



# Psychotherapy for military-related posttraumatic stress disorder: Review of the evidence <sup>☆</sup>



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## HIGHLIGHTS

- ▶ We review outcome studies of military-related PTSD.
- ▶ We describe real-world use of evidence-based PTSD therapies in VA.
- ▶ We conclude with directions for future research.

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## ABSTRACT

Approximately 20% of the two million troops who have deployed to Iraq and Afghanistan may require treatment for posttraumatic stress disorder (PTSD). We review treatment outcome studies on individual outpatient therapy for military-related PTSD, and consider the extent to which veterans initiate and complete available PTSD treatments. We conclude with considerations for future research.

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## Contents

1.	Extant PTSD treatments for service members and veterans . . . . .	46
2.	Treatment outcome studies of military-related PTSD . . . . .	46
2.1.	Intervention studies in veterans . . . . .	46
2.1.1.	Prolonged exposure . . . . .	46
2.1.2.	Cognitive processing therapy . . . . .	48
2.1.3.	Behavioral activation for PTSD . . . . .	48
2.1.4.	VA program evaluation efforts . . . . .	48
2.2.	Intervention studies among active duty military personnel . . . . .	48
2.3.	Summary of findings from outcome studies . . . . .	49
3.	Military-related PTSD treatment implementation . . . . .	50
3.1.	Summary of treatment implementation findings . . . . .	50
4.	Directions for future research . . . . .	51
4.1.	Need for prospective observational research . . . . .	51
4.2.	Need for comparative effectiveness research . . . . .	51

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4.3. Need for treatment process research . . . . .	51
4.4. Need for improvements in outcome reporting . . . . .	51
5. Conclusion . . . . .	51
References . . . . .	52

Deployment to war can be a profoundly stressful and life altering event that leads to lasting mental health problems in a substantial minority of service members (Rintamaki, Weaver, Elbaum, Klama, & Miskevics, 2009; Schnurr, Lunney, Sengupta, & Waelde, 2003). Posttraumatic stress disorder (PTSD) is one of the most common post-deployment mental disorders, and is associated with a host of comorbid mental and physical health problems, functional incapacities (e.g., relationship and occupational problems), and reduced quality of life (e.g., Erbes, Meis, Polusny, & Compton, 2011; Magruder et al., 2004; Shea, Vujanovic, Mansfield, Sevin, & Liu, 2010). Between 5 and 20% of Operations Iraqi Freedom (OIF) and Enduring Freedom (OEF) veterans meet criteria for PTSD (see Ramchand et al., 2010), equating to hundreds of thousands of individuals potentially in need of formal mental health care. If left untreated, military-related PTSD has been shown to follow a chronic course, resulting in lifelong dysfunction (e.g., Prigerson, Maciejewski, & Rosenheck, 2002). The mental health interventions available to treat service members and veterans with PTSD have evolved significantly in recent decades and, since the start of the current wars, the clinical landscape of the U.S. Departments of Defense (DoD) and Veterans Affairs (VA) have undergone considerable transformation in an attempt to make evidence-based care available to all patients with PTSD (see Karlin et al., 2010).

Although there are a variety of disciplines involved in the mental health care of veterans and service members, in this paper, we review psychotherapy for military-related PTSD. We first review clinical outcome studies that target PTSD in veterans and active duty personnel, then review the real-world clinical implementation of these treatments within the DoD and VA, and end with considerations for future research. The scope of this paper is limited to individual outpatient psychotherapy, although couples (e.g., Fredman, Monson, & Adair, 2011), family (e.g., Glynn et al., 1999), group (e.g., Norman, Wilkins, Tapert, Lang, & Najavits, 2010), inpatient/residential (e.g., Alvarez et al., 2011), and web-based (e.g., Litz, Engel, Bryant, & Papa, 2007) psychotherapies for military-related PTSD are also available and represent important additional sources of patient care.

## 1. Extant PTSD treatments for service members and veterans

Treatment of military-related PTSD in the U.S. falls chiefly under the purview of the DoD (caring for active duty *service members*) and VA (treating *veterans* who have reentered civilian life as well as, to a lesser extent, some active duty service members). The recommended best practice for PTSD in VA and the DoD is cognitive-behavioral therapy (CBT). Specifically, the Joint VA/DoD Evidence-Based Practice Workgroup (Department of Veterans Affairs and Department of Defense, 2004) recommends four front-line therapies for treating veterans and service members with PTSD: exposure-based therapy (particularly prolonged exposure; PE); cognitive therapy (particularly cognitive processing therapy; CPT); stress inoculation training (SIT); and eye-movement desensitization and reprocessing (EMDR) therapy. In 2008, VA mandated that PE and CPT be made available to all veterans with PTSD (U.S. Department of Veterans Affairs, 2008) and, following extensive dissemination efforts, by 2010 all VA medical centers reported offering either PE or CPT, with 98% offering both (Ruzek, Karlin, & Zeiss, 2012).

Briefly, PE involves assisting patients to re-live and confront avoided trauma-related stimuli through repeated and prolonged emotional engagement (in imagination and *in vivo*) to extinguish conditioned fear responses and organize traumatic memories (see Foa, Rothbaum,

& Hembree, 2007). CPT targets putatively maladaptive ways of thinking about trauma that are posited to maintain PTSD symptoms and includes an optional written exposure element (see Resick & Schnicke, 1996). Both therapies are manualized and time-limited; PE typically consists of 10–12 sessions of 90 min each and CPT consists of 12 one-hour sessions. Homework activities occurring outside of session form a substantial part of both treatments. SIT focuses on expanding patients' coping skills and emphasizes applied in-vivo relaxation strategies but also includes cognitive techniques and, in some cases, exposure strategies (Meichenbaum & Novaco, 1985). To our knowledge, no study has examined SIT in the *treatment* of military-related PTSD, nor is this intervention used frequently in VA or DoD, and it is thus not discussed below. EMDR is a multi-component treatment that primarily involves recalling the trauma while simultaneously focusing on an external stimulus, typically the therapist's finger being moved back and forth in front of the patient (Shapiro, 1989). We do not include EMDR in this review since its use in the treatment of military-related PTSD has recently been reviewed in detail elsewhere (see Albright & Thyer, 2010). Notably, the authors concluded that there is sparse and equivocal support for its use in the treatment of military-related PTSD.

We next review two related bodies of research: outcome studies of PTSD treatment in veterans and active duty military personnel (i.e., the current state of the science), and studies examining the real-world implementation of these interventions within VA (i.e., the current state of practice). Table 1 provides a summary of extant outcome studies.

## 2. Treatment outcome studies of military-related PTSD

Although the U.S. has been engaged in a war at every generation over the past century, few treatment outcome studies of military-related PTSD exist. PE and CPT were designated as treatments of choice within the DoD and VA based on numerous studies demonstrating their efficacy in improving PTSD among civilians (for a review see Bisson et al., 2007; Powers, Halpern, Ferenschak, Gillihan, & Foa, 2010). Both PE and CPT were originally developed for civilian female sexual assault survivors and, consequently, most data that attest to PE and CPT's efficacy comes from trials with female sexual assault survivors.

### 2.1. Intervention studies in veterans

#### 2.1.1. Prolonged exposure

Four RCTs have been conducted on PE in veterans. The first was a large multi-site trial (N = 284) comparing PE to present-centered therapy in female veterans (N = 277) and active duty personnel (N = 7; Schnurr et al., 2007 – for an earlier trial of trauma-focused group therapy among male Vietnam veterans, see Schnurr et al., 2003). The majority of patients (68%) endorsed sexual assault as their index trauma, meaning that the study more closely approximated civilian trials of PE that have been shown to be efficacious; it is unclear whether the trial can be used to support the use of PE for combat trauma (only 6% endorsed war exposure as their index event). Both treatment conditions effectively reduced PTSD symptoms from pre- to post-treatment, and at post-treatment those receiving PE were more likely to no longer meet criteria for PTSD (41% compared to 28% in the control condition). Of note, this study employed more of an effectiveness framework than is typical for RCTs, for example, many of the study therapists had little prior CBT experience and inclusion criteria were relatively broad.

**Table 1**  
PTSD treatment outcome studies in veterans and active duty military personnel.

Study	Participants	Study type	Intervention conditions	Sessions	Follow-up (months)	Treatment drop-out	Within subjects pre-post effect sizes	% meeting criteria for PTSD at post-treatment
<i>Veterans</i>								
Beidel et al. (2011)	35 male combat veterans	RCT	1. Trauma management therapy (TMT) 2. Exposure only	1. 15 sessions of <i>in vivo</i> and imaginal exposure therapy and 14 sessions of group social skills training 2. 15 sessions of <i>in vivo</i> and imaginal exposure therapy and 14 sessions of TAU group therapy	-	14% overall	1. $d = 0.74$ 2. $d = 1.59$	NR
Chard et al. (2010)	101 OIF/OEF and Vietnam veterans	Open trial	CPT	12–32 weekly 60-minute sessions	-	35% of OIF/OEF veterans, 26% of Vietnam veterans	$d = 2.84$ for OIF/OEF $d = 1.17$ for Vietnam veterans	41% of OIF/OEF veterans and 60% of Vietnam veterans
Gros et al. (2011)	89 mixed-era veterans	Open trial	1. In-person PE 2. PE delivered via telehealth	12 weekly, 60–90 minute sessions	-	1. Not assessed 2. 39%	1. $d = 3.00$ (completers) 2. $d = 1.19$ (completers) $g = .58$	NR
Jakupcak et al. (2006)	11 veterans	Open trial	BA	16 weekly sessions	-	19%		NR
Jakupcak et al. (2010)	8 recent veterans	Open trial	BA	5–8 weekly sessions delivered in primary care	3	12%	$d = 1.44$	NR
Monson et al. (2006)	60 mixed-era veterans	RCT	1. CPT 2. Waitlist	12 twice-weekly sessions	1	1. 20% 2. 13%	$g = 1.12^a$ (ITT) $g = 1.14$ (completers)	1. 60% (ITT) 2. 97% (ITT)
Nacasch et al. (2010)	30 male Israeli veterans or survivors of terrorism	RCT	1. PE 2. TAU	1. 9–15 weekly 90–120 minute sessions 2. Weekly 60-minute psychodynamically-oriented therapy	12+	1. 13% 2. 13%	$d = .06^a$ (ITT)	NR
Rauch et al. (2009)	10 mixed-era veterans	Open trial	PE	7–21 80-minute sessions	-	-	$d = 2.19$	50%
Schnurr et al. (2007)	284 female veterans and active duty personnel	RCT	1. PE 2. Present-centered therapy	1. 10 weekly 90-minute sessions 2. 10 weekly 90-minute sessions	3, 6	1. 38% 2. 21%	1. $d = .80$ (ITT) 2. $d = .62$ (ITT)	1. 59% (ITT), 47% (completers) 2. 72% (ITT), 70% (completers)
Strachan et al. (2012)	40 OIF/OEF veterans	RCT	1. In-person BA and therapeutic exposure 2. Telehealth-delivered BA and therapeutic exposure	1. 8 in-person 90-minute sessions of imaginal and <i>in vivo</i> exposure and BA 2. 8 home-based telehealth-delivered 90-minute sessions of imaginal and <i>in vivo</i> exposure and BA	-	22% overall	1. $d = .66$ 2. $d = .98$	NR
Thorp et al. (2012)	11 veterans aged 55+	Open trial	1. PE 2. TAU	1. 12 twice-weekly 90-minute sessions 2. One medication or supportive therapy appointment	-	27%	1. $d = 1.7$ (completers) 2. $d = 0.5$ (completers)	1. 13% 2. 85%
Tuerk et al. (2010)	47 mixed-era veterans	Open trial	1. In-person PE 2. PE delivered via telehealth	Weekly, 90-minute sessions	-	1. 17% 2. 25%	1. $d = 4.25$ 2. $d = 2.88$	NR
Tuerk et al. (2011)	65 OIF/OEF veterans	Open trial	PE	Weekly 90-minute sessions	-	34%	$d = 1.19$ (ITT), $d = 2.07$ (completers)	51% (ITT), 26% (completers)
Wolf et al. (2012)	10 OIF/OEF veterans	Open trial	PE	8–18 120-minute sessions	-	-	$d = 3.64$	10%
Yoder et al. (2012)	1. 61 OIF/OEF/OND veterans 2. 34 Vietnam veterans 3. 17 Gulf War veterans	Open trial	PE	Weekly 90-minute sessions	-	1. 26% 2. 3% 3. 12%	1. $d = 3.05$ 2. $d = 2.07$ 3. $d = 1.81$	NR
<i>Active duty military personnel</i>								
Cigrang et al. (2011)	15 OIF/OEF personnel	Open trial	PE	4–6 30-minute sessions	1	33%	$g = 1.1$ at follow-up	50% (completers) at follow-up
Corso et al. (2009)	19 Air Force personnel	Open trial	1. TAU 2. Writing about combat 3. Impact statement	2–5 30-minute sessions delivered in primary care	-	-	1. $d = 0.10$ 2. $d = 1.04$ 3. $d = 1.41$	NR
Engel et al. (2008)	4159 soldiers	Effectiveness trial	RESPECT-MIL	Collaborative care model within primary care	3	-	-	NR
Gray et al. (2012)	44 in-garrison Marines	Open trial	AD	6 90-minute weekly sessions	-	25%	$d = 0.79$	NR

Note. RCT = Randomized Controlled Trial; PE = Prolonged Exposure; CPT = Cognitive Processing Therapy; BA = Behavioral Activation; AD = Adaptive Disclosure; TAU = Treatment as Usual; ITT = Intent to Treat, NR = Not reported.  
<sup>a</sup> Only between-group effect size was reported.

In the first RCT of PE in male veterans, [Nacasch et al. \(2010\)](#) compared PE to psychodynamically-based treatment-as-usual (TAU) in a small sample of Israeli patients ( $N=30$ ) with chronic PTSD related to either combat (two thirds of the sample) or terrorism. The psychodynamic TAU therapy focused on daily stressors, childhood issues, and object relations themes, and did not include trauma-processing. PE, but not treatment-as-usual, led to significant PTSD symptom reduction from pre-treatment to 12-month follow-up. Between-group effect sizes for PTSD symptoms at post-treatment and 12-month follow-up were large ( $d=1.80$  and  $d=2.10$ , respectively).

The remaining two RCTs tested modifications of standard PE applications. Beidel and colleagues examined combining individual PE with group therapy targeting comorbid social behavior problems such as anger and communication skills deficits (Trauma Management Therapy, TMT; [Beidel, Frueh, Uhde, Wong, & Mentrikoski, 2011](#)). TMT was compared to an exposure-only control condition in a small sample of Vietnam veterans ( $N=35$ ). The exposure-only control condition consisted of imaginal and *in vivo* exposures, plus a treatment-as-usual group condition. Both groups showed significant decreases in PTSD symptoms and improved social and emotional functioning from pre- to post-treatment, and only those in the TMT group reported increased weekly social activities and greater time spent on weekly social activities. There were no significant changes in reported quality of life or global ratings of anger for either group. [Strachan, Gros, Ruggiero, Lejuez, and Acierno \(2012\)](#) provide preliminary data from an ongoing RCT comparing in-person and home-based telehealth delivery of an eight session intervention combining behavioral activation and trauma exposure therapy (including *in vivo* and imaginal exposures). Participants were a small sample of OIF/OEF veterans with PTSD ( $N=40$ ). Self-reported PTSD ( $d=.84$ ) and depression ( $d=.52$ ) symptoms decreased from pre- to post-treatment and outcomes were comparable across the two conditions.

There have been no randomized controlled effectiveness trials of PE (or any other therapy) targeting military veterans. However, several open outcome trials in clinical settings have been conducted that provide some evidence for effectiveness and in particular the external validity of various approaches. [Rauch et al. \(2009\)](#) evaluated PE with a small group of OIF/OEF veterans ( $N=10$ ), and found large pre-post treatment effect sizes (50% no longer met criteria for PTSD post-treatment). Thorp and colleagues treated a small number of older veterans with PE for six weeks and compared the results with a group who got TAU ([Thorp, Stein, Jeste, Patterson, & Wetherell, 2012](#)). Those receiving PE on average showed a clinical significant decline in symptom severity from the extreme to the moderate range, while patients in the TAU sample did not demonstrate a clinically significant symptom decrease. In another small N study, OIF/OEF veterans ( $N=10$ ) with mild to moderate traumatic brain injury received 8–18 sessions of PE expanded to 120 min ([Wolf, Strom, Kehle, & Eftekhari, 2012](#)). There were large reductions in PTSD severity from pre to post-treatment, and 90% of patients experienced clinically significant change and no longer met criteria for PTSD at post-treatment.

Four additional studies, all of which were conducted at the same VA PTSD clinic, also support PE's effectiveness among war veterans. First, [Tuerk et al. \(2011\)](#) showed large reductions in self-reported PTSD symptoms from pre- to post-treatment in OIF/OEF veterans ( $N=65$ ). Second, to examine possible differences in effectiveness across military cohorts, [Yoder et al. \(2012\)](#) compared PE outcomes for new veterans, Persian Gulf war veterans, and Vietnam veterans ( $N=112$ ). Effect sizes were large for all three groups, and largest in new veterans. Third, in a small pilot study, 12 patients who received PE via videoconferencing were compared with patients who received in-person PE ([Tuerk, Yoder, Ruggiero, Gros, & Acierno, 2010](#)). Effect sizes were large in both groups. A subsequent study compared PE delivered in person and via telehealth in a larger sample of veterans ( $N=89$ ; [Gros, Yoder, Tuerk, Lozano, & Acierno, 2011](#)). Both groups reported large reductions in PTSD symptoms; patients receiving in-

person treatment saw greater improvements (differential effect size  $d=1.11$ ).

### 2.1.2. Cognitive processing therapy

Compared to PE, there are relatively fewer clinical trials of CPT among veterans (one RCT and uncontrolled effectiveness study of individual outpatient CPT). The RCT compared (mostly male, Vietnam) veterans ( $N=60$ ) with chronic military-related PTSD receiving CPT to waitlist controls ([Monson et al., 2006](#)). The between-group effect size was  $d=1.12$  at post-treatment. At post-treatment, 40% of patients receiving CPT no longer met criteria for PTSD, compared to 3% of the wait-list condition. The open effectiveness trial compared CPT outcomes for Vietnam and OIF/OEF veterans ( $N=101$ ; [Chard, Schumm, Owens, & Cottingham, 2010](#)). At post-treatment, 41% of the OIF/OEF veterans and 60% of the Vietnam veterans retained a PTSD diagnosis. Mean pre-post treatment Clinician Administered PTSD Scale (CAPS; [Blake et al., 1990](#)) scores improved 40 points for the OIF/OEF group and 24 points for the Vietnam group; a positive treatment response has been defined as a ten point or greater drop in CAPS scores (e.g., [Schnurr et al., 2007](#)).

### 2.1.3. Behavioral activation for PTSD

Behavioral activation (BA) is a cognitive-behavioral intervention typically used for treating depression that promotes engagement in reinforcing and personally meaningful activities, and emphasizes approach rather than avoidance behaviors. The intervention does not involve confronting trauma memories or trauma-related stimuli *in vivo*, and may thus be appealing for patients unable or unwilling to do trauma-focused work. Two small uncontrolled studies have examined BA to treat military-related PTSD. In a pilot study, veterans (mostly Vietnam era) presenting to a VA PTSD clinic ( $N=11$ ) enrolled in 16 weekly sessions of BA ([Jakupcak et al., 2006](#)). Of the nine veterans who completed treatment, five demonstrated reliable symptom reduction on the CAPS; of these, four continued to meet diagnostic criteria for PTSD at post-treatment. The overall pre- to post-treatment effect size was modest. Also, BA did not significantly improve depression symptoms and half of the patients completing the treatment reported worsening depression. A subsequent study examined BA delivered in primary-care to eight veterans ([Jakupcak, Wagner, Paulson, Varra, & McFall, 2010](#)); four completed all eight sessions; one patient ended treatment prematurely due to symptom remission. The effect size for PTSD symptom reduction from pre-treatment to 3-month follow-up were large.

### 2.1.4. VA program evaluation efforts

The only available program evaluation data from veterans come from patient surveys collected as part of a recent VA-sponsored Capstone report. The report, led by RAND, summarizes a large program evaluation ( $N=836,699$ ) of VA mental health services for veterans with PTSD, bipolar disorder, major depression, or schizophrenia ([Watkins et al., 2011](#)). Data were collected from 2004 to 2008 and drawn from diverse sources, namely VA facility survey data, administrative data, medical record data, and veteran survey data. Although veterans had generally favorable impressions of VA mental health services (75% reported being helped 'a lot' or 'somewhat' by their mental health treatment in the previous year), only 32% reported improvement in mental health ([Watkins et al., 2011](#)).

## 2.2. Intervention studies among active duty military personnel

Clinical trials of PTSD therapies targeting veterans do not generalize well to active duty service members ([Hoge, 2011](#)). Military personnel are younger, face unique sets of challenges and adversities, are at risk for additional exposures to high magnitude stressors, and seeking treatment is more stigmatizing and considerably less private. To date, there have been no published RCTs or effectiveness trials of



PTSD treatments among active duty personnel, although there are small studies testing novel interventions and modifications of established interventions. Not surprisingly, these interventions have tended to be briefer than those with veterans given the high operational tempo and time demands of active duty personnel and, because of stigma and problems with accessing specialty care, many studies have emphasized delivering PTSD treatment in primary care.

First, Cigrang et al. (2011) delivered four to six 30-minute sessions of PE to active duty OIF/OEF personnel in primary care ( $N=15$ ). Patients showed improvements in PTSD ( $g=1.1$ ) and depressive symptoms ( $g=0.8$ ), with half no longer meeting criteria for PTSD at one-month follow up. In a similar study in primary care, active duty service members ( $N=19$ ) received three brief PTSD treatments, each intervention consisting of two to four 30-minute sessions: treatment as usual (consisting of problem-focused, behavioral approaches), writing about a stressful deployment event, and writing an impact statement about the meaning and impact of the event on their lives (Corso et al., 2009). Of these, only the impact statement resulted in statistically significant decreases in PTSD symptoms. Last, Engel et al. (2008) examined the feasibility of a collaborative care model (RESPECT-Mil) in improving system-wide PTSD and depression treatment in primary care. The model consisted of universal screening, brief standardized assessment for positive screens, and the use of a nurse “care facilitator” to ensure follow-up, continuity of care, and appropriate interfacing with specialty mental health care (i.e., psychology and psychiatry). Of the approximately 10% of the 4159 active duty personnel who screened positive for PTSD and/or depression, 20% were not in treatment and were given RESPECT-Mil. Almost 75% of participating patients completed an 8-week follow up, of which 54% endorsed a clinically significant improvement in symptoms, liberally defined as a five point or greater decrease on the PTSD Checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993), a widely-used self-report measure of PTSD symptomatology. At 12-week follow-up, 70% of patients still participating reported a clinically significant reduction in symptoms ( $N=32$ ) but “very few” patients had achieved symptom remission.

The only study of military personnel not involving primary care tested the efficacy of Adaptive Disclosure (AD), a six session CBT designed specifically for service members with military-related PTSD. AD builds on established techniques such as imaginal exposure and cognitive restructuring, but also includes strategies, such as empty chair techniques, to address traumatic loss and moral conflicts (e.g., due to killing), two issues that have historically received less attention in established PTSD treatments (Steenkamp et al., 2011). In a recent open trial, Marines ( $N=44$ ) received six 90-minute weekly sessions of AD while in garrison (Gray et al., 2012). The intervention promoted reductions in self-reported PTSD and depression symptoms from pre- to post-treatment.

### 2.3. Summary of findings from outcome studies

Two broad conclusions can be drawn from the extant outcome studies. First, RCTs demonstrate that trauma-focused therapies for military-related PTSD are superior to no treatment and to supportive or psychodynamic therapies, substantiating their use over these interventions (or no intervention). However, it is noteworthy that the between-group effect sizes in these RCTs were not large, which is surprising given that two active therapies have yet to be compared. In Monson et al.'s (2006) trial comparing CPT to waitlist controls, at one-month follow-up, the between-group effect sizes was  $d=.67$ . In Schnurr et al.'s (2007) trial, between-group effect sizes at post-treatment, 3-month follow-up, and 6-month follow-up were small ( $d=.29$ ;  $d=.24$ , and  $d=.15$ , respectively), indicating only a slight advantage for PE over the non-specific treatment effects of supportive counseling. By 3- and 6-month follow-up, there were no group differences in terms of loss of diagnosis. An exception is the trial by Nacasch et al. (2010), which found large between-group effect sizes at post-

treatment and follow-up ( $d=1.80$  and  $d=2.10$ , respectively) although, again, the comparison condition (psychodynamic therapy) does not have empirical support as a treatment for PTSD and the sample size was small ( $N=30$ ). A recent meta-analysis of 24 studies of PTSD treatment with VA patients ( $N=1742$ ; consisting of evidence-based and non-evidence-based treatments, as well as inpatient and outpatient group and individual therapy) showed medium between-group effect sizes ( $d=0.48$ ) for active treatments vs controls, suggesting that patients in active therapies fared better than 66% in control conditions (Goodson et al., 2011). Unfortunately however, all effect sizes were calculated based on completers only, which substantially inflates treatment effects.

Second, in all of the RCTs, PTSD symptoms improved as a result of trauma-focused treatment, again substantiating their use as front-line interventions. However, the outcomes from RCTs suggest that only a minority of veterans can be expected to lose their PTSD diagnosis as a result of getting CPT or PE, arguably administered in an ideal fashion, namely manualized and standardized care by highly trained and supervised experts. In the case of CPT, the majority of patients (60%) in Monson et al.'s (2006) retained their PTSD diagnosis at post-treatment, and 70% met criteria for PTSD at one-month follow-up. Likewise, in the case of PE, 59% of patients in Schnurr et al.'s trial (2007) continued to meet criteria at post-treatment.

Because even minor symptom improvement can lead to a loss of a PTSD diagnosis, no longer meeting diagnostic criteria does not imply that the individual is symptom-free or functioning better. Indeed, a growing number of studies have shown that subclinical PTSD can result in levels of impairment and distress comparable to full PTSD (e.g., Marshall et al., 2001; Stein, Walker, Hazen, & Forde, 1997). In the RCTs conducted to date, with one exception, mean symptom scores at end of treatment or at latest follow-up (when available) indicated that PTSD symptoms were still substantial. In all three trials using the CAPS as primary outcome measure (Beidel et al., 2011; Monson et al., 2006; Schnurr et al., 2007), the mean score at the end of the trial was above the diagnostic cutoff for PTSD, typically defined as a total score of 45 (e.g., Schnurr et al., 2007; Weathers, Ruscio, & Keane, 1999). Mean PCL score at the end of treatment in the Strachan et al. trial (2012) was 44 (across both conditions); optimal PCL cut-off scores in military/veteran populations have ranged from 30 (Bliese et al., 2008) to 50 (Weathers et al., 1993; see McDonald & Calhoun, 2010). The one notable exception was the trial by Nacasch et al. (2010), which found relatively low symptom levels for the PE group on the PTSD Symptoms Scale-Interview Version (PSS-I; Foa, Riggs, Dancu, & Rothbaum, 1993) at post-treatment and follow-up. It is also of note that only three of the RCTs provided follow-up data (Monson et al., 2006; Nacasch et al., 2010; Schnurr et al., 2007). In these studies, patients' mean PTSD symptom score remained largely stable from post-treatment to follow-up. The longest RCT follow-up period was only 12 months (Nacasch et al., 2010), meaning that there are no long-term outcome data available on veterans and service members treated for PTSD. None of the effectiveness studies provided follow-up data.

Last, it is also unclear from the extant studies whether PTSD symptom change leads to remission or high end state functioning. Indicators of high end-state functioning and well-being were largely absent from the military-related PTSD trials. The only trial to report remission rates found symptom remission in 15% of their sample (Schnurr et al., 2007). Moreover, studies have tended not to report whether additional treatment is necessary following the trial. The only study to do so found that, at 6-month follow-up, 58% of both the PE group and control group had received additional therapy (Schnurr et al., 2007). Thus, on average, evidence from RCTs suggest that the available treatments are more effective at bringing about symptom improvement (for example, possibly reducing PTSD to subclinical levels) rather than remission, and that attaining high end-state functioning may be the exception rather than the rule. Reviews of psychotherapy for PTSD in civilians have similarly found high non-response rates, with one meta-analysis, for example,

concluding that “the majority of patients post-treatment continue to have substantial residual symptoms” (Bradley, Greene, Russ, Dutra, & Westen, 2005, p. 214).

Not surprisingly because of their uncontrolled nature, the open effectiveness trials have shown more encouraging results. However, a significant portion of patients retain their PTSD diagnoses at post-treatment in these trials as well (e.g., 50% in Rauch et al., 2009; 60% of Vietnam veterans in Chard et al., 2010). It is unclear why effect sizes have been larger in effectiveness studies than in RCTs, given that they use fewer inclusion/exclusion criteria, and do not provide financial compensation to motivate adherence and retention. It may be that treatments are more flexibly applied in effectiveness studies, leading to better outcomes. The timing of post-treatment assessments are also often determined by the clinician based on when sufficient improvements have occurred, in contrast to the pre-determined assessment time points of clinical trials.

### 3. Military-related PTSD treatment implementation

We next consider the extent to which the results of these outcome studies inform clinical practice in the veteran and service member communities, examining, in particular, the extent to which patients initiate and complete PTSD treatment. Most of these studies have been conducted on veterans in VA settings; very little information is available about treatment practices in the military (e.g., the types of services routinely offered and the extent to which these services are evidenced-based). The only information available on DoD practices comes from a recent RAND report which found that DoD mental health services vary widely across facility and military branch; over 200 different DoD programs currently address psychological health and TBI but programs tend to be decentralized and developed in isolation (Weinick et al., 2011).

There is mounting evidence that a significant portion of symptomatic veterans and service members do not seek PTSD treatment, refuse treatment when it is offered, drop out of treatment, and/or do not receive evidence-based care in cases where care is provided. First, studies examining treatment seeking in returning veterans have consistently found that high numbers will not seek needed services (e.g., Gorman, Blow, Ames, & Reed, 2011; Hoge et al., 2004). The earliest study examining this question showed that only 38–45% of OIF veterans screening positive for a mental disorder expressed interest in receiving therapy (Hoge et al., 2004). Among OIF/OEF veterans enrolled for healthcare at the a VA medical center, only 56% of those screening positive for PTSD reported using mental health services (Erbes, Westermeyer, Engdahl, & Johnsen, 2007). Similarly, Shiner and colleagues estimated that 58% of OIF/OEF veterans with PTSD have used VA PTSD services (Shiner, Drake, Watts, Desai, & Schnurr, 2012).

Second, in cases where patients do come to the attention of mental health services, many refuse treatment when it is offered. For example, a recent study found that VA primary care providers routinely addressed patients' mental health concerns and frequently attempted to refer to mental health treatment, but 67% of patients either refused referrals or expressed ambivalence about being referred (Passemato et al., 2011). Likewise, a study of VA patients screening positive for PTSD found that roughly 40% did not accept referrals to specialty mental health care (Lindley, Cacciapaglia, Noronha, Carlson, & Schatzberg, 2010).

Third, among patients who engage in therapy, dropout is often a notable problem. In the Lindley et al. (2010) study, of those patients who accepted referral to specialty mental health care, roughly 25% did not attend the initial treatment session and another approximately 25% of those did not attend a second session. Several larger studies using national administrative data have confirmed that only a minority of veterans with PTSD will receive sufficient therapy sessions to constitute a full course of PE or CPT. These studies examined the extent of PTSD treatment participation and retention within VA by looking specifically at the number of mental health treatment sessions

completed. In one large study (N=49,425), only 9.5% of OIF/OEF veterans newly diagnosed with PTSD received recommended levels of mental health care, defined as attending nine or more VA mental health sessions in 15 weeks or less in the first year of diagnosis (Seal, Bertenthal, Miner, Sen, & Marmar, 2007). Similarly, in another large study (N=20,284), only 33% of veterans diagnosed with PTSD in the previous six months received “minimally adequate treatment,” defined as at least eight sessions of psychotherapy or at least a four-month supply of psychotropic medications (Spoont, Murdoch, Hodges, & Nugent, 2010). The largest of these studies (N=204,184) found that, during the first year after being diagnosed with PTSD, the average number of attended VA PTSD visits was eight for Vietnam veterans, seven for OIF veterans, and eight for OEF veterans, less than the number required for a full course of evidence-based treatment (Harpaz-Rotem & Rosenheck, 2011). Dropout rates in the outcome literature have ranged from 12% to 39%, with an average dropout rate for evidence-based treatment of 23% (see Table 1).

Finally, of those patients initiating PTSD treatment, how many receive evidence-based care? To examine this question, the VA has sought to develop software that analyzes PTSD session notes in patient electronic medical records to extrapolate the type of therapy provided. Using such automated coding, Shiner et al. (in press) found that only 6.3% of patients admitted to New England area VA PTSD clinics in 2010 (N=1928) received at least one session of PE and/or CPT. Of the 6.3% of patients receiving evidence-based therapy, the mean number of evidence-based sessions received was six, while the total mean number of individual-based therapy sessions received was 14, indicating that those receiving evidence-based therapies also received a greater number of other types of therapy as part of their care. Of note, the Shiner et al. data were collected in 2010, after VA's widespread dissemination of PE and CPT.

#### 3.1. Summary of treatment implementation findings

There are large discrepancies between models of VA PTSD care in which PE and CPT are widely available and accessed, and actual clinical practice. Whereas VA has made significant strides in improving *potential access* to care (i.e., making PTSD services readily available through its nationwide dissemination PE and CPT, and via telehealth methods), a greater challenge is a lack of *realized access* to care (i.e., services may be available but are not being used; Andersen, 1995). A multitude of barriers to care may prevent or discourage patients from seeking treatment, including logistical (e.g., transportation difficulties, difficulty getting time off work, child care difficulties) and psychological factors (e.g., stigma, lack of knowledge about PTSD symptoms, avoidance of discussing the trauma; see Vogt, 2011). Reasons for treatment refusal, and whether this may differ by treatment type (e.g., PE vs CPT vs non-trauma-focused), have not been studied. Likewise, few studies have examined predictors of dropout in veterans and service members (for an exception, see Harpaz-Rotem & Rosenheck, 2011), or followed dropouts over time to determine how many eventually return to treatment.

Studies also suggest problems with *effective access* (i.e., health care use that leads to improved health, functioning, and satisfaction; Andersen, 1995) within VA, as it appears that only a minority of veterans with PTSD are receiving evidence-based treatments. Whereas decisions about accessing and dropping out of care are largely those of the patient, decisions regarding whether to offer evidence-based intervention are mainly made by clinicians. Hypothetically, the lack of widespread use of PE and CPT demonstrated by Shiner et al. (in press) may be attributable to at least three factors: a lack of trained clinicians, resource limitations preventing individual provision of CPT and PE to all eligible patients, and/or trained clinicians electing not to use PE and CPT with certain patients. First, whereas a lack of trained clinicians may be less and less likely as more clinicians become trained in PE and CPT, it is of note that although almost all VAs in the country now

report offering PE and CPT, this does not necessarily translate into PE and/or CPT being widely available at these facilities, as only one or two providers may be trained in the therapies and they may or may not be using the treatments.

Second, VA and DoD PTSD care is constrained by budgetary and personnel limitations that preclude intensive individualized PE and CPT from being offered to all patients. With more than two million service members having now served in the Iraq and Afghanistan wars, and with many veterans from other eras presenting for PTSD treatment for the first time (U.S. Government Accountability Office; GAO, 2011a, 2011b), PTSD care in VA and DoD face considerable demands on resources. One increasingly common consequence of this problem has been providing PE, CPT, and other evidence-based interventions to patients in group format. However, the efficacy and effectiveness of these group interventions, especially relative to individual therapy, remain under-researched. Third, clinicians' decision-making about which treatments to use with PTSD patients, including perceptions of patient appropriateness for PE and CPT, has not been evaluated. This is a crucial point when considering that PE or CPT were developed and tested on female sexual assault survivors and imported into the DoD and VA on the untested assumption that successes with civilians would generalize to combat trauma. Understanding VA and DoD clinicians' perceptions of the degree of fit of these interventions for their patients, and their assessments of contraindications of these treatments, would shed light on why trained clinicians may not be employing these therapies.

#### 4. Directions for future research

##### 4.1. Need for prospective observational research

It is important to emphasize that the current outcome literature does not represent the full spectrum of patients with military-related PTSD, but only the minority willing and able to participate in evidence-based care and clinical research. A significant portion of patients are unwilling, unready, or unsuited (either by their own or their therapist's estimation) to complete trauma-focused therapies, and almost no data are available on these individuals. It is essential that future studies follow those patients refusing, considered inappropriate for, or who drop out of, evidence-based care to not only determine their long-term outcomes but to better understand their treatment-related decision-making (for example, their reasons for treatment refusal or dropout). Centralized electronic medical records within VA and the DoD afford a unique opportunity for such large-scale evaluations and can track a variety of outcomes over time.

##### 4.2. Need for comparative effectiveness research

To date, military-related PTSD treatment policy has mostly been driven by efficacy research, traditionally considered the gold standard of outcome research. RCTs, however, are likely not representative of either typical treatment or typical patients in VA. Because of the disconnect between efficacy research and actual practice, controlled effectiveness research that examines usual treatment circumstances (rather than ideal treatment circumstances, as with efficacy research) may be more revealing and useful in informing policy (Hunt, 2012; Leichsenring, 2004). More specifically, clinical trials in the medical field are increasingly shifting to a comparative effectiveness research (CER) paradigm, which involves directly comparing interventions so as to provide patients, clinicians, and policymakers with useful information regarding their relative benefits and harms in the 'real world' (e.g., Berger et al., 2012; Goodman, 2012). In this way, for example, two treatments that are in a state of equipoise (as in the case of PE and CPT) may be compared in actual clinical practice. Such research is necessary given how little is known about the relative effectiveness (or even relative efficacy) of military-related PTSD treatments:

only one of the RCTs conducted to date, Beidel et al. (2011), has involved a head-to-head comparison of active treatments (TMT versus exposure-only).

##### 4.3. Need for treatment process research

In addition to treatment outcome research, treatment process research is needed to better understand those aspects of treatment that promote and mediate change, that is, to understand how and why treatments work (Kazdin & Kendall, 1998). Such research has yet to be done on military-related PTSD treatment. For example, examining those patients for whom PE and CPT are highly effective might help identify moderators (such as demographic, combat exposure, and comorbidity profiles) that may clarify whether certain treatments are better suited for given patients, and may help foster the development of clinical algorithms that ensure optimal matching of patient presentation to treatment type. A common clinical lore, for example, is that veterans with complex presentations (such as extensive childhood trauma) are better suited to CPT and may not tolerate the more emotionally evocative demands of PE. However, clinicians currently have no empirical guidance regarding which form of care is indicated for which patients. In the absence of research, newly diagnosed patients are currently being matched to PTSD treatment (PE, CPT, or another therapy) based on hunch, lore, and personal preference, not evidence. Process research might also shed light on therapist characteristics that promote change, which in turn would help inform mechanisms to target during treatment development, and inform therapist training and supervision.

##### 4.4. Need for improvements in outcome reporting

Last, to maximize their practical value, in addition to effect sizes, outcome studies should report more useful metrics of treatment success, such as high end-state functioning (including quality of life and functional indicators), remission rates, continued need for PTSD therapy at post-treatment, and the ratio of patients who are considered successful responders to those who are not (e.g., Pockock, Ariti, Collier, & Wang, 2012). Similarly, to help capture the full range of treatment outcomes, studies should disaggregate those patients who improve, remain unchanged, or deteriorate as a result of therapy; relying on mean post-treatment symptom scores may obfuscate considerable variation in outcomes (Barlow, 2010; Stein, Dickstein, Schuster, Litz, & Resick, 2012). Differentially examining improvement across different PTSD symptom clusters (e.g., reexperiencing vs hyperarousal) may also help clarify the symptoms for which certain techniques are most beneficial, and may highlight the need for multidimensional and multi-component treatments that target different symptoms.

#### 5. Conclusion

Conclusions about whether the current state of military-related PTSD science and practice give cause for optimism or concern depend largely on what is being compared. When comparing current science and practice to that of even ten years ago, it is clear that vast and positive changes in research, therapy, and policy have occurred in a relatively short period of time. Whereas almost no outcome studies existed prior to this time (for exceptions see Cooper & Clum, 1989; Keane, Fairbank, Caddell, & Zimering, 1989), there are currently more than 100 open intervention studies for military-related PTSD listed on clinicaltrials.gov. Innovations in harnessing data from national electronic medical records make unprecedented large-scale evaluations possible, and allow for innovations in methodologies that can more practically shape policymaking decisions. Notwithstanding their small sample sizes, a growing number of effectiveness studies across a number of clinics demonstrate that some veterans can obtain substantial benefit from evidence-based therapy and lose



their diagnosis, which is particularly notable given the often chronic and debilitating nature of military-related PTSD. Moreover, successes in dissemination have helped ensure that service members and veterans have wider access to evidence-based treatments for PTSD, and multiple avenues for ensuring treatment availability, such as telehealth and web-based applications, are being developed and tested.

By contrast, comparing the current state of science and practice to the eventual goal of PTSD care in which patients with PTSD reliably access, receive, and meaningfully benefit from treatment (i.e., looking forward vs looking back), highlights that extensive work remains to be done. The progress of the past decade has, as yet, not equated to patients reliably engaging in treatments or, when they do, in reliably demonstrating good outcomes. The available research suggests that, at present, a full course of evidence-based treatment is not the modal treatment course for veterans with PTSD within VA, and attaining good end-state functioning or loss of PTSD diagnosis may not be the modal outcomes of these treatments. As such, current treatment best practices aimed at ensuring that veterans access, complete, and benefit from PTSD care remain far from ideal. Conclusions about typical treatment course and outcomes cannot be drawn for active duty service members as very little data exist on this population; there is a dire need for research on active duty personnel, particularly given the unique window for early intervention present in this population.

Although there is substantial room for improvement, in no previous period has the scientific understanding of human adaptation to trauma been as advanced, and have the resources and organizational commitment devoted to service members' and veterans' mental health been as extensive, as is currently the case. As such, even as the full psychological toll of the wars becomes more manifest in years to come and as demands on PTSD care continue to grow, there is an unprecedented opportunity for progress in treating military-related PTSD.

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