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Lenz, A. Stephen; Haktanir, Abdulkadir; and Callender, Karisse A., "Meta-Analysis of Trauma-Focused Therapies for Treating the Symptoms of Posttraumatic Stress Disorder" (2017). *College of Education Faculty Research and Publications*. 562.

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Journal of Counseling and Development, Vol. 95, No. 3 (July 2017): 339-353. [DOI](#). This article is © American Counseling Association and permission has been granted for this version to appear in [e-Publications@Marquette](#). American Counseling Association does not grant permission for this article to be further copied/distributed or hosted elsewhere without the express permission from American Counseling Association.

Meta-Analysis of Trauma-Focused Therapies for Treating the Symptoms of Posttraumatic Stress Disorder

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Abstract

This meta-analysis of 46 between-groups studies published between 1997 and 2015 detected treatment effects ranging from large to small when comparing trauma-focused therapies with no treatment ($g = -1.05$), supportive interventions ($g = -0.91$), other interventions ($g = -0.57$), and non-trauma-focused cognitive behavior therapies ($g = -0.08$) for the treatment of posttraumatic stress

disorder (PTSD). The independent random-effects models detected modest publication bias and a negligible influence of moderating variables on treatment outcomes. Considerations for counselors who treat PTSD and suggestions for researchers are provided.

As humans, we live in a complex world wherein the exposure to traumatic, stressor-related events that influence the arc of developmental trajectory has become commonplace. Kilpatrick and colleagues (2013) found that about 90% of individuals in the United States can recall at least one traumatic event that was subsequently associated with the flashbacks, detachment, avoidance, and distress that characterize posttraumatic stress disorder (PTSD). Ultimately, just over 8% of individuals residing in the United States report experiencing the full manifestation of PTSD symptoms, with first responders and military service personnel reporting higher prevalence annually (American Psychiatric Association, 2013). Reynolds, Pietrzak, Mackenzie, Chou, and Sareen (2016) noted little differentiation in the rate that individuals report exposure to traumatic events from adolescence through stages of adulthood. As a result, if accumulated trauma response supersedes coping resources, complex sequelae such as pervasive changes in mood, self-concept, and interpersonal relationships may emerge (Krammer, Kleim, Simmen-Janevska, & Maercker, 2016). Regardless of whether the nascent trauma response is typical or complex in nature, unmitigated PTSD symptoms have deleterious implications for well-being and functioning over the life span, including impairments in academic achievement (Porche, Fortuna, Lin, & Alegria, 2011), employment status (Sansone, Leung, & Wiederman, 2012), physical health (Maschi, Baer, Morrissey, & Moreno, 2013), and social heartiness (Laffaye, Cavella, Drescher, & Rosen, 2008). Therefore, it is imperative that counselors identify and implement therapeutic interventions that are effective for PTSD symptom reduction.

Myriad barriers, including mental health stigma, access to treatment, and awareness of the deleterious effects of PTSD, prevent individuals from seeking the help of a counseling professional following the development of PTSD symptoms. Pat-Horenczyk, Kenan, Achituv, and Bachar (2014) supported the proposition that some individuals possess inherent, adaptive characteristics that mitigate trauma responses and promote resilience without intervention. For others, supportive or psychoeducational efforts by meaningful others provide experiences that restore functioning to previous, pretraumatic levels (Kearns, Ressler, Zatzick, & Rothbaum, 2012). By contrast, formal treatment is indicated in cases in which protective factors, inherent resilience, or supportive resources are not sufficient. In response, trauma-focused therapies (TFTs) that feature exposure to memories of traumatic events and modification of associated cognitions have emerged as a first-line treatment (Monson & Shnaider, 2014).

Therapies Featuring Exposure to Trauma-Related Stimuli

TFTs that feature imaginal or in vivo exposure to traumatic memories and reminders have received attention among scientist-practitioners and, thus, have a robust empirical base from which to infer their effectiveness (Monson & Shnaider, 2014). Although all TFTs feature exposure to traumatic memories, there is a debate regarding the degree of utility associated with different combinations of complementary cognitive and/or behavioral components that contribute to therapeutic change. Prolonged exposure (PE; Foa, Hembree, & Rothbaum, 2007), cognitive processing therapy (CPT; Resick,

Monson, & Chard, **2014**), and eye-movement desensitization and reprocessing (EMDR; Shapiro, **2001**) are among the most popular variations of TFTs featuring varied integration of cognitive and behavioral elements.

PE

PE is a behavioral-oriented intervention that progressively engages clients in exposure to feared stimuli until the intensity of associated anxiety is reduced (Foa et al., **2007**). The underlying assumption within PE is that individuals assign inaccurate meaning to fear situations that become paired with subjective meaning and adverse physiological responses through the process of classical conditioning. From this perspective, the symptoms of PTSD and related fear responses are maintained through negative reinforcement contingencies associated with emotional disengagement, poor quality of trauma-related cognitions, and minimal narrative articulation of experience (Foa et al., **2007**). PE protocols feature a 10- to 12-session manualized treatment approach that targets PTSD symptoms through psychoeducation, breath retraining, imaginal exposure, and in vivo exposure to traumatic material (Foa et al., **2007**; Monson & Shnaider, **2014**). Through these processes, PE approaches promote physiological habituation to traumatic material and mitigation of PTSD symptoms.

CPT

CPT is a cognitive-oriented intervention that engages clients in challenging faulty appraisals and attributions associated with feared stimuli until the intensity of the trauma response is reduced and a more accurate appraisal of self to events is fostered (Monson & Shnaider, **2014**; Resick et al., **2014**). The underlying assumption within CPT is that avoidance of thinking about traumatic events and related problematic appraisals contribute to nonrecovery. From this perspective, the symptoms of PTSD and related fear responses are maintained through cognitive assimilation and overaccommodation that contribute to misappraisals and manufactured emotions (Monson & Shnaider, **2014**). CPT protocols feature a 12-session manualized treatment approach that targets PTSD symptoms through psychoeducation, exposure through the development of impact statements, and cognitive skills training (Resick et al., **2014**). Through these processes, CPT promotes adjustment through modification of cognitive structures that maintain nonrecovery.

EMDR

EMDR (Shapiro, **2001**) is an exposure-based therapy with minimal influence from traditional behavioral or cognitive paradigms such as those reflected by PE and CPT. Shapiro (**2001**) conceptualized nonrecovery as a function of paired visual, kinesthetic, or auditory reminders of traumatic events and their associated beliefs being in a state of arrested memory processing. From this perspective, the active components of EMDR are focusing on an image that represents the traumatic event, identifying negative cognition, visually tracking bilateral movements of an external stimulus, and engaging in self-monitoring activities. EMDR specialists believe that traumatic memories are processed through these activities. These activities occur in a manner similar to that observed in rapid eye movement stages of sleep (Shapiro, **2001**).

Preliminary and Aggregate Evidence for TFTs

PE, CPT, and EMDR have strong evidentiary support, are well established as treatments for PTSD, and are readily disseminated for use by counselors (Cahill, Foa, Hembree, Marshall, & Nacash, **2006**; Field &

Cottrell, **2011**; Hedden et al., **2015**). Primary studies of these TFTs have indicated significant reductions of PTSD symptoms when compared to wait list (Foa et al., **1999**; Resick, Nishith, Weaver, Astin, & Feuer, **2002**; Soberman, Greenwald, & Rule, **2002**), supportive therapies (Nixon, **2012**; Scheck, Schaeffer, & Gillette, **1998**), treatment as usual (Deville, Spence, & Rapee, **1998**; Marcus, Marquis, & Sakai, **1997**), and non-trauma-focused cognitive behavior therapy (CBT; Bryant et al., **2008**; Lee, Gavriel, Drummond, Richards, & Greenwald, **2002**). Single-arm meta-analyses of PE, CPT, and EMDR have revealed large aggregated effect sizes favoring TFTs when compared with no treatment and small-to-medium effect sizes for viable, alternative treatments based on direct comparisons (Chen et al., **2014**; Lenz, Bruijn, Serman, & Bailey, **2014**; Powers, Halpern, Ferenschak, Gillihan, & Foa, **2010**). More recently, an omnibus meta-analysis of indirect treatment effects completed by Erford et al. (**2016**) concluded that there was no differential effectiveness for reducing PTSD symptoms between TFTs and non-TFTs. This more recent finding by Erford et al. is divergent from the findings of single-arm meta-analyses (Chen et al., **2014**; Lenz et al., **2014**; Powers et al., **2010**) and brings into question the current state of best practice and identification of first-line interventions for treating PTSD when compared with other available treatment typologies.

Rationale and Purpose of the Study

Historically, the results from primary studies and meta-analyses have depicted TFTs as a promising and comparatively effective intervention for reducing PTSD symptoms. However, the findings by Erford et al. (**2016**) have stimulated uncertainty about the degree to which TFTs are effective when compared with other treatment options based on direct comparisons of typologies of intervention. We submit that estimating this degree of differential effectiveness between TFTs and other intervention typologies has important indications for understanding what interventions work best, for whom, how, and under what circumstances. The synthesis of treatment effects from available studies using a meta-analytic approach represents a contribution to the field of counseling by providing practitioners with accurate information for making treatment selections.

Therefore, the purpose of this study was to estimate the aggregate effectiveness of three popular TFTs (PE, CPT, and EMDR) for treating individuals who are experiencing PTSD symptoms and to estimate their differential effectiveness across heterogeneous samples. Specifically, we implemented meta-analytic techniques to answer three research questions:

- *Research Question 1:* To what degree are TFTs effective for decreasing the symptoms of PTSD among individuals when compared with no treatment (i.e., no intervention or wait list)?
- *Research Question 2:* To what degree are TFTs effective for decreasing the symptoms of PTSD among individuals when compared with viable, alternative treatments?
- *Research Question 3:* What sample and study characteristics moderate effect size among heterogeneous effect sizes?

With this purpose and these questions in mind, we submit the proposition that the results of these analyses may assist counselors in identifying the status of TFTs for treating individuals experiencing the symptoms of PTSD.

Method

A systematic search strategy was implemented to identify between-groups studies located in published and unpublished literature from 1997 to 2015 that evaluated the efficacy of PE, CPT, and EMDR for treating the symptoms of PTSD across counseling settings and client populations. Studies that met the inclusion criteria were collected, coded, and synthesized using statistical techniques that accounted for quality of study and sample size to yield a mean estimation of treatment effectiveness.

Inclusion and Exclusion Criteria

We gathered data from published and unpublished research reports meeting the following inclusion criteria: (a) studies used randomized controlled or quasi-experimental, between-groups quantitative research designs; (b) studies were published in peer-reviewed journals, dissertations, or theses; (c) studies used PE, CPT, or EMDR; (d) studies used at least one of these therapeutic approaches as a means to decrease the severity of PTSD symptoms as described in the fourth edition, the text revision of the fourth edition, or the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, **1994, 2000, 2013**, respectively); (e) evaluation for primary study eligibility was determined by a trained mental health professional; (f) researchers used standardized pretest and posttest assessments to gauge treatment efficacy; (g) sufficient data were reported to compute an effect size; and (h) studies were published in English. We eliminated the studies if they reported findings from single-group, single-case, correlational research studies; reported previously published data; or compared treatments with medication only.

Search Strategies

We implemented four search strategies to identify relevant studies: (a) electronic database searches; (b) journal-specific searches; (c) reviewing of references lists of included documents and meta-analyses of PE, CPT, and EMDR for PTSD; and (d) reviewing of meta-analytic studies on PTSD studies that used at least one the aforementioned treatment methods. Electronic database searches were completed in PsycINFO, Academic Search Complete, ProQuest Dissertations and Theses, and Google Scholar using the function to limit results to the time period under investigation (1997–2015). The keywords *prolonged exposure (PE)*, *cognitive processing therapy (CPT)*, and *eye-movement desensitization and reprocessing (EMDR)* were implemented to detect the intervention; *posttraumatic stress disorder* and *PTSD* were used to identify the target dependent variable. We used combinations of these search terms across all database searches using the peer-reviewed function to retrieve abstracts of interest, except in the Google Scholar and ProQuest Dissertations and Theses databases. We did not select the peer-reviewed function in the Google Scholar and ProQuest Dissertations and Theses databases because it is not available. Instead, we established an a priori search protocol to review at least 150 returned documents or proceed until a reasonable amount of noneligible items was observed ($N = 50$).

We completed journal-specific searches within *Behavior Therapy; Cognitive and Behavioral Practice; Counseling Outcome Research and Evaluation; The Counseling Psychologist; Journal of Aggression, Maltreatment & Trauma; Journal of Cognitive Psychotherapy; Journal of Consulting and Clinical Psychology; Journal of Counseling & Development; Journal of Trauma Practice; Journal of Traumatic Stress; and Psychological Trauma: Theory, Research, Practice, and Policy*. We chose these journals because of their historical reputations for publishing clinical outcome research related to

PTSD. After a thorough review of each journal, we obtained, saved, and pooled all relevant publications that met the inclusion criteria into a data management software program.

Coding Procedures

We completed the coding of studies using the procedure recommended by Cooper, Hedges, and Valentine (2009) for documenting reference information, descriptive statistics (mean age, racial/ethnic composition, gender frequency, domicile), study features that may moderate outcomes (treatment setting, format, treatment characteristics, type of comparison, type of trauma, and number of sessions), and effect-size data (sample size, means, and standard deviations of posttreatment data for the treatment under investigation and alternative or control treatment). Comparison arms for TFTs were defined as those that administered no treatment (wait list, no intervention), supportive interventions (e.g., nondirective and person-centered therapies), non-trauma-focused CBTs, and other interventions (e.g., treatment as usual). All three authors completed the initial coding, and each author coded documents for one of the TFT modalities. Following the initial coding, the first author reviewed all of the coded data and reviewed discrepancies with the second and third authors until a consensus was established.

Statistical Methods

Primary analysis. We used Comprehensive Meta-Analysis (Version 3.3) software to analyze the data. We computed standardized mean difference for primary studies using the Hedges's g effect-size metric to account for variation in sample size and sampling error among between-groups studies using continuous data (Lipsey & Wilson, 2001). We calculated the standardized mean difference for PTSD outcomes using means and standard deviations. When means and standard deviations were not reported, we converted to this effect size using other statistics (e.g., standard error, confidence interval [CI]), when possible. Moreover, we computed mean effect sizes for each treatment type (PE, CPT, and EMDR) using the weighted invariance effect-size method and selected random-effects models because of their robustness to the differences among studies (Lipsey & Wilson, 2001). Furthermore, we used 95% CIs for point estimates in evaluating the null hypotheses. Negative effect sizes represented greater efficacy of TFTs than no treatment or alternative treatment comparisons, and larger magnitudes represented greater effects. We interpreted effect-size magnitudes reported by Lipsey and Wilson (1993) as small (effect size $\leq .30$), medium (effect size = $.50$), and large (effect size $\geq .67$), standardized in standard deviation units, and referenced to participant context. Finally, we computed prediction intervals around the mean effect size to depict the distribution of true effect sizes within the sample of studies (Borenstein, Hedges, Higgins, & Rothstein, 2009).

Heterogeneity analyses. We estimated heterogeneity among effect-size estimates using the Cochran Q test statistic and the inconsistency index (I^2). The Q statistic tests the hypothesis that all studies share a common effect size. When the value of Q is greater than the degrees of freedom and statistically significant ($p < .05$), the null hypothesis related to a common effect size among studies can be rejected. The I^2 statistic reveals the proportion of observed variance that is due to true error among effect sizes versus sampling error. Higgins, Thompson, Deeks, and Altman (2003) suggested that values of 25%, 50%, and 75% represented small, medium, and large amounts of heterogeneity, respectively. Taken together, when Q is greater than the degrees of freedom and I^2 is greater than 50%, inspection of moderator variables is indicated (Borenstein et al., 2009; Lipsey & Wilson, 2001).

Moderator analysis. We selected moderator variables for inspection after referring to previous meta-analyses of trauma-focused interventions (Chen et al., 2014; Lenz et al., 2014; Lenz & Hollenbaugh, 2015; Powers et al., 2010) and historical commentary within the meta-analytic literature (Cooper, 2010; Lipsey & Wilson, 2001). Specifically, we implemented two strategies to identify associations between four sample variables (mean age, percentage of men vs. women, domicile [United States or non-United States], and type of trauma reported by participants [military-related, physical abuse, sexual assault, polytrauma, or other]) and three study variables (sample size, type of TFT implemented [PE, CPT, or EMDR], setting of study [community-based, university-based, research hospital, Veterans Affairs, or other]) within heterogeneous samples of effect sizes. We completed subgroup analyses with categorical variables (type of comparison, domicile, type of trauma reported by participants, and setting of study) and metaregression modeling with continuous variables (mean age, percentage of men vs. women, and sample size). Subgroup analyses were completed using a mixed-effects analysis to report the combined effect across subgroups and was estimated with the Q test of homogeneity that is analogue to an F test in primary studies and yields a p value interpreted for statistical significance at the .05 level. Within the metaregression analyses, we implemented the method of moments estimator, and we converted z scores to F values within the t distribution using the Knapp and Hartung (2003) modification procedure.

Publication bias. We attempted to control for publication bias by including studies that were sourced within gray literature (i.e., theses and dissertations), which may include null treatment effects. Next, we assessed publication bias through visual inspection of funnel plots that situated individual study effect sizes on the abscissa and their associated standard errors on the ordinate. Symmetrical distributions within these plots depict less bias among studies, and skewed distributions implicate a potential for publication bias. Finally, we computed a fail-safe N for each of the aggregate effect sizes associated with PE, CPT, and EMDR. Although there are no steadfast standards for interpreting fail-safe N , when values are glaringly low in relation to the number of effect sizes represented in the mean effect size, it can be inferred that the value may be subject to publication bias.

Results

Study Characteristics

The research resulted in 122 candidate articles and dissertations/theses that qualified for further investigation. After applying the inclusion and exclusion criteria to each candidate document, we selected 46 studies (45 peer-reviewed articles and one dissertation) constituting 62 effect sizes ($k = 62$) for inclusion in our analyses (see Figure 1). Table 1 presents the method, participant, and treatment characteristics of the studies included in our analysis. There were 2,652 participants within the included studies, with an average of 61 participants per study. Of these 2,652 participants, 1,341 (51%) were assigned to treatment conditions ($N_{PE} = 407$, $N_{CPT} = 685$, $N_{EMDR} = 249$); 310 (12%) were assigned to no-treatment comparison groups; and 1,001 (38%) received a viable, alternative treatment. (Percentages do not total 100 because of rounding.) Most of the studies (98%) were published in journal articles, with an average publication year of 2008, and 80% of the participants were randomly assigned to their treatment conditions. More than half of the studies (60%) were completed in the United States, and all effect sizes calculated were based on outcome measures from established survey instruments rather than informal measures such as subjective units of distress scales. Of the studies

that reported gender, race/ethnicity, and mean age, the mean percentage of men included in the studies was 41.49 ($SD = 38.39$), and the mean number of White participants was 46. In other words, approximately 46 participants out of 61 (the average number of participants) in each study were White. The mean age for all participants in the study was 37.14 years ($SD = 11.91$). Finally, the average number of sessions among the studies that reported it was 9.54 ($SD = 4.77$). Fourteen studies (30.43%) in this meta-analysis included participant samples with multiple traumas ($n = 762$), and 11 (23.91%) included participant samples with other types of traumas ($n = 343$). Sexual assault-related trauma ($n = 715$) was investigated in 10 studies (21.74%); nine studies (19.57%) examined military-related trauma ($n = 778$), and two studies (4.35%) examined physical abuse-related trauma ($n = 54$). Moreover, 14 studies (30.43%) took place in a university setting ($n = 808$), 13 (28.26%) in a community-based facility ($n = 485$), 10 (21.74%) in a Veterans Affairs facility ($n = 722$), seven (15.22%) in a research hospital ($n = 570$), and two (4.35%) in another location ($n = 67$).

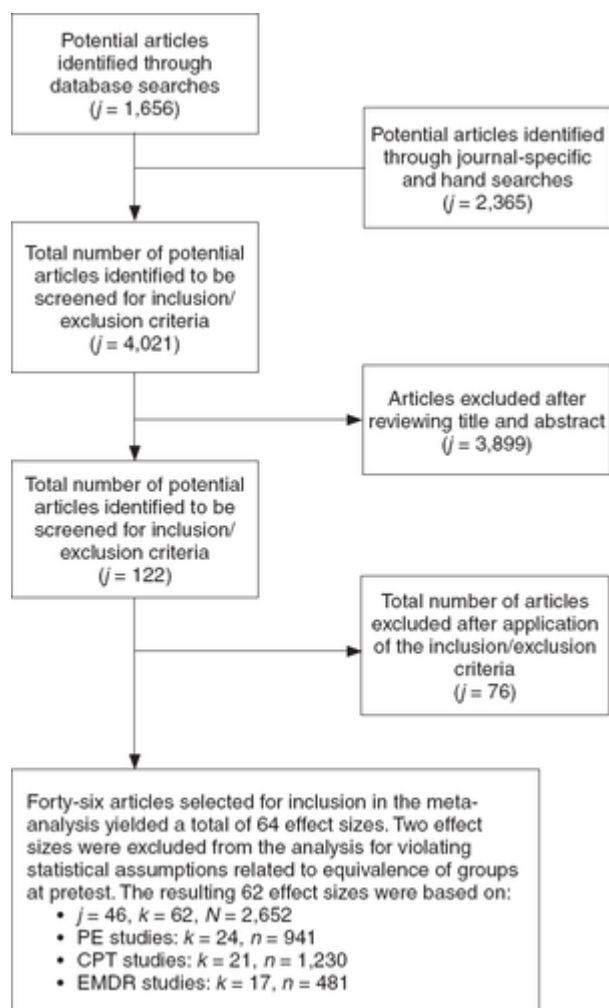


Figure 1 Depiction of Search Strategy, Yielded Studies, and Final Sample of Studies

Note. j = number of articles; k = number of effect sizes; PE = prolonged exposure; CPT = cognitive processing therapy; EMDR = eye-movement desensitization and reprocessing.

Effectiveness of TFTs Across Comparison Types

TFTs versus no treatment. The 21 effect sizes included in the analysis of TFTs versus no treatment for reducing the symptoms of PTSD ($N = 713$) yielded a mean effect size of -1.05 (95% CI $[-1.35, -0.76]$), $p < .01$, $\tau^2 = .32$, indicative of a large effect size and suggesting that the null hypothesis related to therapeutic superiority of TFTs can be rejected. This finding suggests that within the universe of studies included herein, participants receiving TFTs tended to report a decrease in PTSD symptoms about 105% of one standard deviation less than did those who received no intervention. Furthermore, inspection of the prediction interval indicated that the range of possible effect sizes that can be expected from studies of TFTs compared with no treatment fell between -2.27 and 0.17 .

Inspection of the funnel plot of effect size–standard error combinations depicted a symmetrical pattern of outlier influence surrounding the mean effect wherein three larger studies situated to the right (nontherapeutic) side of the mean effect were accompanied by three studies situated to the left (therapeutic). The comparable influence of these outliers was corroborated through inspection of trim-and-fill values that yielded a point estimate of -1.05 (95% CI $[-1.35, -0.76]$), which suggested that no studies were missing. This sample yielded a fail-safe N of 1,372, indicating that 1,372 unpublished studies with an effect size of zero would need to be included in the sample of effect sizes for the combined p value to exceed .05. This finding suggests that we would need to locate 65.3 missing studies for every observed study for the mean effect to be nullified. The effect-size distribution within the sample of studies was heterogeneous, $Q(20) = 73.27$, $p < .05$, $I^2 = 72.70$, indicating that about 73% of the observed variance reflected actual differences in effect sizes; thus, exploration of moderating variables was warranted.

Moderator analysis. Subgroup analyses indicated no statistically significant differences between point estimates across domicile, $Q(1, 20) = 3.84$, $p = .05$; treatment settings, $Q(1, 20) = 3.84$, $p = .05$; or type of trauma reported by participants, $Q(4, 20) = 2.89$, $p = .57$. The metaregression analysis did not yield a statistically significant model, $F(3, 16) = 0.39$, $p = .76$, $R^2 < .01$, indicating that sample size, mean participant age, and percentage of participants who were men versus women did not account for any notable variance among effect sizes of the included studies.

Table 1. Descriptive Statistics for Characteristics of Studies Contributing Mean Effect Sizes and Comparisons Across Treatment Types

Characteristic	<i>M</i>	<i>SD</i>	Range	No. of Studies	<i>N</i>	% Total Sample
Method characteristics						
Publication year	2008.15	5.96	1997-2015			
Conducted in the United States (1 = yes)	0.60	0.49	0-1			
Journal publication (1 = yes)	0.98	0.15	0-1			
Randomized design (1 = yes)	0.80	0.40	0-1			
Established survey instrument (1 = yes)	1.00	0.00	0-1			
Average sample size	60.63	45.64	15-199			
Average number of sessions	9.54	4.77	2-28			
Participant sample characteristics						
Percentage of men	41.49	38.39	0-100			
Number of White participants	46.00	29.80	9-121			
Age (years)	37.14	11.91	8.93-61.90			
Type of trauma						
Military-related				9	778	29.34
Physical abuse				2	54	2.04
Sexual assault				10	715	26.96
Polytrauma				14	762	28.73
Other				11	343	12.93
Treatment setting						
Community-based				13	485	18.29
University-based				14	808	30.47
Research hospital				7	570	21.49
Veterans Affairs				10	722	27.22
Other				2	67	2.53

Note. *N* = 2,652. Forty-six articles were selected for inclusion in the meta-analysis.

Effectiveness of PE, CPT, and EMDR when compared with no treatment. A subgroup analysis examining differences in mean effect sizes among PE, CPT, and EMDR for decreasing PTSD symptoms compared with no treatment was not significant, $Q(2, 20) = 3.19, p = .20$. Inspection of subgroup effect sizes between exposure therapy types revealed the largest treatment effect for PE ($k = 6, g = -1.43, 95\% \text{ CI } [-2.15, -0.71]$) and CPT ($k = 10, g = -1.07, 95\% \text{ CI } [-1.42, -0.71]$), whereas studies evaluating EMDR depicted large but notably lower effects ($k = 5, g = -0.64, 95\% \text{ CI } [-1.18, -0.09]$). This finding suggests that PE, CPT, and EMDR were all superior treatment options, accounting for treatment gains within the range of 143% to 63% of a standard deviation more efficacious than no treatment. Inspection of the CIs for each of the exposure therapy type–no treatment comparison arms indicated a moderate degree of precision for PE, CPT, and EMDR wherein the upper limit of each CI was within the therapeutic range.

TFTs versus supportive interventions. The 15 effect sizes included in the analysis of TFTs versus supportive interventions for reducing the symptoms of PTSD ($N = 875$) yielded a mean effect size of -0.91 ($95\% \text{ CI } [-1.21, -0.62]$), $p < .01, \tau^2 = .22$, indicative of a large effect size and suggesting that the null hypothesis related to the therapeutic superiority of TFTs can be rejected. This finding suggests that within the universe of studies included herein, participants receiving TFTs tended to report a decrease in PTSD symptoms about 91% of one standard deviation less than did those who received supportive intervention. Furthermore, inspection of the prediction interval indicated that the range of possible effect sizes that can be expected from studies of TFTs compared with supportive interventions fell between -1.97 and 0.15 .

Inspection of the funnel plot depicted two smaller studies to the left (therapeutic) side of the mean effect size. The minimal influence of these outliers was corroborated through inspection of trim-and-fill values, which yielded a point estimate of -0.91 ($95\% \text{ CI } [-1.21, -0.62]$), suggesting that no studies were missing.

This sample yielded a fail-safe N of 728, indicating that 728 unpublished studies with an effect size of zero would need to be included in the sample of effect sizes for the combined p value to exceed .05. This finding suggests that we would need to locate 48.5 missing studies for every observed study for the mean effect to be nullified. The effect-size distribution within the sample of studies was heterogeneous, $Q(14) = 73.82, p < .05, I^2 = 73.82$, indicating that about 74% of the observed variance reflected actual differences in effect sizes; thus, exploration of moderating variables was warranted.

Moderator analysis. Subgroup analyses of differences between effect sizes were not significant for domicile, $Q(1, 15) = 3.49, p = .06$; treatment settings, $Q(3, 15) = 5.86, p = .11$; or type of trauma reported by participants, $Q(4, 15) = 1.11, p = .89$. The metaregression analysis did not yield a statistically significant model, $F(3, 8) = 0.44, p = .73, R^2 < .01$, indicating that sample size, mean participant age, and percentage of participants who were men versus women did not account for any notable variance among effect sizes of the included studies.

Effectiveness of PE, CPT, and EMDR when compared with supportive interventions. A subgroup analysis examining differences in mean effect sizes among PE, CPT, and EMDR for decreasing PTSD symptoms compared with supportive interventions was statistically significant, $Q(2, 15) = 8.73, p = .01$. This finding indicates statistically significant differences for the observed treatment effects among PE, CPT, and EMDR when compared with supportive interventions. Inspection of subgroup effect sizes between

exposure therapy types revealed the largest treatment effects for EMDR ($k = 4$, $g = -1.37$, 95% CI [-2.03, -0.70]) and CPT ($k = 6$, $g = -0.99$, 95% CI [-1.44, -0.54]), whereas studies evaluating PE depicted medium yet statistically significant lower effects ($k = 5$, $g = -0.63$, 95% CI [-1.18, -0.09]). This finding suggests that PE, CPT, and EMDR were all superior treatment options, accounting for treatment gains within the range of 137% to 63% of a standard deviation more efficacious than supportive interventions, but that EMDR and CPT were notably more effective than PE when compared with supportive treatments. Inspection of the CIs for each of the exposure therapy type–supportive intervention comparison arms indicated a moderate degree of precision for PE, CPT, and EMDR wherein the upper limit of each CI was within the therapeutic range.

TFTs versus other interventions. The eight effect sizes included in the analysis of TFTs versus other interventions for reducing the symptoms of PTSD ($N = 178$) yielded a mean effect size of -0.57 (95% CI [-0.86, -0.28]), $p < .01$, $\tau^2 = .02$, indicative of a medium effect size and suggesting that the null hypothesis related to the therapeutic superiority of TFTs can be rejected. This finding suggests that within the universe of studies included herein, participants receiving TFTs tended to report a decrease in PTSD symptoms about 57% of one standard deviation less than did those who received other interventions. Furthermore, inspection of the prediction interval indicated that the range of possible effect sizes that can be expected from studies of TFTs compared with other interventions fell between -0.93 and 0.21 .

Inspection of the funnel plot of effect size–standard error combinations depicted a symmetrical pattern of studies surrounding the mean effect wherein several smaller studies were situated at the bottom of the funnel. Inspection of trim-and-fill values yielded a point estimate of $-.62$ (95% CI [-0.91, -0.33]), suggesting that one study may be missing. This sample yielded a modest fail-safe N of 42, indicating that 42 unpublished studies with an effect size of zero would need to be included in the sample of effect sizes for the combined p value to exceed .05. This finding suggests that we would need to locate 5.3 missing studies for every observed study for the mean effect to be nullified. The effect-size distribution within the sample of studies was heterogeneous, $Q(7) = 8.31$, $p = .31$, $I^2 = 15.76$, indicating that about 16% of the observed variance reflected actual differences in effect sizes; thus, exploration of moderating variables, including differences between TFTs, was not warranted.

TFTs versus non-trauma-focused CBTs. The 18 effect sizes included in the analysis of TFTs versus non-trauma-focused CBTs for reducing the symptoms of PTSD ($N = 919$) yielded a mean effect size of -0.08 (95% CI [-0.23, 0.08]), $p = .35$, $\tau^2 = .03$, indicative of a small effect size for which the null hypothesis related to the therapeutic superiority of TFTs cannot be rejected. This finding suggests that within the universe of studies included herein, participants receiving TFTs tended to report a decrease in PTSD symptoms only about 8% of one standard deviation less than did those who received a non-trauma-focused CBT. Importantly, inspection of CIs and significance testing indicated that the difference between TFTs and non-trauma-focused CBTs was not statistically significant based on the studies included in this analysis. Furthermore, inspection of the prediction interval indicated that the range of possible effect sizes that can be expected from studies of TFTs compared with non-trauma-focused CBTs fell between -0.46 and 0.30 .

Inspection of the funnel plot of effect size–standard error combinations depicted a symmetrical pattern of outlier influence surrounding the mean effect wherein one larger study was a modest

outlier situated to the left (therapeutic) side of the mean effect. The minimal influence of this outlier was substantiated through the inspection of trim-and-fill values, which yielded a point estimate of $-.10$ (95% CI $[-0.26, -0.06]$), suggesting that one study may be missing from the analysis. The effect-size distribution within the sample of studies was homogeneous, $Q(17) = 25.17, p = .08, I^2 = 33.87$, indicating that only about 34% of the observed variance reflected actual differences in effect sizes; thus, exploration of hypothesized mediators, including type of TFT, was not warranted.

Discussion

The results of this meta-analysis provide convincing support for the use of TFTs for treating the symptoms of PTSD across client populations. Erford and colleagues (2016) were instrumental in unequivocally demonstrating that counseling interventions, in general, promote recovery from the trauma response, and extant research has demonstrated the value of individual TFTs such as PE, CPT, and EMDR within single-arm comparisons (Chen et al., 2014; Lenz et al., 2014). Our findings portray TFTs as the evidence-supported treatment of choice when compared with no treatment, supportive interventions, and other evaluated treatments, yet equally effective when compared with non-trauma-focused CBTs. It is plausible that the common skills training components that characterize TFTs and non-trauma-focused CBTs may account for a substantial amount of therapeutic influence across PTSD symptoms. Given that almost 90% of individuals will experience a traumatic event in their lifetime (Kilpatrick et al., 2013) and that the degree of trauma recovery has robust associations with life outcomes such as academic achievement (Porche et al., 2011), employment status (Sansone et al., 2012), physical health (Maschi et al., 2013), and interpersonal relationships (Laffaye et al., 2008), we regard our findings as an important reference for understanding the ways that counselors can promote well-being and optimal functioning over the life span.

The results of this study indicate that implementing TFTs is the preferred choice for counselors when compared with relying on natural, inherent recovery processes to support trauma recovery. The meta-analysis of TFTs versus no treatment comparisons yielded a large treatment effect in favor of TFTs (see Figure 2). This finding is consistent with findings from previous single-arm meta-analyses of PE and EMDR, yet somewhat conservative when compared with those reported in meta-analyses of CPT. This finding supports the proposition that although individuals possess natural, inherent characteristics that support resilience following a traumatic experience, implementing TFT protocols may expedite recovery from PTSD symptoms. We conjecture that TFTs may teach coping skills to individuals that may have protective utility at a later point in life, especially if individuals are at increased risk for exposure to traumatic events. Reynolds et al. (2016) found that the rate of trauma exposure is consistent over the life span.

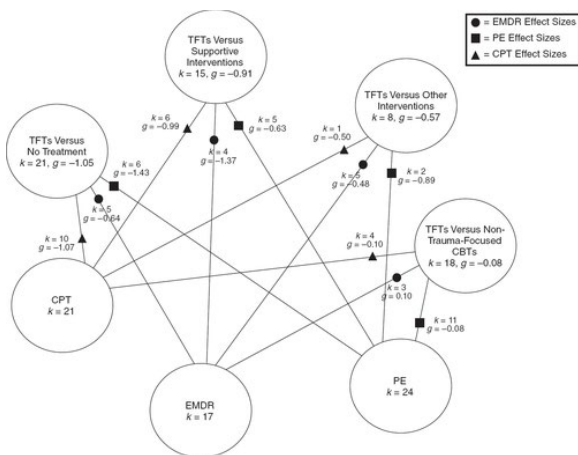


Figure 2 Depiction of Trauma-Focused Treatment Comparisons for Eye-Movement Desensitization and Reprocessing (EMDR), Prolonged Exposure (PE), and Cognitive Processing Therapy (CPT)

Note. k = number of effect sizes; TFTs = trauma-focused therapies; CBTs = cognitive behavior therapies.

TFTs emerged as the superior option when compared with viable supportive interventions and other approaches (e.g., treatment as usual), but not traditional, non-trauma-focused CBT (see Figure 2). The results of this meta-analysis revealed a large treatment effect for TFTs versus supportive interventions in favor of TFTs ($g = -0.91$). This result is consistent with previous findings by Bradley, Greene, Russ, Dutra, and Westen (2005) and Powers et al. (2010) and appears to verify the superiority of TFTs over a common approach to intervention. This finding is interesting given the prominence of supportive groups and interventions as a therapeutic tradition and paradigm for treating individuals who are victims of violent crimes and other traumatic events. Although there is some evidence for the therapeutic effects (Griffiths et al., 2012; Schottelkorb, Doumas, & Garcia, 2012) and curative interpersonal experiences (Badger & Royse, 2010) associated with supportive interventions among individuals with PTSD, we suggest that the detected differential magnitude of almost one standard deviation warrants attention regarding best practice for treatment selection. Therefore, we suggest that implementing a TFT that is accompanied by supportive group interventions as adjunctive or adjuvant may be prudent. It is reasonable to speculate that the synergistic effects of these two approaches may provide a more comprehensive approach to promoting recovery from the symptoms of PTSD.

TFTs emerged as a stronger treatment choice when compared with the myriad, miscellaneous treatments designated as *other*. Despite this analysis resulting in a medium treatment effect favoring TFTs (see Figure 2), we regard this finding cautiously given the nonmanualized nature of the comparisons. Foremost, the constituent components of comparisons labeled as treatment as usual are likely to differ from one primary study to the next. Furthermore, studies that depict treatment as usual as a comparison type rarely have defensible experimental control over the amount, duration, type, and modality of services delivered. From this perspective, the lack of accountability for comparison group experience contributes to measurement error and decreases research design sensitivity for detecting the true effect associated with contrasted therapies. Finally, in addition to the problems inherent with treatment-as-usual comparisons, our sample of studies designated as *other* included a broad scope of interventions ranging from brief dynamic therapy to holographic reprocessing therapy, which may be difficult for many counselors to implement or replicate because of their unique, specialized nature.

The meta-analysis of TFTs versus non-trauma-focused CBTs comparisons yielded an insignificant treatment effect. On the basis of this result, it can be surmised that neither class of intervention can be determined as superior to the other (see Figure 2). This finding is convergent with results from a previous study by Powers et al. (2010) and provides further evidence that both classes of intervention are equally helpful for remediating PTSD symptoms. One explanation for our finding may be that TFTs and non-trauma-focused CBTs, such as stress inoculation training and CBT skills training, share a similar epistemological view of well-being and optimal functioning. Likewise, the two approaches share a similar set of core skills, such as monitoring self-talk and thought stopping, that are inherent within the treatment process. It is possible that these therapeutic components contribute a substantial portion of therapeutic change and thus recovery from PTSD symptoms. The true effect of non-exposure-based CBT skills is difficult to estimate in the absence of aggregated comparisons of dismantling treatments.

Moderators of Treatment Effect and Differentiation of PE, CPT, and EMDR Within Comparison Types

The results of our moderator analyses depicted only one statistically significant differentiation between the degree that treatment effects were associated with the participant (mean age, percentage of men vs. women, domicile, type of trauma reported by participants) and study (sample size, treatment setting, type of TFT) variables under scrutiny. Across the 28 possible moderator variable and treatment effect interactions (four comparison arms × seven moderator variables), only one instance emerged as statistically significant—TFT type among supportive intervention comparisons. Therefore, our conclusions are twofold: (a) much of the observed difference across studies is likely due to random error and (b) TFTs have a noteworthy degree of equivalence across age range, gender, domicile, type of trauma, and treatment setting. Although the average number of participants within our sample of studies was defensible (see Table 1), inspection of the standard deviation value indicates a considerable amount of variability. If our sample of studies was substantially larger or composed of predominantly large samples, less random error would be present and the effects of moderators may not have been obscured.

One explanation concerning the equivalence of treatment effect may be that the trauma response is ubiquitous among individuals, and, therefore, the process of recovery may be characterized by the same benchmarks regardless of the participant characteristics. More likely is the notion that TFTs were intentionally developed to ameliorate the symptoms of PTSD, and mitigation of those specific symptoms is, by design, a primary therapeutic end. This may further explain the similarity in treatment effects between TFTs and non-trauma-focused CBTs, because both share common intervention components that target the specific symptoms of PTSD. As a result, variables such as gender, age, and type of trauma do not notably covary with scores on PTSD scales, because the therapeutic protocols strategically address the symptoms being evaluated. Therefore, we suggest that when random error has been accounted for, the best explanation of treatment effect for TFTs can be attributed to a condition of equifinality, wherein desired outcomes are yielded across TFT and CBT strategies.

Considerations for Counselors

In light of our findings, we offer several considerations for counselors when providing services to individuals experiencing the symptoms of PTSD. Foremost, we regard TFTs featuring exposure-based protocols and other non-trauma-focused CBTs that promote the development of cognitive and

behavioral coping skills as the first-line treatments for traumatic response. This suggestion is submitted following the convergence of our findings with those of previous meta-analyses (Chen et al., **2014**; Lenz et al., **2014**; Powers et al., **2010**) and recommendations by expert traumatologists (Monson & Shnaider, **2014**; National Collaborating Centre for Mental Health, **2005**; U.S. Department of Veterans Affairs & U.S. Department of Defense, **2010**). The state of practice for TFTs, in particular, provides counselors with a well-developed, manualized set of resources for orientation, training, continued education, and practice of TFTs. With this in mind, we emphasize the importance of receiving formal training, supervision, and certification to promote treatment fidelity and increase the probability that services are useful to clients. In addition, we encourage counselors to consider that although this study reports the effectiveness of three types of TFT that share exposure as a core therapeutic component, each has a unique conceptualization and varied use of cognitive behavior components. Therefore, selection of which TFT is best suited for a particular treatment setting or population should be a function of the client's needs, feasibility for full implementation, the counselor's worldview, and the developmental level of counseling skills. In addition, consideration should be given to the client's cognitive abilities (Lu et al., **2009**), the importance of spirituality as a component of recovery (Bowland, Edmond, & Fallot, **2012**), and the potential for discontinuing treatment because of an adverse experience with repeated exposure to traumatic material.

We also submit the caveat that the results of our investigation are based on evaluations of manualized TFT protocols. Consequently, the evidentiary support for the TFTs we have presented extends exclusively to their use, rather than TFT components as part of an eclectic intervention or reflexive approach. We recommend that counselors use TFTs in their entirety, as they were developed to be implemented. From this perspective, counselors using TFTs can be assured that when they implement their TFT approach, they are using it in a way that is evidence supported.

Limitations and Recommendations for Future Research

Although this review of TFTs was subjected to a systematic search process, procedures to detect publication bias, and statistical adjustments to account for sampling error, some important limitations are noted. Foremost, given that the quality of studies is a premium in meta-analysis, it is likely that less random error would have been present in our analyses if significantly more randomized controlled trials and large-sample studies were available for inclusion. We acknowledge that our yield of 46 studies (37 randomized controlled trials) within our analysis represents wonderful contributions by scientist-practitioners, yet several of these were small designs ($N \leq 30$), wherein randomization may not account for sampling error. We suggest that future large randomized trials of TFTs versus viable treatment comparisons will support a better understanding of the mean treatment effect. Also, our analysis was limited to posttest contrasts between treatment types, and, thus, an accurate depiction of treatment effect across meaningful intervals of time is not able to be inferred. As more primary studies that report follow-up data become available, a more accurate depiction of the therapeutic effect of TFTs can be evaluated. In addition, the moderator analyses completed for observed effect sizes were based on categories (e.g., domicile) or proportions (percentage of men vs. women) or were limited because of the underreporting of participant characteristics.

It is important to take multicultural factors into consideration when treating individuals with PTSD as counselors seek to identify what works for whom and under what circumstances in a diverse society.

Some approaches involved in PE, CPT, and EMDR may not be applicable, or considered appropriate, for some cultural groups. In addition, a more holistic outlook of PTSD treatment may benefit some individuals based on their cultural norms and values (Costantino, Primavera, Malgady, & Costantino, **2014**; Drozdek, **2015**; Grayshield, Rutherford, Salazar, Mihecoby, & Luna, **2015**).

Future research reporting that is consistent with the *Publication Manual of the American Psychological Association* (American Psychological Association, **2009**) requirements or CONSORT statement (Schulz, Altman, Moher, & CONSORT Group, **2010**) would promote future evaluation about for whom and under what circumstances TFTs are most effective. For example, greater descriptions of types of trauma among sample participants and their frequency of occurrence may allow for identifying which TFTs are best suited for each type of trauma. Finally, although our analysis depicts the degree that TFTs support the treatment of PTSD, the detected effect is not currently situated within the context of all treatments that may be implemented. With this in mind, we suggest that future meta-analysts consider the utility of a network meta-analysis that takes into consideration indirect comparisons of all viable treatments to develop a hierarchy of PTSD intervention effectiveness. This type of evaluation may better situate the influence of TFTs when compared with medication, supportive interventions, non-trauma-focused CBTs, psychoeducation, skills training, and other interventions.

Conclusion

The findings of this study provided evidence that supports the assertion of TFTs and non-trauma-focused CBTs as first-line treatments for PTSD symptoms when compared with no treatment, supportive interventions, and many other strategies. Among the studies included in our meta-analysis, there was little differentiation between for whom, how, and under what circumstances TFTs are effective despite some instances of notable heterogeneity across effect sizes. In addition, PE, CPT, and EMDR were largely indistinguishable as being more effective than one another. However, we acknowledge that substantially more primary research is needed to identify the therapeutic mechanisms of change within TFTs and specific trauma–population combinations for which each one may be best suited.

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