

**The Development of a Driving Behavior Questionnaire for Veterans with Traumatic Brain
Injury and Post-Traumatic Stress Disorder**

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Abstract

The Development of a Veteran Driving Questionnaire
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Veterans returning home from combat deployment have been shown to be at an elevated risk of Motor Vehicle Accidents (MVAs), as evidenced by research after the Vietnam and Persian Gulf Wars. Both recent clinical observations and empirical findings have demonstrated that veterans of Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF) may be at an increased level of risk from MVAs as compared to veterans of previous wars. The high percentage of post-traumatic stress disorder (PTSD) and traumatic brain injury (TBI) in this population may be contributing to this elevated risk; however, little research has been done on the topic of driving patterns in Iraq and Afghanistan combat veterans, and consequently data on the contributing factors of high-risk driving in this population are not readily available. To address this need, this study aimed to create a novel self-report measure for this population. First, by utilizing data from various sources of expert opinion on the topics of PTSD, TBI, veterans, and driving, the researchers narrowed down the possible contributors to high-risk driving. These findings were then condensed into a novel self-report assessment designed to elicit additional data on specific driving behaviors, high-anxiety driving situations, and the emotional and cognitive components of risky driving in this population. This study also compared the rates of high-risk driving in veterans diagnosed with TBI and PTSD against veterans without these diagnoses, and found that those with TBI/PTSD report more risky driving behaviors and significantly higher levels of anxiety while driving in certain situations. These data suggest that the emotional and psychological symptoms of TBI and PTSD may negatively impact driving safety in veterans.

1. Introduction

1.1 Specific aims

The overarching aim of this research project is to create a self-report measure for driving behaviors in veterans with traumatic brain injury (TBI) and post-traumatic stress disorder (PTSD).

The United States' war on terrorism has been fought most visibly by troops engaged in the wars in Iraq, known as Operation Iraqi Freedom (OIF), and Afghanistan, known as Operation Enduring Freedom (OEF). Recent clinical evidence, combined with a few empirical research studies, seem to suggest that veterans of OIF/OEF often have difficulties adjusting to civilian driving patterns after returning home from deployment. Different hypotheses have been put forth to explain why these veterans may be reporting a higher rate of high-risk driving behaviors, including a self-selection bias (perhaps this population is more prone to risky behavior), overlearned behaviors (driving habits learned while in combat are difficult to unlearn in civilian life), and lastly, the effects of TBI and PTSD on behaviors while performing daily life functions such as driving. This last concern, of veterans returning home with TBI and PTSD, has been a recent focus of investigation. TBI and PTSD are so common consequences of combat that they have been referred to as the "signature injuries" of the wars in Iraq and Afghanistan (Lew et al., 2010); yet, the specific effects of these injuries on functional behaviors such as driving are relatively unknown. Therefore, there is currently an acute need for more data on the topic of veteran driving habits, including what factors may be contributing to the elevated level of high-risk driving.

As Lew et al. (2010) state, the most common injuries sustained by troops during OIF/OEF deployment are TBI and PTSD. The cognitive and emotional dysregulation that are the core features of these two injuries, combined with the veterans' training in evasive driving tactics, suggest that this group's driving habits should be more closely examined. The difficulties most often found with comorbid TBI and PTSD include attention and memory deficits, depression, substance abuse, sleep disturbances, fatigue, irritability, hyperarousal, anxiety, and fearfulness. Though these presenting symptoms are problematic in most aspects of daily life, it is possible

that they present an even greater danger in the context of driving behavior in veterans. However, as this presentation of symptoms is rather unique outside of the military, there are not currently any satisfactorily comprehensive clinical tools in existence that can be utilized to evaluate the driving safety of this population.

This study therefore primarily aims to address this absence in the literature by developing a comprehensive questionnaire that is aimed specifically at characterizing driving behaviors observed in the OIF/OEF veteran population. We aim to account for the unique cognitive and emotional components resulting from combat-related TBI and PTSD that are hypothesized to be contributing factors in high-risk driving and are not incorporated into existing civilian driving assessments. In addition to creating this questionnaire, this study will attempt to fill the gaps in the knowledge base through a pilot test of the novel questionnaire. The purpose of this pilot test will be to provide a more in-depth description of the driving errors commonly committed by this population, and the situations or cues that might be contributing to these high-risk behaviors. This pilot study will also aim to elucidate the effects that PTSD and TBI have in veteran driving habits, as well as the role that overlearned combat-minded driving tactics may be playing in this relationship.

Specific Aim 1: To develop a novel self-report measure that will specifically assess the driving behaviors of recently returned OIF/OEF veterans.

Specific Aim 2: To pilot test the newly developed questionnaire to two groups of OIF/OEF veterans, those with and those without diagnoses of concurrent TBI & PTSD.

1.2 Background: Driving behavior in veterans

Past conflicts, most notably the Vietnam War and the Persian Gulf Wars, have shown that combat veterans are at an increased risk of fatal motor vehicle crashes, particularly in the periods following major deployment (Lincoln et al., 2006), and that motor vehicles accidents (MVA) are one of the top four leading causes of injury and disability in veterans (Lew et al., 2010). MVA was listed as the cause of death for 31% of Gulf War veterans (GWV) who died in the early years after returning from deployment, and the greatest number of GWV MVA fatalities occurred between July and September of 1991 (the first full quarter after the Gulf War, when many GWV had returned to the US after deployment) (Lincoln et al., 2006). More recent statistics

converge with these findings from the early 1990s. In the years 2000-2002, an annual rate of 17.9 fatalities per 100,000 persons made off-duty, privately owned vehicle crashes the leading cause of death among active-duty Army personnel (Lincoln et al., 2006). This suggests that driving safety in veterans is a significant concern, and it has been postulated that the risk of MVA might be higher for those returning from Operation Iraqi Freedom and Operation Enduring Freedom.

1.3 Current literature on driving behaviors in OIF/OEF veterans

The findings from current literature in driving behavior of recently returned veterans, though sparse, support the conclusion that these veterans are at an increased risk of MVA and motor vehicle fatalities. Though little empirical research has been focused on the driving behaviors of OIF/OEF veterans after deployment, a study conducted by Kuhn et al. (2010) found that endorsement of recent aggressive driving in OIF/OEF veterans was associated with greater PTSD severity, younger age, higher income, and being married. These results suggested a link between PTSD severity and aggressive driving, with avoidance and arousal symptoms being most important in this relationship. The authors concluded that PTSD-related aggression and impulsivity can increase the risk of aggressive driving, which contributes to over half of MVA fatalities (Kuhn, Drescher, Ruzek, & Rosen, 2010). Similarly, Lew et al. (2010) postulated that combat veterans are a particular at-risk population for risky driving because it is a behavior so easily influenced by cognitive and affective dysregulation (i.e., anxiety, impatience, irritability), which are the hallmark features of PTSD and TBI. Finally, Fear et al. (2008) found that risky driving in United Kingdom military personnel was associated with being young (under 21); in the Army; male; deployed in a combat role; separated, divorced, or widowed; having experienced childhood adversity; being a heavy drinker; reporting PTSD symptoms; and reporting symptoms of a common mental health disorder. Out of 8,127 U.K. military participants surveyed in this study, 19% were defined as risky drivers. Additionally, this study found that among those deployed to Iraq, risky driving was associated with increasing exposure to traumatic events and low in-theatre morale (Fear et al., 2008). Another contributing risk factor for aggressive driving is alcohol and substance abuse, which often presents comorbidly with PTSD and TBI (Kuhn et al., 2010).

Evasive driving techniques used by troops in the urban combat theatres of Iraq and Afghanistan may present a unique risk to driving safety for these recently returned veterans regardless of PTSD or TBI status. Soldiers in OIF/OEF are trained to maintain constant vigilance while driving in order to manage unpredictable threats, such as roadside bombs and civilian terrorism, and to utilize different defensive and offensive driving techniques in order to remain safe. Because OIF and OEF troops are often attacked while driving, they adopt offensive (i.e., speeding, not stopping at intersections) and defensive (i.e., keeping great distance behind other vehicles, not wearing a seatbelt) driving behaviors to reduce their vulnerability to roadside bombs and ambushes (Kuhn et al., 2010). While potentially life-saving in combat situations, these hypervigilant habits can be difficult to unlearn once returning home (Gerardi et al., 2008).

In a statement to the United States House of Representatives Committee Veterans' Affairs, Carolyn Baum presented Erika Stern's recent findings on the driving behaviors and driving related anxiety of 150 OIF soldiers as compared to 49 soldiers who had not been deployed (Baum, 2008). These results were obtained from a self-reported convenience sample, without known PTSD or TBI conditions. Stern found that previously deployed veterans of OIF reported significantly worse driving behaviors compared to their non-deployed counterparts, with a large percentage reporting that they sometimes or always fell into combat driving behaviors in civilian settings, including: 25% drove through stop signs; 23% drove in the middle of the road or into oncoming traffic; 11% drove erratically in a tunnel; and 35% made lane changes or turns without signaling. Twenty percent of these OIF veterans also reported feeling anxious when driving at any time, with larger percentages feeling anxious in situations that imitate combat exposure: 30% when felt anxious when driving near roadside debris; 25% near parked cars; 19% through tunnels or underpasses; 41% in slowed or stopped traffic; 25% at night; 31% when passed by other cars; and 49% when another car approached quickly or boxed them in (Baum, 2008; Stern, Prudencio, & Sadler, 2011).

As support for Baum's findings, Fear et al.'s (2008) study on United Kingdom military personnel found that dangerous driving behaviors, including speeding and not wearing a seatbelt, were more common among UK combatants deployed to Iraq than nondeployed soldiers. It seems likely that these evasive driving tactics

are overlearned behaviors that are tied strongly to a sense of safety. Consequently, veterans may experience rapidly increasing anxiety when these behaviors are not utilized. More research is clearly needed to identify the specific relationship between OIF/OEF combat experience and dangerous driving behaviors, particularly in the case of veterans suffering from PTSD and TBI. It is possible that the training in evasive driving behaviors alone is responsible for the elevated risk of MVA for these veterans; however, it is also possible that the hypervigilance, excessive arousal, and cognitive/attentional deficits resulting from TBI/PTSD can alone be contributing to this elevated risk. A third possibility is that this particular population might be at increased risk of MVA because of the unique combination of evasive driving training and emotional/cognitive deficits resulting from TBI and PTSD.

1.4 Introduction to TBI and PTSD

By 2009, it was estimated that about 320,000 deployed American military personnel had suffered a TBI, and this statistic creates significant socio-economic health problems for both veterans and the nation as a whole (Aarabi & Simard, 2009). The Center for Disease Control and Prevention estimates that the cost of TBI treatment will total to billions of dollars, particularly because between 20-44% of combat-related TBI patients also present with PTSD (Jaffee & Meyer, 2009; Hoge et al., 2008). Bryant and Harvey (1999) postulate that postconcussive symptoms (PCS) may be exacerbated by anxiety, as they found that 20% of TBI subjects were also suffering from PTSD 6 months after their injury. This common association between combat-related TBI and PTSD did not come to worldwide attention until recently, as a result of military reports on U.S. personnel in Afghanistan and Iraq (Stein & McAllister, 2009).

The changing nature of modern warfare is partially responsible for the elevated percentages of military personnel returning home with some form of TBI and/or PTSD. Jaffee and Meyer (2009) argue that is the increasing frequency of exposure to primary blast overpressure combined with multiple deployments that have increased the medical community's awareness of both TBI and PTSD. In the U.S. military, TBI is the most common form of injury reported, and blast explosion is the most common cause of this TBI (Stein & McAllister, 2009). Aarabi and Simard (2009) found that 60% of deployed Americans have sustained some

degree of blast overpressurization during Operation Iraqi Freedom, while Kennedy et al. (2007) found that slightly more than half of combat injuries from OIF were caused by explosive blasts. This study also found that 29% of patients evacuated to Walter Reed Hospital between the months of January 2003 and February 2007 showed evidence of TBI. Therefore, TBI and PTSD have become a main concern for the medical community, and more research is required in order gain a deeper understanding of the long-term consequences of these diagnoses and their associated symptoms.

1.5 Symptoms of TBI

The term “TBI” can cover a great range of injuries, including open and closed-head wounds, concussions, and blast-related trauma. For the purposes of this paper, TBI will refer to combat-related mild head injuries (mTBI). After a mTBI, common symptoms that occur immediately after trauma include physical or somatic complaints of fatigue, headaches, double or blurred vision, dizziness, balance loss and vertigo, sensitivity to light or sound, cognitive deficits in attention, concentration, and memory, confusion, emotional lability, slowed thinking, irritability, disordered sleep, anxiety, and depression (Bryant & Harvey, 1999) (Kennedy et al., 2007) (Lew et al., 2010). Patients can also be affected in motor skills, new problem solving skills, and general intellectual skills. The main areas of cognitive impairment found in mTBI patients are related to the domains of information processing and memory, specifically immediate recall and retrograde amnesia.

For most mTBI patients, good recovery of these skills can be expected between four and twelve weeks (Kennedy et al., 2007) (Lew et al, 2010). However, for a minority of individuals who present with mTBI (usually thought to be about 10-15%), there are some long-term global effects. These chronic symptoms persist for a year or more after the trauma, and are referred to as postconcussive syndrome (Lew et al., 2010). Other concerning comorbid illnesses often present with mTBI, including depression, substance abuse, and suicidal behaviors (Stein & McAllister, 2009). These cognitive, attentional, and affective disruptions resulting from a combat-related mTBI may be slightly different than those symptoms reported by civilians suffering from more common forms of moderate or severe head injury, both in the symptom presentation and the mechanics of

injury. For example, military personnel may have an elevated risk for repeated exposure to mTBI, and this mTBI is more often the result of explosive pressure than blunt force trauma. Therefore, these combat-related TBI symptoms might play an even more significant contributing role to the high-risk driving habits of this population.

1.6 Symptomatology of PTSD

According to the DSM-IV, PTSD is characterized by three clusters of symptoms—reexperiencing, avoidance/numbing, and hyperarousal (American Psychiatric Association, 2000). These symptoms must have been present for more than one month and must present significant distress or impairment in order for a diagnosis of PTSD to be given. The reexperiencing symptoms, unique to the PTSD diagnosis, are intrusive and unwelcome recollections of the experience. These recollections often evoke the original psychological state of dread, helplessness, terror, or horror. The second cluster of PTSD symptoms, avoidance and numbing, are behavioral, cognitive, or emotional strategies that are utilized in an attempt to ward off the emotions elicited by the reexperiencing symptom. Numbing strategies include a diminished interest in activities, restricted affect, detachment, and at worst, an attempt to suppress all possible feelings in order to block the intolerable ones. These feelings of disconnection and apathy are common among trauma survivors, deeply affecting their relationships with others (Friedman, 2006). Finally, the hyperarousal cluster of the PTSD diagnosis is the result of the excessive physiological arousal experienced by survivors, a state which closely resembles the effects of panic disorder (American Psychiatric Association, 2000). Symptoms such as insomnia, irritability, startle reactions, and hypervigilance are easily recognizable manifestations of greater overall agitation (Friedman, 2006).

1.7 Cognitive deficits in PTSD

The specific nature of cognitive dysfunction in PTSD remains unclear, though previous literature has presented some common findings. It has been shown that deficits in executive functioning, attentional processes, immediate memory, and verbal memory are very common among patients with PTSD (Campbell et al., 2009). A study conducted by Vasterling et al. (2002) found that Gulf War veterans showed impairments in

sustained attention, working memory, initial acquisition of information, as well as sensitivity to retroactive interference. Information processing theorists suggest that PTSD is characterized by a bias towards ambiguous and potentially threatening stimuli, where trauma-relevant schemas lead to both heightened activation and lack of suppression of trauma associates (Kimble et al., 2002). It has been suggested that the deficits in declarative memory commonly shown in study participants with PTSD are the result of impaired encoding or retrieval abilities, which are in turn influenced by the degree of attentional and organizational resources available (Danckwerts & Leathem, 2003).

1.8 The Interface between TBI & PTSD

Current research suggests that both neurological and psychological factors play a role in the development and maintenance of TBI and PTSD symptoms. As discussed above, the two conditions have in many symptoms in common—physiological hyperactivity, memory and other cognitive deficits, fatigue, sleep disruptions, irritability, decreased concentration, and anxiety (Trudeau et al., 1998). Both biomechanical and psychological trauma can result in impaired cognitive processing, including the areas of working and short-term memory, speed of information processing, attention, and executive functioning. Some researchers have therefore suggested that a mild TBI may diminish the brain's capacity to employ cognitive resources that would normally be engaged in problem-solving after a trauma, and consequently leave an individual more susceptible to PTSD and related symptoms (Stein & McAllister, 2009). PTSD is present in more than one-third of OIF/OEF veterans with suspected postconcussion symptoms resulting from mTBI, and the symptoms of these two disorders can often be a challenge to tease apart. However, in clinical work, a distinction can usually be drawn between TBI and PTSD based upon the predominant symptoms. TBI is generally the primary diagnoses when more organic symptoms are present, such as headache or visual complaints, while PTSD is more likely to be diagnosed if a patient complains of nightmares, hypervigilance, reexperiencing, or avoidance (Elder, Mitsis, Ahlers, & Cristian, 2010).

PTSD and TBI can have negative repercussions on every factor of a person's life, and one aspect of daily life that can be particularly impacted by the cognitive and emotional dysfunction in TBI and PTSD is the

ability to safely drive an automobile. The executive functioning deficits that often present with TBI and PTSD, which include impulsivity, disinhibition, working memory disruptions, and emotional lability, might significantly affect the judgment necessary for successful driving.

1.9 Cognition, emotion, and driving

From a cognitive perspective, driving is a complex task that relies on both automatic and controlled cognitive processes, as well as motor, sensory, and behavioral components. When a novel or unfamiliar driving situation occurs, the task becomes more cognitively complex as the individual is challenged to react quickly and appropriately. This reaction is thought to be highly dependent on executive functioning, dynamic problem solving, and attentional resources. It requires the ability to divide attention, make safe judgments, remain awake and alert, and maintain emotional control (Lew, Rosen, Thomander, & Poole, 2009). Recent research on multiple sclerosis, TBI, and HIV-infected individuals has demonstrated that even mild cognitive impairment can directly impact driving safety (Schultheis, Garay, & DeLuca 2001)(Brenner, Homaifar, & Schultheis, 2008), which suggests that the cognitive deficits common with TBI and PTSD might have a significant impact on the driving habits of veterans returning home with these injuries.

Affective components also play a contributing role in driving safety, particularly in the areas of information processing and attention. For example, the emotion of sadness has been demonstrated to involve longer reaction times, distorted judgment, and a tendency to self-focus. Contrarily, happiness has been shown to be associated with an assimilative processing style, a broadening of attentional focus, and a shorter reaction time (Pecher, Lemerrier, & Cellier, 2009). Research has also demonstrated that the experience of anxiety while driving is associated with an increase in perceived risk as well as an increase in self-reported near-accidents, and that anger is associated with increased speeding and near-accident rates (Mesken, Hagenzieker, Rothengatter, & de Waard, 2007). It is therefore established that emotional experiences are related to risky driving behaviors, overspeeding, and near-misses/accidents; what is still unknown is the role that affective changes resulting from TBI and PTSD might play in this relationship.

Driving is an important component in the daily life of the majority of returned veterans. Most veterans have prior experience with driving and expect to reacquire the capacity to drive after returning home. Impairment to driving independence not only damages rehabilitation efforts but also impedes social reintegration (Lew et al., 2010). Previous research on brain injury has identified driving as the third most impaired social ability after trauma (Mazaux, Masson, Levin, & Alaoui, 1997). It has also been shown that the cessation of driving is related to difficulties in employment (Devani-Serio & Devens, 1994) and higher rates of depression (Legh-Smith, Wade, & Hewer, 1986). Given the importance of driving capability, this study proposes to examine the relationship between driving behaviors, deployment history, and deployment-related TBI and PTSD, as there is an immediate need to understand the effects that Iraq and Afghanistan combat experiences may have on the driving behavior in recently returned veterans.

1.10 Available driver assessment measures

There are a few different ways of gathering data on driving behaviors, including direct observation (on the road tests), Department of Motor Vehicles driving records, accident reports, and self-reports. Evaluation of behind-the-wheel performance is the current gold standard for driving assessment, particularly in rehabilitation settings (Schultheis, Hillary, & Chute, 2003). This type of direct observation can be extremely informative and ecologically valid; however, is a time-consuming process that is inherently limited to the types of environments and situations that are presented while the participant and examiner are on the road. Not surprisingly, behind-the-wheel assessments are deliberately designed to avoid dangerous situations in order to prevent injury to the driver and assessor. However, these complex situations that are avoided (i.e., night driving or driving in congested areas), may be the best true predictors of driving performance. DMV records and accident reports, though very useful as a convergent measure, should not be used as a sole measurement of driving behavior. It is possible, even likely, that not all dangerous driving habits result in an official record of tickets, citations, or accidents. Self-reports are a quick and inexpensive method of assessment, and are useful in that they directly ask the participant about their experiences. Self-reports also have the added benefit of the ability to measure self-perception, an important component of behavior that can only be reported by the participant themselves.

However, self-reports are limited by their subjective nature, and may therefore be influenced by response bias, poor memory, and a host of other factors.

1.10.1 Literature review: existing driving questionnaires

Most existing questionnaires aimed at measuring civilian driving safety attempt to quantify the subjective experience of anxiety, as well as avoidance of driving, but do not often measure actual on-the-road behaviors. The Safety Behavior Questionnaire (Ehring et al., 2006), The Fear of Driving Inventory (Walshe, Lewis, Kim, O'Sullivan, & Wiederhold, 2003), and the Driving and Riding Avoidance Scale (Stewart and St. Peter, 2004) are all examples of such measures (Clapp, Olsen, Beck, Palo, Grant, Gudmundsdottir, & Marques, 2011). However, in the past decade, attention has begun to shift to problematic driving behaviors that can result from driving phobias, generalized anxiety, PTSD, and road rage. As a result of this shift in attention, a few measures have been generated that focus specifically on behind-the-wheel behaviors. The proposed project will carefully study four such questionnaires, as well as one measure that was used to assess risky driving in a military population (Kuhn et al., 2010). These questionnaires include The Driving Anger Expression Inventory (DAX; Deffenbacher, Lynch, Oetting, & Swaim, 2002), The Propensity for Angry Driving Scale (PADS; DePasquale et al., 2001), The Driver's Angry Thoughts Questionnaire (DATQ; Deffenbacher et al., 2003) and The Driving Behavior Survey (Clapp et al., 2011). Additional information on these questionnaires can be found in Appendix A.

The Driver's Angry Thoughts Questionnaire (Appendix B) includes 5 subscales that measure types of cognitions while driving; these types include judgmental/disbelieving thinking, pejorative labeling/verbally aggressive thinking, physically aggressive thinking, revenge/retaliatory thinking, and coping-self instruction cognitions. The Driving Anger Expression Inventory measures four ways of expressing anger while driving, including verbal aggressive expression, personal physical aggressive expression, using the vehicle to express anger, and adaptive/construction expression. The Propensity for Angry Driving Scale measures the likelihood of anger responses to common on-road situations, which are described in short vignettes. Finally, The Driving

Behavior Survey measures the frequency of occurrence for maladaptive or dangerous driving behaviors, both overly-cautious and overly-aggressive.

The civilian driving measures, while shown to possess psychometrically sound properties, are not particularly relevant to the military population (Appendix A). While these questionnaires provide good insight into civilian driving behaviors, they are limited in that they only look at “road rage” situations without identifying other triggers or cues that might commonly elicit high-risk aggressive driving (with the exception of the Driver Behavior Survey). They do not address other possible contributions to risky driving behaviors, such as driving while fatigued or under the influence of alcohol or drugs, that have been reported to play a large role in high-risk driving in veterans. Finally, anecdotal reports and the few recent studies that have focused on this particular population of veterans suggest that their dangerous driving behaviors are qualitatively different than those of civilians (Kuhn et al, 2010). Therefore, while these questionnaires may certainly be useful convergent measures, the development of a new questionnaire aimed at a military population seems warranted. The questionnaire that was utilized by Kuhn et al. (2010) to assess risky driving, while applicable to the military population, consists of 6 items and does not elicit much detail about specific dangerous driving behaviors or the circumstances that elicit those behaviors. Again, this questionnaire is useful as a model, but a more detailed measure would be useful. So despite the presence of these questionnaires in the literature, there is still a need for a more in-depth and sensitive measure aimed specifically at the OIF/OEF Veteran population. The development of such a questionnaire is the aim of this study. The creation of this novel questionnaire could help researchers to better understand the scope of the problem, as well as the various contributing sources to high-risk driving in this population.

1.11 Significance of proposed study

Research over the past three decades has shown that returning military veterans are at an increased risk of MVA. Moreover, recent literature and clinical observations point to the conclusion that veterans of OIF/OEF might be at an even higher risk of death or injury due to high-risk driving behaviors. The cognitive deficits

resulting from TBI and PTSD, the “signature injuries” of these two wars, are postulated to play a role in this elevated risk. Another contributing factor may be the evasive driving techniques that veterans of OIF/OEF may have been trained in, or exposed to, while deployed, which become overlearned behaviors that carryover to driving habits after a return to civilian life. However, despite the elevated danger faced by this population after deployment, a useful or sensitive assessment measure designed to evaluate veteran driving safety does not exist. Additionally, the specific high-risk driving behaviors, as well as situations that may trigger these behaviors, remain unclear to clinicians and assessors. Therefore, this study will directly address this need by creating a novel self-report measure. This measure will be designed to 1) provide a more detailed description of the behaviors, situations, and cues that might be resulting in elevated risk of MVA, and 2) add to the literature concerning the role that TBI/PTSD might play in Veteran driving safety. In sum, we aim to provide a useful tool as well as more specific information to clinicians and assessors for the evaluation of driving safety in OIF/OEF veterans.

2. Experimental Design and Methods

2.1 Summary of Changes to Current Study

A sample size of 50 veterans was initially proposed. It was expected that this study would enroll 25 veterans with diagnoses of TBI and PTSD and 25 veterans without these diagnoses as a control group. However, due to recruitment difficulties, this study reports a sample of 33 veterans. Of this total sample, 23 participants were diagnosed with TBI and PTSD according to their VA medical records, while 10 control participants did not carry either diagnosis. While recruitment of veterans with TBI and PTSD was relatively easy because of the researchers’ access to the Polytrauma case list, recruitment of control subjects was more challenging. During the first eight months of the study, recruitment of control subjects relied on posted flyers and referrals from clinicians. However, as veterans without TBI and PTSD generally are more likely to work or attend school full time and do not have appointments at the VA as frequently as veterans with these diagnoses, they are less likely to participate in a research session. As a result of this difficulty, recruitment methods were

changed for control participants. The VA IRB granted the present study a privacy waiver, and control subjects were recruited directly through medical record searches instead of relying on self-referrals.

A second procedural change in the present study involved the age inclusion criteria. It was originally proposed that only veterans aged 19-40 would be included. This age range was expanded to 19-50 in order to increase the recruitment pool and collect a wider range of data.

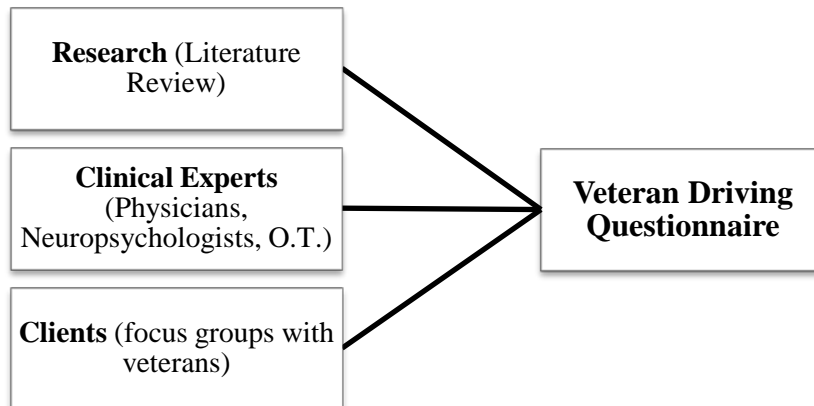
2.2 Study Overview

The data used in this study were collected as part of the author's original master's thesis and as part of an ongoing study funded by the Council on Brain Injury. Participants in the study were recruited from The Philadelphia VA Medical Center Polytrauma and Post-Deployment Clinics. The Philadelphia VAMC is part of the VA Healthcare Veterans Integrated Service Network (VISN 4) network. This network includes 10 medical centers and 44 community-based outpatient clinics in 104 counties throughout Pennsylvania, West Virginia, Delaware, and New Jersey. The Philadelphia VAMC serves as an acute referral center for veterans in eastern Pennsylvania, Delaware, and Southern New Jersey, and as such, more than 90,000 veterans are enrolled in the PVAMC system (U.S. Department of Veterans Affairs, 2011). The primary goals of this study were to 1) to develop and pilot a novel measure of civilian driving habits in veterans of the OIF/OEF military campaigns, 2) to describe situations and behaviors that might contribute to anxiety and high-risk driving, and 3) to examine the possible effects of traumatic brain injury and post-traumatic stress disorder on driving behaviors.

2.3 Phase 1 Methods: Development of Veteran Driving Questionnaire

There is an immediate need for a measure that accurately assesses driving behavior in veterans. The aim of Phase 1 of this project was to develop a novel measure of driving habits of OIF/OEF veterans with PTSD and TBI, in order to contribute to the literature on high-risk driving behaviors and mistakes in this population. This questionnaire was based on both the preexisting driving surveys as well as expert guidance from clinical sources. A flow chart of the development of this questionnaire can be seen in Figure 1.

Figure 1. The Development of the Veteran Driving Questionnaire



2.3.1 Literature Review and Clinician Input

First, a comprehensive literature search on the topics of PTSD, TBI, and driving behaviors was conducted. This literature review provided the theoretical foundation of the questionnaire and helped to direct specific lines of inquiry during the focus group discussions. A search of Ovid, PubMed, and PsychInfo was performed for qualitative and quantitative reviews of veteran driving habits and difficulties. Search terms included “veterans,” “driving,” “PTSD,” “brain injury,” “combat,” “simulator,” “Battlemind,” and “OIF/OEF.” This literature review was limited to articles from peer-reviewed journals, and these articles were searched for specific driving difficulties that may be unique to the OIF/OEF veteran population. A list of high-risk situations, behaviors, and emotional states was created based on the findings of these previous studies, and this list formed the basis for the initial Veteran Driving Questionnaire (VDQ) structure.

The findings from this literature search were then integrated with different sources of expertise on the subject of driving behaviors in OIF/OEF veterans with PTSD and TBI. Two specific avenues of expertise were solicited in order to make this attempt as broad as possible. First, the researchers consulted clinicians who work with the veteran population on a daily basis. These clinicians included Dr. Keith Robinson (Co-Principal Investigator), Chief of Physical Medicine and Rehabilitation, and Medical Director of the Polytrauma Unit, at the PVAMC, as well as Dr. Rosette Biester, a clinical neuropsychologist with appointments at the University of Pennsylvania and the PVAMC. Delores Iacovone, an Occupational Therapist who works specifically with driving and on-the-road assessments for the PVAMC, was also consulted about her first-hand experiences with

the driving habits of these veterans. The information gained from these interviews were then integrated with the findings from the literature to further develop the initial VDQ.

After a draft of the VDQ was produced, Dr. Robinson, Dr. Evan Forman (Drexel University), Dr. Schultheis (Drexel University), and Dr. Biester rated each item in terms of wording and relevance. Items that were not rated highly were clarified or removed entirely, and the original seven-point Likert scale was replaced by a five-point scale. Although a “not applicable” option was considered, it was ultimately decided to keep each item in a forced choice format, as “never” is a possible answer. This analysis ensured that the new measure was adequately sensitive, understandable, and relevant to the veteran population prior to pilot testing.

2.3.2 *Focus Groups*

Next, first-hand data on common high-risk driving behaviors and scenarios were solicited from veterans diagnosed with TBI and PTSD according to PVAMC medical records. Two focus groups with a total of four participants were conducted under the supervision of Dr. Robinson. The first focus group included three veterans. The second had two participants scheduled but one did not show, and subsequently only one veteran was interviewed. All focus group participants underwent informed consent procedures per VAMC protocol then completed the VDQ. After participants completed the questionnaire, they were asked to give both verbal and written feedback on the clarity and relevance of the existing items. Next, various high-risk driving situations, frustrations, and triggers were discussed within the group. During these discussions, several unexpected driving-related concepts were introduced, such as avoiding speeding tickets through the use of a military ID and frustrations with the difference between civilian and military adherence to rules. Although some of these topics were not included in the final VDQ, they provided a greater context for understanding the driving environment of veterans. At the end of the session, participants were debriefed and compensated \$25 for their time. The feedback gained from these focus groups allowed for further modification to the VDQ.

2.3.3 *OIF/OEF Veteran Driving Questionnaire: Organization*

One goal when developing this questionnaire was to balance the completeness and scope of the measure while simultaneously minimizing subject burden. The existing driving questionnaires were studied carefully in

order to rule out redundancies and to include the most pertinent questions, then modified or added to as needed in order to be as relevant as possible for this specific population. The resulting version of the questionnaire (Appendix C) contains three novel sections, and each section addresses a different component of driving. These aspects were highlighted as influential on driving behavior by previous driving research, and anecdotal reports from the clinicians and assessors at the Philadelphia VAMC converged with this literature. These sections are therefore concerned with 1) driving background, 2) situation-specific cues, 3) driving behaviors, and 4) affective states that might be resulting from and/or impacting driving habits. An additional scale, the Driver's Angry Thoughts Questionnaire, assesses frequency of cognitions that may occur while driving. The situational and behavioral sections of the VDQ are aimed at eliciting information about external factors that contribute to MVAs, and it is hypothesized that these external factors would most likely be impacted by the overlearned behaviors and previous combat experiences of each individual. The emotional and cognitive sections ask about various internal experiences that might be feeding into the elevated risk these veterans face, and factors relating to TBI and PTSD, such as cognitive deficits or emotionality, are expected to impact these internal experiences. Comprehensive descriptions of these sections are provided below.

2.3.3.1 Section 1: Driving background

This section is designed to elicit a brief background of a participant's driving history and current driving habits. It assesses days, miles, and hours driven a week, as well as type of vehicle driven before, during, and after deployment. This section also asks for a self-report of accidents and near misses experienced before and after deployment. These responses will be compared against each participant's Department of Motor Vehicles Driving Record. Finally, this section asks participants to explain, in an open-ended format, if/how their driving has changed since deployment and what (if anything) they would like to change about their driving.

2.3.3.2 Section 2: Cues or situations

The second section of the VDQ asks about specific cues and scenarios that may elicit anxiety while on the road. The basis of this section was Erika Stern's findings on anxiety-provoking driving situations (Baum, 2008), and it also includes information on common triggers as mentioned by the focus group participants, Dr.

Robinson, Dr. Biester, and Delores Iacovone. Examples of high-risk scenarios include driving in traffic, driving in tight or narrow lanes (“the cattle shoot”), driving through tunnels or near debris, and driving in cities with tall buildings. Veterans are asked to rate each item on a five point Likert scale, where scores can range from 0 (never anxious in this situation) to 5 (always anxious in this situation).

2.3.3.3 Section 3: Driving behaviors

These items assess driving behavior during the post-deployment period, defined as the day the participant returned home from deployment until the day they completed the questionnaire. This section examines intoxicated driving, speeding, erratic driving, and other risky driving behaviors that have occurred since returning home. This section also asks about the frequency of protective driving behaviors, such as maintaining speed limit and wearing a seatbelt or motorcycle helmet. Every item in this section is rated on a five point Likert scale, and possible responses range from 0 (never engage in this behavior) to 5 (always engage in this behavior).

2.3.3.4 Section 4: Affective states

This section asks participants to rate how frequently they experience certain emotional states while driving. Examples of affective states that could strongly affect driving behavior, or often result from being on the road, include anger, fatigue, frustration, or irritability. This section attempts to elicit information on the emotional experiences of veterans while driving, and how those affective states might play a role in driving safety. As in the prior sections, veterans are asked to rate how frequently they experience each emotion while driving on a five-point scale that ranges from never to very often.

2.3.3.5 Section 5: Cognitive factors

The final subscale, The Driver’s Angry Thoughts Questionnaire (Deffenbacher et al., 2003), measures the frequency of various cognitions that drivers might experience. The DATQ has been shown to possess sound psychometric properties and provides information on both aggressive and safety-conscious driving-related cognitions. The DATQ is a 65-item questionnaire and measured on a 5-point Likert scale. Respondents rate how often they have had the thought listed (or one similar to it) on a range from 1 (not at all) to 5 (all the time)

while driving. The DATQ yields 5 subscales: judgmental/disbelieving thinking, pejorative labeling/verbally aggressive thinking, physically aggressive thinking, revenge/retaliatory thinking, and coping-self instruction cognitions. The DATQ has been shown to predict risky behavior on the road and some crash-related conditions (Deffenbacher, White, & Lynch, 2004), and it is theorized that this measure may be sensitive to the irritability, frustration, and anger that is often anecdotally reported by veterans with TBI and PTSD.

2.3.4 *Questionnaire Outcome Variables*

Each response in the first three sections of this self-report is rated on a 5-point Likert scale. For endorsement of items that are labeled high-risk behaviors (i.e., the statement “I drive through stop signs or red lights”) a score of 0 is applied to “never,” continuing up to a score of 4 for “very often.” In final analyses that calculate subscale score or total VDQ score, these item scores are reversed for endorsement of low-risk or protective driving behaviors, situations, and emotions. For example, an answer of “always” to the statement “I wear a seatbelt while driving or riding in a motor vehicle” is coded as 0, whereas an answer of “never” to the same question is coded as 4. In this manner, each subscale will merit a total score from the sum of each individual response value, with higher total scores representing endorsement of higher-risk driving. As the fourth section of this questionnaire utilizes the DATQ (also a 5-point Likert scale), separate subscale scores for this section were computed using Deffenbacher’s (2003) documented procedures. Finally, a total score for the entire questionnaire is calculated using the sum of each novel subscale. This total score serves as the main outcome measure of this questionnaire.

2.3.5 *Summary of Phase 1*

The goal of Phase 1 was to create a novel self-report measure that assesses veteran driving behavior. The knowledge gained from previous literature on TBI, PTSD, driving, and veterans informed the theoretical foundation of this questionnaire, and feedback from clinicians, assessors, and veterans within the PVAMC system helped to ensure that the measure is sensitive and relative to the OIF/OEF veteran population. The VDQ contains sections aimed at various components theorized to be central to driving safety, which includes behaviors, situational cues, emotional states, and cognitions. Finally, a section was included in this new

measure that asked participants to give feedback on the questionnaire. This feedback allowed the researchers to evaluate the feasibility and utility of the questionnaire, as this project is a pilot study with the ultimate goal of developing a novel self-report measure.

3. *Phase 2 Methods: Pilot Study of Veteran Driving Questionnaire*

3.1 *Participants*

The Philadelphia VAMC's Polytrauma and Post-Deployment Clinics were the primary recruitment sites for this study. Thirty-three participants recruited between February 2012 and March 2013 are included in the present sample. Participants met the following criteria:

Age: All participants were between the ages of 19 and 50. Individuals under the age of 19 were not included as they do not meet veteran status, and individuals over the age of 50 were excluded to minimize the potential effects of aging on driving.

Deployment history: All participants had been deployed to OIF and/or OEF. Participants were excluded if they had a history of deployment to other combat theaters (i.e., the Persian Gulf War), in order to minimize confounds from combat experience.

Psychiatric history: This study enrolled 23 participants with diagnoses of TBI and PTSD and 10 participants without these diagnoses. Participants with any other significant psychiatric history (i.e., psychosis, schizophrenia) that predated deployment were excluded.

Driving criteria: All participants had a minimum of one year of driving experience. All participants were active drivers (defined as a minimum of 1 driving occasion per 2 week block over the last 6 weeks), and all except one was in possession of a current driver's license. Subjects who required any adaptive driving equipment were excluded from the study.

This study proposed to look at comorbid PTSD and TBI, while excluding participants who have a single diagnosis of either PTSD or TBI, for multiple reasons. First, the highest percentage of veterans receiving these diagnoses receive them comorbidly, rather than as single diagnoses. The majority of veterans who present with

PTSD also have a history of blast exposure, so there is currently no clinical rationale for separating these diagnoses into clear-cut cases, particularly in terms of treatment and intervention. Comorbid PTSD and TBI are what the clinicians and assessors report most frequently in this population, so it is the condition that most urgently requires research. It is very possible that future research will look at entirely separate TBI and PTSD diagnoses, but for the purposes of this pilot study, the most logical starting point is with concurrent presentations.

3.2 Power Analysis

A power analysis was conducted to determine the sample size needed to achieve 80% power for a two-way t-test (independent means). An alpha level of .05 was used to determine significance. No previous effect sizes or odds ratios exist in the literature due to the exploratory nature of the current analyses. Cohen's (1992) guidelines were used to calculate sample size for the independent means t-test. For a t-test with a medium effect size of .5, a sample size of 128 will be required to achieve of power of 80%. This power analysis for Aim 2, Hypothesis 1 was conducted using G*Power version 3.1 (Faul, Erdfelder, Buchner, & Cupper, 2007). However, because this sample size was constrained by recruitment pool potential, this pilot study was underpowered. Therefore, in addition to significance testing, we will also examine effect sizes.

3.3 Assessment Measures

3.3.1 Demographic information

Age, basic driving history (year of licensure, loss or suspension of license), employment status, marriage or relationship status, psychiatric history, alcohol and substance abuse history, education in years, military rank, annual income, length of time since deployment, length of time spent deployed, combat role during deployment, and any service connected VA disability were collected for each participant. Time since licensure and hours spent driving per week were collected as measures of driving experience and frequency. The role of this demographics questionnaire was to gather data on the relationship between deployment, TBI/PTSD status, and driving behaviors. The specific combat role of the participant during deployment was hypothesized to be very

important to this relationship, as it might be strongly linked with the amount of time spent in a vehicle or in transit while deployed. Alcohol and substance abuse were also expected to contribute to high-risk driving.

3.3.2 *Sensation Seeking Scale Form V*

The Sensation Seeking Scale Form V (SSS-V; Appendix D) is a 40-item forced choice inventory developed to measure individual differences in sensation seeking proclivity. The SSS-V has been shown to possess strong reliability, construct validity, internal consistency, and convergent validity (Roberti, Storch, & Bravata, 2003). This measure was used to elicit data about premorbid individual characteristics of participants that may better explain high-risk driving behaviors. It will also be used to determine if the novel driving questionnaire is able to provide data above and beyond what is already available through existing measures.

3.3.3 *Driver's Angry Thoughts Questionnaire*

The DATQ asks participants to rate how often they have had a thought listed (or one similar to it) on a range from 1 (*not at all*) to 5 (*all the time*). This measure yields 5 subscales of cognitions while driving, including judgmental/disbelieving thinking, pejorative labeling/verbally aggressive thinking, physically aggressive thinking, revenge/retaliatory thinking, and coping-self instruction cognitions. The DATQ was incorporated as a subscale in the VDQ to provide more detailed information on the types of thoughts veterans most frequently experience while driving.

3.3.4 *Veteran Driving Questionnaire*

Participant scores on the novel Veteran Driving Questionnaire provide the main outcome measures of this pilot study. Individual scores were measured within each subscale (Behaviors, Situations, Emotions), and were then combined to generate an overall rating of an individual's endorsement of high-risk driving.

3.3.5 *Department of Motor Vehicle Driving Record*

Participants were asked to sign a release for their Department of Motor Vehicle Driving Record. This DMV record provides additional data on driving history that may have been misreported by the individual, such as speeding tickets or accident history. Of the 33 total participants, 28 signed a DMV release form. Of those who did not sign a release form: one participant was unwilling to release his records, one participant had his

license legally taken away recently (but was still an active driver), and two participants had not yet transferred their licenses to DE, PA, or NJ.

3.4 Procedure

All recruitment and testing took place at the PVAMC in coordination with co-investigator Dr. Keith Robinson. Participants were recruited through a variety of methods. First, flyers were posted in the Post-Deployment and Polytrauma Clinics, and physicians and medical professionals in these clinics were asked to inform their patients of the study. Next, the Polytrauma case list was searched for potential participants, and all eligible participants were mailed a letter of invitation. This letter was followed with a recruitment phone call. All participants with TBI and PTSD were recruited throughout the Polytrauma list in this matter. Due to the poor recruitment yield of control subjects, after six months a HIPAA waiver was sought from the VA IRB. This waiver allowed for the recruitment of control participants through a search of the Post-Deployment clinic records. All eligible participants were mailed a letter, and this letter was followed with a phone call.

Overall, approximately 400 medical records were searched within the Polytrauma and Post-Deployment Clinics, and 198 letters were mailed to potential participants, both control and TBI/PTSD. Researchers then followed the letters with a phone call. Of these 198 potential participants, 41 veterans were screened, and 33 were enrolled in the study. The remaining eight eligible participants were lost to cancellations or follow-up.

The present study includes 33 participants that met inclusion criteria prior to proceeding to study enrollment. Upon entry into the study, participants were asked to sign an informed consent form approved by the PVAMC IRB. In addition, participants were informed that their driving records would be reviewed as part of the study, and were asked to sign a Department of Motor Vehicle Driving Record request form. All participants met with the study coordinator for one session lasting approximately 1.5-2 hours. All testing took place on-site at the PVAMC, and each session included 1) Informed consent, 2) Demographics Assessment, 3) Sensation Seeking Scale—Form V, 4) Veteran Driving Questionnaire, 5) Driver's Angry Thoughts Questionnaire.

Eligible participants were first asked to review and sign the IRB-approved informed consent forms. After participants had an opportunity to ask questions and indicate their understanding of the study, they were

enrolled into the study. The first portion of the testing session was a verbal assessment of demographic information. During this semi-structured interview, the researcher collected basic information on age, ethnicity, military service, education history, vocational status, marital status, physical and psychological complaints, alcohol and substance abuse, and traumatic brain injury history. Following the collection of this demographic data, participants completed all pen-and-paper assessment measures with the researcher on-hand to answer any questions. The order of the questionnaires was counterbalanced between participants to counteract order effects. Upon completion, participants were debriefed and compensated \$25 for their participation.

Following data collection for the final sample of participants, databases containing the variables of interest to the study were created. Variables were included in the following categories: 1) demographic information, 2) sensation seeking data, 3) VDQ data, and 4) DATQ data. Data management and analysis was performed using PASW 18.0. Data security and back-ups are managed at the PVAMC. All data security measures followed VA IRB protocol. First, participants were randomly assigned a five digit identifier number through the website random.org, and this number was used in place of any identifying information on all assessment measures. The file linking names to ID numbers is kept in a password-protected and encrypted file on the internal VA K:// drive, and only Dr. Robinson and Elizabeth Whipple have access to that file. All participants signed informed consents and HIPAA waivers prior to enrollment, and the hard copies of these files are kept in a locked filing cabinet in Dr. Robinson's office, as mandated by the VA IRB. All data is de-identified prior to coding, and the SPSS files containing this electronic data are also stored in the encrypted K:// drive. No identifiable physical or electronic data has left the VAMC premises.

3.4.1 Specific aims, hypotheses, and planned statistical analysis

Phase 1, Specific Aim 1: Develop a novel self-report measure that will specifically assess the driving behaviors of recently returned OIF/OEF veterans

Hypothesis 1: The integration of data from multiple expert sources on the topic of driving behavior in OIF/OEF veterans with TBI and PTSD will inform the development of a valid questionnaire. No formal data analysis was

conducted after Phase 1. However, the resulting new Veteran Driving Questionnaire was generated from Phase 1 (procedure described in section 2.3.1).

Phase 2, Specific Aim 1: To pilot test the novel questionnaire to two groups of OIF/OEF veterans, those with and those without concurrent diagnoses of TBI and PTSD.

The first level analysis of the data generated by our novel questionnaire will be a descriptive analysis. These descriptive statistics will summarize the data and provide information on the frequency of endorsement of the various driving behaviors and anxiety-provoking situations and mistakes. These analyses will also demonstrate which emotional states and external situations that might be most often contributing to high risk driving in this population. Finally, this descriptive analysis will allow us to compare the driving behaviors of veterans with TBI/PTSD versus those without.

Phase 2, Specific Aim 2: To provide a more in-depth description of the driving errors commonly committed by this population, and the situations or cues that might be contributing to these high-risk behaviors.

Hypothesis 1a: OIF/OEF veterans with TBI/PTSD will report higher levels of risky driving behaviors than OIF/OEF veterans with no diagnoses of TBI/PTSD. This hypothesis will be tested using a two-tailed independent samples t-test. Preliminary analyses will be run to analyze the relationship of PTSD/TBI diagnoses to level of high-risk driving as determined by the questionnaire total score, and both effect sizes and significance will be calculated in order to account for an underpowered sample. It is expected that veterans with TBI/PTSD will report a significantly higher total score on the driving questionnaire than veterans without TBI and PTSD. The relationship between TBI/PTSD diagnosis/no diagnosis and scores on the individual subscales will also be calculated, in order to determine if these diagnoses may be more strongly related to a specific domain of driving.

Hypothesis 1b: OIF/OEF veterans with TBI/PTSD will report higher scores on the affective and situational cues subscales than OIF/OEF veterans with no diagnoses of TBI/PTSD

Hypothesis 1c: Scores on the driving behaviors and cognitions subscales will not show significant differences

between groups. Hypotheses 1b and 1c are concerned with subscale scores rather than the total score of the VDQ. As the individual sections of the VDQ are theorized to look at different dimensions of driving, it is hypothesized that affective and situation factors may play a large contributing role in the dangerous driving behavior of veterans with TBI and PTSD, while actual driving behaviors and cognitions are more influenced by experiences and role during combat. Thus, no group differences are expected on the behaviors and cognitions scales.

Hypothesis 2: Endorsement of high-risk driving behaviors on the novel driving questionnaire will demonstrate a

relationship with level of combat exposure, age, and substance abuse. Due to the exploratory nature of this analysis, it is difficult to predict what other variables will be associated with high-risk driving. However, based on the literature, age, alcohol/substance abuse, level of combat trauma experienced, and role during combat are predicted to be highly correlated with increased risk of MVA. Correlation analyses will be run to analyze the strength of the relationship of each of these factors to high-risk driving. Additionally, the strength of the relationship between total score on the SSS-V and the novel questionnaire total score will be analyzed. This analysis will allow the researchers to begin exploring if the novel measure adds new information about high-risk driving above and beyond what is available through administration of the SSS-V.

4. Results

4.1 Analytical Strategy

All analyses were performed using PASW 18.0. Analyses in the current study used descriptive analyses and comparison of group means. Descriptive analyses were performed for demographic variables, driving variables, and sensation seeking variables. TBI/PTSD diagnostic status (yes/no) served as the measure of group status in comparison of group means. Means and standard deviations (or percentages/frequencies for categorical variables) for variables of interest were reported for each group. The distribution of all variables

was tested for normality using skewness and kurtosis statistical tests, and data was examined for outliers. Non-directional hypotheses were tested using two-tailed tests. The criterion for statistical significant was $p < .05$.

4.2 Phase 1

4.2.1 Specific aims, hypotheses, and statistical analysis

Phase 1, Aim 1: Develop a novel self-report measure that will specifically assess the driving behaviors of recently returned OIF/OEF veterans.

Hypothesis 1: The integration of data from multiple expert sources on the topic of driving behavior in OIF/OEF veterans with TBI and PTSD will inform the development of a novel questionnaire.

4.2.2 Edits to Veteran Driving Questionnaire

The feedback gained from two focus groups allowed for modification to the initial VDQ that was developed based on literature and clinician input. Much of the feedback from focus group participants regarded the wording and clarity of existing items, and some feedback resulted in the inclusion of entirely new items. For example, a more subjective item that asked about “difficulties with driving after deployment” was replaced with “changes in driving after deployment,” as a few focus group participants stated that their driving had changed in a positive way. Although they felt more anxious and aware while driving, they also felt that this vigilance made them more attentive and defensive drivers. Examples of entirely new items that were included after focus group feedback include the behavior of pounding the steering wheel out of anger and the anxiety-provoking situations of driving in narrow lanes and one-way streets. Additional clarification was also given regarding the affective states subscale, as several veterans mentioned a difference between feeling anxious and “nervous” and a difference between feeling energetic while driving versus feeling “excited” or “pumped up.” These items were thus included as separate affective states.

4.3 Phase 2: Pilot Test

In the second phase of this study, 33 participants were seen for one individual testing session lasting approximately two hours. During this pilot testing phase, all participants were administered a measure of

sensation seeking, a measure of driving-related cognitions, a semi-structured interview of military, physical, and psychological history, and the novel driving questionnaire.

4.3.1 Characteristics of the Sample

A two-tailed independent samples t-test revealed no significant difference in the ages of veterans with TBI and PTSD ($n = 23$, $M = 32.74$, $SD = 7.26$) as compared to the age of veterans without these diagnoses ($n = 10$, $M = 28.80$, $SD = 4.80$), $t(31) = 1.57$, $p = .13$, 95% CI: [-1.19, 9.06], $d = .64$. Additionally, a chi-square test for independence revealed that there is no significant difference between groups in military rank, $\chi^2(2, N = 33) = 4.26$, $p = .12$ (values reported in Table 2). However, a two-tailed independent samples t-test revealed a significant difference in the education of veterans with TBI and PTSD ($n = 23$, $M = 15.39$, $SD = 1.95$) as compared to the education of veterans without these diagnoses ($n = 10$, $M = 13.40$, $SD = 2.32$), $t(31) = -2.55$, $p = .02$, 95% CI: [-3.56, -.40], $d = .93$. Other demographic variables (gender, race, marital status, employment, handedness, branch of military) are reported in Table 3.

Table 1. Participant Rank By Group

Military Rank	Group	
	TBI/PTSD	Control
Low (E1-E4)	9	6
Mid (E5-E7)	14	3
High (E8-E10)	0	1*

*Participant was O3

Table 2. Demographic Characteristic By Group

Variable	Group	
	TBI/PTSD	Control
Gender (M/F)	22/1	10/0
Education (yrs)	15.39 (1.95)	13.40 (2.32)*
Handedness (L/R)	6/17	0/10
Race		
African-American	7	4
Asian	1	0
Caucasian	12	6
Native American	1	0
Other	2	0
Marital Status		
Single	7	5
Married	13	4
Divorced	3	1

Employment Status		
Full time	7	2
Part time	1	0
Unemployed	9	5
Student	6	3
Branch of Military		
Air Force	2	0
Army/Army N.G.	15	8
Navy	2	1
Marines	4	1

* $p < .05$ (independent samples t-test; $d = .93$)

4.3.1.1 *Driving and Deployment History: TBI/PTSD Group*

Nine participants began driving at age 16, seven at age 17, and seven between the ages of 18 - 20 years. The majority of this group ($n = 21$) had driven vehicles or been in convoys often during their deployment. Nineteen of the 23 participants had exposure to IEDs, while four were diagnosed with non-blast TBI (due to falls, MVAs, or physical blows to the head). This group drove an average of 14.39 hours a week ($SD = 12.30$, range = 1 – 55 hours). The majority of this group served in Iraq and Afghanistan between the years of 2001-2005, while 5 participants served between the years of 2006-2009. One participant completed his last tour of Afghanistan in February 2011, and was the most recently returned soldier in this group. All participants were enlisted servicemen and women, and ranged in rank from E1 to E7.

4.3.1.2 *Driving and Deployment History: Control Group*

Three control participants received their driving licenses at age 16, four at age 17, and three between the ages of 18 - 22 years. Eight of the 10 participants had driven vehicles or been in convoys often during their deployment. This group drove an average of 6.85 hours a week ($SD = 4.23$, range = 1 – 14 hours). Overall, this group returned home more recently than the TBI/PTSD group. Two participants served in Iraq and Afghanistan between the years of 2005-2006, but the majority served between the years of 2006-2011. One participant completed his last tour of Afghanistan in October 2012, and was the most recently returned soldier in this sample. The enlisted participants ranged in rank from E1 to E4, and this group also included one officer ranked O3.

4.3.2 *Descriptive Analysis of Veteran Driving Questionnaire*

To begin addressing the second study aim of providing a description of the common driving behaviors in the veteran population, descriptive analyses were conducted on the novel driving questionnaire. Descriptive statistics are reported below in table format, clustered by subscale items. The top ten most endorsed items by the TBI/PTSD group on each subscale are included. Each subscale is a five-point Likert scale and scores range from zero to four.

4.3.2.1 Driving Behavior Subscale

On the behavior subscale, possible answer choices ranged from “never engage in this behavior” to “very frequently engage in this behavior.” A score of four would indicate that all participants very frequently engage in that particular behavior.

Table 3. Behavior Subscale: Scores on Individual VDO Items By Group

Item	TBI/PTSD	Control
	<i>M (SD)</i>	<i>M (SD)</i>
Keep a careful eye on others	3.61 (.78)	3.70 (.67)
Drive above speed limit	3.39 (1.34)	2.80 (1.03)
Wear a seatbelt/helmet*	3.30 (1.18)	3.30 (1.16)
Come to full stop at stop sign*	2.91 (1.24)	2.90 (1.19)
Accelerate through yellow light	2.83 (1.23)	2.80 (1.30)
Plan to avoid traffic*	2.78 (1.51)	2.80 (.92)
Plan for a designated driver*	2.59 (1.84)	2.60 (1.71)
Get distracted by sights	2.52 (1.24)	2.00 (1.15)
Demonstrate anger at another	2.47 (1.50)	1.60 (.84)
Plan to avoid anxious situations*	2.26 (1.32)	2.20 (1.14)

*Item score was reversed in final analyses

As expected, speeding was a highly endorsed behavior by both groups. Within the TBI/PTSD condition, 60% stated that they frequently or very frequently drive above the speed limit, while 82.6% of the control group speed either frequently or very frequently. Only one participant from each condition endorsed infrequent speeding, while zero participants stated that they never drive above the speed limit. Additionally, 75.8% ($n = 25$) of TBI/PTSD participants reported that they very frequently keep a close eye on other cars, while 80% ($n = 8$) of control participants very frequently engage in this behavior. This hypervigilant behavior is the only behavioral item that the control group endorsed engaging in more often than the TBI/PTSD group.

4.3.2.2 Anxiety Provoking Situations Subscale

On the situational subscale, possible answer choices ranged from “never anxious in this situation” to “always anxious in this situation.” A mean score of four would indicate that every participant always feels anxious when driving in that particular situation.

Table 4. Anxiety-Situation Subscale: Scores on Individual VDO Items By Group

Item	TBI/PTSD	Control
	<i>M (SD)</i>	<i>M (SD)</i>
Boxed in by other cars	3.57 (.73)	2.22 (1.39)
Approached quickly from behind	3.39 (.89)	2.90 (1.52)
Roadside debris	3.35 (1.03)	1.56 (1.33)
Tight or narrow lanes	3.13 (1.01)	2.40 (1.26)
Slow or stopped traffic	3.09 (.90)	2.10 (1.10)
Driving over potholes	3.09 (.85)	1.80 (1.32)
Driving when lost	2.96 (1.02)	2.11 (1.05)
Person-crowded area	2.91 (1.00)	1.90 (1.29)
Glare from sunlight/headlights	2.83 (1.03)	2.30 (1.25)
Limited visibility	2.57 (1.16)	2.70 (1.34)

Ratings of subjective anxiety in certain driving situations show a difference between groups on several items, and overall the control group appears to rank most situations as less anxiety provoking. Items that incorporate the physical nearness of other cars or objects appear to induce the most anxiety in this population (e.g., being boxed in by other cars, being approached from behind, driving in tight or narrow lanes, driving in slow or stopped traffic). Items that are associated with the possibility of hidden explosive devices in a combat situation, such as roadside debris and potholes, also create a higher level of anxiety in veterans with TBI and PTSD than in their counterparts without TBI and PTSD.

4.3.2.3 Affective States Subscale

Possible answers on the affective scale ranged from “never experience this emotion” to “very often experience this emotion” while driving. A mean score of four would mean that every participant feels that emotion very often while driving.

Table 5. Affective States Subscale: Scores on Individual VDO Items By Group

Item	TBI/PTSD	Control
	<i>M (SD)</i>	<i>M (SD)</i>
Vigilant or very aware	3.43 (.95)	3.60 (.52)
Confident*	2.91 (1.24)	3.10 (1.10)
In control*	2.91 (1.00)	2.90 (1.10)
Impatient	2.74 (1.10)	2.50 (1.08)
Aggressive	2.74 (1.21)	2.00 (1.05)

Anxious	2.70 (1.11)	2.70 (1.16)
Frustrated	2.52 (1.20)	2.10 (1.37)
Excited or pumped up	2.21 (1.28)	2.10 (.57)
Relaxed*	1.57 (1.32)	2.20 (1.40)
Calm*	1.78 (1.24)	1.80 (1.31)

*Item score was reversed in final analyses

Similar to the behavior of keeping a careful eye on other cars, the affective state of vigilant or very aware was most frequently endorsed by participants. In the PTSD/TBI group, 69.6% ($n = 16$) of participants stated that they feel vigilant or very aware very often while driving. Within the control group, 6 participants stated that they very frequently feel vigilant or aware and 4 participants endorsed feeling this state frequently. Only one participant with TBI and PTSD stated that he felt vigilant or aware very infrequently. The items “in control” and “confident” were endorsed very similar rates within each group, while “impatient” and “aggressive” were likewise endorsed at nearly identical frequencies by the TBI/PTSD group but not by the control group, which endorsed feeling anxious more often than aggressive. Finally, both groups endorsed feeling calm or relaxed infrequently while driving.

4.3.3 Sensation Seeking Measure

The Sensation Seeking Scale Form V (SSS-V) produces four subscales with ten questions each, and these scales are combined to form one total score of sensation seeking. The four subscales are: Thrill and Adventure Seeking (TA), Experience Seeking (ES), Disinhibition (DS), and Boredom Susceptibility (BS). Two-tailed independent t-tests revealed no significant differences in sensation seeking between the TBI/PTSD condition ($n = 23$, $M = 20.57$, $SD = 7.42$) as compared to the veterans without these diagnoses ($n = 10$, $M = 19.00$, $SD = 4.69$), $t(31) = .61$, $p = .54$, 95% CI: [-3.64, 6.77], $d = .25$. Equal variance was assumed between groups. Data are for each subscale are reported in Table 7.

Table 6. Sensation Seeking Scores By Group

Subscale	Group		<i>t</i>	<i>df</i>	<i>d</i>
	TBI/PTSD	Control			
TA	5.57 (2.81)	6.20 (2.82)	.34	31	.12
ES	5.26 (1.89)	4.90 (1.97)	.50	31	.18
DS	5.22 (2.43)	5.30 (1.49)	-.10	31	.04
BS	3.09 (2.00)	2.60 (2.01)	.64	31	.23

4.3.4 Differences in VDQ Total Score Between Groups

Hypothesis 1a: OIF/OEF veterans with TBI/PTSD will report higher levels of risky driving behaviors than OIF/OEF veterans with no diagnoses of TBI/PTSD.

A two-tailed independent samples t-test revealed a significant difference in the overall VDQ score of veterans with TBI and PTSD ($n = 23$, $M = 161.83$, $SD = 38.48$) as compared to the overall score of veterans without these diagnoses ($n = 10$, $M = 120.90$, $SD = 44.45$), $t(31) = 2.68$, $p = .01$, 95% CI: [9.79, 72.06], $d = .96$. This is a large effect size, and these findings are likely influenced by the sample size difference between groups. However, this analysis did not reach significance on Levene's test, so equal variance between groups was assumed.

4.3.5 Differences in VDQ Subscale Scores Between Groups

Hypothesis 1b: OIF/OEF veterans with TBI/PTSD will report higher scores on the affective and situational cues subscales than OIF/OEF veterans with no diagnoses of TBI/PTSD.

As expected, an independent samples t-test found that the TBI/PTSD group scored significantly higher ($n = 23$, $M = 62.42$, $SD = 14.52$) than the control group ($n = 10$, $M = 39.50$, $SD = 23.36$) on the situational subscale. This finding suggests that, overall, veterans with TBI and PTSD find certain on-the-road situations more anxiety-provoking than veterans without TBI and PTSD. Data are represented in Table 7.

Contrary to our hypothesis, an independent samples t-test did not reveal significant group differences on the affective subscale scores, though veterans with TBI and PTSD overall endorsed higher ratings ($n = 23$, $M = 43.35$, $SD = 13.32$) than the control group ($n = 10$, $M = 38.00$, $SD = 13.17$). Data are represented in Table 7.

Hypothesis 1c: Scores on the driving behaviors and cognitions subscales will not show significant differences between groups.

As expected, an independent samples t-test found that the TBI/PTSD group was not significantly different ($n = 23$, $M = 56.04$, $SD = 18.54$) than the control group ($n = 10$, $M = 43.40$, $SD = 13.56$) on the driving behavior subscale. This finding shows that, overall, veterans with TBI and PTSD engage in a similar amount of risky driving behaviors as veterans without these diagnoses.

Table 7. Subscale and Overall Scores By Group

Subscale	Group		<i>t</i>	<i>df</i>	<i>d</i>
	TBI/PTSD	Control			
Situations	62.43 (14.52)	39.50 (23.36)	3.45**	31	1.24
Behaviors	56.04 (18.54)	43.40 (13.56)	1.94	31	.70
Affective States	43.35 (13.32)	38.00 (13.17)	1.06	31	.38
Overall Score	161.83 (38.48)	120.90 (44.45)	2.68*	31	.96

Note. * = $p < .05$, ** = $p < .01$. Standard Deviations appear in parentheses next to means.

As hypothesized, an independent samples t-test found no significant group differences were on subscale ratings of the Driver's Angry Thoughts Questionnaire, though the group difference on Coping and Self-Instruction subscale trended towards significance, $p = .06$. Means, standard deviations, critical values, and degrees of freedom for all five subscales are reported in Table 5.

Table 8. DATQ Subscale Scores By Group

Subscale	Group		<i>t</i>	<i>df</i>	<i>d</i>
	TBI/PTSD	Control			
JDT	45.91 (18.51)	56.20 (16.44)	-1.52	31	.59
PLVAT	33.17 (13.24)	33.30 (11.15)	-.03	31	.01
RRT	16.43 (12.77)	12.90 (9.60)	.78	31	.31
PAT	14.91 (12.14)	9.10 (10.03)	1.33	31	.52
CSI	11.87 (7.22)	17.20 (7.15)	-1.96	31	.74

Standard Deviations appear in parentheses next to means.

JDT = Judgmental and Disbelieving Thinking; PLVAT = Pejorative Labeling and Verbally Aggressive Thinking; RRT = Revenge and Retaliatory Thinking; PAT = Physically Aggressive Thinking; CST = Coping Self-Instruction

4.3.6 Pearson correlations: driving behaviors and demographics

Hypothesis 2: Endorsement of high-risk driving behaviors on the novel driving questionnaire will demonstrate a relationship with level of combat exposure, age, and substance abuse.

The relationship between overall sample VDQ scores and age was analyzed. Interestingly, though the novel VDQ subscales are all highly correlated with each other ($p < .01$), age was not significantly related to any of these scores. Data are reported in Table 6.

Table 9. Correlations Between Subscale Scores on VDO

Subscale	Situations	Behaviors	Affective	DATQ	Age
Situations	1				
Behaviors	.51**	1			
Affective States	.54**	.76**	1		
DATQ	.19	.40*	.46**	1	
Age	.28	-.13	.03	-.11	1

Note. * = $p < .05$, ** = $p < .01$.

Table 10. Correlations Between Individual Items on VDQ

	Age	Speed	DUI	Careful	Avoid	Anxious	Confident	Vigilant
Age	1							
Speed	.14	1						
DUI	-.05	.19	1					
Careful eye	.18	.07	.11	1				
Avoid	.23	.32	.01	.20	1			
Anxious	.06	.18	.10	.59*	.21	1		
Confident	.23	.06	.15	.06	-.14	-.15	1	
Vigilant	.06	-.21	-.01	.60*	.06	.20	.24	1
In control	.15	.15	.23	-.13	-.13	-.45*	.62*	.05

In addition to subscale scores and age, the strength of the relationship between specific items on the VDQ was analyzed using correlational tests. These analyses looked at the overall sample of participants. The variables used in these correlational analyses included a demographic characteristic [participant age], the most and least endorsed behaviors [driving above the speed limit, driving under the influence of alcohol or drugs, keeping a careful eye on other cars, planning ahead to avoid driving in anxiety-provoking situations] and the most frequent and intense affective states [anxious, confident, vigilant/aware, in control] reported while driving. Within these correlations, the variables related to anxiety and confidence were found to be significant at the .05 level. Feelings of high anxiety were correlated with the feelings of high vigilance, and interestingly, with the behavior of keeping a very careful eye on other cars. Not surprisingly, feelings of confidence and control while driving were positively correlated, while feelings of anxiety and control were negatively correlated.

Additionally, Pearson correlations were used to determine if a relationship exists between dimensions of sensation seeking and domains of high-risk driving within the overall sample. Each subscale of the SSS-V (TA, ES, DS, BS) and the VDQ (Behaviors, Situations, and Affective States) were included in these analyses. The only subscales between measures that were found to be significantly related are the SSS-V Boredom Susceptibility scale and the VDQ Affective States scale ($r = .36, p < .05$).

5. Discussion

A primary goal of the current study was to address the need for a novel measure to evaluate the various factors that could impact driving performance in veterans with TBI and PTSD. This study generated a new measure, the Veteran Driving Questionnaire (VDQ). Initial findings suggest that this new measure may provide novel descriptors of some of the high-risk behaviors that veterans engage in while driving, as well as some protective or defensively minded behaviors. Overall, these findings appear to support and further previous literature on veteran driving habits, with some noticeable differences. Veterans with TBI and PTSD reported higher levels of anxiety in certain driving situations than veterans without TBI and PTSD, but these groups did not report significant differences in amount of dangerous driving behaviors, frequency of angry cognitions, or endorsement of various affective states. Given the novel information offered by the VDQ, a detailed consideration of these observed group differences is warranted.

5.1 Driving Behaviors

An unexpected and remarkable finding was that the most endorsed driving behavior for both veterans with and without TBI/PTSD was “keeping a careful eye on other cars” while driving. This item is particularly noteworthy because it can be both a protective factor as well as a dangerous or risky behavior. Anecdotally, several participants reported that they were trained to pay attention and remain vigilant while on the road during their deployments, and this training has carried over to civilian life in a beneficial way. These participants reported that their driving habits had improved as compared to pre-deployment, and that they were overall safer, more aware of their surroundings, and more technically skilled drivers. However, many veterans reported feeling that this hyper-vigilance and constant awareness of surroundings impedes their driving safety. These veterans, all of whom were diagnosed with PTSD and TBI, felt that they were overly stimulated and easily distracted while on the road, and this defensive strategy of keeping a close eye on other cars was involuntary and actually more dangerous to their driving safety. By allocating a larger percentage of attention to their surroundings than necessary, their driving suffers in other ways (i.e., forget where they were going, forget directions, miss turns, excess frustration). This interpretation fits with prior research that has demonstrated that

individuals with PTSD are often limited in capacity for divided attention, are more easily distracted by competing stimuli, and are cognitively biased towards attending to trauma-relevant stimuli (Danckwerts & Leatham, 2003). In addition to these attentional aspects of PTSD, research on TBI has found that executive functioning is most often impaired, and individuals with TBI are less likely to respond in an adaptive way to a variety of situations (Campbell et al., 2009). When considering these deficits in attention and executive functioning that occur in comorbid TBI and PTSD, any unnecessary distractions or improper allocation of attention while driving could seriously impair performance on the road, so the behavior of keeping a careful eye on other cars is actually detrimental to overall driving safety.

Two other VDQ items that could be considered either risky or protective driving behaviors are planning ahead to avoid traffic and planning to avoid anxiety-provoking situations. Veterans with and without TBI and PTSD endorsed these behaviors at a similar rate. However, participants with TBI and PTSD anecdotally reported more distress and frustration over this avoidance (e.g., having to pay for public transportation in order to avoid driving through traffic), while control participants considered avoidance of these situations to be logical and protective behavior. This finding was unexpected and may be related to the current wording used in the VDQ for these items. Future research should attempt to word these questions more exactly to determine if avoidance of certain on the road situations is more often a symptom of anxiety or a beneficial strategy, as the motivation behind this avoidance will have implications for future treatment and driver retraining programs.

Several of these findings are consistent with the existing literature. For example, speeding, accelerating through yellow lights, and getting easily distracted by sights and sounds are all risky behaviors that have been mentioned in prior studies on veterans (Fear et al., 2008; Kuhn et al., 2010; Stern, Prudencia, & Sadler, 2011). However, several protective behaviors were also very highly endorsed by this sample, and this finding is somewhat unique to this study. Examples of these common healthy behaviors include wearing a seatbelt or helmet, coming to a full stop at a stop sign, planning for designated drivers, and planning to avoid traffic and anxiety-provoking situations. Prior studies have shown that combat veterans are less likely to wear seatbelts (Lincoln et al., 2006) and more likely to drive intoxicated (Bell et al., 2000; Sayer et al., 2010) than non-combat

veterans, but the individuals in the current study indicated that they drive under the influence extremely rarely. They also rarely get in the car with another person who has been drinking or using drugs and instead plan for a designated driver or alternate method of getting home. This finding may partially be due to a self-report bias, but group differences in this dimension of driving require further examination.

Finally, although veterans with TBI and PTSD endorsed a slightly higher frequency of risky driving behaviors than control participants, these group differences were not significant. This finding lends support to our initial hypothesis that the behavioral subscale would not be affected by TBI and PTSD status. Both groups engage in high-risk behaviors and protective strategies while on the road, and these behaviors are not noticeably influenced by the presence of TBI or PTSD symptoms. One possible explanation for this finding is that the majority of these veterans, regardless of TBI and PTSD status, underwent intense military driver training classes. Members of the military are taught various offensive and defensive driving tactics prior to and during deployment, and it is likely that these overlearned behaviors influence driving patterns post deployment as well. This may be one reason why both groups of veterans endorsed similar driving patterns despite a difference in diagnoses and anxiety levels while on the road.

Another consideration is that driving habits may be more influenced by deployment location and experiences than by PTSD or TBI-specific symptoms. Even with a sample restricted to veterans of the OIF/OEF campaigns, this population had very diverse experiences in terms of combat and driving preferences. Much of this heterogeneity of experience is dependent on the year deployed and the specific region of Iraq or Afghanistan the veteran was stationed in, as methods of combat (particularly relating to armored vehicles, terrain, and IEDs) evolved dramatically over the past decade. For example, veterans who deployed to Iraq in 2004-2006 were taught to drive fast, to never slow down or stop, to swerve and drive erratically to avoid IEDs and mortars, and to push cars or blockades on the road out of the way. However, participants who deployed to Iraq more recently (2009-2012) often stated that they drove more slowly and carefully than their predecessors, usually with the purpose of hunting for IEDs. The later cohort also had more heavily armored vehicles than the earlier generation (particularly on the bottom of the vehicles), and this difference in technology impacted

military driving procedures. It is likely that both groups contained participants from different years, so differences in driving due to experiences balanced out between groups, but future research should consider this aspect more carefully.

5.1 Anxiety-Provoking Situations

While these groups did not differ in terms of driving behaviors, they did differ significantly in their ratings of anxiety-provoking situations. The TBI and PTSD group rated nearly every situation as more anxiety provoking than the veterans without TBI and PTSD, and this finding supports both our initial hypothesis and prior literature. It was hypothesized that the anxiety, avoidance, and flashbacks common to PTSD may affect the way that veterans process common stimuli on the road. Many of these participants were attacked while driving or in convoy, and as a result became wary of certain situations that often provided cover for IEDs or enemy mortar attacks. For example, driving over potholes and next to roadside debris is still anxiety provoking for veterans with PTSD after returning to the civilian world because they were attacked in similar situations while deployed, while veterans without PTSD and TBI did not rate these situations as particularly anxiety provoking. It is interesting to note that the highest mean score for the control group was 2.90 (“frequently anxious” rates a score of 3), while many of the scores for the TBI/PTSD group were above 3 (in the range between “frequently” and “always” anxiety provoking). Consequently, these findings suggest that for the current sample driving is overall a more distressing task for veterans with TBI and PTSD, and this may result in more everyday functioning impairment for a population that already struggles with other cognitive and emotional deficits.

The situations rated most anxiety provoking by veterans with TBI and PTSD seem related to combat (Battlemind) driving training and the misinterpretation of common on the road stimuli. For example, driving in slow or stopped traffic, being boxed in by other cars, and driving in tight or narrow lanes are all situations that produce high anxiety in participants (Baum, 2008). Likewise, being approached quickly by a car from behind, driving over potholes, and driving next to roadside debris also result in elevated distress. It is possible that these particular situations are the most distressing to this population because individuals have been trained to

expect ambushes or attacks in similar combat scenarios, and they may potentially be unable to “unlearn” this association. Many of these veterans reported that they have had difficulties adjusting to driving in civilian situations that are relatively free from danger or threat, and therefore tend to overreact to otherwise benign stimuli (i.e., mistaking a piece of trash on the road for an IED). Some of these overreactions can include behaviors that would be considered risky or dangerous, i.e., speeding up to get away from car that is quickly approaching or swerving to avoid ambushes in tunnels or debris. Another common response to these anxiety-filled situations is a road rage reaction, where veterans respond angrily or aggressively to another person on the road that they perceive as dangerous or irritating. These aggressive behavioral outbursts tend to perpetuate a cycle of internal anger, frustration, and further high risk driving (Houston, Harris, & Norman, 2003). Although veterans report an awareness of these triggers, they often feel unable to control these startle reactions. This finding has important implications for future interventions, both on the road and in psychotherapy.

Finally, although the results table lists the most highly rated ten items, it is important to consider the items that were not highly endorsed by participants. In contrast to the existing literature (Baum, 2008), stopping at stop signs, intersections, and red lights and driving past parked cars were some of the lowest rated situations in terms of anxiety. Additionally, driving at night was also rated as less distressing than expected. This finding is of particular interest because although most participants with TBI reported headaches and light sensitivity (and thus sensitivity to headlights), they also reported feeling more at ease while driving at night because there are fewer cars on the road. So despite the possible physical distress that may result from night driving, veterans anecdotally reported less anxiety, frustration, irritability, and other negative emotions as a result of less crowded roadways.

5.2 Affective States

In considering the affective states subscale, what is most remarkable is the similarity of response between veterans with TBI and PTSD and veterans without these diagnoses. Jakupcak et al. (2007) found that Iraq and Afghanistan veterans with PTSD reported greater aggression, anger, and hostility than veterans without PTSD, while Lew et al. (2011) reported that the most frequently endorsed driving related problems had to do

with anger and impatience. Subsequently, the current study hypothesized similar findings. However, this sample did not significantly differ on these hostile emotional states based on PTSD/TBI status, and anger and aggression were not highly endorsed in comparison to other items. As these groups were also similar in frequency of angry cognitions while driving, it is possible that “anger” is too strong of a term for the emotions most often felt by veterans while driving. Instead, milder but frequent bouts of impatience, irritability, and frustration are the common emotional experience of veterans on the road. Both qualitative interviews and the VDQ findings support this interpretation. The most frequently endorsed emotions by the overall sample were: very vigilant or aware, confident, in control, anxious, impatient, and irritated. Scores across groups were nearly identical on these items, and the majority of these scores cluster between 2.5-3, meaning that participants rated feeling these emotions “sometimes” or “very often.” The notable exception to this is the item “vigilant or very aware,” as the control group rated feeling this affective state more frequently while driving than the TBI/PTSD participants. Both groups, however, highly endorsed this item while driving. This finding, again, supports previous literature that combat veterans in general are hyperaroused and maintain an excessive awareness of their surroundings while on the road.

The relationships between specific emotional states were also analyzed in an attempt to better clarify how positive and negative affective states may impact driving safety. Within the overall sample of veterans, the behavior of keeping a careful eye on other cars was strongly related to the emotional states of anxiety and vigilance/awareness. Data show that as feelings of anxiety and vigilance increase, drivers keep a careful eye on other cars more frequently. This finding is to be expected, as remaining vigilant to surroundings can be a protective behavior that serves to alleviate anxiety. Additionally, as discussed previously, individuals with PTSD and TBI often allocate their attention towards trauma-relevant environmental stimuli (such as potholes, other cars, or tunnels) to the detriment of other driving skills, while control participants do not struggle with this attentional bias as frequently. Therefore, it is understandable that drivers with higher levels of anxiety also engage in hypervigilant behaviors more often. Future research still needs to determine if this behavior is protective against driving mistakes or conversely increases vulnerability to MVAs.

Additionally, data show that as confidence increases, so does the perception of control, while drivers who reported higher levels of anxiety also reported feeling in control less frequently. Anxiety and confidence were not related to each other, suggesting that these two items tap into distinct and unrelated affective states. Looked at together, these relationships between measures of confidence, control, and anxiety suggest that drivers who report lower levels of anxiety on the road also commonly feel either in control or confident while driving. This relationship is consistent with prior anxiety research, which shows that anxiety disorders are characterized by a lack of perceived control (Rapee, Craske, Brown, & Barlow, 1996). Therefore, as PTSD and TBI are both associated with high levels of anxiety, these veterans may be at greater risk for feeling low levels of control and confidence while driving.

Additionally, the TBI/PTSD group shows a significant relationship between age and confidence that is not reflected in the overall sample. Based on this finding, older veterans are more confident while driving regardless of cognitive or emotional stress, and this is perhaps due to more experience on the road as a civilian. Several of these participants joined the military at age 18 and returned home with PTSD and TBI, and thus only had one or two years of civilian driving without any accompanying cognitive and emotional complications, whereas many of the older drivers may have had more time to acclimatize to civilian driving patterns before and/or after deployment. This finding has significant implications for the development of future treatment interventions and specifically implies that military driving experiences are different than civilian driving experiences. Consequently, if members of the military experience the majority of their lifetime driving in combat situations, they may require more directed efforts in relearning civilian driving patterns after returning home.

Finally, several findings on the affective states subscale are inconsistent with expectations based on prior literature. First, feelings of impulsivity, recklessness, irresponsibility, and invincibility while driving were endorsed least frequently. Moreover, the behavior of speeding was unrelated to age. This finding is contrary to the majority of driving literature, which suggests that 1) younger males tend to drive faster than other populations (Kuhn et al., 2010) and 2) combat veterans tend to show increased risk-taking and post-deployment

feelings of invincibility (Killgore et al., 2008). One possible reason these data did not converge with prior literature is that the current study sample is not as recently returned as samples in other studies, including Killgore's (2008). It is possible that these veterans did drive recklessly or irresponsibly in the time period immediately following their deployment, but have since reintegrated more thoroughly to civilian life and moved past those behaviors and feelings. Another explanation is that this sample is overall older than in many studies on veteran risk-taking propensity (i.e., 63% of Bell et al.'s 2008 sample was under the age of 30, while the mean age of this sample was 31.5), so the effects of younger driving age are simply not seen in the current sample. Despite these differences, however, the results of this current study dispute the hypothesis that a military population is simply prone to taking unnecessary risks while driving, and it is likely that alternate explanations (such as overlearned behaviors and TBI/PTSD symptoms) may better explain risky driving behaviors than sensation seeking theories.

5.3 Cognitions

Surprisingly, both groups of veterans were nearly identical in their self-reported frequency of Pejorative Labeling and Verbally Aggressive Thinking (i.e., "what an idiot!"), while control group veterans scored lower in terms of Revenge and Retaliatory Thinking (i.e., "I'm going to box them in and show them"). This finding supports the hypothesis that veterans with TBI and PTSD may be more impulsive and angry than those without TBI/PTSD. However, the control group also endorsed more frequent Judgmental and Disbelieving thoughts (i.e., "How did that person get a license?"), while engaging in more frequent Coping Self-Instruction thoughts (i.e., "Just pay attention to my driving, others can be crazy if they want"). This suggests that the control group, while engaging in verbally aggressive and judgmental thinking patterns, is also more skilled at modifying or attending to angry thoughts and replacing those thoughts with calming or self-soothing instructions. This difference in cognitive processing may partially explain the findings of other studies (Kuhn et al, 2010); Lew et al., 2011) that show that veterans with TBI and PTSD are more prone to feelings of anxiety and aggression while driving.

5.4 Overall Findings: Attention, Anxiety, TBI/PTSD, and Driving

Prior to conducting this study, it was hypothesized that there are at least three possible explanations for the driving difficulties faced by this population. The first explanation, that veterans are simply more prone to risk taking and sensation seeking than the general population, is not supported by these findings. Though previous research has suggested that veterans of OIF and OEF are more prone to taking risks and engaging in unsafe behavior following deployment (Killgore et al, 2008), this sample did not endorse high levels of sensation seeking or risk taking, nor did groups appear to engage in high-risk driving behaviors at different rates. The second theory, that overlearned defensive and offensive driving strategies are simply difficult to extinguish after returning home, was often anecdotally mentioned by participants and is supported by these data. Finally, the third hypothesis was that the emotional and cognitive symptoms of TBI and PTSD might negatively impact veteran driving safety. This hypothesis is supported by this study, as the effects of PTSD and TBI are most noticeable within certain on-the-road situations. The TBI/PTSD group reported significantly higher levels of anxiety in a number of common civilian driving scenarios, and this anxiety impacts both driving behaviors and emotional reactions to the experience of driving.

Previous research has found that OIF/OEF veterans with PTSD are more likely to report aggressive driving (Kuhn, Drescher, Ruzek, & Rosen, 2010) and more persistent driving problems (Lew et al., 2011). However, few studies have specifically examined the relationship between stimuli in common driving environments and PTSD-related anxiety. In general, patients with anxiety disorders (i.e., PTSD, social anxiety, and panic disorder) have been shown to possess a cognitive processing bias in which they perceive neutral stimuli as negatively valenced, and selectively attend to threatening stimuli (Buckley, Blanchard, & Hickling, 2002). This cognitive attribute may have serious consequences on the road, where countless stimuli are constantly competing for attention. Driving is a complex and demanding activity that requires the ability to simultaneously attend to multiple aspects of the environment, make instantaneous decisions, accurately select and divide attention, retain emotional control, and continuously reevaluate a situation. As such, it is likely that driving is a domain in which the cognitive and emotional deficits of PTSD and TBI can negatively and severely

influence a driver's safety. Due to the stressful and often unpredictable nature of driving, veterans with PTSD and TBI may perceive a neutral or low-risk road environment as more threatening or dangerous than a veteran or civilian driver without these diagnoses would.

This cognitive processing bias is further complicated by the offensive and defensive driving skills that members of the military are taught to utilize during their deployments, in addition to the personal experience with roadside IEDs or ambushes that many of these veterans report. Furthermore, increased startle response is a hallmark feature of PTSD (Lew et al, 2011), and this is excess arousal to unpredictable events feeds into a cycle of anxiety and high risk driving in this population. When considering the possible combined effects of overlearned behaviors, cognitive dysfunction, memory impairments, emotional dysregulation, and difficulty with attention allocation, is understandable that veterans with TBI and PTSD report higher levels of anxiety in certain situations that mimic or trigger recollections of combat scenarios. However, the definition and usefulness of the term "anxiety" also deserves further study in this population. These data highlight the need for a clearer distinction between healthy anxiety versus dangerous hypervigilance while on the road. While safe drivers should remain vigilant, excessive anxiety and the resulting hypervigilance may result in dangerous habits such as overchecking mirrors, driving aggressively or erratically to avoid perceived hazards, braking too hard, panicking, or getting angry with other drivers.

While these data have allowed researchers to begin theorizing about the intersection between previous driving experiences (combat and civilian), driver training, cognitions, emotions, behaviors, and environment, more research is needed to clarify the contribution of each of these factors to driving safety. While prior studies have looked at general difficulties veterans face with driving (Lew et al., 2010; Kuhn et al., 2010; Fear et al., 2008) and veteran performance on a driving simulator (Classen et al., 2011), this is the first study to look specifically at differences in anxiety levels in specific driving situations between veterans with TBI and PTSD and veterans without these diagnoses. The new questionnaire developed by the current study provides an adequate foundation for researchers to begin studying the various factors that may be putting veterans at

increased risk while driving, but future research is needed in order to construct a full model that can explain how these factors interact while on the road.

5.5 Limitations to Current Study

The generalization of this study to the broader population of returning OIF/OEF/OND combat veterans is limited because of the small sample size and specific demographics. Only veterans from the greater Philadelphia area were included in this study, and it is likely that common road behaviors and situations may differ in other geographic locations. Participants with TBI and PTSD were also all recruited from one site's Polytrauma clinic, which by its nature treats veterans with severe and often long-standing cognitive and emotional injuries. Thus, this sample of veterans may be distinct from other veterans with diagnoses of TBI and PTSD. Prior to analysis, these groups also differed in educational background, as the TBI/PTSD participants showed a higher mean education level. However, this group difference is interesting because higher education has been found to be protective against PTSD (Polusney et al., 2012). It is likely that this higher education level may be due to a longer span of time between deployment and participation in the study for the TBI/PTSD group as compared to the controls, as many of these participants pursued further education after their military careers. Future research should collect information regarding level of education prior to deployment and subsequent psychiatric diagnoses, rather than education level at the time of evaluation.

This study is also limited because all measures used are retrospective self-reports, and thus recall and self-report biases may be affecting results. As the majority of this sample was also diagnosed with a brain injury, other memory inaccuracies may have influenced participant responses. In order to address these limitations, future studies should be both prospective and longitudinal and include populations other than veterans. First, it would be particularly informative to begin following a cohort of veterans right after they return home deployment and maintain following them over time, in order to capture any changes or adaptations in civilian driving habits that may occur. The VDQ could also be used to capture driving habits of populations without military experience, as well as those with other forms of cognitive deficits (e.g., Multiple Sclerosis, brain injury without PTSD). A particularly interesting population to study would include civilians with driving-

related PTSD. It would be useful to compare the self-reports of civilians with driving-specific anxiety but without a military driving background to the veteran participants included in this study.

The novelty of the VDQ and the integration of the various potential contributors to impaired driving (i.e., affective states) also limit the interpretation of the current findings. The psychometric properties of the VDQ are still unknown and must be evaluated further before conclusions can be extended beyond this sample. It is possible that this measure does not account for all situations and behaviors that may lead accidents, and more research is needed to determine if items should be added to the VDQ. Existing items should also be modified in order to increase the validity of future research findings. Some items, such as “keeping a careful eye on other cars,” “plan to avoid anxiety,” and “plan to avoid traffic” must also be reworded to limit subjective interpretation and to clarify the intent behind such behaviors. The primary veteran input in the VDQ development process was during focus groups; unfortunately, only veterans with TBI and PTSD were included in these focus groups. Therefore, it is possible that control subjects may have a different perspective on driving that was not taken into account while developing questionnaire items. However, this measure does appear to be successful in providing a basic description of the common driving behaviors and triggers for this specific population.

6. Conclusions and Future Directions

The main finding of this study is that while certain situations are anxiety provoking to all veterans regardless of psychiatric diagnosis, veterans with TBI and PTSD overall report a much higher level of anxiety in these situations than the control group. These findings support the theory that the OIF/OEF veteran population demonstrates a specific and unique pattern of driving-related difficulties that may not be reflected in other populations. This pattern of difficulties appears to be linked to certain stimuli in civilian driving environments that may cue PTSD-related recollections and anxiety, and therefore also trigger defensive and offensive driving behaviors. Given the large number of military members who are currently returning home or will return home soon with TBI and PTSD, in addition to those already enrolled in the VA system, it is critical that clinicians gain a better understanding of the dangers presented by driving after deployment.

It is also vital that future research attempt to better understand these driving triggers in order to design targeted interventions and treatment options. Research efforts are needed to test interventions designed to reduce on-the-road accidents and fatalities, and one place to begin these efforts may be in teaching veterans to better manage their anxiety and anger while on the road. Although this sample did acknowledge an awareness of their own driving mistakes and the risks associated with their driving behaviors, they also lacked effective strategies to manage driving-related distress in a safer manner. This inability to safely cope with the irritability, frustration, and anxiety that often occurs with TBI and PTSD can have significant and potentially fatal implications for this population behind the wheel, and additional research is necessary to develop ways of helping veterans manage these difficulties more effectively.

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Appendix A: Existing Driving Questionnaires

Questionnaire	Description	Strengths	Limitations
The Driving Anger Expression Inventory	4 subscales: verbal aggressive expression, personal physical aggressive expression, using the vehicle to express anger, and adaptive/construction expression	Face, discriminate, incremental, convergent validity (Deffenbacher, White, & Lynch, 2004)	Narrow focus on "road rage" behaviors; does not address emotional or cognitive components of driving
The Propensity for Angry Driving Scale	Measures the likelihood of anger responses to common on-road situations (short vignettes)	Convergent and discriminate validity (Dahlen & Ragan, 2004); more detailed; posits specific situations that could elicit certain reactions	Limited to the specific situations described in vignettes; only focuses on angry driving, does not address other high-risk behaviors
The Driver's Angry Thoughts Questionnaire	5 subscales: judgmental/disbelieving thinking, pejorative labeling/verbally aggressive thinking, physically aggressive thinking, revenge/retaliatory thinking, and coping-self instruction cognitions	Face, discriminate, incremental, convergent validity (Deffenbacher, White, & Lynch, 2004)	Long (65 items); does not address affective states that could impact driving other than anger
The Driving Behavior Survey	Measures frequency of occurrence for high-risk driving behaviors	Measures performance deficits, overly-cautious behavior, and aggressive behavior; attempts to account for role of anxiety in driving (not just anger)	Not specific to combat-reminiscent situations; does not account for other affective or cognitive states that could influence driving
Kuhn et al. (2010)	Measures the frequency of 5 aggressive driving behaviors and one caution behavior	Military specific; part of a measure originally designed to determine risk of harm in VA PTSD patients	Not detailed; does not provide info on situations, emotions, or cognitions that might result in dangerous driving

Appendix B: Driver's Angry Thoughts Questionnaire

Driver's Angry Thoughts Questionnaire

Directions: Below are a number of thoughts people have when they are angry or hostile when driving. Take a few seconds to think about whether that thought (or one similar to it) occurs to you when you are angry at another driver or about something when you are driving. Read each statement and then fill in the bubble indicating how much you think this thought (or one similar to it) when you are angry while driving. Please answer all questions:

	<u>Not At All</u>	<u>Sometimes</u>	<u>Moderately Often</u>	<u>Often</u>	<u>All the Time</u>
1. What an idiot!	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. They don't seem to think they can hurt others doing that.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I'm going to get back at them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I'm not going to let them do that to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Just what we need, someone who thinks they are more important than others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I want to yell at them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I want to kick their ass.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I'm going to get revenge.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I'm going to give them the finger.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I want to curse at them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I hate drivers like that.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Get off my ass!	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. I'm going to box them in and show them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. I'm going to slow them up on purpose.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. I feel like telling them off.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. I'm going to get even with them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. They are going to get someone killed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. People like you ought to have to take a driver's test.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. You didn't even look!	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. I'm going to slam on my brakes and back them off.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. They shouldn't be allowed to drive.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. They ought to be shot.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. I'm going to slow down to spite them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. How rude!	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. Cope with it, sometimes you just have to live with bad drivers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26. What a stupid driver!	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27. Where do they get off doing this?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28. I would like to hurt them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29. Why don't they have to drive like the rest of us?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30. They are not going to get away with that.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
31. Where are the cops when you need them?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
32. Damn it!	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
33. I'm going to tailgate them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
34. I can't believe they're so inconsiderate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
35. What an ass!	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

36.	They are going to kill someone doing that. Who do they think they are?	0	0	0	0	0
37.		0	0	0	0	0
38.	What a dumb ass!	0	0	0	0	0
		<u>Not At All</u>		<u>Moderately</u>		<u>All the</u>
			<u>Sometimes</u>	<u>Often</u>	<u>Often</u>	<u>Time</u>
39.	I want to beat them up.	0	0	0	0	0
40.	I want to run them off the road.	0	0	0	0	0
41.	I want to kill them.	0	0	0	0	0
42.	What a jerk!	0	0	0	0	0
43.	That's unsafe.	0	0	0	0	0
44.	How did that person get a license?	0	0	0	0	0
45.	They think they are the only people on the road.	0	0	0	0	0
46.	Who in their right mind would drive like that?	0	0	0	0	0
47.	They think they are above the rules.	0	0	0	0	0
48.	Just back off and relax.	0	0	0	0	0
49.	This is crazy.	0	0	0	0	0
50.	Nothing I can do about it so take it easy.	0	0	0	0	0
51.	I'll just have to call and tell them I'll be late.	0	0	0	0	0
52.	Get people like them off the road.	0	0	0	0	0
53.	Don't even make eye contact with people like that.	0	0	0	0	0
54.	I'm so angry.	0	0	0	0	0
55.	Just calm down.	0	0	0	0	0
56.	Just turn up the radio and tune them out.	0	0	0	0	0
57.	I want to punch them out.	0	0	0	0	0
58.	I'll cut them off and see how they like it.	0	0	0	0	0
59.	I would like to beat the hell out of them.	0	0	0	0	0
60.	They are clueless.	0	0	0	0	0
61.	I'm going to return the favor.	0	0	0	0	0
62.	I am so pissed.	0	0	0	0	0
63.	I'm going to teach them a lesson.	0	0	0	0	0
64.	Chill out.	0	0	0	0	0
65.	Just pay attention to my driving, others can be crazy if they want.	0	0	0	0	0

Appendix C: The Veteran Driving Questionnaire

Subject ID# _____

Veteran Driving Questionnaire

Part I—Driving Habits

Directions: Please answer the following questions to the best of your ability.

How many days a week, on average, do you drive? _____

How many miles a week, on average, do you drive? _____

How many hours per week do you drive? _____

Before you were deployed, what type of car did you drive most often? _____

Automatic or manual? _____

About how many years did you drive this type of car? _____

While you were deployed, what type of vehicle did you drive most often? _____

Automatic or manual? _____

Is the amount you drive more, less, or about the same as it was before your deployment? _____

Did you drive or spend a lot of time in convoys while deployed? Please circle: YES NO

If yes, what were your main responsibilities? _____

If the amount of time you spend driving is different after returning home, as compared to your driving habits pre-deployment, why?

How many car accidents have you been involved in since returning home?

0	1	2	3	4+
---	---	---	---	----

How many car accidents were you involved in the years before deployment?

0	1	2	3	4+
---	---	---	---	----

How many “near misses” (i.e., almost accidents, close calls) have you experienced since returning home?

0	1	2	3	4+
---	---	---	---	----

How many near misses did you experience in the years before deployment?

0	1	2	3	4+
---	---	---	---	----

How many warnings have you received from police or state troopers (either written or verbal) since returning from deployment?

0	1	2	3	4+
---	---	---	---	----

Compared to before deployment, have you noticed any changes in your driving behaviors? If so, please explain:

Is there anything you wish you could change about your driving habits or behaviors? If so, what?

Part II—Common Driving Situations

Directions: For the follow questions, **please indicate how anxious (or nervous/uncomfortable/upset) you typically feel when driving in the following situations** (some common symptoms of anxiety or nervousness can include a racing heart, sweating, feeling flushed, racing thoughts, feeling “jittery”). Please only focus on your driving habits since returning home from deployment.

When I have to stop at a stop sign.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When there is oncoming traffic.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I have to stop at a red light or four-way intersection.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I am driving through a tunnel or underpass.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I am driving in slow or stopped traffic (i.e., rush hour).

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When my car is boxed in by other drivers.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When another driver approaches quickly from behind me.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I drive near or next to roadside debris.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I drive through construction.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I drive past parked cars.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I forget where I am going.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I drive at night.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I drive through a city or am surrounded by tall buildings.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I drive over wires across the road (i.e., camera wires or traffic light monitors).

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I drive in a person-crowded area (i.e., around crosswalks or on busy streets).

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I drive next to guardrails.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I get lost or am not sure how to get to my destination.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I drive into glare (i.e., sunlight or headlights).

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I drive on a new or unfamiliar road.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I drive down a one-way street.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I drive in a situation with limited visibility (i.e., in rain or through a dark tunnel).

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I drive over or around potholes.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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When I drive in tight or narrow lanes.

<i>Never Anxious</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Always</i> <input type="radio"/>
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Part III—Driving Behaviors

Directions: Please circle how often you engage in the following behaviors while driving. Please only focus on your driving habits since returning home from deployment.

Change lanes or make a turn without signaling properly.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Drive above the speed limit.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Intentionally cut off other drivers.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Come to a full stop at a stop sign.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Drive under the influence of alcohol, opiates, or drugs.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Jump a red light before it turns green.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Drive under the influence of stimulants (i.e., heavily caffeinated energy drinks).

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Speed up before an intersection or an underpass/tunnel.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Keep a careful eye on other cars around you.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Plan your driving times or routes in order to avoid traffic.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Drive through stop signs.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Plan for a designated driver or alternate method of getting home, if drinking or using drugs.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Plan your driving in order to avoid situations that might make you upset, angry, or nervous.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Accelerate through a yellow light (that you could stop for).

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Wear a seatbelt (or motorcycle helmet, if applicable).

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Tailgate a driver in front of you.

<i>Never</i>		<i>Sometimes</i>		<i>Very Often</i>
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<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Forget, or take a few seconds to remember, what a certain sign means (i.e., a “No U-Turn” sign).

<i>Never</i>		<i>Sometimes</i>		<i>Very Often</i>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Drive through red lights.

<i>Never</i>		<i>Sometimes</i>		<i>Very Often</i>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Get in the car with someone after he/she (the driver) has been drinking or using drugs.

<i>Never</i>		<i>Sometimes</i>		<i>Very Often</i>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Swerve or change lanes before driving under an overpass, or before coming out the other side.

<i>Never</i>		<i>Sometimes</i>		<i>Very Often</i>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Get distracted by sounds (i.e., a truck driving past).

<i>Never</i>		<i>Sometimes</i>		<i>Very Often</i>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Demonstrate anger at another driver or car (i.e., shouting, giving the finger, honking).

<i>Never</i>		<i>Sometimes</i>		<i>Very Often</i>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Keep a large distance between you and the car in front of you.

<i>Never</i>		<i>Sometimes</i>		<i>Very Often</i>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Drive down the middle of the road (straddle the yellow line; jump the median).

<i>Never</i>		<i>Sometimes</i>		<i>Very Often</i>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Drive erratically on purpose.

<i>Never</i>		<i>Sometimes</i>		<i>Very Often</i>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Try to “test the limits” while driving (i.e., driving very fast, switching lanes quickly, etc.)

<i>Never</i>		<i>Sometimes</i>		<i>Very Often</i>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Chase or follow another driver.

<i>Never</i>		<i>Sometimes</i>		<i>Very Often</i>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Drive while fatigued.

<i>Never</i>		<i>Sometimes</i>		<i>Very Often</i>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Maintain speed limit.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Get lost or disoriented when driving in familiar settings.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Forget what you are doing or where you are going while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Drive while talking on the phone, texting, playing with iPod or radio, or programming GPS.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Drive while under the influence of medication that may cause drowsiness.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Express frustration or anger by pounding the steering wheel.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Get distracted by things you see that are not relevant to your driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Have friends or family refuse to drive with you.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Have trouble driving fast enough for the speed limit.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Part IV—Driving & Emotional States

Directions: Please indicate how often you typically feel these emotional states when driving. Please only focus on your driving habits since returning home from deployment.

I feel **impatient** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **irritated** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **tired** or **sleepy** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **aggressive** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **angry** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **anxious** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **competitive** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **confident** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **excited** or **pumped up** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **relaxed** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **impulsive, reckless, or irresponsible** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **upset** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **invincible, indestructible, or strong** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **energetic** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **panicky, jumpy, or frightened** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **frustrated** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **calm** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **vigilant or very aware** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **in pain** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **nervous** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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I feel **in control** while driving.

<i>Never</i> <input type="radio"/>	<input type="radio"/>	<i>Sometimes</i> <input type="radio"/>	<input type="radio"/>	<i>Very Often</i> <input type="radio"/>
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Part V—Feedback

Are there any directions/questions in this packet that you found confusing?

Have you noticed any changes in your driving behavior since returning home from deployment that this questionnaire does not address?

Is there anything you wish you had been told about driving when you returned home from deployment, or any advice you would like to give future veterans about driving in the civilian world again?

Appendix D: Sensation Seeking Scale—Form V

Subject ID#: _____

Interest and preference test

Directions: Each of the items below contains two choices A and B. Please indicate which of the choices most describes your likes or the way you feel. In some cases you may find items in which both choices describe your likes or feelings. Please choose the one which better describes your likes or feelings. In some cases you may find items in which you do not like either choice. In these cases mark the choice you dislike least. Do not leave any items blank. It is important you respond to all items with only one choice, A or B. We are interested only in your likes or feelings, not in how others feel about these things or how one is supposed to feel. There are no right or wrong answers as in other kinds of tests. Be frank and give your honest appraisal of yourself.

1. A. I like “wild” uninhibited parties.
 B. I prefer quiet parties with good conversation.
2. A. There are some movies I enjoy seeing a second or even third time.
 B. I can’t stand watching a movie I’ve seen before.
3. A. I often wish I could be a mountain climber.
 B. I can’t understand people who risk their necks climbing mountains.
4. A. I dislike all body odors.
 B. I like some of the earthy body smells.
5. A. I get bored seeing the same old faces.
 B. I like the comfortable familiarity of everyday friends.
6. A. I like to explore a strange city or section of town by myself, even if it means getting lost.
 B. I prefer a guide when I am in a place I don’t know well.
7. A. I dislike people who do or say things just to shock or upset others.
 B. When you can predict almost everything a person will do and say he or she must be a bore.
8. A. I usually don’t enjoy a movie or play where I can predict what will happen

- in advance.
- B. I don't mind watching a movie or play where I can predict what will happen in advance.
9. A. I have tried marijuana or would like to.
B. I would never smoke marijuana.
10. A. I would not like to try any drug which might produce strange and dangerous effects on me.
B. I would like to try some of the drugs that produce hallucinations.
11. A. A sensible person avoids activities that are dangerous.
B. I sometimes like to do things that are a little frightening.
12. A. I dislike "swingers" (people who are uninhibited and free about sex).
B. I enjoy the company of real "swingers."
13. A. I find that stimulants make me uncomfortable.
B. I often like to get high (drinking liquor or smoking marijuana).
14. A. I like to try new foods I have never tasted before.
B. I order the dishes with which I am familiar so as to avoid disappointment and unpleasantness.
15. A. I enjoy looking at home movies, videos, or travel slides.
B. Looking at someone's home movies, videos, or travel slides bores me tremendously.
16. A. I would like to take up the sport of water skiing.
B. I would not like to take up water skiing.
17. A. I would like to try surfboard riding.
B. I would not like to try surfboard riding.
18. A. I would like to take off on a trip with no preplanned or definite routes, or timetable.
B. When I go on a trip I like to plan my route and timetable fairly carefully.
19. A. I prefer the "down to earth" kinds of people as friends.
B. I would like to make friends in some of the "far out" groups like artists or punks.
20. A. I would not like to learn to fly an airplane.

- B. I would like to learn to fly an airplane.
21. A. I prefer the surface of the water to the depths.
B. I would like to go scuba diving.
22. A. I would like to meet some persons who are homosexual (men or women).
B. I stay away from anyone I suspect of being "gay" or "lesbian."
23. A. I would like to try parachute jumping.
B. I would never want to try jumping out of a plane, with or without a parachute.
24. A. I prefer friends who are excitingly unpredictable.
B. I prefer friends who are reliable and predictable.
25. A. I am not interested in experience for its own sake.
B. I like to have new and exciting experience and sensations even if they are a little frightening, unconventional, or illegal.
26. A. The essence of good art is in its clarity, symmetry of form, and harmony of colors.
B. I often find beauty in the "clashing" colors and irregular forms of modern paintings.
27. A. I enjoy spending time in the familiar surroundings of home.
B. I get restless if I have to stay around home for any length of time.
28. A. I like to dive off the high board.
B. I don't like the feeling I get standing on the high board (or I don't go near it at all).
29. A. I like to date persons who are physically exciting.
B. I like to date persons who share my values.
30. A. Heavy drinking usually ruins a party because some people get loud and boisterous.
B. Keeping the drinks full is the key to a good party.
31. A. The worst social sin is to be rude.
B. The worst social sin is to be a bore.
32. A. A person should have considerable sexual experience before marriage.
B. It's better if two married persons begin their sexual experience with each

other.

33. A. Even if I had the money, I would not care to associate with flighty rich persons in the "jet set."
B. I could conceive of myself seeking pleasures around the world with the "jet set."
34. A. I like people who are sharp and witty even if they do sometimes insult others.
B. I dislike people who have their fun at the expense of hurting the feelings of others.
35. A. There is altogether too much portrayal of sex in movies.
B. I enjoy watching many of the "sexy" scenes in movies.
36. A. I feel best after taking a couple of drinks.
B. Something is wrong with people who need liquor to feel good.
37. A. People should dress according to some standard of taste, neatness, and style.
B. People should dress in individual ways even if the effects are sometimes strange.
38. A. Sailing long distances in small sailing crafts is foolhardy.
B. I would like to sail a long distance in a small but seaworthy sailing craft.
39. A. I have no patience with dull or boring persons.
B. I find something interesting in almost every person I talk to.
40. A. Skiing down a high mountain slope is a good way to end up on crutches.
B. I think I would enjoy the sensation of skiing very fast down a high mountain slope.