The Comparative Effectiveness of Cognitive Processing Therapy for Male Veterans Treated in a VHA Posttraumatic Stress Disorder Residential Rehabilitation Program

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Objective: To examine the effectiveness of group cognitive processing therapy (CPT) relative to trauma-focused group treatment as usual (TAU) in the context of a Veterans Health Administration (VHA) posttraumatic stress disorder (PTSD) residential rehabilitation program. Method: Participants were 2 cohorts of male patients in the same program treated with either CPT (n = 104) or TAU (n = 93; prior to the implementation of CPT). Cohorts were compared on changes from pre- to posttreatment using the PTSD Checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993) and other measures of symptoms and functioning. Minorities represented 41% of the sample, and the mean age was 52 years (SD = 9.22). The CPT group was significantly younger and less likely to receive disability benefits for PTSD; however, these variables were not related to outcome. Results: Analyses of covariance controlling for intake symptom levels and cohort differences revealed that CPT participants evidenced more symptom improvement at discharge than TAU participants on the PCL, F(3, 193) = 15.32, p < .001, b = 6.25, 95% CI [3.06, 9.44], and other measures. In addition, significantly more patients treated with CPT were classified as “recovered” or “improved” at discharge, χ²(1, N = 197) = 4.93, p = .032. Conclusions: There is still room for improvement, as substantial numbers of veterans continue to experience significant symptoms even after treatment with CPT in a residential program. However, CPT appears to produce significantly more symptom improvement than treatment conducted before the implementation of CPT. The implementation of this empirically supported treatment in VHA settings is both feasible and sustainable and is likely to improve care for male veterans with military-related PTSD.

Keywords: PTSD, veterans, cognitive processing therapy, group/residential therapy, dissemination

Military service places individuals at high risk for exposure to trauma and for posttraumatic stress disorder (PTSD). Studies vary based on measurement and population sampled, but even the most conservative estimates indicate that almost 18.7% of Vietnam veterans have reported symptoms consistent with PTSD at some point since their service (Dohrenwend et al., 2006). The National Vietnam Readjustment Study reported lifetime PTSD prevalence rates of over 30% (Kulka et al., 1990). As soldiers return from Iraq and Afghanistan, it appears that a new generation of veterans is struggling with this disorder and its consequences. A study of Army and Marine combat infantry units deployed to Iraq reported a 18%–20% prevalence using a broad definition of PTSD (meeting Diagnostic and Statistical Manual of Mental Disorders [4th ed.; DSM–IV; American Psychiatric Association, 1994] symptom criteria according to the PTSD Checklist [PCL; Weathers, Litz, Herman, Huska, & Keane, 1993]) and 12%–13% using a narrow definition (meeting DSM–IV criteria and a severity score of at least 50 on the PCL) 3–4 months after returning to the United States...
A more recent investigation revealed 11.8% of active duty men and women reported PTSD immediately postdeployment in Iraq, and 16.7% reported PTSD 3–6 months later (Milliken, Auchterlonie, & Hoge, 2007).

Not surprisingly, PTSD is prevalent among veterans served by the Veterans Health Administration (VHA) health care system. Nearly one in four (24.5%) Iraq and Afghanistan veterans treated by VHA have received a PTSD diagnosis (VHA Office of Public Health and Environmental Hazards, 2009), and among all veterans served by VHA, the proportion diagnosed with PTSD increased by 60% between 2001 (4.8%) and 2007 (7.6%). This increase is likely due to multiple factors, including the following: (a) implementation of mandated screening for PTSD and improved detection; (b) an influx of newly returning veterans with high rates of PTSD; (c) increased prevalence of PTSD diagnoses among Vietnam-era veterans, potentially due to retirement and/or the current wars; and (d) more Vietnam veterans enrolled after a policy change to begin providing free diabetes care for those exposed to Agent Orange.

As a result, many VHA resources have been and will continue to be devoted to PTSD treatment. For example, large-scale dissemination efforts have been executed throughout the VHA health care system to train clinicians in evidence-based treatment interventions for PTSD (Karlton et al., 2010), such as cognitive processing therapy (CPT; Resick, Monson, & Chard, 2007; Resick, Nishith, Weaver, Astin, & Feuer, 2002; Resick & Schnicke, 1992) and prolonged exposure (PE; Foa et al., 1995; Foa, Rothbaum, Riggs, & Murdock, 1991), and to implement these interventions in existing VHA treatment settings. A randomized, controlled trial has provided promising evidence regarding the efficacy of CPT with veteran populations. Monson et al. (2006) reported that CPT administered in an individual, outpatient therapy setting was superior to a wait-list control in treating military-related PTSD in VHA patients.

It is extremely important to evaluate the comparative effectiveness and sustainability of new treatments for PTSD implemented in VHA settings. The randomized, controlled trial discussed above provided valuable efficacy data but does not address whether evidence-based treatments for PTSD can be successfully integrated into existing program structures. Two recent open trials demonstrate the feasibility of delivering CPT in VHA settings. Chard, Schumm, Owens, and Cottingham (2010) examined CPT delivered in individual, outpatient VHA clinic settings and suggested that the intervention was effective overall and that Iraq and Afghanistan veterans may report fewer symptoms of PTSD post-treatment compared to Vietnam veterans. In a small-scale examination of CPT delivered in a group format in the context of a residential PTSD program for female veterans, Zappert and Westrup (2008) reported that veterans significantly improved on a measure of PTSD symptoms after treatment. However, neither of these studies included a comparison group, so they could not assess the comparative effectiveness of CPT relative to treatment as usual (TAU).

The implementation literature has emphasized that in addition to initial staff training, elements such as ongoing technical support, feedback/refinement of the treatment package, and evaluation may be important to implement effective health care interventions in new settings (Kilbourne, Neumann, Pincus, Bauer, & Stall, 2007). For example, one study indicated that on-going feedback, coaching, and/or supervision in addition to one-time training are an essential feature in achieving and retaining new psychotherapeutic skills (Miller, Yahne, Moyer, Martinez, & Pirritano, 2004). A strength of the current implementation study is that it incorporates elements identified as important by the literature, such as a description of refinements to the treatment package and expert consultation.

This study evaluates implementation of CPT in a PTSD Residential Rehabilitation Program in the VHA health care system. The primary aim was to determine whether CPT was more effective than the treatment that was being delivered prior to the implementation effort. We employed a cohort design, comparing clinical outcomes for veterans treated with CPT groups to outcomes for a prior cohort of veterans treated in the same residential program with trauma-focused groups conducted before the implementation of CPT. We hypothesized that the cohort treated with CPT would show more improvement on clinical measures than the cohort treated prior to the CPT implementation. The rationale for this hypothesis was derived from a review of previous research suggesting larger treatment effect sizes for CPT (Monson et al., 2006) compared to a similar type of trauma-focused group therapy as the TAU examined here (Schnurr et al., 2003). A secondary aim of the study was to determine how patient variables such as demographics might be associated with variation in outcomes within the CPT cohort. To help assess whether CPT could be sustained effectively, another aim was to compare outcomes of patients treated in the first year of adoption, when clinicians were receiving regular expert case consultation, and in subsequent years after intensive consultation ended.

Method

Design

This study employed a retrospective, quasi-experimental, cohort design within a VHA residential treatment program for PTSD. Data were obtained from the clinical database of the residential treatment program as described below in the Procedure section. Clinical outcomes for a cohort of patients treated following program-wide implementation of CPT (CPT cohort) were compared to a historical control group of patients treated in the same program prior to the implementation of CPT (TAU cohort). Data were compared at two time periods: intake and discharge from the program. The primary outcome measure was the self-reported severity of PTSD symptoms. Secondary outcome measures were self-reported depression, psychological distress, quality of life, and coping. To identify potential sources of bias, we compared cohorts on demographics and baseline clinical characteristics. Any significant differences in demographic or baseline characteristics were controlled for in all analyses of between-group differences.

To determine the relative effectiveness of treatment during the CPT cohort, compared to during the TAU cohort, we compared primary and secondary outcome measures for each cohort at discharge, controlling for symptoms at intake and cohort differences. As a secondary analysis of relative treatment effectiveness, we compared the proportions of patients with clinically significant improvement on the primary outcome measure for both cohorts. To determine patient characteristics associated with treatment outcome in the CPT cohort, we examined the relationship between demographic variables and primary and secondary outcome mea-
asures at discharge, controlling for intake symptoms. Implementation factors were examined within the CPT cohort by assessing the relationship of regular therapist case consultation to primary and secondary outcome measures.

**Setting**

This study examined implementation of CPT in a PTSD Residential Rehabilitation Program in the VHA health care system, replacing TAU trauma-focused groups. This 60–90 day, residential treatment program has existed since 1978 and provides treatment for men of all ages and eras of service with military-related PTSD and related problems. The program has a national catchment area, receiving referrals from VHA hospitals/clinics, Veterans Centers, and private practitioners around the country. Veterans are referred to the residential program when a more intensive, residential treatment environment is indicated. Often, this means that PTSD symptoms have been treatment-refractory in outpatient settings, but referrals are also made directly from acute psychiatric inpatient or residential substance abuse settings or occasionally when time for treatment is limited by life circumstances (e.g., individual has to return to work). Residents live in a therapeutic milieu setting and participate in group interventions throughout the day and evening, including cognitive therapy, communication skills, psychoeducation, process groups, parenting skills, and recreation therapy. A type of trauma-focused group therapy consisting of a life-span developmental model and incorporating some elements of CBT had been provided in this program for approximately 15 years but had never been empirically validated. In the fall of 2004, three clinical psychologists and one licensed clinical social worker were trained by Patricia Resick, the developer of CPT. These providers had all worked in this VHA PTSD residential treatment program for at least 5 years (three providers had worked in this program for more than 11 years) and were trained or familiar with cognitive-behavioral therapy techniques but not CPT specifically. These same four providers then began conducting CPT in place of the previous type of trauma-focused group therapy. Over the course of the next year, providers in the program participated in weekly telephone case consultation with CPT experts. Treatment providers were consistent across the entire study period. Other than changes related to the implementation and integration of CPT (described below), other changes to the residential treatment program (e.g., other groups, staffing) were minimal over the study period. In addition, the overall theoretical orientation of the program was primarily cognitive-behavioral and remained constant over the entire study period. CPT/TAU groups were the only form of trauma-focused treatment that patients in this program received; none received individual therapy.

**Participants**

Outcome data for 104 male veterans treated with CPT groups and 93 male veterans treated with TAU prior to the implementation of CPT were examined for this study. Sample characteristics are described in Table 1. Participants were two retrospective cohorts of male veterans treated in the same residential treatment program for PTSD in a VHA Medical Center 2 years before and 2 years after CPT was disseminated and implemented in the program (September 2004). Inclusion criteria were as follows: (a) participation in a trauma-focused group in this program during the study period and (b) have previously provided informed consent that their data could be used for research purposes and, thus, participated in routine data collection during their stay in the program. All participants who initiated treatment in a trauma-focused group (for either the CPT or TAU cohorts) were included in analyses, including those who terminated treatment early or were irregularly discharged before completing a trauma-focused group. There were no significant cohort differences in trauma group completion rate (CPT = 89.4%, TAU = 94.6%), $\chi^2(1, N = 197) = 1.779, p = .182$. Similarly, there were no significant demographic or baseline differences among the four providers.

### Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>CPT (n = 104)</th>
<th>TAU (n = 93)</th>
<th>Total (N = 197)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years, $M \pm SD^*$</td>
<td>50.20 ± 11.55</td>
<td>54.51 ± 4.66</td>
<td>52.23 ± 9.22</td>
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<tr>
<td>Married/partnered</td>
<td>39 (37.5)</td>
<td>41 (44.1)</td>
<td>80 (40.6)</td>
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<tr>
<td>Educational attainment, $M \pm SD$</td>
<td>12.98 ± 2.51</td>
<td>12.68 ± 2.52</td>
<td>12.84 ± 2.51</td>
</tr>
<tr>
<td>Income &lt;$50,000</td>
<td>71 (87.7)</td>
<td>68 (78.2)</td>
<td>139 (82.7)</td>
</tr>
<tr>
<td>Period of service*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vietnam</td>
<td>63 (64.3)</td>
<td>82 (94.3)</td>
<td>145 (78.4)</td>
</tr>
<tr>
<td>Iraq/Afghanistan</td>
<td>15 (15.3)</td>
<td>0 (0.0)</td>
<td>15 (8.1)</td>
</tr>
<tr>
<td>Other</td>
<td>20 (20.4)</td>
<td>5 (5.7)</td>
<td>25 (13.5)</td>
</tr>
<tr>
<td>Branch of service</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Army</td>
<td>55 (55.6)</td>
<td>55 (60.4)</td>
<td>110 (57.9)</td>
</tr>
<tr>
<td>Navy</td>
<td>17 (17.2)</td>
<td>5 (5.5)</td>
<td>22 (11.6)</td>
</tr>
<tr>
<td>Air Force</td>
<td>6 (6.1)</td>
<td>7 (7.7)</td>
<td>13 (6.8)</td>
</tr>
<tr>
<td>Marines</td>
<td>21 (21.2)</td>
<td>24 (26.4)</td>
<td>45 (23.7)</td>
</tr>
<tr>
<td>Disability compensation for PTSD*</td>
<td>54 (51.9)</td>
<td>63 (67.7)</td>
<td>117 (59.4)</td>
</tr>
<tr>
<td>Seeking compensation</td>
<td>41 (53.9)</td>
<td>58 (63.7)</td>
<td>99 (59.3)</td>
</tr>
</tbody>
</table>

*Indicates a significant difference between groups at the $p < .05$ level.

**Note.** Data are given as a number (valid percentage) of participants, except where indicated otherwise. CPT = cognitive processing therapy; TAU = treatment as usual; PTSD = posttraumatic stress disorder.
symptom differences between veterans who completed CPT or TAU groups and those who discharged before completing a trauma group. The average length of stay was 86 days for both cohorts (CPT = 85, TAU = 88), with no significant difference by cohort. Due to rapid/unexpected discharge or procedural error in the clinical program, only 84.3% of patients who provided intake data completed a discharge assessment. Veterans who completed their discharge assessment were more likely to report more symptoms on the Beck Depression Inventory (BDI; Beck, Steer, & Garbin, 1988; Beck, Ward, Mendelsohn, Mock, & Erbaugh, 1961) at baseline, \( t(197) = 2.10, p = .037 \), than veterans who did not complete their discharge assessment. There were no other significant demographic or baseline symptom differences between veterans who completed a discharge assessment and those who did not. A multiple imputation strategy was used to handle missing data (described below).

**Measures**

**Demographics.** Demographic variables were measured by a self-report demographic questionnaire that collected information about age, race/ethnicity, marital status, education, income, period of military service, branch of military service, disability compensation, and whether the individual was seeking disability compensation.

**Primary outcome measure.** PTSD was assessed with the PCL (Weathers et al., 1993), a 17-item self-report inventory that assesses DSM-IV Criteria B–D symptoms of PTSD. Items about problems in response to “stressful military experiences” were rated from 1 (not at all) to 5 (extremely) and summed to produce a total score and three subscales: reexperiencing (PCL-B), avoidance/numbing (PCL-C), and hyperarousal (PCL-D). Higher scores indicated more PTSD symptoms (range = 17–85 for the total score). A cutoff score of 50 for likely PTSD diagnosis was recommended for Vietnam veterans (Weathers et al., 1993) and for veterans with combat trauma related PTSD (Forbes, Creamer, & Biddle, 2001). The PCL has very high internal consistency, with coefficients of .97 for the total scale and .92–.93 for each subscale, and test–retest reliability over 2–3 days of .96 for Vietnam veterans (Weathers et al., 1993). Cronbach’s alpha in the current sample was .90 for the total scale and .77–.89 for each subscale at intake, and .92 for the total scale and .82–.86 for each subscale at discharge.

**Secondary outcome measures.** Depression was assessed with the 21-item self-report BDI (Beck et al., 1988, 1961). Items were scored on a scale from 0 to 3 and summed to produce a total score. Higher scores indicated more depressive symptoms (range = 0–63). This measure has high internal consistency in psychiatric and nonpsychiatric samples of .87 and good test–retest reliability of greater than .60 (Beck et al., 1988). Cronbach’s alpha in the current sample was .88 at intake and .90 at discharge.

Quality of life was measured with the World Health Organization Quality of Life–BREF (WHOQOL-BREF; Skevington, Lotty, & O’Connell, 2004). It consists of 26 items; two items that provide a baseline measure of quality of life and quality of health, as well as four specific quality of life domains: physical health, psychological, social relationship, and environment. For the purpose of this study, we examined the Physical, Psychological, and Social subscales. Items were rated on four types of 5-point Likert scales. Higher scores indicated a better quality of life (range = 4–20 for transformed scores). The WHOQOL-BREF has good internal consistency of greater than .70 (Skevington et al., 2004). At intake, Cronbach’s alpha in the current sample was .79 for the WHOQOL-Physical subscale, .73 for the WHOQOL-Psychological subscale, and .66 for the WHOQOL-Social subscale. At discharge, Cronbach’s alpha was .76 for the WHOQOL-Physical subscale, .75 for the WHOQOL-Psychological subscale, and .61 for the WHOQOL-Social subscale.

Coping style was measured using the 28-item Brief COPE (Carver, 1997). Items were rated from 0 (I haven’t been doing this at all) to 3 (I’ve been doing this a lot), querying a variety of different coping methods. Two subscales were identified through factor analysis: Direct coping (COPE-Positive) and Indirect coping (COPE-Avoidant) (Lee & Liu, 2001). Higher scores on the COPE-Positive subscale indicated more positive coping (range = 10–40), and higher scores on the COPE-Avoidant subscale indicated more avoidant coping (range = 6–24). At intake, Cronbach’s alpha in the current sample was .77 for the COPE-Avoidant subscale and .82 for the COPE-Positive subscale. At discharge, Cronbach’s alpha was .78 for the COPE-Avoidant subscale and .75 for the COPE-Positive subscale.

Psychological distress was measured with the six-item index of the Symptom Checklist (SCL-6; Rosen et al., 2000). This index was based on the SCL-90 (Derogatis, Lipman, & Covi, 1973), comprised of two questions each from the Depression, Anxiety, and Psychoticism subscales. Items were rated from 0 (not at all) to 4 (extremely), with higher scores indicating more psychological distress (range = 6–30). The SCL-6 has good internal consistency of .83 and had convergent validity with the SCL-90, correlating .87 (Rosen et al., 2000). Cronbach’s alpha in the current sample was .87 at intake and .86 at discharge.

**Implementation Factors**

To assess whether CPT could be sustained effectively, a variable was created to identify which patients in the CPT cohort were treated during the first year of adoption, when program clinicians were receiving ongoing expert case consultation. Outcomes on primary and secondary outcome measures for these patients were then compared to patients in the CPT cohort treated in subsequent years when intensive case consultation ended. CPT providers remained the same in Years 1 and 2.

**Procedure**

This study conformed to ethical guidelines set forth by the American Psychological Association and was approved by the Stanford University Institutional Review Board. As part of normal clinical practice, a variety of self-report assessment measures of demographics, symptoms, and functioning were completed by all patients upon intake and discharge from the residential program. These assessments were distributed and collected by an assessment coordinator, who was part of the clinical team but who was not a trauma-focused group therapist. All patients in the program also reviewed an informed consent document granting permission for their clinical records to be used for research purposes. For the purposes of this study, clinical records were obtained for all men who had consented to research and had been treated in the program.
during the 2 years before and the 2 years after the implementation of CPT in September 2004.

**Treatment**

**CPT.** CPT (Resick, 2001), as delivered in this program, was a 14-session, manualized, trauma-focused form of cognitive-behavioral therapy for PTSD that is based on cognitive theory of PTSD. Prior to beginning CPT, two initial sessions focused on gathering information about the veteran’s premilitary autobiography. The first CPT session involved brief psychoeducation about PTSD and CPT. The next two sessions focused on writing and reading about the meaning of the traumatic event and beliefs about why it happened, identifying problematic beliefs associated with the trauma (“stuck points”), and learning to identify the connection between events, thoughts, and feelings. The next several sessions involved writing and reading a detailed account of the traumatic event, with a focus on thoughts and feelings associated with the trauma. During the next few sessions, veterans learned to question and challenge their self-statements and assumptions and eventually to modify maladaptive beliefs related to the trauma. The last five sessions involved challenging generalized beliefs about self and others in the following specific areas: safety, trust, power/control, esteem, and intimacy. Treatment gains were discussed and consolidated in the last session. CPT was delivered in a group therapy format, typically including four to five patients and two facilitators.

**TAU.** TAU, as delivered in this program, was a 15-session, trauma-focused therapy, based on a life-span development model, incorporating elements of CBT. The treatment package was similar to that described in VHA Cooperative Study No. 420 (Foy, Ruzek, Glynn, Riney, & Gusman, 2002). The initial sessions involved psychoeducation about PTSD. The majority of the remaining sessions focused on reviewing the veteran’s autobiography in a developmental context. Specifically, premilitary and military coping styles were reviewed, and the impact of these on current functioning was identified. The final sessions involved one session of therapist-guided, in-session exposure to the trauma memory per individual. Groups typically included six to nine patients and two facilitators.

**Therapist training.** In September of 2004, three doctoral-level psychologists and one licensed clinical social worker, who worked on the residential program clinical team and previously provided TAU, participated in an on-site, 2-day training in CPT led by the developer of the treatment, Patricia Resick. The treatment manual and all forms/handouts necessary for conducting the treatment were distributed during the training. After participated in the training, these clinicians began conducting CPT groups in place of TAU groups. Weekly telephone case consultation with Patricia Resick and other CPT experts was conducted for approximately 1 year following the original training. The training, consultation, and entire study period occurred before the publication of the group CPT manual (Resick et al., 2007) and the national roll-out of CPT in VHA.

Over the course of the year, several modifications were made to the protocol and the written forms to accommodate the needs of the program and the patient population. The protocol was lengthened by approximately two sessions to accommodate group members reading their trauma accounts aloud in the group format. It is important to note that trauma accounts are typically not read aloud in group CPT. This specific modification was made to preserve the ethic of the larger treatment program, which encourages peer support and group disclosure. In consultation with CPT experts, some of the language in the original manual and documents was changed to better reflect the trauma experiences or preferences of the veterans (i.e., examples pertaining to combat rather than rape, “problematic” rather than “faulty” thinking patterns). In addition, some of the psychoeducation about PTSD and orientation to CBT was removed, as veterans already learn this information in the treatment program. A brief discussion of veterans’ premilitary autobiography was added prior to beginning CPT to provide information about experiences and beliefs that may be related to potential stuck points.

Modifications were also made to the treatment program overall to facilitate the integration of CPT. For example, aspects of other treatment groups were changed to make them more consistent with CPT (i.e., “5-column” Thought Records already used in the Affect Management Group were changed to the ABC Sheets/Challenging Beliefs Worksheets used in CPT). The daily schedule was also modified to build in more time for homework. An effort was made by the clinical team to portray CPT group participation as one component of the overall treatment program.

**Data Analyses**

Data were analyzed using SPSS for Windows, Version 17.0. Independent-samples t tests and chi-square tests were used to examine potential cohort differences on demographic and baseline symptom variables. Analyses of covariance (ANCOVAs) controlling for intake symptoms and cohort differences were used to examine differences in changes from intake to discharge between treatment groups. Of note, period of military service was not included as an additional covariate in ANCOVAs because of the high degree of collinearity between age and period of service, _r_ (183) = .69, _p_ < .001; this variable was not related to outcome. Also, information about therapy group membership was not available for the TAU cohort, but the intraclass correlation coefficient for therapy group membership in the CPT cohort was very low (< .001) for all measures except the SCL-6, which was low (.11). This suggests that the results of a mixed effect regression including therapy group would likely yield the same results as the ANCOVA presented.

A two-step process was employed to evaluate clinically significant improvement allowing us to classify individuals into four categories: recovered, improved, unchanged, or deteriorated. These categories were determined by (a) a combination of whether the level of functioning at discharge was sufficiently improved so that the individual was no longer a member of the intake population (Jacobson, Follette, & Revenstorf, 1984) and (b) a reliable change index (Jacobson & Truax, 1991).

**Missing data.** Of the 197 patients with baseline PCL data, 166 (84.3%) provided discharge PCL data. There is a rich literature on inference in the presence of missing data, and particularly in the context of missing follow-up data in longitudinal studies (Hedeker & Gibbons, 1997; Little, 1993; Rubin, 1976; Schafer, 1997; Schafer & Graham, 2002). To address the missing follow-up data and potential attrition bias as recommended by this literature, a multiple imputation strategy was used and supplemented by
sensitivity analyses (Daniels & Hogan, 2009; Schafer, 1997; Schafer & Graham, 2002).

For these analyses, all baseline characteristics and intake items were used to impute missing items at follow-up. Although patients with complete data were more likely to have a higher BDI at baseline than those with missing follow-up data, the imputation model adjusts for these differences when making the imputations. Ten data sets were imputed with draws from the theoretically complete data distribution using the Multivariate Imputation by Chained Equations program (R package Version 1.14; Netherlands Organization for Applied Scientific Research, 2005) implemented in the R statistical language (R Foundation for Statistical Computing, 2005). All analyses were conducted on the imputed data sets and pooled to derive the final statistics and inferences presented here.

### Results

#### Cohort Differences

The only statistically significant differences between the two cohorts (see Table 1) were age, period of military service, and whether the veteran received disability compensation for PTSD; veterans in the CPT cohort were younger, more likely to have served in Iraq/Afghanistan or periods other than Vietnam, and less likely to receive disability compensation for PTSD compared to veterans in the TAU cohort. None of these variables were significantly associated with outcome.

#### Comparative Effectiveness of CPT Versus TAU

Intake and discharge scores for veterans in CPT and TAU are listed in Table 2 for descriptive purposes. ANCOVAs comparing the discharge scores for CPT and TAU participants controlling for intake scores and cohort differences (see Table 3) indicated that veterans treated with CPT evidenced more symptom improvement than TAU on PTSD symptoms (total score and all subscales), depression symptoms, psychological quality of life, coping, and psychological distress. There was no significant difference by treatment group reported for physical or social quality of life.

### Clinically Significant Improvement

In the CPT cohort, 16.3% of participants were classified as recovered, 41.3% as improved, 31.7% as unchanged, and 10.6% as deteriorated based upon PCL scores. In the TAU cohort, 4.3% were recovered, 37.6% as improved, 38.7% as unchanged, and 19.4% as deteriorated. Men treated with CPT groups were significantly more likely to be classified as recovered on the PCL, \( \chi^2(1, N = 197) = 7.48, p = .006 \), and significantly more likely to be classified as recovered or improved, \( \chi^2(1, N = 197) = 4.93, p = .032 \). In addition, men treated with CPT groups were significantly less likely than men treated with TAU groups to report a PCL > 50 at discharge (73% vs. 89%, respectively), \( \chi^2(1, N = 197) = 8.37, p = .004 \).

### Variables Associated With Outcome in CPT Cohort

Analyses indicated that treatment effects in the CPT cohort were not significantly influenced by race/ethnicity, marital status, education, income, period of military service, branch of military service, disability compensation, or whether the individual was seeking disability compensation. Older age was significantly associated with greater reductions in psychological distress reported on the SCL-6 at discharge, \( \beta = -.21, r(104) = -.22, p = .027 \).

### Implementation Variables Associated With Outcome

Examination of the therapist case consultation variable revealed that men who participated in CPT groups during the year of expert

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**Table 2**

<table>
<thead>
<tr>
<th>Measure</th>
<th>CPT (n = 104)</th>
<th></th>
<th>TAU (n = 93)</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Intake</td>
<td>Discharge</td>
<td>Intake</td>
<td>Discharge</td>
</tr>
<tr>
<td>PCL</td>
<td>64.05</td>
<td>11.14</td>
<td>55.50</td>
<td>12.78</td>
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<tr>
<td>PCL-B</td>
<td>17.77</td>
<td>4.36</td>
<td>16.89</td>
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</tr>
<tr>
<td>PCL-C</td>
<td>26.55</td>
<td>5.08</td>
<td>21.89</td>
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<td>PCL-D</td>
<td>19.73</td>
<td>3.72</td>
<td>16.71</td>
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<td>25.41</td>
<td>9.17</td>
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<td>9.73</td>
<td>2.51</td>
<td>11.40</td>
<td>2.68</td>
</tr>
<tr>
<td>WHOQOL-Social</td>
<td>9.51</td>
<td>3.21</td>
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<td>3.27</td>
</tr>
<tr>
<td>COPE-Avoidant</td>
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<tr>
<td>COPE-Positive</td>
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<td>6.56</td>
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</tr>
<tr>
<td>SCL-6</td>
<td>21.27</td>
<td>4.72</td>
<td>16.20</td>
<td>4.94</td>
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**Note.** CPT = cognitive processing therapy; TAU = treatment as usual; PCL = Posttraumatic Stress Disorder Checklist; PCL-B = Posttraumatic Stress Disorder Checklist, reexperiencing symptoms; PCL-C = Posttraumatic Stress Disorder Checklist, avoidance/numbing symptoms; PCL-D = Posttraumatic Stress Disorder Checklist, hyperarousal symptoms; BDI = Beck Depression Inventory; WHOQOL-Physical = World Health Organization Quality of Life, Physical subscale; WHOQOL-Psychological = World Health Organization Quality of Life, Psychological subscale; WHOQOL-Social = World Health Organization Quality of Life, Social subscale; COPE-Avoidant = Brief COPE, Avoidant Coping subscale; COPE-Positive = Brief COPE, Positive Coping subscale; SCL-6 = six-item index of the Symptom Checklist.
consultation reported significantly greater symptom improvement on two secondary outcome measures: the BDI, \(F(1, 102) = 6.34, p = .018\), and the SCL-6, \(F(1, 102) = 9.58, p = .004\). Mean pre–post effect sizes on the BDI were large \((d = 0.94)\) in the first year and small \((d = 0.38)\) in subsequent years. Mean pre–post effect sizes on the SCL-6 were large \((d = 1.41)\) in the first year and medium \((d = 0.65)\) in subsequent years. There were no statistically significant differences on the primary outcome measure of PTSD severity or any other outcome measures between the year of intensive consultation and subsequent years. However, there were reductions in the effect sizes of improvements in PTSD (large to medium) and quality of life (large to medium or medium to small) from Year 1 to Year 2. Effect sizes for improvements in coping increased slightly or remained the same.

### Discussion

The results of this investigation suggest that veterans treated in the CPT cohort during residential treatment for PTSD demonstrated significantly more improvement, and more clinically significant improvement, than a prior cohort treated with TAU trauma-focused group therapy. These findings indicate that effective implementation of evidence-based treatment packages such as CPT is superior to TAU and suggest that CPT improved patient outcomes in this residential treatment program.

The findings in the current study are important because they represent some of the first evidence of greater effectiveness of CPT relative to a TAU comparison condition including trauma-focused psychotherapy delivered by experienced clinicians. Prior research has compared CPT to waitlist or minimal attention control groups (Chard, 2005; Monson et al., 2006; Resick et al., 2002, 1992). In the current study, patients in both the TAU and CPT cohorts received an intensive treatment package in the residential program that included approximately 450 hr of present-centered group treatment (i.e., cognitive therapy, communication skills, psychoeducation, process groups) as well as approximately 25–30 hr of trauma-focused therapy. It is therefore compelling that implementing a manualized, evidence-based intervention such as CPT produced an improvement in program outcomes. Given recent evidence about the active ingredients of CPT (Resick et al., 2008), it is possible that the direct challenging of dysfunctional posttraumatic beliefs in CPT (not present in TAU) contributed to improved outcomes.

Regarding the sustainability of implementation of CPT, it is encouraging that veterans continued to report improvements in PTSD symptoms, coping style, and quality of life during the time period when therapists were participating in weekly, case consultation with experts and during the time period after this consultation was discontinued. However, it should be noted that analyses were not powered to detect lack of differences, and although not statistically significantly different, the effect sizes of improvements in PTSD and quality of life in the time period without consultation were smaller. The effect sizes of improvements in coping increased slightly or stayed the same. In addition, reductions in symptoms of depression and psychological distress (which is highly associated with depression) were significantly larger during the period of consultation. This suggests that there may be some potential benefit of continued consultation as it may increase treatment adherence and improve outcomes. In particular, BDI outcomes observed in Year 2 of CPT may reflect a need for more expert supervision regarding Socratic questioning of core depression-related beliefs.

Observed reductions in PCL scores from intake to discharge were not as large as those reported in a randomized controlled trial of CPT with veterans (Monson et al., 2006), and unfortunately, the lack of interview measures in this study did not allow for an accurate assessment of PTSD diagnosis before and after treatment. The proxy equivalent in PCL score (below 50) indicated more veterans may have retained a diagnosis than in prior research (Chard et al., 2010; Monson et al., 2006). However, it should be noted that a prior study with Vietnam veterans suggests that the
PCL may underestimate change in PTSD symptoms during treatment relative to the Clinician Administered PTSD Scale (CAPS; Forbes et al., 2001). Importantly, these improvements were still clinically significant and similar to PCL results reported in prior descriptive studies of CPT implemented in Veterans Affairs clinic settings (Chard et al., 2010; Shia, Grattan, & Galovski, 2009). The differences in outcomes from prior published studies may be due to differences in measurement (self-report vs. interview), differences in implementation of CPT (such as treatment fidelity or reading trauma accounts in group format), additional psychotherapy delivered in the treatment program, or in differences between patient populations. For example, Chard et al. (2010) found similar reductions in PCL scores for Iraq and Afghanistan veterans compared to older Vietnam veterans, but more Vietnam veterans retained their diagnosis of PTSD. Future research should continue to explore the role of age and period of military service on treatment outcome in CPT and other treatments for PTSD as the population of veterans seeking services for PTSD changes. In addition, reexperiencing symptoms of PTSD appeared to show less improvement, relative to avoidance/numbing and hyperarousal symptoms. A potential explanation for this finding, or smaller effect sizes overall compared to randomized trials, may be the group therapy format. In particular, the reading of trauma accounts in group may reduce the amount of time for Socratic questioning, which may have negatively impacted outcomes. However, this study was not designed to investigate the effects of modifications to the CPT protocol on outcomes. Therefore, this remains an empirical question and may warrant further investigation.

These results have important implications for the dissemination and implementation of evidenced-based, manualized treatment packages in existing VHA treatment settings. These represent some of the first data indicating that evidence-based treatments for PTSD can be disseminated, adopted, and sustained effectively by existing staff over the long-term. Furthermore, this study provides support that evidence-based treatments for PTSD such as CPT can be successfully integrated into existing residential program structures, to the benefit of the existing program and perhaps even the manualized treatment package itself. In this case, minor modifications and adjustments were made to the delivery of CPT and to the overall treatment program that appeared to preserve the effectiveness of CPT and to improve the overall standard of care in the treatment program. In addition, information gathered by CPT experts during case consultation with this program contributed to the knowledge base about treatment of veterans with CPT. This study also provides promising evidence that CPT can be delivered in a mixed trauma type, group therapy format and that it is effective for complex cases typically seen in VHA residential care.

There are several additional issues that are relevant to the interpretation of these results. This investigation was not a randomized controlled trial and lacks the experimental methodology and rigorous controls necessary to conclude that the improvements in clinical outcomes between cohorts were due to the implementation of CPT. Although the quasi-experimental design does not provide absolute proof of causality, it may offer more information about the implementation and effectiveness of evidence-based treatments that is generalizable to real-world clinical settings. Indeed, some of the improved outcomes reported by the later cohort of veterans may have been due to the overall improvements in the residential treatment program motivated by the implementation of CPT (i.e., updating of cognitive therapy group to be consistent with CPT, more time for homework). This is an important point and suggests that implementation of evidenced-based, manualized treatment packages may be a catalyst for improving other aspects of the treatment program. It should be noted, however, that other than these changes related to the implementation and integration of CPT, other changes to the residential treatment program (e.g., other groups, staffing) were minimal over the study period. This suggests that the observed improvements in outcomes are associated with CPT group and related changes.

This study did not include any measures of treatment adherence or therapist competency that are typically included in randomized, clinical trials. Whereas these measures would have allowed for more certainty that the therapy delivered in this treatment program was adherent to the manual, the reality of most clinical settings is that administering these measures as a part of routine practice is unlikely. Importantly, the results suggest that regardless of strict adherence, the treatment delivered was effective and associated with improved outcomes relative to the treatment delivered previously.

As mentioned above, this study did not include a clinician-administered measure of PTSD, such as the CAPS, because this assessment was not a part of routine clinical care in the setting. Clinician-administered assessment is often difficult to implement due to staffing constraints in clinical settings, and future studies and implementation efforts should endeavor to find ways to build in this type of assessment. Reporting on self-report measures may be influenced by demographic variables, symptoms, personality, and compensation-seeking (Enns, Larsen, & Cox, 2000; Frueh et al., 2003), and in this study, the method of administration of the PCL did not allow for certainty that the participants were reporting symptoms related to a specific Criterion A event. Examination of a clinician-rated measure of PTSD may have allowed for a more accurate assessment of symptoms and functioning and better comparison of this study to others in the literature. However, the literature is inconsistent regarding the correspondence between the PCL and CAPS; in contrast to research cited above (Forbes et al., 2001), a recent study examining two PTSD treatment studies conducted with veterans found no difference in symptom rating on the PCL compared to the CAPS (Monson et al., 2008).

Finally, the results of this study may not generalize to outpatient settings or other patient populations such as women veterans. This study was also unable to report on patients who did not participate in TAU or CPT in this setting (although criteria for participating in a trauma-focused group did not change when CPT was implemented).

The results of this study indicate that dissemination efforts such as those employed by VHA to train providers in evidence-based treatments and to implement these treatments into clinics and programs may be well-worth the effort and cost because they are associated with considerably improved patient outcomes. Although more research is needed, these findings suggest that CPT may be acceptable and well-tolerated by the complex patients often treated in residential settings. Implementing CPT in residential settings may increase cost-effectiveness if more patients are improved and utilization is decreased; future studies should examine the rate of rehospitalization and outpatient treatment utilization after treatment with CPT. This study also illustrates the utility of patient outcomes monitoring for examining the impact of decisions
to modify treatment programming. Certainly, there is still room for improvement, as substantial numbers of veterans continue to experience significant symptoms even after treatment with CPT in a residential program; however, it appears that replacing older treatment packages with therapies such as CPT may give veterans a better chance at clinically significant symptom reduction and improved functioning and quality of life.

References


