

ABSTRACT

The Influence of a Motivational Interviewing Based Computerized Screening Assessment on
Veteran Request for Mental Health Services and Treatment Entrance Rates

by

Matthew R. Putts

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Director: Paul J. Toriello

Department of Addictions and Rehabilitation Studies

Military veterans experience high prevalence rates of mental illness, substance use disorders (SUDs), and traumatic brain injury (TBI). However, veterans enter into treatment for these problems at very low rates. Mental health stigma, and particularly self-stigma, are posited as reasons for these low treatment entrance rates. One potential way to combat this self-stigma is through the use of computer-assisted screening, allowing veterans to reveal symptoms to a computer. The purpose of this study was to examine the effectiveness of a computer-assisted motivational interviewing (MI) intervention supported by the tenets of Self-Determination Theory in encouraging veterans to request a referral for treatment and to follow-through on attending at least one appointment for services within a 30-day follow-up period. The computer screening created for this purpose contained demographic questions, the Global Appraisal of Individual Needs: Short Screener (GAIN: SS) and the Neurobehavioral Symptom Inventory (NSI). These instruments were followed by a brief MI intervention provided by an on-screen avatar. The final question of the instrument asked participants if they would like a referral to a provider for any symptoms they might have. Those veterans requesting a referral were provided

with one to an appropriate local provider and received a brief follow-up in 30 days to determine whether they had attended at least one appointment.

Results of referral request rates and follow-through on entering into treatment were compared to Lindley, Cacciapaglia, Noronha, Carlson, and Schatzberg (2010), a study completed with veterans with mental health symptoms given the opportunity to accept a referral from primary care providers or mental health providers. The present study was effective at encouraging veterans to request a referral, though did not perform as well as the comparison study in the area of follow-through. Additional analysis uncovered other patterns indicating that some groups of veterans were more likely to request a referral than others. Future research is needed to improve computer-assisted interventions and to uncover those groups for whom they can be best recommended.

THE INFLUENCE OF A MOTIVATIONAL INTERVIEWING BASED COMPUTERIZED
SCREENING ASSESSMENT ON VETERAN REQUEST FOR MENTAL HEALTH
SERVICES AND TREATMENT ENTRANCE RATES

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Matthew R. Putts

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by

Matthew R. Putts

APPROVED BY:

DIRECTOR OF
DISSERTATION:

Paul J. Toriello, RhD

COMMITTEE MEMBER:

Stephen J. Leierer, PhD

COMMITTEE MEMBER:

Steven R. Sligar, EdD

COMMITTEE MEMBER:

Robert. J. Campbell, EdD

CHAIR OF THE DEPARTMENT
OF ADDICTIONS AND REHABILITATION STUDIES:

Paul J. Toriello, RhD

DEAN OF THE
GRADUATE SCHOOL:

Paul J. Gemperline, PhD

DEDICATION

This dissertation is dedicated to all of the men and women who have served in the United States military. Their bravery, willingness to put others before self, and personal sacrifice were the inspiration for this research study into the best ways to meet their needs. The mental health community has an obligation to tirelessly research and serve these men and women, and this dissertation is but one very small part of that important task. The use of our best skills in their service is the least we can do.

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CHAPTER 1: INTRODUCTION

Introduction to the Study

This chapter introduces the background to a study of a new computer-assisted screening tool adapting motivational interviewing (MI) to enhance veterans' motivations to request and enter treatment for substance use disorders, mental illness, and/or traumatic brain injury (TBI). The chapter reviews pertinent background information regarding the veteran population, the prevalence of these issues within this population, and a statement of the problem to be addressed by this study. Also included are the rationale for this study, the research questions to be addressed and their associated hypotheses, as well as, the significance of the study. The chapter concludes with a definition of key terms and a brief summary.

Background of the Study

The nation's veterans are a group that is consistently underserved by the United States mental health system (Wagner et al., 2007; Zinzow, Britt, McFadden, Burnette, & Gillispie, et al., 2012). Individuals with military experience, whether combat related or not, present with a unique set of life experiences unlike those of any other segment of the population (Gibbs, Rae Olmsted, Brown, Clinton-Sherrod, 2011). These experiences contribute to a unique set of needs in counseling. While many counselors may be familiar with the presenting problems, for example, alcohol dependence or major depressive disorder, providers are unable to assist if veterans do not present for treatment. The first step in improving the rate of veterans entering treatment is to understand the issues that most frequently impact this population. Veterans have high rates of substance use disorders, mental illness, and TBI, with certain groups of veterans at particularly high risk (SAMHSA, 2007; SAMHSA, 2011).

Substance Use Disorders

As outlined in the American Psychiatric Association *Diagnostic and Statistical Manual of Mental Disorders-IV-TR*, symptoms of a substance use disorder (SUD) can include tolerance, withdrawal symptoms, interference with occupational or social functions, inability to decrease use, use of the substance in greater amounts than planned, engaging in dangerous activities while under the influence of the substance, and continuing substance use despite negative consequences (4th ed., text rev.; *DSM-IV-TR*; American Psychiatric Association, 2000).

Examining the veteran population, across any time period and regardless of combat experience, 7.1% of veterans meet diagnostic criteria for an SUD each year (SAMHSA, 2007). While the prevalence of SUDs among veterans does not appear alarming when compared to an overall United States prevalence rate of 8.38%, of concern is the number of younger veterans struggling with an SUD (SAMHSA, 2011). For example, 25% of veterans age 18 to 25 met such criteria as compared to 19.26% of their peers of the same age (SAMHSA, 2007; SAMHSA, 2011). Veterans age 26 to 54 also experience high SUD rates at 11.3% (SAMHSA, 2007).

While all of the above SUD prevalence rates are concerning, the data surrounding the veterans of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) represent an especially worrisome trend. Estimates for the prevalence of alcohol abuse or dependence in OEF/OIF service members range from 11% to as high as 40% (Seal et al., 2011; Burnett-Zeiglera, et al., 2011). Other SUD specific research with veterans age 21 to 34 found an SUD prevalence rate of 18% (Wagner et al., 2007). Among National Guard service members recently demobilized from active duty deployment in OEF/OIF, more than a third screened positive for alcohol misuse (Burnett-Zeiglera, et al., 2011). Of these National Guard members, those most likely to misuse alcohol were of younger age, service members who are men, unmarried or

separated service members, and those with posttraumatic stress disorder (PTSD), depressive symptoms, or suicidal ideation. Interestingly, number of deployments experienced by the service member was not associated with alcohol misuse (Burnett-Zeigler, et al., 2011).

In addition to veterans of OEF and OIF, a second high risk group in regards to SUDs is Vietnam veterans. A study conducted in 1992, with results published by Eisen and colleagues in 2004, indicated a lifetime prevalence of alcohol abuse or alcohol dependence (DSM-III-R criteria) of 56.4%, with 17.3% of participants meeting diagnostic criteria for an alcohol use disorder in the previous month. Lifetime and 12-month prevalence rates for substance abuse or dependence other than alcohol were 10.2% and 1.3% respectively (Eisen et al., 2004). The majority of Vietnam era veterans have experienced alcohol abuse or dependence in their lifetime and more than 1 in 10 have faced abuse of or dependence on some illicit substance (Eisen et al., 2004). This population of Vietnam veterans may also yield clues as to what may be expected for OEF/OIF veterans in the decades ahead.

Substance use disorder treatment. Despite the prevalence of SUDs in the veteran population, there is substantial evidence that veterans are not receiving the needed services to address this problem. Only 0.8% of veterans receive specific SUD treatment a year; far fewer than the 7.1% of veterans estimated to have an SUD (Wagner, et al., 2007; SAMHSA, 2007). Among younger veterans age 21 to 34, estimates are that only 2% of those with an SUD receive treatment for the condition. Also of concern is that while an estimated 16% of veterans have an unmet need for SUD treatment, only 1% of veterans with an SUD state that they lack such care (Wagner, et al., 2007). From these studies, a pattern begins to emerge: high rates of SUDs in the veteran population combined with low rates of treatment.

Primary among the reasons for such low rates of treatment participation and the fact that veterans are not reporting this lack of treatment as an issue can be traced to the stigma of seeking assistance for an SUD. Recent research indicates that service members describe seeking SUD treatment as problematic due to the associated stigma of missing work, creating issues with unit cohesion, failing to comply with perceived norms of heavy drinking, treatment causing mistrust of their judgment by peers, and a view of treatment as punishment (Gibbs, et al., 2011).

Mental Illness

Substance use disorders are not the only mental health issue frequently experienced by veterans. In the veteran population at large, 7% of veterans have experienced some form of serious psychological distress in the past year (SAMHSA, 2007). As with SUDs, the prevalence of such distress varies considerably by age group. For the youngest veterans, age 18 to 25, the rate rises to 20.9%. Rates drop to 11.2% for veterans age 26 to 54 and to 4.3% for those veterans age 55 and over (SAMHSA, 2007). Women veterans are more than twice as likely as men to experience such distress (SAMHSA, 2007).

Posttraumatic stress disorder. Of the varying forms of mental illness experience by veterans, PTSD is one of the most common. Posttraumatic stress disorder is an anxiety disorder characterized by exposure to a traumatic event involving the possibility of death or serious injury to self or others, witnessing the death or serious injury to another, or the experience of serious injury to self. At the time of the event, the individual must have experienced significant horror, fear, or helplessness. Among other distressing aspects of the disorder, symptoms can include flashbacks, intrusive thoughts or memories, distress or avoidance related to reminders of the event, loss of memory for some aspects of the trauma, difficulty sleeping, irritability, and anger (American Psychiatric Association, 2000). Examining recent veterans from OIF, as many as one

quarter of these veterans are dealing with this disorder (Donovan, 2010). Other estimates suggest 300,000 (15% of) service members will be diagnosed with PTSD in the coming years as a result of their service in OEF or OIF (Riggs & Sermanian, 2012). By comparison, PTSD prevalence over a lifetime in the United States for civilians is 7.8% (McCarthy & Petrakis, 2010).

Unfortunately, many veterans dealing with PTSD are also experiencing other comorbid conditions, particularly SUDs. Looking at Vietnam era veterans through OEF and OIF, of veterans abusing a substance, more than 41% also have PTSD (Petrakis, Rosenheck, & Desai, 2011). Half to three quarters of OEF and OIF veterans with an SUD also have PTSD (Seal et al., 2011). For veterans, there is approximately 4 times the risk of being diagnosed with an alcohol use disorder and 3 times the risk of a drug use disorder when there is also a diagnosis of PTSD (Seal et al., 2011). While there is a clear relationship between PTSD and SUDs, particularly alcohol, the exact nature of the relationship is not well-known. What is known about the relationship is that PTSD symptoms are of higher magnitude when there is a co-existing alcohol use disorder, and those with such a disorder are more likely to experience a relapse during recovery than those without PTSD (McCarthy et al., 2010). Clinically, there is suspicion that alcohol abuse may be a way to reduce certain PTSD symptoms as those veterans with PTSD and who misuse alcohol have higher rates of hyper-arousal PTSD symptoms (Weiss et al., 2012).

The literature also suggests that PTSD can be chronic, have long-lasting effects, and be associated with poor outcomes later in life. Rates of PTSD among Vietnam veterans remained high (9% to 15%) 15 years after the conclusion of combat (Qureshi et al., 2010). In another study of Korean War, Vietnam War, and World War II veterans age 44 to 70, almost a quarter of individuals receiving inpatient medical (non-psychiatric) treatment had symptoms of PTSD

(Blake et al., 1990). Of further concern is that PTSD is associated with increased prevalence of dementia in older veterans. Those veterans age 65 and older with PTSD and no Purple Heart are more than twice as likely to have dementia as their counterparts with no PTSD. For those with both PTSD and a Purple Heart, their risk of having dementia is 1.4 times that of those veterans with neither PTSD nor the Purple Heart (Qureshi et al., 2010). Researchers did not offer an explanation for the difference between the two groups, but in both cases, PTSD appears to be a considerable risk factor. Furthermore, those with PTSD but no Purple Heart were still 1.7 times as likely to develop dementia when compared to those without PTSD but with a Purple Heart (Qureshi et al., 2010). While much time and research have been devoted to younger veterans, this evidence suggests the possibility of long-term effects beyond just the symptoms of PTSD. Identifying and treating PTSD therefore, may be of great importance to both current and long-term health.

Finally, PTSD in veterans is also associated with distressing situations for their families. Particularly concerning is the pattern among the nation's recent veterans from OEF and OIF. As compared to their cohorts without PTSD, OEF and OIF veterans with a PTSD diagnosis are almost twice as likely to have physically abused an intimate partner in the previous year, 2.5 times as likely to have been psychologically abusive, and more than 3 times as likely to have caused an injury to their partner. When compared to Vietnam veterans with PTSD, OEF and OIF veterans with PTSD were almost twice as likely to have injured their intimate partner and more than 2.5 times as likely to have been psychologically and physically abusive (Teten et al., 2010). Also concerning is that the intimate partner violence is not solely committed by the veteran under these conditions. OEF and OIF veterans with PTSD were more than 1.5 times as likely to have been the recipient of intimate partner psychological abuse, almost twice as likely

to have been physically abused, and nearly 6 times more likely to have been injured by such abuse as their non-PTSD OEF and OIF counterparts. When compared to Vietnam era veterans with PTSD, OEF and OIF veterans with PTSD were more than 2.5 times as likely to have been physically assaulted, injured, or psychologically abused by an intimate partner (Teten et al., 2010). Recognition and adequate treatment, therefore, are crucial not only for the veteran but also other significant individuals in their lives.

Dual Diagnoses

Finally, dual diagnosis of an SUD and mental illness is high in the veteran population. Petrakis, Rosenheck, and Desai (2011) examined data from Vietnam era veterans and later who met the following criteria:

- utilized Veterans Affairs (VA) healthcare services over the course of the one year study period;
- and had a primary or secondary diagnosis involving certain mood disorders (bipolar disorder, dysthymia, and major depression), an anxiety disorder, or schizophrenia.

While rates for co-existing PTSD and substance abuse were high, dual diagnosis of substance abuse and mental illness was seen across multiple categories. Of those abusing substances, 69.3% also carried a diagnosis of major depression or dysthymia. For anxiety disorders on the whole (not exclusive to PTSD), 27.8% of those with an SUD also had a primary or secondary diagnosis in the anxiety disorder category. Finally, for those veterans with an SUD, 14.3% had bipolar disorder and 10.5%, schizophrenia (Petrakis et al., 2011).

Traumatic Brain Injury

Recent conflicts have seen high rates of veterans returning with traumatic brain injuries (TBIs) due to the prevalence of combat involving blasts such as improvised explosive devices (Ettenhofer, Melrose, Delawalla, Castellon, & Okonek, 2012). The symptoms of TBI can include a number of neurological and functional deficits and complications including: balance and coordination issues, vision problems, headaches and dizziness, frustration, depressive symptoms, sleep difficulties, trouble concentrating, and fatigue among other symptoms (Cicerone, 1995). One out of every six OEF and OIF deployed service members meet such symptom criteria for a TBI (Ettenhofer et al., 2012). Concerning is that evidence shows that daily impairments in functioning can continue as long as three months post-injury for even mild TBI, indicating the long-term impacts of such injuries (Ettenhofer et al., 2012).

Much like mental illness and SUDs, there is high comorbidity for TBI and other disorders. In looking at OEF and OIF veterans with TBIs, there is considerable overlap between TBI and PTSD. Almost 9 out of every 10 veterans with a TBI also have a PTSD diagnosis. Given that most TBIs in OEF and OIF veterans are due to explosions, this number begins to make sense (Ettenhofer et al., 2012). More than a third of OEF/OIF veterans with a TBI also have a mood disorder and over 12%, an SUD (Ettenhofer, et al., 2012).

In addition to comorbidity with mental illness, there are a number of other complications experienced by veterans with TBIs. One such complication is that almost 1 in 5 veterans with a TBI seeking VA healthcare do not have permanent housing (Ettenhofer et al., 2012). Furthermore, of the veteran participants in the Ettenhofer et al. study (2012), over 44% were neither working nor in school. These low participation rates in employment and education

indicate a lack of recovery and return to roles within the community which may be related to a combination of TBI, mental health symptoms, and additional physical disabilities.

Demographic Factors

While veterans on the whole face similar issues, there are some differences noted in the literature based on race and gender. Primarily, these differences involve rates of certain types of disorders and comorbidities and the likelihood of receiving certain types of treatment. While many of these differences do not greatly impact the overall concerns of high rates of mental health, SUD, and/or TBI issues and low rates of treatment, they are important to note.

Race. While a variety of research has been completed on the differences between veterans of different conflicts and eras and regarding varying symptoms, little work exists on differences between races. A thorough literature review of search terms for veterans, substance abuse, mental health, and race uncovered no articles which described differences in the prevalence of mental health or substance use disorder symptoms between races. Recent research has begun to address differences in care received by race, however. For example, veterans who are Black, Hispanic, American Indian or Alaskan Native are more likely than their White veteran counterparts to receive advice about their alcohol consumption when seen in Veterans Affairs (VA) healthcare facilities (Dobscha, Dickinson, Lasarev, & Lee, 2009). Additionally, in examining veterans with unhealthy alcohol use seen in the VA healthcare system, Black veterans are most likely to have received care for this problematic drinking. Hispanic veterans are least likely to have received care, while White veterans fall in between the two groups (Williams et al., 2012).

Research is similar when examining other areas of mental health. Spont, Hodges, Murdoch, and Nugent (2009) looked at a national sample of over 20,000 veterans and found that

minority racial status was not associated with any differences in receiving mental health treatment within the six months following a PTSD diagnosis (Spoont et al., 2009). Black veterans and those veterans identifying as Hawaiian/Pacific Islander were more likely than their White peers to enter into counseling, and Black veterans were more likely than other groups to receive at least eight counseling sessions (Spoont et al., 2009). While White, Black, and Hawaiian/Pacific Islander veterans were all as likely to receive medication for their symptoms, White veterans were more likely to receive a one-month trial of the medication (Spoont et al., 2009).

Finally, in looking at veterans who are homeless, some differences exist. Black veterans who are homeless have bigger social networks and more social contacts, higher rates of felony arrests and drug abuse or dependence diagnoses, are more likely to have been hospitalized for a drug problem, and have fewer psychiatric problems than White veterans (Rosenheck, Leda, Frisman, & Gallup et al, 1997). White veterans were more likely to have psychiatric problems and had fewer positive social connections than Black veterans. When provided the same services, Black and White veterans improve in nearly identical fashion (Rosenheck et al., 1997).

Gender. More than one in ten of those military members who have served in OEF and OIF are women, and the number of women in the military is expected to continue growing (Manguen et al., 2012). Therefore, examining differences in mental health issues based on gender is essential. One such distinction is that women veterans are more likely to have major depressive disorder than their men counterparts (Curry et al., 2014). Additionally, women veterans are more likely to have a comorbid anxiety or an eating disorder along with major depressive disorder while being less likely than men to have a comorbid alcohol use disorder (Curry et al., 2014). While Curry et al. (2014) found that women were less likely than men to

have comorbid major depression and an alcohol use disorder, on the whole, evidence is beginning to suggest that women may have higher rates of problematic drinking and substance use than men veterans (Chapman & Wu, 2014). Some research suggests that women who are veterans may engage in unsafe drinking practices at twice the rate of men and are more likely to illegally use prescription medication than men veterans (Lande, Marin, Chang, & Lande, 2007). Women veterans are also known to have higher rates of comorbid PTSD and major depression than their other sex peers (Maguen et al., 2012). Perhaps most concerning of all is that women veterans are about three times more likely than women civilians to die as a result of suicide (Kaplan, McFarland, & Huguet, 2009).

Differences between the genders also exist for receiving mental health treatment. When compared to men veterans, women veterans are more likely to enter into outpatient mental health treatment for PTSD, though less likely to receive inpatient services (Manguen et al., 2012). Regarding substance use treatment, women are more likely to drop out of intensive outpatient treatment for SUDs (Curran, Stecker, Han, & Booth, 2007). More research is needed to examine the reasons for these differences, however, women's expected social roles including as primary caretaker for children may be related to being less likely to participate in inpatient services and to continue with services. Additionally, services for veterans largely serve men and therefore women may feel discounted in the process or may not be receiving services best suited to their needs.

Summary of SUDs, Mental Illness, and TBI

Veterans experience high levels of SUDs, mental illness including PTSD, and TBI. Particularly at-risk are those veterans who have served in OEF, OIF, or the Vietnam War. In addition to high rates of SUDs, mental illness, and TBI, comorbidity of these conditions occurs

frequently. Particularly problematic is the overlap between PTSD and SUDs. Ideally, these high rates of disorders would be met with high rates of treatment. However, evidence suggests that veterans receive care for these disorders at very low rates, with the majority of veterans not receiving treatment for their SUD, mental health and TBI conditions. While some differences exist by gender and race, veterans across backgrounds experience these high rates of disorders and low rates of treatment. Finding ways to identify and encourage treatment entrance is of importance in addressing this gap, a task suited for the collection of counseling techniques packaged as motivational interviewing (MI).

Motivational Interviewing

Motivational interviewing has been chosen as the intervention for this study due to the breadth of research that exists indicating its effectiveness as a counseling intervention for those with SUDs, various mental health and health related concerns, as well as with multiple populations including veterans. Motivational interviewing also has documented effectiveness in encouraging treatment entrance, increasing perceived pertinence of treatment, and improved attendance (Lundahl & Burke, 2009; Westra, Aviram, & Doell, 2011; Murphy, Thompson, Murray, Rainey, & Uddo, 2009). In this study, adapted MI will be delivered by a computer screening tool for SUDs, mental illness, and TBI in order to work to build intrinsic motivation to enter treatment. The software will be utilized to standardize the application of MI in conjunction with two well-established screening tools for mental health and TBI symptoms in an effort to combine these screenings with the well-researched techniques of MI.

As an intervention, MI is a collection of specific techniques rather than a theory. As such, specific techniques from MI can be adapted for use in this study's computer screening (Ondersma, Svikis, & Schuster, 2007). A computer-assisted application of MI has been chosen

due to demonstrated effectiveness in applying the techniques of MI in addition to addressing specific issues likely to be present for veterans. Research indicates that while there are adequate services available for veterans, due to issues of stigma and internalized self-stigma, veterans make the conscious decision to not enter treatment (Dickstein, Vogt, Handa, & Litz, 2010; Ouimette et al., 2011; Stecker, Fortney, & Sherbourne, 2011). Providing MI in a computer-assisted format may be useful in allowing veterans to disclose symptoms they may see as shameful in a non-threatening manner. In addition, successfully addressing this internalized self-stigma involves increasing one's sense of self-empowerment (Dickstein et al., 2010). The literature suggests that both MI and computer based interventions may be useful in accomplishing this task (Dickstein et al., 2010; Fung, Tsang, and Cheung, 2011). The combination of MI as delivered via computer will produce an intervention that is modeled on a well-researched counseling intervention, cost-effective, easily reproducible, and has been found effective with other populations.

In addition to the advantages of using a computer-assisted intervention, brief interventions, which include the basic skills of MI, are recommended as part of the screening process when working with veterans, particularly in screening for alcohol misuse (Hawkins, Grossbard, Benbow, Nacev, & Kivlahan, 2012). Traditionally, a major benefit of brief interventions is that they can be accomplished by providers without specific substance abuse training (Miller and Rollnick, 2002). Medical providers can incorporate brief interventions into their regular care and screening for alcohol use disorders by using the major tenets of such interventions: empathic listening and responding, connecting drinking behavior to medical and other consequences, expressing the provider's own concern, and supporting any readiness to make a change indicated by the patient, which may include referral for additional specialty

treatment or evaluation (Hawkins et al., 2012). When working with veterans, the first two recommendations are the use of established brief screening tools for alcohol use disorders and for those screening positive, brief intervention to encourage beginning to make a change and referral for additional treatment (Hawkins et al., 2012). Therefore, this study seeks to address both of these components through the use of well-established screening tools (Global Appraisal of Individual Needs- Short Screener and the Neurobehavioral Symptom Inventory) that will be combined with MI techniques into a computer-assisted intervention. Together, this brief, purposeful combined screening tool and intervention will address the significant problem outlined in this chapter.

Statement of the Problem

As outlined above, there is considerable evidence that veterans experience high rates of SUDs, mental illness including PTSD and mood disorders, TBI, and comorbidity of these disorders and injuries, yet veteran participation rates in treatment remain low. There is also considerable evidence that the majority of veterans with SUDs do not receive treatment for these conditions, and that the majority of OEF/OIF veterans do not receive treatment for their present mental health disorders (Wagner et al., 2007; Zinzow, Britt, McFadden, Burnette, & Gillispie, et al., 2012). Of the combat veterans qualified for VA services, less than half have ever gone to a VA facility for any health service (Amdur, et al., 2011). Estimates are that each year, 9 out of 10 veterans with an SUD do not receive treatment (Golub, Vazan, Bennett, & Liberty, 2013). Three out of five veterans with serious psychological distress also do not receive care (Golub et al., 2013). When applied to the whole of the veteran population, this means that 16% of veterans have an SUD that is not being treated, and 8% of veterans have an unmet need for treatment for serious psychological distress (Golub et al., 2013).

There is further evidence that veterans in the most serious distress are not receiving mental health care during these crucial episodes. For example, for male veteran suicide deaths from 2000 through 2007, just over half of the men were seen by a healthcare provider in the month preceding their death. Of those who were seen, less than a third were provided care in a mental health setting and about 1 in 10 were seen in an SUD treatment setting (Ilgen et al., 2012). What this data shows is that of the 3,132 veteran suicides studied, less than one in four veterans received mental health services in the month leading up to their death from suicide (Ilgen et al., 2012). What is clear, therefore, is that improving screening methods that successfully encourage treatment for SUDs, mental illness, and TBI must be accomplished.

Closely related to the low rate of treatment for veterans are the perceived social influences contributing to these rates (Gibbs et al., 2011). Primarily, there is a culture of stigma surrounding both SUDs and mental illness in the military. Military members' concerns regarding this stigma fall into two broad categories: their relationships with and perceptions of others in the military and their careers. The majority of those in the military believe that treatment for a mental health concern would cause their peers to see them as weak and to lose confidence in them (Gibbs et al., 2011). More than half also believe they will be blamed for their mental health issues (Gibbs et al., 2011). In addition, half believe their career would be harmed by receiving mental health treatment and the majority endorsed the statement that they would be treated differently by their unit leader (Gibbs et al., 2011). Furthermore, of those military members with mental health disorders, less than half have an interest in receiving mental health care (Gibbs et al., 2011). When service members believe that receiving mental health care is a sign of weakness, as the data suggests they do, they are less likely to pursue receiving mental health services (Gibbs et al., 2011). The high rates of SUDs, TBI, and mental illness in the

veteran population and low treatment rates as discussed would suggest that these social influences continue to be an issue even following active service (Golub et al., 2013).

Study Justification

Based on the demonstrated need to increase the treatment participation rates of veterans with SUDs, mental illness, and TBI, the purpose of this study is the testing of a low-cost instrument to improve not only the recognition of these problems in the veteran population but also increase veteran rates of participation in treatment. Eastern North Carolina provides a particularly apt site for this study as there are an estimated 738,926 veterans living in North Carolina with an estimated 69,599 veterans living in the five counties used for data collection in this study (United States Census Bureau, 2014a). Given the high rates of mental health issues and TBI in the veteran population and the low rates of treatment received for these problems, there exists a gap to be addressed in finding ways to increase the number of veterans receiving care.

One of the most concerning consequences for our nation's veterans is that one veteran takes his/her own life approximately every 80 minutes. From 1998 through 2011, 2,990 veterans lost their lives to suicide (Armed Forces Health Surveillance Center, 2012). The majority of veteran suicide victims do not receive mental health care in the month preceding these deaths (Ilgen et al., 2012). The rate of suicide in the general population is 23 per 100,000. For veterans, this rate climbs to 37 per 100,000 and increases again for veterans with psychiatric diagnoses (Ilgen et al., 2010). At particularly high risk are veterans with bipolar disorder (112.7), alcohol use disorders (83.1), schizophrenia (83.3), depression (81.8), anxiety disorders not including PTSD (76.7), and PTSD (68.6). Given the overall low rates of treatment for psychiatric disorders among veterans, even in the month prior to suicide, and the high level of

risk for these individuals, recognition of mental illness and SUDs and encouragement of treatment entrance are primary justifications for this study.

If the created instrument is demonstrated to be successful in encouraging interest in treatment for SUDs, mental illness, and TBI, the possibility for wider dissemination exists. Analysis completed for Questions 1 and 2 will further identify which groups of veterans are most likely to benefit from the instrument, and these groups can then be targeted for a wider use of the tool. The instrument is relatively low cost and utilizes already established screening tools (the GAIN-SS and NSI) and MI, a frequently employed series of counseling techniques. Therefore, the instrument can likely be implemented with ease and with little alteration to already existing procedures. Continued research may also suggest usefulness with other groups likely to be dealing with stigma or self-stigma surrounding mental health issues.

Research Hypotheses and Questions

This study will investigate the effectiveness of a computer-assisted MI infused screening tool for SUDs, mental illness, and TBI upon two behavioral measures of veterans' participation in treatment. Specifically of interest are the percentage of veterans who screen positive for one or more of the aforementioned disorders or express another problem for which they would like help that (a) request a referral for further services and (b) the percentage of those requesting referrals who enter treatment or other services within 30 days. The rate of those with symptoms of SUDs, mental illness and/or TBI who receive treatment is deemed to be of critical importance in reducing the significantly negative impact of mental health concerns on the nation's veterans. Additionally, two research questions will address the factors associated with higher rates of referral request and treatment entrance.

Research Hypothesis 1: When compared to other veterans with SUD, mental health and/or TBI symptoms, those receiving the computer-assisted MI screening intervention will be more likely to request a referral for additional services.

Research Hypothesis 2: When compared to other veterans with SUD, mental health and/or TBI symptoms, those receiving the computer-assisted MI screening intervention will be more likely to enter treatment within 30 days.

Research Question 1: What demographic variables are associated with higher rates of requesting mental health services?

Research Question 2: What demographic variables are associated with higher rates of follow-through in receiving mental health services?

Study Significance

The primary purpose of this research is to study the influence of a computer-assisted MI screening intervention on veteran interest in and follow-through on receiving treatment for the symptoms of an SUD, mental illness, and/or TBI. Additionally, the study aims to determine whether such an intervention's effectiveness varies by demographic group including combat history or the presence of SUD or PTSD symptoms. Motivational interviewing has shown considerable promise for increasing individuals' likelihood of entering treatment. If the screening tool tested is effective at increasing this probability, then a low-cost intervention that can be easily reproduced will exist to help ameliorate the serious problem of low treatment rates for veterans with SUDs, mental illness, and/or TBI. Furthermore, the techniques used to develop such an instrument will expand knowledge on how to engage more returning service members in seeking out and following through on the care they need.

A secondary purpose of the study is to learn more about the efficacy of elements of MI being infused into a computer-assisted screening tool as investigated in the first and second research questions. Very little previous research exists to indicate whether or not MI will be effective in this manner. Information gleaned will be useful in the larger fields of counseling and psychology in informing the process of developing future screening tools that incorporate MI and the use of technology. Demographic information will be recorded as part of this study, which may inform the field regarding whether such screening interventions are most successful with any particular groups. Data may suggest use of similar tools with other non-veteran groups such as individuals with SUDs or PTSD.

Definition of Key Terms

The term veteran will be used to refer to any former member of the United States military of any branch unless otherwise specified. When describing certain aspects of research, veterans of a particular conflict or era may be specified. When referring to those who are currently serving in the military, service members or members of the military will be used instead.

The phrase substance use disorders (SUDs) is used throughout this paper as an all-encompassing term for alcohol abuse and dependence as well as substance use and dependence as defined in the DSM-IV-TR, with the exception of caffeine and nicotine use. In similar fashion, mental illness is used to describe any DSM-IV-TR recognized mental health disorder. Aside from SUDs, of focus in this paper are PTSD and major depression as defined by DSM-IV-TR criteria.

Traumatic brain injury (TBI) “is defined as an alteration in brain function, or other evidence of brain pathology, caused by an external force” (Brain Injury Association of America, 2011). In this study, endorsing one or more symptoms of TBI at the moderate level of severity

or higher on the Neurobehavioral Symptom Inventory (NSI) will be considered potential evidence of a TBI.

Self-stigma, discussed in detail in Chapter 2, refers to the internalization of mental health stigma. For the purposes of this paper, mental health stigma includes negative attitudes held regarding individuals with mental health problems including attitudes regarding the attribution of the source of the problem. Particularly regarding SUDs, self-stigma may include the attitude that one's symptoms are one's own fault.

Motivational interviewing (MI) is “a collaborative, goal-oriented style of communication with particular attention to the language of change. It is designed to strengthen personal motivation for commitment to a specific goal by eliciting and exploring the person's own reasons for change within an atmosphere of acceptance and compassion” (Miller & Rollnick, 2013, p. 29). The application and techniques of MI will be discussed in detail in the next chapter.

Computer-assisted motivational interviewing (MI) is the application of MI consistent techniques via a computerized intervention. Interaction with the participant and feedback on their responses is provided via an avatar, an on-screen character, in this study. Other forms of computer-assisted MI discussed in Chapter 2 as completed by other researchers may or may not utilize an avatar but also apply MI consistent techniques in responding to clients in a computerized intervention.

Chapter Summary

Our nation's veterans are experiencing high prevalence rates of SUDs, mental illness, and TBI. Of even greater concern are the particularly high risk groups that exist: OEF/OIF veterans and young veterans as well as Vietnam era veterans. While Vietnam era veterans are at unusually high risk for a substance use disorders, OEF/OIF and young veterans are at high risk in

all three categories. Amplifying these concerns are very low participation rates in treatment across all demographic categories. These low participation rates may be related to multiple causes, but issues surrounding the stigma of receiving treatment are of great importance.

This failure in engaging veterans in treatment has significant consequences. These consequences include a high rate of suicide in the veteran population. The majority of male veterans who have died by suicide did not receive mental health specific care in the month leading up to their death (Ilgen et al., 2012). Furthermore, while the majority of veterans with an SUD or mental illness do not receive treatment for their disorder, the preponderance of veterans with such a disorder also do not state they have an unmet treatment need (Wagner, et al., 2007).

The gap this study addresses therefore, is to examine one way to build the importance of receiving treatment as part of a screening for SUDs, mental illness, and TBI. The study does so via the use of MI, an extensively researched method for building motivation and importance to make a change. The following chapter will describe the theoretical rationale for selecting MI for this intervention as well as the widespread body of research and literature informing this decision.

CHAPTER 2: LITERATURE REVIEW

Introduction to Literature Review

This chapter reviews literature relevant to the decision to adapt MI and the supporting framework of Self-Determination Theory (SDT) for use in a computerized, interactive intervention to encourage veterans to enter treatment or services for present concerns. First, research on the current problem of high rates of veterans with SUDs, mental illness, and TBI and low treatment rates is reviewed along with literature on barriers to treatment. The concepts of stigma and self-stigma and associated literature are introduced and explained. Next, research supporting the use of MI is presented, including the use of MI for SUDs, mental illness including PTSD, with veterans, and for treatment entrance. The discussion of MI continues with evidence supporting the adaptation of MI for use with a computerized intervention. Research on SDT, a theory that provides a framework for MI, follows. Literature is reviewed to explain the relationship between SDT and MI and to support the use of MI as explained by SDT for addressing self-stigma. A final section explains the basic techniques of MI. A summary concludes the chapter.

Veteran Symptoms and Treatment Rates

The percentage of veterans with SUDs, mental illness, and TBI far exceeds the percentage of those receiving treatment for these disorders. For example, researchers have concluded that 9 out of 10 veterans with an SUD and 3 out of 5 veterans in serious psychological distress do not receive care for these problems (Golub et al., 2013). Researchers also suggest that service members are aware of these mental health symptoms but make a conscious choice not to seek out care for them (Stecker, et al., 2011). When service members acknowledge symptoms of a mental health disorder, only about a quarter pursue care (Stecker et al., 2011).

The gap, therefore, between those with mental health or TBI symptoms and those receiving treatment appears not to be a failure to identify the need for treatment but rather a choice not to enter services. Research with veterans with SUDs reveals the same conclusion. Of veterans identified as having an SUD, only 1% state they have a need for treatment (Wagner, et al., 2007). More than half of Marines meeting criteria for a mental health disorder also state they are uninterested in receiving help, and only 43% of veterans with significant psychological distress received care in the past year (Golub et al., 2013; Hoge et al., 2004). Understanding the reasons services members and veterans make this choice to not enter into services is therefore critical to increasing rates of treatment entrance.

In addition to the above literature on rates of interest in and receiving care for mental health concerns, Lindley, Cacciapaglia, Noronha, Carlson, and Schatzberg (2010) examined the willingness of veterans who screened positive for PTSD or depression to accept a referral for specialty mental health services within the VA system. They initially examined and found that 77% of OEF/OIF veterans and 76% of veterans from other eras with such symptoms had not accessed VA mental health services in the two years prior to the study (Lindley et al., 2010). Participants seeing their primary care provider (PCP) at the VA are required to be screened for PTSD annually within the first five years after discharge and for depression every year. When an initial screen was found to be positive for at least one of the aforementioned, the PCP either attempted to make a direct referral to a specialty mental health provider within the VA or arranged for the individual to be contacted in person or on the phone by a psychologist or master's level psychology health technician for additional screening and referral.

The authors found that when screened face-to-face, 47% of veterans accepted a referral for specialty mental health services, a number that dropped to 40% when the process was

conducted by phone (Lindley et al., 2010). Those referred by a psychologist or psychology health technician accepted referrals 54% of the time, whereas those referred by their PCP accepted a referral 27% of the time. Additionally, the authors found that if a patient accepted a referral, 74% of OEF/OIF and 71% of veterans from other eras went on to attend a first appointment for mental health services (Lindley et al., 2010).

Mental Health Stigma

Despite the low rates of interest in treatment and treatment entrance described, progress toward decreasing barriers to care has been made. Primarily, the system of care has improved to the point where institutional factors like cost, availability, fitting in at the VA, and distance to care do not appear to be significant barriers to veterans entering mental health treatment (Ouimette et al., 2011; Stecker et al., 2011). Service members and veterans believe they have access to mental health care and largely are not deciding against care because this care is difficult to obtain. Additionally, there is some evidence that veterans believe they would be supported in the decision to seek care and believe that mental health treatment works (American Psychiatric Association, 2008; Stecker et al., 2011). While active duty military members express concerns over career, unit leader, and peer related consequences, these concerns have no reason to impact veterans (Gibbs et al., 2011). Even service members returning from deployment believe their decision to obtain mental health care would be supported (Stecker et al., 2011). Therefore, mental health providers are faced with a situation where a system of care has been established, prospective clients believe this care works, and to some extent, believe they would be supported in seeking such care. Yet, even when veterans have acknowledged their own mental health symptoms, three quarters do not get help (Stecker et al., 2011). With the decrease of systemic

and institutional barriers, the challenge to mental health professionals then, is to uncover and address the more salient barriers to receiving care that exist.

As institutional and systemic barriers do not appear to be the most salient, another type of barrier must be present. Research suggests that personal barriers are what most contribute to veterans' lack of treatment entrance, more so than systemic and institutional factors like cost or distance (Stecker et al., 2011). In part, personal barriers include a failure by veterans to expect that they will be impacted by mental health issues related to their service and an anticipation of being able to handle any symptoms that do arise without professional assistance (Stecker et al., 2011). Additionally, veterans often see treatment as ineffective, think the problem will go away, believe they can solve the problem, and struggle with issues of stigma and self-stigma (Dickstein et al., 2011).

Of these personal factors, researchers suggest stigma and self-stigma play critical roles in the decisions service members and veterans make regarding mental health treatment. While stigma is a barrier to receiving mental health care in the civilian population, stigma is particularly salient for those with military backgrounds (Dickstein et al., 2010). Research with Vietnam, OIF, and OEF veterans with a PTSD diagnosis reveals that stigma is a more significant barrier than many of the other potential barriers to care including systemic or logistical barriers. Similarly to Stecker et al., 2011, Ouimette and colleagues (2011) compared numerous potential barriers to care among veterans with PTSD. Logistical barriers like transportation issues or distance, cost, hours of service, long waits for appointments, and lack of awareness of VA services as well as institutional barriers (distrust of medical and mental health providers and lack of staff responsiveness) and feelings of not fitting in at the VA were less significant barriers for veterans to receiving care than stigma (Ouimette et al., 2011). Stigma related factors, including a

lack of comfort with getting help and fear of social consequences, rated as more significant barriers (Ouimette et al., 2011). Of additional concern is that higher levels of PTSD symptomology were associated with increased perception of stigma and non-stigma related barriers (Ouimette, et al., 2011). Therefore, those veterans in the greatest need may also be those least likely to seek care.

In addition to being stigmatized by others, service members and veterans struggle with self-stigma. Public or social stigma is the negative beliefs of others, whereas self-stigma occurs when these negative beliefs about mental health become internalized (Dickstein et al., 2010). This internalization of stigma occurs when an individual adopts these negative beliefs about their situation and views them as true. In their research, Blais and Renshaw (2013) found that both stigma and self-stigma were associated with intention to seek help for mental health issues among veterans and service members. Regarding self-stigma, higher reported levels of self-stigma were associated with less intention to seek help for mental health symptoms (Blais & Renshaw, 2013).

In examining military culture, finding the basis for this self-stigma is not difficult. The military, by the nature of its mission, works to instill certain values in service members. These values include an ultimate focus on battle and associated values of being strong, managing one's own problems, and relying significantly on unit members and self over outsiders (Dickstein et al., 2010). Seeking outside help is not something that is valued and instead is seen as weak (Dickstein et al., 2010). Military members also believe that seeking help will result in both career and social consequences and that others will lose confidence in them (Gibbs et al., 2011). Combining this value set with issues of stigma and self-stigma creates a situation where help-seeking behavior is minimal.

In examining issues of stigma and self-stigma, there is reason to believe that self-stigma is the more significant problem. Veterans seem to be more uncomfortable with their own decision to seek care than they fear stigmatizing reactions from others. The idea that self-stigma factors most prominently into the decision to receive care is based on two important reasons. The first is that veterans believe treatment works. Research by the American Psychiatric Association (2008) found that the overwhelming majority of veterans (88%) hold the personal belief that mental illness can be effectively treated. The second factor is that returning service members believe they will be supported, not stigmatized, by other people in their life if they chose to enter mental health treatment. Research with service members who had been deployed found that study participants largely believe people will support them if they decide to get help for a mental health problem (Stecker et al., 2011). Taken together, if veterans believe there is effective mental health treatment that they would be supported in receiving and yet they choose not to enter treatment, this would suggest that self-stigma, or their own negative beliefs about mental health, factor more saliently than the beliefs of others.

Finding ways to mitigate self-stigma is therefore crucial to increasing veteran interest in and ultimately entering into treatment. Unfortunately, little is known about the best way to accomplish this goal. Thus far, addressing self-stigma has largely relied on the use of group work. Little research exists on working with veterans to address self-stigma, particularly on an individual basis (Dickstein et al., 2010). While there is considerable evidence suggesting the need to address self-stigma, an empirical research base for accomplishing this goal is weak. The limited literature in the area of self-stigma that does exist posits that a focus on increasing self-empowerment would be useful in addressing this problem (Dickstein et al., 2010). Self-stigma is an internalization of negative stigmatizing beliefs, and this internalization comes along with

decreased self-esteem and lower feelings of self-efficacy (Dickstein et al., 2010). Essentially, providers must find ways to empower veterans in order to overcome this diminished self-esteem and self-efficacy. Accomplishing such a goal may lead to an increased willingness, or an empowerment, to choose help rather than tolerating symptoms alone.

Based on the above, evidence suggests that veterans are aware of their mental health symptoms, acknowledge that mental health treatment works, and have access to such treatment. They perceive few institutional or logistical barriers to obtaining this treatment. However, the majority of service members and veterans with mental health symptoms choose not to enter into treatment, in large part due to issues of stigma and self-stigma. Motivational interviewing provides a way to examine this issue of choice.

Review of MI Literature

A significant body of evidence shows MI has broad utility as a counseling intervention. Hundreds of studies have been published on the usefulness of MI for problems ranging from alcohol abuse and smoking cessation to eating disorders and safe sexual practices. Significant portions of the literature on MI have been analyzed via meta-analyses in the past decade. Four of the most significant meta-analyses that have been published on MI were summarized by Lundahl and Burke in 2009. They concluded that MI is 10 to 20 percent more effective than no intervention and is equivalent to other established forms of treatment across a wide range of problems including substance abuse, engaging in treatment, and addressing forms of risky behavior. Three of the four meta-analyses included in the Lundahl and Burke review are individually addressed next along with an additional meta-analysis found in Miller and Rollnick (2000). The fourth meta-analysis in Lundahl and Burke focused solely on MI for addressing alcohol consumption and is examined separately in the section on MI and SUDs.

The most exhaustive of the meta-analyses reviewed by Lundahl and Burke is that of Lundahl, Tollefson, Kunz, Brownell, and Burke (2010). In this meta-analysis, authors examined 119 studies that used MI based interventions for numerous treatment goals and found an overall Hedges g effect size of 0.22, including studies where MI interventions were compared to no intervention, a weak intervention, and a strong intervention. This effect size is considered to be small and statistically meaningful but may be lower than found in other studies due to the wide range of forms of MI and problems addressed, and the fact that many of the studies included strong comparison groups of other well-established interventions (Lundahl et al., 2010).

Three other meta-analyses have reached similar conclusions to those of Lundahl and colleagues. Burke, Arkowitz, and Menchola (2003) examined 30 studies that used adapted MI, in which MI is used in conjunction with (a) clients receiving feedback to their responses on some form of standardized assessment or (b) in conjunction with other non-MI techniques. They found Cohen's d effect sizes from 0.25 to 0.57 in areas that included alcohol problems, drug addiction, social impact factors (e.g. occupational or legal issues), and diet and exercise. They found no meaningful effect for smoking cessation or HIV risk factors. This review was similar to the meta-analysis completed by Burke, Arkowitz and Dunn (2002; not found in Lundahl and Burke) and published in Miller and Rollnick (2002) which found meaningful effects for adapted MI for hypertension, alcohol and drug problems, diabetes treatment, and bulimia and no meaningful effects for HIV risk factors. Inconclusive results were noted for addressing cigarette smoking and physical activity (Burke, Arkowitz, & Dunn, 2002). Finally, Hettema, Steele, and Miller (2005) looked at 72 studies that used MI based interventions for alcohol, smoking, HIV, drug use, gambling, treatment compliance, water purification/safety, eating disorders, and diet/exercise and uncovered an overall Cohen's d effect size of 0.77 for such interventions with a

decrease to 0.30 after one year. These effect sizes are both statistically and clinically meaningful (Hettema et al., 2005).

While there is good overall evidence supporting the general use of MI in counseling as noted by the above meta-analyses, there is further evidence supporting MI based models for use in encouraging veterans to enter treatment. This evidence falls into three categories. First, MI has been found useful in working with the groups of individuals of interest in this study. Secondly, MI has demonstrated efficacy in encouraging treatment entrance and attendance, a major goal of this study. Finally, evidence exists that MI can be effectively incorporated as part of a computerized intervention as will be undertaken in this research. The following three sections review the research supporting each of these categories.

Motivational Interviewing and Populations of Interest

Motivational interviewing has been found effective in working with the individuals that comprise the sample of this study. Specifically, MI has demonstrated effectiveness in working with individuals with SUDs, PTSD, and various forms of mental illness. Motivational interviewing has some limited research supporting its usefulness for those with a TBI. Additionally, MI has also specifically been used with veterans, including veterans with SUDs and mental illness.

Motivational interviewing and substance use disorders. Motivational interviewing is a widely studied intervention that has been well-established as an effective intervention for SUDs. Compared to other groups, MI has been most studied and best supported in regard to its original use as an intervention for those with SUDs (Hettema et al., 2005). Hettema et al. uncovered a number of interesting patterns regarding the use of MI for SUDs across the 72 clinical trials included in their analysis. Specifically regarding alcohol abuse, a Cohen's *d* effect

size of 0.41 was found across all studies at the conclusion of treatment, and an effect size of 0.26 was found for all follow-up time periods (Hemttta et al., 2005). When these studies were narrowed to trials where MI was compared to no treatment, this Cohen's *d* effect size increased to over 0.7. Research has also found that MI is effective with those with alcohol use disorders of almost any personal demographic including college students, veterans, active-duty service members, and trauma victims (Burke, Arkowitz, & Dunn, 2002).

Other meta-analyses of MI related interventions have found similar success for MI in regard to treating alcohol use disorders. Vasilaki, Hosier, and Cox (2006) included 15 studies in their analysis of MI interventions applied to abuse of alcohol. They found a Cohen's *d* effect size of 0.18 in favor of MI when compared to no interventions and of 0.43 when compared to other forms of treatment. Further analysis showed the difference between the two groups (no treatment versus other treatment) was not statistically significant (Vasilaki et al., 2006).

The recent meta-analysis published by Lundahl and colleagues in 2010 did not provide effect sizes specific to alcohol abuse, however, a list of the 119 studies included in their review was supplied along with effect sizes reported using Hedge's *g*. Of these studies, the authors found 23 published articles where alcohol was the sole substance investigated and where MI had a statistically meaningful positive effect size defined by the authors as a Hedge's *g* of 0.20 or higher (Lundahl, et al., 2010). An analysis of a total of 68 studies which included alcohol or alcohol in combination with other substances yielded an overall positive effect for MI (Lundahl et al., 2010).

Evidence also suggests that MI is useful for the broader category of SUDs beyond alcohol use disorders. Motivational interviewing interventions have been effectively used with poly-substance abusing populations, marijuana users, and those wishing to change smoking

behavior (Burke et al., 2002). In addition to examining alcohol specifically, Hettema et al., (2005) examined 13 studies on illicit drug use. Initial effect sizes after treatment had a mean Cohen's *d* of 0.51. For those studies with follow-up measures, the effect size dropped to a still meaningful 0.29. Similarly, Lundahl et al. (2010) uncovered a positive effect for MI in treating non-alcohol substances. Significant positive effect sizes were found for the categories of miscellaneous drugs (27 studies analyzed) and marijuana (17 studies). These effect sizes were similar to those for alcohol use disorders and indicate that MI is effective with a variety of substances beyond alcohol.

Motivational interviewing and mental illness. Evidence also exists to support the use of MI with other mental health problems. The majority of this research supports the use of MI for addressing issues of treatment entrance and attendance rather than for overall treatment. Unlike SUDs, other forms of mental illness do not necessarily involve a specific behavior within some control of the client, and therefore MI may be less appropriate. For example, MI can be useful in assisting individuals in changing their pattern of alcohol use as this is a specific behavior over which they have some level of control. Using MI with clients to change the degree to which they experience PTSD related flashbacks or schizophrenia related auditory hallucinations is not clinically equivalent or appropriate. When applied to other forms of mental illness then, MI is largely used to evoke client motivation to enter, remain in, and adhere to treatment. Some of the non-SUD mental health problems for which MI has been successfully employed are briefly described below. A more extensive review of MI as it pertains to treatment entrance and attendance is examined later in the section on treatment entrance.

In almost all areas of mental illness treatment, there is evidence supporting the use of MI as both a method to increase treatment entrance as well as promote positive outcomes. In the

area of anxiety disorders, MI is useful in encouraging treatment participation, improving attendance at treatment, and reducing anxiety related symptoms (Westra, Aviram, & Doell, 2011). Motivational interviewing furthermore has demonstrated effectiveness for increasing receptiveness to following cognitive-behavioral therapy for anxiety disorders (Westra et al., 2011). Specific to PTSD (classified as an anxiety disorder in the DSM-IV TR but now classified as a trauma and stress related disorder), MI has been used to increase attendance at treatment and in the recognition of PTSD related problems by clients (Westra et al., 2011).

The effectiveness of MI is not limited to anxiety disorders, PTSD, and SUDs, however. There is evidence supporting the use of MI for depressive disorders, including symptom reduction and compliance with medication (Westra et al., 2011). In individuals with dual diagnoses of an SUD and mental illness, MI has demonstrated effectiveness in increasing treatment participation and compliance with medication as well as decreased use of substances and improved attendance at treatment (Westra et al., 2011). There is even evidence for MI in decreasing bingeing episodes among those with eating disorders (Westra, et al., 2011). Furthermore, MI has been used successfully to encourage treatment entrance in follow-up outpatient treatment after hospitalization in patients with dual psychiatric disorders and SUDs, a commonly occurring scenario in the veteran population (Burke et al., 2002). Forty-seven percent of individuals receiving MI versus 21% of control group individuals attended at least their first scheduled appointment (Burke et al., 2002).

Motivational interviewing and traumatic brain injury. Traumatic brain injury presents a different situation from SUDs and mental illness in employing MI. Primarily, this is because a well-known difficulty in working with individuals with TBI is apathy. Studies have found that as many as 70% of those with a TBI are living with the symptoms of apathy (Lane-

Brown & Tate, 2010). Unfortunately, there is a dearth of information on how to address this problem, which has far-reaching consequences for those impacted by TBI. Apathy can include symptoms on a spectrum from decreased speech or a lack of interest in setting goals to almost a complete lack of engagement with one's environment (Lane-Brown & Tate, 2010). Apathy can have serious impacts on one's physical rehabilitation, interaction with and re-integration into the environment, family and personal relationships, and likelihood of obtaining employment (Lane-Brown & Tate, 2010).

While limited information exists in the literature to suggest methods of addressing this apathy, there is reason to believe MI may be useful in both addressing apathy symptoms and encouraging treatment entrance. Lane-Brown and Tate (2010) found MI useful in both decreasing symptoms of apathy and increasing goal-directed behavior in those with a TBI. Medley and Powell (2010) also make a case for the use of MI in engaging those with TBI in treatment. They suggest that the core techniques of MI may be useful in setting realistic goals and establishing a working alliance. At this juncture, MI has been traditionally used to address ambivalence, a situation in which an individual feels two ways about the same behavior at the same time (e.g. drinking is both beneficial and harmful). Apathy however, is not feeling two opposing ways about the same behavior but rather lacking motivation in any particular direction. Additional research is needed regarding the influence of MI in working with individuals with TBIs.

Motivational interviewing and veterans. As described above, MI has been successfully used in the treatment of many mental health problems and for the purpose of treatment entrance. A question remains then regarding whether MI remains useful when these problems occur specifically in veterans. Fortunately, MI also has demonstrated effectiveness with this group.

As discussed previously, PTSD is a common condition for many veterans, and therefore there exists a need for effective treatment methods. Veterans participating in an MI group for PTSD as compared to a psychoeducational group had higher rates of attendance (Murphy, Thompson, Murray, Rainey, & Uddo, 2009). In addition, those veterans participating in the MI group were more likely to see their beliefs about and behaviors related to PTSD as a problem compared to the control group (Murphy et al., 2009). Moreover, those receiving MI saw the overall PTSD treatment program, even beyond the MI group, as more relevant. This is an issue of particular importance in working with veterans, a group that often views treatment as unnecessary (Murphy et al., 2009).

In addition to successful use with veterans with PTSD, MI can also be a useful in encouraging veterans to enter treatment. For OEF and OIF veterans with anxiety, PTSD, depression, or an SUD and who were not receiving any mental health treatment, MI over the phone was more useful in encouraging veterans to attend treatment than follow-up phone calls employing a neutral intervention (Seal et al., 2010). Of veterans screening positive for one or more of the above disorders and not receiving treatment, 62% receiving MI follow-up phone calls entered mental health treatment as compared to only 26% of those with neutral follow-up phone calls. With 73 participants, this study shows the potential benefits of MI in addressing a serious ongoing problem for the nation's veterans and offers evidence that MI can be useful in encouraging this population to enter into treatment (Seal et al., 2012).

While veterans with SUDs, mental illness, and TBI typically express a lack of interest in receiving mental health treatment, the population of homeless veterans may be even more difficult to engage in treatment. With 14% of homeless men and 2% of homeless women being of veteran status, this is an area of much needed outreach (Veterans Affairs, 2011). Despite the

feelings of abandonment or hopelessness that may surround homelessness for these veterans, MI has also been demonstrated as effective in engaging this population in treatment. In working with veterans who were homeless, unemployed, dependent on at least one substance, and on a waitlist for residential services, an MI intake was significantly more effective than a standard intake in encouraging veterans to enter SUD treatment (Wain et al., 2011). The researchers also noted clinically significant differences between groups in that those participants receiving the MI intake tended to stay in the program longer and were more likely to graduate than those veterans who received a standard intake (Wain et al., 2011). Based on this study, one can conclude that MI as a brief intervention is even effective in engaging veterans in experiencing the significant problems of simultaneous homelessness and SUDs.

Motivational interviewing for treatment entrance. Beyond the specific veteran related evidence noted above, there is additional research to support using MI based interventions for encouraging treatment entrance. The effectiveness of MI as a brief intervention is perhaps one of the strongest reasons to consider its use, particularly as part of a screening tool and for the purpose of encouraging treatment entrance. While health and mental health providers are interested in engaging those with SUDs in receiving treatment, practical constraints often limit the amount of time available to encourage this treatment. Perhaps one of the environments with the greatest limits on time is the hospital emergency department. Emergency departments are a setting in which there is great potential for both screening for SUDs and making connections to follow-up care. In a study involving the use of a standard referral process versus brief MI interventions for individuals with a history of an alcohol use disorder (i.e., patients who had alcohol on their breath at the time of emergency department admission or had used alcohol in the six hours leading up to the injury causing their emergency room visit), some results of note were

discovered regarding the use of brief MI. Participants were randomly assigned to the usual referral process, one brief MI session (40-60 minutes), or a brief MI session with a follow-up MI session seven to 10 days later. While all three groups saw fewer days of heavy drinking one year later, the group receiving two brief MI sessions both had fewer alcohol related injuries during the following year and a decrease in negative consequences from their drinking (Longabaugh, 2001).

As mentioned previously, not only is MI useful in terms of positive treatment outcomes, but research has found even a single session useful in encouraging treatment entrance. The Connecticut Department of Children and Families participated in research using a brief MI session as compared to a traditional evaluation with a referral for treatment for parents believed to be in need of substance abuse treatment. Those providing the MI evaluation included two master's and two bachelor's degree clinicians, each having completed a one day MI training program. Of those parents receiving the MI evaluation and referral, 59% attended at least one treatment session as compared to 29% of those receiving the standard evaluation (Carroll, Libby, Sheehan, & Hyland, 2001). Thirty percent of MI versus 17% of traditionally evaluated and referred parents attended at least three sessions.

A significant number of additional studies have found MI useful in encouraging treatment entrance. Lundahl and Burke's review of MI meta-analyses found 34 studies in which MI was utilized to encourage treatment entrance. When compared to no specific treatment intervention, on the whole there was a 5% to 15% increase in treatment entrance for those receiving MI interventions across the studies. When compared to other interventions, MI saw on average a non-statistically significant but perhaps clinically important 5% advantage in treatment entrance. Therefore, when compared to no intervention, MI is considerably useful. When compared to other evidence-based practices, MI may have a slight advantage, but performs similarly in

encouraging those with mental health symptoms to enter treatment. Across the board, MI is useful in successfully encouraging treatment entrance, has been found useful in widely varying settings, and is a good choice for use as part of a screening intervention if treatment entrance is the desired goal (Lundahl & Burke, 2009).

Summary of Motivational Interviewing Literature

Based on the literature and studies reviewed thus far, MI has been demonstrated an effective intervention for some of the disorders mostly commonly experienced by veterans including SUDs, PTSD, and dual diagnosis of an SUD and other mental health problem. Research is just beginning to examine MI for TBI, but there is reason to believe MI may be useful and superior to other interventions in this area. Motivational interviewing has also been specifically tested with veterans in a limited number of studies and has been found to be a beneficial intervention with this population. Research further supports the use of MI based interventions for encouraging treatment entrance for SUDs and other mental health disorders. Based on this research, MI appears to be a logical choice for incorporation into a screening tool for the purpose of encouraging veterans to enter treatment for SUDs, mental illness, and TBI. The final question regarding the selection of MI then, is whether MI can be successfully incorporated into a computerized intervention as required for this study. Research suggests that it can.

Computer-Assisted Motivational Interviewing

A number of factors were considered in the decision to use a computer-assisted MI intervention for this study. Utilizing MI via a computerized screening tool offers several advantages over alternatives. The validity and reliability of the instruments used, ability to standardize the screening and MI intervention, reaching more individuals than would otherwise

be possible, and producing a tool or method that will be reproducible were all logistical reasons for this choice. Chapter 3 provides a more complete discussion of the methodological reasons for making this decision. What follows is a review of the research on adapting MI for computerized use.

The feasibility of creating a brief computerized intervention based on MI was primarily initially investigated by two different groups: Ondersma and colleagues and Hester and colleagues. Ondersma, Chase, Svikis, and Schuster published their initial work in 2005. These researchers created a software program for delivering MI based interventions and used quantitative and qualitative methods to investigate effectiveness and participant reception of the program (Ondersma et al., 2005). In part, the researchers examined participant ratings of state motivation within the computerized adapted MI session and found that the software was associated with increased motivation (Ondersma et al., 2005). Also published as part of this article was a study completed with postpartum women with a history of drug use in the month leading up to their pregnancy. Those women receiving the computerized intervention had slightly increased levels of motivation to change at one-month after the intervention as compared to a slight decrease in motivation for those in the control group (Ondersma et al., 2005). For those participants available for follow-up, a moderate Cohen's *d* effect size of 0.68 for motivation was found (Ondersma et al., 2005).

Ondersma and colleagues continued their work with the software they had developed with a 2007 study with postpartum women with SUDs. In this study, a single-session computer-assisted MI intervention in conjunction with the Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST) was found useful in decreasing substance use at four months when compared to the assessment without the computerized MI intervention. Impressive to note is the

effect MI had post-pregnancy. Frequently, pregnant women with SUDs decrease their substance use over the course of the pregnancy but return to pre-pregnancy levels of use after the pregnancy is over. For those receiving the single computerized adapted MI intervention in this study, this rebound effect was not found (Ondersma, Svikis, & Schuster, 2007).

While Ondersma and colleagues focused on the use of their software with postpartum women, Hester, Squires, and Delaney (2005) created their own brief MI based computerized intervention for alcohol use. The intervention they created was the Drinker's Check-up (DCU). They recruited participants from the public who were interested in alcohol treatment and randomly assigned participants to receive either immediate treatment via the DCU or to a four-week delay and then the DCU. At four weeks, those receiving the DCU immediately were drinking less than their counterparts who had not yet received the DCU. These decreases held at eight weeks and one year after the intervention (Hester et al., 2005). Those receiving the intervention on a four week delay decreased their drinking a very small amount with no intervention during those first four weeks. At eight weeks (four weeks after receiving the DCU) they had reduced their drinking further but not statistically significantly. At one year, however, both groups were drinking the same and statistically significantly less than baseline (Hester et al., 2005). This study shows the importance of capitalizing on motivation when it is present. While the delayed group eventually caught up to the group treated immediately, the greatest benefit in the shortest amount of time was received by those who received treatment right away. While waitlists for intensive forms of treatment may be inevitable, there is little reason a computer-assisted intervention cannot be used almost immediately.

Other studies have also undertaken the task of combining adaptations of MI with computerized assessment in encouraging a change in behavior. Researchers at the Center for

Health/HIV Intervention and Prevention at the University of Connecticut successfully incorporated MI based techniques into a computerized intervention administered over two short sessions. Four weeks after the intervention, participants were found to be statistically more likely not only to have condoms available, but also to report having used condoms in their sexual encounters than those in a control group (Kiene & Barta, 2006). Of note is that the previously reviewed meta-analyses found mixed or negative results in applying MI to HIV risky behavior, yet computerized MI was seen to be significantly effective in this study (Burke, Arkowitz, and Menchola, 2003; Burke, Arkowitz and Dunn, 2002; Hetteema, Steele, and Miller, 2005). One interpretation of this difference is that there may be an advantage of using a computerized delivery of adapted MI versus clinician delivered when the topic involves stigmatized issues.

Walton and colleagues (2010) further explored the role of adapting MI for use in computerized interventions. In an urban hospital emergency department, researchers provided a brief intervention to adolescents who had reported alcohol use and incidents of aggression in the past year. Participants were randomized to one of three groups after a computer assessment. These groups included a brochure, brief MI based intervention given by a clinician, or a brief MI intervention provided by computer. Six months post-intervention, those participants who had received either the clinician or computer based intervention reported similarly fewer negative consequences from drinking (Walton et al., 2010). The clinician provided brief intervention was useful in reducing the experience of violence whereas the computer provided intervention was not. Not enough is known to conclude what combination of factors led to this difference and whether altering the content of the computerized intervention would improve future use.

Similarly, Alfonso and colleagues compared modes of delivering adapted MI interventions with college students mandated to receive intervention following a school alcohol

policy violation (Alfonso, Hall, & Dunn, 2013). A direct comparison of a brief, individual MI intervention with a computerized MI based intervention found that both led to statistically significant reduction in harm related to alcohol. The brief individual MI also led to a statistically significant reduction in amount of alcohol used, a result not found with the computerized intervention. The computerized intervention was considered to be more cost effective than the brief MI (Alfonso et al., 2013).

Finally, two studies have examined the application of brief computerized MI in military populations. The first study was completed by Williams, Herman-Stahl, Calvin, Pemberton, and Bradshaw (2009). These researchers randomly assigned voluntary participants from eight military bases to be in a control group with no intervention, to receive the DCU as described above, or to receive the web-based Alcohol Savvy (AS). Compared to the control group, at a one month follow-up, those receiving the DCU had fewer drinking days, were less likely to meet heavy drinker status for their gender, were less likely to have binged, had a lower estimated peak blood alcohol content, had fewer drinks per occurrence, and fewer days they perceived themselves drunk. At six month follow-up, significant effects were still seen for number of drinking days and number of drinks per occurrence. No significant differences were found for those in the AS group. This research supports the efficacy of brief computer-assisted MI screening with a military population and also suggests that the type of computerized intervention matters. In Williams et al. (2009), the brief MI DCU intervention was associated with significant change, whereas the AS, which pulls from multiple theories, produced no significant results.

A study by Pemberton and colleagues (2011) also compared the utility of the brief MI DCU with the AS and a no-intervention control group. Military members were recruited from

eight military bases including two bases each from the Army, Navy, Marine Corps, and Air Force (Pemberton et al., 2011). When compared to the no intervention control group, at one-month follow-up, those receiving the DCU were less likely to have frequent heavy episodic drinking, were drinking less per occasion, and had lower estimated peak blood alcohol concentrations. All of these changes held at the six-month follow-up indicating that the results had longevity as well. No significant effects were found for the AS on any measures of alcohol use. The DCU, a brief adapted MI computerized intervention, was found effective where both no intervention and a second computerized intervention were not (Pemberton et al., 2011).

As described in this section, evidence is increasing that MI based interventions can be effectively incorporated into a computerized format. Researchers have primarily accomplished this through the development of their own programs, with the two most notable being those designed by Ondersma and colleagues as used in their 2005 and 2007 research studies and the DCU as developed by Hester and colleagues for their 2005 study with research expanding to various groups. Overall, brief adapted MI interventions provided in computerized form appears to be well-received and effective in producing measurable behavior change (Alfonso, Hall, & Dunn, 2013; Hester et al., 2005; Kiene & Barta, 2006; Ondersma et al., 2005; Ondersma et al., 2007; Walton et al., 2010). Furthermore, the limited research available thus far suggests that these results extend to use with military populations (Pemberton et al., 2011; Williams et al., 2009). Final practical issues in using computer-assisted MI are the potential concerns of computer-assisted interventions and the cost effectiveness of using MI versus alternatives.

Concerns Regarding Computer-Assisted Mental Health Screening

There are several concerns to address regarding the use of a computer-assisted mental health screening tool and intervention. These concerns fall into four broad categories that

include a lack of research, the digital divide and issues of accessibility, the integrity of the screening instruments, and the ability of a computerized intervention to replace a skilled clinician. These concerns must be considered throughout the implementation and evaluation of such a screening tool. While all of these are valid concerns, they do not preclude completion of the study as described below.

Lack of Research

A primary concern regarding the use of computer-assisted motivational interviewing to screen for SUDs, mental illness, and TBI and encourage interest in and entrance into treatment is the small amount of empirical evidence in the literature. As described in the preceding section and based on a thorough review of the research literature, very specific and mostly small studies have been done to test the effects of specific interventions, however, large scale research does not exist, a problem that exists on the grander scale of tele-mental health services in general as the use of technology for such purposes is new, and initial studies with small samples make sense so as to not expend considerable time and financial resources on interventions that may not be effective. Research in this area is also not often in the form of randomized control studies and no accepted standard exists for determining the effectiveness of such interventions (Kramer, Mishkind, & Poropatich, 2011). While research is limited at this time, the research that does exist has found such screening to be useful (e.g. Ondersma et al., 2007). Additionally, this study may contribute to research in this area. The risks of such research to participants are low as the majority of veterans do not enter into treatment for mental illness, SUD, and/or TBI symptoms, and therefore new research in this area has the potential not only to directly assist veterans but also to further overall knowledge of the problem.

The Digital Divide and Accessibility

Another concern regarding the use of a computer-assisted MI screening instrument is the digital divide, or “social stratification due to unequal ability to access, adapt, and create knowledge via use of information and communication technologies” (Warschauer, 2011). For example, socioeconomic differences (low versus high) or age (younger versus older) may contribute to groups being more or less proficient and comfortable with using technology. For the purposes of this research, acknowledging this digital divide includes the realization that this method of screening is not appropriate for all veterans. For such individuals for whom the computer intervention is not accessible, a traditional face-to-face screening with a mental health professional or providing an accommodation (e.g. using the mouse to select participants’ verbal responses) is indicated.

Additionally, the idea of the digital divide as it pertains to the type of computer skill needed for this instrument is a divide that is ever decreasing. Ondersma, the creator of the CIAS package used in this study, was contacted regarding this issue and his experience in using the package with participants. His comments indicated that he experienced very minimal issues with individuals being able to successfully use the computer to complete the CIAS package and that he attributed this fact to the idea that the basic technology skills needed to take the instrument are now a part of everyday interactions like fueling one’s car, operating an automated teller machine (ATM), or using the self-checkout line at the grocery store (S. Ondersma, personal communication, December 2, 2013). Furthermore, Ondersma suggested that a decreased familiarity with technology might lead to increased novelty with such an assessment and perhaps greater effectiveness (S. Ondersma, personal communication, December 2, 2013). Ondersma’s observations are supported by the data from his 2007 study utilizing the Computer Intervention

Authoring System (CIAS) package. Moderate effect sizes for the intervention were found in favor of the CIAS intervention with a sample of postpartum women of low socioeconomic status (88.8% of participants receiving public assistance; Ondersma et al., 2007). In addition, the sample mean IQ was 86.5, 41.1% had less than a high school education, and less than a third had been employed full-time in the previous six months (Ondersma et al., 2007). This data lends support to the idea that the type of computer intervention used in this study is likely to be successful despite the traditional digital divide.

As with Ondersma's work, the level of computer skill needed for this study's instrument is not expected to be a barrier to the majority of potential participants. As society continues to integrate technology into an ever increasing number of daily tasks and interactions, people will only become more familiar with technology and may even begin to expect technology to play a role in such interactions. The need for research regarding how to best implement technology in mental health screening and treatment is essential at this point in time.

In addition to a digital divide due to issues of access and familiarity with computers, the possibility exists that ability to utilize or benefit from the instrument may be limited due to disability status. While the focus of this study was on mental health, SUDs, and TBI, veterans frequently have other disabilities, including physical disabilities. The Veterans Health Council reports that traumatic amputation, hearing and vision impairments, amyotrophic lateral sclerosis (ALS), chronic pain, memory difficulties, cancer, and Parkinson's disease among other disabilities are all service connected disabilities or conditions experienced by veterans (Veterans Health Council, n.d.). This study recognizes the impact of these physical disabilities in addition to the mental health, SUD, and TBI concerns of interest in this study. Therefore, an instrument capable of accommodating some of these specific disabilities was chosen. For those with

hearing impairments, an option exists to have the avatar's speech presented on the screen for participants to read, and for those with visual impairments, the questions can be converted to speech within the instrument itself. Those with physical disabilities such that they could not use a computer mouse would require additional accommodation which, while not available in the present study, is possible via additional assistive technology.

Integrity of Screening Instruments

A concern for some studies integrating mental health screening tools with technology might be the integrity of the screening instrument in a new form. That is, taking an instrument that is traditionally administered by a clinician and instead having the instrument be administered by an avatar or self-administered on a computer may in some way change the instrument. The present study relies on the use of the Global Appraisal of Individual Needs- Short Screener (GAIN-SS) and the Neurobehavioral Symptom Inventory (NSI). The GAIN-SS is designed to be self-administered and is already available for self-administration in computerized form. While the NSI is traditionally given via paper and pencil, the instrument is also one that can be self-administered, and therefore reading and selecting responses on a computer screen is unlikely to change the instrument. While the avatar in this study provides instructions and an MI intervention after the GAIN-SS and NSI, the avatar does not administer either instrument and therefore plays no role in altering the delivery of the assessment.

Substitute for Counseling

Finally, while avatars continue to increase in complexity, and there is evidence that individuals react to characters on a computer screen similarly to how they would react to a person, some might argue against providing mental health screening using technology because technology cannot take the place of good clinical skill, counselor empathy, or create a positive

therapeutic alliance (Clark & Mayer, 2011). While valid concerns as they pertain to counseling itself, these concepts do not present a problem for the present study which serves as a screening tool designed to encourage treatment interest. The purpose of the intervention created in this study is not to provide clinical services but rather to encourage veterans to follow-through on entering into such services. The intervention is designed to make the disclosure of mental health, SUD, and TBI symptoms easier when issues of stigma and self-stigma are present. Any positive changes noted via this instrument would only further the number of veterans receiving counseling as military members and veterans traditionally indicate little interest in services and are unlikely to seek help.

Cost of Motivational Interviewing

Finally, while demonstrated to be a valuable intervention for a number of populations including veterans, MI is also a cost effective intervention to implement when compared to other choices. While in an ideal world counseling interventions would be chosen based solely on their fit for the individual or population, logistics including budget constraints can be expected to be considered when choosing an intervention. Regarding MI, specific research conducted with the United States Air Force found that MI is cost effective to implement and maintain. Researchers examined the cost of responding to a drinking related incident with the typical treatment of the Substance Abuse Awareness Seminar (SAAS, an educational seminar on the progression from substance use to dependence and the consequences of problematic drinking), an individual MI session, or a group MI session (United States Air Force, n.d.). When accounting for all of the costs involved including training practitioners, space, pay for facilitators, expense of participants' pay during time away from work, and travel costs, group MI was the least expensive intervention at \$70 per client (Cowell, Brown, Wedehase, & Masuda, 2010).

Individual MI cost the Air Force \$84 per client, and the traditional SAAS intervention was most expensive at \$184 per individual (Cowell et al., 2010). With both the demonstrated efficacy of MI in working with veterans and the cost savings it can bring, choosing MI as early in the intervention process as possible, including at the point of screening, makes both clinical and practical sense.

The cost of establishing and using MI must also take into consideration the preventative use of such interventions. In such a way, an additional cost savings may be realized by preventing the need for more costly treatment for substance dependence. In research with Swiss military conscripts, young men with low-risk drinking behavior voluntarily received a brief MI intervention. Six months later, when compared to peers who received no intervention, those receiving MI were drinking 33% less (Gaume, Gmel, Faouzi, Bertholet, & Daeppen, 2011). Motivational interviewing can have a protective effect for those who are already low-risk drinkers and also be useful in decreasing the amount military members think their peers drink, and consequently their own drinking (Gaume, 2011; Williams et al., 2009). Given the effectiveness of MI as an early intervention, there is reason to consider using it at the point of screening, especially as MI can be incorporated into a computer-assisted screening at little or no additional cost. Accepting that MI is effective, can be successfully adapted for use in a computerized screening tool, and is cost effective, a next step is to examine the theory that supports the techniques of MI.

Motivational Interviewing and Self-Determination Theory

This study focuses on the issue of making a choice to receive care by using MI via a computer-based strategy. Motivational interviewing has been chosen as a model for understanding this dilemma as ultimately, the purpose of MI is to simultaneously respect client

autonomy and choice while exploring and supporting clients' motivations for change (Hettema, Steele, & Miller, 2005). Viewed through an MI lens, veterans must make a choice about whether to enter treatment. This choice is impacted by any number of individual factors which may include both internal (e.g., wanting to feel better) and external motivators (e.g., a spouse insists on treatment). Currently, the majority of veterans do not choose treatment (Golub et al., 2013). Motivational interviewing is a series of techniques that has been found useful in working with such individuals who have not yet committed to making a change (e.g. entering into SUD treatment) in a way that honors client choice while addressing the ambivalence often associated with committing to making a change (Hettema et al., 2005).

Miller and Rollnick developed MI as a counseling intervention for use with individuals abusing substances (Miller & Rollnick, 1992). Since that time, MI has become a widely practiced intervention with uses beyond the treatment of SUDs, in settings both inside and outside the counseling field (Miller & Rollnick, 2013). As defined by the fathers of the technique, MI is a "...client centered, directive method for enhancing intrinsic motivation to change by exploring and resolving ambivalence" (Miller & Rollnick, 2002). More recently, Miller and Rollnick put forth a more nuanced definition that suggests how MI works. This definition states that MI is "...a collaborative, goal-oriented style of communication with particular attention to the language of change. It is designed to strengthen personal motivation for commitment to a specific goal by eliciting and exploring the person's own reasons for change within an atmosphere of acceptance and compassion" (Miller & Rollnick, 2013, p. 29). This definition describes the spirit of MI which includes a collaborative approach with the client, respecting client autonomy, and evoking client motivation rather than using or forcing external or counselor motivation (Miller & Rose, 2009). More recently, this spirit of MI has been

described as a partnership between counselor and client, counselor acceptance of the client, compassion, and evocation of clients' motivations to change (Miller & Rollnick, 2013).

While there is considerable research as described in this chapter that supports the use of MI for a variety of populations and problems, MI is a counseling style and not a theory. In some ways, the fact that MI does not solely adhere to one theory may be related to its effectiveness. More recently, however, efforts have been made to learn more about how MI works and to address the critique that MI lacks a supporting theory. Having a theory to support MI provides an overall framework for understanding and researching this counseling style. While MI developed separately from any specific theory, as an intervention, MI has roots in a combination of social psychology and counseling related fields (Miller & Rollnick, 2012). A number of recent efforts to understand the relationship between MI and theory have focused on SDT.

The spirit of MI, as described above, includes respecting client autonomy through a collaborative relationship and evoking clients' own motivation to make a change (Miller & Rose, 2009). This spirit of MI is supported by the constructs of SDT. As applied to psychotherapy, Ryan and Deci (2008) describe SDT as a theory that "provides empirically informed guidelines and principles for motivating people to explore experiences and events, and from that reflective basis, to make adaptive changes in goals, behaviors, and relationships" (p. 186). There are clear parallels between this definition and that of Miller and Rollnick (2013) which in part describes MI as "designed to strengthen personal motivation for commitment to a specific goal by eliciting and exploring the person's own reasons for change within an atmosphere of acceptance and compassion" (p. 29).

If SDT provides a framework to which MI provides technique, and both deal predominantly with client motivation to change, understanding how motivation is viewed within

SDT is essential. Motivation in SDT is on a continuum that includes, in order: external regulation, introjected regulation, identified regulation, integrated regulation, and intrinsic motivation (Patrick & Williams, 2012; Ryan & Deci, 2008). Individuals experiencing external regulation to make a change anticipate a reward from, or seek to avoid, a negative outcome in the environment. Clients whose motivation is that of introjected regulation seek to make a change to prove to themselves or others that the change is possible or operate under a sense of obligation to another. In the identified regulation category, change is motivated by personal importance. For those motivated by integrated regulation, making a particular change is driven by the change being connected with other values or a further goal (Patrick & Williams, 2012). Finally, those motivated to treatment by intrinsic motivation are interested in what might happen and in the possibilities that counseling may bring. This last phase is driven by personal curiosity (Ryan & Deci, 2008).

Where SDT looks at sources of motivation, MI picks up by focusing on moving motivation from the beginning of the continuum (motivation from external sources) to the latter (internal sources). Motivational interviewing recognizes that clients are most likely to adopt and implement changes that they give voice to themselves, a central tenet of SDT (Miller & Rollnick, 2013). Motivational interviewing as a counseling style rather than a theory essentially becomes a practical application of SDT via a focus on assessing and encouraging change talk, or client speech in favor of making the adaptive change described in the Ryan and Deci's definition of SDT. Evoking such change talk is done with the goal of eliciting the client's own motivation for change, with a focus on internal sources of motivation. Evoking client motivation to make a change focuses on two types of change talk: preparatory and mobilizing (Miller & Rollnick, 2013).

Preparatory change talk is client speech that voices desire, ability, reasons, and need to make a change (Miller & Rollnick, 2013). This type of talk informs the counselor about sources of motivation and the degree to which they are external or internal in the SDT framework. Counselors then work to encourage talk that voices clients' reasons for preparing to change. Mobilizing change talk indicates that clients have moved toward a decision to make the considered change. In SDT, a client is more likely to be operating from a more internal motivation to change when they have begun using mobilizing change talk. Mobilizing change talk contains speech about commitment, activation, and taking steps (Miller & Rollnick, 2013). Commitment talk expresses that a client is ready to take the next step toward the given change. Activation talk indicates a forward movement that is not quite as strong as action but expresses what the client is preparing or ready to do. Finally, talk about taking steps indicates what a client has already undertaken on the road to change (Miller & Rollnick, 2013). Movement from preparatory talk to mobilizing talk, and within mobilizing talk from activation and commitment to taking steps, are indicative of a client moving through the phases of SDT from external sources of motivation to internal.

In addition to a continuum of motivation, SDT also proposes that individuals have three basic needs that are essential to creating positive change: autonomy, competence, and relatedness (Neighbors, Walker, Roffman, Mbilinyi, & Edleson, 2008; Ryan & Deci, 2008). Autonomy refers to clients' ability to make choices for themselves. SDT posits that client growth is best stimulated when clients are able to choose their own direction and make their own decisions about what path to take (Neighbors et al. 2008). Competence is clients' ability to be successful in their environment. Not only do clients need to be able to choose their own way, but they will be hopeless about change if they do not have the experience of successfully navigating life's

challenges (Neighbors et al., 2008). And finally, the ability to make positive change in SDT relies on meeting the need for relatedness, or the formation and maintenance of positive social relationship (Neighbors et al., 2008).

As with the continuum of motivation, MI provides a counseling style to match the above theoretical constructs of SDT. One of the most basic aspects of MI is respect for client autonomy including their interpretation of the problem, ambivalence about change, and the extent to which they want clinician advice or information (Miller & Rollnick, 2013).

Motivational interviewing also fully recognizes SDT's assertion of client need for competence and supports this sense of competence through techniques aimed at confidence and self-efficacy. Strategies for supporting client competence include looking at past successes, brainstorming with the client, providing affirmations of client strengths, and reframing past failures as attempts (Miller & Rollnick, 2013). Finally, MI addresses the need for relatedness throughout the counseling process. Motivational interviewing is centered on the Rogerian idea of empathy and truly understanding the worldview of the client and their experiences (Miller & Rollnick, 2013). The MI based counseling process not only provides the type of relatedness that one hopes clients will experience in other areas, but models for clients what a positive social relationship can look like.

Recent publications have begun to support the marriage of SDT as a theoretical construct with MI as a practical counseling application. Vansteenkiste and Sheldon (2006) point out that SDT and MI developed from a nearly identical starting place and share many of the same assumptions. SDT research began by confronting traditional behaviorist approaches that focused on external sources of motivation (e.g. external rewards or deadlines) and suggested these methods may actually be detrimental to one's motivation to complete tasks. Similarly, MI

sought to address a perceived problem with traditionally prescriptive forms of therapy where clients received motivation to change in the form of confrontation (Vansteenkiste & Sheldon, 2006). Likewise, SDT and MI share some basic assumptions including the idea that humans have a natural motivation to grow and improve, and both see individuals as quite capable of personal growth and development.

As suggested previously, Vansteenkiste and Sheldon (2006) also believe that MI serves to provide techniques through which counselors help clients move from fully extrinsic forms of motivation to a greater internalization of motivation to make a change. They further argue that MI serves to address the basic needs postulated by SDT. Specifically, they posit that:

- an empathic counseling style addresses the need for relatedness;
- MI's techniques for addressing resistance and evoking client change talk support the need for autonomy and;
- MI's methods of encouraging self-efficacy support the need for competence.

The authors conclude that through their separate development, SDT provides a better understanding of the types of client motivation and how MI works, while MI provides practical suggestions for the largely theoretical SDT, particularly in the area of supporting client autonomy (Vansteenkiste & Sheldon, 2006).

Other recent articles have also supported the marriage of SDT and MI for the purposes of better understanding client motivation and the change process. Patrick and Williams (2012) make a similar argument to that of Vansteenkiste and Sheldon. They support the idea that SDT may be the missing theoretical framework needed by MI, and that MI may offer practical techniques missing in SDT. They go even further in stating that SDT and MI can likely be systematically integrated (Patrick & Williams, 2012). They also make the important point that much of the

discussion surrounding the marriage of SDT and MI has been conceptual rather than empirical. The authors suggest that SDT research has not adequately explained how to best address the psychological needs of autonomy, competence, and relatedness, and that MI strategies and measures may be useful in expanding the empirical literature in this area (Patrick and Williams, 2012).

Finally, one additional way of viewing the relationship between SDT and MI is to look at SDT as a top-down approach and MI as a bottom-up approach to the same issues of motivation and change. Vansteenkiste, Williams, and Resnicow (2012) explain that clinical interventions can develop in either a top-down manner where a theory precipitates the development of clinical interventions as in SDT or through a bottom-up approach where clinical experience drives the development of interventions as in MI. As in Patrick and Williams (2012), they suggest a systematic integration of SDT and MI. Miller and Rollnick (2012) themselves enter this discussion in acknowledging that MI was developed as a bottom-up approach to practical clinical needs and that its techniques are consistent with the needs for autonomy, competence, and relatedness found in SDT. While they express interest in the usefulness of SDT for more fully understanding MI and the complementariness of SDT and MI, they stop short of supporting a full systematic integration (Miller & Rollnick, 2012).

Self-Determination Theory and Stigma

With both a general acknowledgment in the literature of the relationship between the techniques of MI and the theory of SDT, a relationship supported even by the founders of MI, there is adequate evidence to accept the use of MI as a practical approach supported by an SDT framework for the purpose of increasing veteran treatment entrance rates. As discussed in both the previous and current chapter, veterans have high rates of SUDs, mental illness, and TBI, but

express little interest in and are unlikely to enter into treatment for these problems. Research suggests the lack of treatment entrance is tied less to institutional barriers and more to personal barriers, particularly self-stigma. The literature contains scant research on the best ways to combat self-stigma and conceptual models for reducing self-stigma are rare (Mittal, Sullivan, Chekuri, Allee, & Corrigan, 2012). There is reason however, to believe that MI as supported by SDT may be useful for encouraging treatment entrance even when self-stigma is present.

A review of the literature found only one study that specifically employed MI for the purpose of combating self-stigma. Fung et al. (2011) created a program that utilized a number of counseling theories and techniques for the purpose of reducing self-stigma in individuals with schizophrenia. The program contained an MI component for the purpose of increasing likelihood of taking action. Like veterans, people with schizophrenia, particularly in China where the study took place, often have internalized social stigma into self-stigma. The program Fung and colleagues created had some positive results including an increased readiness among clients to change problematic behavior, the goal of the MI component (Fung et al., 2011).

Limited additional literature suggests that the basic psychological needs posited by SDT would be an effective way to address the issue of self-stigma. Dickstein and colleagues (2010) advocate for the use of empowerment in addressing self-stigma for service members and veterans. Empowerment can ignite feelings of righteous anger which fall in line with military values and are associated with lower levels of self-stigma (Dickstein et al., 2010). Corrigan and Calabrese (2005) also suggest personal empowerment strategies for the reduction of self-stigma. The idea of personal empowerment is aligned with all three of the psychological needs proposed by SDT. Empowering individuals supports their autonomy and their right to choose whether and how to engage in treatment. Competence can be increased through assisting individuals in

learning more about their symptoms and the negative impacts of social and self-stigma and providing opportunities for clients to be successful in taking steps toward ensuring they get the care they need. Empowering individuals also addresses the SDT need of relatedness through increasing awareness of how social and self-stigma impact relationships and when combined with autonomy, giving veterans the opportunity to choose how to engage with others. The military reduces autonomy in relatedness by assigning relationships based on units as well as the nature of relationships via the command structure. Using autonomy to empower veterans to choose these relationships, including establishing a positive relationship with a mental health provider, may be quite powerful in addressing self-stigma.

Finally, Dickstein et al. (2010) also suggests that empowerment may be furthered through the use of computer-based strategies. They base this assertion on the idea that Internet use has been correlated with empowerment. Furthermore, their review of self-stigma literature found that changes made through the use of computer interventions have been found to persist as long as six months after the intervention (Dickstein et al., 2010; Finkelstein, Lapshin, & Wasserman, 2008). This study proposes to use SDT based MI in computerized form, an intervention just beginning to be supported by research.

Summary of Self-Determination Theory

Self-Determination Theory can be viewed as a supporting theory for the counseling style of MI. Self-Determination Theory proposes motivation on a continuum and suggests that the best chance for positive change and personal growth comes from meeting the three psychological needs of autonomy, competence, and relatedness. In assessing the relationship between SDT and MI, one can look at SDT as a top-down approach whereby interventions are created based on a theoretical framework. Conversely, MI can be viewed as a bottom-up approach, where

interventions have been generated based on meeting practical needs in counseling. Recognition of the relationship between SDT and MI is increasing with even the fathers of MI, Miller and Rollnick, in agreement. Furthermore, the literature is just beginning to propose that SDT based interventions may be useful in encouraging treatment entrance by mitigating self-stigma, a significant problem faced by veterans. The next section will explain how the techniques of SDT are applied via MI.

Motivational Interviewing Technique

With an understanding of what MI is and the research supporting its use in this study, this chapter concludes with a description of the basic techniques of MI. As described previously, MI is “a collaborative, goal-oriented style of communication with particular attention to the language of change. It is designed to strengthen personal motivation for commitment to a specific goal by eliciting and exploring the person’s own reasons for change within an atmosphere of acceptance and compassion” (Miller & Rollnick, 2013, p. 29). Beyond this definition of MI and any specific techniques, the authors describe a more global spirit of MI for practitioners to adhere to. This spirit of MI includes a partnership between the counselor and client, unconditional acceptance of the client and what they bring with them to counseling, compassion, and evocation of the client’s motivation to change (Miller & Rollnick, 2013).

This spirit of MI provides the overall principles to which clinicians adhere while moving through the four processes that comprise the method of MI. These four processes include engaging, focusing, evoking, and planning. While there is a general progression from engaging to planning, Miller and Rollnick’s (2013) most recent work recognizes that clients and counselors will move back and forth through these processes and that some clients may enter at a later part of the processes than others. Throughout these four processes, counselors work as

partners with their clients, are accepting and compassionate, and work to evoke the client's motivations for change.

The first process, engaging, includes the steps needed to build rapport and a counseling relationship with the client. Clinicians work to build a relationship in which the client trusts them. The emphasis during the engagement process is not on assessment or diagnosing but rather listening to the client, learning more about their values and goals, and establishing a collaborative alliance. Engagement is of vital importance at the most basic level, as a failure in this area can lead a client not to return for additional services after only a single appointment (Miller & Rollnick, 2013). While early work with the client focuses on engagement, engaging the client remains important throughout the other processes.

In the second process, focusing, the clinician works to clarify the client's goals, values, and what they desire from the counseling process. The counselor and client ideally come to an understanding about the direction counseling will take and the desired end result (Miller & Rollnick, 2013). This process can vary in amount of time and complicatedness based on individual factors, including the counseling setting. However, counselors are cautioned that they should not assume that what they see as the obvious issue to be addressed is the greatest concern to the client. For example, someone with a substance use issue may be less concerned about such use than they are about a lack of employment, homelessness, issues of childcare, or a failing relationship.

In the next process, evoking, clinicians focus on what Miller and Rollnick call "change talk" (Miller & Rollnick, 2013). Motivational interviewing recognizes that ambivalence, or having reasons both for and against making a change, is a routine part of the change process. Change talk occurs when clients voice the desire, ability, reasons for, or need to make a change.

At a higher level, change talk can even include things a person is considering doing, is committed to changing, or small steps they have already taken (Miller & Rollnick, 2013). Clinicians use a variety of techniques including open-ended questions, looking forward to possible changes, looking back at past positive behavior, and exploring goals and values as compared to the status quo in evoking such change talk (Miller & Rollnick, 2013). Motivational interviewing recognizes that arguing to a client that they ought to make a change is more likely to produce counterarguments against the change and that a preferred technique is to evoke the client's motivation, wherein they state their own arguments for change.

The final process is that of planning. When sufficient arguments for change have been voiced by the client, the clinician begins to facilitate the planning process. Counselors work to build commitment to the change which can be accomplished through focusing on individual steps rather than the long-term goal and by asking the client to voice this commitment to other supportive individuals in their life (Miller & Rollnick, 2013). Counselors assist the client in planning for possible setbacks before they occur and by normalizing that change takes place on a continuum. Often multiple tries are needed, and success can exist in between the extremes of perfection and failure (Miller & Rollnick, 2013).

These four processes have evolved as Miller, Rollnick, and others continue to research how MI works and investigate SDT as a supporting theoretical framework. In calling these aspects of MI processes rather than stages or steps, Miller and Rollnick recognize that change happens differently for everyone, that different levels of motivation will be present for different individuals, varying levels of readiness, importance, and confidence will exist, and that the engagement process will be different for each individual client. The way to change will not always be a linear series of steps. However, the research described in this chapter has shown that

the processes proposed by Miller and Rollnick and researched by them and others can be quite powerful in increasing motivation and action toward change.

Chapter Summary

Veterans have significant rates of SUDs, mental illness, and TBI, and low rates of interest and entrance into treatment. The majority of veterans with SUDs or other forms of psychological distress do not receive mental health treatment (Golub et al., 2013; Stecker et al., 2011). Additionally, the majority of such veterans do not express interest in such care (Hoge et al., 2004; Wagner, et al., 2007). Veterans do believe that mental health treatment works, but express a number of other barriers to receiving such care (American Psychiatric Association, 2008). When examining these barriers in detail, institutional and systemic variables rate as less problematic than issues of stigma and self-stigma (Ouimette et al., 2011; Stecker et al., 2011). Motivational interviewing as supported by SDT has been chosen for the purpose of encouraging veterans with SUDs, mental illness, and TBI to enter treatment.

Motivational interviewing and interventions based on MI have significant evidence supporting their use for a diversity of populations and health and mental health problems. Meta-analyses over the past decade have compiled and evaluated hundreds of different studies on MI's effectiveness. In general, MI can be stated to be 10 to 20 percent more effective than no intervention and at least as effective as other established interventions (Lundahl and Burke, 2009). Motivational interviewing based treatments have been particularly well studied for alcohol and other SUDs with meaningful effect sizes found for the treatment of both alcohol and the wider category of SUDs (Burke et al., 2002; Vasilaki et al., 2006). Beyond SUDs, MI has demonstrated effectiveness in encouraging treatment entrance, improving attendance, and addressing a host of other behaviors (Lundahl & Burke, 2009). Research exists to support MI for

use with other forms of mental illness including depression, PTSD, and dual diagnosis of mental illness and an SUD, largely for the purposes of encouraging treatment entrance and attendance (Burke et al., 2002; Westra et al., 2011). Positive effects have also been found when MI was employed with veterans with PTSD (Murphy et al., 2009). Some limited research exists at this time to support the use of MI for those with TBIs (Lane-Brown & Tate, 2010; Medley & Powell, 2010). Finally, MI has also been effectively incorporated in adapted form as part of a computerized intervention providing clients feedback based on an assessment, including with veterans (Ondersma et al., 2005; Ondersma et al., 2007; Hester et al., 2005; Williams et al., 2009; Pemberton et al., 2011).

While MI can be called an effective counseling style or treatment, a critique of the methods of MI can be that they are a bottom-up approach, with the techniques driven by clinical need but lacking a supporting theory. Recent literature suggests that SDT provides a theoretical framework for the techniques of MI. Both SDT and MI are driven by client autonomy, the relationship between the counselor and client, and helping the client effectively plan changes. Where MI lacks a theory, SDT provides meaningful theoretical constructs. Where SDT lacks practical clinical techniques, MI provides useful methods for working with clients (Patrick and Williams, 2012; Vansteenkiste and Sheldon, 2006; Vansteenkiste, Williams, and Resnicow, 2012). Miller and Rollnick, the fathers of MI, agree that SDT provides a useful theory for understanding and studying MI (Miller & Rollnick, 2012). MI as supported by SDT may be useful for addressing the issues of self-stigma present for many veterans (Corrigan & Calabrese, 2005; Dickstein et al., 2010).

Based on the available research on MI, SDT, and veterans' barriers to receiving mental health treatment, this study will develop a computer-assisted MI intervention for the purpose of

increasing veterans' rates of interest in and entrance into treatment. The intervention will screen veterans for the symptoms of these disorders and provide feedback in an MI consistent form as done by other researchers including Ondersma and colleagues (Ondersma et al., 2005, Ondersma et al., 2007). Research suggests the combination of MI, SDT, and computer-assisted screening will be effective for this purpose. This intervention and the specific screening instruments to be used are described in detail in the following chapter.

CHAPTER 3: METHODS

Introduction

This chapter discusses the methods implemented in this study. The chapter begins by reviewing study research hypotheses and questions. Following the research hypotheses and questions are a discussion of and the rationale for the design used. Detailed information is provided regarding the population of interest, the sample studied, and issues of sampling. Next, the instruments chosen for use in the study are described, and rationale is provided for their selection. Following are the procedures used for collecting, storing, and analyzing data. The chapter concludes with a look at relevant ethical issues.

Research Questions and Hypotheses

The primary purpose of this study was to examine the effectiveness of a computer-assisted screening tool that incorporates motivational interviewing (MI) on rates of veteran interest and entrance into mental health treatment. Effectiveness of the intervention was based on the specific behaviors of requesting a referral for further services and making and keeping at least one follow-up appointment for services within 30 days. A second goal of the study was to examine whether computer-assisted MI could be effectively implemented in increasing treatment entrance when used as a screening tool and whether the computer-assisted MI screening intervention was most useful with any particular groups of veterans.

Research Hypothesis 1: When compared to other veterans with SUD, mental health, and/or TBI symptoms, those receiving the computer-assisted MI screening intervention will be more likely to request a referral for additional services.

Research Hypothesis 2: When compared to other veterans with SUD, mental health and/or TBI symptoms, those receiving the computer-assisted MI screening intervention will be more likely to enter treatment within 30 days.

Research Question 1: What demographic variables are associated with higher rates of requesting mental health services?

Research Question 2: What demographic variables are associated with higher rates of follow-through in receiving mental health services?

Research Design

This study used a separate pre-test/post-test quasi-experimental field study design. In such a design, a comparison pre-test group that is separate from data collected from the current study's sample is used (Trochim, 2006). This design was chosen for ethical reasons, as the study intervention could not be withheld from an individual interested in participating. If mental health, SUD, and/or TBI symptoms were uncovered there would be an ethical problem with withholding any part of the intervention, and so all participants had to be in the experimental condition. Because there was no standardized data from the sampling sites used in this study by which to compare, veteran averages obtained from Lindley et al. (2010) for accepting a referral and treatment entrance were used as the separate pre-test comparison groups. The design was implemented as a field study in order to meet and recruit veterans in their own environment instead of bringing them into a lab setting. Specifically, this study was conducted as an outreach service at two sites under the auspices of a university-based counseling clinic. This approach likely resulted in increased availability of eligible participants. The separate post-test group was the participants of this study. The post-test group in this study and the separate pre-test group were compared via a non-parametric binomial test of proportions. The final question of the

computer-assisted screening asked each veteran if they desired a referral for further services. Requesting such a referral was used as a measure of interest in receiving services. For those veterans requesting services, a 30-day follow-up survey was conducted by one of the researchers to determine if the participant had entered treatment. Treatment entrance was measured by having made and kept at least one appointment for follow-up services.

In examining validity, there were both advantages and disadvantages to this experimental design. A significant advantage of the design was the computer-assisted delivery. This manner of delivering the intervention ensured that each participant received the intervention in the same way without differences that would be seen with MI delivered by a researcher or multiple researchers. In addition, the computer-assisted intervention recorded all data entered by the participant in a format that was directly imported into the SPSS software. This decreased the likelihood of human error in recording and entering data for analysis. A potential concern of the design was whether those who chose to participate might be more motivated to seek mental health services than those who chose not to participate. This concern may have been amplified by recruiting participants from study sites where these individuals may have already made a decision to reach out for some form of assistance and therefore have been more willing to seek other forms of help as well.

Population

The population of interest for this study was adult veterans regardless of combat experience. Convenience sampling was conducted at a county Veteran Services Office (VSO) due to the large number of veterans residing in the area and the VSO seeing over 2,000 veterans seeking in-person assistance at the office each year (United States Census Bureau, 2014a). The VSO is open to any veteran residing in the county and provides assistance in filing claims for

Veterans Affairs related benefits. As this study aims to explore a screening tool for veterans living with substance use disorders (SUDs), mental illness, and traumatic brain injury (TBI), the VSO provided access to a sample of veterans applying for benefits and potentially dealing with the issues of interest in this study. Additionally, veterans were recruited via East Carolina University's MMHC program which provides mobile outreach and mental health services to veterans who are homeless and/or accessing soup kitchen services in a five county area, a region home to an estimated 69,599 veterans (United States Census Bureau, 2014a).

Sample and Sampling Procedure

All veterans age 18 and over seeking services through the VSO or involved in outreach via MMHC were eligible for participation. Participants were eligible to participate in the study only once, and veterans participating during an earlier visit to the VSO or MMHC were excluded from additional screenings. Veterans already receiving clinical mental health services from the MMHC project were ineligible to participate as such individuals had already made a decision to enter into treatment. The study used a convenience sample of veterans accessing services through both programs. The dissertation author or research assistant directly approached veterans utilizing these services to recruit study participants. All eligible veterans consenting to participate received the computer-assisted MI screening intervention. Aside from face-to-face recruitment via approaching veterans at the VSO and MMHC, no study specific recruitment or advertising was done. As the goal of this research was to study an intervention to encourage treatment entrance for veterans with SUDs, mental illness, or TBI, importance was placed on seeking a sample likely presenting with such issues. The VSO and MMHC project were apt sites for such recruitment.

Instrumentation

This study incorporated two well-known instruments, the Global Appraisal of Individual Needs- Short Screener (GAIN-SS) and the Neurobehavioral Symptom Inventory (NSI), into a computerized intervention utilizing MI (see Appendix A for GAIN-SS and NSI instruments). The Computerized Intervention Authoring Software (CIAS) package by Interva was used as the platform for delivering the screening. The study included all questions from the GAIN-SS and NSI in the CIAS tool. Within the CIAS platform, MI feedback was programmed to deliver MI based interventions based on participant responses to the screening questions of the GAIN-SS and NSI.

Global Appraisal of Individual Needs- Short Screener

The GAIN-SS is a brief 23 item instrument produced by Chestnut Global Partners, a subsidiary of Chestnut Health Systems, Inc., specifically designed as a screening tool to determine both the need for further referral or care for behavioral health disorders as well as to rule out those with only minor or no behavioral health needs (Chestnut Global Partners, 2012). The instrument has been normed with 6,621 adults as part of a total of 27,703 individuals including adults and adolescents, men (67%) and women (33%), and individuals of varying races (59% from minority groups; GAIN Coordinating Center, 2012). The GAIN-SS can be administered by a provider, self-administered via paper and pencil, or self-administered by computer. The GAIN-SS is highly correlated (.84 to .94) with the 123 question GAIN Individual Severity Scale (GAIN-I) and additionally has high internal consistency with an alpha of 0.96 (Dennis, Chan, & Funk, 2006).

Contained in the GAIN-SS are four subscales, each with 5 to 7 questions. The sub-scales include the following:

- Internalizing Disorders Subscale which includes somatic complaints, mood and anxiety disorders, trauma, suicidality, bipolar disorder, and serious mental illness;
- Externalizing Disorders Subscale of attention, hyperactivity, conduct disorders, impulsivity, and impulse control disorders (e.g. gambling);
- Substance Use Disorders Subscale for problematic substance use, abuse, and dependence;
- Crime/Violence Subscale which includes interpersonal and domestic violence, drug-related criminal activity, property crime, and violent crime.

The five to seven questions for each subscale were chosen from the full GAIN-I based on a study of 1,805 adults from a variety of treatment settings as the spread of questions for each of the subscales that would result in the combination of the best sensitivity and specificity (Dennis et al., 2006). As the purpose of the instruments in this study will be to act as a screening tool to determine those individuals in need of further care and to determine specific symptoms (e.g. substance abuse), the GAIN-SS was specifically selected due to its unique psychometric properties. Most importantly, the GAIN-SS has very high sensitivity with a total sensitivity for the instrument of 99% with a score of greater than or equal to 1, 95% for a score of 2 or greater, and 90% for scores of 3 or greater (Dennis et al., 2006). Sensitivity was calculated in regards to diagnoses made by the Global Appraisal of Individual Needs Initial (GAIN-I). Percentages detailed are the percent of those individuals identified as having a diagnosis on the full GAIN-I that were flagged for treatment on the GAIN-SS. Sensitivities for the GAIN-SS individual subscales at scores greater than or equal to one are as follows:

- Internalizing Disorders subscale at 97%;
- Externalizing Disorders subscale at 97%;
- Substance Use Disorders subscale at 97%;

- Crime/Violence subscale at 91% (Dennis et al., 2006).

Also essential to choosing the GAIN-SS for the screening tool in this study was the instrument's specificity. Overall specificity for the GAIN-SS was 92% for total scores of 3 or higher and 88% for scores greater than or equal to 2 (Dennis et al., 2006). Specificity for the GAIN-SS was calculated as a percent of those individuals with no diagnosis on the GAIN-I that were correctly excluded from needing treatment on the GAIN-SS. Subscale specificities at scores of 3 or higher for each subscale were:

- Internalizing Disorders subscale at 100%;
- Externalizing Disorders subscale at 100%;
- Substance Use Disorders subscale at 98%;
- Crime/Violence subscale at 100% (Dennis et al., 2006).

Neurobehavioral Symptom Inventory

The NSI is a 22 item screening tool for TBI. The items are Likert in type, list specific symptoms (e.g. "difficulty making decisions"), and provide a scale from 0 (none) to 4 (very severe) on which individuals rate the severity of each symptom. Like the GAIN-SS, the NSI is primarily used to screen and make a referral for further assessment or services. Each of the 22 items of the NSI has statistically different responses in those individuals with TBI as compared to those without a brain injury (King et al., 2012). However, the total score on the NSI is unlikely to be useful in distinguishing TBI from anxiety, PTSD, and depression (King et al., 2012). For the purposes of this study, the ability to differentiate between TBI and other conditions was less important than the recognition that symptoms were present. As with the GAIN-SS, the purpose of the NSI in this study was to determine that symptoms existed and incorporate MI in order to encourage entrance into treatment. Further assessment and

differentiation between TBI and other disorders was intended to take place at the treatment rather than screening level. The NSI has good internal consistency with an alpha of 0.95. King et al. (2012) examined the NSI as broken into three subscales of Somatic/Sensory, Cognitive, and Affective and found them to have internal consistency alphas of 0.88 to 0.92. Due to the screening rather than testing nature of the instrument, further validity and reliability measures have not been determined in the literature.

Computerized Intervention Authoring Software

Based on the responses provided by participants to the GAIN-SS and NSI questions, participants received a tailored MI intervention. The GAIN, NSI, and MI intervention was provided entirely within the CIAS package and included feedback provided by an avatar, an on-screen character with whom the participant interacted. Those individuals who did not endorse any symptoms within the past year on the GAIN-SS or past two weeks of moderate severity or higher on the NSI received an MI consistent intervention that asked about other concerns the participant may have, elicited the importance of addressing these concerns and their reasons for wanting help, and inquired about the participant's interest in receiving a referral. Those participants endorsing one or more past-year symptoms on the GAIN-SS or symptoms at the moderate level or higher from the past two weeks on the NSI received MI that elicited participant feedback on which of their symptoms, if any, they wished to address. As with the no-symptom group above, participants were asked about other concerns they might have, the importance they placed on obtaining help for any of their symptoms or concerns, their reasons for wanting help, and their interest in receiving a referral.

The CIAS intervention utilized in this study was created specifically for this study by the dissertation author and the study's primary investigator. The CIAS package provided a

framework to which specific questions, instruments, and intervention components could be added. First, the author added a series of demographic questions including age, gender, race, and combat experience. After these demographic questions were added, the GAIN-SS and NSI instruments were inserted. A scoring technique was devised such that a positive score on the assessment would be determined by any symptom endorsed within the past year on the GAIN-SS or any moderate severity or higher symptom from the past two weeks on the NSI. The separate intervention components described above were based on this scoring algorithm.

At the beginning of the instrument and throughout the intervention component, an on-screen avatar in the likeness of a wizard was programmed to provide instructions and MI consistent feedback to participants. This avatar was capable of providing audible spoken instructions and feedback to participants, with feedback tailored to the individual participant's responses. In this way, the avatar was able to ask questions, reflect participant input, and summarize participant responses in a manner consistent with MI. Screenshots from the instrument, including the avatar, can be found in Appendix B.

Design of the instrument was an iterative process. Small components were put together and then tested and edited repeatedly by the author and primary investigator with varying responses entered to ensure components worked correctly across potential participant responses. As sections were added, the entire component was run start to finish in the same manner. After all sections were added and tested by the author and primary investigator, the instrument was tested at the university-based counseling clinic hosting the research by master's degree and doctoral students as well as by a graduate assistant. Only minor typographical errors were found at this stage and were corrected prior to deployment of the instrument.

Procedures

Potential participants were approached in the waiting room of the VSO, were directly referred to the study via VSO staff, or were recruited directly by the author or research assistant via the MMHC project. When approached, veterans were informed that they could only participate in the study once. Veterans who had already participated on a previous visit were excluded from further participation.

Potential participants at the VSO were informed that participation was completely voluntary, would involve approximately 20 minutes of their time, that the study was not a part of the VSO and would not impact any VSO or Veterans Affairs services or benefits. Those participants recruited via the MMHC project were likewise informed that their participation was voluntary, would require about 20 minutes, and would not impact their ability to receive any other MMHC services. A gas card, store gift card, or bus tickets valued at \$10 were offered as incentives at the time of participation as well as the follow-up survey. Veterans were informed of the general study purpose and interested veterans signed an East Carolina University Institutional Review Board (IRB) and Department of Defense approved IRB consent form outlining the risks of the study and their rights as participants (see Appendix C for IRB approvals). Risks of this research were deemed by both IRB boards to be no greater than could be expected in everyday interactions. Potential benefits included the identification of mental health, SUD, and/or TBI symptoms in conjunction with referral to a qualified provider. A more intangible benefit of increasing knowledge of how to increase veteran participation rates in treatment was also identified.

Due to the nature of the study, certain exclusionary criteria were used. Veterans were eligible to participate in the study only once. Those veterans already receiving clinical services

from the MMHC project were ineligible. The study's general consent form was used to determine the participant's ability to read at the level required to participate. Participants unable to work a computer mouse to select their responses on the computer due to physical, technological, or other limitations were provided the option to have the author or research assistant select their answer choices. Those participants who did not want to reveal their answers to the author or research assistant and who could not work a computer mouse to select responses themselves were to be excluded from participating. A primary benefit of the study was expected to be the ability of participants to reveal symptoms to a computer rather than a person. Therefore, having a researcher record responses was considered acceptable when a participant could not do so themselves as such participation by a researcher was deemed more likely to decrease than increase effectiveness and therefore would not be a risk to type 1 error.

Participants who were eligible and agreed to participate and who signed the consent form were given a laptop computer on which to complete the assessment which included headphones for private listening to the on-screen avatar. Each participant was then given the opportunity to complete the screening tool without researcher intervention except in cases of participant questions or in situations where the participant could not work the computer mouse as described above. The final question in the screening tool gave each participant the opportunity to request a referral for further services. In this question, participants were provided the opportunity to state that they wanted a referral, did not want a referral, or did not want a referral because they were already receiving assistance. At the conclusion of each screening, one of the researchers briefly reviewed a summary screen provided by the instrument to determine whether the participant had requested a referral. For those veterans requesting a referral, one was made to a service provider able to address their particular needs. In the majority of cases, this referral was either to a

sliding-scale fee university-based counseling clinic or for clinical services via the MMHC project. The university-based counseling clinic is the only sliding scale fee counseling clinic in the study area offering long-term services and capable of providing individual mental health and SUD treatment. The MMHC project provides free mental health and SUD treatment to veterans. Participants with concerns not within the scope of practice of these two providers or who wished to obtain assistance elsewhere (e.g. somewhere closer to home) were provided with a referral that met their needs and personal preferences.

Participants who did not request a referral were not tracked after the completion of the screening tool. For those veterans requesting a referral for further services, a follow-up survey was conducted approximately 30 days after completing the screening tool. Surveys were conducted either by phone (all VSO participants and some MMHC participants) or in-person (ORNC R&R participants only). The follow-up survey began with a question asking whether the participant had attended one or more appointments during the 30 days following their original participation. Participants not having attended at least one appointment were asked if a future appointment had been made for beyond the 30-day window as well as the date of any such appointment. The combination of recording referral requests and follow-through for those participants making such a request allowed for tracking of both referral request rates and treatment entrance rates.

Data Collection and Storage

Participants received a participant tracking number assigned by the CIAS computer package. This number was used as the sole participant identifier within the screening tool. All data obtained through the computer-assisted screening was maintained in an encrypted and password protected Interva managed digital storage location. Access to the data was provided

via password only to this study's researchers. All data was stored in encrypted digital format with participant demographic information and data obtained solely through the computer-assisted screening tool. A list of participant names and phone numbers with associated participant identifiers was kept in a secured digital storage location accessible only to study researchers.

Summary of Procedures

The following is a summary of the study procedures and steps taken by both researchers and study participants.

- Participants were recruited from VSO waiting room, via direct referral by VSO staff, or through the MMHC project.
- Participants were then screened for eligibility (veteran status, no previous participation, not already receiving MMHC clinical services, and able to understand and consent to participation).
- Participants signed informed consent and authorization to use and disclose information for research forms. Completed forms were stored in a locked safe at the VSO and removed once a week to be stored by the primary investigator. Forms completed with the MMHC mobile clinic were immediately turned over to the PI after returning from the field.
- Participants completed the screening tool with instructions provided on-screen and via audio from the avatar.
- Participants were given an opportunity via the screening tool to request a referral, decline a referral, or decline a referral due to already receiving help.
- All participants were provided a gift card or bus passes for participating.
- The study ended at this point for participants declining to receive a referral.

- Participants requesting a referral were provided a referral meeting their needs and preferences.
- Participants requesting a referral were asked to provide a phone number or other way to be contacted and received a 30-day follow-up survey via phone or in-person asking if they had attended at least one appointment at the referred to agency or had made a future appointment for beyond the 30-day follow-up period.
- After completing the follow-up survey, a second gift card was provided via mail or in-person at the ORNC mobile clinic per the veteran's preference.
- All data received via the follow-up survey was recorded in an Excel spreadsheet and was combined later with the data obtained via the CIAS instrument.

Statistical Analyses

SPSS Version 20 was used to complete statistical analyses of the data. For Hypothesis 1, the rate of referral request was compared to rates of veterans accepting a referral for mental health specialty services via Veterans Affairs primary care providers and mental health providers. A non-parametric binomial test of proportions was used to determine if the sample used in this study requested a referral at a meaningfully different rate from those found in Lindley et al. (2010). Non-parametric binomial tests of proportion are used when comparing a categorical dependent variable from which a proportion is obtained to a hypothesized proportion, in this case a variable obtained from other research (Institute for Digital Research and Education, 2014). Hypothesis 2 was analyzed in the same way, using a non-parametric binomial test of proportions to compare the sample's treatment entrance rates from expected rates based on the research literature. Questions 3 and 4 were analyzed using odds ratios to examine the degree to

which certain demographic variables were associated with requesting a referral and following through on a referral.

Alpha levels for testing Hypotheses 1 and 2 were set at .05. To determine the required number of participants, a power analysis was calculated using JMP11- Pro. A power analysis was completed for the more conservative follow-through on treatment variable, rather than interest in treatment, as this variable was likely to see less change and was therefore more conservative. A desired power of .8 was used along with conservative estimates for a comparison proportion of .24 to an expected experimental proportion of .34. That is, Lindley et al. (2010) found that 24% of veterans from eras other than OEF and OIF screening positive for any combination of depression, PTSD, and/or alcohol use had received Veteran Affairs mental health treatment in the preceding two years. Lundahl and Burke (2009) found a 5 to 15 percent advantage for MI in encouraging treatment entrance in their review of MI meta-analyses including studies in which MI was compared to both no intervention and other established interventions. In conducting a power analysis, a 10 percent increase was used as an estimate of the advantage of MI to no intervention, and therefore .34 was used as the expected experimental proportion. Power remained high despite a relatively small number of experimental participants due to a comparison group of 1,091 veterans, the number of non-OEF/OIF veterans in Lindley et al. (2010), referred by a primary care provider for additional mental screening. The result of this power analysis was that 30 participants screening positive for symptoms would provide the power needed for this study.

Ethical Considerations

East Carolina University and Department of Defense IRB permission were received prior to beginning this research project. Signed informed consent was received from all participants

prior to their participation. However, because the study required obtaining information on mental health, SUD and TBI symptoms, some specific ethical considerations are identified and addressed below to ensure participant well-being and safety.

Primarily, the ethical considerations addressed pertain to the protocol for making referrals. For those participants screening positive for the symptoms of a mental health disorder, SUD, and/or TBI and who requested a referral, researchers chose from a list of local mental health, healthcare, and social service providers. For those screening negative for the symptoms of a mental health disorder, SUD, or TBI but still requesting a referral, researchers were prepared to make a referral to a university-based sliding scale fee counseling clinic, MMHC project, or other provider of the client's choice for further assessment and for the client to discuss his/her reasons for requesting a referral. No participants screened fell into this category. Of greater concern however, were those veterans screening positive for imminently concerning symptoms. The GAIN-SS obtains information on suicidal ideation and psychotic symptoms. A mechanism was programmed into the CIAS software package to flag the results of those participants who endorsed suicidal ideation or psychotic symptoms within the past three months. This author or the research assistant took all legally and ethically required steps for making a referral and ensuring the safety of participants with such symptoms regardless of their response to the final CIAS contained question on desiring a referral. Only three participants screened positive for such symptoms, all of whom denied any currently active symptoms. No participants required clinical intervention from the researchers or immediate crisis services. Two of these three participants requested a referral. Both of these participants was included in the referral group for a follow-up survey as researcher involvement was limited, and no additional services were

provided to the participant above and beyond the computer-assisted instrument that might influence the participant's decision to seek treatment.

Summary

Veterans obtaining services through the VSO or receiving outreach services from the MMHC project were recruited for participation in this study to examine the effectiveness of an MI based computer-assisted intervention on rates of referral requests and treatment entrance. The GAIN-SS and NSI were implemented to screen for mental health and TBI symptoms, and computer-assisted MI was used to encourage those veterans with symptoms to seek further treatment. Rates of referral request and treatment entrance were analyzed using binomial tests of proportions, and odds ratios were used to examine the impact of various demographic variables on referral requests and treatment entrance. Ethical considerations were addressed via the IRB process and through the use of researcher review of computer collected screening data.

CHAPTER 4: RESULTS

Introduction

This chapter begins with a description of the study's sample, including sample demographics. Descriptive statistics are then provided for prevalence of symptoms, referral requests, and entering treatment for mental health, substance use disorder (SUD), and/or traumatic brain injury (TBI) symptoms. Following these descriptive results are a detailed analysis of the data for each research hypothesis and research question. A summary of the results concludes the chapter.

Sample Demographics

The study sample consisted of 31 military veterans recruited from a local Veteran Services Office (VSO; $n = 11$; 35%) and grant funded mobile mental health clinic (MMHC) project ($n = 20$; 65%). One participant began but did not complete the study due to a combination of hearing and vision disabilities. Of the 31 participants completing the study, 26 (83.9%) were men and 5 (16.1%) were women. The majority of the sample described their race as Black/African-American (87.1%). An additional 6.5% ($n = 2$) of the sample described their race as White/Caucasian, 3.2% ($n = 1$) described their race as Hispanic, and 3.2% ($n = 1$) as an option not listed. All participants were at least 18 years old. Most of the sample fell into the age groups of 46 to 55 years old ($n = 13$; 41.9%) and 56 to 65 years of age ($n = 13$; 41.9%). An additional two individuals (6.5%) were 36 to 45 years old, two (6.5%) were 65 years old or over, and one participant (3.2%) stated they were 18 to 25 years of age. No participants were 26 to 35 years of age.

Regarding education, the majority of participants ($n = 21$; 67.7%) stated their highest level of education obtained was a high school diploma or having passed the General Education

Development (GED) tests. Completing less than a high school diploma or GED, an associate's degree, and bachelor's degree were indicated by two participants each (6.5%). Three participants (9.7%) listed another degree or program as their highest level of education completed, and one individual (3.2%) had a graduate degree.

Information was also obtained regarding experiences with combat. Of the 31 participants, 23 (74.2%) stated they had never seen combat during their time in the military. The 8 respondents (25.8%) who had seen combat were able to select more than one conflict during which this combat had occurred as applicable. Four individuals (12.9%; half of those with combat experience) had seen combat during the Vietnam War and four participants (12.9%; half of those with combat experience) had seen combat during the first Gulf War. One participant (3.2%) had experienced combat in the Korean War, two individuals (6.5%) had seen combat in Operation Enduring Freedom (OEF) in Afghanistan, and one individual (3.2%) had been in combat in Operation Iraqi Freedom (OIF). No veterans sampled had combat experience from World War II, Operation New Dawn, or another conflict not specifically listed. All demographic data can be found in Table 1.

Table 1

Sample Demographic Data

Demographic Variable	n	Percent
Gender		
Male	26	83.9
Female	5	16.1
Race		
White/Caucasian	2	6.5
Black/African-American	27	87.1
Hispanic	1	3.2
Other	1	3.2
Age		
18-25	1	3.2
26-35	0	0.0
36-45	2	6.5
46-55	13	41.9
56-65	13	41.9
66+	2	6.5
Highest Level of Education		
Less than high school diploma/GED	2	6.5
High school diploma/GED	21	67.7
Associate's Degree	2	6.5
Bachelor's Degree	2	6.5
Graduate Degree	1	3.2
Other	3	9.7

Note. n = 31

Descriptive Statistics

Descriptive statistics for this study include information regarding the prevalence of mental illness, SUD, and TBI symptoms, referral request rate, and rates of follow-through on referral. Also included are rates of comorbidity for specific groups of symptoms. All of the above data points are reported as percentages of a specified group.

Prevalence of Symptoms

The Global Appraisal of Individual Needs- Short Screener (GAIN-SS) and Neurobehavioral Symptom Inventory (NSI) were used to screen participants for the symptoms of

SUDs, mental illness, and TBI. An individual was considered to have screened positive if they endorsed any symptom or behavior indicative of mental illness or an SUD within the past year on the GAIN-SS or any symptom at the moderate level or higher on the NSI. Of the 31 participants screened via these instruments, 30 participants (96.8%) screened positive for the symptoms of an SUD, mental illness, or both. Twenty-nine (93.5%) endorsed mental illness related symptoms during the past year. Seventeen (54.8%) participants had symptoms of or engaged in behaviors indicative of an SUD during the previous 12 months, and 23 participants (74.2%) had symptoms consistent with a TBI.

The sample of those who screened positive for symptoms was also analyzed for patterns of comorbidity. Of primary interest were comorbid SUD and mental illness symptoms. Of those screening positive, all 17 participants with an SUD (100%) also endorsed symptoms or behaviors of mental illness. No individuals screened positive for TBI symptoms without also screening positive for mental illness, an SUD, or both. Of the 30 individuals screening positive for at least an SUD or mental illness, 23 (76.7%) also had at least one symptom consistent with a TBI. Regarding PTSD and SUDs, of the 21 individuals with PTSD symptoms, 14 (66.7%) also had symptoms consistent with an SUD.

Referral Requests

After completing the above instruments in conjunction with the computer-assisted MI intervention, participants were asked within the computer assessment about their interest in receiving treatment for any of the symptoms or behaviors associated with mental illness, an SUD, or TBI they might have. This final question contained three answer choices:

- Yes, I would like a referral.
- No. I'm already getting help for my concern(s).

- No, thank you. I don't want a referral right now.

Of the 30 participants screening positive for mental illness, an SUD, and/or TBI, 17 individuals (56.7%) selected the first option and requested a referral for additional services. An additional 8 individuals (26.7%) stated they did not want a referral because they were already receiving assistance. A non-parametric binomial test of proportions was calculated to determine if this rate of already receiving help was consistent with that of Lindley et al. (2010), the study used as a comparison group for testing the research hypotheses. In Lindley et al. (2010), 24% of those with mental health symptoms seeing a VA primary care provider had received VA mental health services in the preceding two years as compared to 26.7% of this sample already receiving help for their symptoms. The current study's sample was not significantly different from Lindey et al. (2010; $p = .435$) in the percent of participants with mental health and/or SUD symptoms already receiving help. In total, 25 out of 30 veterans (83.3%) screening positive for mental illness, an SUD, and/or TBI in this study either expressed interest in receiving treatment or were already receiving treatment for these problems.

Treatment Entrance

Twelve out of the 17 (70.1%) participants requesting a referral were able to be reached for the follow-up survey. Of the 5 individuals that could not be reached, all 5 had been referred to the university-based counseling clinic hosting the research project. The clinic records referral sources for new clients and during the study period no referrals were received indicating this study or the MMHC as a referral source. Therefore, the author concluded that these participants had not followed-through to receiving services, allowing follow-through data to be recorded for all 17 participants requesting a referral.

Seventeen individuals of those screening positive for mental illness or SUD symptoms elected to receive a referral at the conclusion of the instrument. Of those 17 participants, 4 (23.5%) attended at least a first appointment at the referred to organization. An additional individual reported they had scheduled an appointment at a Veteran Affairs medical facility but had been unable to get an appointment during the 30-day follow-up period. Therefore, a total of 5 individuals (29.4%) of those requesting a referral took some action to follow through on receiving services. In total, 8 participants reported they were already receiving help, and an additional 4 individuals attended at least one appointment during the 30-day follow-up period. Twelve out of 30 (40%) individuals with symptoms received care during the study.

Data Analysis for Research Hypotheses and Questions

This section includes the analysis of data for two hypotheses as well as two research questions. Tables and a summary are provided to assist in summarizing results.

Data Analysis for Research Hypothesis 1

Research Hypothesis 1: When compared to other veterans with SUD, mental health, and/or TBI symptoms, those receiving the computer-assisted MI screening intervention will be more likely to request a referral for additional services.

Non-parametric binomial tests of proportions were calculated in SPSS Version 20 to compare this study's rate of referral request to established rates for veterans found in the research literature. Lindley et al. (2010) was used as a comparison group. In completing the data analysis, this study's referral request rate was compared to Lindley et al.'s (2010) rates for non-OEF/OIF veterans (mean age of 61.1) accepting a referral for mental health specialty care as described in Chapter 2. Table 2 shows the present study's rates in comparison to both screenings completed by primary care providers (27% accepting a referral) and mental health providers

(psychologists/psychology health technicians; 54% accepting a referral). Those completing this study's instrument were significantly more likely to request a referral than those veterans screened by a primary care provider were to accept a referral in Lindley et al. (2010). No significant difference was found in the rates of veterans requesting a referral between the present study and those veterans screened by a mental health provider in Lindley et al. (2010).

Table 2

Binomial Tests of Proportion for Referral Requests

	Lindley et al. (2010) Proportion Accepting Referral	Study Referral Request	<i>p</i> -value
Primary care physician	.27	.57	.001
Mental health provider	.54	.57	.458

Data Analysis for Research Hypothesis 2

Research Hypothesis 2: When compared to other veterans with SUD, mental health and/or TBI symptoms, those receiving the computer-assisted MI screening intervention will be more likely to enter treatment within 30 days.

Two non-parametric binomial tests of proportions were run in SPSS Version 20 to test this research hypothesis and are summarized in Table 3. First, the rates of attending at least one appointment after accepting a referral were compared between this study and Lindley et al. No significance was found in support of the hypothesis that participants receiving a referral in this study would be more likely to enter into treatment than other veterans when compared to Lindley et al., 2010. The binomial test revealed the opposite of Hypothesis 2 in that those veterans accepting a referral in the Lindley et al. (2010) comparison study were significantly more likely to attend their first appointment than those in the present study. Second, this study's 30-day

follow-through rate was compared to the overall rate of non-OEF/OIF veterans with mental health (depression or PTSD symptoms) who had accessed VA mental health services within the previous two years. This study’s rate of follow-through was not significantly different from the rate of those receiving help found in Lindley et al. (2010). Participants in this study were as likely to enter into treatment as those veterans with mental health symptoms in Lindley et al. (2010) were to have accessed VA mental health care in the two years preceding their study.

Table 3

Binomial Tests of Proportion for Treatment Entrance

Lindley et al. Comparison Group	Comparison Proportion	Study Group	Study Proportion	p-value
Attend first appointment	.71	Attend one appointment	.24	<.0005 ^a
Mental health care previous 2 years	.24	Attend one appointment	.24	.612

Note. Comparison Proportion is proportion attending an appointment after referral or obtaining mental health care in the previous two years as found in Lindley et al. (2010) and used as a control group in this analysis.

^aResult indicates the opposite of the hypothesized result.

Data Analysis for Research Question 1

Research Question 1: What demographic variables are associated with higher rates of requesting mental health services?

Odds ratios were computed in SPSS Version 20 to examine those factors associated with requesting a referral for further services. These results can be found in Table 4. These odds ratios were completed for having experienced combat, SUD symptoms, PTSD symptoms, stating that receiving help was “very important” during the MI component of the intervention, and being

a participant from the mobile mental health clinic (MMHC) project. All odds ratios and associated p-values are reported in Table 4. Odds ratios indicate the degree to which an outcome is more or less likely within a particular portion of the sample. Three odds ratios were statistically significant. Participants who saw combat were significantly less likely to request a referral than other participants ($p = .045$), and participants who endorsed getting help as “very important” were approximately 5 times more likely to request a referral than other participants ($p = .028$). Participants who were recruited from the MMHC project were almost five and a half times more likely ($p = .045$) to request a referral than those participants from the Veteran Services Office (VSO).

Data Analysis for Research Question 2

Research Question 2: What demographic variables are associated with higher rates of follow-through in receiving mental health services?

The same factors examined in Research Question 1 were evaluated for Research Question 2. Odds ratios for having seen combat, having SUD symptoms, presenting with PTSD symptoms, endorsing help as being “very important,” and being recruited from the MMHC project were calculated twice in analyzing this question. First, odds ratios were used to examine 30-day follow-through for participants who had requested a referral. Odds ratios were computed a second time examining all those participants who received help, including those veterans who followed through on a referral as well as those who stated they were already receiving assistance, to examine general help-seeking for each of these factors.

Only one odds ratio calculated for follow-through and getting help was significant. While participants who saw combat were less likely to request a referral, they were approximately 24 times more likely to have received assistance. Seven out of 8 participants who

had seen combat either followed through on a referral (n = 1) or were already receiving help (n = 6) for their mental health symptoms. Unlike requesting a referral, no significant results were found for endorsing getting help as “very important” when follow-through and getting help were measured as results. While participants from the MMHC project were more likely to request a referral, they were less likely, although not significantly so, to follow through on a referral or to receive help. An odds ratio could not be calculated for PTSD and following through on a referral as no participants did not have PTSD symptoms and also follow through on a referral. All participants who followed through to treatment had PTSD symptoms. Odds ratios can be found in Table 4.

Table 4

Odds Ratios for Requesting a Referral and Following Through on/Receiving Help

Demographic Factor	Odds Ratio	<i>p</i> -value
Requesting referral		
Saw combat	.156	.045*
PTSD symptoms	4.00	.099
SUD	3.84	.082
Getting help is “very important”	6.11	.028*
MMHC	5.44	.045*
Follow-through on referral		
Saw combat	4.00	.426
PTSD symptoms	^a	
SUD	1.33	.670
Getting help is “very important”	1.88	.555
MMHC	.545	.579
Receiving Help		
Saw combat	10.26	.003**
PTSD symptoms	3.18	.187
SUD	1.12	.590
Getting help is “very important”	1.25	.529
MMHC	.538	.344

^aUnable to calculate odds ratio due to no participants without PTSD symptoms following through on a referral.

Chapter Summary

This study examined the influence of a computer-assisted MI instrument on rates of veterans requesting a referral for mental health, SUD, and/or TBI symptoms and rates of follow-through on attending at least one appointment within 30 days post-referral. The study sample was primarily comprised of Black/African-American men who were military veterans aged 46 to 65. A high school diploma or GED was the predominant highest level of education completed by this group. The majority of participants did not see combat during their time in the military. Analysis showed that those veterans completing the study’s computer-assisted MI screening tool were as likely to request a referral for mental health services as those veterans receiving a

screening from a VA mental health specialist were to accept a referral when mental health symptoms were present. The study's participants were more likely to request a referral than similar veterans were to accept such a referral from a primary care provider. This study's participants were less likely to follow-through on entering into treatment after a referral than similar veterans were in Lindley et al. (2010). However, the follow-through rate in this study was not significantly different from the rate of similar veterans with mental health symptoms who receive mental health services. Analysis of demographic variables showed that those veterans with combat experience received help at a higher rate than other veterans in the study, and veterans who saw getting help as "very important" were more likely to request a referral than other participants.

CHAPTER 5: DISCUSSION

Introduction

This chapter begins with a summary of the purpose of the study along with the variables measured, study sample, methods, and data collection. Next, study results are discussed including demographic variables, descriptive statistics, as well as the results from each of the research hypotheses and questions. Limitations of the research are then presented, followed by a discussion of implications for practitioners and areas for future research. The conclusion of the chapter is a final summary of the study.

Summary of the Study

The purpose of this study was to investigate the influence of a computer-assisted MI intervention on referral request and treatment entrance rates for military veterans with symptoms of mental illness, SUDs, and/or TBI. Veterans experience high rates of all three of these problems but traditionally enter into treatment at low rates (e.g. SAMHSA, 2007; SAMHSA, 2011; Ettenhofer et al., 2012; Lindley et al., 2010). Additionally, issues of stigma, particularly self-stigma, regarding the presence of these symptoms are a salient issue in this population (e.g. Dickstein et al., 2011). The use of a computer intervention, rather than a traditional face-to-face screening and referral, was proposed to make revealing such symptoms easier for study participants while encouraging them to seek further services.

In order to examine the influence of such an intervention, two screening tools were combined with an MI consistent intervention within the Computer Intervention Authoring System (CIAS). The Global Appraisal of Individual Needs- Short Screener (GAIN-SS) by Chestnut Global Partners was used to detect symptoms of mental illness and/or an SUD. The Neurobehavioral Symptom Inventory (NSI) was used to uncover possible symptoms of a TBI.

The primary function of both tools as used in this study was to detect symptoms that might warrant a referral for services, but not to diagnose any particular disorder. After answering questions on demographic factors and completing the questions of the GAIN-SS and NSI, participants were provided a brief MI-consistent computer intervention. This intervention was specifically designed and programmed within the CIAS system for this study and was presented by an on-screen avatar.

Several variables were recorded for analysis. Demographic variables included participant age, gender, race, highest level of education, and any experience with combat. The CIAS instrument also recorded the presence of a possible disorder on the GAIN-SS and NSI. The first dependent variable in the study was requesting a referral. This variable contained three levels: declining a referral, declining a referral due to already receiving help for one's concerns, and requesting a referral. For those participants requesting a referral, a second dependent variable was the number of participants who entered into treatment within 30 days as measured by having attended at least one appointment at the referred to service provider.

The sample was a convenience sample recruited from two different sources. Eleven participants (35.5%) of the sample of 31 were recruited from a local Veteran Services Office (VSO). The VSO serves veterans needing assistance with earned benefits or in applying for such government benefits. An additional 20 veterans (64.5%) were recruited through a grant funded mobile mental health clinic (MMHC) project serving veterans. This MMHC project consisted of a technology equipped van providing outreach, case management, and counseling to veterans receiving services from homeless shelters or soup kitchens and who were homeless or at risk for homelessness. All veterans age 18 and over were eligible to participate in the study.

All veterans contacted at either the VSO or MMHC were approached regarding the study. After being screening for eligibility (i.e., of veteran status), those participants willing to participate signed the informed consent and authorization to use and disclose information for research forms. These forms were stored per institutional review board (IRB) protocol by the study's primary investigator. After each participant completed the CIAS instrument, a brief review of the results flagged by the instrument was made to be sure that no suicidal thoughts or psychotic symptoms were present and to determine whether the participant had requested a referral. Those veterans requesting a referral received one to a local provider deemed able to meet their specific needs. Contact information was obtained from these individuals requesting a referral so that a brief follow-up survey could be completed in 30 days to find out if the participant had entered into treatment as measured by having attended at least one appointment. No further contact was made with participants who did not request a referral. All data except for 30-day follow-ups was recorded by the CIAS system. This data was downloaded into SPSS where follow-through results were manually entered.

Interpretation of Results

This section contains a detailed analysis of the results presented in Chapter 4. Sample demographic variables and descriptive statistics are discussed first. This discussion is followed by an examination of the results of each research hypothesis and research question.

Demographic Variables

An analysis of demographic variables revealed a relatively homogenous sample. The majority of participants were men ($n = 26$; 81.9%) and Black/African-American ($n = 27$; 87.1%). Two individuals identified their race as White/Caucasian (6.5%) and one each as Hispanic or an option not listed (3.2% each). Most participants were age 46 to 55 ($n = 13$; 41.9%) or 56 to 65 (n

= 13; 41.9%). One individual was 18 to 25 years old (3.2%) and two individuals each were 36 to 45 years of age and 66 years old or older (6.4% each). No individuals reported being 26 to 35 years old. Participants primarily had a high school diploma or had passed the General Education Development (GED) tests (n = 21; 67.7%). Two participants each had less than a high school diploma or GED, an associate's degree, or a bachelor's degree (6.5% each). One individual (3.2%) indicated having completed a graduate degree and 3 individuals (9.7%) stated their highest level of education completed was another form of education. Most of the sample (n = 23; 74%) had never seen combat.

While the sample was relatively homogenous, the primary concern was to access veterans likely to be dealing with mental health, SUD, and/or TBI symptoms in order to test whether the study's intervention was useful in encouraging these veterans to request a referral and enter into treatment for these symptoms, and these sites provided excellent access to this population. A concern with recruiting from the MMHC project was that these veterans were largely homeless or otherwise of low socio-economic status and therefore might be unfamiliar with computers. One individual recruited from the VSO opted to terminate the study early because he could not operate the computer mouse efficiently, was unable to hear the on-screen avatar or see the text version of the avatar's speech, and could not hear the research assistant in reading the questions. This was the only individual unable to participate due to disability or for any other reason. Six individuals were unable to effectively use a computer to complete the study but desired the opportunity to participate. For these individuals, all agreed to read the questions and tell the author or research assistant which answer to select. Of these six participants, all 6 screened positive for symptoms, 4 requested a referral, 1 was already receiving help, and 1 was not interested in services. As the primary reason for using a computerized intervention was to

minimize stigma and self-stigma associated with revealing symptoms to a person, having an individual select the participant's answer choice was not considered likely to increase the likelihood of requesting a referral and therefore the chances of a type 1 error (incorrectly rejecting the null hypothesis). These participants (as with all participants) wore headphones so that the researchers could not hear the avatar's feedback to the participant, which may have offered the veterans the degree of privacy necessary for the intervention to maintain its effectiveness. The majority (81%) of participants were able to effectively operate the laptop computers used in the study to complete the instrument without assistance.

Descriptive Statistics

The symptoms of both mental illness and SUDs were common in this sample. All but one participant (96.8%) screened positive for mental illness or an SUD. Of the 30 participants screening positive for such symptoms, 93.5% ($n = 29$) had symptoms of mental illness and more than half (54.8%, $n = 17$) had symptoms of an SUD. Rates of comorbidity were also high, with all 17 individuals with SUD symptoms also screening positive for other mental health symptoms. More than three quarters (76.7%; $n = 23$) of those with mental illness or SUD symptoms also had symptoms consistent with a TBI. Two-thirds (66.7%; $n = 14$) of the 21 participants with PTSD symptoms had signs of an SUD. As expected, many of the veterans participating in the study were not only experiencing symptoms of a mental health concern, but the majority were living with the symptoms of more than one type of problem.

More than half ($n = 17$; 56.7%) of the 30 participants screening positive for symptoms requested a referral for services. An additional 8 participants (25.8%) stated they were already receiving help for their concerns and did not want a referral for a total of 83.3% of veterans with symptoms indicating interest in receiving mental health, SUD, and/or TBI care. Of the 17

referrals made, 4 individuals (23.5%) attended at least one appointment and 1 additional individual reported she had made an appointment at a Veteran Affairs (VA) clinic but that the appointment had not yet occurred as of the conclusion of the 30-day follow-up period. The descriptive statistics detailing referral requests and treatment entrance were further explored in the research hypotheses and questions as discussed below.

Results of Research Hypotheses and Questions

Research Hypothesis 1 and Research Hypothesis 2 were analyzed using non-parametric binomial tests of proportions to compare this study's results with those of Lindley et al. (2010). In the present study, a true control group was not possible, as failure to provide an intervention that might encourage treatment entrance for individuals with mental illness, SUD, and/or TBI symptoms would have been unethical. Therefore, results had to be compared to known rates of referral request and treatment entrance available in the literature. Lindley et al. (2010) was selected as the best comparison study of those available. While the literature has addressed the issue of low treatment rates among the nation's most recent veterans, little exists looking at rates among older veterans, the primary demographic group in this study. Lindley et al. however, separated their results by Operation Enduring Freedom (OEF)/Operation Iraqi Freedom (OIF) and veterans of other eras (mean age of 61.1). Therefore, a comparison could be drawn between more equivalent groups. Additionally, Lindley et al. (2010) specifically examined the rate at which veterans with mental health symptoms had received VA services in the previous two years, their rates of accepting a referral when one was made by a primary care provider (PCP), when a referral was made by a mental health provider, and rates of follow-through on treatment entrance. The use of Lindley et al. allowed for a comparison of veterans of similar age with mental health symptoms on factors of already receiving help, rates of referral, and treatment

entrance rates. A non-parametric binomial test of proportions was used to compare both studies' rates of veterans already receiving help. Eight out of 30 (26.7%) veterans screening positive in this study stated they were already receiving help. This rate was compared to the 24% of veterans screening positive for mental health symptoms in Lindley et al. (2010) found to have accessed mental health services at the VA in the previous two years. The binomial test found no difference between the two rates.

Results for Research Hypothesis 1. Research Hypothesis 1: When compared to other veterans with SUD, mental health, and/or TBI symptoms, those receiving the computer-assisted MI screening intervention will be more likely to request a referral for additional services.

Analysis of this hypothesis was completed via two non-parametric binomial tests of proportions. The first test compared the present study's rate of referral requests to the proportion of those in Lindley et al. that were screened and offered a referral by a PCP. This study's proportion of .57 was compared to Lindley et al.'s (2010) proportion of .27. The proportions were found to be significantly different with a p -value of .001. Those participants screened and provided the brief CIAS intervention were significantly more likely to request a referral than participants in Lindley et al. screened by a PCP were to accept a referral for mental health services.

The second binomial test of proportions compared this study's referral request rate to the rate of those participants screened and offered a referral for symptoms by a mental health provider in Lindley et al. This study's rate of .57 was found to be not significantly different from Lindley et al.'s (2010) rate of .54. Those veterans screened and found to have symptoms in this study were as likely to request a referral for services as those veterans screened in Lindley et al. were to accept a referral from a mental health provider for further services.

The above results indicate that the computer-assisted MI intervention utilized in this study was effective at encouraging veterans with mental health, SUD, and/or TBI symptoms to request a referral for additional services. The instrument's effectiveness at encouraging the behavioral response of requesting a referral was on par with that of VA mental health providers in encouraging veterans to accept a referral for mental health specialty services. The instrument performed significantly better than VA PCPs at the same task. A concern in utilizing a computer-assisted intervention to take on work traditionally performed by a skilled clinician was that a computer could not provide empathy or create a therapeutic alliance, essential aspects of the counseling process. Of interest then, is that this instrument performed similarly to mental health providers and better than PCPs at the task of encouraging a referral.

Neither the current study nor Lindley et al. provide enough information to know the specific reasons for this result. One possibility is that both this intervention and the mental health providers at the VA devoted more time to the referral process than the PCPs in the study. The amount of time spent on the process may be an important factor. Another possibility is that the specific skills utilized by the mental health providers in Lindley et al. may be more similar to the techniques employed in the computer-assisted MI instrument than those employed by PCPs. Lindley et al. (2010) did not report whether the mental health providers in their study used any particular interventions (e.g. MI), however, the skills and experience acquired by mental health providers are likely different from those of PCPs. Helping individuals to state their concerns, outline their reasons for wanting to obtain help, and state the importance of getting such help while providing reflections as done in this instrument may be as essential, or perhaps even more essential, parts of the process of making a referral than empathy or the therapeutic alliance, particularly in a short screening intervention format. Finally, both the mental health providers

and the CIAS instrument may perform better at normalizing mental health symptoms than PCPs. Other factors likely exist as well, and further research is needed to refine why the CIAS instrument performed as it did.

Results for Research Hypothesis 2. Research Hypothesis 2: When compared to other veterans with SUD, mental health and/or TBI symptoms, those receiving the computer-assisted MI screening intervention will be more likely to enter treatment within 30 days.

As with Research Hypothesis 1, non-parametric tests of binomial proportions were used to analyze the data. First, a binomial test was conducted to compare the proportion of participants in the present study who followed through on a referral with those who followed through on a referral in Lindley et al. (2010). This study's rate of .24 was compared to Lindley et al.'s (2010) rate of .71. No significance was found in the direction of the stated hypothesis. Those requesting a referral after completing the MI CIAS intervention in this study were not more likely to follow-through on entering into treatment than those referred in Lindley et al. (2010). Significance was found in the opposite direction of the hypothesis with a *p*-value of .0005. Those veterans accepting a referral in Lindley et al. were significantly more likely to enter into treatment than the veterans participating in and requesting a referral as part of the this study.

A second binomial test was completed to compare the rate of treatment entrance in this study to Lindley et al.'s (2010) reported rate for veterans with mental health symptoms who had accessed VA mental health services in the two years prior to their study. Their proportion and this study's proportion were both .24. The difference between these proportions was found to be not significant. This proportion was analyzed again to compare it to the original proportion in this study who had mental illness, SUD, and/or TBI symptoms who did not want a referral (.27)

because they were already receiving care. Again, no significant difference was found. This means the proportion of those with symptoms receiving care in the previous two years in Lindley et al. (2010) was similar to the proportion found to be already receiving care in the present study as well as the proportion of participants requesting a referral who went on to enter into treatment. Therefore, once a referral was made in this study, the proportion of individuals not already getting help who went on to get treatment was similar to that of the general veteran population with mental health symptoms. This finding is important in that accurately screening for and making a referral seems to increase the rate of getting help regardless of intervention type.

The rate of treatment entrance and associated binomial test results need to be cautiously interpreted. First, while the comparison sample in Lindley et al. (2010) was similar in some regards like veteran age, the presence of mental health symptoms, and era of service, in other ways, the samples are different. The majority of the veterans recruited for participation in this study were recruited from the MMHC project which primarily serves veterans who are homeless or of low socioeconomic status and accessing services at homeless shelters and soup kitchens. These veterans are likely to have fewer financial and personal resources (e.g. reliable transportation) than those in Lindley et al. More immediate needs were also often salient for this study's population such as the need for shelter, food, and safety, concerns unlikely to be present for the majority of veterans in Lindley et al. and which may have taken priority over following through on a mental health referral. In addition, this study recruited any individual who had served in the military regardless of discharge status or eligibility for VA services. While no data was specifically obtained regarding these points, anecdotally, veterans with other than honorable discharges or who would not have been eligible for the full array of VA services based on their length of service or the service-connected nature of their symptoms were screened and referred

in this study. In combination, the veterans in this study likely had fewer resources, more pressing needs than counseling, and less access to a variety of services than those of the comparison group in Lindley et al. This combination of factors likely played a role in follow-through rates.

In addition to the inherent differences between the samples in this study and Lindley et al., there is the possibility that while the techniques incorporated in the computer-assisted MI instrument were effective at encouraging interest in treatment and requesting a referral, they were lacking in encouraging treatment entrance. Provider empathy or establishing a positive therapeutic alliance may matter more for one being comfortable with entering treatment than being interested in such services.

In determining the overall effectiveness of the intervention, recalling the results from Hypothesis 1 is essential. While the overall follow-through rate was lower in this study than in Lindley et al., a greater proportion of individuals requested a referral from this study than from the PCPs in the comparison sample. A lower follow-through rate when a greater percentage of individuals were referred must be taken into account. Additionally, Lindley et al. (2010) does not outline a window during which they reviewed rates of treatment entrance, although the study itself was conducted looking at those referred over a 6-month period. Somewhat higher rates of attendance would be expected in a study with a longer follow-up window. Therefore, based on the evidence available, both the instrument in this study and screening and referral by a mental health provider can be recommended as interventions over screening by a PCP. Further research is needed with more equivalent samples to know whether the increased follow-through in Lindley was related more to differences between the samples, the method of screening and referral, or overall study methods.

Results for Research Question 1. Research Question 1: What demographic variables are associated with higher rates of requesting mental health services?

Question 1 was analyzed by calculating odds ratios. Five factors were analyzed which included participants who had seen combat, had PTSD symptoms, had SUD symptoms, who endorsed getting help as “very important,” and who were recruited from the MMHC project. For these factors, the odds of a participant requesting a referral were calculated as compared to other participants not meeting that same criterion. Of the four factors analyzed, three factors had odds ratios that were statistically significant.

First, veterans who saw combat were only .156 times as likely ($p = .045$) to request a referral as those veterans who had not seen combat. At first glance, this result would seem to be a concerning statistic, as veterans who saw combat might be expected to have higher levels of need than other veterans and yet be unlikely to ask for help. This result however, does not accurately reflect what occurred in the study. Eight individuals in the study had experienced combat. Of these eight, 2 requested a referral while the other 6 all reported they were already receiving help. Therefore, the low odds ratio here reflects the good news that veterans with combat experience were in fact more likely to be already receiving help rather than lacking interest in such help.

The second significant odds ratio was for participants who endorsed getting help for their symptoms as “very important.” These participants were more than 6 times more likely ($p = .028$) to request a referral than other participants. This result is consistent with both SDT and MI which discuss the importance of personal motivation to make a change. Both SDT and MI would suggest that change motivated by internal importance to make a change would be more likely to result in behavior in that direction (Miller and Rollnick, 2013; Patrick & Williams,

2012; Ryan & Deci, 2008). Participants who stated that getting help was “very important” would be likely to have their own reasons for getting help and therefore be more likely to request a referral. Participants who saw such help as less important might either lack motivation to get help, or such motivation might be coming from external sources such as social expectations or the desires of others, sources less likely to lead to action.

The third significant result was for those veterans recruited from the MMHC project. These participants were more than five times more likely (OR = 5.44; $p = .045$) to request a referral than veterans recruited from the VSO. Part of the explanation for this result is that 4 out of 11 (40%) of veterans screening positive for symptoms at the VSO were already receiving help, whereas only 4 out of 20 (20%) of those screening positive via the MMHC project were getting assistance at the time of the screening. An odds ratio was calculated to determine the likelihood of already receiving help by site, but was not significant (OR = 1.36; $p = .230$).

Odds ratios for PTSD symptoms and SUD symptoms approached but did not reach significance. Odds ratios show that those participants with PTSD symptoms were 4 times more likely to request a referral ($p = .099$) and veterans with SUD symptoms were just less than 4 times more likely to request a referral (OR = 3.84; $p = .082$). While not significant at the standard alpha level of .05, both of these results may be clinically significant and warrant future study with larger sample sizes.

Results for Research Question 2. Research Question 2: What demographic variables are associated with higher rates of follow-through in receiving mental health services?

Question 2 was analyzed in a similar manner to Question 1 through the calculation of odds ratios. For this question, follow-through was examined from two different perspectives. First, attending at least one appointment based on a referral was examined. Then, a second

analysis was computed, combining those who had followed through on a referral with those already receiving help at the time of screening. This larger group was analyzed to determine which factors were associated with increased likelihood of getting help as compared to other veterans.

Regarding follow-through on a referral, having combat experience, PTSD symptoms, SUD symptoms, endorsing getting help as “very important,” and being a participant from the MMHC project were all analyzed. An odds ratio could not be calculated for PTSD symptoms as one of the conditions (no PTSD symptoms and entering treatment) had no participants. Of the remaining four factors, no odds ratio was found to be significant. Although not significant, the odds ratio for having seen combat and following through on a referral was calculated to be 4.00. This high value was due to 2 veterans with combat experience requesting a referral and 1 veteran following through. Help-seeking behavior in this group is better explained below in the odds ratios for receiving help. As none of the odds ratios for follow-through approached significance, one interpretation is that other factors not measured by the study may carry more weight in the decision to get care. For example, meeting more pressing basic needs like food, shelter, or safety, may take precedence over attending a counseling appointment. The extremely low odds ratio for being recruited from the MMHC site (.195), although not statistically significant, suggests that these participants, who were largely dealing with issues of homelessness and very low socioeconomic status, were less likely to follow-through on entering treatment.

Finally, odds ratios were calculated for receiving help on the whole. Those veterans who followed through on a referral in this study were combined with those already getting help for their symptoms to determine whether any groups of veterans from the study were significantly more or less likely to have gotten help than other participants. Again, odds ratios for combat

experience, PTSD symptoms, SUD symptoms, endorsing getting help as “very important,” and being recruited via the MMHC project were calculated. Of these factors, those participants who had seen combat were more than 10 times more likely ($p = .003$) to have received help for their symptoms as other veterans. As mentioned above, odds ratio analysis on likelihood of requesting a referral showed that veterans with combat experience were significantly less likely to request a referral than other participants. However, this final odds ratio analysis shows that 7 out of 8 (87.5%) of veterans who had seen combat received help either through following through on a referral or were already receiving such assistance at the time of screening. There are many possible explanations for this result, including that those with combat experience might experience more significant symptoms and therefore be more likely to have pursued getting help, that having symptoms tied directly to combat may be less self-stigma inducing, the VA and other providers may do more to reach out to this group than others, and these veterans qualify for more VA services than other veterans. No other factors for overall receipt of help had odds ratios that were significant. As with following through on a referral, factors not measured here including having to address more basic needs, may be a significant factor in receiving help.

Summary of Research Hypotheses and Results

Two research hypotheses were analyzed using non-parametric binomial tests of proportion. Hypothesis 1 examined the proportion of participants requesting a referral after screening positive for mental illness, SUD, and/or TBI symptoms in comparison to participants in Lindley et al. (2010). Results showed that participants screened in this study were more likely to request a referral than participants in Lindley et al. were to accept a referral when screened by a PCP. Participants in this study were just as likely to request a referral as participants in Lindley et al. were to accept a referral when screened by a mental health provider. Hypothesis 2

examined the proportion of veterans in this study who followed through on entering into treatment after requesting a referral. Results did not support this hypothesis. Veterans in this study were less likely to follow through on entering into treatment than veterans in Lindley et al. (2010), although the rate of those who did enter into treatment was not significantly different from the proportion of veterans with mental health symptoms in Lindley et al. that had received VA mental health care in the previous two years.

Two research questions were also analyzed using odds ratios. Research Question 1 examined factors associated with the likelihood of requesting a referral. Veterans with combat experience were significantly less likely to request a referral due to already receiving care. Veterans who endorsed getting help as “very important” were more likely to request a referral as were veterans recruited from the MMHC project. Research Question 2 examined factors associated with following through on a referral and overall receipt of help (following through on a referral or already getting help at the point of screening). No factors revealed significant odds ratios for following through on a referral. For overall receipt of help, veterans with combat experience were significantly more likely to receive help than other participants.

Study Limitations

Limitations of this study fall into three major categories. First, some limitations exist because of the separate pre-test/post-test quasi-experimental field study design, which was necessitated by the ethical inability to have a true control group. Second, the study has limitations due to the sample used, which may not be representative of the overall population of veterans. Finally, limitations exist due to the instruments used.

Research Design

A separate pre-test/post-test quasi-experimental field study design was used in this study because veterans agreeing to participate in the research could not have the intervention withheld for ethical reasons. This factor led to the inability to have a true control group. Rather than reporting only descriptive data (e.g. the proportion of veterans who requested a referral), a decision was made to compare this sample to a study with a similar sample that did not use computer-assisted screening methods on rates of referral request and treatment entrance. A major limitation of this type of design is that there is no way to ensure that the samples are equivalent (Trochim, 2006). In this study, proportions of two unrelated samples were compared as the best estimate of the effectiveness of the intervention. This method was stronger than reporting only descriptive measures of effectiveness, but cannot be viewed as strongly as a design in which all participants come from the same sample. To ensure the design was as strong as possible, a power analysis was conducted to be sure that the number of participants used in this study was sufficient for the types of conclusions the study sought to draw. This power analysis revealed one of the benefits to this type of design in that comparing to a large sample size reduces the number of participants needed to maintain power.

While there was no way to ensure equivalent samples for comparison, Lindley et al. (2010) was deemed to be the best study for comparison. While various studies have examined treatment interest and rates of treatment, Lindley looked not at interest and treatment rates but rather the rates of accepting a referral and following through on a referral. These behavioral measures closely resembled the present study, which sought to examine effectiveness of a new instrument on requesting and following through on a referral. In addition, Lindley et al. (2010) separated out OEF/OIF veterans from veterans of other eras. This latter group, with an average

age of 61.1, more closely resembled the age of veterans in this study, who were predominantly not the younger OEF/OIF veterans found in many other available research studies. While Lindley et al. did not match the current sample on issues of SUDs or race, great care was taken to ensure the study was the closest available comparison group. A benefit of the study was that data included referral request rates for screenings by both PCPs and mental health providers, which provided a unique comparison between the current computer-assisted intervention, those skilled in mental health techniques, and those from a medical discipline.

Another possible concern regarding the study design was that participants were offered a \$10 gift card to a local store, local gas station, or \$10 in local bus passes for their participation and again at the time of 30-day follow-up for those participants requesting a referral. Due to the relatively low dollar amount associated with the gift cards, the cards are believed to have been most influential in encouraging participation in the study rather than influencing any study outcome. The possibility exists that some participants may have requested a referral in order to receive a 30-day follow-up survey and therefore receive a second gift card. However, given the small difference in percentages between the number of participants requesting and not requesting a referral, the likelihood of this occurring on any significant scale is deemed low.

Study Sample

A potential second limitation of the study is the sample. The sample was recruited specifically for the purpose of testing an intervention for effectiveness with veterans with mental health, SUD, and/or TBI symptoms and thus had higher rates of these symptoms than the general veteran population. This aspect of the sample was not problematic, as this allowed the instrument to be tested with the type of veteran that could most benefit. A potential limitation of the sample however, is that other demographic variables do not match the overall veteran

population. For example, in the United States, the majority of veterans are White (84.3%) with only 10.9% of veterans identifying as Black (United States Census Bureau, 2014b). These figures are in sharp contrasts to this study's sample, in which 87.1% of the sample was Black and 3.2%, White. In addition, more than a quarter of United States veterans have a bachelor's degree or higher (9.7% of this study) and the average annual income is \$37,434, likely well above the income of the participants recruited via the MMHC project who were largely homeless or at risk for homelessness (United States Census Bureau, 2014b).

One of the potential limitations of the sample in this study is that in addition to being non-representative of veterans, the sample was comprised of individuals that might be less likely to own or be familiar with using a computer. However, more than 80% of the sample possessed the required computer skills to complete the instrument. While having a sample of low financial resources may be seen as a limitation, in interpreting the results, this factor is a strength. As the study was useful in encouraging referral requests and to some extent treatment entrance despite these limitations, evidence is bolstered for the idea that this type of computer-assisted screening may be appropriate for the majority of individuals. Completing such a study with a sample comprised of those with greater financial resources and computer familiarity would make generalizing the results to other groups more difficult. While the sample of this study may seem a limitation, ultimately, choosing to use a sample with significant mental illness, SUD, and/or TBI symptoms and few personal and financial resources allows for greater generalizability, as the sample is likely representative of those individuals in the most serious need of assistance, and therefore, exactly those individuals providers would hope to help.

A final concern regarding the study sample was that participants were recruited from the VSO and MMHC project, and some these veterans may have been more likely to seek out help

than the overall veteran population. The data suggests that veterans recruited from the VSO project were more likely to be receiving help already than those from the MMHC project. However, the greater number of veterans were recruited from MMHC, where only 20% of veterans with symptoms were receiving care already. Including participants from both sites balanced out the sample, and analysis of this study's sample compared to Lindley et al. (2010) showed that this sample was not different in already receiving help for symptoms.

Instrumentation

Some final limitations involved the use of the CIAS instrument in this study. While the GAIN-SS and NSI have research supporting their use as screening instruments, less is known at this juncture about the use of computer-assisted screening tools for the purpose of increasing referral requests and follow-through to treatment. While the purpose of this study was to examine the usefulness of exactly such an instrument, some limitations were in place regarding the ability to fully examine these questions. One limitation is that programs allowing for the design of such an instrument are scarce and allow for relatively few programming options on the part of the instrument designer. Some limitations of the CIAS package included a lack of ability for clients to be able to select an avatar that they could identify with (e.g. similar race or age, gender, etc.) and that the instrument could not record participant generated responses, only multiple-choice responses generated by the researchers. Designing an instrument containing an avatar with a natural speaking voice, a collection of avatars to match participant preferences, and with all of the desired options (e.g. easily responding to different clusters of symptoms; accept answers created by the participant) would require either considerable computer programming skill or financial resources likely to exceed the personal or financial resources of most individual

researchers. As such packages evolve to meet customer needs and become more user-friendly, research will no doubt continue to expand and improve outcomes.

Implications of the Study

This study presents material contained within a relatively new area of research. Based on the above results and analysis and the newness of this type of research, some important implications of the study in terms of future research and for mental health providers have been identified. These implications are addressed below.

Future Research

The most important aspect of future research at this point in time is replication. Studies examining computer-assisted interventions, particularly incorporating MI-consistent approaches, are few. With such new research, studies with small numbers of participants make sense at the outset so that created computer interventions can be examined for effectiveness and altered based on participant feedback and results. However, ultimately, studies with considerably more participants are needed to draw more meaningful and generalizable conclusions. When possible, true experimental studies containing control groups will help to propel this area of research.

Future research may also wish to focus not only on outcome measures like requesting a referral or entering into treatment, but also variables like participant satisfaction regarding their interaction with the instrument, ratings of ease of use, and perhaps qualitative feedback. Incorporating this feedback will help to increase the effectiveness of computer-assisted interventions. Expanding the research to as many groups as possible will help generalizability, and collecting a variety of demographic data points like socioeconomic status, age, and education level in less homogenous samples will aid in determining those groups for whom computer-assisted interventions might be most useful.

In conceptualizing a possible next study, a few specific steps are recommended. First, a true experimental design should be implemented if ethically possible with both control and experimental group participants recruited from the same population, preferably from a population where another screening intervention is currently in use. The first group (the control group) should receive the typical screening intervention used with that population. The second group (the experimental group) should receive the computer-assisted MI intervention. This design improvement would provide for more robust statistical results and improved ability to draw conclusions about the data.

A second step in creating a future study of this or similar instruments would be to collect more demographic data including exact age, experience level with computers, socioeconomic status, and information regarding physical disabilities in addition to mental health symptoms. These variables would be useful in determining which groups benefit the most or are least apt to benefit from computer-assisted interventions and allow for a detailed analysis of interactions between variables. These factors could be combined with the next suggestion below. At this time, the CIAS instrument does not record exact participant responses (e.g. the participant's age as entered by the participant) but only responses pre-set by the researcher. Methods of obtaining some of this data from outside the instrument would be required.

A third step to take in designing a future study would be to include other measures about the instrument itself. For example, participants could be provided Likert-style scales for rating ease of use and satisfaction with the instrument. In a study with both a control and experimental group, these ratings could be compared between groups to illuminate participant preferences and to determine whether specific groups (e.g. age or type of symptoms) prefer one type of screening over the other. In combination with the demographic data obtained above, a fuller picture of

those who might prefer and most benefit from computer-assisted screening can be further investigated.

Finally, future studies will improve along with technology. A next step regarding the improvement of technology would be allowing participants to enter their own responses to questions. While such an improvement would be somewhat useful for demographic variables (e.g. entering an exact age rather than selecting a range of ages), this improvement could contribute considerably to the effectiveness of the MI aspect of such an intervention. For example, this intervention asked participants to select the reasons they had for wanting to get treatment. Participants were provided with options from which to choose (e.g. “I’d like to feel healthier”). Participant selections were reflected back by the avatar in an MI-consistent manner in later steps of the intervention. However, this type of feedback would be more powerful if participants listed their own reasons and their own language was reflected back to them. While such improvements may not be possible in a next study, they will likely be steps taken as CIAS and other tools continue to develop.

Implications for Mental Health Providers

The primary implication of this research for mental health providers is to be open to possibilities involving technology-assisted services. The provision of mental health services is, by definition, based on communication between provider and client. As such, resistance to technology replacing activities normally completed by a provider is natural. However, providers should be aware of those specific situations in which technology can help them to better work with clients. If practitioners can see technology as enhancing their services and client outcomes rather than as a replacement of their role, appropriate acceptance of the role of technology will be possible and clients will ultimately benefit. Continued research will further illuminate those

clients and scenarios where the most benefit can be provided. The role of mental health providers is to be open to innovations that may assist their clients and to do their due diligence by consulting the research literature regarding evidence based practices.

Mental health practitioners may also consider those situations in which technology, and particularly computer-assisted screening interventions such as this one, may provide greater access to services for clients. Those in rural areas may be able to access a well-designed instrument via the Internet when accessing a clinician for an in-person screening might be difficult. Clients coping with issues of self-stigma may be willing to take a computer-assisted screening, potentially even from their own home, when making an initial face-to-face appointment would otherwise be unlikely. Programs with waiting lists can offer computer-assisted interventions even when a provider is initially unavailable. Such technology can help not only screen clients but also identify those in most serious distress and capitalize on clients' motivation to receive treatment while they wait for more traditional services to begin. Considering ways in which technology can not only be integrated into the daily provision of services but even increase access and improve services will be an exciting part of the next steps mental health providers can take.

Implications for Counselor Training

Finally, this research suggests some implications for training counselors and other mental health professionals. In the classroom environment, counseling students should be exposed to technological options by those with expertise in this area. Training should also include administering tests and assessments in both traditional and non-traditional forms as well as learning about issues of accessibility. Perhaps more important than exposure to technology however, is teaching counseling students the skills necessary to evaluate new instruments and

successfully analyze research and counseling literature to draw their own conclusions about the technology and its usefulness with the populations with whom they work. Technology changes so rapidly that even interventions a counseling student experiences in their graduate program may be outdated as they enter into the field. Rather, learning how to evaluate technological advances through a thorough understanding of issues of accessibility, ethical practice, cultural issues, testing and assessment, and by accessing and analyzing research are of greatest importance.

Conclusion

Veterans have high prevalence rates of mental illness, SUDs, and TBI (e.g. SAMHSA, 2007; SAMHSA, 2011; Ettenhofer et al., 2012; Lindley et al., 2010). They also face issues of mental health stigma and self-stigma (e.g. Dickstein et al., 2011). As a result, veterans tend not to enter into treatment for the symptoms of mental illness, SUDs, and/or TBI (e.g. Golub et al., 2013; Lindley et al., 2010). This study examined the effectiveness of a newly created computer-assisted screening tool and MI-consistent intervention for increasing veterans' interest in and participation in mental health treatment. The GAIN-SS and NSI were used as screening tools and were followed by a computer-assisted intervention employing an avatar using basic MI-consistent techniques.

The results of this study were compared to those in Lindley et al. (2010) which examined rates of referral request and treatment entrance in a similar sample. Overall, this study effectively encouraged veterans with the symptoms of mental illness, an SUD, and/or TBI to request a referral. However, veterans screened in this study were less likely to enter into treatment than those in Lindley et al (2010). Differences between the two samples, including socioeconomic factors, may partially explain this difference as does the increased number of

individuals who requested a referral in this study over those screened by a PCP in Lindley et al. Veterans who saw getting help as “very important” and those participants recruited from the MMHC project were more likely to request a referral than their peers. Those with combat experience were significantly more likely than their peers to have received help for their symptoms. Continued research is needed to improve on existing computer-assisted interventions and to better understand who can best benefit from such assistance.

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APPENDIX A: SCREENING INSTRUMENTS

Global Appraisal of Individual Needs: Short Screener

A copy of the proprietary Global Appraisal of Individual Needs- Short Screener (GAIN-SS) can be found on Chestnut Health System's website at:

http://www.gaincc.org/_data/files/Instruments%20and%20Reports/Watermarked%20Instruments/GAINSS_3_0_Watermarked.pdf

Neurobehavioral Symptom Inventory

Retrieved from:

<http://dvbic.dcoe.mil/sites/default/files/uploads/Neurobehavioral%20Symptom%20Inventory%20form.pdf>

Neurobehavioral Symptom Inventory (NSI)

Please rate the following symptoms with regard to how much they have disturbed you IN THE LAST 2 Weeks. The purpose of this inventory is to track symptoms over time. Please do not attempt to score.

0 = None – Rarely if ever present; not a problem at all

1 = Mild – Occasionally present, but it does not disrupt my activities; I can usually continue what I'm doing; doesn't really concern me.

2 = Moderate – Often present, occasionally disrupts my activities; I can usually continue what I'm doing with some effort; I feel somewhat concerned.

3 = Severe – Frequently present and disrupts activities; I can only do things that are fairly simple or take little effort; I feel I need help.

4 = Very Severe – Almost always present and I have been unable to perform at work, school or home due to this problem; I probably cannot function without help.

Symptoms	0	1	2	3	4
Feeling Dizzy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Loss of balance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor coordination, clumsy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Headaches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nausea	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vision problems, blurring, trouble seeing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sensitivity to light	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hearing difficulty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sensitivity to noise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Numbness or tingling on parts of my body	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Change in taste and/or smell	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Loss of appetite or increased appetite	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor concentration, can't pay attention, easily distracted	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Forgetfulness, can't remember things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulty making decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Slowed thinking, difficulty getting organized, can't finish things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fatigue, loss of energy, getting tired easily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulty falling or staying asleep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling anxious or tense	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling depressed or sad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Irritability, easily annoyed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor frustration tolerance, feeling easily overwhelmed by things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Date:

Name:


Medical Record #:

Used with permission: Cicerone, KD: J Head Tr Rehabil 1995;10(3):1-17

APPENDIX B: CIAS INSTRUMENT

Below are screenshots from the Computer Intervention Authoring Software (CIAS) instrument used in the study.

Concerns You Have Importance



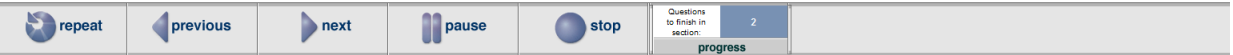

How important is it for you to get help for what you told me?

A There is nothing I would like help with


B It's not very important that I get help

C It's somewhat important that I get help

D It's very important that I get help



Concerns You Have Referral




Would you like a referral?

Yes, I would like a referral.

No, I'm already getting help for my concern(s).

No, thank you. I don't want a referral right now.



APPENDIX C: INSTITUTIONAL REVIEW BOARD APPROVALS

From: umcirb@ecu.edu [mailto:umcirb@ecu.edu]
Sent: Tuesday, August 27, 2013 1:56 PM
To: Toriello, Paul
Subject: IRB: Amendment Approved

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board Office
4N-70 Brody Medical Sciences Building · Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office **252-744-2914** · Fax **252-744-2284** · www.ecu.edu/irb

Amendment Approved

ID: Ame1_UMCIRB 12-000419
Title: Amendment 1 for IRB Study #UMCIRB 12-000419
Description: Your amendment has been approved. To navigate to the project workspace, click on the above ID.

IRB00000705 East Carolina U IRB #1 (Biomedical) IORG0000418
IRB00003781 East Carolina U IRB #2 (Behavioral/SS) IORG0000418

From: Mahasreshti, Parameshwar J CIV USARMY MEDCOM USAMRMC (US)
[mailto:parameshwar.j.mahasreshti.civ@mail.mil]
Sent: Friday, November 22, 2013 9:36 AM
To: Toriello, Paul; Morris, Ted
Cc: 'Ashley.Fisher@tatrc.org'; 'sandra.rosario@amedd.army.mil'; Brosch, Laura R CIV USARMY MEDCOM USAMRMC (US); Bennett, Jodi H CIV USARMY MEDCOM USAMRMC (US); Menke, Jim; 'regulatorycompliance@tatrc.org'; Katopol, Kristen R CTR USARMY MEDCOM (US); 'ruchi.malik@tatrc.org'; Kitchen, Susan E CTR USARMY MEDCOM (US)
Subject: A-17093.4 HRPO Approval Memorandum (Proposal Log Number 10251005, Award Number W81XWH-11-2-0221) (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

SUBJECT: Initial Approval for the Protocol, "Effects of Counseling Interventions With Clients Receiving Counseling at the Navigate Clinic," Submitted by Paul J. Toriello, RhD, East Carolina University, Greenville, North Carolina, in Support of the Proposal, "Operation Re-Entry North Carolina," Submitted by J. Ted Morris, PhD, East Carolina University, Greenville, North Carolina, Proposal Log Number 10251005, Award Number W81XWH-11-2-0221, HRPO Log Number A-17093.4

1. The subject protocol version dated May 2013 was approved by the East Carolina University, University and Medical Center (UMC) Institutional Review Board (IRB) on 27 August 2013. This protocol was reviewed by the US Army Medical Research and Materiel Command (USAMRMC), Office of Research Protections (ORP), Human Research Protection Office (HRPO) and found to comply with applicable DOD, US Army, and USAMRMC human subjects protection requirements.

2. This no greater than minimal risk study is approved for the enrollment of 100 subjects.

3. The Principal Investigator has a duty and responsibility to foster open and honest communication with research subjects. The USAMRMC strongly encourages the Principal Investigator to provide subjects with a copy of the research protocol, if requested, with proprietary and personal information redacted as needed.

4. The following are reporting requirements and responsibilities of the Principal Investigator to the HRPO. **Failure to comply could result in suspension of funding.**

a. Substantive modifications to the research protocol and any modifications that could potentially increase risk to subjects must be submitted to the HRPO for approval prior to implementation. The USAMRMC ORP HRPO defines a substantive modification as a change in Principal Investigator, change or addition of an institution, elimination or alteration of the consent process, change to the study population that has regulatory implications (e.g. adding children, adding active duty population, etc.), significant change in study design (i.e. would prompt additional scientific review), or a change that could potentially increase risks to subjects.

b. All unanticipated problems involving risk to subjects or others must be promptly reported by telephone (301-619-2165), by email (usarmy.detrick.medcom-usamrmc.other.hrpo@mail.mil), or by facsimile (301-619-7803) to the HRPO. A complete written report will follow the initial notification. In addition to the methods above, the complete report can be sent to the US Army Medical Research and Materiel Command, ATTN: MCMR-RP, 810 Schreider Street, Fort Detrick, Maryland 21702-5000.

c. Suspensions, clinical holds (voluntary or involuntary), or terminations of this research by the IRB, the institution, the sponsor, or regulatory agencies will be promptly reported to the USAMRMC ORP HRPO.

d. Events or protocol reports received by the HRPO that do not meet reporting requirements identified within this memorandum will be included in the HRPO study file but will not be acknowledged.

e. A copy of the continuing review approval notification by the UMC IRB must be submitted to the HRPO as soon as possible after receipt of approval. According to our records, it appears the next continuing review by the UMC IRB is due no later than 13 June 2014. Please note that the HRPO conducts random audits at the time of continuing review and additional information and documentation may be requested at that time.

f. The final study report submitted to the UMC IRB, including a copy of any acknowledgement documentation and any supporting documents, must be submitted to the HRPO as soon as all documents become available.

g. The knowledge of any pending compliance inspection/visit by the Food and Drug Administration (FDA), Office for Human Research Protections, or other government agency concerning this clinical investigation or research; the issuance of inspection reports, FDA Form 483, warning letters, or actions taken by any regulatory agencies including legal or medical actions; and any instances of serious or continuing noncompliance with the regulations or requirements must be reported immediately to the HRPO.

5. **Please note:** The USAMRMC ORP HRPO conducts site visits as part of its responsibility for compliance oversight. Accurate and complete study records must be maintained and made available to representatives of the USAMRMC as a part of their responsibility to protect human subjects in research. Research records must be stored in a confidential manner so as to protect the confidentiality of subject information.

6. Do not construe this correspondence as approval for any contract funding. Only the Contracting Officer/Grants Officer can authorize expenditure of funds. It is recommended that you contact the appropriate contract specialist or contracting officer regarding the expenditure of funds for your project.

7. The HRPO point of contact for this study is Susan Kitchen, BS, Human Subjects Protection Scientist, at 301-619-1126 or Susan.E.Kitchen.ctr@mail.mil.

PARAMESHWAR MAHASRESHTI, PhD
Human Subjects Protection Scientist
Human Research Protection Office
Office of Research Protections
US Army Medical Research and Materiel Command

Note: The official copy of this memo is housed with the protocol file at the Office of Research Protections, Human Research Protection Office, 810 Schreider Street, Fort Detrick, MD 21702-5000. Signed copies will be provided upon request.

Classification: UNCLASSIFIED
Caveats: NONE