

## BRIEF REPORT

# The Impact of Military Status on Cognitive Processing Therapy Outcomes in the Community

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Military-affiliated individuals (i.e., active duty personnel and veterans) exhibit high rates of posttraumatic stress disorder (PTSD). Although existing evidence-based treatments for PTSD, such as cognitive processing therapy (CPT), have demonstrated effectiveness with military-affiliated patients, there is evidence to suggest these individuals do not benefit as much as civilians. However, few studies have directly compared the effects of PTSD treatment between civilian and military-affiliated participants. The current study compared treatment outcomes of military-affiliated and civilian patients receiving CPT. Participants with PTSD who were either civilians ( $n = 136$ ) or military-affiliated ( $n = 63$ ) received CPT from community-based providers in training for CPT. Results indicated that military-affiliated participants exhibited reductions in PTSD,  $B = -2.53$ ,  $p < .001$ ; and depression symptoms,  $B = -0.65$ ,  $p < .001$ , they experienced smaller reductions in symptoms relative to civilians:  $B = 1.15$ ,  $p = .015$  for PTSD symptoms and  $B = 0.29$ ,  $p = .029$  for depression symptoms. Furthermore, variability estimates indicated there was more variability in providers' treatment of military-affiliated versus civilian participants (i.e., completion rates and symptom reduction). These findings suggest that military-affiliated patients can be successfully retained in trauma-focused treatment in the community at the same rate as civilian patients, and they significantly improve in PTSD and depression symptoms although not as much as civilians. These findings also highlight community providers' variability in treatment of military-affiliated patients, providing support for more military-cultural training.

Posttraumatic stress disorder (PTSD) is a prevalent and impairing mental disorder, with a lifetime prevalence rate of 8.3% among U.S. adults (Kilpatrick et al., 2013). Among veterans and active duty military service members, prevalence estimates are even higher. Estimates among veterans across

combat eras range from 12% to 30% (Natelson, Mahan, Lee, & Murphy, 2003; Kulka et al., 1990; Tanielian & Jaycox, 2008), which is comparable with what has been reported among active duty service members (Hines, Sundin, Rona, Wessely, & Fear, 2014; Thomas et al., 2010).

There are several evidence-based treatments available to treat PTSD. Of such treatments, one of the most researched is cognitive processing therapy (CPT; Resick, Monson, & Chard, 2016), which was originally developed to treat survivors of rape but has since been applied to other trauma types and populations, including veterans and active duty service members. Several randomized controlled trials (RCTs) have supported the effectiveness of CPT in veteran populations (Forbes et al., 2012; Monson et al., 2006; Surís, Link-Malcolm, Chard, Ahn, & North, 2013). More recently, two RCTs have supported the use of CPT to treat PTSD in service members (Resick et al., 2015, 2017). In fact, based on years of support, CPT has been identified as a frontline PTSD treatment for veterans and active duty military personnel (Department of Veterans Affairs & Department of Defense, 2017).

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Despite the overall effectiveness of CPT in military samples, there are data to suggest that outcomes are less robust in this population (Dillon, LoSavio, & Resick, 2017). In the two RCTs with active duty samples (Resick et al., 2015, 2017), effect sizes were in the medium-to-large range, but they were lower than those typically found in other samples (Watts et al., 2013). Additionally, there was less improvement in depressive symptoms than was reported in previous trials (Resick et al., 2015). Further, in a meta-analysis of PTSD treatment, analyses revealed that PTSD treatments were less effective for combat-related PTSD versus other trauma types (Bradley, Greene, Russ, Dutra, & Westen, 2005).

To our knowledge, the only study to directly compare the PTSD treatment outcomes of civilian and veteran samples was an RCT conducted by Morland and colleagues (2015), who compared in-person CPT with CPT delivered via video teleconferencing in a sample of women civilians ( $n = 105$ ) and veterans ( $n = 21$ ). The authors found that civilians experienced a significantly higher level of symptom improvement than veterans, regardless of treatment modality. Overall, civilians experienced significant reductions in PTSD symptoms, but veteran participants did not. The study by Morland et al. (2015) represents an important first step in evaluating the extent to which CPT outcomes may be stronger among civilian samples but did not include male participants or active duty service members.

The purpose of the current study was to compare treatment outcomes of male and female military-affiliated (i.e., veteran or active duty) and civilian patients receiving CPT in the community. Specifically, the goal was to examine whether military status impacted treatment completion (drop-out vs. completer) or the reduction of PTSD and depression symptoms. We hypothesized that military-affiliated patients would be more likely to drop out of CPT and would experience less improvement in symptoms of PTSD and depression.

## Method

### Participants

Participants included 199 patients with known military status who were seen by 47 community-based clinicians. The clinicians were receiving training in CPT as part of a learning collaborative (LoSavio et al., 2018) and came from 16 community-based, outpatient, mental health agencies or clinical teams. Of these clinicians, 21 (44.7%) saw at least one military-affiliated patients; of this group, six (12.8%) saw only military-affiliated patients. Patient demographics and index traumas are reported in Table 1. Military-affiliated patients were more likely to be male, married or partnered, and to have graduated from high school (see Table 1).

Inclusion criteria for treatment included (a) experience of a Criterion A traumatic event according to the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association, 2013), (b) significant PTSD symptoms that were the priority for treatment, and (c)

willingness to attend sessions at least weekly and complete between-session practice assignments. The only exclusions were (a) current suicidal or homicidal ideation that needed immediate intervention, (b) current unmanaged mania or psychosis, or (c) substance use requiring immediate detoxification. Other comorbidities were not exclusionary.

### Procedure

The project was reviewed by the Duke University Institutional Review Board and determined to be exempt from further oversight. Clinicians were trained in CPT as part of a learning collaborative (LoSavio et al., 2018), which consisted of three in-person 1–2 day learning sessions; weekly, small group, clinical consultation calls to discuss clinicians' training cases; and support to implement CPT in their clinical practices. In total, the Learning Collaborative spanned 12 months. Clinicians were trained to provide the variable-length version of CPT (Galovski, Blain, Mott, Elwood, & Houle, 2012), which allowed participants to complete treatment in more or less than the traditional 12 sessions depending on individual needs. Additionally, clinicians were trained in the version of CPT that does not include a written trauma account. Clinicians recruited patients at their practice sites, either from their existing caseload or from new referrals and intakes. As part of an initial assessment, clinicians collected demographic information on participating patients and administered self-report questionnaires (see Measures section) to determine if the patient had significant symptoms of PTSD and was logistically a good fit for treatment. At subsequent treatment sessions, clinicians administered weekly symptom questionnaires to monitor treatment progress. Participants were considered a completer if they attended a final, agreed upon CPT session, during which the course of treatment was reviewed, after making significant progress as agreed upon by patient and provider.

### Measures

**Traumatic event exposure.** The Life Events Checklist for *DSM-5* (LEC-5; Weathers, Blake et al., 2013) was used to assess exposure potentially traumatic events. Participants are given a list of 16 events and asked to indicate which they had experienced in their lifetime. The LEC-5 was administered prior to initiating CPT, and the event identified as most bothersome was the focus during treatment.

**PTSD symptoms.** The PTSD Checklist for *DSM-5* (PCL-5; Weathers, Litz et al., 2013) was used to assess PTSD symptom severity. The PCL-5 is a 20-item, self-report measure that assesses the extent to which the respondent has been bothered by each of the *DSM-5* PTSD symptoms on a scale from 0 (*not at all*) to 4 (*extremely*). The items are summed to create a total score. Possible scores range from 0 to 80, with higher scores indicating a higher level of PTSD severity. A cut-point score of 33 or higher has been proposed to indicate a likely diagnosis of PTSD (Bovin et al., 2016). In prior research, the PCL-5 has

Table 1  
Demographic Variables

Variable	Military-Affiliated Patients		Civilian Patients		Statistical Test
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Age (years)	35.29	12.75	36.30	13.04	$t(183) = 0.49$
	<i>n</i>	%	<i>n</i>	%	
Male gender	34	55.7	18	13.8	$\chi^2(1, N = 191) = 6.77^{***}$
Race					$\chi^2(6, N = 188) = 9.05$
White	42	68.9	75	59.1	
Black	10	16.4	40	31.5	
American Indian/Alaskan Native	0	0	1	0.8	
Asian	1	1.6	0	0	
Two or more races	1	1.6	4	3.2	
Other	7	11.5	7	5.5	
Hispanic ethnicity	8	13.3	14	10.8	$\chi^2(1, N = 190) = 0.26$
Married/partnered	38	62.3	47	36.2	$\chi^2(1, N = 191) = 11.49^{***}$
Education					$\chi^2(2, N = 186) = 20.43^{***}$
Less than high school	0	0	32	25.2	
High school	29	49.2	35	27.6	
Some college or more	30	50.9	60	44.1	
Index trauma					
Nonmilitary sexual trauma	12	19.7	45	34.9	
Victim of violence/abuse	11	18.0	52	41.3	
Vehicle accident	0	0	7	5.4	
Other accident	3	4.9	5	3.9	
Natural disaster	0	0	1	0.8	
Other	1	1.6	19	14.7	
Combat	25	41.0			
Military sexual trauma	7	11.5			
Other military trauma	2	3.3			
Military status					
Active duty	17	27.0			
Veteran	30	47.6			
Unknown	16	25.4			

Note. Complete demographic data were not available for all patients. Sample sizes ranged between  $n = 61$  and  $n = 59$  for military-affiliated and  $n = 130$  and  $n = 127$  for civilian patients.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

demonstrated good internal consistency (Cronbach's  $\alpha = .96$ ), test-retest reliability ( $r = .84$ ), and convergent and discriminant validity (Bovin et al., 2016). In the current study, the past-month version was used prior to initiating CPT to determine whether participants likely met criteria for PTSD. During CPT, the past-week version of the measure was used to assess progress.

**Depressive symptoms.** The Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001) was used to assess depressive symptoms over the course of CPT. The PHQ-9 is a 9-item, self-report measure that assesses frequency of depressive symptoms on a scale from 0 (*not at all*) to 3

(*nearly every day*). The items are summed to create a total score. Possible scores range from 0 to 27, and higher scores indicate more severe depression. Scores of 10 or more indicate moderate or higher severity. The PHQ-9 has demonstrated good internal consistency (Cronbach's  $\alpha = .89$ ) and test-retest reliability ( $r = .84$ ) as well as several forms of construct validity (Kroenke et al., 2001).

### Data Analysis

Participants attended a variable number of treatment sessions ( $M = 8.13$ ,  $SD = 4.62$ , range: 1–17). There were a small number of missing observations in terms of PCL-5 and PHQ-9 scores

( $M = 0.36$ ,  $SD = 0.96$ ). The linear mixed-effects modeling approach that was used takes into account differing numbers of time points per individual, and because the model between number of sessions and PCL-5 and PHQ-9 scores is linear, the association was interpolated across missing values.

The association between military status and probability of completing treatment was modeled using generalized linear mixed-effects modeling with a logistic link function. The fixed effect of military status (coded as 0 for nonmilitary and 1 for either veteran or active duty military) was assessed in tandem with a random intercept and random effect of military status conditional on provider. These random effects accounted for variation between providers in their nonmilitary rate of completion (intercept) and their military-specific rate of completion.

Changes in symptom outcomes (i.e., PCL-5 and PHQ-9 scores) over the course of treatment were analyzed using three-level multilevel models, nesting sessions within patients within providers and assessing the session-by-session change in outcome as a linear function of session number, military status, and the interaction between session number and military status. The intraclass correlations (ICC) for the PCL-5 were 0.42 at the patients-within-provider level and 0.04 at the provider level, after controlling for patient. For the PHQ-9, the ICC at the patients-within-provider level was 0.49 and 0.08 at the provider level, after controlling for patient. Both outcome and number of sessions were unstandardized, leaving the interpretation of fixed effects as the change in outcome per session completed. Random intercepts at both the provider and patient levels were fit, as were random slopes for the session number, whereas random slopes for military status and the interaction between session number and military status were fit at only the provider level. We used a variance components approach, constraining the covariance between all random effects at 0. Additionally, the addition of fixed and random effects for number of sessions squared was tested but did not significantly improve the fit of the model for either outcome as assessed by a nested chi-square goodness-of-fit test:  $\chi^2(6, N = 199) = 11.9, p = .064$  for the PCL-5 and  $\chi^2(6, N = 199) = 1.31, p = .971$  for the PHQ-9. As such, the linear model was retained for both outcomes. Finally, session number was not centered, which allowed for the interpretation of the effect of military status to be the difference between military and civilian participants at the beginning of treatment. Additional analyses were performed to examine differences between types of military status (i.e., veteran vs. active duty). No significant differences were found when the sample was analyzed this way, and both veteran and active duty were therefore combined into the single military-affiliated category. Descriptive statistics and comparisons between subsamples were calculated using SPSS (Version 22.0; IBM Corp, 2013). All multilevel models were performed using the R package lme4 (Version 1.1.17; Bates, Maechler, Bolker, & Walker, 2015) using the REML estimator and default “bobyqa” optimizer, whereas simple slope analyses were performed using the R package reghelper (Version 0.3.3; Hughes, 2017).

Table 2  
*Treatment Variables*

	Military-Affiliated Patients ( $n = 63$ )		Civilian Patients ( $n = 136$ )	
	<i>n</i>	%	<i>n</i>	%
Treatment completers <sup>a</sup>	33	52.4	67	49.3
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
No. of sessions completed				
Noncompleters	5.50	3.68	3.58	2.32
Completers	12.21	1.80	11.99	1.69
All initiators <sup>b</sup>	9.02	4.41	7.72	4.68
Baseline PCL-5 <sup>b</sup>	52.00	12.76	51.07	13.98
Final PCL-5 <sup>b</sup>	32.14	23.83	27.61	21.44
Baseline PHQ-9 <sup>b</sup>	15.35	6.17	15.69	5.85
Final PHQ-9 <sup>b</sup>	10.10	8.04	9.67	7.28

Note. PCL-5 = PTSD Checklist for DSM-5; PHQ-9 = Patient Health Questionnaire-9.

<sup>a</sup>Treatment completers were defined as having a planned and agreed upon final cognitive processing therapy (CPT) session after sufficient treatment progress had been made. <sup>b</sup>Means and standard deviations represent all initiated CPT cases (including treatment noncompleters).

## Results

Rates of treatment completion, number of sessions, and pre- and posttreatment mean scores on measures of symptom severity are presented in Table 2. The results for treatment completion suggested that on average there was no association between military status and probability of completing CPT, as evidenced by a nonsignificant fixed effect for military status, Log odds ratio ( $OR$ ) = 0.14,  $SE = 0.30$ ,  $p = .648$ . However, there was a substantial amount of variability in the random effect of military status, variance = 0.06, when compared to the variance of the random intercept, variance = 0.01. This suggests there was more provider-specific variability in completion with regards to military-affiliated participants compared to civilian participants. In another multilevel model predicting the number of sessions completed with military status, completer status, and the interaction between the two, we found that military-affiliated noncompleters completed significantly more sessions than civilian noncompleters ( $M_s = 5.77$  vs. 3.53 sessions completed, respectively),  $p = .004$ . There was no difference between military-affiliated and civilian participants in terms of number of sessions among completers.

The results for the change in PCL-5 scores are presented in Table 3. These results suggest that military-affiliated and civilian individuals did not differ in their PCL-5 scores at the beginning of treatment as evidenced by a nonsignificant main effect of military status. Furthermore, the significant effect of number of sessions suggested that, on average, civilian participants experienced a 3.63 point reduction in their PCL-5 score for each session of treatment,  $p < .001$ . There was significant interaction between military status and number of sessions, indicating

Table 3  
*PCL-5 Change Over the Course of Cognitive Processing Therapy (CPT)*

Parameter	Estimate	SE	<i>t</i>	<i>df</i>	<i>p</i>	Variance	Total Variance Explained (%)
Fixed effect							
Intercept	54.49	1.44	37.73	55.12	< .001		
Military status	0.51	2.40	0.21	41.93	.833		
Session number	−3.64	0.21	−17.75	153.68	< .001		
Military Status × Number of Sessions	1.15	0.44	2.60	29.41	.015		
Random effect							
Patient level							
Intercept						163.33	62.9
Session number						2.28	0.9
Provider level							
Intercept						23.17	8.9
Session number						0.28	0.1
Military status						< 0.001	0.0
Military Status × Session Number						1.54	0.6
Residual						69.27	26.7

Note. PCL-5 = PTSD Checklist for DSM-5.

that military-affiliated participants experienced a smaller reduction in their PCL-5 scores,  $B = 1.15$ ,  $p = .015$ , compared to civilians. Military-affiliated participants experienced an average 2.53 point reduction for each session,  $p < .001$ .

Random effects indicate the main sources of variance were the random intercepts at both patient and provider levels, with the patient random intercept (representing the variation in the baseline for each participant) accounting for 62.9% of variance. There was a small amount of variance explained at the patient level by the number of sessions, and this was scaled relative to the fixed effect of session number, suggesting civilian participants varied in their response to treatment. The variance explained by the Military Status × Session Number interaction additionally suggested that military-affiliated participants were even more varied in their response to treatment than civilians as a function of provider (see Table 3). Finally, the small amount of variance explained by the provider-level session number and military status random effects suggest that providers did not vary in efficacy in treating civilians, and their military-affiliated participants did not exhibit widely varied starting PCL-5 scores relative to the rest of the sample.

Finally, results for the change in PHQ-9 scores are found in Table 4. These results mirrored the findings for the PCL-5, with no significant effect of military status, which suggests no difference in PHQ-9 scores between military-affiliated and civilian participants at the beginning of treatment. The significant effect of session number,  $B = -0.93$ ,  $p < .001$ , suggests that civilians experienced a 0.93 point decrease in PHQ-9 scores, on average, for each session whereas the significant interaction between military status and session number,  $B = 0.29$ ,  $p = .029$ , suggests that military-affiliated

participants experienced a smaller decrease in PHQ-9 scores ( $M = 0.65$  point decrease per session),  $p < .001$ .

The random effects also mirrored those for the PCL-5, with the exception of two differences. Specifically, military status had a larger amount of variance explained at the provider level for the PHQ-9 versus the PCL-5, which suggests that providers' military-affiliated patients had more variability in initial PHQ-9 scores than their PCL-5 scores. Additionally, the variance explained by the interaction between military status and session number interaction was slight, which suggests that, unlike with the PCL-5, at the provider level, there was not much variance in efficacy with regard to PHQ-9 score reduction for military-affiliated participants.

## Discussion

In this community-based comparison of military-affiliated versus civilian patient CPT outcomes, military-affiliated participants were no more likely to drop out of treatment than civilians. This is contrary to our hypothesis and extremely promising as it suggests that military-affiliated patients can be effectively retained in community treatment long enough to reap benefits. This evidence of engagement is further highlighted by our finding that military-affiliated patients who dropped out of treatment completed significantly more sessions than civilian participants. However, we found substantial variability at the provider level in terms of treatment completion for military-affiliated patients, which suggests that providers differed in their ability to retain military-affiliated patients in treatment.

Our findings also revealed that, although military-affiliated and civilian participants started treatment with similar symptom

Table 4

*Patient Health Questionnaire (PHQ-9) Change Over the Course of Cognitive Processing Therapy (CPT)*

Parameter	Estimate	SE	<i>t</i>	<i>df</i>	<i>p</i>	Variance	Total Variance Explained (%)
Fixed effect							
Intercept	16.53	0.53	30.84	47.91	< .001		
Military status	−0.40	0.95	−0.43	39.46	.666		
Session number	−0.93	0.07	−14.06	24.89	< .001		
Military Status × No. of Sessions	0.29	0.14	2.30	31.97	.029		
Random effect							
Patient level							
Intercept						24.07	63.4
Session number						0.21	0.6
Provider level							
Intercept						2.66	7.0
Session number						0.03	0.1
Military status						1.01	2.7
Military Status × Session Number						0.08	0.2
Residual						9.93	26.1

Note. PHQ-9 = Patient Health Questionnaire-9.

levels, military-affiliated participants experienced less reduction in PTSD and depression symptoms relative to civilians, as hypothesized. This is consistent with previous research that has demonstrated less dramatic reductions in symptoms among military-affiliated patients compared to civilians (Morland et al., 2015). However, although symptom reduction was less steep in military-affiliated patients compared to civilians, the military group nonetheless experienced significant reductions. Again, significant variability was seen among providers, which suggests that providers varied in the amount of symptom reduction they could facilitate with military-affiliated patients, particularly for PTSD symptoms. Even though we did not find any group differences in terms of dropout rates, there was significant provider-level variability, suggesting differences in skill in both engaging military-affiliated patients in treatment and reducing their symptoms. This might suggest that more provider training in military culture is needed to decrease between-provider variability in military outcomes.

This study replicated and extended prior findings that military-affiliated patients may not benefit as much as civilians from PTSD treatment. In addition to the aforementioned provider-level variables, a number of factors have been proposed to explain differential findings between military-affiliated patients and civilians like those observed in the present study. For example, researchers have noted the potential role of warrior ethos (e.g., “I will never accept defeat”) and other aspects of military training and culture that might make PTSD treatment more difficult, such as valuing approach-focused responses like anger over more vulnerable emotions such as sadness or grief that may be important for recovery (Dillon et al., 2017; Wachen et al., 2016). We did not find any differences when types of mil-

itary affiliation (i.e., veteran vs. active duty) were compared; however, these analyses may have been limited by insufficient power to detect differences between groups. Future research with larger samples of veterans, active duty service members, and civilians should be undertaken to more conclusively evaluate differences between subtypes of military-affiliated patients.

Military-affiliated patients were significantly more likely to be male than civilian patients (55.7% vs. 13.8%, respectively), and we did not have adequate power to test a model that compared the effects of gender and military status on treatment outcome. This makes it difficult to conclude that our findings can be attributed to military status rather than gender differences in treatment outcome. Although there are very few studies that have compared CPT outcomes between men and women, there is some evidence from veteran and civilian samples that women experience more benefit than men (Galovski, Blain, Chappuis, & Fletcher; 2013; Voelkel, Pukay-Martin, Walter, & Chard, 2015). This suggests that additional research to compare CPT treatment outcomes between genders and military status is warranted.

It should be noted that the patients in the present analyses were treated by community therapists who were taking part in an intensive training in CPT. Thus, results from a sample of more experienced CPT providers may differ. However, the treatment effect sizes obtained by these CPT trainees were large, and fidelity to the CPT protocol was high (LoSavio et al., 2018).

Taken together, the results of the present study are promising in that they highlight that military-affiliated patients seeking treatment in the community complete treatment at similar rates to civilians and benefit from treatment. Because their rate of improvement was less dramatic than civilians, future research

should continue to improve strategies to enhance treatment effectiveness with this important population, including enhancing provider skill in working with military-affiliated patients.

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