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Cognitive Processing Therapy for Veterans with Comorbid PTSD and Alcohol Use Disorders

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Abstract

Posttramatic stress disorder (PTSD) and alcohol-use disorders (AUD) frequently present comorbidly in veteran populations. Traditionally those with alcohol dependence have been excluded from PTSD treatment outcome studies, thus we do not know how those with alcohol dependence may tolerate or respond to PTSD-specific interventions; no studies to date have examined the extent to which cognitive PTSD interventions are tolerated or effective for those with comorbid PTSD/AUD. The present study examines the extent to which CPT is tolerated by and effective in treating PTSD symptoms for veterans with PTSD and AUD, as compared to veterans with PTSD only in an outpatient treatment setting. Data were obtained through chart review of 536 veterans diagnosed with PTSD who had received at least 1 session of CPT at a Midwestern US Veterans Affairs hospital. Nearly half (n = 264, 49.3%) of the veterans in the study exhibited a current or past AUD diagnosis. Participants were grouped into the following diagnostic groups: current AUD (past 12 months), past AUD (prior to 12 months), and no AUD. Participants completed an average of 9 sessions of CPT with no significant difference between AUD diagnostic groups on the number of CPT sessions completed. Individuals with past AUD had higher initial symptoms of self-reported PTSD symptoms than those with no AUD. All groups reported significant reductions in PTSD symptoms and depression over time. Overall, the results suggest that CPT appears well tolerated among veterans with comorbid AUD and is associated with significant reductions in symptoms of PTSD and depression in an outpatient treatment setting.

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Disclosures

Drs. Debra Kaysen and Jeremiah Schumm designed and planned the study design. Drs. Debra Kaysen, Eric Pedersen, and Michele Bedard-Gilligan conducted literature searches and provided summaries of previous research studies and assisted with writing portions of the final manuscript. Drs. Jeremiah Schumm and Richard W Seim conducted the statistical analyses and coded data from chart reviews. Dr. Chard provided editorial and design oversight. All authors contributed to and have approved the final manuscript. All authors declare that they have no conflicts of interest.

Keywords

posttraumatic stress disorder (PTSD); alcohol use disorder; veterans; treatment

Large scale epidemiological research suggests that substance use disorders (SUDs) are prevalent among individuals diagnosed with Posttraumatic Stress Disorder (PTSD) in the general population (Jacobsen, Southwick, & Kosten, 2001; Kessler et al., 1995; Mills, Teesson, Ross, & Peters, 2006), with an estimated 42% comorbidity prevalence between PTSD diagnoses and Alcohol Use Disorders (AUDs) obtained from data from the National Epidemiologic Survey on Alcohol and Related Conditions (Pietrzak, Goldstein, Southwick, & Grant, 2011). However, among the veteran population, the rates of co-occurrence are higher. Both PTSD and AUDs are relatively common among veterans and frequently appear comorbidly (Hoge et al., 2004; Hoge, Auchterlonie, & Milliken, 2006; Milliken, Auchterlonie, & Hoge, 2007; Richardson, Frueh, & Acierno, 2010). In a recent study, 63% of recent veterans who met criteria for AUDs or drug use disorders also met criteria for PTSD, while the PTSD prevalence among those who met criteria for both AUDs and drug use disorders (e.g., alcohol dependence and cocaine abuse) was 76% (Seal et al., 2011). The rates of comorbidity are similar among Vietnam veterans, with 73% diagnosed with PTSD among those meeting criteria for an AUD (Kulka et al., 1990). Individuals with comorbid PTSD and SUDs are more difficult to treat, with more health and physical problems, higher mental health symptoms, higher alcohol use and consequences, drop out of treatment more often, and cost substantially more (e.g., greater degree of inpatient care) than those in treatment for SUDs without comorbid PTSD (Brown, Stout, & Mueller, 1999; Kessler, 2000; Ouimette, Brown, & Najavits, 1998; Ouimette, Goodwin, & Brown, 2006).

Considering the alarming rates of comorbidity and the high individual and societal costs of co-occurring PTSD and AUDs there have been surprisingly few studies evaluating how trauma-focused treatment may benefit those presenting for PTSD but also suffering with comorbid AUDs (Back, 2010; Conrad & Stewart, 2005). Additionally, very few studies focus on the veteran population and have evaluated whether trauma-focused treatment can benefit veterans with comorbid AUDs.

Trauma-focused intervention research studies typically exclude individuals with comorbid alcohol or drug dependence from research protocols (Riggs, Rukstalis, Volpicelli, Kalmanson, & Foa, 2003). This exclusion stems predominantly from concerns that discussing trauma-related content could lead to relapse or increased consumption rates. While traditional treatment approaches have focused on targeting one disorder prior to receiving services for the other, theory and research suggest that leaving one disorder untreated can exacerbate symptoms of the other (Najavits, 2005; Stewart, Pihl, Conrod, & Dongier, 1998). For example, among veterans, unremitted PTSD has been found to predict rates of relapse two years following substance use treatment (Ouimette, Moos, & Finney, 2000). Additionally, trauma-focused treatments are believed by some clinicians to exacerbate PTSD symptom severity (van Minnen et al., 2012) and alcohol cravings do appear to increase in response to fluctuations in PTSD symptom severity (Simpson et al., 2012). In an event level study conducted with treatment-seeking individuals with AUDs and PTSD, on days where PTSD symptoms were higher than average for that individual, they reported higher alcohol cravings on that day and the next (Simpson et al., 2012). Interestingly, reported reductions in PTSD symptoms during outpatient pharmacologic PTSD treatment have been associated with greater improvement in alcohol dependence symptoms compared to the opposite effect (i.e., reported greater improvements in alcohol dependence symptoms did not impact alleviation of PTSD symptoms) (Back et al., 2006). Thus, targeting PTSD disorders specifically in treatment may help to alleviate alcohol

dependence symptoms and PTSD-focused programs that wait to start PTSD treatment for those patients who are substance dependent may be missing an important clinical opportunity.

Integrated treatment for PTSD and SUDSs

Research on treatment of comorbid PTSD and SUDs has predominantly focused on testing interventions that target PTSD and SUDs concurrently in treatment or interventions that specifically target trauma symptoms among patients with comorbid PTSD and SUDs. Recent reviews (van Dam et al., 2012; Torchalla, Nosen, Rostam, & Allen, 2012) highlight the promise of integrated treatments targeting PTSD and SUDs. In a controlled study evaluating a concurrent PTSD and SUD treatment, Mills and colleagues (2012) found that individuals with PTSD and SUDs who received substance use treatment as usual with an added exposure component reduced their PTSD symptoms at nine-month follow-up to a significantly greater degree than those receiving only treatment as usual. Promising effects of combined treatments have been found among individuals who report alcohol misuse (e.g., Back et al., 2012; Back, Dansky, Carroll, Foa, & Brady, 2001, Back et al., 2006; Hien et al., 2010; McGovern et al., 2009, Zlotnick, Johnson, Rohsenow, & Najavits, 2003). However, the majority of the integrated treatment research has consisted of uncontrolled studies, pilot studies, and case studies. The studies are limited by small sample sizes, high attrition, absence of control groups, or lack of standardization across protocols. Moreover, some recent studies have failed to find differences in outcomes between combined treatments and more standard alcohol treatments or health education controls (Cohen & Hien, 2006; Hien et al., 2009; Morrissey et al., 2005). However, these studies had their own limitations such as the use of substance use rather than alcohol use treatments. The studies focused on women in community settings and the results may not generalize to male veterans. Lastly, these studies focused on group treatment which makes it difficult to determine whether the use of a group intervention format may have influenced the findings and whether individual treatment would have demonstrated more differences between combined treatments and control conditions. In addition, combined treatments are often lengthy (upwards of 24 sessions) and complex, which can make implementation more difficult (Baschnagel, Coffey, & Rash, 2006). Thus, while promising, more research is needed to make further conclusions regarding the efficacy of integrated treatment particularly for those suffering from comorbid AUDs.

Trauma-focused Interventions for Comorbid PTSD and SUDs

Interventions focused on trauma content that include individuals with SUDs are also promising, yet there are fewer studies focused on these types of interventions and the majority are uncontrolled studies or case studies with small sample sizes (van Dam et al., 2012; Torchalla et al., 2012). This represents an important area for research, as studies documenting reductions in PTSD among individuals with comorbid PTSD and SUDs may encourage inclusion of comorbid individuals in research studies and in clinical settings. Thus, it is important for the field to move toward testing treatments established as efficacious for PTSD (e.g., exposure based treatments such as Prolonged Exposure, cognitive-based treatments such as Cognitive Processing Therapy) with comorbid individuals.

Preliminary research suggests that focusing on PTSD and trauma-related content may improve both PTSD and AUD outcomes and is able to be tolerated (e.g., Brady, Dansky, Back, Foa, & Carroll, 2001; Coffey et al., 2006; Tuerk et al., 2009). For example, Coffey, Stasiewicz, Hughes, and Brimo (2006) found that individuals with PTSD and AUDs who received six sessions of imaginal exposure (i.e., repeated revisiting of the trauma memory)

on an outpatient basis reported lower alcohol cravings and emotional distress in response to trauma-related cues than individuals who received relaxation training. Although attrition rates were high (17 out of 43 participants completed; 60% drop out) there were no differences in drop-out rates between the exposure and relaxation conditions lending further support to the notion that trauma content can be tolerated by those with comorbid PTSD and AUDs. While drop-out has been a concern in trauma-focused studies, it should be noted that the majority of treatment drop-outs occurred before the initiation of exposure techniques suggesting that it is not trauma content per se that contributes to study attrition (Brady et al., 2001). Taken together, research suggests that trauma-focused treatments do not necessarily lead to an exacerbation of either PTSD or substance use and that these treatments show initial promise for comorbid populations. Studies have yet to examine the extent to which primarily cognitive-based interventions for PTSD can be tolerated by those with comorbid AUDs.

The veteran population is particularly at-risk for PTSD and AUDs. Despite this there are surprisingly few studies evaluating treatment for veterans with PTSD and AUD comorbidity. Those that do exist (e.g., Cook et al., 2006; Donovan et al., 2001; Norman et al., 2010; Steindl et al., 2003; Tuerk et al., 2009) have utilized small samples, have examined modified exposure treatment, Seeking Safety, or the Transcend protocols in uncontrolled or case studies, or have examined effects of group-based treatment. There are limited studies that examine the efficacy of an empirically-based manualized PTSD-focused interventions delivered according to protocol with veterans struggling with PTSD and AUDs.

Cognitive Processing Therapy (CPT)

CPT is a manualized cognitive-behavioral treatment for PTSD that focuses on restructuring trauma-related maladaptive thoughts about the meaning of the traumatic event and about self, others, or the world that serve to maintain trauma symptoms (i.e. “stuck points”), and helping facilitate emotional processing of the event (Resick & Schnicke, 1993). Randomized control trials of CPT have demonstrated efficacy of the intervention in PTSD symptom relief with samples of victims of interpersonal violence, childhood sexual abuse, and with veterans suffering from military-related trauma (e.g., Chard, 2005; Monson et al., 2006; Resick et al., 2008; Resick, Nishith, Weaver, Astin, & Feuer, 2002). CPT is widely disseminated in treatment centers; most relevantly within the Veterans Affairs Healthcare System (VA), where CPT is one of two empirically-supported PTSD-focused treatments offered to veterans (Chard, Ricksecker, Healy, Karlin, & Resick, 2012; Karlin et al., 2010). As a substantial proportion of veterans seeking care for PTSD at the VA also meet criteria for an AUD (Hankin, Spiro, Miller, & Kazis, 1999; Seal et al., 2011), it is important to explore how CPT functions as an effective trauma-focused treatment for veterans with PTSD and comorbid AUDs.

While CPT can be an efficacious treatment for PTSD, it is unclear if and how veterans with active substance use problems can benefit from this treatment approach. One recently published case study (McCarthy & Petrakis, 2011) reports encouraging findings using the CPT protocol, modified slightly to no longer include the trauma narrative writing (CPT-C) and to integrate specific monitoring and targeting of alcohol related behavior throughout treatment. In this case, the implementation of CPT-C resulted in clinically meaningful gains on both PTSD and alcohol use outcomes for a male veteran with comorbid PTSD and heavy alcohol use. Monson and colleagues (2006) found reductions in therapist-observed and patient-reported PTSD symptoms in a sample with an 83% rate of lifetime comorbid substance abuse or dependence. However, only 3% of the sample was currently diagnosed with an SUD and those with current substance dependence were excluded from participating. While these studies provide preliminary support for veterans with a history of

substance use concerns and suggest a cognitive-based intervention may be well-tolerated for those with lifetime SUD diagnoses, it is unclear if veterans with a current SUD or those with a recent dependence diagnosis can tolerate and benefit from CPT. As the Department of Veterans Affairs and Department of Defense have initiated widespread dissemination of CPT (Chard et al., 2012; Karlin et al., 2010) it is important to explore whether CPT can reduce PTSD symptomatology among an undoubtedly highly comorbid population of veterans.

The present study examines the effectiveness of CPT for veterans with PTSD and AUD, compared to veterans with PTSD only, who were enrolled in a VA outpatient treatment program as part of standard clinical services. We compared those with PTSD only, PTSD with current AUD, and PTSD with past AUD in treatment drop-out and treatment outcome. Given prior literature on the impact of comorbid PTSD and AUD presentations, we hypothesized a main effect for time, with individuals with PTSD only and with comorbid AUD demonstrating significant improvements in depression and PTSD symptoms over time. We hypothesized a significant main effect for AUD with individuals with past or current AUDs having higher pre-treatment depression and PTSD. Given the lack of data on CPT as a potential treatment for those with comorbid AUDs, we had no apriori hypotheses regarding whether those with AUDs would differ from the PTSD only group in PTSD and depression improvement following completion of CPT or in number of CPT sessions attended.

Method

Participants

Approval from the University of Cincinnati Institutional Review Board was obtained to review archival data for the purpose of the research. Data were obtained through chart review of 536 veterans diagnosed with PTSD who had received at least 1 session of CPT as part of standard practice through an outpatient PTSD treatment program at a Midwestern US Veterans Affairs hospital. The sample consisted of 482 males (90%) and 54 females (10%), and the mean age was 44.6 years (*SD* = 14.5). Ethnicity was as follows: 82% non-Hispanic Caucasian, 15% African American, and 3% other race/ethnicity or multiracial. Fifty-one percent (*n* = 272) had no current or prior history of AUD diagnosis. Regarding the proportion who exhibited a current or past AUD diagnosis according to *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition-Text Revised* (DSM0IV-TR; American Psychiatric Association, 2000) criteria, nearly 11% (*n* = 57) met criteria for current (last 12 months) alcohol use disorder, and nearly 39% (*n* = 207) met criteria for a past alcohol use disorder (prior to the last 12 months). Ten of the 536 veterans (2%) met DSM-IV-TR criteria for a current drug use disorder, and 91 (17%) of the sample met criteria for a past drug use disorder (prior to the last 12 months). The most common past drug use disorders were marijuana (*n* = 46; 9%), followed by cocaine (*n* = 37; 7%) and opiates (*n* = 18; 3%). Most (*n* = 336; 64%) were assessed for PTSD based upon combat being reported as the worst trauma; this was followed by interpersonal traumas (e.g., rape, child abuse; *n* = 108; 20%), and other traumas (e.g., accidents, natural disasters; *n* = 85; 16%). Finally, most (*n* = 324; 61%) met criteria for major depressive disorder. See Table 1 for further demographic information.

Procedure

Participants completed the following measures at the initial diagnostic intake assessment and then within 2 weeks of completing CPT. CPT is predominantly a cognitive therapy that focuses on teaching skills to address maladaptive cognitions about the traumatic event itself and regarding in five thematic areas thought to be particularly affected by trauma exposure

(safety, trust, power/control, esteem, and intimacy). CPT was offered in an individual format by 68 different therapists, which included psychologists, psychiatrist, social workers, nurse practitioners and psychology practicum and internship students working in the PTSD clinic. Staff training consisted of either a 2 or 3 day workshop by a CPT trainer or a "see one do two" training model with one of the qualified CPT providers in the clinic. All staff were offered weekly group supervision with one of the authors of the CPT Veteran/Military manual. The treatment protocol was implemented in keeping with the 12 session CPT manual with sessions typically offered once a week for 60 minutes. In some instances patients were given fewer than 12 sessions if their scores on the PCL decreased and the decreases were maintained for two sessions. Other patients received more sessions to address cognitions that were not examined earlier in the treatment. These alterations were conducted in keeping with the CPT protocol. Since the treatment was delivered as part of routine clinical care, measures of treatment fidelity or adherence were not collected.

Measures

Alcohol and Drug Use Disorder Diagnoses—Current (last 12 month) and past (prior to the last 12 months) alcohol use and drug use disorders were assessed via the *Structured Clinical Interview for DSM–IV-TR, Non-Patient Version-I* (SCID; First, Spitzer, Gibbon, & Williams, 2002), which has been shown to be a reliable and valid measure of alcohol use disorders (Kranzler, Kadden, Babor, Tennen, & Rounsaville, 1996).

Clinician-Rated PTSD—The one week version of the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1990) was used to assess clinicians' ratings of patients' PTSD symptoms at pre- and post-treatment. Among Veteran samples, the CAPS has demonstrated good to excellent interrater reliability and convergent and diagnostic criterion validity (Blake et al., 1995; Weathers, Keane, & Davidson, 2001). Following prior studies, participants were diagnosed with PTSD if according to the CAPS, they met diagnostic criteria based upon DSM-IV-TR criteria and had a severity score of 45 or higher (Monson et al., 2006; Schnurr et al., 2007).

PTSD Checklist – Specific (PCL-S; Weathers, Litz, Herman, Huska, & Keane, 1993)—The one-week version of the PCL was used to assess participant self-reported PTSD symptoms at pre- and post-treatment. Because data were derived from archival chart review that contained only total scores for the PCL, item-level data were unavailable to compute internal reliability for this measure in the present sample. However, prior studies of the PCL demonstrate this measure to have excellent reliability and validity for veteran populations (e.g., Weathers et al., 1993).

Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996)—The BDI-II is a 21-item self-report test designed to measure the severity of depressive symptoms during the past two weeks. The BDI-II was administered at pre- and post-treatment. The BDI-II has demonstrated excellent internal and test-retest reliability and strong convergent validity (Beck et al., 1996). Only the total score for the BDI-II was entered into the archival psychotherapy notes. Therefore, item-level data were not available for calculating internal reliability of the BDI-II for this sample.

Data Analysis

Missing data was present on 11% of the values in the overall dataset. This included 67% of participants missing data on one or more variable, with missing values primarily occurring on post-treatment outcome measures. The degree of missing post-treatment outcomes ranged from 55% on the CAPS to 59% on the PCL. Although pre-treatment CAPS scores were available for all participants, there were a small number of cases with missing data for pre-

treatment PCL (6%) and BDI-II (4%) scores. To address this issue, the automatic imputation method in SPSS Missing Values Version 18 (SPSS Inc., 2009) was used to generate multiple imputation datasets, and these datasets were used testing the study hypotheses. Multiple imputation (MI) is a Bayesian approach to addressing missing data that involves replacing missing data values with estimates of plausible values over the course of a specified number of datasets. This procedure has the advantages of allowing for the calculation of standard statistical techniques using the total sample, while providing parameter estimates that are shown to be less biased than traditional approaches to missing data management, such as casewise deletion or mean replacement (Graham, 2009; Schafer & Graham, 2002). Typically, 5–10 MI datasets are sufficient to provide accurate parameter estimates. In this study, we generated 10 MI datasets, since this number shows a high degree of efficiency in providing unbiased parameter estimates even among datasets with large degrees of missing data (Schafer & Graham, 2002).

The following variables were included as predictors in the MI models in order to inform the imputation estimates of missing data: age, gender, ethnicity, service era, marital status, number of CPT sessions completed, AUD diagnostic status, drug use disorder diagnostic status, and pre-treatment CAPS total severity score. Variables that served as both predictors and outcomes in the MI models included pre-treatment PCL and BDI-II total scores, years of education, and post-treatment CAPS, PCL, and BDI-II total scores. Finally, MI imputation estimates were restricted so that the estimated values were within the possible range of each scale (e.g., CAPS Min = 0, Max = 136). To ensure a statistically conservative approach to interpretation, individuals were included who had received at least one session of CPT. This modified intent-to-treat approach has been used in prior studies of CPT (Chard, 2005; Galovski et al., 2012; Morland et al., 2009).

A between subjects ANOVA was used to test the effect of AUD diagnosis on number of CPT sessions attended. Data were available for all participants on these variables. Therefore, the MI estimation approach was unnecessary to these analyses involving total sessions completed.

A series of 2 (assessment time period) x 3 (AUD diagnosis) mixed ANCOVA's were used to test our study hypotheses. Specifically, ANCOVA's were calculated to test the hypothesis that individuals with a current or previous AUD would exhibit higher pre-treatment scores on the CAPS, PCL, and BDI-II. We covaried for demographic variables that were found to differ between AUD groups. In the ANCOVA's that showed a significant main effect for AUD diagnosis, we deconstructed the main effect finding by calculating post hoc Bonferroni comparisons between groups that had a current or past AUD diagnosis and those that had PTSD only. Among those post hoc comparisons that were significant, we further probed these findings by using independent samples t-tests to understand if the groups differed at pre- and separately at post-treatment on outcomes. We followed formulas originally described by Rubin (1987) and then applied by Raghunathan and Don (2011) to pooling analysis of variance results with MI datasets.

Results

Associations between AUD and Demographic Descriptive Variables

As shown in Table, 1, AUD was common. Nearly 39% of the sample (n = 207) met DSM-IV-TR criteria for having a past (prior to the last 12 months) alcohol use disorder. Nearly 11% of the sample (n = 57) met DSM-IV-TR criteria for a current (last 12 months) alcohol use disorder.

AUD diagnostic status was associated with many of the variables found in Table 1. AUD status was related to age, $F(2, 533) = 10.01$, $p < .01$. Post-hoc comparisons using the Bonferroni correction showed that participants with current AUD were significantly younger than those with past AUD and those without AUD histories, $p < .05$ (see Table 1). AUD status was also related to education, $F(2, 529) = 7.63$, $p < .001$. Post-hoc, Bonferroni-corrected comparisons showed that those with past AUD had less education than those without AUD histories, $p < .05$ (see Table 1). AUD groups also differed with regard to gender composition, $\chi^2(2, N = 536) = 6.28$, $p < .05$, and this appeared to be related to a higher number of women without a history of an AUD (O = 36, E = 27.4). Other findings showed AUD status to be related to service era, $\chi^2(8, N = 536) = 26.76$, $p < .001$. This finding appeared to be related to a higher number of OEF/OIF veterans with current AUD (O = 35, E = 21.6) and a lower number of OEF/OIF veterans with past AUD (O = 60, E = 78.2). There were also lower numbers of Vietnam veterans with current AUD (O = 13, E = 21.3) and a higher numbers of Vietnam veterans with past AUD (O = 98, E = 77.2). AUD status was related to drug use disorder diagnostic status, $\chi^2(8, N = 536) = 26.76$, $p < .001$. The pattern of results suggested a greater number of individuals with past AUD also have past drug use disorders (O = 71, E = 35.1).

Association between AUD and CPT Session Attendance

As shown in Table 1, participants completed a mean of 9 sessions of CPT. There was no significant difference between AUD diagnostic groups and the number of CPT sessions completed, $F(2, 535) = 2.65$, $p = .07$. We also examined differences in the number of participants completing at least 12 CPT sessions by AUD diagnosis. Forty-seven percent of the overall sample completed at least 12 sessions, and the AUD diagnostic groups did not differ, $\chi^2(2, N = 536) = 2.86$, $p > .23$.

AUD Diagnosis and Clinician-Rated PTSD Severity

Mixed ANCOVA was calculated to test the hypothesis that individuals with a current or past AUD would exhibit higher CAPS scores versus those with PTSD only. Given these variables differed by AUD status, we included age, gender, years of education, and drug use disorder diagnoses as covariates. To avoid multicollinearity, service era was not included as a covariate because it was highly related to age. Results from showed a significant main effect for time (see Tables 2 and 3). AUD status was not significantly related to clinician-rated PTSD severity, and the interaction between AUD diagnosis and assessment time was also non-significant (see Table 2).

AUD Diagnosis and Patient-Rated PTSD Severity

Results from the mixed ANCOVA supported a significant decline in PCL scores, and a significant between groups effect of AUD diagnosis (see Tables 2 and 3). However, the AUD diagnosis by time interaction term was not significant (see Table 2).

Post hoc Bonferroni comparisons revealed some support for our hypotheses. Those with past AUD were significantly different from those with no AUD. Independent samples t-tests showed that those with past AUD, had higher pre- but not post-treatment PCL scores when compared to those with PTSD only, pre-treatment pooled $t(534) = 3.52$, $p < .001$, $d = .32$, post-treatment pooled $t(534) = 1.25$, $p > .22$, $d = .11$(see Table 3).

AUD Diagnosis and Patient-Rated Depression Severity

ANCOVA results show significant reductions in depression symptoms over time. There was no significant effect for AUD status nor interaction between AUD diagnosis and assessment time (see Tables 2 and 3).

Discussion

This paper is the first to examine Cognitive Processing Therapy (CPT) in the treatment of PTSD for veterans with AUD. Notably, the study examined the impact of past and current diagnoses on treatment outcome, as these are common questions for clinicians contemplating whether or not to initiate a PTSD treatment. Generally we found that CPT sessions, administered within an outpatient VA PTSD treatment program, were equally as well attended, regardless of presence or absence of an AUD diagnoses. Although individuals with PTSD and comorbid AUD had more severe self-reported PTSD symptom severity prior to beginning treatment, treatment generally appeared effective in reducing symptoms of PTSD and depression for those with or without current or past AUD diagnoses.

Traditionally, trauma-focused treatments like CPT or prolonged exposure were thought to be inappropriate for patients with comorbid substance use disorders unless they had been in remission for 6- to 9- months because of concerns that the intensity of trauma-focused treatment would lead to a substance relapse or interfere with emotional processing and prevent PTSD from improving (Back, 2010; Becker et al., 2004; Killeen, Back, & Brady, 2011, Najavits, 2006; Ouimette et al., 2003; Resick & Schnicke, 1993; Resick et al., 2002). In this particular study we found no interactions between AUD diagnosis and treatment outcome. Instead PTSD and depression symptoms improved over time, regardless of the presence or absence of an AUD diagnosis. The findings were largely consistent, based on both self-report of symptoms and symptoms assessed by an independent rater. Moreover the post-treatment symptom severity scores for both PTSD and depression were comparable to those reported in randomized clinical trials testing CPT in veteran and in community settings (Chard, 2005; Forbes et al., 2012; Monson et al., 2008; Resick et al., 2002). However, this is the first study to address whether AUD moderates PTSD outcomes for those receiving CPT. These findings, coupled with the lack of difference by AUD diagnosis in treatment attendance, suggests that CPT should be further investigated as a potential treatment option for individuals with AUDs and PTSD using a more rigorous and controlled design. These findings are consistent with recommendations that requiring patients with PTSD and AUD to be in remission prior to starting a trauma-focused therapy may not be necessary (Back, 2010).

We examined the number of sessions attended by individuals both with and without comorbid AUD. Individuals attended an average of 8–9 sessions and 47% of the veterans attended all 12 sessions. This rate is slightly lower than what has been reported in other CPT trials, where rates of completion have ranged from 74% through 84% (Chard, 2005; Forbes et al., 2012; Galovski et al., 2012; Monson et al., 2008; Resick et al., 2002; Resick et al., 2008). It is important to note that individuals may not always need to complete 12 sessions to benefit clinically from CPT. For example, a recent study found that 45% of individuals achieved good end state functioning before session 12, with an average of approximately 7 sessions (Galovski et al., 2012). These rates of completion are also higher than those reported in many treatment studies of individuals with PTSD and SUD (Brady et al., 2001; Crits-Christoph et al., 1999; Mills et al., 2012; Najavits et al., 1998).

As is consistent with other studies, we also found that individuals who presented with both PTSD and comorbid AUD reported more severe initial PTSD symptoms than those with PTSD alone (Brown et al., 1999; Ouimette et al., 1998; Ouimette et al., 2006). Despite the higher initial PTSD symptom severity, based on self-report, for those with past histories of AUD, there were no differences between them and the individuals without AUD in the number of sessions completed or in their ultimate treatment outcome. The initial more severe report of symptoms noted in this study and in other research may help to explain why traditionally those with comorbid AUD have often been referred out by PTSD treatment

providers for initial treatment of their substance use prior to beginning PTSD interventions. Fears of causing relapse or worsening their course of symptoms may be reinforced for providers by client's more severe initial symptom presentation. However, our findings suggest that those with AUD and PTSD have comparable drop-out rates as those with PTSD only and comparable degrees of improvement in PTSD symptoms over the course of outpatient treatment. Thus these fears may not entirely be supported by the data. By reducing distress associated with PTSD, this may indeed decrease risk of relapse from trauma-related cues and triggers (e.g., Coffey, Schumacher, Brimo, & Brady, 2005).

It is surprising that our rates of current AUD (11%) and past AUD (39%) were quite low despite general high rates of comorbidity between PTSD and AUD within veterans (Erbes, Westermeyer, Engdahl, & Johnsen, 2007; Maguen, Cohen, Cohen, Madden, Bertenthal, & Seal, 2012; McDevitt-Murphy et al., 2010; Seal et al., 2011). This may reflect the ongoing bias, as discussed above, for providers to avoid referring individuals with AUD to trauma-focused treatment programs, either on their own or as part of an integrated approach to treatment of comorbidity. It is also possible that the low rates of AUD may reflect reluctance of veterans, especially those with current AUD to embark on a trauma-focused treatment program like CPT. If the low rates of current AUD reflect a selection bias on the part of the veterans, this could bias our findings, as only the most dedicated veterans with AUD would have been the ones to enroll in treatment. In addition, our low rates of veterans with current AUDs precluded us from examining subgroups such as whether there were differences between veterans meeting criteria for abuse as compared to those meeting criteria for dependence.

The number of women receiving CPT was relatively in keeping with the number of women veterans. Approximately 7.7% of veterans are women (DVA, 2006). It is interesting to note, however, that we had relatively low numbers of women who met criteria for comorbid AUD. Approximately 6% of our female veterans met criteria for a current AUD and 28% met criteria for a past diagnosis of AUD, although these numbers are in keeping with other studies of female veterans and larger epidemiological studies (Kessler et al., 1995; Maguen et al., 2012). Male veterans are significantly more likely to have a dual diagnosis than women (Maguen, et al., 2012). There are gender differences in degree of trauma exposure and in the order of onset between PTSD and AUD, where PTSD appears to play more of a causal role in the onset of AUD for women than for men (Sonne et al., 2003; Sonne et al., 2010; Tuchman, 2010). It is possible that for women in particular, addressing PTSD may be beneficial in change alcohol use behaviors. Future research should not only look at CPT as a potential treatment for PTSD with AUD but should examine gender as a potential moderator of treatment outcome. Moreover, men and women appear to have different relationships between PTSD-related cognitions and alcohol cravings, which suggests that particularly for a cognitively-based intervention like CPT, gender may moderate treatment outcomes in relation to alcohol use (Nayawickreme, Yasinski, Williams, & Foa, 2012).

There are several important limitations of the study that should be noted. As it not uncommon with data collected as part of routine clinical care (i.e., chart review) rather than as part of a control trial, we had missing data. We also had small cell sizes, which limited our ability to make meaningful conclusions regarding factors such as the role of substances other than alcohol on treatment outcome. We did not collect information regarding treatment compliance, only attendance. It is possible that those with AUD may have been less compliant with homework. Lastly, as this was part of standard clinical care, there was no comparison condition, there was not random assignment to services, and individuals received other services in addition to CPT. As this information was not collected, we cannot control for or address the contribution of other services in addition to receiving CPT. Moreover, as this was based on chart review in a standard VA outpatient clinic, there were

no measures of therapist adherence or fidelity to the CPT protocol nor were there measures of client satisfaction. The use of chart review to look at treatment response is underutilized in the field of psychiatry compared to other fields (e.g., emergency medicine), despite the advantages of being low cost and particularly helpful in generating future research questions that can then be tested using controlled, prospective designs (Gearing, Mian, Barber, & Ickowicz, 2006). Indeed, these results suggest for the need for randomized clinical trials to determine whether CPT is effective and whether it is as effective as other treatment options for those with PTSD/AUDs

Despite the promising outcomes in terms of PTSD and depression symptom improvement using CPT for individuals with comorbid AUDs this study is limited in its ability to address the impact of CPT on alcohol use or cravings. As data were collected via chart review instead of in the context of a controlled trial, we were limited in the outcomes that we can report on to those included in participant medical records. We do not have long-term follow-up data on PTSD, depression, or, potentially most importantly, on alcohol use outcomes. It is possible that despite our initial positive findings, individuals still have high rates of substance use relapse over time. Thus these findings, while promising, do suggest a need for further research that assesses the tolerability of CPT in relation to substance use outcomes.

Best practices for treatment of PTSD and AUD is currently an area of active research focus and clinical debate (e.g., Back, 2010; Coffey et al., 2005). Although treatment outcome results from combined treatment approaches were initially seen as promising, the results from more recent trials suggest that these interventions are not as effective as the early results suggested (Hein et al., 2009). Newer research has begun to explore the potential of exposure-based interventions for PTSD/AUD and early findings are promising (Back et al., 2012; Coffey et al., 2006; Foa & Williams, 2010; McCauley, Killeen, Gros, Brady, & Back, 2012; Mills et al., 2012). Several randomized clinical trials are underway to evaluate interventions such as prolonged exposure for PTSD/AUD (Back, Foa, Killeen, Mills, Teeson, Carroll, Cotton, & Brady, in press; Foa & Williams, 2010). Cognitive interventions, despite their clear efficacy in treatment of PTSD, have not been studied in relation to PTSD/AUD, which is somewhat surprising given that cognitive interventions clearly have a role within substance use treatment more broadly (Magill & Ray, 2009). Yet, based on these preliminary results it appears that cognitive interventions for PTSD, such as CPT, are a treatment avenue for PTSD/AUD that merits further exploration. Given the lack of research about whether CPT can be effective clinically in the treatment of PTSD for those with comorbid AUD, and that it is often routine clinical practice to refer those patients out, we believe these findings suggest that CPT can address PTSD symptoms and depression for individuals with comorbid AUD, within the context of a VA treatment program. However promising these results are, they are exploratory, and should be examined further with a rigorous research methodology that also examines the impact of CPT on alcohol use and relapse, includes a control condition, and includes long-term follow up.

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Highlights

- We conducted chart reviews of 536 veterans diagnosed with PTSD.
- All veterans received at least 1 session of Cognitive Processing Therapy.
- 49% exhibited a current or past AUD diagnosis.
- There were no significant differences between between veterans with and without AUD diagnoses on CPT sessions completed.
- Groups reported large reductions in PTSD and depression from pre to post-treatment.

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Table 1

Demographic information

	No Hx of AUD *n* = 272		**Current AUD *n* = 57**		**Past AUD *n* = 207**	
	M* or *N	***SD* or %**	***M* or *N***	***SD* or %**	***M* or *N***	***SD* or %**
Age	44.2	14.6	37.7	14.0	47.1	13.8
Education (years)	13.5	1.9	13.4	1.7	12.8	2.0
Gender						
Male	236	86.8%	54	94.7%	192	92.8%
Female	36	13.2%	3	5.3%	15	7.2%
Race/Ethnicity						
African American	40	14.8%	10	17.5%	32	15.5%
Caucasian	223	82.3%	47	82.5%	168	81.2%
Other	8	3.0%	0	0%	7	3.4%
Service Era						
Pre-Vietnam	3	1.1%	0	0%	3	1.4%
Vietnam	89	32.7%	13	22.8%	98	47.3%
Post-Vietnam	32	11.8%	4	7.0%	22	10.6%
Persian Gulf	40	14.7%	5	8.8%	24	11.6%
OEF/OIF	108	39.7%	35	61.4%	60	29.0%
Marital Status						
Married	158	58.5%	25	43.9%	117	57.1%
Previously Married	69	25.6%	18	31.6%	55	26.8%
Never Married	43	15.9%	14	24.6%	33	16.1%
Military Experience						
Combat	218	81.6%	49	87.5%	153	76.1%
Noncombat	49	18.4%	7	12.5%	48	23.9%
Work Status						
Employed/Student	124	47.5%	29	53.7%	79	42.0%
Unemployed/Disabled	104	39.8%	23	42.6%	86	45.7%
Retired	33	12.6%	2	3.7%	23	12.2%
Index Trauma						

	No Hx of AUD *n* = 272		Current AUD *n* = 57		Past AUD *n* = 207	
	M* or *N	***SD* or %**	***M* or *N***	***SD* or %**	***M* or *N***	***SD* or %**
Combat-related	175	64.8%	39	68.4%	122	60.4%
Interpersonal	53	19.6%	8	14.0%	47	23.3%
Other	42	15.6%	10	17.5%	33	16.3%
Drug Use Disorder						
No History	258	94.9%	43	75.4%	134	64.7%
Current	4	1.5%	4	7.0%	2	1.0%
History	10	3.7%	10	17.5%	71	34.3%
Major Depressive Disorder						
Present	155	57.2%	38	66.7%	131	63.6%
Absent	116	42.8%	19	33.3%	75	36.4%
Sessions Attended	9.5	4.9	8.1	4.9	8.6	5.1

* Data regarding the specific index trauma were not available for seven participants

Table 2

ANCOVA results for effects of time, AUD diagnosis, and time x AUD

	CAPS	PCL	BDI
AUD diagnosis			
df	2, 529	2, 529	2, 529
F	1.60	4.47	0.84
p	.20	.01	.43
d	.11	.18	.08
Time			
df	1, 529	1, 529	1, 529
F	39.89	16.61	5.55
p	<.001	<.001	.004
d	.55	.35	.21
Time x AUD			
df	2, 529	2, 529	2, 529
F	0.47	0.35	0.70
p	.63	.70	.50
d	.06	.05	.07

Note. Time involves pre- to post-treatment comparisons. PCL = PTSD checklist total score. BDI-II = Beck Depression Inventory-II total score. CAPS = Clinician-Rated PTSD Scale total severity. Models covaried for the effects of age, gender, education, and drug use disorder diagnosis. Cohen's *d* effect sizes:.10 = small, .30 = medium, .50 = large.

Table 3

ANCOVA estimates for study outcomes by AUD diagnosis while covarying for demographic variables

	CAPS		PCL		BDI-II	
	M	***SE***	***M***	***SE***	***M***	***SE***
No AUD (*n* = 272)						
Pre	66.94	0.97	58.84	0.67	30.84	0.70
Post	31.87	1.13	38.56	0.82	18.45	0.65
Current AUD (*n* = 57)						
Pre	69.44	2.07	60.31	1.44	30.84	1.48
Post	35.24	2.41	40.56	1.75	19.99	1.39
Past AUD (*n* = 207)						
Pre	68.64	1.13	61.51	0.78	31.71	0.81
Post	34.31	1.32	41.16	0.94	19.48	0.76

Note. CAPS = Clinician-Rated PTSD Scale total severity. PCL = PTSD checklist total score. BDI-II = Beck Depression Inventory-II total score. Pre = pre-treatment. Post = post-treatment. AUD = alcohol use disorder. Models covaried for the effects of age, gender, education, and drug use disorder diagnosis.