

# The Impact of Service-Connected Disability and Therapist Experience on Outcomes From Prolonged Exposure Therapy With Veterans

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**Objective:** Although prolonged exposure therapy (PE) has been shown to be effective in treating posttraumatic stress disorder (PTSD), a sizable minority do not benefit. Examining patient and therapist characteristics that impact treatment outcome may improve treatment delivery and identify individuals who are less likely to respond to treatment or are at risk to prematurely discontinue treatment. The current study uses a sample from a large urban Veterans' Affairs (VA) hospital to build on a previous report that identified correlates of treatment outcome for Veterans who received PE. **Method:** Two hundred eighty-seven veterans completed measures of PTSD, depression, and quality of life at the beginning and end of treatment. Veterans' service-connected disability rating, therapist experience, benzodiazepine prescription, and traumatic brain injury diagnosis were investigated as predictors of treatment outcome in linear regression analyses. **Results:** Results showed that Veterans with a service-connected disability for a mental health condition had smaller treatment gains than those without service connection ( $p < .01$ ). Additionally, results showed that patients treated by certified PE therapists had larger treatment gains than those treated by noncertified PE therapists ( $p < .01$ ). Finally, younger age and therapist certification were associated with dropout from treatment ( $p < .05$ ). **Conclusion:** Veterans treated by PE-certified therapists and Veterans who were not service-connected for a mental health condition fared better in treatment. Results suggest that additional study of both the national effort to train VA clinicians in PE and the impact of service connection on PTSD treatment outcome may be helpful for future research.

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Prolonged exposure therapy (PE) has been shown to be an effective treatment for Veterans with posttraumatic stress disorder (PTSD; Eftekhari et al., 2013; Goodson, Lefkowitz, Helstrom, & Gawrysiak, 2013; Schnurr et al., 2007; Yoder et al., 2013). Support from numerous randomized clinical trials and effectiveness studies has resulted in exposure therapy being classified as a "first-line" treatment for PTSD (Institute of Medicine, 2007; Rauch, Eftekhari, & Ruzek, 2012). Nevertheless, a sizable number of patients pre-

maturely discontinue PE, with dropout rates ranging from 16% to 44% (Jeffreys et al., 2014; Yoder et al., 2013). In addition, despite good overall treatment response rates, 30–37% of individuals who receive a full course of treatment do not respond with significant reductions in PTSD symptoms (Eftekhari et al., 2013; Schnurr et al., 2007). As such, it remains important to continue to identify patient and therapist characteristics associated with PTSD treatment response that may eventually lead to improvements in treatment delivery and patient outcomes.

Of relevance to treating PTSD within the Veterans' Affairs (VA) system is service-connected disability compensation (service connection [SC]). As a national system, VA provides health care and financial benefits to Veterans across the United States. The Veterans' Health Administration (VHA) provides health care in medical centers, outpatient clinics, and other care facilities across the country. A second branch of the VA, the Veterans' Benefits Administration (VBA), provides financial benefits to Veterans for problems or conditions connected to their military service. Veterans who were exposed to a traumatic event during military service and experience PTSD symptoms may be eligible for monthly financial payments as compensation and coverage of health-care costs related to PTSD. Veterans may also be awarded SC for other mental health disorders related to military service, such as depression and anxiety. There is currently interface between VHA's provision of PTSD-related treatment and VBA's provision of

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compensation for mental health conditions, including PTSD. Treatment notes, diagnoses, and other documentation in VHA's electronic medical record are used in the SC process to substantiate claims and provide support for diagnoses in disability evaluations. Thus, the presence, worsening, or improvement of symptoms documented throughout Veterans' treatment may have implications for service-connected disability pensions.

It has been suggested that the SC benefits system may serve as a disincentive for wellness and may be at odds with the recovery-focused goals of evidence-based psychotherapies for PTSD such as PE (Freeman, Powell, & Kimbrell, 2008; McNally & Frueh, 2013). This concern is supported by studies that have demonstrated that compensation for medical disability outside of the VA system is associated with poorer treatment outcomes (Harris, Mulford, Solomon, van Gelder, & Young, 2005). However, within the VA, there has been limited research investigating the impact of the compensation and pension system on PTSD treatment outcomes, and most findings have suggested no adverse effects (Fontana & Rosenheck, 1998; Goodson et al., 2013; Schnurr et al., 2007; Yoder et al., 2013). In fact, one large-scale study found positive long-term effects when comparing those who had received SC to those seeking SC (Murdoch et al., 2011). In contrast, a recent study of PE among veterans with PTSD and comorbid traumatic brain injury (TBI) found that higher percentages of SC rates were associated with smaller treatment gains (Crawford et al., 2016). Taken together, these findings regarding SC and behavioral health treatment outcome underscore the complexity of the SC issue which can be emotionally validating and financially stabilizing while at the same time introducing a potential conflict into treatment and recovery.

Another potentially important factor in PTSD treatment within VA is therapist training and experience. In general psychotherapy research, therapist experience usually accounts for a small but significant percentage of the outcome variance (Crits-Christoph et al., 1991). However, less attention has been paid specifically to the impact of therapist experience in PTSD treatment (Ehlers et al., 2013). Within the VA system, thousands of mental health providers with varying backgrounds and experience levels have been trained in evidence-based treatments for PTSD over the past 9 years (Eftekhari et al., 2013; Karlin et al., 2010). To date, the most common approach to investigate the impact of therapist experience has been to compare outcomes from patients treated by therapists in training with those treated by certified PE therapists/licensed providers, with findings showing no significant disadvantage for therapists in training (Eftekhari et al., 2013; Goodson et al., 2013; Rauch et al., 2009). An alternative approach has been to examine the advantage conferred by therapist experience with a treatment protocol (e.g., number of cases completed, years implementing the protocol, higher certification levels). Ehlers and colleagues (2013) examined the impact of therapist experience in the delivery of cognitive therapy for PTSD (CT-PTSD) with a civilian sample. Results of the study found that that experienced therapists (i.e., completion of  $\geq 12$  CT-PTSD cases) had fewer dropouts and a trend toward better outcomes (Ehlers et al., 2013). In a recent study with veterans with PTSD and TBI treated with PE, Crawford and colleagues (2016) identified that treatment outcomes improved as experience level (trainee, certified PE provider, or national PE consultant and trainer) increased. Given these findings and the large number of therapists with varying levels of experience in the

present study, we wished to investigate the effect of therapist training and experience on PE treatment outcomes.

TBI has been identified as a comorbid condition that may affect PTSD treatment outcome for Veterans. An estimated 8–15% of returning veterans deployed in the service of recent operations in Afghanistan and Iraq suffer from TBI (Hoge, 2008; Vasterling et al., 2006). Moreover, the rates of PTSD among veterans with TBI are significantly elevated, with estimations as high 40% (Carlson et al., 2010). Symptoms typically associated with TBI include headaches, fatigue, irritability, poor sleep, concentration problems, and memory problems, all of which overlap with clinical symptoms of PTSD (Sripada et al., 2013). Continued investigation into the effect of comorbid TBI on PTSD treatment outcomes remains important because VA providers may be hesitant to treat veterans with co-occurring PTSD and TBI because of concerns about possible cognitive limitations, impulsivity, and behavioral/emotional dysregulation (Wolf et al., 2015). However, PE outcome studies to date have suggested that "TBI," which is a broad term used to describe a trauma to the head and related sequelae as opposed to an actual diagnosis (Carroll, Cassidy, Holm, Kraus, & Coronado, 2004), may have little impact on treatment outcomes. For instance, Sripada and colleagues (2013) found no effect on treatment outcomes for mild TBI in a sample of 55 Veterans receiving PE for PTSD (Sripada et al., 2013). A more recent study by Wolf and colleagues (2015) investigating the impact of a full range of TBI severity (from mild to moderate) on PE outcomes in a sample of 69 veterans found not only that TBI severity did not negatively impact outcomes but also that more severe TBI was associated with more rapid improvement in PTSD symptoms (Wolf et al., 2015). Although these findings are encouraging, additional investigation into the potential impact of TBI-related diagnoses on PTSD treatment outcomes is warranted.

A significant number of veterans are prescribed benzodiazepines for symptom management (Lund, Bernardy, Vaughan-Sarrazin, Alexander, & Friedman, 2013); however, this class of medication may have implications for psychotherapy treatment outcome (van Minnen, Arntz, & Keijsers, 2002). It has been suggested that the use of benzodiazepines attenuates the long-term response to cognitive-behavioral therapy (CBT) for anxiety disorders, especially once the medication is discontinued (Otto, Hong, & Safren, 2002). With respect to PTSD, van Minnen, Arntz, and Keijsers (2002) found that daily use of benzodiazepines was associated with poorer outcomes in a sample of patients receiving PE at a community mental health center. A controlled trial comparing the use of *d*-cycloserine, placebo, and a benzodiazepine during virtual reality exposure for PTSD among veterans found that participants receiving the benzodiazepine showed a much higher rate of PTSD symptoms compared with the placebo group at 3 months posttreatment (Rothbaum et al., 2014). Furthermore, the 2010 Clinical Practice Guidelines classified benzodiazepines as having "no benefit" for the treatment of PTSD and included an additional warning if they have the "potential for harm" (Department of Veterans Affairs, 2010). Although the use of benzodiazepines for PTSD is declining, approximately 30% of veterans diagnosed with PTSD are still prescribed a benzodiazepine (Lund et al., 2013). Given the concerns about benzodiazepines in PTSD treatment, we chose to examine the effect of benzodiazepine prescription on PE outcomes.

The aim of the current study is to investigate SC status, therapist experience with PE, TBI-related diagnosis, and benzodiazepine prescription as predictors of PE treatment outcome for Veterans in a large, urban VA medical center. These particular variables were chosen based on their potential impact on treatment outcomes for Veterans undergoing PE. The current study is an update and extension of an earlier study (Goodson et al., 2013) that reported on 115 Veterans who underwent PE. In the earlier study we found no negative association with SC or therapist training (i.e., cases treated by therapists under consultation vs. cases completed by PE-certified therapists). The study sample was not large enough to investigate the possible impact of TBI or benzodiazepine prescription. In the current study we revisited the relationships among PE and SC, therapist experience, TBI, and benzodiazepine prescription with a larger sample of veterans and therapists that allowed for additional and better powered analyses. We hypothesized that SC and benzodiazepine prescriptions would be associated with poorer outcomes. We also hypothesized that more therapist experience would be associated with fewer treatment dropouts. Finally, we hypothesized that a history of a TBI-related diagnosis would not be associated with treatment outcome.

## Method

### Study Overview

We conducted a single-sample, nonrandomized treatment effectiveness study with a chart-review component evaluating patient characteristics and provider experience on treatment outcome for PE for Veterans with military-related PTSD at an urban VA medical center and its surrounding community-based outpatient clinics (CBOCs). All participants were Veterans actively involved in outpatient treatment. Pre- and posttreatment measures of PTSD, depression, and quality of life, gathered as part of routine clinical care and program evaluation, were compared to evaluate the effectiveness of PE. Data regarding SC for PTSD or other psychiatric conditions, prescription for benzodiazepine medications, and a history of TBI-related diagnoses were extracted through chart review and analyzed as potential predictors of treatment outcome. Therapists' were categorized according to training and certification status variables. The project was determined by the Corporal Michael J. Crescenz Veterans Affairs Medical Center's Internal Review Board to meet criteria for quality management and was approved to be published as such.

### Participants and Procedures

Participants were 287 veterans who received PE through several different behavioral health outpatient clinics. All participants had a diagnosis of PTSD and were deemed appropriate for PE by their treating clinicians (i.e., no immediate threat of harm to self or others, no non-PTSD related psychosis or uncontrolled bipolar disorder, and no severe TBI). Before and after treatment, participants completed self-report measures of PTSD, depression, and quality of life. Participants were classified as treatment completers if they completed the PE protocol or completed eight or more sessions of PE.

### Therapists

PE was provided by a total of 52 therapists, including 37 licensed clinicians and 15 therapists in training. The breakdown of licensed providers by discipline included psychology (25), social work (5), nursing (5), and psychiatry (2). Of the 37 licensed providers, 21 were officially certified through the VA national training initiative. Official certification in PE requires successful completion of an initial 4-day training and subsequent follow-up consultation. The consultation process typically lasts 6 months and includes weekly group and individual calls. All sessions during consultation are audio-recorded and reviewed by PE consultants, who also provide treatment fidelity ratings and feedback to consultees. Official PE certification requires completion of at least two full PE cases. Eleven of the 37 licensed providers were not VA-certified PE providers. Nine of these 11 completed initial trainings but failed to complete the consultation requirements whereas 2 completed nonofficial PE trainings (local-level or private trainings) and did not apply for certification through equivalency provisions. Two of the PE-certified providers are also consultants. Therapists in training were psychology interns completing an evidence-based treatment rotation for their predoctoral internship. Psychology interns received an initial 2-day training in PE (conducted by J.T.G.), and all sessions were audio-recorded and reviewed by supervisors (one of the two PE consultants). Weekly feedback was provided to the psychology interns in group and individual supervision meetings.

The number of completed cases per licensed provider ranged from 0 to 31 whereas the number of completed cases by trainees ranged from 0 to 2. Most cases were completed by a small number of clinicians. Only four clinicians completed more than 12 PE cases, but these accounted for 41% of all completed cases. On the other side, 17 of the providers completed two cases or fewer.

In the present study, we categorized therapists according to training and certification status, with clinicians being placed into one of four categories: (a) trainee, (b) non-PE certified licensed providers, (c) certified PE licensed providers, and (d) consultants/trainer. Through a series of post hoc  $\chi^2$  tests it was determined that the driving factor was whether the therapist was certified; thus, we collapsed these categories and used a binary classification of PE certification (yes/no). We also considered therapist clinical placement within various behavioral health teams or settings. Therapist placements are provided in the online supplemental materials.

### Treatment

PE is a behaviorally based treatment designed to address trauma-related symptoms and distress. The core interventions of PE include psychoeducation, breathing retraining, in vivo exposure, and imaginal exposure, which are typically delivered in 9–12 sessions. For a more thorough description of PE treatment components, see Goodson et al. (2013).

### Measures

PTSD symptoms were measured using the PTSD Checklist–Military Version (PCL-M; Weathers, Litz, Herman, Huska, & Keane, 1993), a 17-item, self-report measure designed to assess the severity of PTSD symptoms. The PCL-M is frequently used in VA

settings and has good psychometric properties (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). Respondents rated the severity of each item on a 5-point scale (1 = *not at all*; 5 = *extremely*). Individual items were summed to provide a total score (17–85), with higher scores associated with a greater severity of PTSD symptoms. Among combat veterans, a score of 50 and above is typically used as the clinical significance point (Weathers et al., 1993).

Depression symptoms were measured using the Patient Health Questionnaire–9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001), a nine-item, self-report measure designed to assess symptoms of depression. The diagnostic validity and high levels of sensitivity and specificity for major depression have been demonstrated for the PHQ-9 in several studies (Kroenke et al., 2001). Each item on this measure corresponds to a *Diagnostic and Statistical Manual of Mental Disorders* (fourth edition; *DSM–IV*) diagnostic criterion for a major depressive episode. Respondents rated the frequency with which they experience each of the symptoms of depression on a 4-point scale (0 = *not at all*; 3 = *nearly every day*). Individual items were summed to provide a total score, with higher scores indicative of greater depression severity with scores ranging from 0 to 27.

Quality of life was measured using two subscales from the Behavioral Health Questionnaire–20 (BHQ-20; Kopta & Lowry, 2002), a measure that assesses global mental health. The BHQ-20 has been found to be reliable and valid with adequate internal consistency, test–retest reliability, and construct validity (Kopta & Lowry, 2002). Wellbeing and Life Functioning subscales were used to assess Veterans' quality of life. The Wellbeing subscale consists of three items that assess distress, life satisfaction, and energy/motivation (Cronbach's  $\alpha = .71$ ; Kopta & Lowry, 2002). The Life Functioning subscale consists of four items assessing work/school, intimate relationships, social relationships, and overall life enjoyment ( $\alpha = .80$ ). Each item on these two measures is rated on a 5-point scale (0 = *terrible*; 4 = *very well*), with higher scores indicative of higher levels of quality of life. Scores from both subscales were summed for a total quality of life score, with scores ranging from 0 to 28.

Data regarding SC, history of TBI, and prescription of benzodiazepine medications were captured through review of veterans' electronic medical records. For the purposes of the present study, the SC variable was coded as positive if they were currently service-connected for PTSD or any other mental health condition at the time of treatment.

With respect to TBI-related diagnoses, the variable was coded as positive if Veterans were service-connected for TBI-related diagnosis or their treatment notes indicated a TBI-related diagnosis (e.g., the hospital's polytrauma team, neuropsychological assessment). This procedure for coding TBI was similar to the procedure previously used by Sripada and colleagues (2013). Veterans were coded as positive for benzodiazepine prescription if there was an active prescription for a benzodiazepine medication in the "medication list" section of their chart at the time of treatment or if a benzodiazepine was noted as being prescribed in a medical record note during the time they were completing PE. Additional information on these variables is provided in the supplemental materials.

## Analytic Plan

All statistical analyses were conducted using SPSS version 20 and SAS version 9.4. Differences between treatment completers and noncompleters were assessed with  $\chi^2$ , Mann–Whitney U, and independent-sample *t* tests. Paired *t* tests analyzed changes in symptoms from pre- to posttreatment for all outcome variables. Within-group effect sizes were calculated using Cohen's *d* (1988). As an evaluation of the ongoing implementation of PE at our facility (which began in 2009), measures for outcome assessment were implemented at various stages of the program. Early in 2015 we discontinued use of the PCL–M and started using the PCL–5 as the primary PTSD outcome measure. Because there is no conversion formula, 12 cases that used the PCL–5 are missing PCL–M data, and an additional 12 cases are missing PCL–M for other reasons (e.g., not administered by provider). Some measures, including the PHQ–9, and the Quality of Life (QOL) subscales derived from the BHQ–20, were added as routine assessment tools at later dates, resulting in more missing data for these measures. In total, we are missing 33 PHQ–9 scores and 138 quality of life scores. To handle the missing data, we used multiple imputation using the SAS MI procedure to generate 100 Markov chain Monte Carlo (MCMC) imputed data sets. The imputation model included age (continuous), gender (binary), ethnicity (binary), TBI (binary), benzodiazepine prescription (binary), number of sessions completed (continuous), SC (binary), combat index trauma (binary) and PE certification status (binary), clinic type (as five dummy variables), three auxiliary variables (pretreatment outcome scores), and the three treatment outcome change scores. A multivariable linear regression model for each outcome was estimated on each imputed data set, and we used the SAS procedure MIANALYZE to pool parameter estimates and standard errors into a single set of results. Significance was indicated by a *p* value less than .05.

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## Results

Of the 287 Veterans that initiated PE, 200 (69.7%) completed treatment. Demographic and clinical characteristics are presented in Table 1, as well as comparisons between Veterans who completed treatment and those that did not. Veterans who completed treatment were slightly older on average ( $p = .03$ ) but did not significantly differ in other observed patient characteristics. There was a significant effect of therapist experience on treatment completion such that completers were more likely to have been treated by a therapist with a PE certification ( $p < .001$ ).

T1

## Symptom Reduction and Quality of Life Improvement After PE

In both the complete case analysis and the multiple imputation analysis, Veterans showed statistically significant improvements in PTSD, depression, and quality of life (see Table 2). Effect sizes for all three measures were large ( $0.9 < d < -0.9$ ).

T2

## Predictors of Treatment Response

Results of the multivariable linear regression models are presented in Table 3. SC was a significant predictor of PTSD and depression outcomes such that Veterans who were service-connected had smaller treatment gains ( $p < .01$ ). Therapist PE

T3

Table 1  
Patient Demographic and Clinical Characteristics at Baseline

Characteristics	Total (n = 287)	Completers (n = 200)	Noncompleters (n = 87)
	% (n)	% (n)	% (n)
Age, M (SD)	50.8 (14.0)	52.0 (13.9)	47.9 (14.0)*
Gender (M)	86.7 (242)	86.5 (173)	87.3 (69)
Ethnicity			
African American	40.4 (110)	38.5 (75)	45.5 (35)
Caucasian	52.9 (144)	53.8 (105)	50.6 (39)
Other	6.6 (18)	7.7 (15)	3.9 (3)
TBI	13.0 (36)	12.0 (23)	15.5 (13)
Benzodiazepine	20.7 (56)	20.8 (40)	20.3 (16)
Therapist Exp			
PE Certification	71.2 (203)	78.9 (157)	53.5 (46)*
SC	73.3 (203)	76.7 (148)	65.5 (55)
PTSD SC	63.1 (181)	75.1 (136)	60.8 (45)
Clinic type			
PTSD clinical team	47.7 (137)	48.0 (96)	47.1 (41)
General mental health	22.6 (65)	21.5 (43)	25.3 (22)
ARU	6.6 (19)	6.5 (13)	6.9 (6)
BHL	2.8 (8)	2.5 (5)	3.4 (3)
CBOC	16.0 (46)	17.0 (34)	13.8 (12)
Other	4.2 (12)	4.5 (9)	3.4 (3)
Pre-PCL-M, M (SD)	63.7 (10.7)	63.4 (10.6)	64.5 (10.8)
Pre-PHQ-9, M (SD)	16.4 (5.9)	16.2 (5.8)	16.9 (6.2)
Pre-QOL, M (SD)	8.9 (4.2)	9.2 (4.1)	8.4 (4.5)

Note. Gender (M) = male; TBI = chart diagnosis of TBI-related diagnosis; Benzodiazepine = prescriptions for benzodiazepine medications; Therapist Exp = therapist experience; PE Certification = Official VA-certified PE therapist; SC = service connection; PTSD = posttraumatic stress disorder; General mental health = general mental health clinical team; ARU = Addictions Recovery Unit; BHL = Behavioral Health Laboratory; CBOC = community-based outpatient clinics; Other = polytrauma clinic; PCL-M = PTSD Checklist–Military Version; PHQ = Patient Health Questionnaire–9; QOL = Quality of Life.  
\*  $p < .05$ .

certification was also a significant predictor of PTSD and depression, such that certified therapists had significantly larger treatment gains (PTSD:  $p < .001$ ; depression:  $p = .01$ ). Gender predicted a change in PTSD symptoms only; specifically, males experienced attenuated treatment gains compared with females ( $p = .03$ ). There were no significant predictors of QOL.

**Discussion**

We analyzed outcomes from a sample of Veterans that received PE treatment at an urban VA medical center and surrounding outpatient clinics. We found that after PE, Veterans experienced improvements in PTSD symptoms, depression, and quality of life. We also found that having a service-connected disability for any mental health condition was associated with smaller treatment

gains (less improvement in PTSD and depression symptoms). In addition, we found that veterans treated by a certified PE therapist had larger treatment gains (more improvement in PTSD and depression symptoms) and fewer dropouts than those treated by noncertified PE therapists. We also found that females had larger PTSD treatment gains than did males. Finally, we found that Veteran age was negatively associated with dropout.

Our findings suggest that individuals with a service-connected disability for a mental health condition showed attenuated responses to treatment (PTSD and depression symptoms) compared with those without SC. This finding is inconsistent with several studies that found SC not to be associated with treatment outcome (Schnurr et al., 2007; Tuerk et al., 2011; Yoder et al., 2013). This inconsistency may be explained in part by sample considerations

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Table 2  
Clinical Measures at Pretreatment and Posttreatment Assessed with Paired Sampled t Tests

Measures	n	Complete cases					Multiple imputation				
		Pretreatment	Posttreatment	Mean difference	t	ES	Pretreatment	Posttreatment	Mean difference	t	
PCL-M	192	63.7 (10.7)	46.4 (15.3)	17.0 (14.8)	15.9**	1.3	63.6 (6.6)	46.8 (10.8)	16.8 (10.4)	16.1**	
PHQ-9	177	16.4 (5.9)	11.0 (6.3)	5.1 (6.2)	10.9**	.9	16.3 (3.7)	11.2 (4.5)	5.1 (4.5)	11.2**	
QOL	92	8.9 (4.2)	13.4 (5.4)	-4.1 (4.8)	-8.1**	-.9	8.9 (3.7)	8.5 (35.8)	-3.6 (13.0)	-2.7*	

Note. ES = Cohen’s d within-group effect size. PCL-M = PTSD Checklist–Military Version; PHQ = Patient Health Questionnaire–9; QOL = Quality of Life.  
\*  $p < .01$ . \*\*  $p < .0001$ .

Table 3  
 Combined Multivariable Linear Regression Analysis Predicting Outcome Measure Change Scores From the Multiply Imputed Data Sets

Predictor	PTSD symptoms Model 1			Depression symptoms Model 2			Quality of life Model 3		
	$\beta$	SE	t	$\beta$	SE	t	$\beta$	SE	t
Age	0.05	0.08	0.63	-0.01	0.04	-0.35	-0.06	0.10	-0.64
Gender (M)	-7.15	3.23	-2.21*	-2.11	1.44	-1.46	2.78	3.38	0.82
Non-White	-3.92	2.03	-1.93	-0.31	0.92	-0.34	0.86	1.70	0.51
SC	-8.00	2.47	-3.24**	-3.44	1.12	-3.08**	2.51	1.81	1.39
TBI	-4.64	3.89	-1.19	-1.46	1.72	-0.85	0.65	2.94	0.22
Benzo	-3.86	2.50	-1.54	0.92	1.12	0.82	0.11	2.23	0.05
Certification	7.91	2.31	3.42**	2.57	1.05	2.45*	-1.58	1.68	-0.95

Note. PTSD = posttraumatic stress disorder; SE combined standard error estimate from all imputation data sets; Gender (M) = male; SC = service connection; TBI = chart diagnosis of TBI; Benzo = prescriptions for benzodiazepine medications;  $\beta$  = combined parameter estimate from all imputation data sets.  $N = 287$ ;  $m = 100$ .

\*  $p < .05$ . \*\*  $p < .05$ .

because the current sample is larger and more diverse than other PE outcome studies that have investigated the SC issue. There are also methodological differences between the current and previous studies. For example, Tuerk and colleagues (2011) examined the impact of total percentile SC ratings on treatment outcome. Results from that study also demonstrated that PTSD symptoms among veterans with SC improved with PE treatment; however, comparisons were not made to those veterans who did not receive SC disability pensions. Additional research with this area will be important to be able to make comparisons across studies and better understand the impact of SC on treatment outcome.

Several possible explanations exist for our current findings. It has been suggested that individuals with a SC disability may be less likely to report improvements on self-report measures out of concern that they will lose their disability payments (McNally & Frueh, 2013). Alternatively, individuals who are service connected may have identified with a diagnosis of PTSD, which results in factors that make treatment outcome less effective (e.g., lowered treatment expectations, more cautious engagement in exposure exercises). It could also be that individuals who are service connected represent a different population than those who are not service connected with respect to symptom severity or chronicity, although this is not supported by pretreatment symptom severity levels. Overall, explanation of this finding is only speculative because the current data do not allow for conclusions regarding causality; further research, particularly using a prospective method, would be of benefit.

Despite the less robust response of Veterans with mental-health-related SC compared with those without SC, it is important to recognize that Veterans who were service-connected still experienced a clinically meaningful reduction in symptoms as defined by greater than a 10-point reduction in the PCL (Monson et al., 2008). Thus, individuals who receive SC disability payments still benefit significantly from treatment.

We also found that therapist experience was associated with treatment outcome and dropout. In particular, patients treated by PE-certified therapists had larger treatment gains and fewer dropouts than those treated by non-PE-certified therapists. These findings highlight the importance of completing the certification process for therapists being trained in PE. Although speculative, achieving certification may enhance therapist confidence and ef-

ficacy levels, thereby bolstering their practice, whereas not achieving certification may leave therapists with more reservations about PE and their abilities to effectively deliver it. It is also noteworthy that the trainees and some of the noncertified licensed providers attended a shorter initial training (2 days vs. 4 days). Thus, it could also be that shorter 2-day initial trainings are not adequate for optimal learning of PE delivery. Regardless, the finding that certified PE therapists had better outcomes adds to a growing number of studies pointing to an association between therapist experience and PTSD treatment outcomes (Crawford et al., 2016; Ehlers et al., 2013).

Unexpectedly, we found that females had larger PTSD treatment gains than males. This is an interesting finding given that PE was initially developed and validated with female sexual assault survivors. Findings with respect to gender have been mixed (Mouilso, Tuerk, Schnurr, & Rauch, 2016), but at least one other PE outcome study within the VA reported similar results (Eftekhari et al., 2013). Although speculative, it may be that gender norms and expectations regarding expression of emotion present a barrier in PE for some male veterans. Likewise, male veterans may be more likely to habitually respond to trauma reminders with anger, which may limit access to, and processing of, more vulnerable trauma-related emotions (e.g., sadness, helplessness, fear, guilt, etc.) during exposure sessions. Future studies may wish to investigate these and other possible gender dynamics within PTSD treatment. We also found age to be negatively associated with dropout, which has been found by several other studies (Eftekhari et al., 2013; Goodson et al., 2013; Jeffreys et al., 2014). This result could reflect several factors, including increased phase of life demands in a younger population that may make a time-intensive treatment such as PE difficult to complete.

In contrast to our initial hypothesis, we did not find that benzodiazepine prescription was associated with PE outcomes. This finding should be interpreted with some caution because we had no way of reliably assessing whether the individual was actively taking the medication or how the medication was being taken (e.g., as necessary or "PRN" vs. time contingent). Consistent with previous literature (e.g., Sripada et al., 2013; Wolf et al., 2015), a chart diagnosis of a TBI-related condition was also not associated with PE outcomes. These findings suggest that the presence of a TBI-related diagnosis in a veteran's medical record is not associ-

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ated with negative treatment outcomes in PE. Finally, therapist's treatment team and ethnicity were not associated with PE outcomes. Taken together, these findings suggest that PE is a robust and effective treatment in various real-world clinical settings with complex clinical presentations.

### Limitations

The study has several limitations. We did not use a randomized treatment outcome design; thus, comparisons could not be made across treatment conditions. Although naturalistic research offers valuable and generalizable information about the benefits of ongoing treatment in a real-world setting (Moller, 2011), this method precludes thorough evaluation of identified variables (e.g., TBI, SC). Instead we relied on chart review for these variables, which is a less rigorous, less clean approach to data collection. In addition, follow-up data were not obtained for either completers or noncompleters; therefore, we were unable to assess the long-term maintenance of treatment gains for completers or to compare these gains to noncompleters. The current sample was also a select sample in that it is composed of patients selected to receive PE by their providers. Providers may have implicit and explicit assumptions regarding PE that influence who is offered the treatment.

The QOL assessment was initiated after the study began; as a result, nearly half of the QOL outcome measures were imputed in our analysis and should be interpreted with caution. Another limitation of the current study was the way predictor variables were operationalized. For instance, SC starts at 0% and increases in intervals of 10 up to 100%. Dichotomizing this variable as service connected or not service connected prevented us for looking at how the relationship between SC and outcome in a more sophisticated manner. Likewise, a TBI-related diagnosis was dichotomized and coded as present or not present. More information about the severity of the TBI diagnosis would allow for more meaningful analyses and a better understanding of its impact on PE treatment outcome. Likewise, our coding of benzodiazepine medication was lacking because we could not say if a veteran was actively taking the medication during PE or how the medication was being taken (e.g., as needed vs. time contingent). In addition, because we were only able to exclusively access VA medical records, we were not able to capture medications that may have been prescribed by providers outside of the VA.

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