

Evaluating Brain Boosters
A New Cognitive Enhancement Program
for Treating Post-Traumatic Stress Disorder and Depression

by

Christina M. Walter

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Graduate Supervisory Committee:

Nicole A. Roberts, Chair
Mary H. Burleson
Paul Miller

ARIZONA STATE UNIVERSITY

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ABSTRACT

Post-Traumatic Stress Disorder (PTSD), depression, and insomnia are prevalent among United States (US) military veterans. This study investigates whether Brain Boosters, a new cognitive enhancement group therapy, improves symptoms of PTSD, depression, and insomnia among veterans completing the groups.

The study population includes 64 US military veterans treated in the setting of the Veterans Affairs (VA) Health Care System in Phoenix, AZ. Group members were US military veterans, age 22 to 87 (mean age=53.47), who had served in or after World War II (WWII), who sought mental health care at the Phoenix VA from 2007 through 2011. Participants were treated with Brain Boosters therapy. They completed measures of mental-health related symptoms before and after this therapy. Participants were assessed pre and post group with the PTSD Checklist for military personnel (PCL-M), the Patient Health Questionnaire (PHQ-9; a measure of depression symptoms), and the Insomnia Severity Index (ISI).

Statistical analyses were done with paired samples t-tests and McNemar's tests, using SPSS. The hypotheses were that symptoms of PTSD, depression, and insomnia would show statistically significant improvement with Brain Boosters therapy. Results supported the hypotheses that symptoms of PTSD and depression would improve significantly. Insomnia did not show significant improvement.

The results showed the mean PCL-M score was 54.84 before Brain Boosters therapy and 51.35 after ($p= 0.008$). The mean PHQ-9 score was 15.21 before Brain Boosters therapy and 13.05 after ($p= 0.002$). The mean ISI score was 15.98 before Brain Boosters Therapy and 14.46 after ($p= 0.056$). Although this is a

nonrandom, uncontrolled trial, findings nevertheless suggest that Brain Boosters may be an effective therapy to reduce PTSD symptom severity and depression symptom severity. This may be especially important for veterans seeking alternatives to pharmacological intervention or traditional therapeutic interventions.

DEDICATION

I dedicate this thesis in memory of my Grandpa, Don Baker and Grandma, Anna Marie Walter.

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Evaluating Brain Boosters

A New Cognitive Enhancement Program

for Treating Post-Traumatic Stress Disorder and Depression

Post-Traumatic Stress Disorder (PTSD), depression, and insomnia are prevalent among United States (US) military veterans (Hoge et al., 2004; Germain, Buysse, & Nofzinger, 2008). Epidemiological surveys indicate that for Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) veterans, high rates of PTSD, depression, and related conditions are present (Pietrzak et al., 2010). Approximately 25% of OEF/OIF veterans receiving care at VA Health Care Systems meet criteria for one or more distinct mental health diagnoses. The most common diagnosis is PTSD (Bushnell and Goren, 2011). This study investigates whether Brain Boosters (BB), a new cognitive enhancement group therapy, improves symptoms of PTSD, depression, and insomnia among veterans completing the groups. The goal of this research was to assess the effectiveness of BB.

Background

Brain Boosters

Development of program. Brain Boosters was developed by Dr. MaryLu Bushnell, Psy.D. and Dr. Kathleen Goren, Ph.D., in 2007. The genesis of BB occurred when demand from OEF/OIF/Operation New Dawn (OND) veterans with traumatic brain injury (TBI), in need of cognitive rehabilitation, support therapy, and education, arose (Bushnell & Goren, 2011). This population of veterans presented post deployment with a rate of TBI between 10% and 23% in

returning OEF/OIF veterans (Reisinger, Hunt, Burgo-Black, and Agarwal, 2012). Neuropsychological evaluations were identifying cognitive deficits with unclear etiologies. Many evaluations yielded no signs of cognitive dysfunction, but veterans were experiencing daily difficulties in functioning. Existing treatment for mild cognitive problems was found to be lacking. BB was originally designed for OEF/OIF veterans with blast exposure (Bushnell & Goren, 2011). A need was identified and these neuropsychologists sought to treat it in a creative, unique, way that had not been done before. Given strong enthusiasm for BB, it was opened to all interested veterans.

Veterans self refer to these groups and referrals are made from neuropsychologists, mental health workers, primary care physicians, social workers, and recruitment flyers. Caregivers, spouses, or other friends/family members who provide the veteran with support are encouraged to attend (Bushnell & Goren, 2011).

Program rationale. BB seeks to provide education, “exercise” for the brain, tools to re-train oneself in daily activities of life, and an improvement in cognition and memory. The educational component of BB emboldens participants to obtain an increased understanding of various etiologies of cognitive functioning (Bushnell & Goren, 2011). One example of this, taught in BB, is neuroanatomical structure and functioning. Research indicates that education is the first step in intervention for residual deficits incurred from TBI (Khan, Bagueley, & Cameron, 2003). The content of the BB sessions are described in the Method.

Implementation of compensatory strategies is taught to participants in BB. The information and tools provided from group can be applied to daily life. Participants are rallied to identify personal strengths to compensate for deficits. Finally, practice skills are taught through experiential activities to improve cognitive, personal, and psychological functioning (Bushnell & Goren, 2011).

The creators note that similar programs have shown success in addressing the needs of this population, including the deleterious effects on psychiatric and cognitive functioning, a need for increased life satisfaction, and increased use of compensatory strategies (Bushnell & Goren, 2011). In my review of the literature I did not find any treatments quite like BB. The creators of BB (Bushnell & Goren, 2011) conjectured the following, “By providing Psychoeducation and teaching both compensatory strategies and cognitive rehabilitation strategies, it is hypothesized that the veteran will develop habits that will promote continued cognitive growth following completion of the program” (p.7). Along with the confidence and self-efficacy gained through participating in this group, veterans are presented with connections to resources to help sustain and further their growth. Referrals for resources within and outside of the VA for further education, support, and rehabilitation are offered.

Overview of program. The goal of BB is to assist veterans in learning to help themselves to re-train their brains to function more efficiently. It is geared towards veterans with perceived cognitive deficits, regardless of etiology or level of impairment. Each session has a didactic and experiential (fun, computer, technology etc.) component. Strength based focus and generalization to daily life

are pillars of BB. Groups are designed to be meaningful, practical and fun (Bushnell & Goren, 2011).

Prior to beginning sessions, pre measures are completed and collected for baseline assessments of PTSD, depression, insomnia, attention and memory, combat exposure, and strengths and weaknesses. Post measures are collected after the tenth session to help assess the effectiveness of BB. Symptom severity scores are measured from the outset of BB to the culmination. Assessing the effectiveness of BB and other treatments for PTSD and comorbid disorders or features is so important because veterans depend on this knowledge to inform higher quality treatment and practice guidelines. This unique blend of cognitive enhancement, psychoeducation, self-efficacy, resilience, positive coping, social support, and CBT like therapy is unlike any other and an exciting advancement in the field.

The present study focuses on the effectiveness of BB in reducing symptoms of PTSD, as well as symptoms of depression and insomnia, which are highly comorbid with PTSD. Therefore, the sections below review PTSD symptoms, neurobiological correlates, and treatments. Factors that are potential mechanisms, through which BB may relate to symptom reductions, such as through increased problem-focused coping, social support, and self-efficacy, are also discussed.

PTSD Criteria, Symptoms, and Consequences

PTSD diagnostic criteria. Veterans are particularly vulnerable to PTSD, especially those who have been exposed to combat. PTSD is characterized by

intrusive recollections of the traumatic event and avoidance. To meet clinical significance for a diagnosis of PTSD, multiple criteria must be met, as assessed by a clinician. The diagnosis of PTSD requires exposure to a traumatic event and symptoms from each of three symptom clusters: intrusive recollections, avoidant/numbing symptoms, and hyper-arousal symptoms (DSM-IV-TR, 2000). These symptoms are marked by psychological and physiological consequences. Next, the two criteria mentioned above include experiencing, witnessing, or being confronted with an event that caused or had the potential to cause death or serious injury to oneself or others, coupled with feelings of horror, intense fear, and helplessness (DSM-IV-TR, 2000). These two criteria represent Criterion A, which concern the stressor itself. PTSD symptom duration (Criterion E) is determined as acute or chronic and requires that symptoms from the three symptom clusters have been present for at least a month. Finally, global functioning (Criterion F) is assessed, which relates to the veterans' ability and aptitude to function in the workplace, individually, and in social settings with peers, coworkers, family, and friends; even in everyday settings like buying groceries amongst strangers.

Symptoms and consequences associated with PTSD. Dekel and Monson articulate an important point; individuals who do not have a diagnosis of PTSD may experience a range of sub-diagnostic symptom severity. Consistent with this, many studies examine PTSD symptom severity rather than diagnosis (Dekel and Monson, 2010). Potential symptoms or consequences of PTSD experienced by

the individual are outlined in the next paragraphs, as stated by Kennedy and colleagues (2007).

Cognitive symptoms include confusion, memory impairment, forgetfulness, impaired concentration, attention difficulties, learning and decision making problems, slower processing speed, and the potential consequence of feeling overwhelmed with previously simple tasks. Behavioral symptoms include impaired work and school performance, reduced relational intimacy, and a potential consequence of relational conflict from social withdrawal, and alienation. Somatic symptoms include headaches, exhaustion, insomnia, and exaggerated startle response, along with hyperarousal, musculoskeletal, gastrointestinal, and cardiovascular disorders (Kennedy et al., 2007).

These symptoms are only a fraction of those associated with PTSD. After studying PTSD and health outcomes, Jakupcak, Luterek, Hunt, Conybeare, and McFall (2008) impart, even after accounting for demographic factors, combat exposure, chemical exposure, and health risk behaviors, PTSD is significantly associated with poorer health.

Veterans with PTSD face numerous obstacles to regain their mental health. PTSD has debilitating effects on individuals' family and social functioning (Tiet et al., 2006). Daily life can become a struggle, in which the individual and their family suffer.

Prevalence of PTSD

In the United States, a nationally representative study conducted by Kessler and colleagues found that over the life course, 5% of men experience PTSD, while 10% of women do; whereas, almost half of adults report having experienced a traumatic event. Other lifetime prevalence studies estimate a current PTSD prevalence rate of 15% among Vietnam veterans, 2%-10% among Gulf War veterans, and 3%-4% among civilians (Hoge et al., 2004). Wolfe, Keane, Kaloupek, Mora, and Wine (1993) obtained, that 15% of male, Vietnam theater veterans continue to suffer from PTSD. This disparity may be explained by a combination of individual differences, environmental influences, and genetic predisposition. In striking comparison, a national survey of Vietnam veterans conducted by Kulka and colleagues reported that 31% of males and 26% of females had PTSD from their military service (Ozer & Weiss, 2004).

This illustrates the exceptional number of veterans, as compared to civilians, who experience PTSD. Of the veterans studied in meta-analyses by Ozer and Weiss, the strongest predictor of PTSD was peritraumatic dissociation, part of the intrusive recollection symptom cluster. Peritraumatic dissociation refers to unusual experiences during or immediately after the trauma, such as an altered sense of self, time stretching out, or the sense that things around oneself are not real (Ozer & Weiss, 2004). Sensations like these are representative of many other adverse symptoms associated with PTSD.

PTSD and Combat Exposure

As a population, veterans are at heightened risk for developing PTSD. Those who have been in combat and personally witnessed the hell of war, as General Sherman said, are even more vulnerable to acquire the disorder. Vietnam veterans with the greatest exposure to combat had the highest rates of PTSD. Likewise, Gulf War veterans with greater exposure to combat had a higher likelihood of PTSD (Stein et al., 2005). Rodrigues and Renshaw (2010) point out that service members' PTSD symptom severity scores are significantly positively related to their amount of combat exposure. As discussed in the PTSD and Social Support section below, greater social support is one of the strongest correlates for lower PTSD symptom severity. Fascinatingly, this is particularly true for veterans exposed to combat (Erbes, Polusny, MacDermid, & Compton, 2008). The higher the exposure to combat, the greater the potential for payoff from tools like social support.

Studies have been conducted to determine the differences between combat exposed veterans with PTSD and without PTSD. In a study by Blake, Cook, and Keane (1992) neither group reported using a significantly different amount of problem-focused coping. However, veterans with PTSD relied more on emotion-focused coping, including escape avoidance and accepting responsibility, as compared to veterans without PTSD. Wolfe et al. (1993) divided soldiers into four groups: high combat/high symptoms, high combat/low symptoms, low combat/high symptoms, and low combat/low symptoms. The high symptoms groups reported using significantly higher levels of mental escapism,

externalization, and extensive behavioral avoidance, more so than either of the low symptom groups. The results of this study indicated that soldiers exposed to high combat reported significantly greater distress and endorsed increased cognitive analysis of trauma. Neither combat exposure nor war zone stressors were the strongest predictors of functioning. Instead, a variable reflecting detrimental coping strategies was the strongest predictor. Veterans who endorsed externalization, extreme avoidance, and wishful thinking were significantly more symptomatic than veterans who were primarily reliant on active forms of coping.

The implications of these findings warrant therapy designed to encourage use of problem-focused coping, rather than emotion-focused approaches such as avoidance, as mentioned in the coping section, below. It is evident that increased combat exposure leads to increased PTSD and comorbid symptom severity. Thus, combat exposed veterans, especially those with PTSD and comorbid features need treatment to encourage the formation of problem-focused attitudes and actions.

Physiological Mechanisms of PTSD

The physiological mechanisms behind PTSD contributing to psychological states, such as dissociation are important to grasp before exploring the adverse symptoms of the trauma induced disorder. Rauch, Shin, and Phelps (2006) point out that although the origin of PTSD has historically been defined by the traumatic event associated with the disorder, evolving models of pathogenesis have brought to light the potential interaction between intrinsic individual vulnerabilities, the traumatic event or events, and past experiences. A

neurocircuitry model proposed by Rauch and colleagues posits that hyperresponsivity occurs within the amygdala to threat-related stimuli. The ventral/medial prefrontal cortex (vmPFC), subcallosal cortex, orbitofrontal cortex (OFC), and hippocampus exhibit poor top-down governance over the amygdala, as a result of the trauma. These inadequacies in governance explicate the deficiencies experienced by individuals with PTSD for the following reasons: When the amygdala is not capable of controlling hyperresponsivity, the flood gates for hyperarousal are opened, explaining the indelible quality of emotional memory for the trauma; next, inadequate vmPFC functioning inhibits the capacity to suppress attention and response to trauma cues, as well as deficits in extinction; third, decreased hippocampal volume, and in turn function, underlie deficits in identifying safe contexts, and explicit memory use. PTSD can be conceptualized as a fear-conditioning process, whose toll is visible in neurological structure and functioning (Rauch et al., 2006). In support of the fear-conditioning process, Vaiva and colleagues agreed that in the immediate aftermath of a trauma, a surge of catecholamines, including adrenalin and noradrenalin are released. These activating neurotransmitters are triggered by the central nucleus of the amygdala and locus coeruleus, two key brain structures of the ‘neurocircuitry of fear’. Prolonged adrenergic activation increase risk for PTSD through two avenues: increased fear conditioning and overconsolidation of memories of the traumatic event (Vaiva et al., 2003). Trauma induced changes in neurophysiologic and psychological functioning, as described above, can have lasting effects on the brain, the individual, and their families and support systems.

PTSD Treatment

Several types of therapeutic interventions have been proven effective at moderating the long term consequences of PTSD, including: Cognitive Processing Therapy (CPT), Cognitive Behavioral Therapy (CBT), Prolonged Exposure Therapy (PE), Eye Movement Desensitization and Reprocessing Therapy (EMDR), Virtual Reality Exposure Therapy (VRE), and Group Therapy. The treatments above are a fraction of those available.

A variety of individually focused treatment options exist for PTSD. A study by Carlson, Chemtob, Rusnak, Hedlund, and Murakoa (1998) found that EMDR evidenced significant improvement of PTSD symptoms in combat veterans at a three month follow up; greater improvement than those given routine care or bio-feedback assisted relaxation. Virtual Reality Exposure Therapy (VRE) is a promising treatment. Reger and Gahm (2008) believe the capacity for the incorporation of new information, due to enhancement and activation of the patient's fear structure by a multisensory computer experience is a potentially powerful clinical tool to treat PTSD. Objective assessment showed a decline in patient reported PTSD symptom severity. The incorporation of new information is necessary to promote growth of more positive neuronal networks, resulting in new, more positive thought processes, moving away from engrained, negative thought processes.

A monthly gathering at Walter Reed was designed (Musgrove, 2007) for recovering soldiers to socialize and use VRE gaming technology. One veteran mused, "When you're just sitting in your room thinking about what happened, it

drives you crazy... this is something to get your mind off your sorrows... I wish they had it every week.” (p.2) EMDR and VRE are less conventional methods of treatment, versus more established treatment options like CPT, PE, and CBT.

CPT is a very popular line of treatment for PTSD. Chard, Schumm, Owens, and Cottingham (2010) endorsed the consensus by the International Society for Traumatic Stress Studies Practice Guideline, that CPT is a best practice model. They assert that CPT has strong empirical evidence for treating symptoms of PTSD, trauma related distress, and depression. This is the case across populations and treatment settings, including veterans seeking care. CPT includes both cognitive and exposure components, borrowing from CBT and PE.

Interestingly, CPT has shown statistically significant improvements compared to PE for trauma related aspects of guilt like lack of justification and hindsight bias. During CPT, a range of emotions resulting from traumatization are focused upon, as well as anxiety, allowing for the veteran to attempt to emotionally process the event and regain control (Monson et al., 2006). Like CPT, CBT is also helpful for allowing patients to regain control.

Knaevelsrud and Maercker (2007) advocate that CBT is a powerful and effective method of treating PTSD. CBT uses techniques and strategies to help patients correct negative and often distorted views. Underlying maladaptive beliefs that give rise to negative and distorted cognitions are targeted (Elkin et al., 1989). These include views about themselves, the world, and the future. If CBT and CPT, a form of CBT are not successful in treating symptoms of PTSD, Prolonged Exposure is another common method of therapeutic intervention.

PE is a somewhat more radical approach to treatment; although, a potentially effective one. While undergoing PE therapy, patients may be asked to revisit the trauma associated with their PTSD symptoms. This can be done by talking in the first-person, present tense, about what they experienced. Also, by focusing on what they could smell, hear, feel, see, and taste. Finally, by remembering their response, the meaning they may have found in the event and a host of other feelings linked to the trauma. Whatever has generated the most intrusive thoughts is addressed and visited with the therapist, head on. Trauma related stimuli are presented to the patient in the hope of lessening or even extinguishing the fear and intrusion of trauma related cues (Marks, Lovell, Noshivani, & Livanou, 1998). While the treatments listed above can be thought of as primary therapeutic tools to lessen PTSD symptom severity, an integral part of achieving wellness lies with the use of secondary therapeutic tools. Most importantly, secondary tools include social interaction, social recognition, and social support. Also, feelings of self worth and self efficacy gained through psychoeducation and other outlets. Finally, coping style, an often under recognized tool, wielded to overcome PTSD, along with attribution style. Coping style, social support, familial support, peer support, self-efficacy, cognitive enhancement, and psychoeducation are further explored in the sections to follow.

BB incorporates components from PTSD treatments above, including: CBT, CPT and VRE. PE and EMDR are not used, likely because their therapeutic quality would be hindered or infeasible in a group setting. Elements of CBT, and some from CPT practiced in BB are, self awareness, behavioral

recognition and modification, positive thinking, focusing on strengths versus weaknesses, and asking for and using support. The use of technology and gaming systems is encouraged, like in VRE.

Obstacles to seeking treatment for PTSD. In a study conducted by Hoge et al. (2004), the authors learned that of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), only 23% to 40% of soldiers positive for mental disorders sought mental health care. Interestingly, subjects reported stigma as the greatest barrier to seeking mental health services. It is imperative that efforts are made to reduce stigma, and that therapeutic interventions to lessen PTSD symptom severity are further explored to provide better care for Veterans of WWII, Korea, Vietnam, the Gulf War, Afghanistan, Iraq, and other conflicts. The goal of BB is to approach treatment in a less stigmatizing way. Despite numerous unpleasant and in some cases, life altering symptoms, an arsenal of treatments exist to combat adverse symptoms characteristic of PTSD.

BB as treatment for PTSD. As mentioned, there are a variety of individually focused PTSD treatment options. Also, group therapy can be used for social or peer support, marriage and family therapy, and other forms of less internally focused therapies. What seems to have been lacking is somewhat individually focused treatment in the context of a group setting. Dr. Goren and Dr. Bushnell, neuropsychologists at the Phoenix VA, sought to bridge this gap and fill in the spaces where they believed treatment could be improved. Cognitive enhancement and psychoeducation for veterans to lessen PTSD symptom severity has been largely missing from the literature. Although BB was not designed

specifically to treat PTSD, it may be an improvement from the treatments above because education is presented as the foundation to build self-efficacy, cope in more positive ways, improve attention, memory, learning and cognition, decrease symptoms associated with PTSD, depression, and insomnia and foster support. The belief is that knowledge is power (Bushnell & Goren, 2011). Knowledge helps empower the individual to achieve their personal goals, to lessen PTSD and depression symptom severity, and actively seek wellness. Part of attaining wellness is to practice using positive forms of coping.

PTSD and Coping

Coping style has a significant effect on PTSD symptom severity and health outcomes. Chronic PTSD increases stress and heightens demands on coping resources. Participants in BB are taught to recognize their coping style and work toward using more positive forms of coping. According to Hyer, McCranie, Boudewyns, and Sperr (1996), “Coping is defined as the person’s cognitive and behavioral efforts to master, ameliorate, or tolerate external and internal demands, and conflicts created by stressful person-environment transactions” (p. 300). There are two primary types of coping, problem-focused and emotion-focused. Problem-focused coping attempts to resolve or alter the stressor. Emotion-focused coping attempts to manage the distressing responses evoked by the stressor (Lazarus & Folkman, 1987). Stressors can be approached and engaged or avoided and disengaged.

Individuals with PTSD experience distressing and intrusive recollections of the traumatic event, enduring in the active memory, posing an ongoing threat,

perpetuating chronic stress (Hyer et al., 1996). Working to use advantageous forms of coping instead of less adept forms is taught in BB, thereby creating the potential to reduce overall stress.

Several researchers have sought to better understand the relationship between chronic PTSD and coping style. Prior research indicating that avoidance, a type of emotion-focused coping has been related to poorer psychological outcomes for trauma survivors, motivated Rodrigues and colleagues to study associations between coping, combat exposure, and PTSD among National Guard veterans deployed overseas since 2001 (Rodrigues & Renshaw, 2010). In a similar study, Tiet and colleagues examined approach coping, functioning outcomes and relationships between coping and PTSD (Tiet et al., 2006). Wolfe et al. (1993), interested in coping style, PTSD, and health outcomes, studied readjustment patterns in Vietnam veterans who felt that they had adjusted adequately to daily life since their deployments. They were interested in what differentiated the well adjusted veterans from those who were not. Blake et al. (1992) studied coping styles and mental health treatment histories of veterans diagnosed with PTSD. They sought to identify the type of coping style war era veterans with and without PTSD were most likely to use.

Results from the studies mentioned above agree, avoidant coping is hallmark of increased PTSD severity, while problem-focused coping reduces symptoms (Blake et al., 1992; Rodrigues et al., 2010; Tiet et al., 2006; Wolfe et al., 1993). In another study, Hyer and colleagues found that escape-avoidance was the most frequently used strategy, followed by self-control, distancing,

accepting responsibility, and confrontive coping. Greater symptom severity was significantly correlated with greater use of escape-avoidance. These emotion-focused and avoidant coping strategies accounted for three-fourths of subjects' coping efforts in dealing with Vietnam War memories. Planful problem-solving, seeking social support and positive reappraisal were the least frequently used coping methods (Hyer et al., 1996). BB teaches veterans to execute planful problem-solving, make positive reappraisals and seek social support. These types of non-avoidant coping are characteristic of well adjusted veterans (Wolfe et al.). Whereas, use of avoidant coping seems to prevent individuals from fully processing events emotionally, problem-focused coping allows for a sense of mastery over the event, through control over self and the experience (Stein et al., 2005).

Tiet et al. (2006) found that approach coping is instrumental in improving functioning of patients with chronic PTSD and is predictive of better family and social functioning, despite chronic PTSD symptoms. More cognitive avoidance was indicative of greater PTSD symptoms; PTSD symptoms not only predicted more behavioral avoidance coping, but also predicted greater use of approach coping. Approach coping includes: making plans, trying to work things out, and focusing on positive aspects of a situation, while actively confronting difficult situations. Similarly, active task-oriented coping decreases behavioral withdrawal, emotional disengagement, and avoidance symptoms, serving to enhance adaptation and limit stress (Pietrzak et al., 2010). These findings suggest approach coping should be encouraged in treatment. BB encourages approach

coping and promotes the use of problem-focused coping, control over the self, and self-efficacy through psychoeducation. Tiet cited that higher IQ, hardy disposition, social resources or support, family resources, and adaptive coping contribute to more positive health outcomes related to PTSD symptom severity (Tiet et al., 2006).

In summary, individuals suffering from PTSD who used problem-focused coping scored higher, while those who predominantly used emotion-focused coping scored lower on self-reported and clinician rated outcomes. Approach coping seems to decrease PTSD symptom severity by promoting the use of problem-focused coping strategies, discouraging avoidant, maladaptive behaviors.

Changes in coping strategy influence changes in PTSD symptom severity. With the help of their families, friends, and peers, the transition to improved mental health is less arduous. The use of non-avoidant coping implicitly suggests seeking social support, both instrumental and emotional.

PTSD and social support. The coping literature examined above has made evident that approach and non-avoidant coping are important to reducing PTSD symptom severity. Pietrzak et al. (2010) state that effective coping strategies may be fostered through social support by limiting avoidant coping, involvement in risky behavior, reducing feelings of loneliness, and promoting self-efficacy. For service members with PTSD, longitudinal research suggests that interpersonal relationship problems are their fastest rising concern (Dekel & Monson, 2010). The provision of early social support may reduce the known increase in PTSD and comorbid conditions, postdeployment for OEF/OIF

veterans (Pietrzak et al., 2010). BB invites veterans to bring any form of social support to groups, including: family, friends, and loved ones who can provide emotional or instrumental support. Instrumental and emotional, two forms of social support seeking, offer distinctive benefits. Instrumental support may be financial, whereas emotional support can be derived from simply talking to a friend or peer. Interestingly, Laffaye and colleagues observed that among Vietnam veterans, lack of social support, regardless of the type, is a posttrauma risk factor for development of PTSD. Among Gulf War veterans, higher PTSD symptom severity was correlated with greater erosion of social support; whereas, social support was not predictive of later PTSD symptom severity. This erosion of social support was most significant with perceived interpersonal resources from friends who were not veterans. Social support may come from a variety of individuals, but in this study, positivity from friends was found to be exceptionally helpful to recovery (Laffaye, Cavella, Drescher, & Rosen, 2008). Social support protects against PTSD and depression. Meta-analyses suggest social support is among the most compelling negative predictors of PTSD (Pietrzak et al., 2010). Knowing we are not alone is often enough to potentiate a more positive affect.

PTSD and familial support. For many veterans, the consequences of and stress of deployment do not resolve when they return home (Erbes et al., 2008). Dekel and Monson (2010) state that a solid base of evidence recognizes the association between PTSD symptoms and poorer family functioning, and significant other relationships. Intriguingly, these results are found with respect

to different wars, in different countries at different times. BB encourages veterans to utilize familial support by bringing family members to the groups.

Monson and colleagues have honed in on PTSD and the effects on intimate relationships. Luckily, greater attention has been brought to the consequences on intimate relationships and loved ones, along with the consequences of trauma on their military counterparts, because of the wars in Iraq and Afghanistan. Studies have documented an association between caregiver burden and PTSD symptoms (Monson, Taft, & Fredman, 2009). BB invites family members to attend groups, along with their veteran. To mediate symptoms of PTSD, supportive interactions with family are crucial. Familial support has been found to reduce PTSD symptom severity across trauma levels (Laffaye et al., 2008). Individual therapy results are even impacted by the familial environment (Monson et al., 2010). Thus, the more positive the environment, the better for individual treatment outcomes.

PTSD, peer support, and group psychotherapy. Group psychotherapy is a popular and widespread form of therapy, whose rationale is based on the provision of, and opportunity for validation and support from peers. Laffaye et al. (2008) illustrated that veterans' peers are a highly valued and important piece of PTSD patients' social networks. Participants reported receiving a roughly equal amount of instrumental assistance from relatives and veterans; however, veteran peers were their most common source of emotional support. Veterans rated relationships with their peers as supportive and relatively stress free in comparison with marital, non-veteran peer, and familial relationships (Laffaye et

al.). As well as peer support, unit support, a tightly knit version of peer support may enhance feelings of self-efficacy, personal control, and meaning making, increasing their ability to reappraise stressful events (Pietrzak et al., 2010). The innate understanding of other warriors' tribulations and experience allow for support that is often unrivaled in strength.

PTSD, resilience, and self-efficacy. Support can also be garnered from within, a belief supported in BB. Psychological resilience is an individual's ability to successfully adapt to adversity. Both resilience and social support may best work together to protect against PTSD and depressive symptomatology by reducing hypothalamic-pituitary-adrenal (HPA) axis reactivity and other stress related physiological arousal. Facets of resilience subsume active coping, meaning-making, cognitive flexibility and exercising positive emotions (Pietrzak et al., 2010). Resilient individuals are apt to be self-efficacious in nature.

Self-efficacy is central to being human. It is the belief that we have the ability to exercise control over events that affect our lives and that we are capable of managing our own functioning (Benight & Bandura, 2004). In sum, self-efficacy is the conviction that we control our own destiny. Self-efficacy regulates functioning through decisional, motivational, cognitive and affective processes. It can dictate the quality of our emotional lives, willingness to persevere and the choices we are faced to make (Benight & Bandura). When feelings of self-efficacy are low, the consequences are far reaching. Benight and colleagues refer to a study by Solomon and colleagues that longitudinally followed the effects of battlefield traumatization on perceived self-efficacy. The traumas these soldiers

witnessed and experienced decimated their perceived efficacy to cope. The less self-efficacy they reported the more intrusive recollections and adaptational difficulties they bore (Benight & Bandura). Pietrzak and colleagues conclude that individuals with PTSD often have lower coping self-efficacy than those who do not have PTSD, which positions them at heightened risk for intrusive and avoidance symptoms, and greater distress (Pietrzak et al., 2009). BB teaches the utilization of cognitive flexibility through cognitive restructuring, asks patients' to acknowledge positive attributes about themselves, and make attempts to actively cope with stress, strongly encouraging self-efficacy building tactics.

PTSD and psychoeducation. In order to strengthen and build self-efficacious values and practice analogous behaviors, psychoeducation can be employed. The International Society for Traumatic Stress Studies established practice guidelines for PTSD (Foa, Keane, Friedman, & Cohen, 2008). Prior to distribution of these guidelines, Rosen and colleagues surveyed VA medical centers to ascertain their practice guidelines for the treatment of PTSD. Psychoeducation was listed as one of the six most often used practices (Rosen et al., 2004). However, the psychoeducation literature is sparse. Perhaps this is where the present study of BB fills a need. BB uses psychoeducation to encourage self-efficacious beliefs amongst veterans participating in the groups. Cognitive enhancement is used, as well.

PTSD and cognitive enhancement. Cognitive enhancement therapy (CET), described by Hogarty, Greenwald, and Eack (2006) is a developmental, small group approach to the remediation of neurocognitive and social-cognitive

deficits. They endorse that there is a widespread belief that cognitive deficits limit recovery. A study was designed to compare CET with another form of treatment, enriched supportive therapy (EST). The creators of BB deem it a cognitive enhancement therapy; a multidimensional, developmental treatment for neurocognitive and social cognitive deficits.

The CET literature has been most influenced by research with schizophrenic and Traumatic Brain Injury (TBI) patients. BB was developed with TBI as a primary target for treatment. CET attempts to do the following: increase active processing, mental stamina, and appropriate, spontaneous, negotiation of social challenges. Experiential exercises utilize verbal and non-verbal cues, teaching the patient facility to actuate the thoughts, feelings and likely behaviors of others, through perspective taking. Social cognition is sculpted by judging affect, reevaluating personal affect, reciprocity, forming shared understanding, and appraising social context. CET discourages concrete cognitive processing, advocating more flexible abstraction of relationship themes, addressing incomplete or incorrect schemas about others. Hogarty and colleagues found that CET effect sizes on cognition and behavior exceeded those for other cognitive rehabilitation treatments. CET was superior to EST for improvement and maintenance of processing speed, social cognition, social adjustment and cognitive style (Hogarty et al., 2006). CET seems useful for treating patients who experience neurocognitive challenges with TBI, PTSD, and severe combat exposure.

PTSD and Comorbid Features

Unfortunately, the presence of one or more comorbid disorders is the rule for patients with PTSD, not the exception. For those with a diagnosis of PTSD, the most common comorbidity is depression, followed by substance use and personality disorders (Dekel & Monson, 2010).

PTSD and depression. Depression is characterized as a mood disorder. For the aim of this paper, Major Depressive Disorder (MDD) is referenced. Five or more symptoms, occurring within the same two week period, representing a change from baseline with at least one of the following symptoms: depressed mood or loss of interest or pleasure is necessary for a diagnosis of MDD. At least five of the following nine symptoms must be endorsed: depressed mood most of the day, nearly every day; diminished interest or pleasure in all or almost all activities; significant weight loss or gain; insomnia or hypersomnia; psychomotor agitation or retardation; fatigue or loss of energy; feelings of worthlessness or excessive guilt; diminished ability to think or concentrate or indecisiveness, and recurrent thoughts of death (DSM-IV-TR, 2000). Dunn and colleagues (2007) indicate that for many disorders, comorbid depression worsens prognosis. Depression and PTSD share core features, strengthening the rationale for concurrent treatment. Low self esteem, social withdrawal, helplessness, and anhedonia or loss of pleasure, co-occur with PTSD and depression. BB offers strategies to target symptoms of each of these disorders with content to lessen symptom severity across each of the ten group sessions. Next, insomnia, a comorbid feature of PTSD and depression is discussed.

PTSD and insomnia. One associated symptom of PTSD producing poor health outcomes from sleep deprivation, especially in veterans with chronic PTSD, is insomnia. Germain and colleagues state that mounting evidence for sleep disruption post trauma may constitute a specific mechanism for the pathophysiology of chronic PTSD and poor clinical outcomes (Germain et al., 2008). Primary insomnia is characterized by a complaint of difficulty initiating or maintaining sleep or the indication of nonrestorative sleep for at least one month. This disturbance or subsequent fatigue must cause clinically significant impairment. Impairment refers to significant distress, social, and occupational functioning. The sleep disturbance must be exclusive of other sleep disorders, as well as mental disorders and medical conditions. Finally, the disturbance must be exclusive of the effects of substance use (DSM-IV-TR, 2000).

Insomnia and PTSD exacerbate the symptoms of one another, along with depression. Haynes and colleagues note that the relationship between sleep and stress has been explored in multiple studies. This is applicable to individuals with PTSD because, increased stress is associated with decreased slow wave sleep, which is theorized to be restorative and an increased number of arousals during sleep (Haynes, McQuaid, Ancoli-Israel, & Martin, 2006). A lack of restorative sleep and increased awakenings lead to poorer daytime functioning; thereby, establishing deficits in daily life.

LaMeerlo, Sgoifo, and Suchecki (2008) recall controlled studies having shown that acute sleep deprivation strongly affects emotionality and cognitive functioning. Chronic sleep loss may induce neurobiological changes over time,

resulting in serious health consequences. Insomnia, and sleep deprivation and disturbance may be reduced by resolving PTSD symptom severity. BB provides a session dedicated to sleep hygiene.

OVERVIEW OF CURRENT STUDY

The current study investigates whether BB, a new cognitive enhancement group therapy, improves symptoms of PTSD, depression, and insomnia among veterans completing the groups. The goal of this research was to assess the effectiveness of BB.

Hypotheses

H1: PTSD symptoms will show statistically significant improvement from pre- to post-treatment.

H2: Depression symptoms will show statistically significant improvement from pre- to post-treatment.

H3: Insomnia symptoms will show statistically significant improvement from pre- to post-treatment.

METHOD

Participants

The present study consisted of 64 US military veterans ($n= 64$), who served in or after World War II (WWII), were treated in the setting of the Veterans Affairs (VA) Health Care System in Phoenix, AZ, who took part in BB groups between 2007 and 2011. Participants were recruited via referral from neuropsychologists, mental health workers, primary care physicians, social workers, and recruitment flyers posted within the Phoenix VA Hospital (Bushnell and Goren, 2011). Data from 16 groups were used. Participants attended an average of 8 of the 10 sessions offered, ranging from 1 to 10 sessions, with a mean of 8.02 sessions attended per participant ($SD = 1.780$).

For each of the first sessions of BB (i.e. across all groups) a total of 207 individuals attended. Upon removal of those who did not continue with treatment or who did not complete measures, 179 remained (As noted below, completing measures was not required.) Some of the individuals in the groups who completed measures were wives or other family members/friends who attended to provide social support to the veteran attending. These individuals were then removed, resulting in 159 participants. Next, individuals who did not complete at least one pre- and post-measure of interest, including the PCL-M, PHQ-9 and ISI, were removed, resulting in a sample size of 64 veterans.

Finally, each item was measured individually. For the PCL-M, 18 individuals were removed, because they had not completed every pre- and post-measure item in the PCL-M. 46 veterans were run in this analysis. For the PHQ-

9, 8 individuals were removed, because they had not completed every pre- and post-measure item in the PHQ-9. 56 veterans were run in this analysis. For the ISI, 12 individuals were removed, because they had not completed every pre- and post-measure item in the ISI. 52 veterans were run in this analysis.

The mean age of sample participants was 53.47 years of age ($SD= 13.73$), spanning between 22 and 87 years of age; 21 participants did not report age. There were 48 participants who reported ethnicity. Overall, participants were predominantly Caucasian (87.5%), followed by Black or African American (4.2%) and Hispanic or Latino (4.2%), and American Indian (2.1%) and Native Hawaiian or Pacific Islander (2.1%); 16 participants did not report ethnicity.

Procedure

All procedures were approved by the Phoenix VA Healthcare System institutional review board.

Brain Boosters groups. Veterans who attended the first session of BB were invited to fill out pre measures of mental-health related symptoms, including: the PTSD Checklist (PCL-M), Patient Health Questionnaire (PHQ-9), and Insomnia Severity Index (ISI). Other measures not relevant to the present investigation were also administered (the Combat Exposure Scale [CES], Attention Process Training [APT-II], and an assessment of functional memory impairment [Strengths and Weaknesses (SW) scale]. Ten sessions of BB were administered to group members. Sessions were facilitated primarily by neuropsychologists, with psychologists, nurses, speech therapists and social workers included as guest speakers (Bushnell and Goren, 2011).

BB consists of a ten week course with a 90 minute session each week.

Week 1 is an introduction to the course, along with an overview of the curriculum; week 2 reviews general health and stress management; weeks 3 and 4 address memory and new learning; week 5 reviews attention and neuroanatomy; week 6 addresses sleep hygiene; week 7 reviews executive functions; week 8 addresses PTSD; week 9 discusses emotions, personality, and communication; week 10 is a 'wrap-up' (Goren and Bushnell, 2011).

Each session is comprised of numerous topics or components. A brief description of each session is as follows: During week 1, participants complete pre measures, go over disorders most prevalent among veterans, everyday living strategies, challenging the brain, promotion of maintenance and generalization, self-fulfillment, and resilience building. During week 2, participants go over substance use, resiliency, exercise, nutrition, medication compliance, sleep, emotional well-being, and stress management. During weeks 3 and 4, participants learn about various forms of memory, strategies for improving it, development of positive routines and habits to aid memory, metacognition, and new learning. During week 5, participants learn about various forms of attention, strategies for improving attention, modification of the environment, social support to improve attention, and neuroanatomical structure and functioning. During week 6, participants review sleep hygiene, identifying hindrances to sleep quality and methods to overcome sleep dysfunction. During week 7, participants examine executive functions, including: self-regulation, self-awareness, self-determination, self-control, self-management, self-direction, maturation, personality changes,

motivation, and goal setting. During week 8, PTSD is highlighted. Participants review prevalence of the disorder, fight or flight response, repeated stress, neurobiology, risk factors, diagnostic criteria, poor health outcomes, comorbidities, TBI, and adaptation to PTSD. Week 9 is an overview of emotion, personality and communication. Week 9 addresses emotion regulation, anger, personality, sense of self, forms of communication, and listening. Week 10 is a ‘wrap up’ session designed to review prior sessions, complete post measures, discuss personal insights, strengths and weaknesses recognized by the individual and as they pertain to BB, and to make referrals for future treatment (Goren and Bushnell, 2011).

Upon completion of BB therapy, veterans are invited to fill out post measures of mental-health related symptoms, including the measures mentioned above, except for the CES. They are also invited to provide feedback about BB with a Group Evaluation form. The Group Evaluation form is a powerful way to assess the effectiveness of BB from the patient’s perspective, potentially allowing for the design and implementation of improved therapy. Participants are encouraged to complete pre and post measures; however, it is not a requirement. Participants are told that if at any point they feel uncomfortable answering a question, especially those related to combat exposure, to stop and skip to the next item or measure they feel comfortable with.

Chart review. Pre and post measures from the BB sessions were entered into an Excel database. Charts were reviewed to identify demographic information, group membership, and number of sessions attended. A de-

identified dataset that included both pre-and post-treatment measures (described below) and demographic information (e.g., age, gender, ethnic background) was created.

Measures and Data Reduction

The present study attempts to examine PTSD symptom severity and provisional diagnoses of PTSD, based on PTSD symptom severity and diagnostic scoring established in previous literature. Self-report pre- and post-measures were used to assess symptom severity and provisional diagnoses in BB. Therefore, the word ‘provisional’ is used in reference to diagnosis, because diagnoses were not made by a clinician who had conducted a clinical structured diagnostic interview.

PTSD Checklist (PCL-M) (Weathers, Litz, Herman, Huska, and Keane, 1993). The PCL-M is one of the most commonly used self report measures of PTSD, anchoring to stressful military experiences. Anchoring, meaning relating to stressful military experiences. It is a 17 item, self-report measure of PTSD symptom severity. The PCL-M uses a Likert scale with the following scale anchors to indicate how much a person has been bothered by each item in the past month: 1 (not at all), 2 (A little bit), 3 (Moderately), 4 (Quite a bit), and 5 (Extremely). Items reflect symptoms for PTSD as outlined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). The PCL-M can be completed in approximately 5 minutes. A total symptom severity score (range= 17-85) can be obtained by summing the scores from each of the 17 items. A cut off score of

50 has been successful in diagnosing PTSD in Vietnam era veterans and recommended for use with OEF/OIF veterans (Barrett et al., 2002).

A provisional diagnosis of PTSD also can be made from the PCL-M by determining whether an individual meets DSM-IV symptom criteria, i.e., a score of 3 or more on at least 1 B item (questions 1-5), 3 C items (questions 6-12), and 2 D items (questions 13-17). By using this scoring method in conjunction with a cut-off score of 50 described above, it ensures that the individual has experienced sufficient symptom severity as well as that they meet the necessary symptom patterns for diagnosis, required by the DSM-IV (Wilkins, Lang, and Norman, 2011). Thus, the present analyses use the provisional diagnostic criteria in addition to total symptom scores to evaluate the effectiveness of BB treatment.

Patient Health Questionnaire-9 (PHQ-9) (Kroenke, Spitzer, and Williams, 2001). The PHQ-9 is a 9 item, self-report measure of depression symptom severity from the Patient Health Questionnaire, which assists primary care clinicians in diagnosing depression and monitoring treatment. Items are keyed to the diagnostic criteria for Major Depressive Episodes in the DSM-IV. Each of the 9 DSM-IV criteria is rated between 0 (not at all) and 3 (nearly every day). Possible total scores on this measure therefore range from 0 to 27 points. PHQ-9 symptom severity scores fall into the following categories: 1-4 (minimal depression), 5-9 (mild depression), 10-14 (moderate depression), and 15-19 (moderately severe depression), and 20-27 (severe depression). Scores that fall within the moderate to severe categories constitute a diagnosis of MDD. A provisional diagnosis is given, upon which treatment recommendations are made

(Kroenke et al., 2012). The present analyses use these provisional diagnoses of MDD (i.e. scores that fall within the moderate to severe depression categories) as well as total symptom severity scores to evaluate the effectiveness of BB.

Insomnia Severity Index (ISI) (Morin, Belleville, Belanger, and Ivers, 2011). The ISI is a brief self-report instrument to assess a person's perception of his/her insomnia using seven items with a Likert-type response format. The ISI items partially address the diagnostic criteria for Primary Insomnia in the DSM-IV and the International Classification of Sleep Disorders (ICSD). The patient is asked to think about their sleep over the past two weeks. The ISI can be completed in less than 5 minutes. Each item is rated on a 0-4 scale (4 indicating the greatest severity). Each item has different wording for 0-4 scale. For item 1, severity is measured as 0 (none), 1 (mild), 2 (moderate), 3 (severe) and 4 (very). For item 2, satisfaction is measured as 0 (very satisfied), 1-3 are continuous and 4 (very dissatisfied). For item 3, interference is measured as 0 (not at all interfering), 1 (a little), 2 (somewhat), 3 (much), 4 (very much interfering). For item 4, how noticeable sleeping problems are, is measured as 0 (not at all noticeable), 1 (barely), 2 (somewhat), 3 (much) and 4 (very much noticeable). For item 5, worry is measured as 0 (not at all), 1 (a little), 2 (somewhat), 3 (much) and 4 (very much). Total potential scores range from 0 to 28. The symptom severity scores are categorized as follows: 0-7 (not clinically significant), 8-14 (sub-threshold insomnia, 15-21 (moderate insomnia), and 22-28 (severe insomnia). A six point reduction is recommended to represent clinically meaningful improvement for those with Primary Insomnia (Yang, Morin,

Schaefer, and Wallenstein, 2009). For the present analyses, scores that fell within the moderate to severe insomnia categories were used to denote Primary Insomnia. These scores as well as total symptom severity scores were used to evaluate the effectiveness of BB.

Data Analysis

Hypothesis 1. To test hypothesis 1, that PTSD symptoms would show a statistically significant improvement from pre to post treatment, a paired samples t-test was run with PCL-M total score as the outcome measure. In addition, McNemar's Test, a non-parametric test for nominal data, was run to determine the proportion of participants who met criteria for a provisional diagnosis of PTSD at the outset of treatment versus at the end of treatment.

Hypothesis 2. To test hypothesis 2, that depression symptoms would show a statistically significant improvement from pre to post treatment, a paired samples t-test was run with total scores on the PHQ-9 as the outcome measure. In addition, McNemar's Test was run to determine the proportion of participants who met criteria for a provisional diagnosis of MDD at the outset of treatment versus at the end of treatment.

Hypothesis 3. To test hypothesis 3, that insomnia symptoms would show a statistically significant improvement from pre to post treatment, a paired samples t-test was run with total scores on the ISI as the outcome measure. In addition, McNemar's Test was run to determine the proportion of participants who met criteria for a provisional diagnosis of Primary Insomnia at the outset of treatment versus at the end of treatment.

RESULTS

Hypothesis 1. PTSD symptom severity showed a statistically significant improvement from pre to post treatment, as seen in Table I and Figure I. At time 1 (T1) (pre-treatment), participants scored a mean of 54.83 ($SD= 15.35$) on the PCL-M. At time 2 (T2) (post treatment), participants scored a mean of 51.35 ($SD= 14.74$) on the PCL-M, $t(45)= 2.78$, $p= 0.008$, Cohen's $d= 0.231$.

Participants positive for provisional PTSD diagnoses at T1 showed a statistically significant improvement from pre to post treatment, $N= 46$, $\chi^2= 5.44$, $p= 0.039$, as seen in Table II. Of the 36 participants who had a provisional diagnosis of PTSD at T1, 8 of them did not at T2. Eight participants met criteria for a provisional diagnosis of PTSD at T1 but no longer met diagnostic criteria at T2. Of the 10 participants who did not have a provisional diagnosis of PTSD at T1, 1 did at T2. McNemar's Test results indicated, $N= 46$, $\chi^2= 5.44$, $p= 0.039$, as seen in Table II. Twenty-eight participants met criteria for a provisional diagnosis of PTSD at both T1 and T2. Nine participants did not meet criteria for a provisional diagnosis of PTSD at T1 or T2, as seen in Table III.

Hypothesis 2. Depression symptom severity showed a statistically significant improvement from pre to post treatment, as seen in Table I and Figure I. At time T1, participants scored a mean of 15.21 ($SD= 7.79$) on the PHQ-9. At T2, participants scored a mean of 13.05 ($SD= 6.35$) on the PHQ-9, $t(55)= 3.32$, $p= 0.002$, Cohen's $d= 0.304$. Participants positive for provisional MDD diagnoses at T1 did not show a statistically significant improvement from pre to post treatment, $N=56$, $\chi^2= 0.50$, $p= 0.727$, as seen in Table II. Of the 41 participants

who had a provisional diagnosis of MDD at T1, 5 of them did not at T2. Five participants met criteria for a provisional diagnosis of MDD at T1 but no longer met diagnostic criteria at T2. Of the 15 participants who did not have a provisional diagnosis of PTSD at T1, 3 did at T2. McNemar's Test results indicated, $N= 56$, $\chi^2= 0.50$, $p= 0.727$, as seen in Table II. Thirty-six participants met criteria for a provisional diagnosis of MDD at both T1 and T2. Twelve participants did not meet criteria for a provisional diagnosis of MDD at T1 or T2, as seen in Table IV.

Hypothesis 3. Insomnia symptom severity did not show a statistically significant improvement from pre to post treatment, as seen in Table I and Figure I. At time T1, participants scored a mean of 15.98 ($SD= 6.89$) on the ISI. At T2, participants scored a mean of 14.46 ($SD= 7.08$) on the ISI, $t(51)= 1.96$, $p= 0.056$ (2 tailed), Cohen's $d= 0.218$, as seen in Table II. Participants positive for provisional Primary Insomnia diagnoses at T1 did not show a statistically significant improvement from pre to post treatment, $N= 52$, $\chi^2= 2.57$, $p= 0.180$ (2 sided). Of the 32 participants who had a provisional diagnosis of Primary Insomnia at T1, 10 of them did not at T2. Ten participants met criteria for a provisional diagnosis of Primary Insomnia at T1 but no longer met diagnostic criteria at T2. Of the 20 participants who did not have a provisional diagnosis of Primary Insomnia at T1, 4 did at T2. McNemar's Test results indicated, $N= 52$, $\chi^2= 2.57$, $p= 0.180$ (2 sided). Twenty-two participants met criteria for a provisional diagnosis of Primary Insomnia at both T1 and T2. Sixteen

participants did not meet criteria for a provisional diagnosis of Primary Insomnia at T1 or T2, as seen in Table V.

DISCUSSION

This study investigated whether Brain Boosters (BB), a new cognitive enhancement group therapy, would improve symptoms of PTSD, depression, and insomnia among veterans completing the groups. The goal of this research was to assess the effectiveness of BB. Paired samples t-tests were run to determine the effectiveness of BB for treating PTSD, depression and insomnia symptom severity. Results supported the hypotheses that symptoms of PTSD and depression would improve significantly. Results did not support the hypothesis that symptoms of insomnia would improve significantly. McNemar's Tests were run to determine the effectiveness of BB for significantly reducing the number of participants who met criteria for provisional diagnoses for PTSD, depression, and insomnia. Results of these tests supported the hypothesis that provisional diagnoses of PTSD would decrease from pre to post treatment. The hypotheses that provisional diagnoses of depression and insomnia would show a significant decrease post treatment were not supported. These results suggest BB may be effective for reducing PTSD and depression symptom severity, along with provisional diagnoses of PTSD.

Evaluating Clinically-Meaningful Change

Two different ways of assessing participant data were used: symptom severity and provisional diagnoses (i.e., diagnoses based on self-report measures rather than clinical interviews). The rationale for assessing symptom severity, along with changes in provisional diagnoses is to assess PTSD with the highest possible chance of maintaining clinically-meaningful findings. The PCL-M is

reflective of the theory that using both methods of assessment for PTSD is ideal. The PCL-M can be scored in two ways: by summing the scores from each of the 17 items for a symptom severity score, or by keying items to the DSM-IV for a score that falls within a certain diagnostic category. Scoring the PCL-M each way provides a more global view of PTSD, including symptom severity and diagnosis. Interestingly, in the analysis for the present study, using a cut off score for symptom severity of 50 and above, when diagnosing PTSD, versus the diagnostic categories from moderate to severe, the symptom severity score was more sensitive and thus, more stringent for diagnosing participants with PTSD. Prior studies have done this, such as one by conducted by Pietrzak and colleagues that only studied respondents who met a symptom severity score of 50 or greater and had moderate to severe ratings for enough DSM-IV criteria to indicate a provisional diagnosis of PTSD. They note that this definition provides a conservative estimate of the PTSD prevalence (Pietrzak et al., 2009).

Potential Mechanisms for BB Effectiveness

BB was not designed specifically for any one disorder; rather, it was devised to improve overall functioning in veterans seeking treatment and to aid veterans in attaining improved quality of daily life. BB was initiated when creators, neuropsychologists, Dr. Goren and Dr. Bushnell, saw a need for improved treatment for OEF/OIF veterans, returning with symptoms of PTSD, TBI, cognitive impairments and difficulty functioning (Goren and Bushnell, 2011). Again, although BB is not solely targeted to treat PTSD, it was developed with PTSD at present of mind. Only one session of the ten week course is

devoted to PTSD; however, throughout the course, strategies are taught to properly cope with functional impairments and symptoms associated with PTSD.

Similarly, although BB was not designed to address symptoms of depression per se, strategies taught throughout the course may be helpful for reducing depression symptom severity. Positive forms of coping, such as approach coping and social support seeking are encouraged during the groups and may minimize depression symptom severity by revising global, stable, internal, negative beliefs. Cultivating self-efficacious attitudes and behaviors provide additional means to achieving wellness. Psychoeducation empowers participants with knowledge about their deficits and ways to overcome them, focusing on their strengths. Peer support also may have played a large role in decreasing depressive symptoms. An unexpected finding was that BB is not effective for significantly reducing provisional diagnoses of depression. This may have been the case, in contrast to the finding that BB is effective for reducing depression symptom severity, because to meet criteria for a diagnosis of MDD from the PHQ-9, a moderate to severe score is required. Therefore, decreases in symptom severity were apparent, but decreases in provisional diagnoses were not, considering that it is more difficult to jump from one scoring category to another, especially for participants with moderate to severe depression.

BB is not effective for statistically significantly reducing insomnia symptom severity or provisional diagnoses of insomnia. Ten participants began treatment with provisional diagnosis of insomnia and completed treatment without meeting criteria for such a diagnosis. In addition, although not

significant, there was a statistical trend toward decreased insomnia symptoms from pre- to post-treatment. Therefore, BB may have had some influence on veterans' sleep. One session was offered reviewing sleep hygiene. A potential reduction in insomnia symptoms also may be attributed to reduction in PTSD and depression symptom severity, as insomnia, depression, and PTSD share interrelated symptoms.

Dunn and colleagues point out core psychological features of PTSD and depression are shared, mentioning helplessness, social withdrawal, anhedonia and low self-esteem (Dunn et al., 2007). Overlapping symptoms of PTSD and depression include irritability, concentration difficulties, mood disruptions, and perhaps even more psychological factors, such as a low sense of self worth, and feelings of guilt and shame; all of which are indirectly targeted through strategies taught in BB groups.

BB and peer support. BB is potentially effective for decreasing PTSD and depression symptom severity, and provisional diagnoses of PTSD for many reasons. First, peer support provides tremendous reassurance, validation, and understanding of feelings only experienced by those who have been to war, potentially enhancing feelings of self-efficacy, personal control, and meaning making, increasing veterans' ability to reappraise stressful events (Pietrzak et al., 2010). The innate understanding of other warriors' tribulations and experience allow for support unrivaled in strength.

BB and social support. Second, encouragement from BB to seek out social support from family and friends is valuable. An invitation is given to

veterans to bring any form of social support to groups, including: family, friends, and loved ones. The provision of early social support may reduce PTSD and comorbid conditions, postdeployment for OEF/OIF veterans (Pietrzak et al., 2010). Although most veterans were not recently returned OEF/OIF veterans, for those who were, BB may have been especially helpful. For OEF/OIF/OND veterans, the implementation of treatment programs like BB immediately upon return home from deployment may reduce PTSD and comorbid disorder symptom severity, resulting in a more seamless transition to everyday life, away from theater.

Familial support has also been found to reduce PTSD symptom severity across trauma levels (Laffaye et al., 2008). Reliance on others for instrumental and emotional support is an integral piece of the puzzle to manage PTSD and depression symptom severity.

BB and coping strategies. Next, resilient tendencies, such as meaning-making, cognitive flexibility and focusing on positive emotions (Pietrzak et al., 2010) are taught in BB. Awareness and practice of advantageous forms of coping contribute to decreases in PTSD and depression symptom severity. Veterans learn that they do not have to cope with negative symptomatology alone; approach coping can help. Many veterans with PTSD are prone to practice avoidant coping, a hallmark of increased PTSD severity, while problem-focused coping reduces symptoms (Blake et al., 1992; Rodrigues et al., 2010; Tiet et al., 2006; Wolfe et al., 1993). BB emphasizes problem-focused coping. Tackling daily obstacles through environmental modification, as simple as keeping your

keys in one place, reduces the frustration some veterans struggle with (Goren and Bushnell, 2011). Curtailing the cumulative effect of daily life hassles may mitigate frustration and feelings of anger and irritability.

BB and self-efficacy. Low self-efficacy is found more often in individuals who have PTSD versus those who do not have PTSD (Benight and Bandura, 2004). Self-efficacy regulates functioning through decisional, motivational, cognitive and affective processes, thereby dictating the quality of our emotional lives, willingness to persevere and the choices we are faced to make (Benight and Bandura). Relative to self-efficacy, Seligman, Abramson, Semmel, and Baeyer (1979) introduced the depressive attributional style, maintaining that attributing lack of control to internal factors lead to lowered self esteem. The realization that we are responsible for our own thoughts, and do have some control of our feelings, actions, attitudes and behaviors is empowering. BB offers a session on executive functioning, which relates to self-efficacy (Goren and Bushnell, 2011). Perceived self-efficacy likely combats depressive symptomatology, especially feelings of helplessness.

BB, cognitive enhancement, psychoeducation and CBT. The components of BB related to cognitive enhancement and psychoeducation may decrease PTSD and depression symptom severity, as well. Cognitive enhancement addresses the need for improvement in processing speed, cognitive style, social cognition and social adjustment. Psychoeducation promotes experiential learning and self empowerment. A psychoeducational group format, administered by Dunn et al. (2007) included didactic discussions and information

about the causes, treatment and nature of PTSD and depression, akin to BB. Participants rated this therapy as being high in clarity, helpfulness, and positive group environment. BB also borrows from previous treatment methods like CBT. The ability to restructure negative thought processes with more positive ones and become goal oriented versus inwardly focused, is conceivably important for decreasing PTSD and depression symptom severity.

BB and improved functioning. Once veterans learn it is possible to improve one area of functioning, they may be more likely to participate in other tasks or activities to improve areas of their lives, like vocational rehabilitation, psychotherapy, BB splinter groups and other treatment groups offered at the VA. They may be more willing to seek out help because behavioral activation (BA) therapy mimicked in BB, works to treat depression, lifting mood and mitigating the cycle of learned helplessness. BA focuses on the assessment and treatment of avoidant behaviors, promoting regular routines and structuring of daily activities. Most importantly, patterns of avoidance and withdrawal related to interpersonal situations are targeted (Dimidjian et al., 2006). Practical factors, consistent with newly attained knowledge of how to navigate the VA system and relational factors, such as trusting providers may lead to increases in treatment seeking and ultimately, improved functioning. As corroborated by the creators of BB, upon completion, veterans are more willing to seek out and receive support from other veterans, friends, and family (Bushnell and Goren, 2011).

The finding that BB is effective for reducing PTSD and depression symptom severity, along with provisional diagnoses of PTSD is an exciting one.

The time and effort put into developing BB now has analyses to support the effectiveness of this new treatment for reducing PTSD and depression symptom severity and provisional diagnoses of PTSD.

Limitations

The present study has several limitations. Self report measures were used, and therefore are open to differences in interpretation, memory issues, the halo effect and social desirability bias. Symptom severity and provisional diagnoses were made based on pre- and post-measures, not structured clinical diagnostic interviews. Diagnoses made by healthcare professionals were not taken into account in the present study.

Participants attended an average of 8 of the 10 sessions offered with a mean of 8.02 sessions attended per participant ($SD = 1.780$). Thus, certain material was missed, potentially altering responses to post measures and treatment outcomes. This study captured a non-random subset of veterans who participated in the groups and not only were willing to complete questionnaire measures, but did so both pre-and post treatment. Therefore, generalizability to other samples of veterans may be limited.

Individual and within participant differences also pose a limitation to this study. An incredibly wide age range of veterans presented for treatment, between 22 and 87 years with a mean age of 53.47 years old ($SD= 13.73$). Generational differences and war era differences, along with cohort effects may affect group therapy. Veterans who served in or after World War II (WWII) made up the BB groups. Reportedly, per the facilitators of the group, veterans from different eras,

who fought in different wars, and who were of varying ages, got along, complementing each other with personal experiences, stories, and advice. The relationships formed in BB between OEF/OIF/OND veterans, along with those formed with older veterans appeared to be of value to participants. However, as stated above, individual differences may have affected treatment. Sessions attended, number of sessions attended, level of combat exposure, and amount of time since being in a war zone are a few of the variables that may have contributed to individual differences.

There are also potential differences between groups, which may pose a limitation to this study. Factors like mean age, number of sessions provided, and personality factors may have resulted in different outcomes between groups. Per the creators of BB, groups seemed to take on personalities of their own. Consequently, no two groups were the same.

The halo effect may have played a role in perception of treatment outcomes when post measures were collected. An end of treatment halo effect, described by Thorndike (1919) refers to the phenomenon that self report measure improvement is typically rated as higher immediately following intervention. These effects may not translate into long term gains.

Next, there was no control group in this study; all participants received the same treatment with BB. Therefore, it cannot be determined whether the reduction seen in PTSD and depression symptom severity and provisional diagnoses of PTSD were a result of BB treatment or of a natural improvement over time. Also, this study only analyzed data from veterans, but the presence of

wives and social support at the groups may have altered interaction between veterans.

Finally, comorbid disorders, such as substance abuse or schizophrenia and chronic medical conditions, such as diabetes, may have had an effect on treatment outcomes. For certain individuals, improvement or deterioration in one area of functioning or of one disorder or condition may have had an effect on BB treatment results.

This is just the beginning for BB in terms of learning which aspects of BB constitute the greatest improvements in symptom severity for PTSD, depression, and insomnia. Future work with BB may entail a greater focus on tools to improve insomnia symptom severity and understanding what about BB improves PTSD and depression. Based on preliminary analyses run to explore the effectiveness of BB for treating PTSD, depression, and insomnia it is a hope that the results obtained may guide the creators of BB in recognizing the strengths of the program and honing areas in which there is greater potential for symptom improvement.

Implications

The results of this study have potential implications for treatment of veterans with PTSD and depression, as well as civilians. A recent study related to treating veterans with opioids emphasized the importance of alternative treatments to pharmacological intervention for PTSD (Seal et al., 2012). Brain Boosters may be one such treatment. They highlighted the challenge of treating veterans with haunting memories of war and devastating physical injuries and

state that physicians treating veterans should offer less risky treatment, including therapies other than drugs (Seal et al.). BB is an excellent example of a less risky form of treatment, because it is strictly therapeutically based, eliminating the risk of harmful side effects from pharmacological interventions like the prescription of opioids, beta blockers, anti-depressants, anti-anxiolytics, and even tranquilizers. Therapeutic interventions should be recognized as a primary or if necessary, complementary method to treating symptoms of PTSD and depression.

Cognitive enhancement and psychoeducation for veterans to lessen PTSD symptom severity has been largely missing from the literature. The analyses ran on this data set suggested that BB is effective for treating PTSD and depression symptom severity and provisional diagnoses of PTSD.

These findings should encourage wider dissemination of BB therapy protocols to VA healthcare systems around the country. Peer support for veterans, along with a treatment format emphasizing cognitive enhancement and psychoeducation is promising. The need for improved care for OEF/OIF/OND veterans returning from combat is urgent. BB provides a foundation for new treatments to be modeled after to reduce PTSD and depression symptom severity.

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APPENDIX A
RECRUITMENT FLYER

Memory difficulties?

Irritability?

Problems with organization?



Trouble with attention?

Sleeping problems?

Nightmares?

Interested in learning strategies to help?

Carl T. Hayden VA Medical Center

BRAIN BOOSTERS

A Cognitive Enhancement Group

WHAT:

Participants will be introduced to techniques and strategies to help with memory, attention, sleep difficulties, irritability, and more. Education will be provided regarding the cognitive effects of traumatic brain injury (TBI), blast exposure & posttraumatic stress disorder (PTSD).

WHEN:

Tuesday Mornings (10–11:30am)

or

Tuesday Evenings (5:30–7pm)

This is a 10-week program

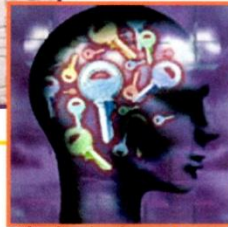
WHERE:

Carl T. Hayden VA Medical Center

Room: To Be Announced

WHO:

All veterans and adult family members are welcome



Learn about the brain, how it is affected by PTSD, TBI and Blast Exposure as well as strategies and tips for exercising your brain

FOR MORE INFORMATION & TO SIGN UP
PLEASE CONTACT

Dr. Goren (602-277-5551 x7884) or
Dr. Bushnell (602-277-5551 x6561)

APPENDIX B

TABLES I, II, III, IV and V

Table I – Paired Samples T-Tests Results

Symptom Severity Measures	N	Means (SD)	Mean Difference (95% CI)	p-value
PCL-M				
Time 1	46	54.84 (15.35)	3.489	0.008
Time 2	46	51.35 (14.74)	(0.963 to 6.015)	
PHQ-9				
Time 1	56	15.21 (7.79)	2.161	0.002
Time 2	56	13.05 (6.35)	(0.858 to 3.463)	
ISI				
Time 1	52	15.98 (6.89)	1.519	0.056
Time 2	52	14.46 (7.08)	(-0.038 to 3.076)	

Table II – McNemar’s Tests Results

Provisional Diagnoses Measures	X²	N	p-value
PCL-M	5.44	46	0.039
PHQ-9	0.50	56	0.727
ISI	2.57	52	0.180

Table III – McNemar’s PCL-M Test Results

		PTSD Diagnosis Time 2		
		No diagnosis (0)	Diagnosis (1)	Total
PTSD Diagnosis Time 1				
No diagnosis (0)	Count	9	1	10
Diagnosis (1)	Count	8	28	36
Total	Count	17	29	48

Table IV – McNemar’s PHQ-9 Test Results

		MDD Diagnosis Time 2		
		No diagnosis (0)	Diagnosis (1)	Total
MDD Diagnosis Time 1				
No diagnosis (0)	Count	12	3	15
Diagnosis (1)	Count	5	36	41
Total	Count	17	39	56

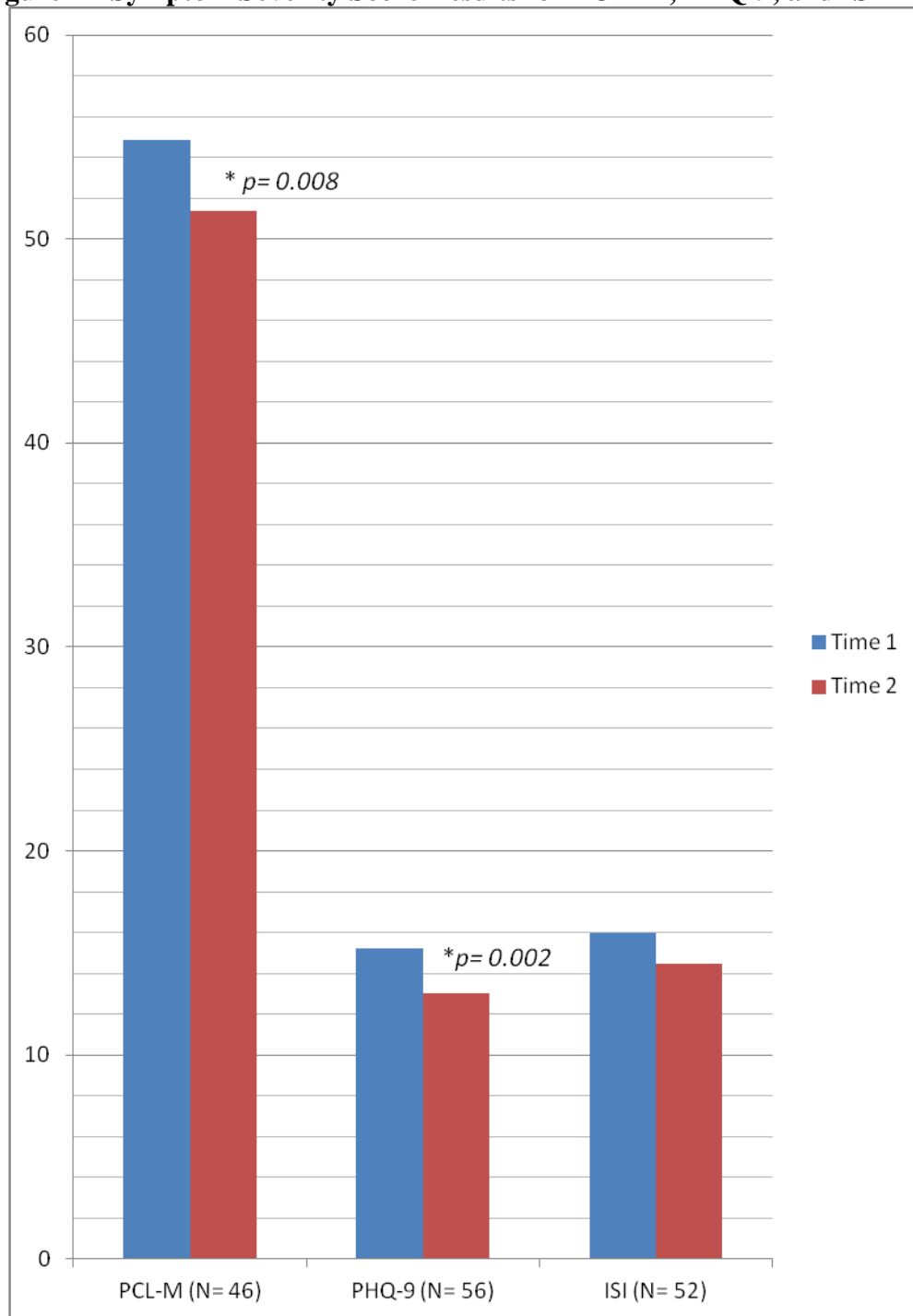
Table V – McNemar’s ISI Test Results

		Primary Insomnia (PI) Diagnosis Time 2		
Primary Insomnia (PI) Diagnosis Time 1		No diagnosis (0)	Diagnosis (1)	Total
No diagnosis (0)	Count	16	4	20
Diagnosis (1)	Count	10	22	32
Total	Count	26	26	52

APPENDIX C

FIGURE I

Figure I – Symptom Severity Score Results for PCL-M, PHQ-9, and ISI



Note.

PCL-M, Posttraumatic Stress Disorder Checklist- Military Version.

PHQ-9, Patient Health Questionnaire 9.

ISI, Insomnia Severity Index.

APPENDIX D
MEASURES

PTSD Checklist – Military Version (PCL-M)

Name: _____ Unit: _____
 Best contact number and/or email: _____
 Deployed location: _____

Instructions: Below is a list of problems and complaints that veterans sometimes have in response to a stressful military experience. Please read each one carefully, put an "X" in the box.

		Not at all	A little bit	Moderately	Quite a bit	Extremely
1.	Repeated, disturbing <i>memories, thoughts, or images</i> of a stressful military experience?					
2.	Repeated, disturbing <i>dreams</i> of a stressful military experience?					
3.	Suddenly <i>acting or feeling</i> as if a stressful military experience were <i>happening again</i> (as if you were reliving it)?					
4.	Feeling <i>very upset</i> when <i>something reminded</i> you of a stressful military experience?					
5.	Having <i>physical reactions</i> (e.g., heart pounding, trouble breathing, or sweating) when <i>something reminded</i> you of a stressful military experience?					
6.	Avoid <i>thinking about or talking about</i> a stressful military experience or avoid <i>having feelings</i> related to it?					
7.	Avoid <i>activities or talking about</i> a stressful military experience or avoid <i>having feelings</i> related to it?					
8.	Trouble <i>remembering important parts</i> of a stressful military experience?					
9.	Loss of <i>interest</i> in things that you used to enjoy?					
10.	Feeling <i>distant or cut off</i> from other people?					
11.	Feeling <i>emotionally numb</i> or being unable to have loving feelings for those close to you?					
12.	Feeling as if your <i>future</i> will somehow be <i>cut short</i> ?					
13.	Trouble <i>falling or staying</i> asleep?					
14.	Feeling <i>irritable</i> or having <i>angry outbursts</i> ?					
15.	Having <i>difficulty</i> concentrating?					
16.	Being " <i>super alert</i> " or watchful on guard?					
17.	Feeling <i>jumpy</i> or easily startled?					

Has anyone indicated that you've changed since the stressful military experience? Yes __ No __

PCL-M Scoring

There are 2 ways to score the PCL:

- Add up all the items for a total severity score

or

- Treat “moderately” or above (response 3 through 5) as symptomatic and anything

below “moderately” (1 and 2) as non-symptomatic.

- Then follow the DSM scoring rule to get a diagnosis. That is:
- You need an endorsement of at least 1 ‘B’ item (question #s 1-5)
- You need an endorsement of at least 3 ‘C’ items (question #s 6-12)
- You need an endorsement of at least 2 ‘D’ items (question #s 13-17)

PHQ-9 — Nine Symptom Checklist

Patient Name _____ Date _____

1. Over the last 2 weeks, how often have you been bothered by any of the following problems? Read each item carefully, and circle your response.
- a. Little interest or pleasure in doing things
Not at all Several days More than half the days Nearly every day
 - b. Feeling down, depressed, or hopeless
Not at all Several days More than half the days Nearly every day
 - c. Trouble falling asleep, staying asleep, or sleeping too much
Not at all Several days More than half the days Nearly every day
 - d. Feeling tired or having little energy
Not at all Several days More than half the days Nearly every day
 - e. Poor appetite or overeating
Not at all Several days More than half the days Nearly every day
 - f. Feeling bad about yourself, feeling that you are a failure, or feeling that you have let yourself or your family down
Not at all Several days More than half the days Nearly every day
 - g. Trouble concentrating on things such as reading the newspaper or watching television
Not at all Several days More than half the days Nearly every day
 - h. Moving or speaking so slowly that other people could have noticed. Or being so fidgety or restless that you have been moving around a lot more than usual
Not at all Several days More than half the days Nearly every day
 - i. Thinking that you would be better off dead or that you want to hurt yourself in some way
Not at all Several days More than half the days Nearly every day
2. If you checked off any problem on this questionnaire so far, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?
- Not Difficult at All Somewhat Difficult Very Difficult Extremely Difficult

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PHQ-9 Patient Depression Questionnaire

For initial diagnosis:

1. Patient completes PHQ-9 Quick Depression Assessment.
2. If there are at least 4 s in the shaded section (including Questions #1 and #2), consider a depressive disorder. Add score to determine severity.

Consider Major Depressive Disorder

- If there are at least 5 s in the shaded section (one of which corresponds to Question #1 or #2)

Consider Other Depressive Disorder

- If there are 2-4 s in the shaded section (one of which corresponds to Question #1 or #2)

Note: Since the questionnaire relies on patient self-report, all responses should be verified by the clinician, and a definitive diagnosis is made on clinical grounds taking into account how well the patient understood the questionnaire, as well as other relevant information from the patient.

Diagnoses of Major Depressive Disorder or Other Depressive Disorder also require impairment of social, occupational, or other important areas of functioning (Question #10) and ruling out normal bereavement, a history of a Manic Episode (Bipolar Disorder), and a physical disorder, medication, or other drug as the biological cause of the depressive symptoms.

To monitor severity over time for newly diagnosed patients or patients in current treatment for depression:

1. Patients may complete questionnaires at baseline and at regular intervals (e.g., every 2 weeks) at home and bring them in at their next appointment for scoring or they may complete the questionnaire during each scheduled appointment.
2. Add up s by column. For every : Several days = 1 More than half the days = 2 Nearly every day = 3
3. Add together column scores to get a TOTAL score.
4. Refer to the accompanying **PHQ-9 Scoring Box** to interpret the TOTAL score.
5. Results may be included in patient files to assist you in setting up a treatment goal, determining degree of response, as well as guiding treatment intervention.

Scoring: add up all checked boxes on PHQ-9

For every Not at all = 0; Several days = 1; More than half the days = 2; Nearly every day = 3

Interpretation of Total Score

Total Score Depression Severity

- 1-4 Minimal depression
- 5-9 Mild depression

10-14 Moderate depression
15-19 Moderately severe depression
20-27 Severe depression

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A2662B 10-04-2005

Name: _____ Age: _____

Ethnicity: Please check one:

- American Indian or Alaska Native Asian
Black or African American Hispanic or Latino
Native Hawaiian or Pacific Islander White

1. Please rate the current (i.e., last 2 weeks) **SEVERITY** of your insomnia problem(s).

	<u>None</u>	<u>Mild</u>	<u>Moderate</u>	<u>Severe</u>	<u>Very</u>
Difficulty falling asleep:	0	1	2	3	4
Difficulty staying asleep:	0	1	2	3	4
Problem waking up too early:	0	1	2	3	4

2. How **SATISFIED**/dissatisfied are you with your current sleep pattern?

<u>Very Satisfied</u>					<u>Very Dissatisfied</u>
0	1	2	3	4	

3. To what extent do you consider your sleep problem to **INTERFERE** with your daily functioning (e.g. daytime fatigue, ability to function at work/daily chores, concentration, memory, mood, etc.).

<u>Not at all</u>	<u>A Little</u>	<u>Somewhat</u>	<u>Much</u>	<u>Very Much</u>
0	1	2	3	4

4. How **NOTICEABLE** to others do you think your sleeping problem is in terms of impairing the quality of your life?

<u>Not at all</u>	<u>Barely</u>	<u>Somewhat</u>	<u>Much</u>	<u>Very Much</u>
0	1	2	3	4

5. How **WORRIED**/distressed are you about your current sleep problem?

<u>Note at all</u>	<u>A Little</u>	<u>Somewhat</u>	<u>Much</u>	<u>Very Much</u>
0	1	2	3	4

Add scores for all seven items (1a + 1b + 1c + 2 + 3 + 4 + 5) = _____

Insomnia Severity Index (Charles M. Morin, 1993). Modified March 20, 2007 by Fair, C.



Insomnia Severity Index

Guidelines for Scoring/Interpretation:

Add the scores for all seven items (questions 1 + 2 + 3 + 4 + 5 + 6 + 7) = _____
your total score

Total score categories:

0–7 = No clinically significant insomnia

8–14 = Sub-threshold insomnia

15–21 = Clinical insomnia (moderate severity)

22–28 = Clinical insomnia (severe)

Print out your completed Insomnia Severity Index, along with the Guidelines for Scoring/Interpretation, to show to your health care provider.

Used with permission from Charles M. Morin, Ph.D., Université Laval

Group Evaluation Form

Please rate each item on a scale from 0 to 5

- 0 = has had no effect or has had a negative effect
- 1 = has had a minor effect while in the group
- 2 = has had a minor effect in my daily life
- 3 = has had a definite effect that is short-lived
- 4 = had had a definite effect in all aspects of my daily life
- 5 = has had a major effect in changing this aspect of my life

- ___ Insight
- ___ Ability to communicate effectively to others
- ___ Ability to receive feedback and understand it
- ___ Self-esteem
- ___ Ability to socialize with other comfortably
- ___ Depression
- ___ Anxiety
- ___ Stress management
- ___ Understanding of how general health and fitness affects brain functioning
- ___ Approach to general health and fitness
- ___ Memory aids/techniques
- ___ Knowledge of neuroanatomy
- ___ Attention
- ___ Sleep hygiene information
- ___ Listening skills
- ___ PTSD information

COMMENTS:

Please provide suggestions and/or comments on the different sessions (please use the back of this page if you need more room):

1. Introduction / Overview / Education
2. General Health/Stress Management
3. Memory / New Learning – Sally Walsh, Speech Pathologist
4. Neuroanatomy/Attention
5. Executive Functions / Reasoning
6. Sleep and PTSD – Drs. Epstein and Tarazon
7. Emotions/Personality/Communication Skills

Would you be interested in the following groups if they were available?

- PTSD
- Sleep Hygiene
- Social/Communication
- Humor
- Memory
- Organization Skills
- Stress Management Skills

What would you have liked to see in this group that wasn't covered?
What was your favorite thing about the group?
What did you like least about the group?
General comments:

Would you recommend this group to a friend? Yes No
Why or why not?

APPENDIX E
DIAGNOSTIC CRITERIA

Post-Traumatic Stress Disorder. Criterion A, concerns the stressor itself, and both of the following must have been present: “The person has experienced, witnessed, or been confronted with an event or events that involve actual or threatened death or serious injury, or a threat to the physical integrity of oneself or others. The person’s response involved intense fear, helplessness, or horror.” (DSM-IV TR, 2000) Next, Criterion B through D detail the three symptom clusters: intrusive recollection, avoidant/numbing, and hyper-arousal, from each of which, the patient must report experiencing symptomatology to some degree.

Criterion B pertains to the first of the three symptom clusters, intrusive recollection. “The traumatic event is persistently re-experienced in at least one of the following ways: Recurrent and intrusive distressing recollections of the event, recurrent distressing dreams, acting or feeling as if the event were recurring, intense psychological distress, and physiological reactivity upon cues.” (DSM-IV TR, 2000) Unpleasant memories, obsessive and compulsive thoughts, heightened stress response, increased reactivity, nightmares, dissociative states, flashbacks, and even hallucinations are characteristic of intrusive recollection. Although there are three distinct symptom clusters, some overlap is found, specifically in physiological and psychological reactivity. For example, physiological reactivity upon cues or triggers of the traumatic event in the intrusive recollection cluster are likely to incur uncomfortable physical sensations similar to the hyper-vigilance, and exaggerated startle response, found in the hyper-arousal cluster. Much of the avoidant/numbing cluster seems to parallel depressive symptoms.

Criterion C pertains to the symptom cluster, avoidant/numbing.

“Persistent avoidance of stimuli associated with the trauma and numbing in general responsiveness (not present before the trauma), as indicated by at least three of the following: Efforts to avoid thoughts, feelings, and conversations associated with the trauma; activities, places, and people that arouse recollections of the trauma; inability to recall an important aspect of the trauma; markedly diminished interest or participation in significant activities; feelings of detachment or estrangement from others; restricted range of affect; [and] sense of a foreshortened future.” (DSM-IV TR, 2000) The symptoms associated with avoidance and numbing can contribute to feelings of loneliness, helplessness, and hopelessness; all associated with depression, a disorder highly comorbid with PTSD. Entrenchment in the individuals PTSD psychopathology, coupled with avoidance of triggers, including people, places, and things heightens isolation, leading to the potential for increased symptom severity, and decreased social support, resultant from withdrawal from others. In contrast to the avoidant/numbing cluster, the third and final symptom cluster.

Criterion D pertains to the symptom cluster, hyper-arousal. “Persistent symptoms of increasing arousal (not present before the trauma), indicated by at least two of the following: Difficulty falling or staying asleep, irritability or outbursts of anger, difficulty concentrating, hyper-vigilance, and exaggerated startle response.” (DSM-IV TR, 2000) The hyper-arousal symptoms can make daily tasks more difficult, resulting in decreased efficiency, productivity, and ultimately, self-efficacy. The debilitating nature of some of these symptoms,

along with negative symptomatology associated with Criterion B and C, can lead to adverse events, marked by psychological and physiological consequences.

Criterion E pertains to duration and requires that symptoms from the above clusters have been present for at least a month.

Lastly, Criterion F relates to functional significance. “The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.” (DSM-IV TR, 2000) PTSD can be acute, lasting less than six months or chronic, lasting more than six months. Symptom onset should also be considered. Markers of the disorder may be evident at the time of the trauma or at least six months after the traumatic event (DSM-IV TR, 2000).

Major Depressive Episode. Criterion A requires that five or more of the following nine symptoms are present during the same two week period and indicate a change from previous functioning. At least one of the nine symptoms must be depressed mood or loss of interest or pleasure. (DSM-IV TR, 2000)

Symptom 1: “Depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g., feels sad or empty) or observation made by others (e.g. appears tearful).” Symptom 2: “Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated by either subjective account or observation made by others).” Symptom 3: “Significant weight loss when not dieting or weight gain (e.g. a change of more than 5% of body weight in a month), or decrease or increase in appetite nearly every day.” Symptom 4: “Insomnia or hypersomnia nearly every day.” Symptom

5: “Psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down).” Symptom 6: “Fatigue or loss of energy nearly every day.” Symptom 7: “Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick).” Symptom 8: “Diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others).” Symptom 9: “Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide.” (DSM-IV TR, 2000)

Criterion B posits that these symptoms do not meet criteria for a mixed episode. Criterion C states that symptoms must cause clinically significant impairment and distress in important areas of functioning, such as social and occupational functioning. Criterion D states that symptoms are not directly caused by the use of a substance or effects of a general medical condition. Finally, criterion E says that the symptoms cannot be better accounted for by bereavement (DSM-IV TR, 2000).

Major Depressive Disorder. Major depressive disorder is characterized by the presence of a Major Depressive Episode. This episode cannot be better accounted for by another disorder and the patient must never have had a manic episode, mixed episode, or a hypomanic episode (DSM-IV TR, 2000). The PHQ-9 does not test for a specific type of depression. Upon completing the PHQ-9, the

measurement should indicate to the provider whether or not the patient is experiencing any number of depressive disorders.

Primary Insomnia. Insomnia is a symptom of both PTSD and depression. Primary insomnia requires five prerequisites for diagnosis. Criterion A: “The predominant complaint is difficulty initiating or maintaining sleep, or nonrestorative sleep, for at least one month.” (DSM-IV TR, 2000) Criterion B: “The sleep disturbance (or associated daytime fatigue) causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.” (DSM-IV TR, 2000) Criterion C: “The sleep disturbance does not occur exclusively during the course of Narcolepsy, Breathing-Related Sleep Disorder, Circadian Rhythm Sleep Disorder, or a Parasomnia.” (DSM-IV TR, 2000) Criterion D: “The disturbance does not occur exclusively during the course of another mental disorder (e.g. Major Depressive Disorder, Generalized Anxiety Disorder, a delirium).” (DSM-IV TR, 2000) Last, Criterion E: “The disturbance is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition.” (DSM-IV TR, 2000) Insomnia may be diagnosed independently of another disorder or as a symptom of disorders like Major Depressive Disorder or Post-Traumatic Stress Disorder.

APPENDIX F
INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL: PHOENIX VA

**PHOENIX VA HEALTH CARE SYSTEM
IRB ANNUAL LETTER**

Research & Development
650 E. Indian School Rd.
Phoenix, AZ 85012

To: Katherine Goren, PhD
From: IRB Subcommittee
Date of Letter: August 17, 2011
Review Type: Full Review
Study Title/IRB Protocol #: A Cognitive Enhancement Group for Veterans with Perceived Cognitive Deficits (No. 001)
IRB expiration (anniversary) date: September 7, 2012
Risk/benefit ratio: Minimal risk/benefit ratio
Approve for total number of subjects/charts review: 100 subjects
Version date of ICF reviewed: N/A – waiver on file
Version date of protocol reviewed: 7/30/09

1. The above-reference protocol was given renewed approval by the IRB Subcommittee at their **August 10, 2011** meeting.
2. After consideration of the research involving human subjects, the IRB results of this review are as follows:
 Approved for continuation
3. It is the Principal Investigator's responsibility to obtain review and continued approval of ongoing research before the expiration noted above. Research activity of any sort may not continue beyond the expiration date without committee approval. Failure to receive approval for continuation before the expiration date will result in the automatic Lapse of approval of this protocol on the expiration date.
4. If you have questions or need assistance, please contact Ted Mobley, MD or Grace Moreno, IRB Coordinator at extension 7224. Please retain a copy of this letter with your approval protocol.

T. Mobley
Ted Mobley, MD
Chair, Institutional Review Board (IRB)

8/18/11
Date