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Development of a Novel, Integrated Cognitive-Behavioral Therapy for Co-Occurring Posttraumatic Stress and Substance Use Disorders: A Pilot Randomized Clinical Trial

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Abstract

Posttraumatic stress disorder (PTSD) and substance use disorders (SUD) are complex psychiatric conditions that commonly co-occur. No evidence-based, 'gold standard' treatments for PTSD/SUD comorbidity are currently available. The present pilot randomized clinical trial was designed to evaluate the feasibility and preliminary efficacy of a novel, integrated cognitive-behavioral treatment approach for PTSD/SUD, entitled Treatment of Integrated Posttraumatic Stress and Substance Use (TIPSS), as compared to standard cognitive-behavioral treatment (CBT) for SUD. The TIPSS program integrates cognitive processing therapy with CBT for SUD for the treatment of co-occurring PTSD/SUD. Both treatment conditions are comprised of 12, 60-minute individual psychotherapy sessions, delivered twice-weekly over six weeks. Primary aims examine whether TIPSS, compared to standard CBT for SUD, reduces: (1) PTSD symptoms and (2) substance use outcomes (i.e., self-report, objective). Secondary aims examine whether (a) trauma- and substance cue reactivity and (b) distress tolerance (i.e., actual or perceived ability to withstand uncomfortable emotional or physical states) are significant mechanisms of change. The study was recently closed to new enrollment. Participants included adults with substance dependence and at least four symptoms of PTSD.

Keywords

trauma; posttraumatic stress disorder; substance use disorder; integrated treatment; cognitive processing therapy

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Introduction

Posttraumatic stress disorder (PTSD) and substance use disorders (SUD) commonly co-occur [e.g., 1, 2, 3]. The comorbidity is complex, difficult-to-treat, and marked by a more costly and chronic clinical course, when compared to either disorder alone [e.g., 1, 4, 5]. To date, there is no consensus regarding ‘best practice guidelines’ for this comorbidity [6, 7].

Study Rationale

Based on recent meta-analytic evidence, there is promise in the preliminary efficacy of individualized, integrated, trauma-focused therapy plus evidence-based SUD interventions [6, 7]. Most such programs have combined prolonged exposure therapy [PE; 8], one of the “gold standard” evidence-based therapies for PTSD [9, 10], with cognitive-behavioral relapse prevention therapy for SUD [6, 7, 11, 12]. Though promising, available PTSD/SUD treatments are marked by small effect sizes and high rates of attrition [e.g., 13, 14]. Thus, the development of novel PTSD/SUD integrated treatments, based upon evidence-based principles, is imperative.

No studies to date have reported upon the potential efficacy of integrating cognitive processing therapy [CPT; 15, 16], another “gold standard” treatment for PTSD [9, 17], with cognitive behavioral therapy (CBT) for SUD [18, 19] for the treatment of PTSD/SUD. CPT targets PTSD symptoms through a focus on evaluating and changing trauma-related cognitions, particularly those relevant to five central themes: safety, power/control, intimacy, trust, esteem [15]. Unlike PE, CPT does not include in-vivo or imaginal exposures. CPT is as effective as PE for the treatment of PTSD [16] and may be more effective at targeting trauma-relevant emotions such as guilt [16]. In addition, preliminary studies indicate that CPT for PTSD is similarly well-tolerated by individuals with co-occurring PTSD and alcohol use disorder [20, 21], as compared to those with PTSD-only, and leads to significant reductions in PTSD symptomatology regardless of alcohol use disorder diagnosis [20].

Study Aims

We proposed a novel, integrated CBT, the Treatment of Integrated Posttraumatic Stress and Substance Use (TIPSS). The primary purpose of this pilot randomized controlled trial (RCT; Clinical Trials Identifier: NCT02461732) was to evaluate the impact of TIPSS, as compared to Standard CBT for SUD [18, 19], on PTSD symptoms and substance use outcomes. Consistent with leading work in integrated treatment development for PTSD/SUD and the limited scope of the pilot trial, which allowed for only a two-arm RCT, standard CBT for SUD was selected as a comparison condition [22]. A related goal was to maintain high levels of generalizability to real-world treatment settings by using broader inclusion criteria (please see Methods). Secondary aims included exploring mechanisms by which TIPSS may improve outcomes. Specifically, cue reactivity and distress tolerance [i.e., perceived or actual ability to withstand emotional or physical distress; 23] were examined as mechanisms of change due to (1) documented associations with PTSD/SUD [e.g., 24, 25–30], (2) empirical support for cue reactivity as a mechanism of change in PTSD/SUD treatment [25, 26, 31,

32], and (3) theoretical models purporting DT as a pertinent treatment target and change mechanism in PTSD/SUD [33]. Please see Figure 1 for overview of study aims.

First, we hypothesized that reductions in PTSD symptoms will be greater in TIPSS compared to Standard CBT for SUD because PTSD symptoms would be targeted directly. Second, we hypothesized that substance use outcomes will be improved in TIPSS, as compared to Standard CBT for SUD, as measured by: (a) urine toxicology testing, alcohol breath level analyses, and participants' self-reports of substance use; and (b) longest sustained abstinence, operationalized as the maximum number of days of abstinence for each participant (i.e., UDS, self-report). This prediction is driven by the well-established self-medication model of PTSD/SUD, which posits that individuals with PTSD/SUD use substances in attempt to self-medicate the painful and intense emotionality associated with PTSD [e.g., 24, 28, 34–37]. Thus, targeting PTSD is essential to improving SUD outcomes, since PTSD, including subclinical PTSD symptomatology [e.g., 38], is predictive of stronger drug cravings [39, 40] and withdrawal symptoms [41] as well as a greater tendency to use substances to alleviate negative mood states [e.g., 42, 43, 44]. Third, we hypothesized that TIPSS, as compared to Standard CBT for SUD, will decrease cue reactivity and increase distress tolerance and that this will be associated with improvements in outcomes (see Figure 1).

Materials and Methods

Trial Design Overview

This study is a RCT designed to compare the efficacy of two CBT interventions: standard CBT for SUD [18, 19] and TIPSS, a novel integrated CBT program for PTSD/SUD. Across both conditions, all participants attended 12 (one-hour) treatment sessions, meeting twice per week for 6 weeks. To examine mechanisms of change, four experimental laboratory sessions (Baseline + Sessions: 4, 8, 12) were conducted in the context of the treatment protocol. At the baseline/screening visit, the laboratory session took place after the otherwise scheduled activities (i.e., assessments). On sessions 4, 8, and 12, the laboratory sessions were scheduled before other activities (i.e., treatment sessions) (see Table 1 for session details). The study was recently closed to new enrollment; and data analyses are being initiated.

Recruitment and Eligibility

Adults interested in treatment for SUD and trauma-related symptoms were recruited via community-based and online strategies (e.g., newspaper ads; Craigslist). Interested individuals called the treatment research clinic, located in a large southern U.S. metropolitan area, and were screened for general eligibility (e.g., age, substance use, English proficiency) via telephone. Potentially eligible individuals were then scheduled for an intake appointment. Inclusionary criteria were comprised of: being 18–65 years old and proficient in English, meeting criteria for current (past month) *DSM-IV* [45] substance dependence, reporting a history of trauma exposure per *DSM-5* PTSD Criterion A [46] and at least four current (past month) *DSM-5* PTSD symptoms (PTSD diagnosis not required), and seeking treatment for substance dependence and trauma-related symptoms. The inclusion of

subclinical PTSD was informed by extant interventions for PTSD/SUD [e.g., 47] and driven directly by two major lines of evidence: (1) comparable rates of distress and impairment associated with full versus partial PTSD [e.g., 3, 48, 49]; and (2) high rates of subclinical PTSD among SUD populations [e.g., 50, 51, 52]. Exclusionary criteria included: exclusive (only) nicotine dependence, alcohol or opioid dependence requiring detoxification, current or past bipolar I disorder or major psychotic disorder, active (past 6 months) psychotic spectrum symptoms, major unstable medical conditions, current (past month) suicidal or homicidal ideation with intent or plan, pregnancy, or inability to provide verbal and written consent. The study was approved by all relevant institutional review boards, and all study procedures were carried out in accordance with the Code of Ethics of the World Medical Association and Declaration of Helsinki.

Participant Characteristics

A total of 60 participants were screened in-person, and 51 participants (51% women; $M_{\text{age}} = 45.4$, $SD = 10.1$) were deemed eligible and enrolled. Of those participants, 76.5% ($n = 39$) identified as black/African American, 19.6% ($n = 10$) as white, and 3.9% ($n = 2$) as Hispanic. Participants endorsed an average of 7.2 PTSD Criterion A traumatic event exposure types per the Life Events Checklist for *DSM-5* [53], and the most represented trauma types included physical assault (74.5%, $n = 38$), assault with a weapon (72.5%, $n = 37$), and transportation accident ($n = 37$). Approximately 74.5% ($n = 38$) of the sample met diagnostic criteria for PTSD. In terms of SUD, 68.6% ($n = 35$) of the sample met *DSM-IV* criteria for cocaine dependence, 45.1% ($n = 23$) for alcohol abuse/dependence, and 39.2% ($n = 20$) for cannabis dependence. The majority (62.7%, $n = 32$) of participants identified as currently single and the majority reported attaining high school/GED or higher levels of education (86.3%, $n = 44$). The average monthly income reported by participants in this sample was \$405.60 ($SD = \784.7).

Treatment Conditions

Standard CBT for SUD—The SUD treatment components are based upon cognitive-behavioral relapse prevention principles [18, 19, 54–56] that are intended to facilitate awareness and management of cravings, review coping skills for high-risk substance-related cognitions and situations, and provide a greater understanding of the associations between thoughts, feelings, and substance use behaviors, including cravings, via functional analyses (see Table 2 for details).

TIPSS—The TIPSS integrates CBT for SUD [18, 19] with CPT for PTSD [15, 57]. CPT is based upon a social-cognitive theory of trauma, which emphasizes the interpretation of the traumatic event and coping in its aftermath. Social-cognitive theories focus upon the content of cognitions and the impact of thoughts on emotions and behavior; emotional expression is needed to alter the emotional elements of trauma memories and not for purposes of habituation [15, 58]. Thus, CPT is designed to target trauma-related cognitions [59, 60] in order to facilitate cognitive-emotional processing of the trauma and thus alleviate PTSD symptomatology (see Tables 2 and 3 for details). Techniques such as Socratic questioning are utilized to target trauma-related cognitions and create more balanced views of the self, others, and the world in the aftermath of trauma. Each session begins with a review of

substance use and PTSD symptoms since the last session, and connections between PTSD and SUD are drawn through each session. Functional analyses of substance use, discussion of adaptive ways of coping with urges and cravings, and review of substance use refusal skills are conducted at each session. Discussion of substance triggers, antecedents/consequences of substance use, relapse prevention, and valued (non-substance-related activities) are integrated into each session. Avoidance is emphasized as a driving process underlying both PTSD and SUD. Throughout treatment, PTSD/SUD comorbidity is approached as an integrated syndrome rather than as two separate disorders such that neither CPT nor CBT for SUD takes priority in any particular treatment session.

Treatment fidelity—Therapists for both conditions were M.A.-level psychological counselors and M.A.-level doctoral students in counseling psychology. Therapists had training in CBT and drug counseling for SUD prior to the study. All therapists were new to the treatment of PTSD/SUD and had no experience in the treatment of PTSD or PTSD/SUD prior to the study. At the outset of the trial, therapists were assigned to either the TIPSS or CBT for SUD conditions; therapists were not permitted to cross-over between treatments. Training and supervision for TIPSS and CBT for SUD were conducted separately throughout the trial. The PI (AAV), a licensed clinical psychologist, provided weekly supervision of the TIPSS condition; and another licensed clinical psychologist (JMS) conducted weekly CBT for SUD supervision. Therapy adherence checklists, based upon manual content, were developed for both therapists and supervisors to complete. All sessions were audio-recorded and a random sample (20%) in both conditions was selected for formal rating of treatment fidelity by the respective therapy supervisor.

The PI developed the TIPSS manual. All TIPSS therapists completed an online CPT training course (www.cpt.musc.edu) and received extensive training on the TIPSS manual with the study PI. Therapists were encouraged to consider PTSD and SUD not as two separate disorders but as one overarching syndrome, wherein symptoms of PTSD were interconnected and thus maintained over time. The PI administered TIPSS to one (non-randomized) pilot participant and provided session recordings to supplement training. Training included 2–3 hours of manual review in addition to 4–6 hours of role plays of session material. Treatment-related issues were discussed in weekly group supervision meetings; and continued role plays were conducted within supervision for the duration of the trial.

The CBT for SUD manual was based upon extant manuals focused upon cognitive behavioral relapse prevention strategies [18, 19] and used in other RCTs [e.g., 61]. Training of therapists delivering CBT for SUD was exclusively focused upon SUD and did not include any discussion of trauma or PTSD. Therapists were provided with videos to illustrate the various treatment components (e.g., function analysis, distinguishing lapse versus relapse). Training included 2–3 hours of manual review in addition to 4–6 hours of role plays of session material. Treatment-related issues were discussed in weekly group supervision meetings; and continued role plays were conducted within supervision for the duration of the trial.

Measures

Screening and eligibility—The *Structured Clinical Interview for DSM-IV Axis I Disorders* [SCID-I; 62] is a well-established, structured diagnostic interview that was administered at baseline (only) to assess major *DSM-IV* Axis I disorders (except PTSD) to establish study inclusionary/exclusionary criteria.

PTSD outcomes—The *Clinician Administered PTSD Scale for DSM-5* [CAPS-5; 63] was administered at baseline and session 12. The CAPS-5 is a well-established, 30-item structured interview for the assessment of PTSD diagnosis and severity, wherein each of 20 *DSM-5* (past month) PTSD symptoms is rated on a 5-point Likert-style scale (0 = *absent* to 4 = *extreme/incapacitating*); duration of symptoms, subjective distress, and relevant impairments in functioning are also assessed. The *PTSD Checklist-Civilian Version-5* [PCL-5; 64] was administered at baseline and each treatment session. The PCL-5 is a 20-item self-report measure of PTSD symptom severity; each item is rated on a 5-point scale (0 = *not at all* to 4 = *extremely*) in terms of how often the respondent has been bothered by the symptom. In this study, the time-frames for the PCL-5 administration during treatment referred to the time since the previous session.

Substance use outcomes—All substance use measures were administered at each study visit to provide a continuous index of objective and self-report substance use. *Urine drug screens* (UDS) provided an objective measure of substance use/nonuse. Use was determined using qualitative urine drug screen levels. The integrated E-Z split key cup II (Innovacon Company, San Diego, CA) was used to test for urine cocaine [benzoylecgonine (BE)], tetrahydrocannabinol (THC), opiates, amphetamine, and benzodiazepines. In addition, all participants provided *alcohol breath samples* to estimate blood alcohol content (BAC) at the time of the visit. The Alco-Sensor III was used to assess BAC. Levels over .00 would require a meeting with the nurse practitioner for an intoxication assessment. The *Time-Line Follow-Back* [TLFB; 65, 66] was used as a self-report measure of substance use (e.g., timing, number of episodes, and amount of substance) throughout the study; at each visit, participants reported substance use since their last visit. The UDS, alcohol breath samples, and TLFB data yielded the two primary outcome variables: 1) urine toxicology testing, alcohol breath level analyses, and participants' self-reports of substance use; and (2) longest sustained abstinence, operationalized as the maximum number of days of abstinence for each participant (i.e., UDS, self-report).

Treatment mechanisms—Distress tolerance was assessed multi-modally via both self-report and behavioral measures at four time-points during the study (Baseline; Session 4, 8, 12). Four measures, including the *Distress Tolerance Scale* [DTS; 67], *Mirror-Tracing Persistence Task* [MTPT; 68], *Breath-Holding Task* [BH; 69], and *Paced Auditory Serial Addition Task-Computerized Version* [PASAT-C; 70], were selected in an effort to better understand and define the distinct aspects of the distress tolerance construct with regard to PTSD/SUD. The Distress Tolerance Scale [DTS; 67] is a 15-item self-report measure, rated on a 5-point Likert-style scale (1 = *strongly agree* to 5 = *strongly disagree*), that evaluates the extent to which respondents believe that they can experience and withstand distressing emotional states [67]. The Mirror-Tracing Persistence Task [MTPT; 68] is a behavioral index

of psychological distress tolerance that requires participants to use a computer mouse to trace objects on the computer screen, while a buzzer sounds loudly when the mouse moves outside the lines. Participants can discontinue at any time, and distress tolerance is measured as the length of time (number of seconds) that participants engage in the task. The Breath-Holding Task [BH; 69] is a behavioral index of physical distress tolerance that requires participants to hold their breath as long as possible. Distress tolerance is measured as the length of time (average of two trials; in seconds) that participants are able to hold their breath [69, 71]. Finally, the Paced Auditory Serial Addition Task-Computerized Version [PASAT-C; 70] is a behavioral index of psychological distress tolerance that requires participants, over three levels (increasing in difficulty), to add numbers by continually summing the two most recently presented digits. On the third level, participants are given the option to self-terminate the task, and distress tolerance is measured as the latency to discontinue.

To assess cue reactivity, a well-established script-driven paradigm to measure trauma and substance cue reactivity [e.g., 72] was utilized. The script-driven cue reactivity paradigm was selected for this study to create individualized, emotionally salient trauma and substance cues and account for the diverse experiences of participants. At the baseline study session, participants were asked to generate three 50-second script cues (trauma, substance, neutral scripts) from the first-person perspective, with the assistance of study staff. These scripts were used in each of the four experimental paradigms throughout the study. At the beginning of the experimental sessions, participants were introduced to the sound-attenuated controlled experiment room and seated at a desk, facing a computer screen equipped with keyboard and mouse. Each participant was informed of the laboratory procedures and fitted with physiological monitoring equipment for heart rate. Physiological monitoring was recorded continuously throughout the laboratory session using BIOPAC Systems. Participants were asked to provide Visual Analogue Scale (VAS; e.g., 23) ratings (100-point scale; “not at all” to “very much so”) of craving, substance use urge, desire to avoid consuming substances, as well as level of anxiety, safety, and control, on a computer screen at one-minute intervals. VAS measures were presented in a similar fashion to past work [e.g., 25, 73–75].

Participants were led through each laboratory session via standardized, audio-recorded directions. The presentation of the script cues (neutral, trauma, substance) was randomized and counterbalanced across participants to minimize carryover effects. Pre-cue baseline monitoring required that participants sit quietly for 5 minutes, which was followed by the presentation of a cue. After each script cue presentation, participants were instructed to immediately complete VAS ratings and then to sit quietly for 10 minutes to allow a return to pre-cue baseline physiological levels. The next script cue was then administered and the process repeated until all three script cues were presented. The laboratory sessions ran 45 minutes in duration, all inclusive. Participants were provided with a 20-minute break following the laboratory procedures and before their scheduled therapy session; experimental procedures were required to be conducted prior to therapy sessions throughout the study. Therapy sessions 4, 8, and 12 were preceded by laboratory sessions.

Statistical Analysis Plan

Randomization to treatment group was conducted using urn randomization procedures in order to increase the likelihood of obtaining comparable groups with respect to gender and PTSD diagnosis. To evaluate group differences on demographic and baseline variables, contingency tables with chi-square testing, analyses of variance (ANOVA), and examination of correlations between demographic/baseline variables and specified outcomes will be conducted. Generalized linear modeling and mixed effects models (SAS 9.3) will comprise the broad-based data analytic strategy. Tests of mediational hypotheses will utilize a Structural Equation Modeling framework (MPlus v. 7.0). Parallel Frequentist and Bayesian analyses will provide converging inferential statistical analyses for study hypotheses. For Bayesian analyses, vague, neutral priors will form the basis of reported analyses, evaluation of optimistic and pessimistic priors' sensitivity will permit assessment of the robustness of conclusions. Finally, analyses will utilize the intent to treat principle with follow-up sensitivity analyses to assess the robustness of conclusions to assumptions about the ignorability of missing data. As the proposed investigation is a pilot RCT with the purpose of, in part, to estimate an effect size for a larger study, power consideration for a larger trial will be based upon outcomes of this investigation.

Discussion

This paper describes a pilot RCT, which sought to evaluate the impact of TIPSS, as compared to Standard CBT for SUD, with regard to PTSD symptoms and substance use. Across treatment settings, the majority of patients with PTSD/SUD have historically received treatment for SUD only [76, 77], despite patients' preferences for treatment of both disorders [78, 79]. When both types of treatment are available, individuals with PTSD/SUD typically transfer between PTSD and SUD treatment services with little care coordination [6, 7]. Moreover, there are no preferred treatments for the highly prevalent comorbidity of PTSD/SUD, although trauma-focused integrated treatments appear to be promising [6, 7]. Thus, it is imperative to develop novel, integrated, evidence-based treatment programs for individuals with PTSD/SUD.

The most promising PTSD/SUD integrated treatments to date have combined trauma-focused psychotherapy with CBT for SUD [6, 7]. Indeed, much of this work has implemented PE [8], one of the "gold standard" evidence-based therapies for PTSD [9, 10], with CBT for SUD [6, 7, 11, 12]. For example, Concurrent Treatment of PTSD and SUD with Prolonged Exposure [COPE; 22, 80] is a 12-session (90 minutes each), individually delivered integrated CBT for PTSD/SUD. However, these interventions are still being developed and marked by relatively small effect sizes and substantive drop-out, given the unfortunately significant treatment attrition rates common to both PTSD and SUD populations [e.g., 6, 7, 13, 14, 22, 81, 82].

The study design had a number of strengths. Notably, this RCT was designed for high levels of generalizability within real-world treatment settings, and therefore, the protocol was inclusive of all types of SUD and therapy sessions were limited to 60 minutes. Second, the design allowed for inclusion of individuals experiencing SUD with *subclinical*/PTSD as well as diagnostic PTSD. Inclusion criteria specified at least four or more *DSM-5* [46] symptoms

of PTSD, instead of the specific constellation of six symptoms required for the PTSD diagnosis. The inclusion of subclinical PTSD builds upon extant interventions for PTSD/SUD [e.g., 47] and is informed by the comparable rates of distress and impairment associated with full versus partial PTSD [e.g., 3, 48, 49] as well as the high rates of subclinical PTSD among SUD populations [e.g., 50, 51, 52]. Third, the twice-weekly treatment sessions were designed to decrease drop-out by keeping participants more connected to treatment. Finally, repeated measurement of putative treatment mechanisms was included across four points during the trial. Multi-modal indices of distress tolerance were utilized to improve our ability to generalize and synthesize findings across indices.

Despite these strengths, there have been challenges in conducting this trial that should be noted. First, given the limits inherent to the size and scope of the pilot trial, we were not able to conduct an ideal parametric design, comparing TIPSS for PTSD/SUD versus CBT for SUD versus CPT for PTSD. This type of design would most ideally differentiate among the active components of each treatment with regard to both PTSD and SUD outcomes. Second, study therapists could not be blinded to condition given the obvious nature of treatment content. Although this is a limitation inherent to all psychosocial treatment development, it is nonetheless important to consider. Third, while a goal of the RCT was expanded generalizability, the inclusion of diverse SUD (and participants with often multiple SUD) did not allow for exclusive reliance on objective measurement of substance use since UDS is more amenable to monitoring weekly changes in use of some substance (i.e., cocaine) than others (e.g., cannabis). The small sample size of the pilot trial may preclude meaningful examination of sample subsets. Furthermore, participants represented a predominantly black/African-American, low-income population, thus elucidating a commonly underrepresented population in the research literature but also potentially precluding generalizability to less disadvantaged individuals with PTSD/SUD. Fourth, three treatment sessions (4, 8, and 12) were preceded by experimental laboratory procedures. Although a 20-minute break was provided to participants following the laboratory tasks and prior to the treatment sessions, it is possible that the laboratory procedures contributed to distress which affected their engagement in therapy. Finally, among PTSD/SUD populations, re-traumatization (i.e., experience of new traumatic events) is a clinically significant issue and one that should be considered a pertinent variable with potential to significantly effect outcomes in the context of RCTs.

Taken together, if deemed feasible and preliminarily efficacious, TIPSS may provide an additional treatment avenue for PTSD/SUD. Indeed, TIPSS merges the leading evidence-based CBT for SUD [18, 19, 83] with CPT, one of the “gold standard” evidence-based treatments for PTSD [9, 17]. As such, TIPSS holds significant promise for providing a feasible, well-tolerated, and effective treatment package for PTSD/SUD. Furthermore, while research has indicated that PE and CPT are equally as effective in treating PTSD [e.g., 16, 84, 85], some emerging evidence suggests slightly higher dropout rates for PE as compared to CPT [e.g., 86]. Some patients or providers may also prefer to offer PE or CPT [87], underscoring the clinical relevance of a treatment alternative in terms of dissemination and implementation.

Notably, given the complex and difficult-to-treat nature of the PTSD/SUD population [1, 5–7], unexpected results are possible and may yield important insights into methods for improving future directions for PTSD/SUD treatment. This trial provides an important stepping stone in terms of better understanding how a CPT-based integrated treatment for PTSD/SUD performs and is tolerated. If hypotheses are supported, next steps might involve larger trials and use of pharmacotherapy to augment CBT to enhance effectiveness [e.g., 82, 88, 89]. Further treatment development research for PTSD/SUD is timely and clinically important in order to advance science and practice for this complex comorbidity.

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Figure 1.

Conceptual model of RCT depicting study hypotheses. Study outcomes are hypothesized to be affected by changes in individual cue reactivity and distress tolerance. A1 = treatment type will be related to cue reactivity; B1 = cue reactivity will be related to study outcomes; A2 = treatment type will be related to distress tolerance; B2 = distress tolerance will be related to study outcomes; C = treatment types (TIPSS and standard CBT) will be related to study outcomes (PTSD and substance use).

Table 1

Overview of Measures and Procedures by Study Session

Procedure	Treatment Sessions											
	Week 1			Week 2			Week 3			Week 4		
	1	2	3	4	5	6	7	8	9	10	11	12
Urine Sample & Alcohol Breath Samples	x	x	x	X	x	x	x	x	x	x	x	x
Time-Line Follow-Back	x	x	x	x	x	x	x	x	x	x	x	x
CAPS-5	x											x
PCL-5	x	x	x	x	x	x	x	x	x	x	x	x
Distress Tolerance Measures	x			x				x				x
Writing Trauma, Drug, & Neutral Scripts	x											
Experimental Cue Reactivity Laboratory Sessions	x			x				x				x

Table 2

Summary of Treatment Content for Standard CBT for SUD and TIPSS for PTSD/SUD

Target	Topics	Standard CBT	TIPSS / Integrated CBT
Substance Use	Motivational interviewing	X	X
	Substance triggers	X	X
	Antecedents/consequences of substance use	X	X
	Relapse prevention	X	X
	Coping skills	X	X
	Problem thinking	X	X
	Changing problem thinking	X	X
	Lifestyle balance	X	X
	Values	X	X
	Increasing non-substance activities	X	X
	Decision-making	X	X
	Enhancing social support	X	X
PTSD Symptoms	Education on PTSD and substance use associations		X
	Discussion and written statement of impact of trauma on beliefs about self, others, and the world		X
	Written account of trauma memory and in-session review and discussion		X
	Cognitive exercises and cognitive restructuring regarding trauma- and substance related thoughts relevant to the following themes: trust, intimacy, esteem, power/control, safety		X
	Review of any between-session substance use, cravings, trauma cues		X

Table 3**Summary of Session Content: TIPSS for PTSD/SUD**

Session	Topics ^a
1	Introduction/Motivational Interviewing for PTSD/SUD Treatment Engagement
2	Psychoeducation on PTSD/SUD; Trauma- and Substance-Related Triggers
3	Values and Valued Action
4	Coping Skills for Managing PTSD and SUD Symptoms
5	Impact of Trauma and Substance Use on Beliefs about Self, Others, and World
6	Identification of Thoughts and Feelings about PTSD and SUD
7	Remembering the Trauma I
8	Remembering the Trauma II
9	Challenging Questions regarding PTSD and SUD
10	Problematic Thinking regarding PTSD and SUD
11	Themes: Trust, Safety, Power/Control, Esteem, Intimacy
12	Themes: Trust, Safety, Power/Control, Esteem, Intimacy / Graduation

^aEach session begins with a review of substance use and PTSD symptoms since the last session, and connections between PTSD and SUD are drawn through each session. Functional analyses of substance use, discussion of adaptive ways of coping with urges and cravings, and review of substance use refusal skills are conducted at each session. Discussion of substance triggers, antecedents/consequences of substance use, relapse prevention, and valued (non-substance-related activities) are integrated into each session. Avoidance is emphasized as a driving process underlying both PTSD and SUD.