CNS Spectrums

www.cambridge.org/cns

Original Research

Cite this article: Duran ÉP, Corchs F, Vianna A, Araújo ÁC, Del Real N, Silva C, Ferreira AP, De Vitto Francez P, Godói C, Silveira H, Matsumoto L, Gebara CM, de Barros Neto TP, Chilvarquer R, de Siqueira LL, Bernik M, and Neto FL (2021). A randomized clinical trial to assess the efficacy of trial-based cognitive therapy compared to prolonged exposure for post-traumatic stress disorder: preliminary findings. *CNS Spectrums* **26**(4), 427–434. https://doi.org/10.1017/S1092852920001455

Received: 02 November 2019
Accepted: 12 May 2020

Key words:
Post-traumatic stress disorder; prolonged exposure therapy; cognitive behavioral therapy; trial-based cognitive therapy.

Author for correspondence:
*Érica Panzani Duran,
Email: ericapduran@gmail.com

© The Author(s), 2020. Published by Cambridge University Press.

CAMBRIDGE UNIVERSITY PRESS

A randomized clinical trial to assess the efficacy of trial-based cognitive therapy compared to prolonged exposure for post-traumatic stress disorder: preliminary findings

Érica Panzani Duran[1,2*], Felipe Corchs[1], Andrea Vianna[1], Álvaro Cabral Araújo[1], Natália Del Real[1], Cláudio Silva[1], Ana Paula Ferreira[1], Paula De Vitto Francez[1], Cláudio Godói[1], Helena Silveira[1], Lina Matsumoto[1], Cristiane Maluhy Gebara[1], Tito Paes de Barros Neto[1], Raquel Chilvarquer[1], Luciana Lima de Siqueira[1], Marcio Bernik[1] and Francisco Lotufo Neto[1]

[1]Postgraduate Anxiety Program, Institute of Psychiatry, Faculty of Medicine, University of São Paulo, São Paulo, Brazil, and [2]Postgraduate Program of Interactive Processes of Organs and Systems, Health Sciences Institute, Federal University of Bahia, Salvador, Brazil

Abstract

Background. Post-traumatic stress disorder (PTSD) is a prevalent mental health condition that is often associated with psychiatric comorbidities and changes in quality of life. Prolonged exposure therapy (PE) is considered the gold standard psychological treatment for PTSD, but treatment resistance and relapse rates are high. Trial-based cognitive therapy (TBCT) is an effective treatment for depression and social anxiety disorder, and its structure seems particularly promising for PTSD. Therefore, we evaluated the efficacy of TBCT compared to PE in patients with PTSD.

Methods. Ninety-five patients (77.6% females) who met Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision, criteria for PTSD were randomly assigned to receive either TBCT (n = 44) or PE (n = 51). Patients were evaluated before and after treatment, and at follow-up 3 months after treatment. The primary outcome was improvement in PTSD symptoms as assessed by the Davidson Trauma Scale (DTS). Secondary outcomes were depression, anxiety, and dysfunctional attitudes assessed by the Beck Depression/Anxiety Inventories and Dysfunctional Attitudes Scale, as well as the dropout rate.

Results. A significant reduction in DTS scores was observed in both arms, but no significant difference between treatments. Regarding the secondary outcomes, we found significant differences in depressive symptoms in favor of TBCT, and the dropout rate was lower in the TBCT group than the PE group.

Conclusion. Our preliminary results suggest that TBCT may be an effective alternative for treating PTSD. Further research is needed to better understand its role and the mechanisms of change in the treatment of this disorder.

Introduction

Exposure to traumatic events, especially those involving interpersonal violence, is a global problem and carries the highest post-traumatic stress disorder (PTSD) risk.[1,2] Most adults experience at least one potentially traumatic event during their lifetime.[3] The vast majority of people have a brief acute stress response, but approximately 80% recover during the first month after the event and do not develop long-term sequelae.[4] Lifetime prevalence estimates of those who develop PTSD range from 8% to 10% in the general population.[5,6] Research has shown that 11% to 12% of patients in Veterans Affairs primary care facilities have PTSD.[7] The trauma types that convey the highest burden are those comprising intimate partner sexual violence and the unexpected death of a loved one.[2]

Cognitive behavioral therapy (CBT) has received empirical support for its efficacy and is among the first-line treatments for PTSD.[8] Cognitive processing therapy (CPT) has also received strong empirical support for its efficacy and effectiveness.[9-11] However, prolonged exposure therapy (PE) is currently considered the gold standard psychological treatment for this disorder,[12,13] as it has been studied and received extensive empirical support in the treatment of PTSD for over 30 years.[14]

PE and CPT have been suggested to have different mechanisms of change.[15] One question raised by Gallagher and Resick[15] was whether CBT, PE, and CPT differentially target some beliefs more effectively than others. For example, assuming that PE changes the belief that a person

cannot handle thinking about the trauma, whereas CPT is more likely to change beliefs related to self-blame, then it may be possible to select the individual's profile of beliefs to maximize treatment benefit.[16]

Trial-based cognitive therapy (TBCT)[17] is a novel transdiagnostic approach effective in depression[18] and social anxiety disorder (SAD).[19-22] Although TBCT restructures cognition in a similar fashion as conventional CBT and CPT, TBCT is distinctive in that it introduces a new, organized, and systematic approach to modify dysfunctional core beliefs by presenting an easy-to-remember case-formulation model while allowing cognitive, emotional, and experiential work to be implemented simultaneously.[23] One of the characteristics of TBCT is that its main technique simulates a legal trial, incorporating a courtroom metaphor by which the patient is allowed to express multiple internal characters to challenge core beliefs conceptualized as self-accusations.[23] Furthermore, TBCT incorporates and integrates components of other psychotherapies, especially gestalt therapy, making it more experiential.[24]

Effective treatments for PTSD may have a high rate of nonresponse and dropout. Schottenbauer et al[25] carried out a review of the literature on the rates of nonresponse and dropout in 55 studies of empirically supported PTSD treatments, and found nonresponse rates as high as 50% and widely ranging dropout rates depending on the nature of the study population. Another meta-analysis[26] that assessed dropout rates in war trauma ranged from 5% to 78%, suggesting new and innovative strategies to improve treatment retention. More recently, Berke et al[27] reviewed data from three clinical trials of evidence-based PTSD treatment (namely CPT, present-centered therapy, and PE) in military service members and reported a 31% dropout rate. They suggested that dropout from PTSD treatment is significantly associated with treatment outcome, and that new strategies are needed to reduce dropout rates, especially in group and trauma-focused therapies. Thus, the development of new treatments for PTSD with lower potential for dropout may still be necessary.[28,29]

In this study, we carried out a two-arm randomized controlled trial to assess the efficacy of TBCT relative to PE in the treatment of PTSD. Because TBCT was especially designed to change dysfunctional core beliefs, we hypothesized that it would outperform PE in the primary outcome, as measured by the Davidson Trauma Scale (DTS), as well as the secondary outcome measures, as assessed by the Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), and Dysfunctional Attitudes Scale (DAS). We also hypothesized that TBCT has a lower dropout rate than PE.

Methods

Recruitment

After dissemination of the recruitment notice in the media, 128 prospective patients voluntarily sought treatment for PTSD at the Anxiety Disorders Program of the Institute of Psychiatry at the University of São Paulo (São Paulo City, Brazil) from January 2014 to March 2015. After an initial interview, 95 participants were selected.

Inclusion criteria were age 18 to 65 years; fulfilled the diagnostic criteria for PTSD according to Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR); being able to read, write, and follow the protocol instructions; and if on medication, the doses were stable during the study. Noninclusion criteria were current clinically relevant suicide risk, assessed by the Structured Clinical Interview for DSM (SCID); current self-mutilating behaviors (ie, cutting, burning, and hurting themselves deliberately), as assessed by the SCID; psychotic symptoms not stabilized with medication; current exposure to traumatic events; lack of awareness of the traumatic event; or active abuse of or dependence on alcohol or other drugs. In addition, patients who did not meet the diagnostic criteria or refused to participate in the research were excluded. Those not included in the study who required treatment were duly referred.

Sample size

Sample size was estimated based on the standard deviation of the difference in the scores of our primary outcome (ie, DTS) before and after treatment, which was 22.4 points in a study by Davidson et al[30] We assumed that this deviation would also be found in both proposed treatments. Based on the estimated sample size for comparing two means[31] at a significance level of 5% and 80% power, at least 42 patients were needed per group, a total of 84 patients.

Seventy-four patients completed all 13 therapeutic sessions and underwent at least the posttreatment assessment: 34 in the PE group and 40 in the TBCT group. We found no significant differences between groups in terms of baseline scores for any of the scales used in this study. In the total sample of 95 patients randomized to the trial, no significant sociodemographic differences were present between the two groups. The mean age was 41.7 years with an average of 13.1 years of education. The mean duration since the traumatic event was 7.4 years. We found no difference in distribution between the groups. This study was approved by both the institutional review board of the Institute of Psychiatry and the Hospital Ethics Committee (CAPPesq–HCFMUSP, approved protocol number 266643). The trial was registered at controlled-trials.com (identifier: ISRCTN58151265).

Instruments

In the initial patient screening, we used a sociodemographic questionnaire and the SCID, which used the DSM-IV-TR diagnostic criteria for diagnosing PTSD and comorbidities.

Primary outcome

Our primary outcome measure was the severity of PTSD symptoms as assessed by the DTS,[32] a self-rating scale developed to diagnose and measure symptom severity and treatment outcome in patients with PTSD.[30] The scale is composed of 17 questions corresponding to the 17 DSM-IV PTSD symptoms, measured on a scale of 0 to 4 for severity and frequency. Questions 1 to 4 cover criterion B (traumatic event is persistently reexperienced); questions 5 to 11 concern criterion C (numbing of general responses); and questions 12 to 17 concern criterion D (hyperarousal or increased excitability). The maximum possible score is 136.

Secondary outcomes

The updated BDI-II[33,34] is a 21-item self-assessment instrument developed to evaluate the psychological and somatic manifestations of major depressive episodes according to the DSM-IV criteria.[35] Items are scored on a scale of 0 to 3, and the total maximum score is 63. The standard cutoff scores are 0 to 9 (minimal), 10 to 18 (mild), 19 to 29 (moderate), and 30 to 63 (severe).

The BAI[36] contains 21 self-rating items evaluating symptoms of anxiety on a scale of 0 to 3: 0 (not at all), 1 (mildly), 2 (moderately), and 3 (severely). The maximum score on the BAI is 63. The standard cutoff scores are 0 to 7 (minimal), 8 to 15 (mild), 16 to

https://doi.org/10.1017/S1092852920001455 Published online by Cambridge University Press

25 (moderate), and 26 to 63 (severe). The Brazilian version of the BAI has been shown to present very similar psychometric properties in relation to the original study.[37]

The DAS[38,39] is a 40-item self-report scale designed to assess the presence and intensity of dysfunctional attitudes, with each item being a 7-point Likert scale statement. The scores range from 40 to 280, and the higher the score, the more dysfunctional the individual's attitudes. The Brazilian version of the DAS was adapted by Orsini et al[40]

Finally, the number of dropouts for any reason was also considered as a secondary outcome measure.

All scales used to measure primary and secondary outcomes were applied immediately before treatment, at the end of treatment, and 3 months after the end of treatment.

Study design

Randomization procedure and blinding

After meeting the inclusion criteria and signing the informed consent form, participants were randomly allocated to either TBCT or PE using a table of random numbers (http://www.dficcet.ufms.br/prrosa/metodologia/TNA.html) in the horizontal sequence, starting at the top of the first page to the left. Therapists and raters did not participate in the allocation procedure. Figure 1 shows the Consolidated Standards of Reporting Trials (CONSORT) diagram describing patient inclusion in the trial.

Assessments were performed by independent evaluators who were unaware of the assigned treatment condition. Therapists were experienced professionals with at least 6 and 5 years of practice for PE and TBCT, respectively. However, they received weekly 2-hour supervision from senior psychologists during the trial for both groups. Treatments were conducted in 13 sessions, 1 hour each. The therapy sessions were held once a week in the first 11 weeks and fortnightly in the last 4 weeks. To ensure that therapists complied with the intervention protocol, the senior therapist also listened to three audio-recordings randomly picked for each patient.

Interventions

PE is a set of exposure techniques for traumatic experiences based on the manual proposed by Foa et al[41] It is a treatment protocol founded on prolonged imaginal exposure techniques using a hierarchy of feared situations from those eliciting the least anxiety or discomfort to those that are the most difficult. The two main components of PE were imaginal exposure involving revisiting and narrating aloud the disturbing traumatic event, and gradual in vivo exposure to the avoided trauma reminders. Homework was assigned weekly, which consisted of reading a leaflet with instructions explaining breathing techniques and relaxation, in vivo and imaginal exposure, and a hierarchy construction for the in vivo exposure. A trauma semistructured clinical interview[41] was applied to all patients in session 1. Session 2 consisted of psychoeducation of PTSD symptoms. All of the other sessions (3-13) involved imaginal exposure to the trauma memory. The six therapists who conducted PE (67% female, mean age 35.7 years) were all trained

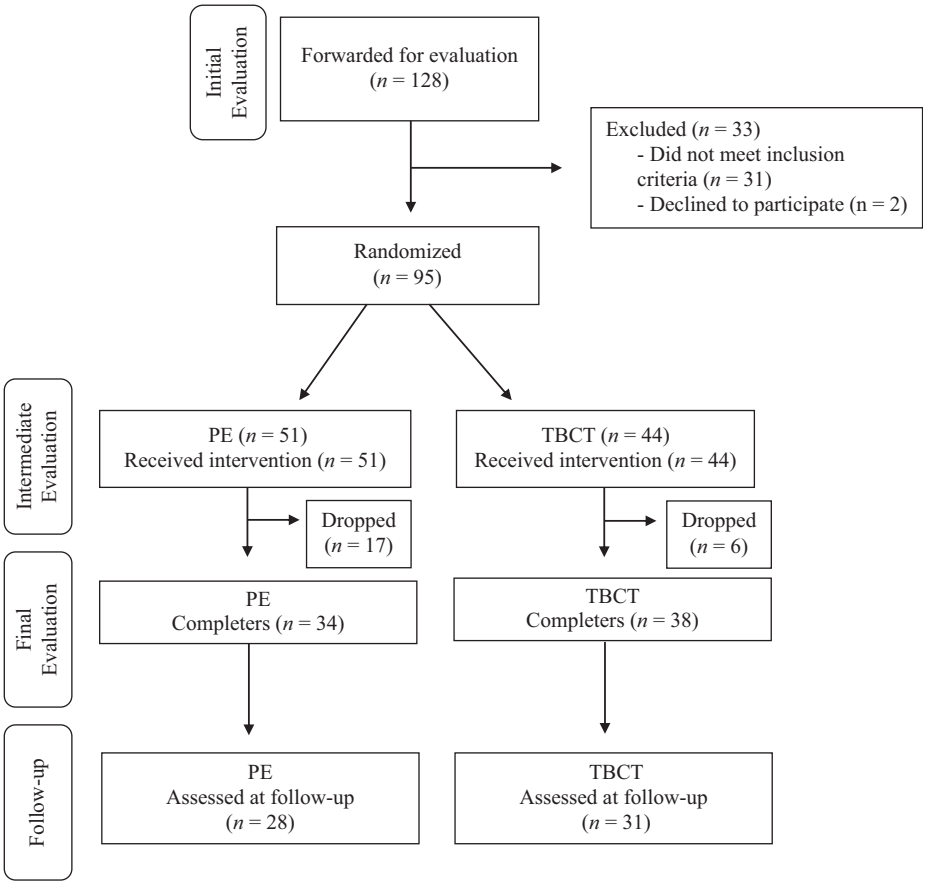

Figure 1. Participants in the study. Abbreviations: PE, prolonged exposure therapy; TBCT, trial-based cognitive therapy.

https://doi.org/10.1017/S1092852920001455 Published online by Cambridge University Press

research assistants who graduated in psychology and specialized in behavioral therapy or CBT with at least 6 years of experience.

TBCT was based on the manual proposed by de Oliveira[42] and adapted to PTSD for the purpose of this study. In the manual, the first sessions address the first levels of cognition, represented by dysfunctional automatic thoughts. During treatment, therapists received weekly 2-hour group supervision from a senior therapist. As for the PE group, a trauma semistructured clinical interview[41] was applied to all patients in session 1, and session 2 consisted of psychoeducation of PTSD symptoms. Sessions 3 and 4 were dedicated to introducing the first level of the TBCT conceptualization diagram and restructuring dysfunctional automatic thoughts. Although the TBCT manual contemplates restructuring underlying assumptions and performing experiments consisting of exposure to avoided situations using the color-coded symptom hierarchy, for the purpose of this study, this technique was not employed. In session 5, the therapist could choose the participation grid technique to resolve guilt and shame, or the consensual role-play to restructure dysfunctional underlying assumptions (second level of the TBCT conceptualization diagram). From session 6 onward, the trial technique was used to change negative core beliefs (third level of the TBCT conceptualization diagram and the main mechanism of TBCT change). The trial is used to simulate a legal trial in which the patient is asked to role-play the investigated party (inquiry), the defendant, the prosecutor, the defense attorney, and the juror. The goal is for the patient to develop functional positive core beliefs after collecting evidence supporting and not supporting the dysfunctional negative core beliefs. In this phase, the patient is also assigned homework in which he or she is asked to gather evidence supporting the new functional positive core beliefs, a technique called "preparation for the appeal." The five therapists responsible for conducting TBCT (100% female, mean age 34.0 years) were all trained research assistants who graduated in psychology and were certified TBCT therapists.

Although patients were not required to be on a stable medication regimen to start psychotherapy, they were asked to maintain their medication use stable throughout the treatment. Patients who refused medication were allowed to participate.

Statistical analysis

To evaluate the effects of TBCT vs PE on the main and secondary outcomes over the three time periods (preassessment, postassessment, and follow-up), we used a generalized estimating equation (GEE) method for each scale.[43-45] The first-order autoregressive working correlation matrix was used to deal with the within-subject effect, expecting that measurements made further apart correlated less than those made closer together.[46] The following covariates were used in the models: allocation status (eg, randomized to receive TBCT or PE), time effect (ie, capturing changes in the outcomes over time regardless of the allocated arm and keeping the allocation constant), sex, use of medication (dichotomous variables), number of traumatic events, and age. Two different models were used: the unconditional and the conditional (ie, interaction effects). The unconditional model evaluated the effects of the intervention, given the random allocation status, on outcome, and the conditional model evaluated potential interaction effects between allocation and time on outcome. This conditional model was tested taking into account the following hypothesis: TBCT decreases the BDI scores more rapidly over time than PE. If the interaction term was not significant, it was removed from the conditional model; therefore, we returned to the unconditional model previously tested without including the interaction terms.

Due to missing data on outcomes, which is commonly observed in longitudinal designs, a multiple imputation procedure was used. As CONSORT advocates the intention-to-treat paradigm, techniques dealing with missing data must be used. One of the main flexible procedures for dealing with missing data in the context of randomized trials is multiple imputation[47]; namely, replacing missing data with one or more specific values to allow statistical analyses that include all participants and not just those who do not have any missing data.[48] The specification for modeling the missing data was as follows: five data sets were imputed[49] and the variables entered in the unrestricted model were those cited previously (allocation, repeated time effect, sex, use of medication, number of traumatic events, and age) and the outcome measures across the item per se. The imputation method was fully conditional specification with no constraints in terms of the range of imputed continuous values (BAI and DAS).

For outcomes with missing data over the three assessments (eg, DTS, BAI, and DAS), the effects of the intervention are presented as pooled estimates derived from the multiple imputation procedure. For BDI, no multiple imputation was needed because at least one BDI score was obtained for each patient and GEE can accommodate this pattern of missing data.

Significance was set at 0.05, and all analyses were performed in SPSS version 24.[50] The effects of the covariates *group assignment* and *time* were reported in nonstandardized coefficient regression (represented by "B") because, under the routine of multiple imputation, standardized effects are not available in SPSS.

Results

Forty-four patients were allocated to TBCT and 51 to PE. The groups were homogeneous in regard to demographic and clinical variables, including gender, education, age, duration of PTSD, previous psychiatric treatment, subclinical diagnosis according to SCID criteria, comorbidities, religion, number of traumatic events, and pharmacological treatment. The population included 76 females (80%), and 92 (87.4%) patients were using some kind of medication. Fifty-one patients (53.7%) were single or divorced, 37 (38.9%) married, and 7 (7.4%) widowed. In regard to religious beliefs, 45 patients (43%) were Catholic, 24 (23.3%) evangelical, 20 (18.6%) Kardecist, and 16 (15.1%) had no religious affiliation. Furthermore, 81 patients (76.7%) still presented with symptoms of PTSD, and only 25 (24.2%) presented with remission (33 [31.8%] in TBCT vs 18 [17.6%] in PE; $P = .11$).

Table 1 shows some of the baseline and sociodemographic features of the patients in each group.

Table 2 presents the GEE effects for *random allocation status* and *time* after adjusting for sex, use of medication, number of traumatic events, and age.

Regarding the primary outcome, the PE group had an average DTS score 4.42 points higher than the TBCT group across the study ($P = .456$) when controlled for sex, use of medication, number of traumatic events, age, and time. As shown in Table 2, time was significant, with an average reduction of 23 points in each assessment ($P < .001$). Twenty-three patients remitted during the study, 14 in the TBCT group and 9 in the PE group ($P = .11$).

In terms of secondary outcomes, the PE group had a significantly higher mean BDI-II score relative to the TBCT group ($B = 3.703$, $P = .049$). No significant interaction effects of time and allocation group on the three outcomes were observed. Significance was not found with the BAI and DAS.

https://doi.org/10.1017/S1092852920001455 Published online by Cambridge University Press

Table 1. Main Sociodemographic Features of Each Group

	PE (n = 51)		TBCT (n = 44)	
Characteristics	*M*	SD	*M*	SD
Age, y	40.118	12.3881	43.636	12.5644
Education, y	13.229	3.4900	12.860	3.7580
Duration of the disorder, mo	95.978	117.4290	81.927	144.5272
Number of traumatic events	2.373	1.6729	2.364	1.3992

Abbreviations: PE, prolonged exposure therapy; SD, standard deviation; TBCT, trial-based cognitive therapy.

Table 2. Supplementary Measures Over Time in Each Group

		Pretreatment			Posttreatment			Follow-up (3 mo)		
Measure	Treatment	*M*	SD	n	*M*	SD	n	*M*	SD	n
DTS	PE	87.38	27.39	50	48.41	34.34	34	48.25	34.36	28
	TBCT	89.89	27.61	44	37.42	32.27	38	42.87	38.80	31
BDI	PE	28.04	10.50	51	14.54	12.60	37	16.96	10.16	28
	TBCT	25.68	10.22	44	11.26	8.85	38	12.47	10.89	34
BAI	PE	33.14	14.58	50	19.17	11.12	35	21.11	16.22	28
	TBCT	33.18	13.24	44	16.97	13.11	37	19.94	14.44	33
DAS	PE	155.40	31.88	50	169.62	37.15	34	169.25	31.19	28
	TBCT	156.42	32.73	43	174.92	28.51	36	179.53	31.61	32

Abbreviations: BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory II; DAS, Dysfunctional Attitudes Scale; DTS, Davidson Trauma Scale; PE, prolonged exposure therapy; TBCT, trial-based cognitive therapy.

Twenty-three patients (n = 6 TBCT [13.6%] and n = 17 PE [33.3%]) dropped out during the treatment phase of the study ($\chi^2_{(1)}$, $P = .025$). The reasons for withdrawal were inability to get a job that was compatible with the treatment schedule (n = 4 and 5), refusal to continue the treatment (n = 1 and 8), and lost contact (n = 1 and 4) in the TBCT and PE groups, respectively.

Discussion

This study aimed to evaluate the efficacy of TBCT and PE in PTSD patients, both posttreatment and 3 months after treatment. Several psychological treatments have been shown to be effective for PTSD.[51] Two trauma-focused therapies (CPT and PE) are the most frequently studied psychotherapies for military-related PTSD, but nonresponse and dropout rates have remained high, with many patients continuing to experience symptoms.[52,53] After an extensive systematic review of the literature in different populations, Forman-Hoffman et al[54] concluded that current psychological and pharmacological treatments have moderate to high strength of evidence regarding the efficacy of treating adults with PTSD, and that research is still needed on the comparative effectiveness of treatments.

Although CPT is the most widely used cognitive-based intervention for treating PTSD, and conventional CT is also widely used,[55] our goal was to choose a new and innovative approach that addresses the most important aspect that needs to change in PTSD and many other disorders: dysfunctional negative core beliefs.[56]

According to Wenzel,[56] TBCT is unique in that it outlines a series of systematic, concrete steps to achieve belief modification. TBCT is a transdiagnostic approach,[57] whereas PE was designed as a particular exposure-based treatment protocol to treat PTSD.[58] Considering that TBCT has been demonstrated to be effective for depression[18] and SAD,[19-22] it may be considered an option for treating patients with PTSD and comorbid conditions, such as depression and SAD. The study by Caetano et al[20] included SAD patients with high rates of comorbid disorders, especially depression, and demonstrated that participants in the TBCT group had significantly decreased social anxiety, social avoidance, and depressive symptoms, whereas no differences were observed between pretreatment and posttreatment measures in the waitlist condition.

Orsillo et al[59] examined the prevalence of SAD and the comorbidity of SAD and PTSD in Vietnam veterans, and tested a theory of the etiology of social anxiety in trauma victims. They reported that 32% of the sample was positive for both SAD and PTSD, and that adversity of repatriation and shame about the reported experiences in Vietnam were significant predictors of current social anxiety levels. The authors suggested that social anxiety may be a significant problem among individuals with PTSD. These findings were confirmed by Crowson et al[60] in the same population, suggesting that veterans reported a high level of social anxiety and agoraphobia-like symptoms. In addition, Zayfert et al[61] found that, of 240 patients with principal PTSD, 43% had comorbid SAD, whereas only 7% of 57 patients with principal SAD had comorbid PTSD. In their sample, PTSD patients with SAD reported more trauma-related guilt. Two important TBCT techniques, namely the participation grid and the trial, were designed to deal with emotions such as guilt and shame. Although we did not objectively measure guilt and shame in the current sample, the previous data[59-61] allow us to speculate that TBCT acts on PTSD by regulating such emotions, suggesting further studies to clarify this hypothesis.

Negative cognition prior to trauma has been suggested to predict acute PTSD symptoms.[62] In our study, although DAS scores were significantly decreased, no difference was observed between patients treated by TBCT and PE. This is important considering that the mechanism of change in PE has been suggested to be mainly based on behavioral techniques, whereas TBCT is supposed

https://doi.org/10.1017/S1092852920001455 Published online by Cambridge University Press

to act mainly on cognitive aspects. Dysfunctional attitudes have been explored in depression but, to the best of our knowledge, their possible relationship with PTSD symptoms has only been explored by Keller[63] in PE-treated patients, showing no significant prediction of homework adherence and response to treatment.

Another well-known issue in PTSD treatment is the rate of premature treatment termination, as PTSD dropout rates vary greatly across studies, ranging from 28% to 68%.[64,65] In a qualitative study of 28 veterans by Hundt et al,[66] therapy-related barriers were reported by more than two-thirds of the sample, including not buying in to rationale or specific tasks, absence of improvement, and agreement with the therapist to switch to another therapy or level of care that may better fit the patient's needs. In another study,[67] only 7% (n = 14) of the patients in one sample completed the image habituation procedure as a homework assignment, and only 57% (n = 37) in a second sample complied with the audiotape exposure treatment, resulting in the conclusion that exposure-based treatments are not the choice for some clients. A randomized trial of 72 patients who received imaginal exposure or cognitive therapy[68] found that, although improvements were seen in both groups, a significantly greater number of patients in the imaginal exposure group worsened and missed more sessions relative to the cognitive therapy group. The findings reported in these studies confirm the need for approaches that are as effective as the existing evidence-based PTSD treatments but have a lower dropout rate and greater treatment retention. In our study, the dropout rate was 13.6% for TBCT and 33.3% for PE ($P = .025$).

Patients with PTSD often have other psychiatric diagnoses (current and past). Among the patients attending a psychiatric trauma clinic in Copenhagen, the prevalence of depression, somatic illness, pain, low functioning, and social isolation was significantly associated with PTSD symptoms.[69] The same was found in this study, with high rates of comorbidity for generalized anxiety and depression according to the SCID. In addition, PTSD has been associated with disruptions in work, difficult social functioning, and poor physical health,[12] similar to the results in our patients. A transdiagnostic approach, such as TBCT, could be helpful for patients presenting with such comorbid conditions.

This study has some limitations. First, PTSD involves a number of different manifestations and the symptoms may change over time. Therefore, to adequately address the consequences of trauma, it is important to be aware of the information coming from different groups of victims, as the results of different types of trauma can vary considerably.[70] In this study, we do not take this into account. According to Chu,[71] the nature and severity of traumatic events may influence whether prolonged psychological effects occur, and this may hinder the variables that actually help classify the predictive factors for treatment outcome. Another important limitation is that the majority of participants (n = 83) received pharmacotherapy throughout the study because of the severity of their clinical condition. In addition, patients were not required to be on a stabilized medication regimen to start psychotherapy. This may make it difficult to analyze predictors of the response to psychotherapy in this sample.

In conclusion, TBCT was as effective as PE in the treatment of PTSD. Nonetheless, TBCT was more effective in treating comorbid depression in this sample and presented fewer dropouts. Future research is needed to confirm these preliminary findings. Another important point that deserves further research is to understand the underlying mechanisms of change.

Acknowledgments. The authors would like to thank all of the staff and faculty of the Institute of Psychiatry Anxiety Program (AMBAN) of the School of Medicine of the University of São Paulo, who in different ways helped us complete this study.

Funding. This article was not funded or supported for its execution.

Disclosures. The authors authors have no conflict of interest to declare. Statement from Erica Duran: Opinions expressed in the submitted article are my own authority without interference from any official position of the institution or funding, as this study does not hear funding and other form of curation.

References

1. Kessler RC, Ruscio AM, Shear K, *et al.* Epidemiology of anxiety disorders. In: Stein M, Steckler T, eds. *Behavioral Neurobiology of Anxiety and Its Treatment: Current Topics in Behavioral Neurosciences*. Vol. **2**. Berlin and Heidelberg, Germany: Springer-Verlag; 2009:21–59.
2. Kessler CK, Aguilar-Gaxiola S, Alonso J, *et al.* Trauma and PTSD in WHO world mental health surveys. *Eur J Psychotraumatoloy*. 2017;**27**(8 suppl 5). doi:10.1080/20008198.2017.1353383.
3. Bryant RA. The complexity of complex PTSD. *Am J Psychiatry*. 2010;**167** (8):879–881.
4. Zohar J, Juven-Wetzler A, Sonnino R, *et al.* New insights into secondary prevention in post-traumatic stress disorder. *Dialogues Clin Neurosci*. 2011; **13**(3):301–309.
5. Kilpatrick DG, Resnick HS, Milanak ME, *et al.* National estimates of exposure to traumatic events and PTSD prevalence using DSM-IV and DSM-V criteria. *J Trauma Stress*. 2013;**26**(5):537–547.
6. Miller M, Wolf E, Kilpatrick DG, *et al.* The prevalence and latent structure of proposed DSM-V post-traumatic stress disorder symptoms in US national and veteran samples. *Psychol Trauma*. 2013;**5**(6):501
7. Magruder KM, Frueh BC, Knapp RG, *et al.* Prevalence of post-traumatic stress disorder in Veterans Affairs primary care clinics. *Gen Hosp Psychiatry*. 2005;**27**(3):169–179.
8. Kar N. Cognitive behavioral therapy for the treatment of post-traumatic stress disorder: a review. *Neuropsychiatr Dis Treat*. 2011;**7**:167–181.
9. Resick PA, Uhlmansiek MO, Clum GA, *et al.* A randomized clinical trial to dismantle components of cognitive processing therapy for post-traumatic stress disorder in female victims of interpersonal violence. *J Consult Clin Psychol*. 2008;**76**(2):243–258.
10. Rizvi SL, Vogt DS, Resick PA. Cognitive and effective predictors of treatment outcome in cognitive processing therapy and prolonged exposure for post-traumatic stress disorder. *Behav Res Ther*. 2009;**47**(9):737–743.
11. Chard KM, Heady ET, Martin CE. Cognitive processing therapy. In: Ford JD, Courtois CA, eds. *Treating Complex Traumatic Stress Disorders in Adults: Scientific Foundations and Therapeutic Models*. 2nd ed. Guilford, NY: The Guilford Press; 2020:249–266.
12. Powers MB, Halpern JM, Ferenschak MP, *et al.* A meta-analytic review of prolonged exposure for post-traumatic stress disorder. *Clin Psychol Rev*. 2010;**30**(6):635–641.
13. Zhou Y, Sun L, Wang Y, *et al.* Developments of prolonged exposure in treatment effect of post-traumatic stress disorder and controlling dropout rate: a meta-analytic review. *Clin Psychol Psychother*. Mar. 2020; 1–14. 2020. doi:10.1002/cpp.2443.
14. Hembree EA, Foa EB. Prolonged exposure therapy. In: Ford JD, Courtois CA, eds. *Treating Complex Traumatic Stress Disorders in Adults: Scientific Foundations and Therapeutic Models*. 2nd ed. Guilford, NY: The Guilford Press; 2020:207–225.
15. Gallagher MW, Resick PA. Mechanisms of change in cognitive processing therapy and prolonged exposure therapy for PTSD: preliminary evidence for the differential effects of hopelessness and habituation. *Cognit Ther Res*. 2012;**36**(6):1–10.
16. Zalta AK. Psychological mechanisms of effective cognitive-behavioral treatments for PTSD. *Curr Psychiatry Rep*. 2015;**17**(4):560.

https://doi.org/10.1017/S1092852920001455 Published online by Cambridge University Press

17. de Oliveira IR. Trial-Based Thought Record (TBTR): preliminary data on a strategy to deal with core beliefs by combining sentence reversion and the use of analogy with a judicial process. *Rev Bras Psiquiatr*. 2008;**30**(1):12–18.
18. Hemanny C, Carvalho C, Maia N, *et al.* Efficacy of trial-based cognitive therapy, behavioral activation, and treatment as usual in the treatment of major depressive disorder: preliminary findings from a randomized clinical trial. *CNS Spectr*. 2019; **26**:1–10. doi:10.1017/S1092852919001457.
19. Neufeld CB, Palma PC, Caetano KAS, *et al.* A randomized clinical trial of group and individual cognitive-behavioral therapy approaches for social anxiety disorder. *Int J Clin Health Psychol*. 2020;**20**:29–37.
20. Caetano KAS, Depreeuw B, Papenfuss I, *et al.* Trial-based cognitive therapy: efficacy of a new CBT approach for treating social anxiety disorder with comorbid depression. *Int J Cogn Ther*. 2018;**11**(3):325–342.
21. de Oliveira IR, Powell VB, Wenzel A, *et al.* Efficacy of the trial-based thought record, a new cognitive therapy strategy designed to change core beliefs, in social phobia. *J Clin Pharm Ther*. 2011;**37**(3):328–334.
22. Powell VB, Oliveira OH, Seixas C, *et al.* Changing core beliefs with trial-based cognitive therapy may improve quality of life in social phobia: a randomized study. *Rev Bras Psiquiatr*. 2013;**35**(3):243–247.
23. de Oliveira IR. *Trial-Based Cognitive Therapy: Distinctive Features*. New York, NY: Routledge; 2016.
24. Delavechia TR, Velasquez ML, Duran EP, *et al.* Changing negative core beliefs with trial-based thought record. *Arch Clin Psychiatry*. 2016;**43**(2): 31–33.
25. Schottenbauer MA, Glass CR, Arnkoff DB, *et al.* Nonresponse and dropout rates in outcome studies on PTSD: review and methodological considerations. *Psychiatry*. 2008;**71**(2):134–168.
26. Goetter EM, Bui E, Ojserkis RA, *et al.* A systematic review of dropout from psychotherapy for posttraumatic stress disorder among Iraq and Afghanistan combat veterans. *J Trauma Stress*. 2015;**28**(5):401–409.
27. Berke DS, Yeterian J, Presseau C, *et al.* Dynamic changes in marines' reports of PTSD symptoms and problem alcohol use across the deployment cycle. *Psychol Addict Behav*. 2019;**33**(2):162–170.
28. Schnyder U. Why new psychotherapies for post-traumatic stress disorder? *Psychother Psychosom*. 2005;**74**(4):199–201.
29. Butollo W, Karl R, König J, *et al.* A randomized controlled clinical trial of dialogical exposure therapy versus cognitive processing therapy for adult outpatients suffering from PTSD after type I trauma in adulthood. *Psychother Psychosom*. 2016;**85**(1):16–26.
30. Davidson JR, Tharwani HM, Connor KM. Davidson Trauma Scale (DTS): normative scores in the general population and effect sizes in placebo-controlled SSRI trials. *Depress Anxiety*. 2002;**15**(2):75–78.
31. Chow S-C, Shao J, Wang H. *Sample Size Calculations in Clinical Research*. 2nd ed. . Boca Raton, FL: Chapman & Hall/CRC; 2008.
32. Davidson JR, Book SW, Colket JT, *et al.* Assessment of a new self-rating scale for post-traumatic stress disorder. *Psychol Med*. 1997;**27**(1):153–160.
33. Beck AT, Steer RA, Garbin MGJ. Psychometric properties of the Beck Depression Inventory: twenty-five years of evaluation. *Clin Psychol Rev*. 1988;**8**:77–100.
34. Beck AT, Steer RA, Brown GK. *BDI-II: Beck Depression Inventory Manual*. 2nd ed. . San Antonio, TX: Psychological Corporation; 1996.
35. Wang YP, Gorenstein C. Psychometric properties of the Beck Depression Inventory-II: a comprehensive review. *Braz J Psychiatry*. 2013;**35**(4): 416–431. doi:10.1590/1516-4446-2012-1048.
36. Beck AT, Epstein N, Brown G, *et al.* An inventory for measuring clinical anxiety: psychometric properties. *J Consult Clin Psychol*. 1988;**56**(6): 893–897.
37. Osório FL, Crippa JAS, Loureiro SR. Further psychometric study of the Beck Anxiety Inventory including factorial analysis and social anxiety disorder screening. *Int J Psychiatry Clin Pract*. 2011;**15**:255–262.
38. Weissman AN. The Dysfunctional Attitude Scale: A Validation Study [PhD thesis]. Philadelphia, PA: University of Pennsylvania; 1979.
39. Weissman AN, Beck AT. A development and validation of the Dysfunctional Attitude Scale: a preliminary investigation. Paper presented at: Annual Meeting of the Association for the Advancement of Behavior Therapy; 1978; Chicago, IL.
40. Orsini MRC, Tavares M, Tróccoli BT. Adaptação Brasileira da Escala de Atitudes Disfuncionais (DAS). *Psico-USF*. 2006;**11**:25–33.
41. Foa EB, Hembree EA, Rothbaum BO. *Prolonged Exposure Therapy for PTSD: Emotional Processing of Traumatic Experiences: Therapist Guide (Treatments That Work),* Vol. **8.** New York: Oxford University Press; 2007.
42. de Oliveira I. *Trial-Based Cognitive Therapy: A Manual for Clinicians*. New York, NY: Routledge; 2015.
43. Feng Z, Diehr P, Peterson A, *et al.* Selected statistical issues in group randomized trials. *Ann Rev Public Health*. 2001;**22**:167–187.
44. Hardin JW, Hilbe JM. *Generalized Estimating Equations*. Boca Raton, FL: Chapman and Hall/CRC Press; 2003.
45. Fitzmaurice G, Larid NM, Ware JH. *Applied Longitudinal Data*. New Jersey: John Wiley & Sons; 2004.
46. Gueorguieva R. *Statistical Methods in Psychiatry and Related Fields: Longitudinal, Clustered, and Other Repeated Measures Data*. New York: CRC Press; 2017.
47. Kenward MG, Carpenter J. Multiple imputation: current perspectives. *Stat Methods Med Res*. 2007;**16**(3):199–218.
48. Li P, Stuart EA, Allison DB. Multiple imputation: a flexible tool for handling missing data. *JAMA*. 2015;**314**(18):1966–1967.
49. Rubin DB. *Multiple imputation for nonresponse in surveys*. New York, NY: John Wiley & Sons; 1987.
50. IBM Corp. *IBM SPSS Statistics for, Version 24.0*. Armok, NY: IBM Corp; 2018.
51. Ford JD, Courtois CA. *Treating Complex Traumatic Stress Disorders in Adults: Scientific Foundations and Therapeutic Models*. 2nd ed. . Guilford, NY: The Guilford Press; 2020.
52. Steenkamp MM, Litz BT, Hoge CW, *et al.* Psychotherapy for military-related PTSD: a review of randomized clinical trials. *JAMA*. 2015;**314**(5): 489–500.
53. Larsen SE, Fleming CJE, Resick PA. Residual symptoms following empirically supported treatment for PTSD. *Psychol Trauma*. 2019;**11**(2):207–215.
54. Forman-Hoffman V, Middleton JC, Feltner C, *et al.* Psychological and pharmacological treatments for adults with posttraumatic stress disorder: a systematic review update. *Comp Eff Rev*. 2018;**207**:15–24.
55. Ehlers A, Murray H. Cognitive therapy. In: Ford JD, Courtois CA, eds. *Treating Complex Traumatic Stress Disorders in Adults: Scientific Foundations and Therapeutic Models*. 2nd ed. Guilford, NY: The Guilford Press; 2020:226–248.
56. Wenzel A. *Innovations in Cognitive Behavioral Therapy: Strategic Intervention for Creative Practice*. New York, NY: Routledge; 2017.
57. de Oliveira IR, Hemmany C, Powell VB, *et al.* Trial-based psychotherapy and the efficacy of trial-based thought record in changing unhelpful core beliefs and reducing self-criticism. *CNS Spectr*. 2012;**17**(1): 16–23.
58. Foa EB, Rothbaum BO, Riggs DS, *et al.* Treatment of post-traumatic stress disorder in rape victims: a comparison between cognitive-behavioral procedures and counseling. *J Consult Clin Psychol*. 1991;**59** (5):715–723.
59. Orsillo SM, Weathers FW, Litz BT, *et al.* Current and lifetime psychiatric disorders among veterans with war zone-related post-traumatic stress disorder. *J Nerv Ment Dis*. 1996;**184**(5):307–313.
60. Crowson JJ, Frueh BC, Beidel DC, *et al.* Self-reported symptoms of social anxiety in a sample of combat veterans with post-traumatic stress disorder. *J Anxiety Dis*. 1998;**12**(6):605–612.
61. Zayfert C, DeViva JC, Hofmann SG. Comorbid PTSD and social phobia in a treatment-seeking population: an exploratory study. *J Nerv Ment Dis*. 2005; **193**(2):93–101.
62. Su YJ, Chen SH. Negative cognitions prior to trauma predict acute post-traumatic stress disorder symptomatology. *J Trauma Stress*. 2018;**31**(1): 14–24.
63. Keller SM. Homework Adherence in Prolonged Exposure for Chronic Post-Traumatic Stress Disorder [PhD dissertation]. Case Western Reserve University; 2015.
64. Gross DF, Price M, Yuen EK, *et al.* Predictors of completion of exposure therapy in OEF/OIF veterans with post-traumatic stress disorder. *Depress Anxiety*. 2013;**30**(11):1107–1113.
65. Garcia HA, Kelley LP, Rentz TO, *et al.* Pretreatment predictors of dropout from cognitive behavioral therapy for PTSD in Iraq and Afghanistan war veterans. *Psychol Serv*. 2011;**8**(1):1–11.

https://doi.org/10.1017/S1092852920001455 Published online by Cambridge University Press

66. Hundt NE, Ecker AH, Thompson K, *et al.* "It didn't fit for me": a qualitative examination of dropout from prolonged exposure and cognitive processing therapy in veterans. *Psychol Serv*. 2018; 26. doi:10.1037/ser0000316.
67. Scott MJ, Stradling SG. Client compliance with exposure treatments for post-traumatic stress disorder. *J Trauma Stress*. 1997;**10**:523–526.
68. Tarrier N, Pilgrim H, Sommerfield C, *et al.* A randomized trial of cognitive therapy and imaginal exposure in the treatment of chronic post-traumatic stress disorder. *J Consult Clin Psychol*. 1999;**67**:13–18.
69. Buhman C, Mortensen EL, Lundstrom S, *et al.* Symptoms, quality of life, and level of functioning of traumatized refugees at psychiatric trauma clinic in Copenhagen. *Torture*. 2014;**24**(1):25–39.
70. Kapczinski F, Margis R. Post-traumatic stress disorder: diagnostic criteria. *Braz J Psychiatry*. 2003;**25**(suppl 1):3–7.
71. Chu JA. *Rebuilding Shattered Lives: Treating Complex PTSD and Dissociative Disorders*. 2nd ed. New Jersey: John Wiley & Sons; 2011.

https://doi.org/10.1017/S1092852920001455 Published online by Cambridge University Press