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A Randomized Controlled Trial of Group Cognitive Behavioral Treatment for Veterans Diagnosed With Chronic Posttraumatic Stress Disorder

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Abstract

Relative to advances in the literature that have examined individual treatment approaches for posttraumatic stress disorder (PTSD), scientific knowledge about group treatment approaches has lagged, resulting in no currently available group treatment for PTSD despite the frequency with which this format is used. Our goal was to build upon the existing literature by examining the efficacy of a group cognitive-behavioral treatment (GCBT) for PTSD relative to group present-centered treatment (GPCT). The sample consisted of 198 male veterans with PTSD who were recruited at two Department of Veteran Affairs medical centers and randomly assigned to either GCBT ($n = 98$) or GPCT ($n = 100$); both treatments were 14 sessions. Assessments occurred at baseline, midtreatment, posttreatment and 3-, 6-, and 12-month follow-ups. Findings indicated significant reductions in PTSD severity and PTSD diagnostic status following treatment for both GCBT, $d = 0.97$, and GPCT, $d = 0.61$. In addition, we observed significant reductions for depression symptoms, anxiety symptoms, and functional impairment for both group treatments as well as a reduction in the percentage of veteran participants who met diagnostic status for co-occurring major depression disorder and generalized anxiety disorder. Notably, these treatment gains were maintained at 12-month follow-up. Contrary to expectations, there were no significant differences between treatment conditions. Veterans diagnosed with PTSD were successfully treated using a group approach. Consistent with a growing body of evidence, the findings also suggest GPCT is as equally efficacious as group trauma-focused treatment. The trial was registered at clinicaltrials.gov (NCT01544088).

Posttraumatic stress disorder (PTSD) is prevalent in the general population, with an even higher prevalence in active duty and veteran populations. The prevalence of PTSD in men and women returning from overseas operations in Afghanistan and Iraq is estimated to be at least 10% immediately postdeployment, with an approximate doubling within 5 years

(Tanielian & Jaycox, 2008). Given the prevalence and debilitating consequences of PTSD, establishing effective treatment approaches is a high priority (Smith, Schnurr, & Rosenheck, 2005).

Substantial progress has been made in identifying effective individual treatments for PTSD, with trauma-focused treatments having the strongest empirical support (Institute of Medicine, 2008; Department of Veterans Affairs & Department of Defense [VA/DoD], 2017). Notably, these treatments have lower efficacy for veterans and service members relative to effects found in civilians (Steenkamp, Litz, Hoge, & Marmar, 2015). Moreover, a growing number of studies have found that non-trauma-focused treatments have comparable PTSD symptom outcomes to first-line trauma-focused PTSD approaches. For instance, several studies have found significant PTSD symptom reduction in veterans and service members receiving prolonged exposure (PE) and cognitive processing therapy but no significant condition difference at posttreatment assessment when compared with present-centered therapy (PCT; Foa et al., 2018; Resick et al., 2015; Surís, Link-Malcom, Chard, Ahn, & North, 2013) or interpersonal therapy (Markowitz et al., 2015). One exception was a study conducted with women veterans treated with either PE or PCT in which PE resulted in significantly greater PTSD symptom reductions at posttreatment relative to PCT (Schnurr et al., 2007). However, at a 6-month follow-up assessment, no significant differences were noted between veterans treated with PE compared to those treated with PCT. These studies underscore the need to investigate PTSD treatment approaches for military veterans and service members using an active, non-trauma-focused treatment.

Another area in which the PTSD treatment literature is lacking is group-based approaches. Relative to individual treatment approaches, there has been much less research conducted on PTSD group treatments. The relative lack of attention to group treatment approaches is likely due to the complexity and cost of conducting group randomized controlled trials. Although group treatment is recognized as better than no treatment (VA/DoD, 2017), the scant number of randomized controlled studies has resulted in there being no evidence-based group approaches currently available for PTSD (VA/DoD, 2017). One frequently used group treatment within the Department of Veteran Affairs (VA) is Seeking Safety, which targets comorbid PTSD and substance use disorder. However, the recent VA/DoD Clinical Practice Guidelines indicate that there is insufficient evidence to recommend either for or against the use of Seeking Safety. Despite the lack of available recommended group treatment options, group approaches are frequently used in clinical settings, especially within the Department of Veteran Affairs. Of the 172,420 veterans who received PTSD treatment services in fiscal year 2017, 63,620 (36.3%) received group treatment (personal communication, R. Hoff, February 16, 2018). The frequent use of group treatment for PTSD reflects, in part, the greater treatment efficiency needed to meet the clinical care demands.

The majority of studies investigating PTSD group treatment have used an open trial design, which provides limited information about treatment efficacy. Sloan and colleagues (2013) conducted a meta-analysis of PTSD group treatment studies that used a randomized controlled trial (RCT) design ($N = 16$). Findings indicated that group treatment was associated with significant reduction in PTSD and resulted in superior outcome effects relative to a waitlist comparison condition, $d = 0.56$. Importantly, the findings revealed that

no significant group treatment effect was found when an active treatment comparison condition was used, $d = 0.09$. These findings should be interpreted with caution given the relatively small number of studies examined. In addition, most studies were likely underpowered to detect between-condition differences, each study investigated a different group treatment protocol, and only a few studies correctly accounted for the group cluster effect in the data analytic plan. Not accounting for the group cluster effect leads to overestimation of the obtained effect size (Baldwin, Murray, & Shadish, 2005). Overall, there is a clear need for additional RCTs on group treatment that build on findings for a specific treatment protocol, include an active treatment comparison condition, are appropriately powered to detect between group effects, and take into account the group cluster in the analytic approach.

The goal of the current study was to build upon the group PTSD treatment literature by examining the effectiveness of a group cognitive behavioral therapy (GCBT) protocol for PTSD that has demonstrated efficacy (Beck, Coffey, Foy, Keane, & Blanchard, 2009). Group CBT is a trauma-focused protocol that includes cognitive restructuring skills, instruction on conducting imaginal and in vivo exposures to PTSD-related stimuli, and skills for prevention of symptom recurrence. The current study expanded upon prior work (Beck et al., 2009) in several important ways. We recruited a larger sample size, included an active non-trauma-focused treatment comparison condition, examined a veteran sample, and used longer-term follow up assessment to determine the durability of any observed treatment gains. In addition, given the high rate of comorbidity in PTSD (Kessler, Chiu, Demler, Merikangas, & Walters, 2005; Rytwinski, Scur, Feeny, & Youngstrom, 2013), the current study investigated the efficacy of GCBT in targeting common comorbid conditions (e.g., anxiety, depression, and social functioning).

We expected that veterans assigned to GCBT would have significantly greater reduction in PTSD symptom severity relative to veterans assigned to group PCT and that this effect would be maintained at a 12-month follow-up assessment. This prediction was, however, tempered by recent data suggesting a lack of difference in efficacy for trauma-focused and non-trauma-focused treatments (e.g., Foa et al., 2018; Resick et al., 2015; Surís et al., 2013). In order to provide a strong test of GCBT, we selected group PCT as the active comparison condition. In several trials, PCT has been shown to produce positive, clinically meaningful change in PTSD symptoms among veterans (Schnurr et al., 2003; Schnurr et al., 2007; Surís et al., 2013). With this design, we hoped to examine the efficacy of GCBT against a non-trauma-focused active group treatment comparison in order to bracket effect sizes that could be expected from each intervention. Finally, given the evidence that successful PTSD treatment shows generalization to comorbid conditions (e.g., Resick, Monson, Gutner, & Maslej, 2014), we expected GCBT to result in superior treatment generalization effects relative to group PCT effects and anticipated these generalized gains to be maintained at 12-month follow-up.

Method

Participants

Participants were recruited from VA Boston Healthcare System and Providence VA Medical Center. Male veterans were recruited through clinic referrals and flyer announcements distributed throughout the medical centers. Women were not recruited due to the small number presenting for services and the need to conduct separate groups for men and women due to the high rate of sexual assault among female veterans (see Sloan, Unger, Beck, 2016). Study inclusion criteria were a current diagnosis of PTSD established by the Clinician-Administered PTSD Scale for *DSM-5* (CAPS-5; Weathers, Blake et al., 2013) and stable psychotropic medication for a minimal of 30 days prior to study entry. Exclusion criteria were significant cognitive impairment, active psychosis/psychotic disorder, high risk for suicide, current substance dependence, and current psychotherapy for PTSD. Participants provided written informed consent prior to enrollment and were compensated for their time completing the assessment sessions.

Procedure

The study was a hybrid efficacy–effectiveness RCT examining the efficacy of GCBT versus GPCT for veterans diagnosed with PTSD. Study approval was obtained from the VA Boston Healthcare System and Providence VA Medical Center institutional review boards. Recruitment for the study began November 27, 2012 and the last study assessment took place on August 23, 2017. The same recruitment procedures were used at both study sites. Randomization was stratified by site. Each group cohort consisted of 10–16 participants (equally assigned to each treatment condition). We used the sealed envelope program to generate randomization, which was conducted by the study statistician. After all participants in a potential group cohort had completed their initial assessment, randomization was conducted by opening sealed envelopes that revealed the treatment assignment. Envelopes were opened for participants in the order in which they were recruited for the group cohort. The project coordinator then informed all group cohort members of their group assignment. A detailed description of study procedures is described elsewhere (Sloan, Unger, & Beck, 2016). The study was registered at clinicaltrials.gov (NCT01544088) prior to data collection.

Both treatment groups included 14 sessions of 2-hrs each, which were scheduled across 16 weeks. Two therapists, drawn from existing mental health providers, led each group. One therapist was a licensed social worker while all other therapists were PhD-level clinical psychologists. Therapists were nested within each treatment condition. All therapists completed workshop training on one group protocol, which was followed by weekly supervision. Treatment fidelity was assessed by two individuals otherwise unaffiliated with the study. For each treatment condition, 20% of the treatment sessions were randomly selected, reviewed, and rated, using the adherence and competence forms developed for each protocol. Both treatment conditions were rated as good-to-excellent in terms of competency and very good-to-excellent in terms of adherence. There were no significant between-treatment differences in fidelity.

The GCBT treatment focuses on nurturing group cohesion while introducing cognitive-behavioral interventions that focus on trauma. Considerable emphasis is placed on between-session practice (homework) in an effort to foster acquisition and generalization of skills. Interventions include psychoeducation, in vivo and written exposure, progressive muscle relaxation, cognitive restructuring of posttrauma dysfunctional thoughts, assertion training, behavioral activation, and prevention of symptom recurrence. Imaginal exposure is conducted through written narratives conducted in two of the group sessions and continued as between-session assignments for the duration of treatment. Therapists provide input to each patient regarding their written trauma narratives, to ensure adequate processing. Homework is tailored to address each participant's fear hierarchy, with cognitive and behavioral strategies taught to all group members. In the current study, GCBT was manualized, with ample handouts provided for patients. For a detailed description of the protocol, see Beck and Coffey (2005).

Group present-centered therapy served as the comparison condition; this treatment was developed for use in the Veterans Administration Cooperative Study #420 (Schnurr et al., 2003) and focuses on helping patients learn to manage symptoms in a group context by increasing awareness of the cognitions and emotions they are experiencing. The core components of GPCT include psychoeducation, peer support, and the development of peer-facilitated problem solving. Trauma-focused work or the delivery of clinician instruction in skill development was not included in this study. Weekly home therapy assignments were given and concerned reactions to the session content from the previous week as well as symptom management during the week. One goal of GPCT is to normalize the associated features as well as the symptoms of PTSD. A second goal is to develop a framework for the ongoing focus of the group, targeted at increasing awareness of the manifestations of PTSD-related themes in the individual's current day-to-day life, and increasing mastery and ability to cope with such issues. All assessments were conducted by a master's- or doctoral-level assessor who was unaware of treatment assignment. For the current study, GPCT was manualized.

Measures

PTSD.—The CAPS-5 (Weathers, Blake et al., 2013) was the primary outcome measure. The CAPS-5 is a structured diagnostic interview and gold standard for assessing PTSD for the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association [APA], 2013). A 5-point ordinal rating scale is used to measure symptom severity (ranging from 0 = *absent* to 4 = *extreme/incapacitating*) on the 20 symptoms that correspond to PTSD diagnosis. Symptom severity ratings combine information about symptom frequency and intensity obtained by the interviewer. Development of CAPS-5 was completed at the time recruitment began; thus, this interview was used to assess PTSD symptoms according to *DSM-5* criteria. The CAPS-5 has strong psychometric properties indicating criterion and construct validity and agreement with a self-report measure of PTSD (Weathers et al., 2018). Total PTSD severity was calculated by summing the severity score for the 20 PTSD symptom items. The CAPS-5 total score demonstrated strong internal consistency, Cronbach's $\alpha = .81$. Interrater reliability, as assessed by random selection of 20% of administered CAPS-5 interviews across all

assessment points, was high, $\kappa = 0.80$. In the current study, PTSD diagnostic status was established according to the *DSM-5* diagnostic algorithm. To contextualize the severity of the sample, CAPS-5 total scores of 26 or higher are generally indicative of PTSD diagnosis (see Weathers et al., 2018, for a detailed description).

PTSD symptom severity.—The PTSD Checklist for *DSM-5* (PCL-5; Weathers, Litz et al., 2013) is a 20-item self-report measure of *DSM-5* PTSD symptoms. Respondents rate the degree to which they were bothered by each symptom during the past month on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*). Item scores are summed to a total score with higher scores indicating a higher level of overall PTSD symptom severity. The PCL-5 has demonstrated strong reliability and validity in multiple studies among both veteran and undergraduate samples (Blevins, Weathers, Davis, Witte, & Domino, 2015; Bovin, Marx, & Schnurr, 2015). Internal consistency for the current study was excellent (Cronbach's $\alpha = .88$).

Comorbid conditions.—The Structured Clinical Interview for *DSM-IV* (SCID; Spitzer, Williams, Gibbon, & First, 1994) was administered to assess for exclusion criteria as well as the efficacy of GCBT and GPCT on commonly occurring comorbid conditions associated with PTSD. We were unable to use the SCID for *DSM-5* because it was not available at the start of the study. To reduce participant burden, the SCID was not administered at midtreatment and 6-month follow-up assessment. Interrater reliability was good for the most commonly occurring comorbid diagnoses, which were major depressive disorder (MDD; median $\kappa = 0.87$) and generalized anxiety disorder (GAD; median $\kappa = 0.82$).

Anxiety and depression.—The Beck Depression Inventory–II (BDI-II; Beck, Steer, & Brown, 1996) is a 21-item self-report measure that assesses depression symptoms over the past two weeks. Items are totaled with a possible score range of 0–63. The Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) is a 21-item self-report measure of anxiety symptoms over the past week. Items are calculated to create a total score, with a possible score range of 0–63. These two measures were included to examine the efficacy of the treatments on self-reported depression and anxiety symptoms. For the current study, the internal consistency was excellent for the BDI-II and the BAI (Cronbach's $\alpha = .93$ and $.92$, respectively).

Functional impairment.—Functional impairment was indexed with two subscales of the Medical Outcomes Study Short-Form Health Survey (SF-36; Ware & Sherbourne, 1992): Role Limitations due to Emotional Problems (RE) and Social Functioning (SF). Both subscales have shown strong psychometric properties (McHorney, Ware, & Raczek, 1993; Quilty, Van Ameringen, Mancini, Oakman, & Farvolden, 2003). For the current study, the internal consistency was excellent for both subscales (Cronbach's $\alpha = .88$ for RE and Cronbach's $\alpha = .92$ for SF).

Treatment variables.—Process variables included measures of treatment expectancies, treatment satisfaction, and adequate treatment dose. The Expectancy Rating Questionnaire (ERQ; Borkovec & Nau, 1972) was administered after the first treatment session to assess treatment credibility. Treatment satisfaction was assessed at the last treatment session using

the Client Satisfaction Questionnaire (CSQ; Larsen, Attkisson, Hargreaves, & Nguyen, 1979). Consistent with the definition used by Beck et al. (2009), adequate treatment dose was defined as whether the participant attended at least 10 of the 14 treatment sessions.

Data Analysis

In the computation of sample size, we used a power level of 0.80. With a proposed group size of seven, a maximum p of 0.11, and $d = 0.50$, we estimated a total sample size of 162, using $p < .05$. Based on prior PTSD clinical trials (e.g., Schnurr et al., 2003), we expected a 20% dropout rate and adjusted our sample size goal to 196.

Primary treatment outcomes were examined using hierarchical linear modeling (Raudenbush & Bryk, 2002), which is appropriate for designs with repeated measures nested within individuals. The fixed effects of treatment condition (GCBT vs. GPCT), time (baseline, midtreatment, posttreatment, and 3-, 6-, and 12-month follow-ups), and their interaction were examined for each outcome. An unstructured covariance matrix and maximum likelihood estimator were used for all analyses. Shape of change was examined separately for each outcome variable, first via visual inspection and then via computation of linear, quadratic, and hyperbolic growth terms. The majority of participants ($n = 113$, 57.1%) had complete data. The percentage of participants who exhibited reliable change was calculated for each condition. Using the Reliable Change Index (RCI; Jacobson & Truax, 1991), CAPS-5 total score changes of 13 points or more are considered greater than variation, which could be attributed to measurement error (Sloan, Marx, Lee, & Resick, 2018). Of the individuals with missing data ($n = 85$), the majority (48.2%) were only missing data from one time point. Hierarchical linear modeling analyses are robust to missing data; cases with missing data at later time points were retained in analyses. Analyses were conducted using all data points for participants who were randomized (i.e., intent to treat).

The impact of therapy group, recruitment cohort, and treatment site were examined using random effects modeling in preliminary analyses. The intraclass correlation coefficient (ICC) for therapy group and recruitment cohort ($< .001$ and $.001$, respectively) indicated that both groupings accounted for less than 1% of the variance in CAPS-5 scores; thus, these variables were not included. The ICC for treatment site ($.09$, $p = .043$) indicated that site did account for significant variance in CAPS-5 scores and thus, site-level differences were examined in each model. Models for each outcome measure were conducted in four steps: (a) a baseline model examining the effect of linear change over time, (b) addition of quadratic and hyperbolic growth terms, (c) examination of condition by time interactions, and (d) examination of the role of site in condition by time interactions. Nonsignificant effects were dropped from all subsequent steps.

Results

Sample Characteristics

A total of 198 veterans were randomized (Figure 1), with seven cohorts recruited at Providence VA and eight cohorts recruited at VA Boston. Cohort sizes ranged from 11 to 16 ($M = 13.27$). Most participants in both treatment conditions identified combat as their index

trauma. Underscoring the chronicity of the sample, time since index trauma event was 334 months (i.e., approximately 28 years), and 75.2% of the sample ($n = 149$) reported at least one prior course of PTSD treatment, either in group or individual format. Treatment conditions did not significantly differ in any demographic variables (Table 1). Participants in Providence were significantly younger ($M = 53.86$ years, $SD = 13.38$) compared to Boston ($M = 57.36$ years, $SD = 10.70$) $t(196) = 2.04$, $p = .042$. No other significant site differences were observed.

Treatment conditions did not significantly differ at baseline on any of the outcome measures, $ps = .323-.735$ (see Tables 2 and 3). However, there were site differences, with participants from the Providence site endorsing higher levels of baseline PTSD symptom severity, higher levels of depressive symptom severity, and a higher likelihood of meeting criteria for co-occurring MDD and GAD relative to the Boston site participants.

Process Measures

Veterans reported having moderate expectations that the group treatment would be effective in reducing PTSD symptoms (CAPS-5 total scores $M = 22.56$, $SD = 7.14$), with no significant between-condition differences, $t(183) = 0.79$, $p > .402$. Veterans also reported high levels of satisfaction with group treatment (CSQ scores $M = 28.37$, $SD = 4.12$), with no significant difference observed between the treatment conditions ($M = 29.11$, $SD = 4.21$ for GCBT and $M = 27.75$, $SD = 3.96$ for GPCT), $t(135) = -1.95$, $p = .053$.

In terms of adequate treatment dose, participants assigned to the GCBT condition were significantly more likely to report inadequate treatment dose, with 38.4% inadequate dose in GCBT compared to 21.2% for GPCT, $\chi^2(1, N = 198) = 6.71$, $p = .008$. Across sites, participants from Providence VA Medical Center were more likely to have inadequate treatment dose; 37.2% with inadequate dose in Providence VA compared to 23.1% in VA Boston, $\chi^2(1, N = 198) = 4.20$, $p = .037$. At the VA Boston site, no significant between-condition differences were noted in the percentage of participants who received an inadequate treatment dose (28.4% for vs. 19.2% for GPCT), $\chi^2(1, N = 111) = 1.11$, $p = .294$. In contrast, for the Providence VA site, participants in the GPCT condition were more likely to have inadequate treatment dose (50.3% for GCBT vs. 23.2% for GPCT), $\chi^2(1, N = 87) = 6.69$, $p = .008$.

Primary Outcome

Means, standard deviations, effect sizes, and diagnostic status for all outcome measures by condition and time are presented in the Supplementary Materials. Scores on the CAPS-5 showed significant effects of linear change over time (see Table 3). A significant quadratic effect for time indicated symptom decrease plateaued over time (see Supplement). However, Linear Time and Quadratic Time x Condition interactions were nonsignificant, indicating that the two treatment conditions did not significantly differ in symptom improvement across time. Significant site differences emerged for the CAPS-5 such that participants from Providence VA had higher CAPS-5 scores overall, $b = 4.51$, $SE = 1.84$, $t = 2.45$, $p = .02$. However, the Time x Site interaction, $b = -0.72$, $SE = 0.61$, $t = 1.17$, $p = .24$; and Time x Site x Condition interaction, $b = 0.93$, $SE = 0.91$, $t = -1.02$, $p = .31$, were both

nonsignificant, indicating that PTSD symptom severity decreases over time did not vary by site or by condition across sites. Within-condition effect sizes suggest participants experienced moderate to large reductions in PTSD symptoms (see Supplementary Material). Between-condition differences were small at all assessments. More than half of the veterans in both treatments continued to meet full diagnostic criteria for PTSD at the 3-, 6-, and 12-month follow-up assessments (see Supplement). Less than 40% of participants in both conditions at all time points evidenced this magnitude of symptom reduction, and conditions did not significantly differ in likelihood of producing reliable change, all chi-square $p > .05$ (see Supplementary Material). Total CAPS-5 scores for treatment completers and individuals who dropped out of treatment did not significantly differ at any time point. Similarly, a significant effect of linear change over time was observed for PCL-5 scores. Consistent with CAPS-5 scores, the Time x Condition interaction was not significant for the PCL-5, indicating that the two treatment conditions did not significantly differ in symptom improvement across time. The within-condition effect sizes indicated that participants experienced moderate reductions in PTSD symptoms as measured by the PCL-5; the between-condition effect sizes were small at all assessments.

Secondary Outcomes

Approximately half of the individuals who met criteria for co-occurring MDD and PTSD at baseline continued to meet criteria at posttreatment, and less than half of participants in both conditions met criteria at 3- and 12-month follow-ups, with no between-condition differences. The BDI-II showed significant effects of linear change over time. The Time x Condition interaction was not significant, which indicated that the two treatments did not significantly differ in symptom improvement across time. The within-condition effect sizes suggested that all participants experienced a small improvement in depression symptoms; between-condition effect sizes were small at all assessments.

Among individuals who met criteria for co-occurring GAD and PTSD at baseline, less than 20% continued to meet criteria at posttreatment and less than 10% of participants met criteria at 3- and 12-month follow-ups, with no between-condition differences. The BAI showed significant effects of linear change over time. Additionally, significant quadratic and hyperbolic effects of time were observed. Visual inspection of the data revealed a small-magnitude increase in BAI scores from baseline to midtreatment followed by decreases from midtreatment to all follow-ups in both conditions. When models with quadratic and hyperbolic effects of time were compared, the hyperbolic model provided slightly better fit and was retained. The Time x Condition interactions were not significant, which indicated the two treatments did not significantly differ in anxiety symptom improvement across time. The within-condition effect sizes for self-reported anxiety symptoms were small for both conditions; between-condition effect sizes were small at all assessments.

The SF-36 subscale scores for emotional and social functioning showed significant effects of linear change over time. Time x Condition interactions were not significant for either measure, which indicated that the two treatments did not significantly differ in functioning across time. Within-condition effect sizes indicated that participants experienced a small

improvement in emotional functioning and moderate improvement in social functioning; between-condition effect sizes were small at all time points.

Adverse Events

A total of 37 serious adverse events occurred and were reported to the local IRB and the Data Monitoring Committee. Of these events, 24 were deemed unrelated to the study (e.g., hospitalization due to surgery). The remaining 13 events were deemed probably unrelated to the study (e.g., hospitalization due to depression symptoms that occurred during the follow-up period, residential treatment for substance use disorder during the follow-up period for an individual with a long-standing history of substance use disorder that predated enrollment in the study).

Discussion

Veteran participants randomized to both group treatments displayed significant reductions in PTSD symptom severity at posttreatment, which was maintained 12 months following treatment completion. The stability of symptom reduction 12 months following treatment was notable given the severity and chronicity of the sample. The finding of long-term maintenance of PTSD treatment gains is consistent with those reported in other studies that examined the efficacy of PTSD group treatment with veterans (e.g., Schnurr et al., 2003). Moreover, in the current study, veteran participants in both treatment groups reported high levels of satisfaction with treatment. Despite the significant symptom reduction, approximately 70% of participants continued to meet PTSD diagnostic criteria following treatment, and less than 40% of participants in both conditions evidenced reliable symptom decreases. It should be noted that the rate of remission observed in the current study was consistent with what has been reported in PTSD treatment studies with veteran and activity-duty service member samples (Steenkamp et al., 2015), which underscores the challenges associated with treating PTSD in this population.

Contrary to expectations, GCBT was not associated with a significantly better outcome relative to GPCT. This finding adds to a growing number of studies that have not found statistically significant differences between trauma-focused group treatment compared to group PCT (Classen, Koopman, Nevillmanning, & Spiegel, 2001; McDonagh et al., 2005; Schnurr et al., 2003), in addition to the increasing number of studies that have found no significant between-condition effects for PE (Foa et al., 2018) and CPT (Surís et al., 2013) when compared to individually delivered PCT. Indeed, although PCT was created to serve as a comparison condition to control for nonspecific therapy effects (Schnurr et al., 2003), this treatment has emerged as a moderately efficacious PTSD treatment approach (Frost, Laska, & Wampold, 2014) that has shown lower treatment dropout rates than what is typically observed for trauma-focused treatments (Imel, Laska, Jakupcak, & Simpson, 2013). The current study observed a similar pattern in terms of adequate dose. That is, GPCT had a significantly larger percentage of participants who achieved adequate dose (71.4%) relative to GCBT (62.6%). The larger percentage of adequate dose for the GPCT condition was more pronounced at the Providence site relative to the Boston site. Participants in GPCT may have attended a greater number of group sessions because of the non-trauma-focused nature of the

treatment compared to the more intensive, trauma-focused format of GCBT. Taken together, the current study adds to the emerging literature that suggests structured non-trauma-focused treatment can be helpful for individuals with chronic PTSD, particularly military veterans and service members, and is associated with a higher level of treatment retention (for a commentary on this issue, see Hoge & Chard, 2018).

The findings reported herein bolster those reported in related studies that have suggested that the efficacy of trauma-focused treatment delivered in group format is dampened relative to individual format. In the current study, within-treatment effect sizes were smaller than what has been typically observed for individual treatment approaches. Similarly, we observed the current a moderate within-group effect size for GCBT in the current study whereas large effect sizes have more typically been observed for individual treatments (e.g., VA/DoD, 2017). These findings provide an important contribution to the existing literature given that the majority of prior group treatment studies for PTSD have not included an active treatment comparison and were likely underpowered to detect between-treatment effects. Moreover, most previous studies have not accounted for the group clustering effect in their data analyses, which overestimates effect sizes.

Only one study of which we are aware has directly compared individual and group treatments (Resick et al., 2017). The authors of this study reported that CPT delivered via individual format resulted in significantly larger PTSD symptom reductions relative to group CPT. Given the frequency with which group treatment is used in VA clinics as well as considerations of cost-effectiveness in large care environments, such as the VA Health Care System, it is important to establish parameters of efficacy and effectiveness for group treatments.

The current study assessed treatment generalization to comorbid conditions using a combination self-report and clinician-administered measures. The findings of significant reductions in anxiety, depression, and functioning were notable, but mostly small effects were observed. However, a striking reduction was observed for reduced rates of MDD and GAD following treatment (50% and 80%, respectively), and these reductions were greater than what was observed for PTSD. It is unclear why the reductions in MDD and GAD were greater than what was observed for the primary diagnostic target although the general effects of the group format (e.g., social support) may have influenced these reductions. These findings highlight the idea that comorbid conditions can be successfully treated by targeting PTSD, regardless of whether the treatment is trauma- or non-trauma-focused.

We observed a number of baseline site differences, with participants recruited at the Providence VA site displaying greater severity; this factor likely accounted for the overall higher dropout rates at this site. The site differences were surprising given that the same study recruitment procedures were followed at both sites, but the likely reflect the types of site differences that are commonly observed across such a large system of health care. Despite these baseline differences, the rate of symptom reduction between the two sites was similar.

A limitation of the study is that we were not able to include a comparison condition of no treatment, as VA policy prohibits this practice. Because participants had a chronic history of PTSD and a substantial percentage of the participants reported at least one prior course of PTSD treatment, it is highly unlikely that significant symptom reductions were the result of spontaneous remission. As previously described, the study only included male veterans for a variety of reasons. Nonetheless, the exclusion of female veterans is a limitation of the study.

The findings of the current study are promising as PTSD can be difficult to treat in veteran and service-member samples (Hoge & Chard, 2018; Steenkamp et al., 2015). Veterans displayed reductions in PTSD and comorbid symptoms of depression and anxiety as well as functional impairment. Moreover, the participants indicated high levels of treatment satisfaction. The study adds to the growing literature that shows smaller effect sizes for trauma-focused group treatment relative to trauma-focused treatment delivered individually. The current study also supports the growing number of studies that have not found significant between-condition differences for trauma-focused and non-trauma-focused treatments, particularly for the veteran and service-member populations. Given the small number of RCTs that have examined group PTSD treatment, it will be important to continue to investigate group treatment approaches for PTSD given the potential cost-effectiveness of this approach and the need to provide quality care for large numbers of veterans and active-duty service members seeking PTSD treatment. As noted by Hoge, Lee, and Castro (2016), group PTSD treatment is associated with significant clinical improvements that are sustained for 6–12 months following treatment. Accordingly, group treatment for PTSD should continue to be considered a valuable treatment option.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1. CONSORT diagram. PTSD = posttraumatic stress disorder; CBT = cognitive behavioral therapy; PCT = present-centered therapy; tx = treatment; mid-tx = midtreatment.

Table 1**Sample Demographic Characteristics**

Demographic	Full Sample		GCBT		GPCT		<i>t</i>	χ^2	<i>df</i>	<i>N</i>	<i>p</i>
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%					
Mean age (<i>SD</i>)	55.82	(12.05)	54.40	(11.44)	57.22	(12.51)	1.66		196	198	.099
Race											
White	147	74.2	75	76.5	72	72.0		0.38	3	198	.624
African American	33	16.7	14	14.3	19	19.0					
American Indian	3	1.5	2	2.0	1	1.0					
Other	15	7.6	8	8.2	7	7.0					
Education											
< High school graduate	19	9.6	6	6.1	13	13.0		0.45	3	191	.586
High school graduate	29	14.7	18	18.4	11	11.0					
Some college or vocational training	103	52.0	50	51.0	53	53.0					
Graduated college	40	20.2	22	22.5	18	18.0					
Household income (USD)											
< \$15,000	45	22.7	25	25.5	20	20.0		7.33	3	192	.062
\$15,001–50,000	86	43.4	40	40.8	46	46.0					
\$50,001–75,000	37	18.7	14	14.3	23	23.0					
> \$75,000	24	12.1	17	17.4	7	7.0					
Did not report	6	3.0	2	2.0	4	4.0					
Employment											
Full time	59	29.8	24	24.5	35	35.0		5.70	4	190	.223
Part time	26	13.1	13	13.3	13	13.0					
Student	3	1.5	3	3.1	0	0.0					
Retired or on disability	80	40.4	40	40.8	40	40.0					
Unemployed	22	11.1	13	13.3	9	9.0					
Marital Status											
Married or remarried	98	49.5	51	52.0	47	47.0		0.50	4	198	.566
Widowed	6	3.0	3	3.1	3	3.0					
Cohabiting	9	4.6	5	5.1	4	4.0					

Demographic	Full Sample		GCBT		GPCT		<i>t</i>	χ^2	<i>df</i>	<i>N</i>	<i>p</i>
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%					
Separated or divorced	63	31.8	34	34.7	43	43.0					
Single	22	11.1	14	14.3	8	8.0					
Index trauma											
Combat	138	69.7	68	69.4	70	70.0		0.01	7	198	.994
Death of or trauma to friend or loved one	14	7.1	6	6.1	8	8.0					
Adult sexual assault	6	3.0	3	3.1	3	3.0					
Adult nonsexual assault	8	4.0	3	3.1	5	5.0					
Childhood sexual assault	1	0.5	0	-	1	1.0					
Childhood nonsexual assault	7	3.5	3	3.1	4	4.0					
Accident	17	8.6	10	10.2	7	7.0					
Other	7	3.5	5	5.1	2	2.0					

Note. GCBT = group cognitive-behavioral treatment; GPCT = group present centered treatment.

Table 2

Condition Differences in Baseline Symptoms and Co-Occurring Psychopathology

Measure	GCBT				GPCT				t	χ^2	df	p
	<i>M</i>	<i>SD</i>	<i>n</i>	%	<i>M</i>	<i>SD</i>	<i>n</i>	%				
CAPS-5 Total	39.84	9.84			39.37	9.52			-0.34		196	.735
BDI-II Total	23.85	11.95			23.94	11.65			0.06		196	.955
BAI Total	18.22	11.31			20.97	12.15			1.65		195	.102
SF-36-RE	49.57	24.01			52.00	28.21			0.65		195	.516
SF-36-SF	39.43	26.60			42.88	26.37			0.91		195	.363
Co-Occurring Disorders ^a												
MDD			54	55.1			57	57.0		0.07	1	.552
GAD			21	21.4			18	18.0		0.33	1	.851
Panic disorder			12	12.2			14	14.0		1.21	1	.553
Binge eating disorder			9	9.2			6	6.0		1.61	1	.445
SAD			7	7.1			10	10.0		1.64	1	.438
Specific phobia			5	5.10			3	3.00		1.40	1	.495
OCD			3	3.06			3	3.00		0.94	1	.628
Cannabis abuse			3	3.06			2	2.00		1.10	1	.581
Alcohol abuse			1	1.02			3	3.00		1.05	1	.314

Note. BAI = Beck Anxiety Inventory; BDI-II = Beck Depression Inventory, second version; BOS = VA Boston Healthcare System; CAPS-5 = Clinician Administered PTSD Scale for DSM-5; GAD = generalized anxiety disorder; GCBT = group cognitive-behavioral treatment; GPCT = group present centered treatment; MDD = major depressive disorder; OCD = obsessive compulsive disorder; PROV = Providence VA Medical Center; SAD = social anxiety disorder; SF-36-RE = 36 Item Short Form Survey – Role Limitations due to Emotional Problems subscale; SF-36-SF = 36 Item Short Form Survey – Social Functioning subscale.

^a Only disorders present for three or more participants reported.

Table 3

Hierarchical Linear Modeling Results of the Effects of Time, Condition, and Their Interaction on Symptoms and Functioning

DV	Model	Effect	Estimate	SE	df	t	p	-2LL	AIC	BIC
CAPS-5	1	Linear time	-1.80	0.18	215.33	-10.21	< .001	7,176.78	7186.78	7211.30
	2	Linear time	-2.95	0.52	591.27	-5.70	< .001	7,171.32	7,183.32	7,212.74
		Quadratic time	0.24	0.10	637.90	2.36	.019			
	3	Linear time	-1.49	0.33	453.16	-4.58	< .001	7,175.57	7,187.57	7,216.99
		Hyperbolic time	-1.87	1.68	778.10	-1.13	.269			
	4	Linear time	-3.14	0.71	581.92	-4.42	< .001	7,167.38	7,185.38	7,229.52
		Quadratic time	0.33	0.14	634.75	2.42	.016			
		Condition	0.49	1.73	352.49	0.28	.779			
PCL-5		Linear Time x Condition	0.41	1.03	589.77	0.39	.692			
		Quadratic Time x Condition	-0.20	0.20	635.60	-1.02	.307			
	1	Linear time	-1.67	0.23	199.22	-7.19	< .001	7,548.18	7,558.18	7,582.70
	2	Linear time	-2.35	0.64	629.06	-3.65	< .001	7,546.92	7,558.92	7,588.35
		Quadratic time	0.14	0.12	697.73	1.13	.263			
	3	Linear time	-1.67	0.41	459.54	-4.04	< .001	7,548.18	7,560.18	7,589.61
		Hyperbolic time	-0.02	2.05	798.80	-0.01	.998			
	4	Linear time	-1.42	0.32	192.74	-4.45	< .001	7,543.70	7,557.70	7,592.03
BDI-II		Condition	-1.88	2.04	320.37	-0.92	.361			
		Linear Time x Condition	-0.56	0.46	198.91	-1.20	.232			
	1	Linear time	-0.55	0.14	230.11	-3.80	< .001	7,012.18	7,022.18	7,046.70
	2	Linear time	-0.53	0.45	547.46	-1.18	.242	7,012.18	7,024.18	7,053.56
		Quadratic time	-0.01	0.09	580.17	-0.02	.990			
	3	Linear time	-0.79	0.28	443.47	-2.85	.005	7,011.05	7,023.05	7,052.47
		Hyperbolic time	1.60	1.49	745.04	1.07	.286			
	4	Linear time	-0.30	0.18	225.86	-1.56	.123	7,007.76	7,021.76	7,056.09

DV	Model	Effect	Estimate	SE	df	t	p	-2LL	AIC	BIC
BAI		Condition	-0.50	1.67	255.69	-0.30	.764			
		Linear Time x Condition	-0.51	0.28	231.13	-1.83	.069			
	1	Linear time	-0.59	0.17	227.24	-3.56	< .001	7,081.62	7,091.62	7,116.09
	2	Linear time	0.53	0.50	589.76	1.06	.289	7,076.07	7,088.07	7,117.44
		Quadratic time	-0.23	.10	634.28	-2.37	.018			
	3	Linear time	-1.77	0.32	465.86	-5.58	< .001	7,062.70	7,074.70	7,104.06
		Hyperbolic time	7.26	1.65	769.17	4.41	< .001			
	4	Linear time	-1.57	0.43	458.26	-3.62	< .001	7,058.62	7,076.62	7,120.67
		Hyperbolic time	6.43	2.27	761.03	2.84	.005			
		Condition	-1.07	3.33	745.16	-0.33	.744			
		Linear Time x Condition	-0.44	0.64	462.55	-0.69	.494			
		Hyperbolic Time x Condition	1.72	3.30	766.81	0.52	.604			
SF-36-RE	1	Linear time	1.38	0.38	274.35	3.61	< .001	8,904.17	8,914.17	8,938.68
	2	Linear time	2.61	1.22	582.63	2.13	.034	8,903.07	8,915.07	8,944.48
		Quadratic time	-0.25	0.24	608.74	-1.06	.294			
	3	Linear time	1.23	0.76	491.32	1.63	.104	8,904.12	8,916.18	8,945.53
		Hyperbolic time	0.94	4.12	756.26	0.23	.825			
	4	Linear time	0.74	0.52	266.33	1.43	.157	8,900.92	8,914.92	8,949.24
		Condition	-2.31	3.50	313.60	-0.66	.510			
		Linear Time x Condition	1.37	0.77	274.61	1.79	.074			
SF-36-SF	1	Linear time	1.87	0.39	261.55	4.76	< .001	8,918.08	8,928.08	8,952.59
	2	Linear time	3.02	1.24	583.97	2.43	.016	8,917.14	8,929.14	8,958.56
		Quadratic time	-0.24	0.24	613.53	-0.97	.334			
	3	Linear time	1.70	0.77	484.81	2.20	.028	8,918.01	8,930.01	8,959.42
		Hyperbolic time	1.11	4.15	761.54	0.27	.793			
	4	Linear time	1.39	2.51	254.83	0.55	.584	8,916.59	8,930.59	8,964.91

DV	Model	Effect	Estimate	SE	df	t	p	-2LL	AIC	BIC
		Condition	0.70	1.28	315.46	0.55	.589			
		Linear Time x Condition	-0.13	0.17	262.69	-0.74	.462			

Note. AIC = Akaike's Information Criterion; BAI = Beck Anxiety Inventory; BDI-II = Beck Depression Inventory, second version; BIC = Bayesian Information Criterion; CAPS-5 = Clinician Administered PTSD Scale for DSM-5; PCL-5 = PTSD Checklist for DSM-5; SF-36-RE = 36 Item Short Form Survey – Role Limitations due to Emotional Problems subscale; SF-36-SF = 36 Item Short Form Survey – Social Functioning subscale; -2LL = -2LogLikelihood.