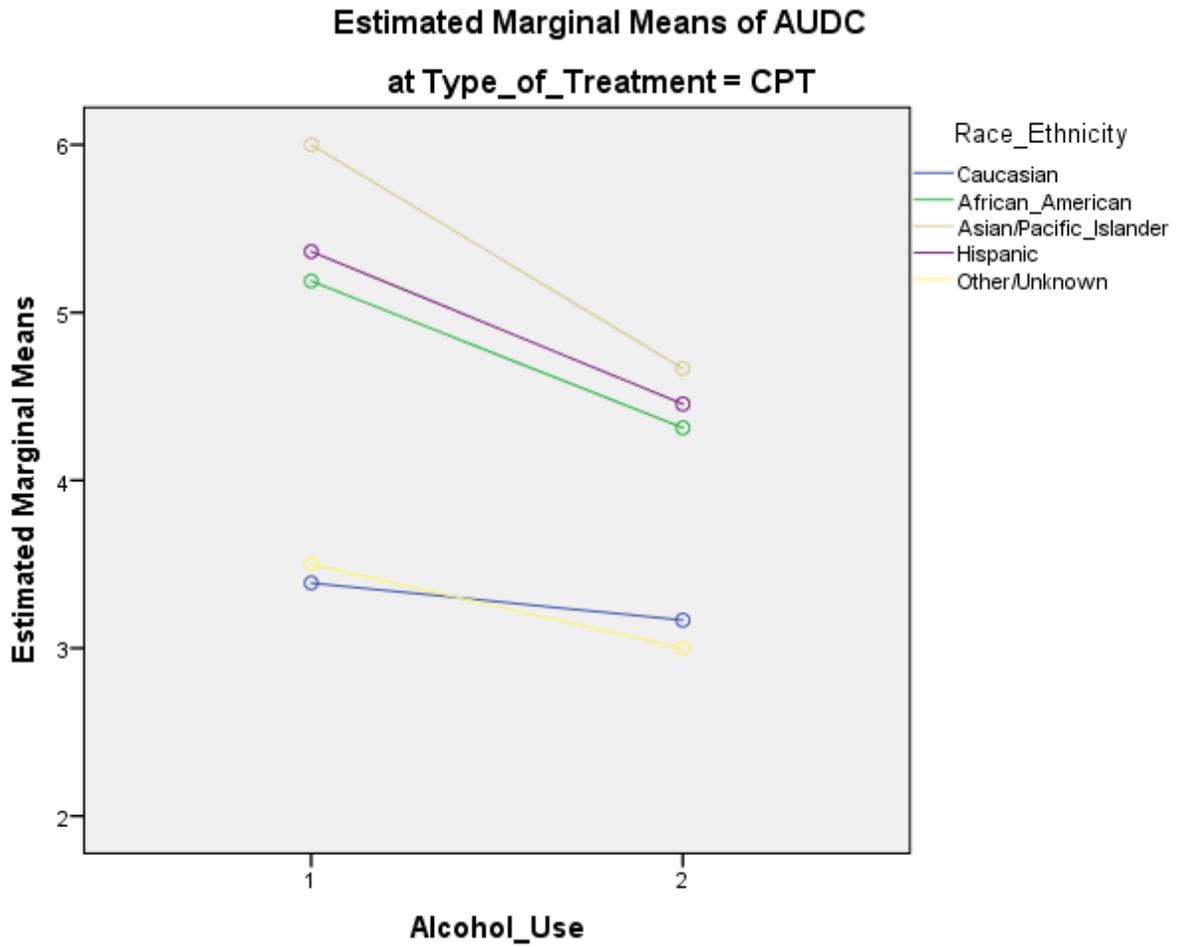


Figure 15. AUDIT-C changes by race in CPT

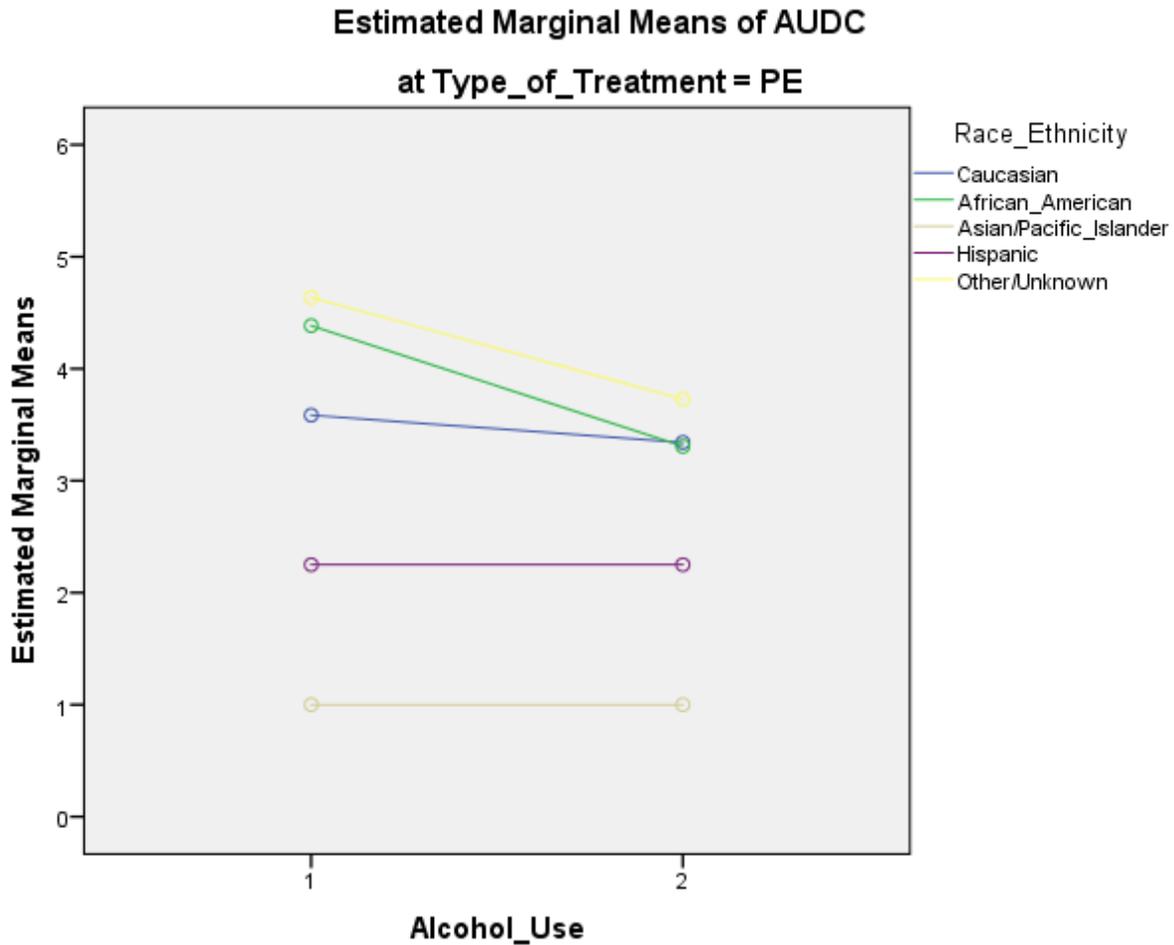


Figure 16. AUDIT-C changes by race in PE

- Hypothesis 6: There will be no difference in post-treatment pain outcomes (pain scale scores) between CPT and PE treatment conditions by race/ethnicity.

Treatment effects within groups: $F(1, 130) = .182, p = .670, \eta_p^2 = .001$. There was not statistical significance on within subjects treatment effects.

Treatment modality effects between subjects: $F(1, 130) = .637, p = .426, \eta_p^2 = .005$. There was not statistical significance between subjects in different treatment modalities.

Race effects between subjects: $F(4, 130) = .499, p = .736, \eta_p^2 = .015$. There was not statistical significance between subjects by race.

Treatment modality by race interaction effects: $F(4, 130) = .870, p = .484, \eta_p^2 = .026$. There was not statistical significance of interaction effects between treatment modalities by race.

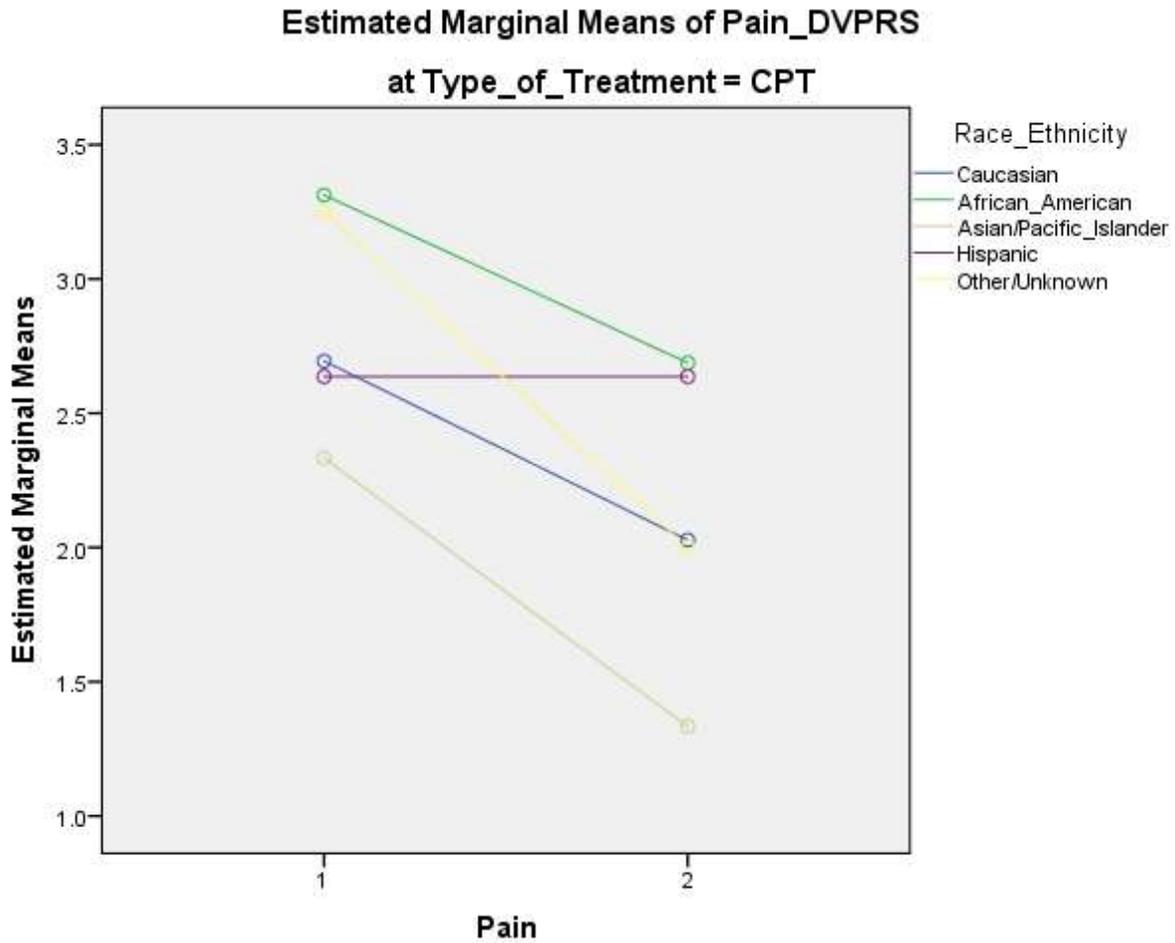


Figure 17. DVPRS changes by race in CPT

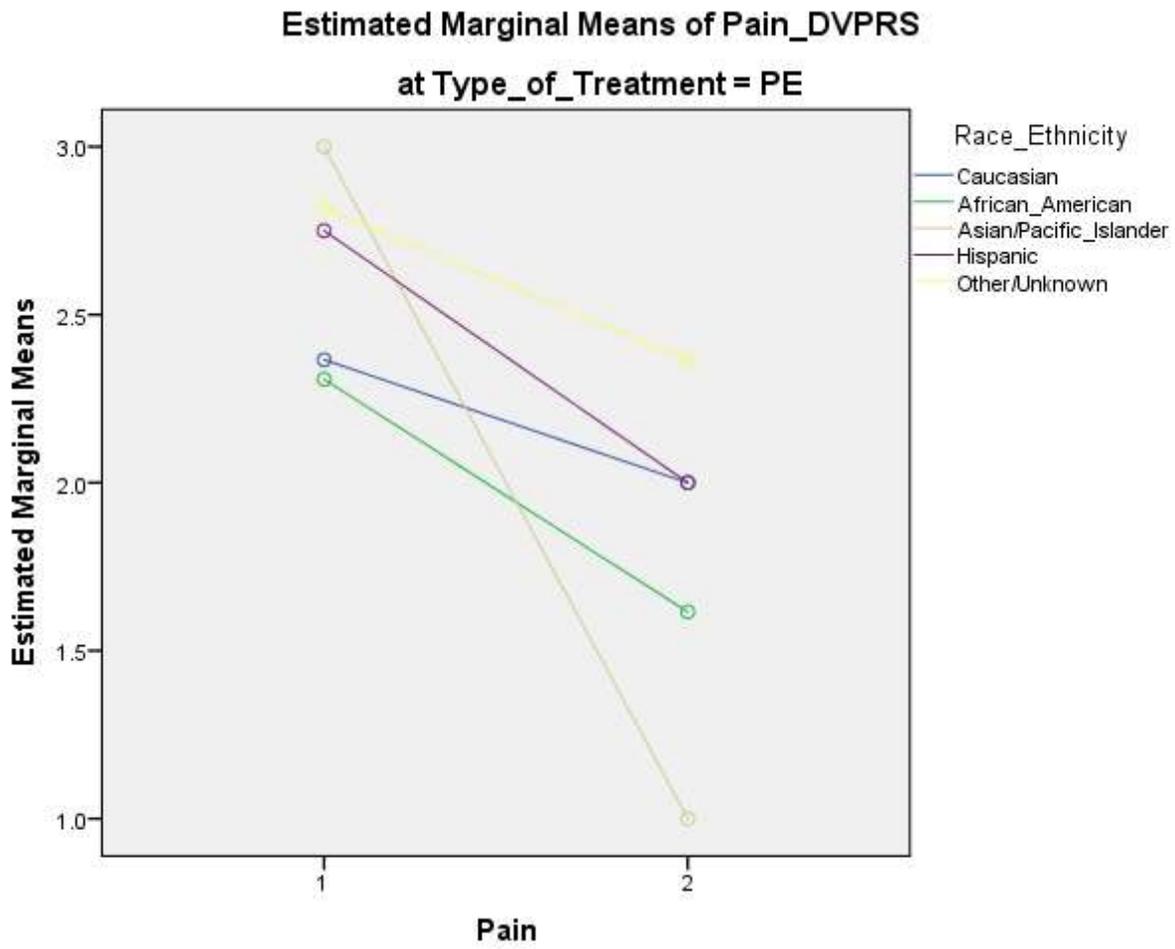


Figure 18. DVPRS changes by race in PE

Chapter V

Discussion

The final chapter of this dissertation will describe and summarize the main findings of this study. The results from statistical analyses will be discussed and compared to findings of previous literature. Additionally, scientific issues such as validity, potential future directions for research, and implications for clinical endeavors will be highlighted.

Summary of the Findings

Perhaps the most important finding of the current study is that both CPT and PE are effective treatments of PTSD for OEF/OIF/OND veterans with PCT. Furthermore, both treatments also demonstrated added benefits of reducing other commonly co-occurring symptoms including depression, anxiety, alcohol use, and pain. One interesting finding that was found in the current study is that the patients with higher initial mean PCL-M scores were more likely to participate in CPT than PE, but patients in both treatment groups had very similar decreases in total PCL-M scores at post-treatment which were statistically and clinically significant. The average change in PCL-M score for the CPT group was 15.543 points. Those in the PE group averaged a 14.529 decrease in PCL-M score. It is important to note that any change on the PCL-M greater than 10 points is considered clinically significant change (Monson et al., 2008; National Center for PTSD, 2014). This finding is consistent with previous literature that has demonstrated that not only are completed protocols of CPT and PE both effective empirically based treatments for PTSD, but both are about equally effective at reducing PTSD symptoms (Rutt, 2014).

The third research question explored whether there were differences in treatment outcomes for PTSD symptoms using the PCL-M between treatment groups by race/ethnicity. Consistent with previous findings, no statistically significant differences between groups by race were found. Both CPT and PE seem to be effective at treating PTSD with racially and ethnically diverse patient populations. Possibly worthy of additional study was the observation that there were more within group variations by race/ethnicity in the PE group than in the CPT group. Consistent with Rutt (2014), the current study found that Hispanic veterans endorsed higher initial PCL-M scores compared to other racial/ethnic groups. The current study also agreed with Tuerk et al. (2011) that Caucasian and African American veterans do not have significantly different outcomes in PE and that overall, race was not a significant predictor of PTSD symptoms. Future studies may seek to include a component that specifically looks more in depth at cultural factors that are relevant to the components of PE.

Findings in the current study indicated that there are statistically significant differences between CPT and PE in regards to outcomes for depression. BDI-2 scores for the CPT group decreased 4.33 points while scores decreased 11.96 points on average for the PE group. Those in the CPT group entered treatment with an average of about 2.5 points higher on the BDI-2. In other words, patients entered both treatment modalities with relatively the same levels of depression. It is notable that those who completed PE were more likely to have pre-treatment BDI-2 scores in the severe depression range which by the end of treatment were in the mild or moderate range. Those who completed CPT were more likely to start with moderate to severe depression and still have moderate depression at the end of treatment. Patients in the PE group had greater relief of depressive symptoms than those in the CPT group. The finding that those in the PE group had significantly greater decrease in depressive symptoms is surprising because

CPT grew out of CBT which is and EBP for depression. Further research on the use of CPT and PE for veterans with co-occurring PTSD and depression is worthy of further investigation. The results of the current study suggest that using PE rather than CPT for patients with severe depression is worthy of consideration.

The third researcher question focused on looking at between and within treatment differences by race on the symptom measures. Within the CPT group, Caucasians, Hispanics, and Other/Unknown groups had the largest decreases in depression symptoms. This suggests that CPT may improve depressive symptoms to a larger degree for those three groups than for African Americans and Asian/Pacific Islanders. Changes in BDI-2 scores by race in the PE group were about the same for all race/ethnicity groups except for Asian/Pacific Islander. There was only 1 Asian/Pacific Islander patient in PE group which leads to there being limited inferences that can be made about changes in depression for that racial/ethnic group from this study. In general, the results observed from the current study offer preliminary evidence that both CPT and PE are effective PTSD interventions that are likely to also lead to reductions in depressive symptoms.

The current study found that both CPT and PE were effective at reducing anxiety. It was observed that initial scores on the BAI were higher by 2.76 points for those who participated in CPT compared to PE. Statistical analysis found that both treatment groups experienced similar levels of pre to post treatment reductions in anxiety. Those who participated in CPT typically entered treatment with moderate anxiety and completed treatment still in the moderate anxiety range. However, those in the PE group began treatment with slightly lower, but still moderate, levels of anxiety on average yet at the completion of PE were more likely to be in the low

anxiety range. Veterans in the CPT group averaged a decrease on the BAI of 4.24 points.

Veterans in the PE group averaged a decrease on the BAI of 4.33 points.

When looking at the treatments with race included as a factor, Hispanics in the CPT group had much higher mean BAI scores than all other racial/ethnic groups at pre-treatment, but had similar point reductions in anxiety by post treatment. Hispanics were most likely to enter treatment with severe anxiety in the CPT group. In the PE group, the Asian/Pacific Islander individual entered treatment with the highest BAI score, followed by those in the Other/Unknown category. Follow up research may consider studying why Hispanics may enter CPT with higher levels of anxiety than other racial groups. Additionally, future research may ask why Asian/Pacific Islanders may engage in PE with higher anxiety rates and also have the greatest relief of anxiety

Additional research that includes qualitative information from both patients and clinicians who are deciding between the use of CPT and PE as treatment options would be a recommended direction for further study. Many clinicians and patients have noted that the anxiety, fear, and desire to avoid talking in great detail about traumatic experiences and memories is one reason why patients with higher initial anxiety may choose to engage in CPT rather than PE. However, the findings of this study may provide some evidence for the benefit of using PE with patients who are anxious.

It was noted that average AUDC scores decreased for veterans in both treatment groups. There were not enough female veterans in the current study to analyze if gender differences existed for changes in alcohol use, but this could be included in future studies to gain valuable information. Both treatment groups had average decreases of about .5 points on the AUDC. Those in the CPT group were more likely than those in the PE group to enter treatment with

higher AUDC scores greater than 4 which in males indicates a greater likelihood of alcohol abuse or dependence. Those in the PE group entered treatment more likely to disclose safer levels of alcohol use (scores below 4 on the AUDC). Not surprisingly, AUDC scores in the PE group showed less of a reduction at post-treatment likely due to the fact that patients were already more likely to not have problematic drinking habits than patients in the CPT group.

One surprising finding in the CPT group was that Asian/Pacific Islanders were most likely to endorse the highest mean scores on the AUDC. This group was followed by Hispanics and then Caucasians in order of heaviest alcohol use disclosure at pre-treatment screening. These three groups had mean pre-treatment AUDC scores usually between 5 and 6. They also had the greatest reduction in mean AUDC scores by post-treatment, however they were still likely to endorse lower levels of problematic drinking habits with post-treatment mean AUDC scores around 4. In the PE group, Other/Unknown and African American racial/ethnic groups endorsed the highest mean AUDC scores at pre-treatment which tended to be mean scores between 4 to 5. At post-treatment, these two groups typically had mean AUDC score reductions of about 1 point. Caucasians, Hispanics, and the Asian/Pacific Islander in the PE group had almost no changes in their mean AUDC scores from pre to post treatment. It is likely that CPT is more likely to correlate with or result in greater reductions in alcohol use than PE when patients screen positive for hazardous drinking habits.

Both CPT and PE participants reported that their pain as reported on the DVPRS decreased by about 1 point from pre to post treatment. The majority of participants entered treatment reporting mild pain which was rated between 0-4 on a 10 point scale, the DVPRS. Those in the CPT group tended to have pain scores that were about .5 point higher than patients in the PE group. Although data was not collected on medications prescribed, it was noted during

chart review that many patients were already involved in other forms of pain management such as by prescription medication or physical therapy. Future research on the relationship and treatment of pain throughout the recovery process from mental health conditions like PTSD, depression, anxiety, and substance use is an area lacking in research. There were also some concerns brought to light that when assessing pain it may be important to specifically differentiate pain ratings for emotional versus physical pain which the DVPRS does not explicitly do.

When looking at changes in pain within and between treatment groups by race, the results were mixed to say the least. In the CPT group, there were decreases in pain for all racial/ethnic groups except for the Hispanic group reported no change in their mean DVPRS scores. Other racial groups in the CPT group reported decreases in pain between .5 to about 1 point from pre to post treatment. In the PE group, African Americans and Hispanics reported the largest decreases in pain of about 1 point. A general interpretation of these results is that CPT seems to be more effective in the current study at reducing pain scores, except for Hispanics for which PE may be more effective.

The main summary of the results of this study are that both CPT and PE are effective PTSD treatments for veterans with the PCT. It is critical to consider contextual and patient factors like race/ethnicity in addition to the constellation of additional symptoms explored in the current study that patients endorse when discussing treatment options between CPT and PE. Furthermore, limitations that patients may have because of their TBI may impact which PTSD treatment protocol is possible to use or if adjustments to the protocol may need to be considered for issues such as physical or sensory deficits. Providers who choose to use either CPT or PE

with OEF/OIF/OND veterans with PCT can feel confident that either protocol will be effective treatment for PTSD as well as other symptoms this population frequently endorses.

Limitations

Validity This study intended to investigate or predict clinical outcomes. In essence, this could be considered a type of effectiveness study that looked at pre to post treatment changes. This study aligns with a quasi-experimental design because existing data was retrospectively analyzed. Because data had already been collected prior to this study, participants had not been randomly assigned to treatment conditions or groups which is a limitation to internal validity. Random assignment would increase the validity of this study by reducing selection bias. Initially, this study hoped to include a control group of veterans who met diagnostic criteria for PCT and had completed the necessary assessments. However, it quickly became apparent that those who would have been included in the control group tended to be extreme outliers with regards to symptoms severity, especially substance use and suicidal ideation, and many were noted to have history of psychotic related episodes. Previous studies that have included control groups have found absolute efficacy of both CPT and PE which is congruent to what the current study found as well. The participants in this study were also 95% male and 5% female and not evenly distributed in the two treatment modalities by race. This greatly limits what could be inferred about female veterans or differences by race/ethnicity with PCT who engage in either CPT or PE. Overall, this study has a few design flaws that could be addressed in through research design methodology or other statistical adjustments in future research.

An area of strength for the current study is that it uses retrospective clinical data collected from the records of real veterans who sought services throughout the US at VA healthcare settings over a span of more than 10 years. Using data collected from real-world clinical settings

increases the current study's external validity. The researcher included 140 veterans, 70 in CPT and 70 in PE, in the current study to ensure adequate statistical power. The results of this research have generalizability to OEF/OIF/OND veterans with similar demographic backgrounds and mental health diagnoses as those included in the current study.

Unaccounted for variables. While some variables were accounted for in this study that previous literature may not have included, there are more variables that could have been explored through additional analyses which may be able to be completed through additional requests or chart review run on the existing dataset. For example, pharmacotherapy and length of duration (i.e. in months) was not controlled for in this study, but should be addressed in future research. Other data that could produce helpful findings may include employment and disability status beyond service connection rating. It is also recommended that personality factors, trauma severity such as complex chronic trauma, adhering to homework, time between trauma and initiation of therapy, and other motivational factors be considered. It may be useful to consider differentiating by level and type of brain injury as well as therapist factors too such as type of degree, level of training, and years of experience. Future research may benefit from interdisciplinary data that may be relevant to factors such as genetics or other neurological and biological facets of the diagnoses that were included in this study including but not limited to information from imaging studies, vital signs, and medical labs.

Testing effects and limitations of self-report measures. The use of self-report style measures is a limitation of this study. Effort was taken to ensure that valid and reliable self-report measures were used, but only using self-report measures may have limited the data. Some literature has found that self-report measures may be biased because of response styles that typically err on the side of social desirability. It is possible that some participants may not have

fully disclosed the most accurate severity levels of their symptoms. This could be due to a variety of reasons, but one example of an issue that is a problem within VA settings is that patients who receive service connected benefits may not be motivated to report improvements in symptoms if those improvements could mean a reduction in service connected disability benefits. Future studies may want to consider including qualitative analysis of other forms of data such as objective measures, clinical notes, or informational interviews completed by family members or friends.

Implications for Practice

The current study has a higher level of external validity which is beneficial when generalizing the findings into real-world practice settings when trauma-focused therapies such as CPT and PE are conducted by mental health practitioners with OEF/OIF/OND veterans with PCT. The findings indicate and are consistent with previous literature that CPT and PE are both effective in treating PTSD. The current study extends the previous literature to include some evidence for the use of CPT and PE with PCT veterans, especially those who are current war-era male veterans with PCT. Additionally, this research looked into the records of patients with multiple co-occurring mental health conditions beyond PTSD including depression, anxiety, alcohol use, and pain to gain insight into how CPT and PE may be beneficial to those who present to therapy with multiple sets of symptoms. This study might also serve to point out to clinicians that assessing for common symptoms, like those measured in this study, are important to consider including at least at the time of screening before engaging in treatment to ensure one is making the best clinical recommendations for patients and again at post-treatment to greatly increase the possibility of gaining research on areas of clinical concern.

Other relevant clinical issues that stood out during chart review included high therapy drop-out rates for OEF/OIF/OND veterans with PCT. This finding is consistent with reports from previous literature that a large percentage of veterans do not complete either PE or CPT protocols and tend to drop out of therapy before the 6th session if there has been little or no improvements on PCL scores. The results of this study could be communicated to patients to provide them with an understanding of how much improvement in certain symptoms related to PTSD, depression, anxiety, alcohol use, and/or pain they might expect if they complete the treatment protocol. The idea of sharing clinical outcome data with patients is consistent with the first idea about common factors that Jerome Frank's book, *Persuasion and Healing*, points out. Frank (1961) wrote about 4 common elements or factors to effective psychotherapy: (1) an expectation that treatment will work or help to alleviate symptoms (2) there is a therapeutic relationship between therapist and patient (3) the treatment contains a rationale that includes an explanation for the symptoms being experienced and describes a ritual (treatment) for healing those symptoms, and (4) both the patient and therapist adhere to and actively participate in the treatment's protocol. With the above reference in mind, it is logical that both CPT and PE would be effective treatments for PTSD and other mental health disorders with overlapping symptoms.

Conclusion

The results of this study are generally in agreement with and extend the current literature regarding the effectiveness of CPT and PE. Both of these interventions consistently demonstrate improvements in PTSD symptoms over time. Furthermore, these treatments show promise for helping to reducing symptoms that commonly co-occur with PTSD such as depression, anxiety, alcohol use, and pain. While chart review conducted during the current study revealed that drop-out rates continue to be problematic for both therapies investigated, the overall findings that both

CPT and PE are effective in reducing PTSD symptoms equally well across multiple racial and ethnic categories is encouraging. Clinicians who choose to be trained in, use, and adhere to the protocols of CPT and/or PE can feel confident that either of these EBP's for PTSD are likely to improve the lives of patients seeking treatment for PTSD.

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