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ADHERENCE TO PSYCHOTHERAPY FOR POST-TRAUMATIC STRESS IN VETERANS
OF MILITARY COMBAT IN AFGHANISTAN (OPERATION ENDURING FREEDOM)
AND IRAQ (OPERATION IRAQI FREEDOM)

by

NICOLLE C. ANGELI

Under the Direction of Erin B. McClure-Tone

ABSTRACT

Elucidating factors associated with adherence to treatment for physical and mental health conditions is important, given well-documented associations between non-adherence and poor treatment outcomes. Researchers have worked to identify such factors; however, most studies focus on adherence to medical, rather than, psychological treatments. Clarifying variables that predict adherence to psychotherapy is particularly important for individuals with post-traumatic stress disorder (PTSD), for whom treatment, which typically involves exposure to trauma-related stimuli and imagery, can be aversive. It may consequently be associated with high non-adherence rates, even though studies indicate that greater adherence to PTSD treatment relates to better treatment outcomes. Research needs to identify factors that increase or decrease the likelihood that affected individuals will enter and complete therapy.

Although several studies to date have examined adherence to treatment for PTSD, this literature is limited on several fronts. First, studies on psychotherapy adherence have identified few consistent predictors of treatment adherence. Second, adherence to psychotherapy is rarely a central focus of treatment-related research; more typically, researchers treat adherence as secondary in importance to treatment outcomes. Third, little research on psychotherapy adherence has been theoretically driven. Fourth, little adherence research has focused on combat veterans with PTSD, who tend to have particularly poor treatment outcomes. Especially lacking is knowledge about predictors of adherence in veterans who have recently returned from combat; most research focuses on veterans of the Vietnam War, many of whom were initially traumatized decades earlier.

The study tested the hypothesis that elevated reports of a specific type of PTSD symptom--avoidance/emotional numbing-- predicted poorer adherence to treatment in 160 veterans who received psychotherapy. No significant associations between avoidance and emotional numbing symptoms and adherence were found. However, emotional numbing was negatively related to psychotherapy adherence. Other variables typically related to PTSD and treatment outcomes were found to be important predictors of psychotherapy adherence and completion/noncompletion of therapy.

INDEX WORDS: Post-traumatic stress disorder, Adherence, Drop out, Avoidance, Emotional numbing, Combat veterans, Operation Iraqi Freedom, Operation Enduring Freedom

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Georgia State University

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Nicolle Christine Angeli
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CHAPTER 1.

INTRODUCTION

Mental health problems among combat veterans are widespread. Recent studies have found that 25% of veterans who served in Operation Enduring Freedom (OEF) in Afghanistan and/or Operation Iraqi Freedom (OIF) received one or more mental health-related diagnoses (Seal, Bertenthal, Miner, Sen, & Marmar, 2007). More specifically, researchers have found a high prevalence of depression and alcohol use disorders, both of which commonly co-occur with post-traumatic stress disorder (PTSD), among OEF/OIF veterans (Hoge et al., 2004). Furthermore, of those OEF/OIF veterans with identified mental health problems, 52% received a diagnosis of PTSD (Seal, Bertenthal, Miner, Sen, & Marmar, 2007). OEF/OIF veterans are clearly at high risk for developing PTSD or related symptoms (Hoge et al., 2004; Rundell, 2006). Research on earlier samples of veterans suggests that this is especially true if they are young at the time of the trauma, have limited education, faced childhood adversity, lack social support, or experienced severe trauma (Brewin, Andrews, & Valentine, 2000).

Given the prevalence of PTSD among veterans it is not surprising that rates of mental health treatment utilization are high for the disorder and related conditions. Recent findings, for example, suggest that as many as 23 to 40% of veterans of recent conflicts have sought mental health services from the Veterans Administration (VA) (Hoge, Auchterlonie, & Milliken, 2006; Hoge et al., 2004). Many, however, fail to adhere to or to complete treatment after enrollment (Schnurr et al., 2007). Reasons for the high rates of PTSD treatment non-adherence among veterans are unclear. I designed the present study to investigate potential correlates of treatment adherence in veterans of combat in the ongoing campaigns in Afghanistan and Iraq. More specifically, I examined whether high levels of avoidance/emotional numbing symptoms related

negatively to treatment adherence. To provide background and a rationale for the proposed study, I first review the literature regarding the etiology and maintenance of PTSD, what works in treating PTSD, and why individuals may fail to adhere to treatment for PTSD.

General Background on PTSD

PTSD, by definition, develops after exposure to a situation or event that is, or is perceived to be, threatening to the safety or physical integrity of one's self or of others. The affected individual must also experience intense fear, helplessness, or horror during the threatening event (APA, 2000). Given the frequency with which threats to safety arise in the context of combat, high rates of PTSD among veterans are not surprising.

The disorder manifests as three types of symptoms: re-experiencing of the traumatic event (e.g., recurrent and intrusive thoughts, distressing dreams, flashbacks), avoidance/emotional numbing (e.g., avoidance of reminders of the event, restricted range of affect), and hyperarousal (e.g., sleep difficulties, exaggerated startle response). To obtain a diagnosis of PTSD, an individual must have at least one re-experiencing symptom, at least three avoidance and emotional numbing symptoms, and at least two hyperarousal symptoms. Further, the individual must be bothered by the symptoms for a month or more and must experience significant distress or impairment in social, occupational, or other areas of functioning (APA, 2000).

PTSD is highly impairing, both in isolation and in the context of comorbidity with other major psychological conditions such as substance abuse, major depression, and personality disorders (Bremner, Southwick, Darnell, & Charney, 1996; Keane & Wolfe, 1990). Severity of PTSD symptoms has been associated with the onset of medical problems including arterial, dermatological, gastrointestinal, and musculoskeletal disorders (Schnurr, Spiro, & Paris, 2000).

Social functioning difficulties are also apparent in individuals with PTSD; these include interpersonal violence, social anxiety, marital/family issues, and occupational problems (Frueh, Turner, Beidel, & Cahill, 2001; Schlenger, Kulka, Fairbank, & Hough, 1992).

For veterans who develop PTSD, it is not unusual for symptoms to arise during or shortly after their tours of duty and to persist over long periods of time (Hoge et al., 2004; Rundell, 2006; Schlenger, Kulka, Fairbank, & Hough, 1992). The National Vietnam Veterans Readjustment Study found that 15 or more years after combat had ended, 15% of veterans of the Vietnam War met diagnostic criteria for current PTSD (Kulka et al., 1990; Schlenger, Kulka, Fairbank, & Hough, 1992). Over decades, researchers have investigated the etiological underpinnings of PTSD, which in turn has led to the development of multiple theoretical models.

Although rates of PTSD are high among veterans, not all individuals who witness or experience traumatic events, such as those common in combat, develop the disorder or related symptoms. Researchers, therefore, have begun to devise models to explain and predict risk for its development and maintenance. Although PTSD is widely accepted to be multiply determined and maintained (Barlow, 2002), a number of theorists have focused on specific factors, such as maladaptive patterns of cognition and behaviors, that appear to contribute heavily to the disorder and its persistence (Ehlers & Clark, 2000; Foa & Kozak, 1986). According to Ehlers and Clark (2000), who developed a prominent cognitive model of persistent PTSD, affected individuals think about, interpret, and re-experience traumatic events in ways that lead them continually to perceive their environments as threatening, even when real threat cues are absent (see Figure 1). Such misperceptions, in turn, lead them to engage in maladaptive behaviors, such as avoidance, that may reduce distress in the moment, but contribute to persistent PTSD symptoms in the long term by preventing the development of more adaptive thoughts and responses.

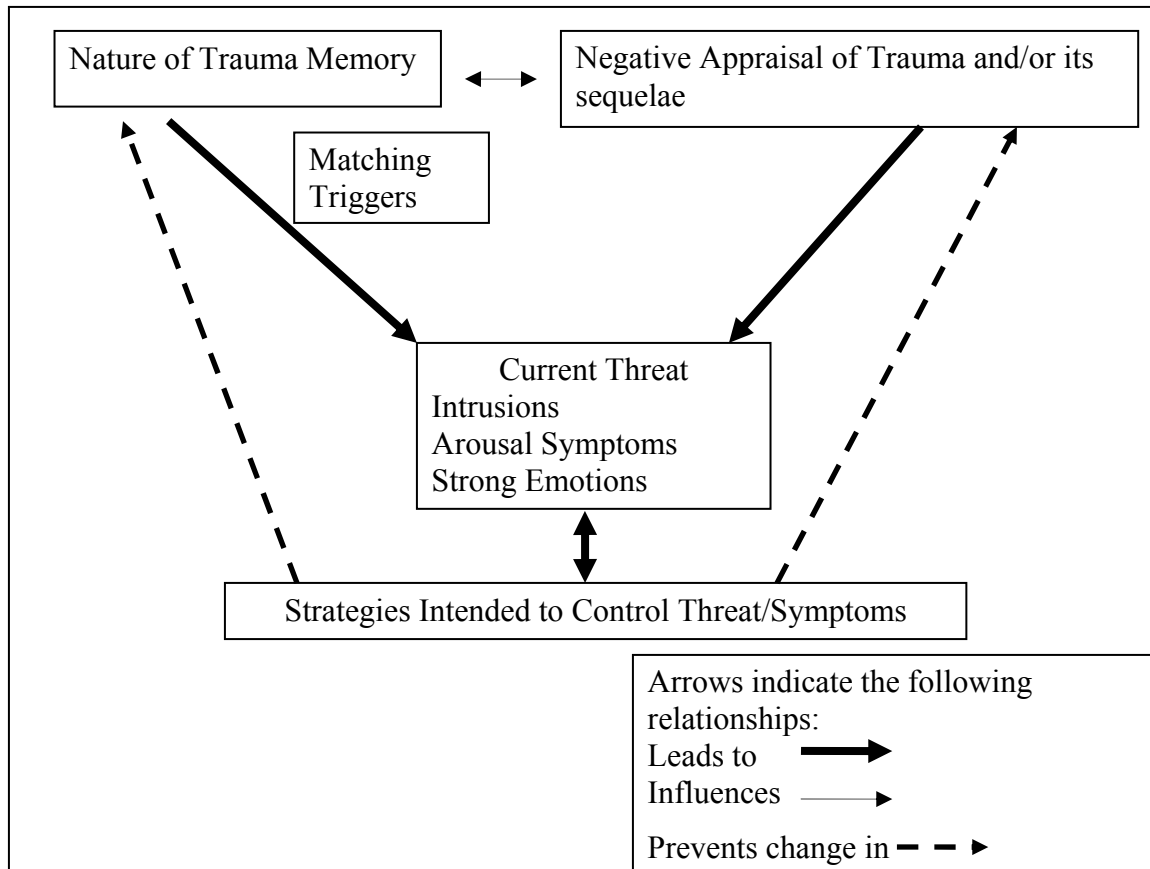


Figure 1: Ehlers and Clark (2000) cognitive model of PTSD

Indeed, multiple researchers have suggested that avoidance is a primary obstacle to changing negative appraisals and memories of traumatic events (Ehlers & Clark, 2000; Foa & Kozak, 1986). There are three types of avoidance: cognitive, behavioral, and emotional. Cognitive avoidance (e.g., “thought suppression”) is when an individual tries to avoid thinking about trauma. This strategy may work in the short term, but tends over time to increase intrusive recollection of traumatic experiences. Behavioral avoidance involves staying away from places or things that elicit memories of a trauma. For example, a veteran with PTSD might avoid watching war movies or the news (Ehlers & Clark, 2000). A third type of avoidance—emotional—is not central to Ehlers’ and Clark’s model (2000), but has received attention as an additional maladaptive coping strategy for PTSD (Foa et al., 1986; 1989). According to Foa and colleagues, individuals with PTSD experience emotional discomfort when environmental cues

activate their ‘fear structures’ (i.e., constellations of information about the traumatic event, their own responses to the trauma, and the meaning of the event). To avoid this emotional discomfort, affected individuals steer clear of reminders of the trauma. This avoidance may be voluntary, and manifest as effortful suppression of trauma-related feelings, or involuntary, in which case it may manifest as “numbing” or difficulty experiencing typical emotional responses (Ehlers & Clark, 2000; Foa, Steketee, & Rothbaum, 1989).

As Ehlers and Clark (2000) point out, avoidance of any type can interfere with the successful treatment of PTSD. Exposure therapy, a well-supported treatment for PTSD (e.g., Bradley, Greene, Russ, Dutra, & Westen, 2005), challenges clients to relive traumatic experiences in a controlled manner by engaging with, rather than avoiding, traumatic memories. According to Ehlers and Clark (2000), this reliving process has three benefits. First, reliving helps the individual to elaborate and integrate memories. Second, it provides opportunities to examine and challenge cognitive appraisals of traumatic experiences. Third, reliving allows the individual to examine and challenge catastrophic beliefs (e.g., that he or she will “lose control,” “die,” “fall apart”) by recalling a trauma imaginally (Ehlers & Clark, 2000).

Treatment of PTSD

Meta-analyses and narrative literature reviews suggest that cognitive-behavioral therapies, including exposure therapy, cognitive restructuring therapy, and stress inoculation therapy, are efficacious treatments for PTSD (Bradley, Greene, Russ, Dutra, & Westen, 2005; Davidson & Parker, 2001; Foa & Meadows, 1997; Shalev, Bonne, & Eth, 1996; Sherman, 1998). Although evidence is limited and conflicting, research also has yielded some support for psychodynamic and eye movement desensitization therapies as treatments for PTSD (Davidson & Parker, 2001; Shalev, Bonne, & Eth, 1996).

Exposure therapy, which has received the most attention in the research literature, is an approach that encompasses a broad range of treatments, all of which require clients to confront feared stimuli either imaginally or in vivo for varied durations and at varied intensity levels (Foa & Meadows, 1997). Although research suggests that exposure therapy is an efficacious treatment for PTSD (Bradley, Greene, Russ, Dutra, & Westen, 2005), concerns have been raised regarding its use (Foa, Zoellner, Feeny, Hembree, & Alvarez-Conrad, 2002; Pitman et al., 1991; Tarrier et al., 1999) because many clients find it to be aversive (Bradley, Greene, Russ, Dutra, & Westen, 2005). Indeed, there is some evidence that exposure therapy may cause a temporary increase in PTSD symptoms, and thus may lead clients to leave treatment prematurely (Foa, Zoellner, Feeny, Hembree, & Alvarez-Conrad, 2002). Further, the association between treatment dropout and symptom exacerbation may be reciprocal; Tarrier and colleagues (1999) have posited that missing exposure therapy sessions may further sensitize rather than desensitize an individual to anxiety.

Concerns about elevated rates of treatment non-completion are based in part on findings that up to 33% of individuals who enter exposure therapy in randomized controlled trials fail to complete treatment (Deville, Spence, & Rapee, 1998). Non-adherence rates are even higher (up to 72%) in community clinical settings (Zayfert et al., 2005). It remains unclear, however, whether individuals drop out of exposure-based therapies more often than they drop out of other therapies for PTSD. Schnurr and colleagues (2007) found that among veterans with PTSD, the treatment dropout rate was significantly higher in an exposure therapy condition than in a present-centered treatment condition that focused on current life problems as a result of PTSD, and that those who dropped out of treatment did so during imaginal exposure. In contrast, Foa and colleagues (2002) found that sexual assault survivors whose symptoms were exacerbated

during various types of treatment (prolonged exposure (PE) alone, PE and cognitive restructuring, or waitlist) were not significantly more likely to drop out of treatment than women whose symptoms did not get worse. However, it is unclear whether dropout rates differed across treatment conditions.

Clearly there is both support for the use of exposure therapy in varied traumatized populations and a need for caution in its application. Notably, some evidence suggests that findings regarding efficacy may be less applicable to combat veterans, who tend to show less pre- to post-treatment improvement in PTSD symptoms than individuals who have experienced traumatic events unrelated to combat (Bradley et al., 2005). At this point, reasons for lower rates of improvement among veterans are unclear, but could include higher rates of treatment non-adherence.

Treatment Non-Adherence in PTSD

In the psychotherapy and medical literatures, researchers refer to treatment non-adherence by different names, including dropout and attrition. I will use the terms non-adherence and dropout interchangeably in the following review. Treatment non-adherence, or the failure to complete prescribed medical and psychological regimens can lead to the worsening of medical/psychological conditions, development of further health problems, need for additional services, poorer work productivity, and decreases in quality of life (Christensen, 2004; Reis & Brown, 1999). Despite these clear negative consequences, treatment non-adherence is common. Studies in the medical literature yield estimates of 20 to 40% non-adherence to acute illness regimens, 30 to 60% to chronic illness regimens, and up to 80% to preventative regimens (Christensen, 2004). Adherence to treatments for psychological or psychiatric disorders is not as extensively documented. However, studies suggest that rates of adherence to medical treatments

for psychological disorders are moderate to low, that clients typically take 65% or less of prescribed psychiatric medications than doctors recommend (Cramer & Rosenheck, 1998), and that adherence rates tend to decline over time (Demyttenaere, 1997). Non-adherence to psychotherapy also appears to be a widespread problem (Levensky & O'Donohue, 2006; Ogrodniczuk, Joyce, & Piper, 2005), with premature treatment termination rates ranging from 30 to 75% for clients with varied disorders (Barrett, Chua, Crits-Christoph, Gibbons, & Thompson, 2008; Baekeland & Lundwall, 1975; Garfield, 1994; Smart & Gray, 1978; Wierzbicki & Pekarik, 1993). A contributing factor to the low adherence rates for psychotherapy may be the amount of treatment necessary for clients to start to feel better; data suggest that the majority of clients receiving psychotherapy both within the Veterans Health Administration and in other settings tend to drop out before they have received an “adequate dose” for symptom relief (Barrett, Chua, Crits-Cristoph, Gibbons, & Thompson, 2008; Cully, Henderson, Kunik, Tolpin, Jimenez, & Petersen, 2008).

One barrier to drawing conclusions about adherence to psychological treatment is the considerable variability in operational definitions of treatment adherence across studies. Depending on the study, adherence has been defined as attending or coming on time to sessions (TARRIER, Sommerfield, Pilgrim, & Faragher, 2000), beginning a recommended treatment (Rogers & Bullman, 1995), completing homework (van Minnen & Hagedaars, 2002), taking medication as prescribed (Shemesh et al., 2001), or sticking with versus dropping out of treatment after enrollment (Kubiak, 2004; van Minnen, Arntz, & Keijsers, 2002). Each of these approaches has strengths and weaknesses. Measuring treatment adherence using attendance records, for instance, can be problematic if treatment is long-term and time-unlimited, which is historically common in

psychotherapy especially as practiced in naturalistic settings (Hansen & Lambert, 2003; Pekarik, 1983).

Because definitions of adherence, as well as approaches to measuring the construct, vary greatly, it has been difficult for researchers to isolate variables that reliably predict continued engagement in psychotherapeutic treatment (Barrett et al., 2008; Baekeland & Lundwall, 1975; Garfield, 1994; Hatchett & Park, 2003; Levensky, Fisher, & O'Donohue, 2006; Ogrodniczuk, Joyce, & Piper, 2005; Pekarik, 1991; Wierzbicki & Pekarik, 1993). In the literature to date, demographic variables have received the most attention as potential predictors. Indeed, the most consistent finding in the literature is an inverse relationship between treatment dropout and socioeconomic status (SES) (Baekeland & Lundwall, 1975; Berrigan & Garfield, 1981; Garfield, 1994; Wierzbicki & Pekarik, 1993). It is unclear, however, if low SES per se accounts for increased dropout risk. An alternate possibility is that SES functions as a proxy for other associated factors, such as minority racial status, low educational level, and being female, young, and unmarried, each of which relates significantly to dropout rates both from psychotherapy treatment in general (Wierzbicki & Pekarik, 1993) and from more focused treatment for chronic depression (Arnow et al., 2007).

Client characteristics that extend beyond demographics also have been examined in relation to treatment adherence for varying psychological disorders, but the findings regarding such variables are mixed across studies (Baekeland & Lundwall, 1975). Several studies demonstrate associations between non-adherence and pre-treatment symptom severity or comorbidity status. Persons and colleagues (1988), for example, found a negative association between pre-treatment depression scores and adherence to psychotherapy in depressed clients who received cognitive therapy in a private practice setting. Further, clients with comorbid

personality disorders were more likely to drop out of treatment than were those without personality pathology (Persons, Burns, & Perloff, 1988). In another study, chronically depressed outpatients receiving cognitive behavioral therapy and/or medication were at higher risk for non-adherence if they had comorbid anxiety disorders (Arnow et al., 2007). Finally, studies of treatment for alcoholism suggest positive associations between treatment dropout and such factors as social isolation, poor motivation for treatment, and nonabstinence (Baekeland & Lundwall, 1975; Cummings, 1977; Smart & Gray, 1978).

Beyond demographics and client characteristics, some researchers have followed Wierzbicki and Pekarik's (1993) suggestion that more psychologically complex variables, such as client expectations of treatment, merit consideration as predictors of adherence. Research utilizing this approach is still unusual, but yields interesting findings. For example, expectations about treatment duration better predicted number of therapy sessions attended than did demographic variables, with the exception of age (Garfield, 1994; Mueller & Pekarik, 2000; Pekarik, 1991). Together, these disparate areas of research suggest that multiple factors may influence adherence to treatment regimens.

Relatively little is known about factors that may affect adherence specifically in those with PTSD, particularly adherence to exposure therapy, a treatment of choice for the disorder. This is surprising, given that existing studies examining treatment adherence in individuals with PTSD consistently show that adherent clients tend to have better outcomes, including decreased PTSD symptoms (Matthieu & Ivanoff, 2006; Schnurr et al., 2003; Scott & Stradling, 1997; TARRIER, Sommerfield, Pilgrim, & Faragher, 2000; van Minnen & Hageraars, 2002; Vermeire, Hearnshaw, Van Royen, & Denekens, 2001). TARRIER and colleagues (2000), for example, found

that the best predictor of poor treatment outcome (PTSD severity) in a mixed-trauma population was inconsistent attendance to cognitive behavioral therapy sessions.

The lack of available information about predictors of adherence to PTSD treatment appears to reflect several issues. First, most research on adherence to psychotherapy among individuals with PTSD is embedded in the context of treatment outcome studies. For example, none of the PTSD treatment studies reviewed in a recent meta-analysis examining the efficacy and generalizability of controlled trials of psychotherapy treatments for PTSD (Bradley et al., 2005) were designed explicitly to examine treatment adherence. Instead, treatment adherence served, at best, as a secondary variable that might hold some relevance to treatment outcome. In fact, 32% of the published studies that reported completion or dropout rates did not examine or report differences between dropouts and completers. This lack of data regarding adherence is particularly striking for studies of veterans. Forty percent of the reviewed studies that focused on veterans either did not examine or did not report differences between dropouts and completers (Bradley, Greene, Russ, Dutra, & Westen, 2005).

Second, rates of adherence to treatment in clients with PTSD vary, in part, depending on the setting, the types of treatment, and patient populations or diagnostic groups under study (Foa et al., 2005; Hembree et al., 2003; McDonagh et al., 2005). Active treatments tend, for example, to have higher dropout rates than control treatments (Foa et al., 2005), and adherence appears to be lower in clinical settings than in randomized, controlled trials, where participants are stringently selected and monitored (Bradley et al., 2005; Burstein, 1986; Fisher et al., 1993; Zayfert et al., 2005). This makes it difficult to generalize findings about predictors from one study to another or to compare results across studies.

Third, studies of treatment adherence in PTSD differ dramatically in their definitions of treatment dropout. Many studies provide no information except the number of individuals who dropped out of treatment for any reason (e.g., Bryant, Moulds, Guthrie, Dang, & Nixon, 2003). Some studies deem treatment completed when the therapist and client agree that they have achieved PTSD treatment goals (Zayfert et al., 2005). Others define dropout based on the number of sessions clients attended (e.g., Glynn et al., 1999). These different definitions make it difficult to draw conclusions about adherence to psychotherapy across studies (Barrett et al., 2008).

Fourth, studies also differ in their selected predictors of adherent behaviors (Bradley, Greene, Russ, Dutra, & Westen, 2005; Bryant et al., 2007; Burstein, 1986; Fisher, Winne, & Ley, 1993). Bradley and colleagues (2005) found that in studies that provided adequate data to permit examination of adherence predictors, no one set of variables consistently predicted treatment completion or treatment dropout (see Appendix A). A similar review of broadly defined mental health service use among trauma survivors found comparable inconsistencies in predictors of service use (Elhai, North, & Frueh, 2005).

Of the studies reviewed in the Bradley et al. (2005) meta-analysis, some found that treatment dropouts differed from completers on demographic characteristics (Foa et al., 1999; Foa, Rothbaum, Riggs, & Murdock, 1991; Krakow et al., 2001; Paunovic & Ost, 2001; Schnurr et al., 2003). Other controlled trials found significant differences between treatment completers and dropouts on measures of non-PTSD psychopathology (e.g., depression, anxiety), with dropouts showing more severe symptoms than completers (Bryant, Moulds, Guthrie, Dang, & Nixon, 2003; Schnurr et al., 2003). Finally, some studies found that treatment dropouts had more severe overall PTSD symptoms than did treatment completers (Marks, Lovell, Noshirvani,

Livanou, & Thrasher, 1998; Zlotnick et al., 1997) or more severe PTSD avoidance/emotional numbing symptoms (Bryant, Moulds, Guthrie, Dang, & Nixon, 2003; Glynn et al., 1999). Other studies, in contrast, failed to find differences between completers and non-completers on demographic characteristics (Brom, Kleber, & Defares, 1989; Bryant, Moulds, Guthrie, Dang, & Nixon, 2003; Cloitre, Koenen, Cohen, & Han, 2002; Tarrier et al., 1999; Taylor et al., 2003), measures of non-PTSD symptoms (Cloitre, Koenen, Cohen, & Han, 2002; Foa et al., 1999; Resick, Nishith, Weaver, Astin, & Feuer, 2002; Tarrier et al., 1999; Taylor, 2003), measures of overall PTSD symptoms (Cloitre, Koenen, Cohen, & Han, 2002; Krakow et al., 2001; Resick, Nishith, Weaver, Astin, & Feuer, 2002; Schnurr et al., 2003; Tarrier et al., 1999; Taylor, 2003) or measures of PTSD-avoidance (Tarrier et al., 1999; Taylor, 2003).

Results from several controlled trials of PTSD therapy and adherence did not become available until after Bradley and colleagues published their meta-analysis in 2005 (see Appendix B). Consistent with results of the meta-analysis, these studies also failed to find reliable predictors of treatment completion or dropout. Findings in these studies regarding demographic characteristics (e.g., age) are conflicting, with some evidence suggesting that they relate to treatment dropout (Foa et al., 2005; Kubany et al., 2004; Matthieu & Ivanoff, 2006; Resick, Galovski, Uhlmansiek, Scher, Clum, & Young-Xu, 2008) and other evidence indicating that they do not (Power et al., 2002). Similarly, associations between treatment adherence and both severity of global psychopathology (Kubany et al., 2004; McDonagh et al., 2005; Taylor et al., 2001) and severity of PTSD symptoms (Matthieu & Ivanoff, 2006; Taylor et al., 2001) vary across studies. Lastly, one study found that the only difference between treatment completers and dropouts was more severe PTSD-avoidance/emotional numbing symptoms in dropouts (Power et al., 2002).

Studies that base predictions about adherence to exposure therapy on theoretical models in accordance with the recommendations of Christensen (2004), Vermeire and colleagues (2001), and Andersen (1995) are rare, but have yielded interesting findings. Researchers have started to use the behavioral model of service utilization (Andersen, 1995) to examine what predicts general mental health use in veterans with PTSD (Sayer, Clothier, Spoont, & Nelson, 2007). Sayer and colleagues (2007) found, in a sample of veterans with PTSD who were submitting a claim to become financially compensated for PTSD, that mental health use was facilitated by younger age, marriage, and dependence on public insurance. Spoont and colleagues (2005) examined, in a study based on the Self Regulation Model (Leventhal, Diefenbach, & Leventhal, 1992), whether health beliefs predicted adherence to psychotherapy in combat veterans undergoing treatment for PTSD. They found that veterans who believed in psychosocial rather than biological explanations for PTSD or who reported stronger beliefs that PTSD had negatively affected their lives were more likely to participate in psychotherapy.

Similarly, Bryant and colleagues (2007) based their investigation of associations between avoidance and exposure treatment adherence on Ehlers' and Clark's (2000) cognitive model of PTSD. These researchers proposed that individuals who dropped out of treatment would be those who entered treatment with maladaptive coping strategies that interfered with treatment completion (Bryant et al., 2007). More specifically, they hypothesized that individuals with PTSD who were more avoidant would be more likely to drop out of treatment. In fact, their findings demonstrated that individuals with PTSD related to motor vehicle accidents or non-sexual assaults who dropped out of treatment had significantly higher avoidance scores than individuals who completed treatment. Bryant and colleagues (2007) concluded that individuals who have a proclivity to avoid aversive events avoid therapy by dropping out of treatment.

Although treatment adherence rates are low in many traumatized populations, some evidence suggests that veterans have particular difficulty entering and adhering to treatment. Nearly 40% of Vietnam Veterans who developed PTSD, for example, have never sought mental health treatment (Kulka et al., 1990). Further, those who have completed treatment show smaller treatment gains than do individuals with PTSD due to other traumatic experiences (Bradley, Greene, Russ, Dutra, & Westen, 2005). Some evidence suggests that this could reflect, at least in part, poor adherence: veterans with PTSD miss more therapy appointments than veterans in other diagnostic groups such as clients with schizophrenia, schizoaffective disorder, bipolar disorder, major depressive disorder, and dysthymic disorder (Sparr, Moffitt, & Ward, 1993).

Combat veterans with PTSD differ in other notable ways from individuals who have experienced non-combat-related trauma, which may influence their risk for non-adherence (Foa & Meadows, 1997). First, secondary gains from remaining ill, such as disability compensation for physical, medical, or psychological conditions that relate back to military service, may be greater for veterans, especially those treated in the VA system, than for non-veteran trauma survivors. For example, veterans with PTSD can receive monetary compensation for a PTSD diagnosis due to a trauma during military service (a service-connected condition). Those who receive treatment that improves their PTSD symptoms may risk a decrease in this compensation (Frueh et al., 2003).

Second, traumatized veterans are unusual in that they are often both perpetrators and victims of trauma. This dual and conflicting set of roles may elicit feelings of guilt and shame that are more rational than those experienced by other groups, such as rape survivors (Foa & Meadows, 1997). Third, combat veterans often experience severe anger in addition to classic

PTSD symptoms, which interferes with the therapeutic alliance and with treatment adherence (Chemtob, Novaco, Hamada, & Gross, 1997; Stevenson & Chemtob, 2000).

Non-adherence rates from early PTSD treatment outcome studies conducted with veterans range from zero (Keane, Fairbank, Caddell, & Zimering, 1989) to 33% (Devilley, Spence, & Rapee, 1998), and less tightly controlled treatment outcome studies report a slightly wider range (Chemtob, Novaco, Hamada, & Gross, 1997). Until recently, however, studies of PTSD treatment occurred primarily in inpatient units of veterans' hospitals where participants would have had difficulty refusing treatment (Boudewyns & Hyer, 1990; Hyer, Woods, Bruno, & Boudewyns, 1989; Silver, Brooks, & Obenchain, 1995). Additionally, many early treatment outcome studies, which typically used some form of exposure therapy, either did not report adherence rates or did not report whether and how dropouts and completers differed (Carlson, Chemtob, Rusnak, Hedlund, & Muraoka, 1998; Devilly, Spence, & Rapee, 1998; Frueh, Turner, Beidel, & Mirabella, 1996; Hyer, Woods, Bruno, & Boudewyns, 1989; Pitman, Orr, Altman, & Longpre, 1996; Silver, Brooks, & Obenchain, 1995).

Findings from more recent studies of PTSD treatment adherence in veterans are consistent with earlier research, in that dropout rates are relatively high, particularly for active treatments, and predictors of adherence are mixed (Kutter, Wolf, & McKeever, 2004; Monson et al., 2006; Schnurr et al., 2007; Schnurr et al., 2003). Some studies found that demographic characteristics, quality of life, or family problems differentiated treatment completers from dropouts (Creamer, Elliott, Forbes, Biddle, & Hawthorne, 2006; Schnurr et al., 2003), but others did not (Chemtob, Novaco, Hamada, & Gross, 1997; Cooper & Clum, 1989; Kutter, Wolf, & McKeever, 2004; Munley, Bains, Frazee, & Schwartz, 1994). Creamer and colleagues (2006), for example, found that younger, unmarried Vietnam Veterans dropped out of group-based

treatment provided in varied settings (inpatient, outpatient, and day programs) more often than older, married Vietnam Veterans. Mixed results have been found regarding differences between treatment completers and dropouts in severity of PTSD symptoms (Chemtob, Novaco, Hamada, & Gross, 1997; Kutter, Wolf, & McKeever, 2004; Munley, Bains, Frazee, & Schwartz, 1994; Schnurr et al., 2003), PTSD-avoidance/emotional numbing symptoms (Creamer, Elliott, Forbes, Biddle, & Hawthorne, 2006; Glynn et al., 1999; Kutter, Wolf, & McKeever, 2004), psychopathology (e.g., depression, anxiety, substance use)(Chemtob, Novaco, Hamada, & Gross, 1997; Cooper & Clum, 1989; Creamer, Elliott, Forbes, Biddle, & Hawthorne, 2006; Kutter, Wolf, & McKeever, 2004; Munley, Bains, Frazee, & Schwartz, 1994; Schnurr et al., 2003; Sparr, Moffitt, & Ward, 1993), and feelings of anger, guilt and shame (Chemtob, Novaco, Hamada, & Gross, 1997; Kutter, Wolf, & McKeever, 2004).

Although the relevant body of research is growing, several factors limit current understanding of what predicts adherence to treatment in veterans with PTSD. First, most studies focus on predictors of treatment outcome rather than treatment adherence, which tends to be examined only in secondary analyses. Second, most studies report treatment dropout rates instead of rates of adherence, with the notable exception of a study conducted by Schnurr and colleagues (2003). These researchers conducted a randomized, clinical trial of trauma-focused group therapy for Vietnam Veterans. They found that participants who attended at least 80% of trauma-focused treatment achieved a significant improvement in avoidance, numbing, and PTSD symptoms compared to those who completed present-centered treatment. Finally, with the exception of one study (Spoont et al., 2005), researchers have not selected predictors of adherence among veterans based on theoretical models. I designed the present study as a first

step toward addressing these limitations, with a narrow focus on veterans of the Iraq and Afghanistan Wars (Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF)).

The veterans of the OEF/OIF campaigns are largely male, under the age of thirty, working, and Caucasian; additionally, half are married (Fontana & Rosenheck, 2008; Hoge, Auchterlonie, & Milliken, 2006; Seal, Bertenthal, Miner, Sen, & Marmar, 2007). Despite demographic similarities to veterans of 20th century wars, this group constitutes an unusual population of combat veterans in several ways. Not only do these soldiers face multiple tours of duty, unlike veterans of other recent conflicts, but they are also more likely to survive severe injuries than were veterans of past conflicts (Hoge et al., 2004). These factors likely increase their risk for PTSD, which is common in this population (Seal, Bertenthal, Miner, Sen, & Marmar, 2007). Further, unlike veterans of the Vietnam War, many of whom did not present for mental health treatment until many years after combat, a growing number is seeking assistance shortly after returning from combat zones. Indeed, three times more OEF and OIF veterans than Vietnam Veterans have enrolled in the VA health care system (Seal, Bertenthal, Miner, Sen, & Marmar, 2007).

Given the unusual characteristics of OEF/OEF veterans, predictors of treatment adherence for this population may differ from those for veterans of earlier conflicts (e.g., Vietnam War; Spoont, Sayer, & Nelson, 2005). Only recently, however, have researchers begun to examine treatment responses and correlates in this population. In one of the only published treatment outcome studies to date that includes participants from this population, along with veterans of earlier conflicts, female veterans with primarily sexual traumas were treated with either prolonged exposure therapy or with present-centered therapy (Schnurr et al, 2007). Treatment dropout rates and numbers of missed sessions were significantly higher in the

prolonged exposure than in the present-centered therapy. No data regarding correlates of treatment dropout, however, were presented. Another preliminary investigation of virtual reality therapy for this population was piloted with active-duty service members (Rizzo, Reger, Gahm, Difede, & Rothbaum, 2009). Results were promising and indicated a significant decrease in PTSD and depression scores post-treatment. This study reported 20 service members completed the treatment, and 13 dropped out. The average number of completed sessions was less than 11. This study did not report examine or report differences between completers or dropouts.

Avoidance as a Predictor of Non-Adherence

Research on adherence to psychotherapy in clients with PTSD has examined many individual predictors in different samples and yielded mixed findings. What has clearly emerged is the need for theory to drive the selection of variables to test as predictors of adherence to psychotherapy. Ehlers' and Clark's (2000) cognitive model of PTSD and Foa and Kozak's (1986) information processing model of PTSD, taken together, serve as a theoretical framework for the current study. These models postulate that avoidance constitutes a major obstacle to changes in an individual's negative appraisals and memories of traumatic events, and thus also prevents successful engagement in and completion of treatment. Although ten studies have examined this association in different traumatized populations, yielding largely positive findings, none have focused on veterans who recently returned from combat and whose symptoms are thus more likely to be focused explicitly on their combat experiences. I therefore chose to examine avoidance/emotional numbing symptoms as a predictor of non-adherence to psychotherapy in OEF/OIF veterans.

Avoidance is particularly interesting as a predictor of OEF/OIF veterans' adherence to PTSD treatment because the efficacious treatments available for PTSD typically include

exposure therapy (Bradley, Greene, Russ, Dutra, & Westen, 2005), which requires clients to discard avoidant coping strategies. This may be particularly hard for individuals who are more avoidant to begin with; high levels of avoidance of stimuli that are associated with or that trigger the memory of a trauma may lead individuals to be less tolerant of treatment approaches (e.g., exposure therapy) that involve confronting a traumatic memory (Power et al., 2002).

Studies of samples with non-combat-related PTSD have yielded largely, but not uniformly, positive findings regarding the relationship between avoidance and treatment dropout, regardless of the type of trauma or the measure of avoidance used (Brady, Dansky, Back, Foa, & Carroll, 2001; Bryant, Moulds, Guthrie, Dang, & Nixon, 2003; Bryant et al., 2007; Burstein, 1986; Power et al., 2002). Two studies, however, found no significant relationship between avoidance and dropout (Tarrier et al., 1999; Taylor et al., 2001). Notably, most of these studies examined treatment adherence secondary to a focus on treatment outcomes (Brady, Dansky, Back, Foa, & Carroll, 2001; Bryant, Moulds, Guthrie, Dang, & Nixon, 2003; Power et al., 2002; Tarrier et al., 1999; Taylor et al., 2001).

Of the studies that have examined the role of avoidance in adherence to PTSD treatment, only three have focused on veterans, most of whom were traumatized during the Vietnam War and sought treatment years after they returned from combat (Creamer, Elliott, Forbes, Biddle, & Hawthorne, 2006; Glynn et al., 1999; Kutter, Wolf, & McKeever, 2004). Nonetheless, these studies yielded conflicting findings, perhaps in part because of differences in the types of treatment offered (e.g., exposure, psychoeducational, individual, or group therapy), differences in definitions of treatment dropouts (e.g., stating that clients dropped out of treatment at some point and defining completion such that almost every client completed treatment), and complexities of mental health issues in individuals seeking treatment years after they were

initially traumatized. One way to address these conflicting findings is to examine associations between avoidance and adherence to psychotherapy in a population of veterans with PTSD who recently returned from combat and whose presentations are thus not complicated by long intervals between their combat tours and their initial presentation for treatment.

Overview of Study

I designed this study as a first step toward addressing several limitations of the adherence literature. First, I examined adherence in a circumscribed, clearly defined subset of veterans with PTSD. Second, I examined potential predictors of adherence to psychotherapy that I selected based on theoretical models of the development and maintenance of PTSD. Third, I clearly defined adherence as the percentage of scheduled psychotherapy sessions a veteran attended.

Given the theoretical (Ehlers & Clark, 2000; Foa & Kozak, 1986) and empirical support (e.g., Brady, Dansky, Back, Foa, & Carroll, 2001; Bryant et al., 2007;) for a negative association between severity of avoidance/emotional numbing symptoms and psychotherapy adherence, I predicted that there would be a significant, negative association between severity of avoidance/emotional numbing symptoms and psychotherapy adherence. Moreover, I predicted that this negative association would remain significant after I statistically controlled for demographic and clinical variables that have been examined as predictors of adherence in previous studies or that were significantly associated with the outcome variable.

CHAPTER 2.

METHODS

This study used an archival dataset developed with the approval of the Emory and Georgia State Universities and Veterans Administration Institutional Review Boards for the purpose of evaluating the Trauma Recovery Program (TRP) at the PTSD specialty clinic at the Atlanta Veterans Administration Medical Center. This dataset includes participants' responses on a standard set of self-report measures [Veteran Affairs Military Stress Treatment Assessment (VAMSTA; Fontana, Ruzek, McFall, & Rosenheck, 2006)] completed at initial intake into the TRP and a detailed intake interview conducted by a licensed or supervised mental health professional to evaluate symptoms of PTSD, depression, substance use, suicidality, and childhood family, social, and learning history. Additionally, veterans and their clinicians provided data at multiple time points after intake regarding the veteran's symptoms, treatment adherence, and type of treatment received from the TRP. The primary outcome measures of interest include PTSD symptoms, treatment adherence, symptoms of psychopathology, and emotional functioning. Secondary outcome measures include measures of quality of life and aspects of life history.

Participants

Participants (N=160 in the final sample) represent all consecutive referrals to the TRP between July 2006 and May 2008 with the exception of any clients who declined to complete program evaluation data. The number of veterans who refused to complete the program evaluation data is unknown. Only veterans of the Operation Enduring Freedom (OEF) campaign in Afghanistan or the Operation Iraqi Freedom (OIF) campaign were included in the present study.

Of the 252 OEF/OIF veterans whose data were initially coded and entered, 25 were referred out of the TRP, 18 never returned for treatment post-intake, and 31 only received medication management (See Tables 1 and 2 for descriptive data regarding included and excluded participants). These 74 veterans were thus excluded from the dataset. Furthermore, 7 veterans were excluded because their total PTSD Checklist-Military version (PCL-M; Weathers et al., 1993) scores were below the recommended total cutoff score (34) for a probable diagnosis of PTSD (Bliese, Wright, Adler, Cabrera, Castro, & Hoge 2008). Eleven veterans were excluded from the dataset due to having data with outlier scores on more than one variable. Final analyses included only the 160 veterans who received psychotherapy.

Table 1: Veterans who were referred out of the TRP

Referred Out	Frequency	Percent
Distance/closer to home	6	2.5
No PTSD	8	3.3
Psychotic	4	1.7
Conflicts with work	2	0.8
No combat trauma or MST	1	0.4
No need for therapy/ medications	1	0.4
Unclear why	3	1.2
Total	25	10.4

Table 2: Veterans who never returned for treatment post-intake

Never Returned	Frequency	Percent
Unclear why	11	4.6
Did not want treatment	4	1.7
Went elsewhere for treatment	1	0.4
Childcare issues	1	0.4
Being redeployed	1	0.4
Total	18	7.5

Cramer's V tests and analyses of variance (ANOVA) were used to determine if veterans who received psychotherapy and were thus included in the final sample differed from those who were excluded because they either received medication management alone (medication group) or

did not return to the TRP for treatment (no-TRP-treatment group) (see Appendix D for detailed results). Comorbid diagnoses were more common in the no-TRP-treatment group than in the other two groups (Cramer's $V = 0.17$, $p = 0.04$). Groups also differed according to trauma exposure ($p = .000$), overall PCL score at admission ($p = .01$), total depression score ($p = .01$), and PCL re-experiencing score ($p = .03$), with the no-TRP-treatment group obtaining consistently lower scores than the therapy group and, in some cases, the medication management group. No significant differences among groups were evident on any other demographic or clinical variables (all p 's $> .05$).

Full demographic and clinical data for the final sample are presented in Table 3. Veterans in this sample ($N = 160$) were largely male ($N = 135$; 84%), of a minority race or ethnicity ($N = 103$; 64%), and were currently married ($N = 84$; 53%). The majority had enlisted in the military (only four were officers) and most were in either the Army (78%) or the Marines (12%). Participants' ranks ranged from Private First Class to Sergeant Major. The majority of veterans in the sample ($N = 155$; 96%) reported experiencing multiple traumatic stressors during deployment to Iraq or Afghanistan. The most frequently endorsed stressors included going on combat patrols or missions, encountering explosive devices, receiving hostile fire, witnessing injury or death, exposure to the sight, sound, or smell of dying people, and knowing someone who was seriously wounded or killed. A small minority ($N = 11$; 7%) reported experiencing a military sexual trauma.

Most veterans in the sample had at least one comorbid diagnosis ($N = 106$; 66%), most commonly depression (43%), substance abuse or dependence (18%), and/or anxiety (12%). Some veterans reported having suicidal ($N = 25$; 15%) and/or homicidal ($N = 11$; 7%) thoughts. The majority had received previous mental health treatment (68%) and/or had been on medication for a mental health issue (73%); 18% had been psychiatrically hospitalized. Non-

Table 3: Demographics for N=160 veterans

Measured variable	Mean (SD)	Range	N	Percent
<i>Overall Demographics</i>				
Age	33.05 (8.26)	(20-57)		
Education level	13.43 (1.62)	(11-17)		
Days of employment	11.85 (11.02)	(0-30)		
Birth order	2.19 (1.52)	(0-6+)		
Gender				
Male			135	84.37
Female			25	15.63
Race/Ethnicity				
White			57	35.63
African-American, not Hispanic			89	55.63
Hispanic, not White			7	4.38
Hispanic, African-American			3	1.88
Asian			2	1.25
Other			2	1.25
Marital Status				
Married			84	52.83
Unmarried			75	47.17
<i>Childhood Variables</i>				
Child abuse			56	37.84
Stable family			104	75.91
Discipline problems			32	22.07
<i>Psychological Variables</i>				
Comorbid issues	0.96 (0.85)	(0-3+)		
Depression	24.74 (6.27)	(10.48-36)		
Quality of life	34.29 (9.55)	(12-60)		
Trauma exposure	9.86 (4.04)	(1-16)		
Alcohol abuse			44	27.85
Drug abuse			7	4.38
Violence & Anger			140	87.50
<i>Medical Issues</i>				
Number medical problems	1.24 (1.01)	(0-3+)		
Pain scale	5.83 (2.04)	(0-10)		
<i>Compensation Variables</i>				
Service connection	26.62 (31.54)	(0-100)		
PTSD connection	6.99 (14.87)	(0-70)		
<i>Perceptions</i>				
Expected ease of treatment	2.23 (0.67)	(0.87-4)		
<i>Predictor Variables</i>				
PCL Re-experiencing	17.92 (4.58)	(6-25)		
PCL Avoidance & Emotional Numbing	24.45 (5.98)	(9-35)		
PCL Hyperarousal	20.57 (3.54)	(11-25)		
PCL Avoidance Only	7.42 (2.01)	(2-10)		
PCL Emotional Numbing only	11.57 (2.99)	(4-15)		
<i>Type of treatment</i>				
Exposure therapy			73	45.63
Time-limited treatment			111	69.38
<i>Adherence variables</i>				
Sessions scheduled	10.62 (5.83)	(1-39)		
Sessions attended	6.41 (4.78)	(0-19)		
Non-exposure therapy adherence	.53 (.35)	(0-1)		
Time-limited adherence	.54 (.33)	(0-1)		
Unlimited therapy adherence	.65 (.32)	(0-1)		
<i>Therapy completion</i>				
Overall psychotherapy			42	26.25
Exposure therapy			28	38.36
Non-exposure therapy			20	18.02
Time-limited therapy			32	28.83
Unlimited therapy			10	20.41

psychiatric medical problems were common; 75% of veterans reported at least one medical problem and 76% reported receiving current medical treatment. Nearly half of the veterans (N=74; 46%) in this sample reported a history of a traumatic brain injury (TBI), and 69 indicated that the TBI had occurred during their military service.

Some participating veterans reported having experienced notable difficulties during their youth. Approximately a fifth of the sample (20%), for example, reported childhood discipline problems that included getting suspended or expelled from school, (48%), fighting (39%), truancy (26%), breaking the law (26%), getting into trouble frequently (13%), and running away from home (10%). Childhood maltreatment appeared relatively common; 56 veterans (35%) endorsed having experiencing physical (N=33), sexual (N=25), and/or emotional (N=30) abuse.

Procedure

All participants were referred to the TRP by health care providers within the Veterans Administration Medical Center (VAMC) system, and all completed an initial questionnaire and intake interview (Figure 2).

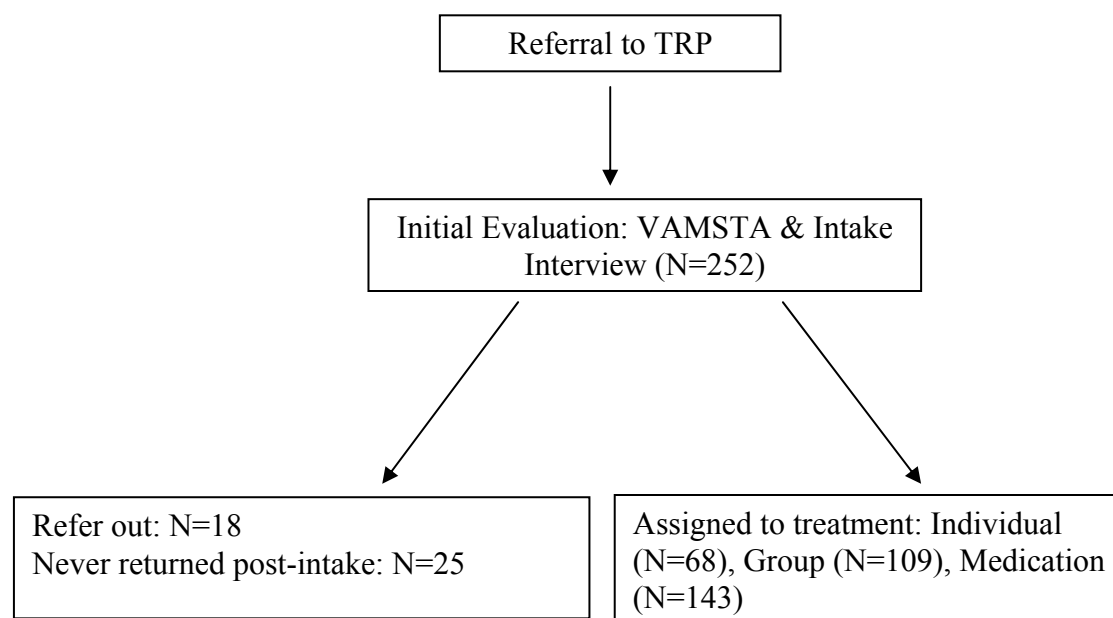


Figure 2: Client flow in the Trauma Recovery Program

After intake, the TRP team discussed each veteran's psychological symptoms and diagnoses and determined appropriate treatment. Veterans were referred out of the TRP if they had a current psychotic disorder, substance dependence, or were in imminent danger of hurting themselves or someone else. Veterans identified as appropriate for the TRP were assigned to a treatment based on the initial intake, the patient's availability for treatment, the treatments currently available, and the treatment team's impression of which treatment would be most beneficial. OEF/OIF veterans were assigned to either exposure-based (individual or group) or non-exposure based treatments (e.g., individual nonspecified therapy, psychoeducational group, post-military re-adjustment group). The psychoeducational groups focused on teaching veterans about the symptoms of PTSD and coping with the disorder. This group met weekly for either four or eight weeks and included veterans of different combat theaters. The eight-week psychoeducational group included both veterans and their family members. The post-military re-adjustment group was an ongoing weekly group in which participants primarily discussed issues related to adjusting after military services; however, group members were also free to raise other issues. The exposure therapy groups were time-limited (13 or 16 weeks). The 13-week group met weekly, with a focus on interoceptive group exposure and individual exposure exercises. This group included only OEF/OIF veterans. The 16-week group met twice a week; treatment consisted of three phases: building group cohesion, exposure work, relapse prevention, and "closing the wound," which involved a funeral for fallen soldiers and forgiving oneself or others. This group included veterans of various combat theaters, but the majority had served in the Vietnam War. All veterans were also assigned to a psychiatrist who managed their medication regimens while they were in psychotherapy, but for unknown reasons, 17 veterans never met with their assigned psychiatrists. Lastly, some veterans (N=16) completed a non-exposure based

treatment prior to entering exposure-based treatment to ensure that they received some therapy while waiting for placement in an exposure-based group.

Measures

Veteran Affairs Military Stress Treatment Assessment (VAMSTA; Fontana, Ruzek, McFall, & Rosenheck, 2006). This self-report instrument, which is typically completed at numerous time points during the first four months of treatment at the VAMC, combines demographic questions (e.g., marital status and days employed) and multiple well-validated measures into one questionnaire assessing symptom severity, social functioning, quality of life, and service use (Fontana & Rosenheck, 1996; Fontana, Rosenheck, Ruzek, & McFall, 2006). The VAMSTA demonstrates high stability at both the item and scale levels, as well as high homogeneity of items within subscales and indices (Fontana, Ruzek, McFall, & Rosenheck, 2006). The VAMSTA is psychometrically sound and is recommended for routine monitoring of veterans' clinical status and treatment outcomes. Five measures from the VAMSTA—the Quality of Life, Depression, Alcohol and Substance Use scales; Violence and Anger scale, and the PTSD Checklist (PCL-M)—were used in the present study.

VAMSTA Depression (see Appendix E). This is a self-report measure, derived from the Patient Health Questionnaire (PHQ; Spitzer, Kroenke, & Williams, 1999) which measures depressive symptoms over the previous two weeks. This measure demonstrates high internal consistency (alphas range from .88 to .90 based on two waves of data collection). Total score on this measure served as a covariate in regression analyses. The internal consistency of this measure in the current sample of veterans was high ($\alpha = .87$).

VAMSTA Alcohol and Drug Use (see Appendix F). These self-report measures ask about how often alcohol and drugs have disrupted aspects of one's life in the past four months. Fontana

and colleagues (2006) found the internal consistency of the questions about alcohol use to be good (alphas ranged from .81 to .93 in two waves of data collection). They found evidence of similarly high internal consistency for the questions about drug use ($\alpha = .96$). The alcohol use measure is derived from the Drinker Inventory of Consequences (Forcehimes, Tonigan, Miller, A., & Baer, 2007). These variables were dichotomized in the present study due to skewness and kurtosis and were used as covariates in the analyses.

VAMSTA Quality of Life (see Appendix G). This self-report measure is derived from the Quality of Life Interview (Lehman, 1988), which asks about people's feelings about different aspects of their life (e.g., friends, family, finances, health, etc). This scale demonstrates a test-retest reliability of .80, and an internal consistency of .81-.90 based on two waves of data collection (Fontana et al., 2006). The internal consistency of this measure in the present sample was high ($\alpha = .88$). Total score on this measure served as a covariate in analyses.

VAMSTA Violence and Anger Scale (see Appendix H; *Violence Inventory*; Kulka, Schlenger, Fairbank, Hough, Jordan, Marmar, & Weiss, 1990). This is an 8-item self-report measure of the presence of conflict with others. Veterans indicate if they have engaged in any of a list of conflictual behaviors (i.e., destroyed property, threatened someone with physical violence, had a physical fight with someone, threatened someone with a weapon, used a weapon against someone, had thoughts of hurting someone, were verbally abusive, or broke off contact with someone out of anger or fear of losing control) in the past 4 months. This scale demonstrates a test-retest reliability of .86, and an internal consistency of .67-.72 based on two waves of data collection (Fontana et al., 2006). The dichotomized variable (i.e., presence of violence versus a denial of violence) was used as a covariate in the present analyses.

VAMSTA PTSD Checklist (PCL; see Appendix I; Weathers, Litz, Herman, Huska, & Keane, 1993). This is a 17-item self-report measure of the presence and severity of PTSD symptoms participants were “bothered by...in the past month.” Participants rated their levels of distress for each symptom on a 5-point scale that ranges from 1 (“not at all”) to 5 (“extremely”). There are several versions of the PCL; the original was the PCL-M (military), which was used in the present study and which asks about problems associated with "stressful military experiences." The original validation sample included 123 Vietnam Veterans, but this measure has subsequently been validated and used in other populations as well (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Cook et al., 2005; Lang, Laffaye, Satz, Dresselhaus, & Stein, 2003).

The PCL can be scored in several ways. A total score (range 17-85) can be obtained by summing the scores on all 17 items. A cutoff score of 34 is used to indicate likely presence of a PTSD diagnosis in this veteran population (Bliese et al., 2008). A second way to score the PCL is to examine responses to determine if the respondent meets the PTSD diagnostic criteria specified in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV; APA, 2000) and to combine this information with the total score to determine PTSD status (Norris, Hamblen, Wilson, & Keane, 2004). Separate scores can also be calculated for Criteria B (re-experiencing symptoms), C (avoidance/emotional numbing), and D (hyperarousal). Total scores for the three criteria (re-experiencing, avoidance/emotional numbing, and hyperarousal) were used in the present study as covariates and independent variables.

The psychometric properties of the PCL-M include a test-retest reliability of .96 across a few days, high overall internal consistency ($\alpha = .97$), and internal consistency estimates ranging from .92-.93 for the subscales. Alpha for this measure in the present sample of veterans was .93.

The re-experiencing scale had an alpha of .91, the avoidance and emotional numbing symptom cluster had an alpha of .85, and the hyperarousal symptoms had an alpha of .81. The PCL-M has a .93 correlation with the Mississippi Scale for Combat-Related PTSD (Keane, Caddell, & Taylor, 1988). Results have been found to be consistent with PTSD diagnoses obtained using the Structured Clinical Interview for DSM-III-R (SCID; Spitzer, Williams, Gibbon, & First, 1990), which is one of the “gold standard” instruments for diagnosing PTSD. Schnurr and colleagues (2007) and Monson and colleagues (2006) found similar agreement between PCL-M scores and diagnoses obtained using the Clinician Administered PTSD Scale (CAPS; Weathers, Keane, & Davidson, 2001), another “gold standard” of PTSD assessment.

The PCL-M avoidance and emotional numbing total score is the primary independent variable of interest in this study. I also broke this total score into its subcomponents of the two avoidance symptoms ($\alpha = .82$) and the emotional numbing symptoms (.84) because there is some evidence that the total symptom score may not be measuring a unitary symptom cluster (e.g., Litz, 1992), and these variables were used as exploratory independent variables. The avoidance score consisted of the total score on the two items that explicitly focused on avoidance (avoiding thinking about or talking about a stressful military experience or avoiding having feelings related to it and avoiding activities or situations because they reminded you of a stressful military experience). The emotional numbing score consisted of the combined score on three items (loss of interest in activities that you used to enjoy, feeling distant or cut off from other people, and feeling emotionally numb or being unable to have loving feelings for those close to you).

Adherence. I examined adherence using two operational definitions. First, because treatment modalities varied in the number of sessions veterans were expected to attend, I defined adherence as the *percentage* (range 0-100) of scheduled appointments that veterans attended,

rather than the number of appointments attended. In the time-limited therapy modalities (e.g., psychoeducational group, group-based exposure therapy) veterans assigned to the treatment were informed about the duration and modality of treatment prior to the first session.

To facilitate comparison of results from this study to those in the literature, I also operationalized adherence as completion versus noncompletion. However, this was complicated because this data was drawn from a real-world practice setting in which veterans could receive multiple treatments, which could be time-limited (i.e., exposure-based or nonexposure-based treatments), time-unlimited/less clearly defined, or a combination of both types of treatment. A veteran was considered to have completed treatment if he or she attended 80% or more of the scheduled sessions (e.g., 11/13 sessions). This definition is consistent with what has been deemed necessary for significant improvements in both general psychological symptoms and PTSD symptoms specifically (Barrett et al., 2008; Hansen, Lambert, Forman, 2002; Schnurr, et al., 2003). If a veteran was enrolled in two (N=29) or three separate treatments (N=3), then the veteran needed to attend 80% of all treatments to be counted as a completer. If a veteran only received the psychoeducation group, then he or she needed to attend all of the sessions (4 or 8 sessions) to be coded as a completer.

Intake interview. Several variables used as covariates in this study were coded from the intake interview. More specifically, childhood discipline problems were coded as present or absent. The percentage of PTSD service-connection (i.e., the PTSD disability rating based on the level of social and occupational impairment associated with military-related PTSD) was also used as a covariate.

Data Analytic Plan

Data were entered into SPSS 17.0 for Windows, checked, and cleaned. Further, the data were assessed for the presence of outliers and threats to normality. I used hierarchical multiple regression to examine the relationship between avoidance/emotional numbing severity total score and percentage of therapy sessions attended. My core hypothesis was that severity of avoidance/numbing symptoms would significantly predict adherence to treatment, above and beyond demographic variables, measures of other psychopathology, clinical/treatment variables, and measures of PTSD re-experiencing and hyperarousal symptoms. Specifically, the more severe the avoidance/numbing symptoms, the less adherent the patient would be to therapy. In this multiple regression analysis, the independent variable was PCL-M avoidance/emotional numbing criterion score and the dependent variable was percentage of scheduled psychotherapy sessions attended. Employment status, marital status, depression, consequences of alcohol and drug use, composite score of PTSD-re-experiencing and hyperarousal symptoms, discipline problems, percentage of PTSD service-connection, quality of life score, the presence/absence of violence/anger, whether or not a veteran received exposure-based therapy, and whether a veteran received time-limited treatment served as covariates.

In order to further explore the hypothesized relationship between avoidance/emotional numbing symptoms and psychotherapy adherence, I separately examined the relationship between avoidance symptoms and emotional numbing symptoms and adherence using multiple regression. Lastly, to facilitate comparison of the results of this study with those in the literature, I coded the psychotherapy adherence variable as completion/noncompletion and ran three logistic regressions with completion/noncompletion as the outcome variable and PTSD severity composite score, depression, exposure-based treatment, PCL avoidance and emotional numbing

symptoms/avoidance symptoms only, and emotional numbing symptoms only, respectively, as predictors.

Power Analysis

A priori power analyses indicated that I would have an 88% chance of detecting a significant, medium effect ($R^2 = .05$) in tests of the association between avoidance and psychotherapy adherence with a sample of 200 veterans. The final sample in the analyses included 137 veterans; therefore, I had a 72% chance of detecting a significant, medium association ($R^2 = .05$) between severity of the avoidance/emotional numbing scores and percentage of therapy sessions attended.

CHAPTER 3.

RESULTS

Data Screening

Initial analyses involved screening data to identify outliers, missing values, or atypical distributions. Screening analyses were conducted in accordance with Tabachnick and Fidell (2001) using SPSS 17.0. As recommended by Tabachnick and Fidell (2001), SPSS Missing Values Analysis (SPSS MVA) was used to impute missing values for continuous, but not dichotomous, variables.

Veterans whose values fell outside the whiskers of boxplots for measured variables were identified as outliers. Data from 11 veterans with outlier scores on more than one variable were excluded from the dataset. For veterans with only one outlier score, values were changed to equal the next most extreme value in the distribution (Tabachnick & Fidell, 2001). This adjustment was necessary for the PCL-M hyperarousal symptom cluster score, but not for other variables.

Continuous variables were also examined for normality, linearity, homoscedasticity, and internal consistency. All variables fit a normal distribution; skewness (absolute value less than 3) and kurtosis (absolute values less than 10) statistics were within recommended limits for each examined variable (Kline, 1998). Linearity and homoscedasticity were examined by inspecting residual plots and appeared acceptable for all variables, with none violating the assumptions of regression. Finally, measures were assessed for internal consistency, using Cronbach's alpha. All measures used in these analyses demonstrated acceptable internal consistency ($\alpha > .70$).

Correlations

Correlations among all predictor and outcome variables were examined (see Table 4). Results were used to inform the selection of covariates for core analyses. Childhood discipline problems and time-limited therapy were significantly related to psychotherapy adherence ($p < .05$); therefore they were chosen as covariates for regression analyses focused on adherence.

Regression Analyses

Three hierarchical multiple regression analyses were conducted using SPSS REGRESSION to examine the hypothesized relationship between the independent variable, avoidance and emotional numbing, and the dependent variable, psychotherapy adherence. Missing covariate data regarding childhood discipline problems, PTSD service-connection, and marital status led to the exclusion of data from 23 participants from the original 160 veterans in the sample. Data from 137 veterans were included in the regression analyses.

In the first multiple regression analysis, the PCL-M total avoidance/emotional numbing cluster score served as a predictor of treatment adherence. I then parsed the avoidance/emotional numbing cluster score into separate PCL-M avoidance symptom scores and PCL-M emotional numbing symptom scores, because of controversy in the literature about whether avoidance and emotional numbing constitute a single, unitary cluster of symptoms (Litz, 1992; Lancaster, Melka, Rodriguez, 2009). The avoidance score consisted of the total score on the two items that explicitly focused on avoidance (avoiding thinking about or talking about a stressful military experience or avoiding having feelings related to it and avoiding activities or situations because they reminded you of a stressful military experience).

Table 4: Correlations of predictor and outcome variables.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	
Therapy adherence	1.00																		
Completion of therapy	.58**	1.00																	
PCL-M avoidance & emotional numbing score	-.07	.05	1.00																
PCL-M avoidance symptoms only	.01	.11	.70**	1.00															
PCL-M emotional numbing symptoms only	-.07	.11	.87**	.42**	1.00														
Marital status	.03	-.02	-.17*	-.14	-.15	1.00													
Days Employed at Admission	.13	.08	-.38**	-.28**	-.35**	.03	1.00												
Discipline problems	-.20*	-.10	-.09	-.07	-.05	-.15	.02	1.00											
Current medical treatment	.08	.10	.15	.18*	.06	.03	-.11	-.06	1.00										
PTSD service connection	-.15	.00	.03	.13	.01	-.05	-.18*	.00	.19*	1.00									
Depression score	.04	.13	.72**	.42**	.69**	-.09	-.33**	-.01	.21*	.06	1.00								
Quality of Life score	-.10	-.14	-.58**	-.36**	-.61**	.11	.33**	.00	-.22**	-.09	-.67**	1.00							
Violence and Anger	-.02	.04	.10	.04	.14	-.13	-.05	.11	-.03	-.05	.18*	-.11	1.00						
PCL-M re-experiencing & hyperarousal symptom composite	-.02	.04	.66**	.52**	.57**	-.13	-.39**	-.23**	.13	.02	.65**	-.44**	.25**	1.00					
Alcohol abuse	.01	.00	.00	.01	.03	-.04	.03	-.04	-.02	-.03	-.06	.05	.07	.12	1.00				
Drug Abuse	-.11	-.05	.14	.20*	.09	-.04	-.11	-.09	.04	.11	.05	-.01	.08	.14	.21**	1.00			
Exposure therapy	.14	.24**	-.07	.07	-.02	-.04	.14	.09	-.05	.01	-.12	.08	.12	.00	.01	-.13	1.00		
Time limited therapy	-.16*	.09	.02	.05	.06	.02	-.03	.16	-.01	.06	-.07	.01	.08	.03	.11	-.12	.61**	1.00	

The emotional numbing score consisted of the combined score on three items (loss of interest in activities that you used to enjoy, feeling distant or cut off from other people, and feeling emotionally numb or being unable to have loving feelings for those close to you). These scores each served as predictors of adherence in exploratory analyses.

Avoidance and emotional numbing total score. In this regression analysis, the overall model with all of the independent variables in the equation significantly predicted psychotherapy adherence, $R = .49$, $F(13, 123) = 3.01$, $p < .01$. At step 1, when the covariates (employment status, marital status, depression, consequences of alcohol and drug use, composite score of PTSD-re-experiencing and hyperarousal symptoms, discipline problems, percentage of PTSD service-connection, quality of life score, the presence/absence of violence/anger, whether or not a veteran received exposure therapy, and whether a veteran received time-limited treatment) were entered, the model was significant, $R^2 = .23$, $F(12, 124) = 3.12$, $p < .01$. At step 2, when avoidance/emotional numbing symptom score was added, the model remained significant, $R^2 = .24$, $F(13, 123) = 3.01$, $p < .01$. However, addition of avoidance/emotional numbing symptoms to the regression equation did not result in a significant increase in R^2 ($\Delta R^2 = .01$, $p = .21$). Further, avoidance and emotional numbing symptom score did not have a significant independent association with psychotherapy adherence, $B = -.01$, $SE B = .01$, $t = -1.26$, $p = .21$. Several covariates, in contrast, significantly and independently predicted psychotherapy adherence. The following covariates were negatively and significantly related to psychotherapy adherence: discipline problems ($B = -.20$, $SE B = .07$, $t = -2.83$, $p = .01$), PTSD service-connection ($B = .00$, $SE B = .002$, $t = -2.18$, $p = .03$), and having time-limited therapy ($B = -.23$, $SE B = .07$, $t = -3.05$, $p = .003$). Having received exposure therapy was positively and significantly associated with psychotherapy adherence ($B = .22$, $SE B = .07$, $t = 3.21$, $p = .002$).

Avoidance only symptoms. In this regression analysis, the overall model with all of the independent variables in the equation significantly predicted psychotherapy adherence, $R = .48$, $F(13, 123) = 2.91$, $p < .01$. At step 1, the entry of the covariate set yielded significant results, $R^2 = .23$, $F(12, 124) = 3.12$, $p < .01$. Addition of avoidance symptoms to the regression equation at step 2, however, did not result in a significant increase in R^2 ($\Delta R^2 = .003$) but the model significantly predicted adherence, $R^2 = .24$, $F(13, 123) = 2.89$, $p < .01$. Although avoidance symptoms were not significantly related to psychotherapy adherence, $B = .01$, $SE B = .02$, $t = 0.74$, $p = .46$, several covariates significantly and independently predicted psychotherapy adherence. The following covariates were negatively and significantly related to psychotherapy adherence in this model: discipline problems ($B = -.20$, $SE B = .07$, $t = -2.85$, $p = .01$), PTSD service-connection ($B = .00$, $SE B = .002$, $t = -2.17$, $p = .03$), endorsing drug abuse ($B = -.38$, $SE B = .19$, $t = -2.03$, $p = .03$), and having time-limited therapy ($B = -.23$, $SE B = .07$, $t = -3.10$, $p = .002$). Having received exposure therapy was positively and significantly associated with psychotherapy adherence ($B = .22$, $SE B = .07$, $t = 3.16$, $p = .002$).

Emotional numbing symptoms. In this regression analysis, the overall model with all of the independent variables in the equation significantly predicted psychotherapy adherence, $R = .52$, $F(13, 123) = 3.51$, $p < .01$ (see Table 5). When the covariates were entered at step 1, results were significant, $R^2 = .23$, $F(12, 124) = 3.12$, $p < .01$. The model remained significant when emotional numbing symptom score was added at step 2, $R^2 = .27$, $F_{inc}(1, 123) = 6.53$, $p < .05$. Addition of emotional numbing symptom score to the regression equation resulted in a significant increase in R^2 ($\Delta R^2 = .04$), and results indicated that emotional numbing symptoms were significantly and negatively related to psychotherapy adherence, $B = -.03$, $SE B = .01$, $t = -2.56$, $p = .01$. Several covariates also significantly and independently predicted psychotherapy

adherence in this analysis. The following covariates were negatively and significantly related to psychotherapy adherence: discipline problems ($B = -.21$, $SE B = .07$, $t = -2.97$, $p = .004$), PTSD service-connection ($B = .00$, $SE B = .002$, $t = -2.36$, $p = .02$), quality of life score ($B = -.01$, $SE B = .00$, $t = -2.17$, $p = .03$), drug abuse ($B = -.37$, $SE B = .18$, $t = -2.07$, $p = .04$), and having time-limited therapy ($B = -.22$, $SE B = .07$, $t = -3.02$, $p = .003$). Having received exposure therapy was positively and significantly associated with psychotherapy adherence ($B = .23$, $SE B = .07$, $t = 3.42$, $p = .001$).

Table 5: Regression table with emotional numbing symptoms predicting adherence

Variable	<i>B</i>	<i>SE B</i>	β	ΔR^2
Step 1				
PTSD severity composite	-0.01	0.01	-0.10	
Discipline problems	-0.20	0.07	-0.25**	
PTSD service connection	0.00	0.00	-0.17*	
Depression	0.00	0.01	0.05	
Quality of life	-0.01	0.00	-0.16	
Days employed	0.00	0.00	0.05	
Marital status	-0.03	0.06	-0.04	
Alcohol abuse	0.06	0.06	0.07	
Drug abuse	-0.35	0.18	-0.16	
Violence and anger	0.01	0.08	0.01	
Exposure treatment	0.22	0.07	0.33**	
Time-limited treatment	-0.23	0.07	-0.32**	
				.23
Step 2				
PTSD severity composite	0.00	0.01	-0.06	
Discipline problems	-0.21	0.07	-0.26**	
PTSD service connection	0.00	0.00	-0.19**	
Depression	0.01	0.01	0.17	
Quality of life	-0.01	0.00	-0.23*	
Days employed	0.00	0.00	0.02	
Marital status	-0.04	0.05	-0.06	
Alcohol abuse	0.06	0.06	0.08	
Drug abuse	-0.37	0.18	-0.17*	
Violence and anger	0.00	0.08	0.00	
Exposure treatment	0.23	0.07	0.34**	
Time-limited treatment	-0.22	0.07	-0.30**	
Emotional numbing symptom score	-0.03	0.01	-0.30**	
				.04

Exploratory Analyses

To facilitate comparison of the present results with findings in the PTSD literature, where adherence has typically been defined dichotomously as completion vs. drop out, I used logistic regression to examine whether PCL-M avoidance and emotional numbing symptom score was significantly related to treatment completion. I conducted three separate logistic regression analyses, one with avoidance and emotional numbing total score as the predictor variable, one with the avoidance only score as the predictor variable, and the last with the emotional numbing only score as the predictor variable. Assumptions of logistic regressions were checked and no violations were found. Due to the limited number of veterans who completed treatment (N=42; 26% of the sample), only four covariates were selected for the analyses (Tabachnick & Fidell, 2001). PTSD severity composite score was chosen to control for PTSD symptom severity. Depression was also selected as a covariate due to the frequent comorbidity of this disorder with PTSD. Lastly, exposure-based treatment was selected as a covariate because it was significantly related to completion of therapy (see Table 4). This variable was coded dichotomously, with absence of the exposure-based treatment used as the reference category. The predictor variable for each analysis (PCL-M avoidance and emotional numbing score, avoidance only score, and emotional numbing only score, respectively) was entered into the second block of the logistic regression.

Avoidance and emotional numbing score. The full model with all of the predictors (PTSD severity composite score, having received exposure-based therapy, depression score, and PCL-M avoidance and emotional numbing score) included was statistically reliable, $\chi^2(4, N=160) = 17.15, p < .05$. This indicates that the predictors as a set distinguish between veterans who

completed and those who did not complete therapy. Table 6 displays regression coefficients, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each predictor.

Table 6: Logistic regression with PCL-M avoidance/emotional numbing score predicting treatment completion/dropout

Variable	B	SE	Wald	df	p	Exp(B)
PTSD composite	-0.03	0.04	0.82	1	.37	0.97
Depression score	0.10	0.05	4.60	1	.03	1.11
Exposure-based treatment	1.40	0.40	12.09	1	.001	4.06
Avoidance and emotional numbing score	0.00	0.05	0.00	1	.99	1.00
Constant	-3.07	1.19	6.70	1	.01	0.05

Having received exposure-based treatment was the strongest predictor of therapy completion ($z = 12.09$, $p < .01$; OR = 4.06); indeed, participants who received exposure therapy were four times as likely as peers who did not receive exposure to complete treatment. Depression scores were also related to psychotherapy completion, although the relationship was weaker than that for exposure therapy ($z = 4.60$, $p < .05$; OR = 1.11). PCL-M total avoidance and emotional numbing score was not significantly related to completion of therapy ($p = .99$). Similar results were obtained when PCL-M avoidance only score and the PCL-M emotional numbing only scores were used as predictors in the logistic regression (see Tables 7 and 8 for results).

Table 7: Logistic regression with PCL-M avoidance only score predicting treatment completion/dropout

Variable	B	SE	Wald	df	p	Exp(B)
PTSD composite	-0.05	0.04	1.55	1	.21	0.96
Depression score	0.10	0.04	5.35	1	.02	1.10
Exposure-based treatment	1.37	0.41	11.39	1	.001	3.93
Avoidance and emotional numbing score	0.11	0.12	0.91	1	.34	1.12
Constant	-3.29	1.22	7.31	1	.01	0.04

*Dependent variable was PCL-M avoidance only score.

Table 8: Logistic regression with PCL-M emotional numbing score predicting treatment completion

Variable	B	SE	Wald	df	p	Exp(B)
PTSD composite	-0.04	0.04	1.26	1	.26	0.96
Depression score	0.09	0.05	3.53	1	.06	1.10
Exposure-based treatment	1.39	0.40	11.92	1	.001	4.03
Avoidance and emotional numbing score	0.06	0.10	0.42	1	.52	1.06
Constant	-3.20	1.20	7.06	1	.01	0.04

*Dependent variable was PCL-M emotional numbing only score.

CHAPTER 4.

DISCUSSION

This study was designed to examine adherence to psychotherapy in a circumscribed population of veterans. The study focused explicitly on veterans who had returned from campaigns in Iraq and Afghanistan, been diagnosed with PTSD, and had been offered treatment for their psychological symptoms in a PTSD specialty clinic. The research to date in this domain has been limited by several factors, including inconsistent and unclear definitions of adherence, a failure to treat adherence as a primary outcome variable, and a lack of theory guiding selection of variables important to adherence. The present study represents an effort to address these limitations by focusing specifically on adherence, clearly defined in two ways: the percentage of scheduled sessions attended and completion/noncompletion of therapy. Additional strengths of the study include the use of an exhaustive archival database with data collected from a real-world practice setting and the effort to base predictions on a theoretical framework.

Based on Ehlers and Clark's (2000) and Foa and Kozak's (1986) models of PTSD, in which avoidance and emotional numbing symptoms are thought to contribute to the development and maintenance of PTSD symptoms and to impede engagement in psychotherapy, I hypothesized that avoidance and emotional numbing symptoms, as measured using the PCL-M, a self-report measure of PTSD symptoms (Weathers et al, 1993), would be negatively and significantly related to psychotherapy adherence. This primary hypothesis received only partial support in the context of exploratory analyses, regardless of whether adherence was defined continuously or dichotomously. Specifically, tests of the core hypothesis that scores on a combined measure of these two symptom types would predict adherence yielded null findings; however, when the two symptom types were examined separately in exploratory analyses, there

was evidence of a significant and negative relationship between emotional numbing symptom score and treatment adherence.

Previous research has produced mixed results regarding avoidance/numbing symptoms as predictors of adherence in other veteran samples (e.g., Creamer, Elliott, Forbes, Biddle, & Hawthorne, 2006; Glynn et al., 1999; Kutter, Wolf, & McKeever, 2004). Variability in definitions of adherence across studies may contribute to inconsistencies in this literature. When Hatchett and Park (2003) operationalized dropout in four different ways for the same sample, rates varied dramatically, ranging from 17.6 to 53.1%. Thus individuals defined as completers according to one definition might not qualify according to other definitions. To address this problem, Hatchett and Park (2003) recommend defining dropout based on an objective measure assessing therapy outcome such as a measure of psychological symptoms completed at each therapy session.

Analyses yielded differing results in the present study, depending on how adherence was defined. Each definition offered some advantages; defining adherence as the percentage of scheduled appointments attended provided a way to compare participants enrolled in treatments that varied in length and modality, which is reflective of real-world practice. In contrast, defining treatment completion as a dichotomous variable permitted more direct comparison with findings from prior studies. Further, this definition had an empirical basis: dose-response research (Hansen et al., 2002) indicates that at least 11 to 13 sessions of evidence-based treatment are necessary for significant symptoms reduction, and research on PTSD in veterans has indicated that 80% adherence is necessary to reduce PTSD symptoms (Schnurr et al., 2003). Notably, this empirically-based definition provided a conservative categorization of therapy completion. Specifically, any veteran who left therapy before attending 11 sessions was considered a therapy

noncompleter. It is possible that some veterans who did not attend at least 11 sessions would be better described as completers; for example, some may have experienced significant symptoms reduction prior to completing 11 sessions and thus may have left therapy due to satisfaction with their psychological health. Notably, the only significant association between a hypothesized predictor (emotional numbing score) and adherence emerged when adherence was defined continuously; neither avoidance, nor numbing, nor combined scores predicted adherence defined dichotomously. This suggests that there may be value in using multiple definitions of adherence in a single study.

Another reason that the literature on predictors of adherence in veterans has yielded mixed findings may be that studies vary in the treatments offered and thus their findings reflect adherence patterns for only those treatments that were available. Further, most current PTSD treatment outcome research involves tightly controlled trials of clearly time-limited treatments. The present study, in contrast, included a wide range of treatments, some time-limited and others more open-ended. Such real-world approaches have received little attention in the literature on PTSD and adherence, although at least one study that Zayfert and colleagues (2005) conducted examined predictors of adherence to both individual and group-based CBT for PTSD in a sample assigned to treatments based on practical factors such as third party reimbursement, scheduling needs, and health issues. This study, however, also yielded findings that were only partially consistent with the present results; Zayfert and colleagues (2005) found that participants who dropped out had significantly higher avoidance and emotional numbing symptom scores, hyperarousal, depression, and more impaired social functioning than did participants who completed treatment.

Exploratory analyses in which PCL-M avoidance symptoms and PCL-M emotional numbing symptoms served as separate predictor variables revealed interesting results. Specifically, although no significant relationship was evident between avoidance and adherence, emotional numbing symptom score was significantly and negatively associated with psychotherapy adherence even after controlling for covariates. To date, this is the first study of psychotherapy adherence in veterans with PTSD that has examined avoidance and emotional numbing symptoms separately and the present findings suggest that the constructs of avoidance and emotional numbing may warrant individual attention in treatment outcome research.

Notably, associations between emotional numbing scores and adherence were enhanced when VAMSTA Depression scores were covaried. Given the strong bivariate correlation between VAMSTA Depression and emotional numbing symptom scores and the relatively weak bivariate correlation between emotional numbing scores and adherence (see Table 4), it is possible that depression score served as a suppressor variable in data analyses (Kline, 1998). This suggests that aspects of emotional numbing that are distinct from depression are particularly predictive of failure to adhere to treatment. Further research examining emotional numbing as a multifaceted construct and the relationships of these facets with adherence could help elucidate this finding.

There are several possible reasons that veterans with higher levels of emotional numbing symptoms, considered “cardinal signs” of PTSD (Litz, 1992), may be especially likely to discontinue treatment prematurely. Litz (1992) has proposed that trauma-induced changes in assumptions about safety, predictability, control, and interpersonal relationships can lead to an inflexible and maladaptive pattern of emotion suppression, aimed at avoiding activation of trauma-related memories. This chronic emotion suppression, in turn, may interfere with the

formation of intimate relationships. Thus, veterans with high levels of emotional numbing may have particular difficulty connecting with clinicians and other group members in treatment settings, which may lead to noncompletion of therapy. Indeed, emotional numbing has been shown to be negatively associated with perceived social support in relationships (Beck, Grant, Clapp, & Palyo, 2008) and perceived quality of relationships with family members (Ruscio, Weathers, King, & King, 2002).

Additionally, in light of evidence that emotional numbing is closely linked to chronic hyperarousal (Badura, 2003; Litz, Schlenger, Weathers, Caddell, Fairbank, & La Vange., 1997), Badura (2003) has speculated that emotional numbing, along with the related construct of alexithymia, functions as an avoidant coping strategy designed to reduce hyperarousal and re-experiencing symptoms. Individuals who report high levels of emotional numbing may therefore be especially likely to drop out of treatments that elicit arousal and re-experiencing symptoms, such as flashbacks. It is also plausible, although as yet unexplored in the literature, that this cluster of PTSD symptoms may serve as a marker of disorder severity. Consistent with this idea are case reports that more severely affected individuals find treatment more challenging or aversive than do less severely affected peers and may thus be more resistant to changing their styles of coping with PTSD symptoms and emotionally processing the traumatic event(s) as is expected in the context of psychotherapy (Jaycox & Foa, 1996). Although research has been conducted on correlates of emotional numbing with other symptoms, few studies have focused on emotional numbing and treatment outcomes or treatment adherence. Further research needs to continue to explore the potential role of emotional numbing and treatment adherence independent of the avoidance symptoms of PTSD.

Not surprisingly several covariates in the analyses were consistently and significantly related to adherence. Further discussion of several salient covariate findings will follow. These results are consistent with the behavioral model of service utilization developed by Andersen (1995) in which three types of factors (predisposing or background factors, enabling factors, and need factors) interact to predict use of medical or mental health services. Predisposing factors are those that exist before the onset of illness and include demographic characteristics, health beliefs, and expectations. Enabling factors are those that facilitate or impede service use including income, insurance, and family involvement/social support. Need factors include diagnosis, symptoms, comorbidity, and expected length of treatment. Of the covariates included in regression analyses in the present study, variables representing all three factors significantly predicted adherence to therapy. Specifically, when adherence was defined as a percentage of psychotherapy sessions attended, endorsement of childhood discipline problems, drug abuse, PTSD service-connection, and having received time-limited therapy were consistently related to psychotherapy non-adherence. In contrast, having received exposure-based therapy and, in one analysis, quality of life, were related to increased psychotherapy adherence. These results indicate that predisposing, enabling, and need factors may be important to examine concurrently when examining treatment adherence in veterans with PTSD.

One of the most consistent findings in the present study is that receipt of exposure-based therapy predicts psychotherapy adherence, regardless of how adherence is defined. This finding merits cautious interpretation, however, because veterans were not randomly assigned to therapies. Instead, they were assigned to treatment modalities based on real world practice issues such as what treatments were available, the veteran's ability to attend therapy, and the treatment team's impression of what therapy would be most beneficial. It is not possible to determine

whether treatment assignment was biased; however, it is possible that higher functioning veterans who were motivated for treatment were more likely to be assigned to exposure therapies than were less motivated or lower functioning peers.

Nonetheless, although treatment assignment was not random in this study, the finding that receiving exposure therapy is positively related to adherence is consistent with earlier research. For example, Hembree and colleagues (2003) found that, contrary to popular belief, exposure therapy does not lead to higher drop out rates than do other types of CBT. In fact, exposure therapy may facilitate treatment adherence and completion through emotional processing, cognitive restructuring, and, given its typically brief duration, a quick decrease of PTSD symptoms (Bradley et al, 2005; Foa & Kozak, 1986; Jaycox, Foa, & Morral, 1998). There is also the concern that exposure therapy is more aversive to individuals and exacerbates symptoms to a degree leading them to drop out of treatment (Pitman et al, 1991); however, research has found that even when symptoms were exacerbated, individuals had similar improvements in symptoms post-treatment to those whose symptoms were not exacerbated and drop out was not associated with symptom exacerbation (Foa et al, 2002).

Findings of an inverse relationship between drug abuse and adherence are also consistent with results of other studies, which reliably show that PTSD patients who struggle with comorbid substance abuse or dependence are at elevated risk for dropping out of treatment (Riggs, Rukstalis, Volpicelli, Kalmanson, & Foa; 2003; van Minnen, et al., 2002). More difficult to interpret, based on the existing literature, is the finding of a relationship between childhood discipline problems and psychotherapy non-adherence. Although results of one study suggest that individuals high in “reactance” and thus less likely to follow direction from others, may do better than more compliant peers in nondirective therapies (Karno, Beutler, & Harwood, 2002), a

second study found adolescent clients self-reported high rates of delinquency to be associated with drop out of treatment more often than when clients were engaging in less delinquency (Baruch, Vrouva, & Fearon, 2009).

This study had several strengths. First, it focused on a circumscribed sample of veterans who recently returned from operations in Iraq and Afghanistan. PTSD appears to be a common concern in this group of veterans, many of whom access evidence-based services soon after returning from combat. It remains unclear, however, why a sizable proportion of these veterans fail to complete treatment and the present study provides a theoretically driven examination of several potential predictive factors. Second, the present data were collected in a real-world practice setting instead of a randomized control trial of psychotherapy, which facilitates broader generalization of results.

In addition to these strengths, however, there were also several limitations. We lacked data regarding how long veterans waited prior to receiving therapy, which has been found to relate to more sporadic treatment attendance and treatment dropout (Cully et al., 2008; Rodolfa, Rapaport, & Lee, 1983). Missing data was an issue in this study, which significantly affected the sample size and may limit generalizability of these results. It was not clear whether the sizable amount of missing data reflected unwillingness among veterans to answer some questions or a lack of thorough data collection among clinicians, for whom the primary measure in this study was novel at the time when the present data were gathered. It was also difficult to clearly define adherence in this sample of veterans receiving multiple treatments, particularly because temporal parameters were only clearly defined for a few treatments. We also lack data regarding reasons that those participants who dropped out or left treatment; collection of such data in future studies may facilitate interpretation of findings.

Future research can build on the strengths of this study and address some of the limitations. Stronger and more comprehensive theoretical models of treatment adherence in PTSD are needed to capture the complexity of the factors that appear to impede or encourage treatment completion. The Andersen (1995) behavioral model of health behaviors seems to hold promise in this area. Additionally, adherence merits explicit attention in treatment outcome studies, which have historically neglected this variable. Given that generalizability of treatment outcome findings is likely compromised in the context of high non-adherence to treatment, it is critical that adherence rates be described and examined. It would also be helpful for researchers to identify the points at which individual participants drop out of treatment; however, this is difficult if treatment is not clearly time-limited and does not progress in a regular, predictable order, which historically is not the case (Schottenbauer, Glass, Arnkoff, Tendick, Hafter, & Gray, 2008). Finally, before trying to identify ways to improve retention, which several researchers have recommended (Barrett et al., 2008; Schottenbauer et al, 2008), it seems important to more carefully characterize adherence patterns, which continue to be poorly understood.

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Appendix A: Studies Reviewed in Bradley and Colleagues (2005) Meta-Analysis

Author(s)	Trauma Type	Dropout rate	Significant differences in adherence rates
Brom et al., 1989	Mixed	11%	No significant differences on SES, multiple symptom measures, and personality characteristics between dropouts and completers.
Bryant et al., 2003	Assault & MVA	23%	Dropouts had higher depression, avoidance, catastrophic thinking scores; No differences in pretreatment pathology or demographic characteristics.
Carlson et al., 1998	Veterans	26%	Did not examine.
Cloitre et al., 2002	Abuse	21%	No differences on demographic, clinical, or overall PTSD symptom differences between completers and dropouts.
Deville & Spence, 1999	Mixed	28%	Did not examine.
Deville et al., 1998	Veterans	33%	Did not examine.
Foa et al., 1999	Assault	13%	Dropouts more likely to be non-working and in PE-SIT or SIT condition. No differences on pretreatment psychopathology measures.
Foa et al., 1991	Sexual assault	18%	Dropouts were more likely to have lower incomes and were blue-collar workers. No differences between treatment groups.
Gersons, Carlier, Lamberts, & van der Kolk, 2000	Police	2%	Did not examine.
Glynn et al., 1999	Veterans	14%	Dropouts had higher negative PTSD symptoms including avoidance and numbing symptoms.
Ironson, Freud, Strauss, & Williams, 2002	Mixed	12%	Higher dropout in prolonged exposure than EMDR.
Keane et al., 1989	Veterans	0%	N/A
Krakow et al., 2001	Sexual assault	25%	Control dropouts were younger than treatment completers and used fewer antidepressants than completers. No differences on CAPS scores, sleep, or frequency of nightmares.

Lee, Gavriel, Drummond, Richards, & Greenwald, 2002	Mixed	8%	Did not examine.
Marcus, Marquis, & Sakai, 1997	Mixed	1%	Did not examine.
Marks et al., 1998	Mixed	25%	Dropouts had higher overall CAPS severity scores at baseline and had more prior treatment than completers.
Paunovic & Ost, 2001	Refugees with mixed trauma	20%	Dropouts had more positive schemas and had a higher education than completers.
Resick et al., 2002	Rape	23%	Dropouts did not differ from completers on overall PTSD or depression scores. No other comparisons were mentioned.
Rothbaum, 1997	Rape	14%	Did not examine.
Schnurr et al., 2003	Veterans	18%	Dropouts were significantly higher in the trauma focused group treatment compared to the present centered group treatment. Dropouts had lower GAF scores, were more likely to be unemployed, and have a history of substance abuse or dependence. No differences on overall CAPS severity scores.
Tarrier et al., 1999	Mixed	14%	No differences on demographic, trauma, or outcome measures (PTSD severity, CAPS, intrusions or avoidance, depression, anxiety, and general psychopathology).
Taylor et al., 2003	Mixed	25%	No differences on demographic variables, type of trauma, PTSD duration or symptoms, guilt, anger, dissociative symptoms, or depression.
Vaughan, Armstrong, Gold, & O'Connor, 1994	Mixed	0%	N/A
Wilson, Becker, & Tinker, 1995	Mixed	7%	Did not examine.
Zlotnick et al., 1997	Sexual abuse	29%	Dropouts had higher pre-treatment overall PTSD scores and Dissociative Experiences Scale scores.

Appendix B: Recent Controlled Studies of PTSD Treatment Outcomes

Author(s)	Trauma Type	Dropout rate	Significant differences in adherence rates
Cohen & Hien, 2006	Physical or sexual abuse and comorbid substance abuse disorder	20%	Did not examine.
Ehlers, Clark, Hackmann, McManus, & Fennell, 2005	Not reported	0%	N/A
Foa et al, 2005	Mixed	32%	Higher dropout rate in PE than WL. Dropouts had lower education, were younger, and unemployed. Comorbidity, additional trauma, and interpersonal violence were not related to dropout.
Kubany et al, 2004	Abuse	20%	Dropouts were less educated, younger, more depressed, had more shame, and had lower self-esteem. No racial or medication differences.
McDonagh et al, 2005	Sexual abuse	23%	Higher dropout rate from CBT than psychoeducation and waitlist treatment. Dropouts from CBT had more frequent and severe childhood sexual abuse, more severe depression and anxiety, a lower quality of life, and more distorted schemas.
Monson et al, 2006	Veterans	17%	Significant difference in dropout rates between CPT and the waitlist condition, with more veterans dropping out of CPT. Did not report or examine any other differences.
Power et al, 2002	Mixed	31%	No differences on demographic or treatment outcome measures except dropouts had higher frequency CAPS-Avoidance/emotional numbing scores.
Resick et al, 2008	Female victims of interpersonal violence	53%	Significant difference in dropout rates for race and income. No differences between CPT-C, CPT, and written accounts; also no differences on marital status, education level, number of crimes in childhood, number of crimes in adulthood, or recent number of crime events.
Rothbaum, Astin, &	Rape	17%	Did not examine. No differences between treatment groups.

Marsteller, 2005			
Schnurr et al, 2007	Female Veterans	29%	Dropouts higher in PE than PC therapy. Did not examine any other differences.
Taylor et al, 2001	Road Traffic Collision	7%	No differences on pre-treatment measures (SCID, CAPS, PSS-SR, Motor Vehicle Accident Scale, depression, pain, anger, and guilt).

Appendix C: Less Tightly Controlled Studies of PTSD Treatment Outcomes

Author(s)	Trauma Type	Dropout rate	Significant differences in adherence rates
Brady et al, 2001	PTSD and cocaine dependence	62%; no control group	Treatment dropouts had significantly higher avoidance symptoms and fewer years of education compared to treatment completers.
Chemtob et al, 1997	Vietnam Veterans	46%	No differences between treatment completers and dropouts on overall PTSD severity or severity of anger, or age and education. These researchers did not examine potential differences on depression or anxiety measures.
Cooper & Clum, 1989	Vietnam Veterans	28%	Did not find any demographic or symptomology (i.e., depression or behavioral avoidance scores) differences between treatment completers and dropouts.
Creamer et al, 2006	Veterans	3% during treatment; 32% including follow up; no control group	Dropouts were younger, unmarried, had higher levels of intrusion, arousal, alcohol use, and poorer family functioning. No differences were found in levels of avoidance, anxiety, depression, social functioning, somatic symptoms, or employment status.
Fisher et al, 1993	Childhood sexual abuse	41%	Mixed results on demographic characteristics and personality profiles. Dropouts had experienced more trauma.
Forbes et al., 2005	Veterans and peacekeepers	0% group treatment; no control group	N/A
Frueh, Turner, Beidel, & Mirabella, 1996	Veterans; no control group	27%	Did not examine.
Hyer et al, 1989	Veterans; inpatient	Did not report	Did not examine.
Kutter et al, 2004	Veterans, no control group	29%	Depression and PTSD hyperarousal predicted initial enrollment with higher scores positively associated with enrollment. No demographic characteristics or measures of psychopathology associated with continuation. Continuation was associated with higher PTSD symptom severity (each domain and overall) scores and greater frequency of anger

Monson, Rodriguez, & Warner, 2005	Veterans	Not reported	expression.
Munley et al, 1994	Vietnam Veterans	12%	Inpatient group treatment. No differences on demographic characteristics, pre-military/military adjustment measures, combat exposure, intelligence, or overall PTSD severity. A few differences on indicators of psychopathology as measured by the MMPI. Dropouts scoring higher than completers on the F scale, paranoia, and hypomania.
Pitman et al, 1996	Veterans; no control group	30%	Did not examine.
Rizzo et al, 2009	OEF/OIF active duty service members	39%	Did not examine.
Silver et al, 1995	Vietnam Veterans	Not reported	Did not examine.
Sparr et al, 1993	Veterans	20% of clients missed appointments; 3% dropout treatment	More likely to miss appointments if had a PTSD or substance abuse diagnosis. No other differences reported or examined.
Tarrier et al, 2000	Mixed	Not reported	No differences examined or reported. Best predictor of treatment outcome was inconsistent therapy attendance.
van Minnen & Hagenaars, 2002	Mixed; no control group	14%	Dropouts had higher PTSD scores than treatment improvers. No other differences examined.
van Minnen, et al, 2002	Mixed; no control group	Study 1: 24% Study 2: 32%	Study 1: No differences between dropouts and completers. Study 2: Dropouts were more likely to be male, use alcohol, and have higher levels of anxiety.
Zayfert et al, 2005	Mixed	72%; no control group	Completion of exposure therapy was negatively related to pre-treatment PTSD severity, CAPS avoidance and numbing, hyperarousal, depression, and “impaired social functioning.”

Appendix D: Analyses of differences between veterans who received therapy and those who did not

Crosstabs analysis

Count	Group			Total
	Medication only	Referred out/Never returned post-intake	Therapy	
Number of comorbid issues				
0	14	5	47	66
1	10	16	71	97
2	6	15	34	55
3	1	4	8	13
Total	31	40	160	231

ANOVA

Variable	<i>df</i>	F	<i>p</i>
Summary trauma exposure	2	10.26	.000
PCL total score	2	4.47	.01
Depression total score	2	4.86	.01
PCL re-experiencing score	2	3.49	.03

Summary of trauma exposure Tukey HSD

Group	Subset for alpha = 0.05	
	1	2
Referred out/Never returned	6.35	
Medication only		9.37
Therapy		9.84
<i>p</i>	1.00	.86

PCL total score Tukey HSD

Group	Subset for alpha = 0.05	
	1	2
Referred out/Never returned	56.58	
Medication only	61.32	61.32
Therapy		62.95
<i>p</i>	.14	.79

Depression total score Tukey HSD

Group	Subset for alpha = 0.05	
	1	2
Referred out/Never returned	21.92	
Medication only	22.55	22.55
Therapy		24.85
<i>p</i>	.87	.15

Appendix E: Depression scale

32. Over the **last 2 weeks**, how often have you been bothered by any of the following problems?

a. Little interest or pleasure in doing things

- | | |
|--|---|
| <input type="checkbox"/> 1. Not at all | <input type="checkbox"/> 3. More than half the days |
| <input type="checkbox"/> 2. Several days | <input type="checkbox"/> 4. Nearly every day |

b. Feeling down, depressed, or hopeless.

- | | |
|--|---|
| <input type="checkbox"/> 1. Not at all | <input type="checkbox"/> 3. More than half the days |
| <input type="checkbox"/> 2. Several days | <input type="checkbox"/> 4. Nearly every day |

c. Trouble falling or staying asleep, or sleeping too much.

- | | |
|--|---|
| <input type="checkbox"/> 1. Not at all | <input type="checkbox"/> 3. More than half the days |
| <input type="checkbox"/> 2. Several days | <input type="checkbox"/> 4. Nearly every day |

d. Feeling tired or having little energy.

- | | |
|--|---|
| <input type="checkbox"/> 1. Not at all | <input type="checkbox"/> 3. More than half the days |
| <input type="checkbox"/> 2. Several days | <input type="checkbox"/> 4. Nearly every day |

e. Poor appetite or overeating.

- | | |
|--|---|
| <input type="checkbox"/> 1. Not at all | <input type="checkbox"/> 3. More than half the days |
| <input type="checkbox"/> 2. Several days | <input type="checkbox"/> 4. Nearly every day |

f. Feeling bad about yourself—or that you are a failure or have let yourself or your family down.

- | | |
|--|---|
| <input type="checkbox"/> 1. Not at all | <input type="checkbox"/> 3. More than half the days |
| <input type="checkbox"/> 2. Several days | <input type="checkbox"/> 4. Nearly every day |

g. Trouble concentrating on things, such as reading the newspaper or watching television.

- | | |
|--|---|
| <input type="checkbox"/> 1. Not at all | <input type="checkbox"/> 3. More than half the days |
| <input type="checkbox"/> 2. Several days | <input type="checkbox"/> 4. Nearly every day |

h. Moving or speaking so slowly that other people could have noticed? Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual.

- | | |
|--|---|
| <input type="checkbox"/> 1. Not at all | <input type="checkbox"/> 3. More than half the days |
| <input type="checkbox"/> 2. Several days | <input type="checkbox"/> 4. Nearly every day |

i. Thoughts that you would be better off dead or hurting yourself in some way.

- | | |
|--|---|
| <input type="checkbox"/> 1. Not at all | <input type="checkbox"/> 3. More than half the days |
| <input type="checkbox"/> 2. Several days | <input type="checkbox"/> 4. Nearly every day |

Appendix F: Alcohol and Drug use scale

43. During the **past 4 months**, about how often has this happened to you?*Check one answer for each item.*

	Never	Once or a few Times	Once or twice a week	Daily or almost daily
	0	1	2	3
a. I have been unhappy because of my drinking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. I have taken foolish risks when I have been drinking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. My physical health has been harmed by my drinking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. My drinking has gotten in the way of my growth as a person.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. My drinking has damaged my social life, popularity, or reputation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. I have spent too much or lost a lot of money because of my drinking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. I have had an automobile accident or injured myself while drinking or while intoxicated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

47. During the **past 4 months**, about how often has this happened to you?*Check one answer for each item.*

	Never	Once or a few Times	Once or twice a week	Daily or almost daily
	0	1	2	3
a. Because of my drug use, I have not eaten properly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. I have failed to do what is expected of me because of my drug use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. I have felt guilty or ashamed because of my drug use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. When using drugs, I have done impulsive things that I regretted later.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. I have had money problems because of my drug use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. My family has been hurt by my drug use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. A friendship or close relationship has been damaged by my drug use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix G: Quality of Life scale

83. How do you feel about:

b. The living arrangements where you live?

- | | | |
|---|--|---------------------------------------|
| <input type="checkbox"/> 1. Terrible | <input type="checkbox"/> 4. Mixed | <input type="checkbox"/> 7. Delighted |
| <input type="checkbox"/> 2. Unhappy | <input type="checkbox"/> 5. Mostly satisfied | |
| <input type="checkbox"/> 3. Mostly dissatisfied | <input type="checkbox"/> 6. Pleased | |

c. The way you spend your free time?

- | | | |
|---|--|---------------------------------------|
| <input type="checkbox"/> 1. Terrible | <input type="checkbox"/> 4. Mixed | <input type="checkbox"/> 7. Delighted |
| <input type="checkbox"/> 2. Unhappy | <input type="checkbox"/> 5. Mostly satisfied | |
| <input type="checkbox"/> 3. Mostly dissatisfied | <input type="checkbox"/> 6. Pleased | |

d. The amount of time you spend with other people?

- | | | |
|---|--|---------------------------------------|
| <input type="checkbox"/> 1. Terrible | <input type="checkbox"/> 4. Mixed | <input type="checkbox"/> 7. Delighted |
| <input type="checkbox"/> 2. Unhappy | <input type="checkbox"/> 5. Mostly satisfied | |
| <input type="checkbox"/> 3. Mostly dissatisfied | <input type="checkbox"/> 6. Pleased | |

e. The amount of fun you have?

- | | | |
|---|--|---------------------------------------|
| <input type="checkbox"/> 1. Terrible | <input type="checkbox"/> 4. Mixed | <input type="checkbox"/> 7. Delighted |
| <input type="checkbox"/> 2. Unhappy | <input type="checkbox"/> 5. Mostly satisfied | |
| <input type="checkbox"/> 3. Mostly dissatisfied | <input type="checkbox"/> 6. Pleased | |

f. The way things are in general between you and your family?

- | | | |
|---|--|---------------------------------------|
| <input type="checkbox"/> 1. Terrible | <input type="checkbox"/> 4. Mixed | <input type="checkbox"/> 7. Delighted |
| <input type="checkbox"/> 2. Unhappy | <input type="checkbox"/> 5. Mostly satisfied | |
| <input type="checkbox"/> 3. Mostly dissatisfied | <input type="checkbox"/> 6. Pleased | |

g. The amount of friendship in your life?

- | | | |
|---|--|---------------------------------------|
| <input type="checkbox"/> 1. Terrible | <input type="checkbox"/> 4. Mixed | <input type="checkbox"/> 7. Delighted |
| <input type="checkbox"/> 2. Unhappy | <input type="checkbox"/> 5. Mostly satisfied | |
| <input type="checkbox"/> 3. Mostly dissatisfied | <input type="checkbox"/> 6. Pleased | |

h. How comfortable and well-off you are financially?

- | | | |
|---|--|---------------------------------------|
| <input type="checkbox"/> 1. Terrible | <input type="checkbox"/> 4. Mixed | <input type="checkbox"/> 7. Delighted |
| <input type="checkbox"/> 2. Unhappy | <input type="checkbox"/> 5. Mostly satisfied | |
| <input type="checkbox"/> 3. Mostly dissatisfied | <input type="checkbox"/> 6. Pleased | |

i. Your physical condition?

- | | | |
|---|--|---------------------------------------|
| <input type="checkbox"/> 1. Terrible | <input type="checkbox"/> 4. Mixed | <input type="checkbox"/> 7. Delighted |
| <input type="checkbox"/> 2. Unhappy | <input type="checkbox"/> 5. Mostly satisfied | |
| <input type="checkbox"/> 3. Mostly dissatisfied | <input type="checkbox"/> 6. Pleased | |

j. Your emotional well-being?

- | | | |
|--------------------------------------|--|---------------------------------------|
| <input type="checkbox"/> 1. Terrible | <input type="checkbox"/> 4. Mixed | <input type="checkbox"/> 7. Delighted |
| <input type="checkbox"/> 2. Unhappy | <input type="checkbox"/> 5. Mostly satisfied | |

3. Mostly dissatisfied

6. Pleased

Appendix H: Violence & Anger scale

79. Did you do any of these **during the last 4 months?** (Check one answer for each item.)

- a. Destroyed property?
- b. Threatened someone with physical violence (without a weapon)?
- c. Had a physical fight with someone?
- d. Threatened someone with a weapon?
- e. Used a weapon against someone?
- f. Had thoughts of hurting someone?
- g. Were verbally abusive?
- h. Broke off contact with someone out of anger or fear of losing control?

Appendix I: PTSD Checklist–Military Version (PCL-M)

30. **INSTRUCTIONS:** Below is a list of problems and complaints that veterans sometimes have in response to stressful military experiences. Please read each one carefully, then **CHECK one** of the boxes to the right to indicate how much you have been bothered by that problem **IN THE PAST MONTH**.

	Not At all	A little bit	Moderately	Quite a bit	Extremely
	1	2	3	4	5
a. Repeated, disturbing memories, thoughts, or images of a stressful military experience?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Repeated, disturbing dreams of a stressful military experience?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Suddenly acting or feeling as if a stressful military experience were happening again (as if you were reliving it)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Feeling very upset when something reminded you of a stressful military experience?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Having physical reactions (e.g., heart pounding, trouble breathing, sweating) when something reminded you of a stressful military experience?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Avoiding thinking about or talking about a stressful military experience or avoiding having feelings related to it?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Avoiding activities or situations because they reminded you of a stressful military experience?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Trouble remembering important parts of a stressful military experience?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Loss of interest in activities that you used to enjoy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Feeling distant or cut off from other people?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Feeling emotionally numb or being unable to have loving feelings for those close to you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. Feeling as if your future somehow will be cut short?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m. Trouble falling or staying asleep?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n. Feeling irritable or having angry outbursts?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
o. Having difficulty concentrating?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

p. Being "superalert" or watchful or on guard?

q. Feeling jumpy or easily startled?

*Avoidance/emotional numbing symptoms are in bold face type.

Weathers, F.W., Huska, J.A., Keane, T.M. *PCL-M for DSM-IV*. Boston: National Center for PTSD – Behavioral Science Division, 1991. This is a Government document in the public domain.