

Increased Resilience is Associated with Positive Treatment Outcomes for Veterans with Comorbid PTSD and Substance Use Disorders

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ABSTRACT

Objective: Resilience has been associated with less severe psychiatric symptomatology and better treatment outcomes among individuals with posttraumatic stress disorder (PTSD) and substance use disorders. However, it remains unknown whether resilience increases during psychotherapy within the comorbid PTSD and substance use disorder population with unique features of dual diagnosis, including trauma cue-related cravings. We tested whether veterans seeking psychotherapy for comorbid PTSD and substance use disorder reported increased resilience from pre- to posttreatment. We also tested whether increased resilience was associated with greater decreases in posttreatment PTSD and substance use disorder symptoms. **Methods:** Participants were 29 male veterans ($M_{age} = 49.07$ years, $SD = 11.24$ years) receiving six-week residential day treatment including cognitive processing therapy for PTSD and cognitive behavioral therapy for substance use disorder. Resilience, PTSD symptoms, and trauma cue-related cravings were assessed at pre- and posttreatment. **Results:** Veterans reported a large, significant increase in resilience posttreatment ($M_{diff} = 14.24$, $t = -4.22$, $p < .001$, $d = 0.74$). Greater increases in resilience were significantly associated with fewer PTSD symptoms ($b = -0.37$, $p = .049$, $sr = -.36$) and trauma-cued cravings ($b = -0.39$, $p = .006$, $sr = -.38$) posttreatment when controlling for pretreatment scores and baseline depressive symptoms. **Conclusions:** Results suggest that evidence-based psychotherapy for comorbid PTSD and substance use disorder may facilitate strength-based psychological growth, which may further promote sustained recovery.

KEYWORDS

PTSD; substance abuse; resilience; psychotherapy

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Military veterans, a population often exposed to traumatic stressors in their lifetimes, are at high risk for experiencing posttraumatic stress disorder (PTSD), depression, and alcohol or substance use disorders (Prigerson, Maciejewski, & Rosenheck, 2002). PTSD and substance use disorders are highly comorbid among veterans (41.1%; Petrakis, Rosenheck, & Desai, 2011), due in part to increased substance cravings associated with being triggered by trauma reminders (Coffey et al., 2002) that perpetuate both substance use and PTSD symptoms (e.g., Coffey et al., 2010). This comorbidity is also associated with greater medical and psychiatric illness severity than either disorder alone (Bowe & Rosenheck, 2015). Better understanding of the mechanisms of recovery for this population is needed. For treatment to have the maximum impact for veterans, it is also essential to understand whether and how psychological growth can be cultivated, which may equip veterans with a greater capacity to manage future stressors and improve overall quality of life.

Resilience is defined as the ability to withstand adverse events or thrive in the face of significant challenges (Connor & Davidson, 2003) as well as to endure or bounce back from the effects of trauma exposure (Almedom & Glandon, 2007). Connor and Davidson (2003) suggest that resilience is a protective trait that can vary between and within people (i.e., over time); thus, it is important to further examine how resilience might be impacted by treatment in a population that could benefit from cultivating protective factors. Notably, a recent study found that veterans who utilized treatment services reported significantly lower resilience and fewer protective factors (e.g., social support) compared to non-treatment-seeking veterans (DeViva et al., 2016), rendering it even more important to understand how to enhance resilience among veterans and whether enhanced resilience facilitates treatment response.

Previous research suggests that resilience may have a buffering effect on PTSD symptoms and substance use. For example, higher resilience was associated with lower alcohol misuse in a non-treatment-seeking veteran sample when controlling for combat-related PTSD (Green, Calhoun, Dennis, & Beckham, 2010). Baseline resilience also predicted lower PTSD symptoms (Davidson et al., 2005; Davidson et al., 2012) and substance use (Acosta et al., 2017) posttreatment, suggesting that resilience may serve as an important protective trait for veterans with comorbid PTSD and substance use disorder. Given evidence that specific pharmacotherapies are associated with reduced stress reactivity (Connor, Sutherland, Tupler, Malik, & Davidson, 1999), several studies have also examined antidepressants as a mechanism for enhancing resilience. Among civilians with PTSD, cognitive behavioral therapy (CBT) combined with sertraline (Davidson et al., 2005) and venlafaxine alone (Davidson et al., 2008) have been associated with increased resilience at the individual level (after three and six months of treatment) as well as greater increases in resilience posttreatment compared to placebo groups.

Higher resilience pre- and posttreatment, respectively, were also linked to greater PTSD symptom improvement at treatment completion. No studies, however, have tested changes in resilience and substance use outcomes within clinical populations with both PTSD and substance use disorder.

Cognitive processing therapy (CPT) for PTSD and CBT for substance use disorders (CBT-substance use disorder) utilize cognitive restructuring techniques designed to shift patients' maladaptive beliefs related to their trauma and substance use (Emmelkamp & Vedel, 2006; Resick & Schnicke, 1992). These approaches have shown longer-lasting effects than medication alone (Butler, Chapman, Forman, & Beck, 2006; Carroll et al., 1994). Positive shifts in cognitions following CBT-based interventions are also consistent with the construct of resilience (e.g., increased refusal self-efficacy; Litt, Kadden, Kabela-Cormier, & Petry, 2008). Therefore, more adaptive belief systems may enhance resilience by increasing one's ability to cope with future stressors and triggers related to trauma or substance use.

To the authors' knowledge, previous studies have not examined whether engagement in psychotherapy is associated with increases in resilience within a comorbid PTSD and substance use disorder population. Furthermore, it is unknown whether the resilience-enhancing effects and subsequent improvement in treatment outcomes observed in civilians generalize to veterans—a subgroup at high risk for trauma exposure and treatment challenges related to dual diagnosis (e.g., severe symptomatology and case management needs; Back, Waldrop, & Brady, 2009). Last, the extent to which enhanced resilience is linked to features unique to dual diagnosis (i.e., trauma-cued cravings) is largely unknown. We sought to address these gaps through two primary aims. First, we tested whether veterans engaged in residential treatment for PTSD and substance use disorder in which psychotherapy was the primary intervention reported increased resilience from pre- to posttreatment. Second, we assessed whether increased resilience was associated with posttreatment PTSD and substance use disorder symptoms. We hypothesized that veterans would report higher resilience after completing evidence-based psychotherapy and that a greater increase in resilience from pre- to posttreatment would be associated with lower PTSD symptom severity and lower trauma-cued cravings posttreatment.

Method

Participants and Procedure

All participants were recruited at the time of enrollment into a six-week residential day treatment program within a PTSD/substance use disorder clinic. Treatment activities occurred on weekdays and included three days of CPT (individual and group sessions) and four days of CBT-substance use disorder (group sessions) per week. Supervised housing was provided off-site for evenings and weekends. Medication management was also available as needed, but information regarding current prescriptions and medication history was not available for this study. The sample consisted of 29 male veterans ($M_{age} = 49.07$, $SD = 11.24$; 65.5% Black, 34.5% White). The majority of participants served in the U.S. Army (62.1%), with the greatest proportion during the Vietnam era (34.5%), followed by post-Vietnam (27.6%), Persian Gulf (20.7%), and Iraq and Afghanistan (13.8%). All veterans met diagnostic criteria for both PTSD and a substance use disorder as assessed with the Mini-International Neuropsychiatric Interview (Sheehan et al., 1998). Combat-related trauma was the most commonly endorsed worst trauma (37.9%), followed by military sexual trauma (10.3%) and physical assault (10.3%). Sixty-two percent of veterans met diagnostic criteria for alcohol use disorder, 44.8% met criteria for a substance use disorder (including cannabis [27.6%], cocaine [24.1%], opioid [6.9%], and

stimulant [3.4%] use disorders), 13.8% endorsed polysubstance use, and 34.5% met criteria for comorbid alcohol and substance use disorders. Participants completed self-report measures at enrollment (pretreatment) and again six weeks later at treatment completion. All participants reported abstinence during treatment and completed the six-week program. This study was approved and monitored by the Institutional Review Board of G.V. (Sonny) Montgomery Veterans Affairs Medical Center. There was a complete discussion of the study with potential participants. Written informed consent was obtained after this discussion.

Measures

The 25-item Connor-Davidson Resilience Scale (Connor & Davidson, 2003) was used to assess resilience. Items, scored from 0 to 4, were summed to create a total score; higher scores indicate greater resilience (average $\alpha = .94$). For this study, a change score was calculated by subtracting the total score at pretreatment from total score at posttreatment, as is typical with observational studies (Fitzmaurice, Laird, & Ware, 2012).

The PTSD Checklist-Specific (PCL-S; Weathers, Litz, Herman, Huska, & Keane, 1993) assessed past-month PTSD symptom severity. Participants rated their experience of 17 symptoms during the past month on a scale of 1 (not at all) to 5 (extremely). Items were summed, with higher scores indicating greater symptom severity. The PCL-S has demonstrated reliability and convergent validity with clinician-rated PTSD symptoms in past studies (e.g., Wilkins, Lang, & Norman, 2011) and internal consistency in this sample (average $\alpha = .93$).

A modified version of the Alcohol Craving Questionnaire-Short Form-Revised (Singleton, Tiffany, & Henningfield, 1995) assessed trauma-related cravings for alcohol and/or substances. On a scale from 1 (strongly disagree) to 7 (strongly agree), participants rated 12 items assessing their current level of craving immediately after they provided a detailed verbal description of their worst traumatic event (i.e., index trauma as treatment target), thus assessing cravings following idiosyncratic trauma cues. The same trauma narrative and procedure was used to assess trauma-related cravings posttreatment. A total score was computed by summing all items, with higher scores indicating higher levels of craving (average $\alpha = .86$).

The Beck Depression Inventory-II (Beck, Steer, & Brown, 1996) assessed depressive symptom severity over the past two weeks as a covariate. Participants rated 21 items on a scale from 0 (never) to 3 (nearly every day) and items were summed to create a total score, with higher scores indicating greater depressive symptom severity ($\alpha = .89$).

Data Analysis

First, change in resilience from pre- to posttreatment was tested with paired samples *t* tests. Next, multiple regression analysis with IBM SPSS Statistics Version 24 was used to test two models with distinct dependent variables: whether change in resilience (*X*) was uniquely associated with posttreatment PTSD symptoms (*Y1*) and trauma-cued cravings (*Y2*). Pretreatment PTSD and trauma-cued craving scores were added as covariates in their respective models, so the resilience change score coefficient (*X*) represents the estimate of residual change in outcome scores (i.e., improvement) posttreatment. Baseline depression, a correlate of PTSD and substance use disorder (Prigerson et al., 2002), was also added as a covariate to both models. All variables were normally distributed and there were no missing data.

Results

As hypothesized, veterans reported a large, significant increase in total resilience scores posttreatment (see Table 1). On average, veterans also reported a large, significant decrease in PTSD symptoms and a nonsignificant decrease in trauma-cued craving posttreatment. In the first regression model, as hypothesized, a greater increase in resilience from pre- to posttreatment (i.e., change in resilience) was significantly associated with a greater decrease in PTSD symptoms posttreatment (see Table 2). Also consistent with hypotheses, a greater increase in resilience was significantly associated with a greater decrease in trauma-cued cravings posttreatment.

Table 1. Changes in pre- to posttreatment scores and effect sizes.

Variable	<i>M</i> Pretreatment Score	<i>M</i> Posttreatment Score	Change (<i>M</i> difference)	<i>t</i>	<i>p</i>	<i>d</i>
CD-RISC	49.83	64.07	14.24	-4.22	< .001	0.74
PCL-S	66.93	52.03	14.90	5.05	< .001	-1.24
ACQ-SF-R	28.48	25.31	3.17	1.45	.158	-0.22

Note. CD-RISC = Connor-Davidson Resilience Scale; PCL-S = PTSD Checklist-Specific; ACQ-SF-R = Alcohol Craving Questionnaire-Short Form-Revised.

Table 2. Multiple regression analyses with increased resilience and residual change in posttreatment outcomes.

Variable	β	<i>t</i>	<i>p</i>	<i>sr</i>	<i>F</i>	<i>df</i>	Significance	Adjusted <i>R</i> ²
DV: PCL-S posttreatment					2.93	3, 25	.053	.17
BDI pretreatment	0.32	1.49	.149	.26				
PCL-S pretreatment	-0.01	-0.06	.951	-.01				
CD-RISC change	-0.37	-2.07	.049	-.36				
DV: ACQ-SF-R posttreatment					12.48	3, 25	< .001	.55
BDI pretreatment	0.05	0.35	.729	.04				
ACQ-SF-R pretreatment	0.59	4.59	< .001	.58				
CD-RISC change	-0.39	-3.01	.006	-.38				

Note. DV = dependent variable; PCL-S = PTSD Checklist-Specific; BDI = Beck Depression Inventory; CD-RISC = Connor-Davidson Resilience Scale; ACQ-SF-R = Alcohol Craving Questionnaire-Short Form-Revised.

Discussion

To the authors' knowledge, this is the first study to examine changes in resilience during a PTSD-substance use disorder treatment. Overall, the findings suggest that existing components of psychotherapy might facilitate increased resilience and impact desirable outcomes. For example, the emphasis on cognitive interventions within this program could have positively impacted resilience constructs, such as cognitive hardiness (Campbell-Sills & Stein, 2007) and self-efficacy (Green et al., 2014), given that cognitive interventions target increased use of positive reappraisal and skill acquisition to manage stressors (Beasley, Thompson, & Davidson, 2003; Litt et al., 2008). In addition, it is possible that individuals with greater resilience are also more likely to demonstrate greater cognitive flexibility in the understanding of their traumatic experiences, thus leading to greater decreases in PTSD symptoms upon pursuing cognitive behavioral treatments focused on enhancing these precise skills. Greater resilience could also motivate the use of more adaptive coping strategies to manage PTSD symptoms and urges to self-medicate with substances, such as seeking social support and using problem-focused rather than avoidance coping styles. Future research should include follow-up studies to assess whether increased resilience impacts symptoms after treatment, including an assessment of long-term substance use, given that the scope of this study was limited to trauma-cued cravings. Last, it should be noted that these effects were found in the context of a six-week residential day treatment, whereas previous studies found increased resilience after three to six months (e.g.,

Davidson et al., 2005). Although the specific role of treatment setting is unknown given the lack of comparison groups, significant findings could indicate that a higher dose of psychotherapy facilitates enhanced resilience in a shorter period of time. Future studies should compare the effects of other treatment lengths and settings on resilience.

Because these results, which require replication, suggest that psychotherapy might contain resilience-enhancing components that do not impede existing treatment activities, future work should explore ways to further enhance and maintain resilience through the development of a brief protocol or add-on module to PTSD-substance use disorder psychotherapies. For example, this population may benefit from a module related to identifying signature strengths (Peterson & Seligman, 2004) and discussing how patients can utilize their character strengths (e.g., bravery, spirituality) to face challenges related to trauma symptoms and cope with trauma-cued cravings. In addition, a module on optimism focusing on life stressors that can be changed and discerning the difference between reality and what cannot be changed may further enhance self-efficacy and encourage a more proactive response to future stressors. Despite the findings in this study, posttreatment scores for PTSD symptoms and cravings were still elevated and clinically significant, which highlights additional clinical needs that could potentially benefit from novel resilience-based interventions.

Limitations of this study include the small sample size, lack of female veterans, and lack of a control group that could clarify specific effects of combined CPT and CBT-substance use disorder interventions for PTSD and substance use disorder versus changes in resilience over time or other treatment types. For example, results might not generalize to outpatient settings where substances are more readily available and patients do not benefit from living in a supportive environment during treatment. Future research should also test whether adding novel resilience-based interventions to CPT and CBT-substance use disorder protocols leads to even greater increases in resilience and should explore directional causality. Another limitation is the lack of information regarding participants' prescribed medications during residential treatment and history of treatment. Future studies should seek to replicate these findings with a larger, more diverse sample while controlling for the effects of psychotropic medication and previous treatments. All variables were measured with self-report, which has clinical relevance, but self-report of resilience in particular may not accurately represent one's ability to withstand the negative effects of adverse events (Fletcher & Sarkar, 2013). For example, psychological distress preand posttreatment could have influenced veterans' selfreport of resilience (e.g., Scali et al., 2012); however, it should be noted we controlled for baseline depression in an effort to address this possibility. Other ways of measuring resilience, such as repeated measurements or observer ratings, are needed. Last, future researchers should assess for the sustained effects of increased resilience by examining resilience following treatment, which would better inform how to facilitate resilience-enhancing effects that are long-lasting and can be utilized during future challenges or stressors.

This study provided preliminary, novel evidence suggesting that veterans who complete cognitive behavioral therapies for PTSD and substance use disorder report increased resilience. Results also indicate that greater increases in resilience were significantly associated with fewer PTSD symptoms and trauma-cued cravings to use substances after treatment completion. These findings increase our understanding of the potential for psychotherapy to facilitate strength-based psychological growth among individuals with comorbid PTSD and substance use disorder and the possible impact on improved mental health outcomes.

DISCLOSURES

The authors declare no conflicts of interest with respect to the research, authorship, and/or publication of this article. The authors report no financial relationships with commercial interests.

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