IMPLEMENTATION OF A LOW-COST, WEB-BASED, MULTI-COMPONENT TRAINING FOR TRAUMA-FOCUSED COGNITIVE-BEHAVIORAL THERAPY

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IMPLEMENTATION OF A LOW-COST, WEB-BASED, MULTI-COMPONENT TRAINING FOR TRAUMA-FOCUSED COGNITIVE-BEHAVIORAL THERAPY

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ABSTRACT

Although continuing education appears to be a promising strategy for closing the research-to-practice gap, effective trainings that result in clinician behavior change remain expensive and largely inaccessible. The current study evaluated a low-cost, multi-component, web-based training for Trauma-Focused Cognitive-Behavioral Therapy (TF-CBT). Clinician members of a practice-based research network were recruited via email and randomized to either a training group (TG; *N*=89 assigned) or control group (CG; *N*=74 assigned), with half of each group randomized to receive incentives for completion. The TG was immediately offered the training; the CG was offered the same training after 6 months. Clinicians completed assessments at baseline (pre-training), 6-months, and 12-months covering (a) completion of training components, (b) knowledge, (c) use of TF-CBT, and (d) for a subset of clinicians (*N*=34), TF-CBT fidelity. There were no significant between-group differences on TF-CBT knowledge and strategy use at 6 months, although significant differences in overall TF-CBT skill were found. There was also considerable variability in the extent of training completed. We found significant positive associations between extent of training completed and clinician knowledge, use, and fidelity in TF-CBT. A multiple regression showed that previous TF-CBT training, clinician attitudes towards evidence-based practices, and clinician age predicted training completion. Implications for web-based trainings and implementation science are discussed.

Introduction

Despite a half century of youth mental health treatment efficacy research (Weisz et al., 2017) and almost two decades of concerted dissemination and implementation efforts (Lonigan, Elbert, & Johnson, 1998; National Institutes of Mental Health [NIMH], 2001), there is little indication that the research-to-practice gap has narrowed in youth mental health services (Garland, Bickman, & Chorpita, 2010). This is not unique to youth mental health services; one frequently-cited statistic is that it takes about 17 years for even a portion of medical research findings to make it into routine practice (Balas & Boren, 2000; Grant, Green, & Mason, 2003; Institute of Medicine, 2001; Morris, Wooding, & Grant, 2011). Observational studies of youth mental health services and surveys of clinicians indicate that very few evidence-based practices (EBPs) have become everyday practice (Beidas et al., 2015; Borntrager, Chorpita, Higa-McMillan, Daleiden, & Starace, 2013; Cook, Hausman, Jensen-Doss, & Hawley, 2015; Garland et al., 2010; Jensen-Doss, Hawley, Lopez, & Osterberg, 2009; Walrath, Sheehan, Holden, Hernandez, & Blau, 2006). Moreover, when EBPs are available in typical community service settings, they can suffer from both "program drift" (i.e., low fidelity; Kilbourne, Neumann, Pincus, Bauer, & Stall, 2007) and "voltage drop" (i.e., decreased efficacy; McGrew, Bond, Dietzen, & Salyers, 1994).

Continuing professional education and training has been proposed as one promising implementation strategy that may help narrow the gap from research to practice (Powell et al., 2015). Unfortunately, in addition to the research-to-practice gap, several have noted a training-to-practice gap in youth mental health services (Frazier, Bearman, Garland, & Atkins, 2014) and medicine as a whole (Davis et al., 1999; Davis,

Thomson, Oxman, & Haynes, 1992, 1995). Lack of interest does not seem to be the barrier; many clinicians demonstrate high motivation to invest in EBP training (Powell, McMillen, Hawley, & Proctor, 2014), but still fail to implement EBPs following training (Beidas & Kendall, 2010; Herschell, Kolko, Baumann, & Davis, 2010).

One factor influencing the training-to-practice gap may be the quality of trainings available (Beidas & Kendall, 2010). Training as usual (TAU) has been found to increase declarative knowledge (i.e., knowledge of facts; Fixsen, Naoom, Blase, & Friedman, 2005), but produce little actual behavior change in clinicians (Beidas & Kendall, 2010; Davis et al., 1999, 1992, 1995; Herschell et al., 2010; Lyon, Stirman, Kerns, & Bruns, 2011). This may be because TAU primarily consists of "single-shot" workshops focused on passive learning strategies such as didactic lecture (e.g., Hoge et al., 2007; Lyon, Stirman, Kerns, & Bruns, 2011). In contrast, trainings that utilize active, behaviorally oriented learning strategies (e.g., role-plays, consultation, feedback) and include multiple training methods (e.g., such as didactics, role play or practice, discussion, supervision or consultation, and manuals within a single training) often demonstrate more robust changes in clinician behavior (Cross, Matthieu, Cerel, & Knox, 2007; Davis et al., 1999, 1995; Herschell et al., 2010; Lyon et al., 2011; Miller, Yahne, Moyers, Martinez, & Pirritano, 2004; Wyman et al., 2008). Multiple reviews of continuing education in the medical field corroborate these findings, with single-factor interventions (e.g., a didactic workshop, printed materials, or a conference) proving ineffective at altering physician behavior (Davis et al., 1999, 1992, 1995; Haynes, Davis, McKibbon, & Tugwell, 1984). In contrast, practice-based enabling and reinforcing strategies (e.g., reminders, audit and feedback, academic detailing, videotapes, role-playing, practicing, chart audits), have

demonstrated efficacy at altering physician behavior (Davis et al., 1999, 1992, 1995). Such effective, multi-component trainings also have major impediments (Cook, Biyanova, & Coyne, 2009; Stewart, Chambless, & Baron, 2012). Namely, these sorts of trainings require substantial time and monetary investment, making them inaccessible to most practicing clinicians (Powell et al., 2014). Cheap, accessible, and effective trainings are needed in order to reach large numbers of clinicians, particularly those working within low-resourced, publicly-funded service settings (Powell et al., 2014).

Web-based trainings may be a promising avenue for decreasing cost and increasing accessibility. For instance, Becker & Jensen-Doss (2014) found attitudes towards computer-based trainings to be relatively positive among a large, national sample of clinicians. A recent study examining the free web-based training for Trauma-Focused Cognitive-Behavioral Therapy (TF-CBT) showed that 68% of those who initiated the training eventually completed it and showed significant knowledge gain from pre- to post-training (Heck, Saunders, & Smith, 2015). Another study evaluating online training for exposure therapy found the online training significantly improved clinicians' self-efficacy and use of exposure therapy from pre- to post-training and at 6- and 12-week follow-ups (Harned et al., 2014).

Web-based trainings clearly offer an opportunity for increasing the availability of trainings for EBPs, and the limited outcome data on these types of trainings suggest they may also impact EBP knowledge and use. More studies are needed to advance our understanding of what features make web-based trainings appealing and engaging to providers and successful in changing practice. Few studies have examined the full range

of potential outcomes of these more accessible trainings on knowledge, attitudes, and use of the intervention (Becker & Stirman, 2011).

One framework that may help inform efforts to evaluate training programs is the Therapist Training Evaluation Outcomes Framework (TTEOF; Decker, Jameson, & Naugle, 2011). The TTEOF includes both short- and long-term outcomes assessed across six areas: reactions, attitudes, knowledge, skills, use of new skills, and changes in client outcomes. One strength of this framework is that it includes domains that should be immediately observable (e.g., reactions, attitudes) as well as those that should theoretically come later (e.g., use of new skills, improvements in client outcomes) and that may predict or mediate these later changes (e.g., knowledge, skills). It was designed specifically for evaluating mental health provider training programs. It was adapted from a model of training evaluation and aligns well with both Rogers's (2003) diffusion of innovations model and recent training reviews (Beidas & Kendall, 2010; Herschell et al., 2010). This framework can provide guidance for exploring the "what training methods, for which clinicians, at what dose, and under what conditions" questions inherent to training studies (Decker, Jameson, & Naugle, 2011; Gaglio, Shoup, & Glasgow, 2013).

Finally, while other barriers potentially influencing clinicians' adoption of EBPs (e.g., clinical supervision, fit of an EBP with client population, attitudes towards EBPs, and the quality of trainings) have been studied (Beidas & Kendall, 2010), clinician motivation and engagement remains an understudied determinant to adoption of a practice and implementation following training. Lyon and colleagues (2011) note that clinician motivation and engagement in training needs to be examined, as motivational enhancement strategies could then potentially be utilized to increase clinician motivation

and the effectiveness of the training. Under Self-Determination Theory, there are different forms of motivation (Ryan & Deci, 2000). Intrinsic motivation is motivation that arises from one's psychological needs for autonomy, competence, and relatedness (Ryan & Deci, 2000). Extrinsic motivation is motivation that emerges from incentives or consequences (e.g., money, praise, and public recognition). Those with intrinsic motivation act out of interest and from a sense of challenge, while those with extrinsic motivation act because of some other incentive or consequence separate from the activity. Intrinsic motivation has been associated with greater persistence on a task and increased conceptual understanding (Reeve, 2008). Friedberg (2015) stated that most D&I research has emphasized intrinsic motivation (e.g., clinician attitudes) more than extrinsic motivation and the effects of external rewards on the effectiveness of clinician trainings warrant further research. A recent pilot study examined two incentive-based implementation strategies, financial or social incentive, on the implementation of CBT (Beidas et al., 2017). Findings indicated that both incentive-based implementation strategies were feasible and acceptable, and although the study was not powered to determine the effectiveness of the implementation strategies on CBT adherence, the study found a trend suggesting the financial incentive to be more effective on CBT adherence than the social incentive.

In sum, ongoing training appears to be a promising strategy for closing the research-to-practice gap, but effective trainings remain expensive and largely inaccessible. For the current study, we developed a low-cost, largely web-based, multi-component training protocol for Trauma-Focused Cognitive-Behavioral Therapy (TF-CBT). The training was designed to be an inexpensive approximation of the gold

standard of training - i.e., live, interactive training; a manual to guide intervention use; ongoing case-based consultation and feedback (Sholomskas et al., 2005). TF-CBT is an evidence-based treatment for children and adolescents who have experienced trauma or traumatic grief (Cohen, Mannarino, & Deblinger, 2006). TF-CBT consists of several components (i.e., psychoeducation, parenting, relaxation, affective modulation, cognitive coping, trauma narrative, in vivo exposures, conjoint sessions, and enhancing safety) delivered in eight to twenty-five sessions (Cohen et al., 2006). Fourteen randomized controlled trials have been conducted and demonstrated TF-CBT's effectiveness in improving trauma symptoms and responses including posttraumatic stress disorder symptoms and diagnosis, depression, anxiety, and behavioral problems (Cohen, Deblinger, Mannarino, & Steer, 2004; Cohen & Mannarino, 1996; Dorsey et al., 2017; Silverman et al., 2008). TF-CBT was selected as the evidence-based practice to be implemented in the current study due to two reasons. First, previous data indicated traumatized children make up a large percentage (around 47%) of the Midwestern state's children who are provided therapy services reimbursed by Medicaid. Second, a free, introductory, online training was already available through the Medical University of South Carolina (https://tfcbt.musc.edu/), so the current study could build upon this pre-existing online training. The design of the current study's training was based on existing research on continuing education and provider training in the medical and mental health fields outlined above (Beidas & Kendall, 2010; Davis et al., 1999, 1992, 1995; Haynes et al., 1984; Herschell et al., 2010; Lyon et al., 2011), the standards of trainings in controlled clinical trials research (e.g., Weisz et al., 2012), and theory and research on learning discussed below.

In clinical trials research, clinicians are typically intensively trained via didactic workshop, combined with closely supervised practice by the original developers of the intervention in question or others previously trained in the model. In the current study, the three co-developers of TF-CBT provided web-based didactic trainings to approximate the content they normally provide in in-person workshops, and a certified TF-CBT train-the-trainer supervised an online discussion and consultation forum to approximate the supervision and feedback typically provided throughout one or more initial practice cases (Cohen et al., 2004; "TF-CBT Certification Criteria," n.d.).

Relevant theory and research on human learning also informed the development of the training program: blended learning, scaffolded learning, collaborative learning, adult and self-directed learning. Blended learning for trainings involves the incorporation of multiple methods or strategies (e.g., didactics, readings, discussion, practice, feedback) of information delivery into one learning system (Cucciare, Weingardt, & Villafranca, 2008; Singh, 2003). Blended learning strategies have demonstrated enhanced learning compared to traditional classroom learning (Snipes, 2005) and may be cost-effective (Gruber, Moran, Roth, & Taylor, 2002) ways to extend the reach of the training program (Singh, 2003). The current study's training used a blended learning system that included eight different learning strategies (see below). Scaffolded learning (Wood, Bruner, & Ross, 1976) is considered useful for the development of higher-level cognitive strategies (e.g., skills in TF-CBT in this study) that often cannot be learned by a clinician completely on his or her own (the area where assistance is necessary is referred to as an individual's zone of proximal development; Vygotsky, 1978). It posits that learning is a social, transactional process, whereby knowledge is shared and learned through

interactions with others (Bruner, 1985; Vygotsky, 1978). Thus, scaffolded learning entails providing supports, or scaffolds (e.g., trainer modeling, consultation, tutor), and the gradual fading of this assistance until it is no longer needed (Rosenshine & Meister, 1992; Van Merriënboer, Kirschner, & Kester, 2003; Wood et al., 1976). The current study's training provided scaffolding through the use of a written manual and toolkits including handouts, guides, and measures to facilitate and guide provider use of TF-CBT. The current study's training was also designed to encourage collaborative learning, a situation in which two or more people work together and interact to learn something (Dillenbourg, 1999), such as through discussion, sharing ideas, evaluating each other's ideas, and/or monitoring each other's work. Collaborative learning can facilitate a clinician's learning by enabling the clinician to learn through the skills and experiences of other clinicians (Khanna & Kendall, 2015). The current training integrated collaborative learning through provision of an assigned learning partner and an online, professionally-manned discussion forum within which to ask questions, share examples, and discuss issues related to learning and implementing TF-CBT. Finally, adult learning and self-directed learning assumptions, principles, and concepts (Knowles, 1973, 1980, 1984; Merriam, 2001) were taken into account when designing the current study's training. For example, Knowles (1984) proposes four principles of adult learning to apply to trainings including: involving the adult learners in the development and evaluation of the training, including experience-related learning activities, including learning activities with direct application to their job, and having the training be problem-centered rather than content-oriented (Kearsley, 2010; Knowles, 1984). The current training relied on providers to direct their own learning, to choose which training components to complete,

and allowed for asynchronous time and place learning (i.e., it was accessible to all clinicians in both location and time; Cucciare et al., 2008; Weingardt, 2004).

The overarching purpose of this study was to explore whether a cheap, accessible EBP training could also be effective. Clinician members of a practice-based research network were recruited via email and randomized to receive the low-cost, multi-component, web-based training for Trauma-Focused Cognitive-Behavioral Therapy (TF-CBT) immediately or following a six-month waitlist. Moreover, within each training group, clinicians were further randomized to receive an incentive or no incentive. This study was guided by the following aims and hypotheses:

Aim 1) To compare receiving training (Training Group) versus not receiving training (Control Group) on TF-CBT knowledge, strategy use, and fidelity at 6 months. My primary hypothesis was that the training would be effective and the Training Group would show higher levels of knowledge, use, and fidelity in TF-CBT at six-months compared to the Control Group.

Aim 2) To examine the association between extent of training completed and knowledge, strategy use, and fidelity to TF-CBT. My hypothesis was that there would be a positive association between extent of training completed and TF-CBT knowledge, use, and fidelity.

Aim 3) To predict training completion by evaluating whether a) provider characteristics measured at baseline (e.g., attitudes, practice context) or b) incentives predict training completion in order to better understand clinician variability in training completion. Due to its exploratory nature, no a priori hypotheses were posited for Aim 3a. For Aim 3b, my hypothesis was that the clinicians in the Incentive group would show

higher levels of training completion on the training activities in which they would receive incentives compared to the No Incentive group.

Aim 4) To examine the short- and long-term outcomes of the training using the Therapist Training Evaluation Outcomes Framework (Decker et al., 2011). Similarly, due to its exploratory nature, no a priori hypotheses were posited for this aim.

Method

Recruitment

Clinicians were recruited from a practice-based research network (PBRN) in a Midwestern state. The PBRN included community therapists and affiliated mental health agencies who provided publicly-funded mental health services to youths. Therapists (n = 614) who were part of the PBRN and lived or worked in the 84 county catchment area targeted for health promotion and support by the non-profit funding agency (Missouri Foundation for Health) were emailed a brief description of the training opportunity and provided a phone number and email address to respond if interested in more details. Of these therapists, about half (n = 301) replied indicating initial interest in the training. Interested clinicians were offered enrollment if they met the following three inclusion criteria: 1) reliable access to high-speed internet, 2) treated three or more children with a significant trauma history in their practice within the past 12 months, and 3) submitted therapy claims for reimbursement to the state's Medicaid authority within the past 12 months. Interested therapists were provided an email link to formally enroll in the study via online consent and completion of a web-based pre-training survey. This resulted in 163 clinicians who met the inclusion criteria and completed the baseline survey to enroll in the study at 0-months (see Figure 1). These 163 clinicians were then randomly assigned to a training group (TG) or control group (CG) and then further randomly assigned to an incentive group or no incentive group.

Randomization

Enrolled clinicians at 0-months (N = 163) were randomized to one of two training groups, a training group (TG; N = 89) or control group provided access only to the web-

based TF-CBT tutorial (CG; $N = 74$). Clinicians in the TG and CG were further randomized to one of two incentive groups, incentive group ($N = 90$; TG: $n = 53$, CG: $n = 37$) or no incentive group ($N = 72$; TG: $n = 35$, CG: $n = 37$); the incentive status for one clinician was missing. This was true random assignment and the groups were not constrained to be equal.

Procedures

Pre-Training (0-Months). All participants enrolled in the study completed a web-based pre-training assessment that consisted of multiple measures. All clinicians received $5 for completing the pre-training assessment. Clinicians assigned to the TG (N=89) were offered the opportunity to participate in the training immediately, were mailed all supporting materials (e.g., manual, toolkit), and were encouraged to complete all training activities within six months. Clinicians assigned to the six-month CG waitlist (N=74) were told they would be offered training in six months.

6-Months. At six months, clinicians in both the TG and CG were asked to complete a web-based 6-month assessment. All clinicians received $5 for completing the 6-month assessment. Following completion of this assessment, clinicians in the CG were then offered the opportunity to participate in the training, were mailed all supporting materials (e.g., manual, toolkit), and were encouraged to complete all training activities within six months. Sixty-three (70.8% response rate) and fifty-two (70.3% response rate) clinicians from the TG and CG, respectively, completed this assessment. Clinical demonstration interviews (i.e., a behavioral role play assessment) were conducted with a selected subset of clinicians from the TG ($N = 17$) and CG ($N = 11$). Qualitative interviews were also conducted with a selected subset of clinicians from the TG group

(McMillen, Hawley, & Proctor, 2015). The subsets of clinicians were selected using stratified purposeful sampling based on level of training completed to interview clinicians who completed the full training, most of the training, some of the training, and none of the training. Clinicians received $50 for participating in clinical demonstration interviews and $50 for participating in qualitative interviews.

12-Months. At 12 months, clinicians in both the TG and CG were again asked to complete a web-based follow-up assessment. Some 59 clinicians (66.3% response rate) in the TG and 36 (48.6% response rate) in the CG completed this assessment. In an effort to increase response rates, nonresponding clinicians were offered a very brief assessment after 3 months (i.e., 15 months after baseline); four opted to complete it. All clinicians received $5 for completing the 12-month assessment. Clinical demonstration interviews (i.e., a behavioral role play assessment) were conducted with a selected subset of clinicians from the CG ($N = 6$). Qualitative interviews were also conducted with a selected subset of clinicians from the CG group (McMillen et al., 2015). Clinicians received $50 for participating in clinical demonstration interviews and $50 for participating in qualitative interviews.

Participants

Participants were 163 clinicians from a practice-based research network (PBRN) in a Midwestern state. Clinicians were primarily female ($N = 121$, 74.2%), Caucasian ($N = 144$, 88.9%), and Master's level: MSW ($N = 52$, 31.9%), MA ($N = 37$, 22.7%), or MS ($N = 26$, 16.0%). Clinicians had an age range of 25-75 years with an average age of 47.9 ($SD = 11.7$). Clinicians were predominantly licensed as LPCs ($N = 72$, 44.2%) and LCSWs ($N = 60$, 36.8%); employed in private individual practice ($N = 57$, 35.0%),

Outpatient/Community mental health center (*N* = 45, 27.6%), or Private Group Practice (*N* = 38, 23.3%); and had a primary theoretical orientation of Cognitive or Cognitive Behavior Therapy (*N* = 82, 50.3%) or Eclectic Therapy (*N* = 34, 20.9%).

Web-based TF-CBT Training Protocol

As noted above, reviews of the education and learning literatures (e.g., Vygotsky, 1978; Wood, Bruner, & Ross, 1976; Dillenbourg, 1999; Cucciare et al., 2008; Knowles, 1984) and the provider training literature (e.g., Beidas & Kendall, 2010; Davis et al., 1992, 1995, 1999; Haynes et al., 1984; Herschell et al., 2010; Lyon et al., 2011), as well as a survey of clinicians' motivation to invest in trainings (Powell et al., 2014), guided the development of the multi-component, web-based training. This culminated in a low-cost, web-based, multi-component training protocol for TF-CBT with the following components:

1) Online 10-hour introductory training in TF-CBT (https://tfcbt.musc.edu/). All participants were able to access this training-as-usual component at any time regardless of assigned condition;

2) TF-CBT treatment manual (Cohen et al., 2006). All participants were provided with a free copy of the book and asked to read it;

3) Four live webinars presented by the developers of TF-CBT covering topics that these expert trainers felt were most critical for accurate understanding and implementation of TF-CBT and that were normally covered in in-person TF-CBT workshops (i.e., Introducing TF-CBT to Parents and Child, Introducing the Trauma Narrative, Cognitive Processing of the Trauma with Parents and Child, and Conducting Conjoint Session with

Child and Parent). These webinars were recorded and online access was provided for anyone unable to participate during the live webinar;

4) Weekly emailed TF-CBT clinical and implementation tips generated by the treatment developers and the investigative team;

5) On-line discussion forum with other trainees and moderated by a certified TF-CBT trainer;

6) Four brief video demonstrations of TF-CBT components delivered by a certified TF-CBT trainer. These demonstrations were selected and designed in consultation with the treatment developers and a certified TF-CBT trainer to provide coverage of critical TF-CBT components typically covered during in-person trainings (e.g., introducing and explaining TF-CBT to a skeptical caregiver; psychoeducation about trauma; beginning the trauma narrative with a reluctant child; cognitive restructuring with a caregiver);

7) Toolkit of supplementary TF-CBT training materials that included clinical measures, sample treatment plans, handouts for clients, and other clinical tools; and

8) An assigned learning partner with whom to discuss and practice TF-CBT skills. Learning partners were assigned by the investigative team based on geography (i.e., closest clinician to them) and provided with specific role-plays and discussion topics designed by the treatment developers and investigative team to approximate those typically completed during live trainings.

Incentives

After randomization to the TG or CG, clinicians were randomized to an Incentive group or No Incentive Group. Clinicians in the Incentive Group could receive up to $100 total, $20 for completing the free online introductory training in TF-CBT and $20 for

each online webinar training offered (up to $80 total for webinars). Clinicians in the No Incentive Group did not receive any money for completing these training components. This incentive amount ($20) was based on prior survey work indicating one barrier to participation was time off of work, so this amount was computed to be roughly comparable to the take home rate for Medicaid providers.

Measures

Measures were administered at three time-points: 0-months, 6-months, and 12-months. The time(s) each was administered can be found in Table 1. We constructed the measures at each assessment point based on the Tailored Design Method (Dillman, 2000) and existing clinician surveys (Hawley, Cook, & Jensen-Doss, 2009; Jensen-Doss & Hawley, 2011; McMillen et al., 2015; Powell et al., 2014).

Clinician Demographics, Current Practice Information, and Trauma Caseload and Training. This 16-item survey was administered at pre-training to all clinicians (i.e., TG, CG) and collected information about clinician's age, gender, race, employment, and current practice. Current practice questions inquired about supervision, caseload, and theoretical orientation. Four items inquired about previous training in TF-CBT (e.g., had the clinician previously completed the online training offered by the MUSC on TF-CBT) and about current trauma caseload (e.g., what percent of their clients have a history of abuse, victimization, or other trauma; what percent of their traumatized child clients are in the foster care system; most common types of trauma experienced by their clients).

Evidence-Based Practice Attitudes Scale-50 (EBPAS-50; Aarons, Cafri, Lugo, & Sawitzky, 2012). The EBPAS-50 is a 50-item questionnaire assessing

clinician's attitudes towards EBPs. Respondents rated the extent to which they agreed with each statement (e.g., "I would adopt an EBP if I knew it was right for my clients") on a 5-point Likert scale of "Not at all" to "To a Very Great Extent." This measure consists of 12 subscales and has demonstrated high internal consistency (Aarons, 2004; Aarons et al., 2012). The current sample's internal consistency was unacceptable to excellent (Openness [Cronbach's α =.79], Burden [Cronbach's α =.74], Divergence [Cronbach's α =.61], Balance [Cronbach's α =.44], Monitoring [Cronbach's α =.86], Feedback [Cronbach's α =.84], Limit [Cronbach's α =.94], Organizational Support [Cronbach's α =.72], Job Security [Cronbach's α =.90], Fit [Cronbach's α =.84], Appeal [Cronbach's α =.82], and Requirements [Cronbach's α =.92]. EBPAS-50 was administered at pre-training to all clinicians.

Trauma Efficacy. This 2-item survey developed for the current investigation asked clinicians to self-rate their competency in providing therapy services with (1) traumatized youth and (2) caregivers on a 5-point Likert scale from "not at all competent" to "exceptionally competent." These self-rated competency items were given to clinicians at pre-training, 6-months, and 12-months assessment points.

TF-CBT Strategy Use Survey. This measure was comprised of 44-items assessing clinician's use of various treatment strategies using a recent case that represented their usual treatment approach for trauma, specifically a case within the last 3 months. Clinicians rated their use of each technique on a 5-point Likert scale of "Never" to "Almost Always." We developed this measure by adapting an existing treatment strategies survey (Cho, Taylor, Hausman, Andrews, & Hawley, 2016). This original treatment strategies survey consisted of 76 therapeutic strategies (e.g., explained how

thoughts can influence feelings and behavior, worked with the child to identify and gradually confront situations s/he is afraid of) that were developed by reviewing the treatment outcomes literature, coding treatment manuals, and through expert consensus. The three TF-CBT treatment developers reviewed this original treatment strategies survey and adapted and reduced it to 44-items for this study to reflect and track the use of the core components of TF-CBT. The measures consisted of three types of TF-CBT strategies: prescribed TF-CBT strategies (34 items), allowed TF-CBT strategies (7 items), and proscribed TF-CBT strategies (3 items). Prescribed TF-CBT strategies are advised or recommended treatment strategies in TF-CBT (e.g., trauma narrative). The allowed TF-CBT strategies are treatment strategies that are allowed but not explicitly prescribed in TF-CBT (e.g., discussed non-trauma related case management). Proscribed TF-CBT strategies are treatment strategies that are not recommended in TF-CBT (e.g., non-directive play therapy). In the current study, the survey had unacceptable to excellent internal consistency for each scale: Prescribed TF-CBT Strategy Use (Cronbach's α =.93), Allowed TF-CBT Strategy Use (Cronbach's α =.70), and Proscribed TF-CBT Strategy Use (Cronbach's α =.42). This measure was administered to clinicians at pre-training, 6-months, and 12-months.

Knowledge of TF-CBT (Heck et al., 2015; National Crime Victims Research & Treatment Center, 2007). This test assessed clinicians' current knowledge of TF-CBT. The test consisted of 34 multiple choice questions, measuring 6 areas of knowledge: (1) general CBT knowledge (4 items), (2) Trauma knowledge (4 items), (3) TF-CBT psychoeducational component (4 items), (4) TF-CBT affective expression and affect modulation component (12 items), (5) TF-CBT cognitive restructuring activities (4

items), and (6) TF-CBT trauma narrative component (6 items). The current test is a shortened version of the Heck et al. (2015) Knowledge of TF-CBT test; we abbreviated the test based on communication with the authors of the measure. The TF-CBT knowledge test was administered at pre-training to all clinicians, 6-month assessment point, and at 12-month assessment point to only the CG.

Training Participation. This 8-item measure developed for the current study assessed the extent to which clinicians participated in each of the TF-CBT training activities on a 5-point Likert scale of "Not at all" to "Completely." The training participation survey was given to clinicians at 6-month and 12-month assessment points.

TF-CBT Protocol Implementation. This 5-item measure developed for the current study asked clinicians to self-report (1) the percentage and number of youth trauma cases with whom they had used *something* they learned in the TF-CBT training in the past three months, (2) the percentage and number of youth trauma cases with whom they had started or finished using the *entire* TF-CBT treatment protocol in the past three months, and (3) the degree to which they are using the TF-CBT protocol with new (incoming) youth trauma cases (rated on a 4-point Likert scale of "…not using any components…" to "…using the entire TF-CBT protocol…"). This measure was administered to clinicians at 6-month and 12-month assessment points.

Client Improvement. This 2-item measure was developed for the current study and had clinicians self-report at the 12-month assessment point (1) the average improvement in Posttraumatic Stress Disorder symptoms (from 0-100% symptom decrease) of clients, and (2) the average improvement in other emotional and behavioral problems (from 0 to 100% symptom decrease) of clients in the last 6 months.

Usefulness, Satisfaction, & Compatibility with Training Components. In this 26-item survey, clinicians rated how useful they found and how satisfied they were with seven of the training components or activities and how comfortable with, useful, and compatible the training was overall on a 5-point Likert scale of "Not at all" to "Extremely." We developed these items based on the definitions of acceptability and appropriateness posited by Proctor et al. (2011), and the items were administered at the 12-month assessment point.

TF-CBT Fidelity: Clinical Demonstration Interviews. Consistent with other efforts to develop practical methods for evaluating clinician adherence and skill (e.g., behavioral rehearsal, role-play assessment; Dimeff et al., 2009; Miller et al., 2004; Puspitasari, Kanter, Murphy, Crowe, & Koerner, 2013; Sholomskas et al., 2005), we developed clinical demonstration interviews in collaboration with the three treatment developers Judith Cohen, M.D., Anthony Mannarino, Ph.D., and Esther Deblinger, Ph.D. and a certified TF-CBT trainer Matthew Kliethermes, Ph.D. Interviews were videotaped and conducted in-person by trained graduate research assistants. The interview consisted of the clinician viewing a "stem" videotape of a clinician and client beginning a component of TF-CBT, at which point the video would cut off and the clinician being interviewed would be asked to role-play what they would do next in the therapy session. Graduate research assistants were trained to respond consistently across interviews to minimize variation in response. The interview assessed fidelity and competence across the three following TF-CBT domains: (1) introducing and describing TF-CBT to a caregiver, (2) conducting a trauma narrative with a traumatized child, (3) cognitive processing of the trauma with a caregiver. A certified TF-CBT trainer and three clinical

psychology graduate students coded the interviews for TF-CBT fidelity. Fidelity, or treatment integrity, is "the extent to which the intervention was implemented as intended" (Perepletchikova, Treat, & Kazdin, 2007). While fidelity can entail adherence (the extent to which the prescribed treatment strategies are delivered and proscribed are not used), exposure (how much of the intervention is delivered to or received by the client), skill (the quality or level of skill with which the intervention is delivered), participant engagement (the client's responsiveness to the intervention), and/or contamination (whether the treatment differs from other treatments), the current study focused on coding clinician's TF-CBT adherence and skill in the clinical demonstration interviews (e.g., Perepletchikova et al., 2007; Reinke, Herman, Stormont, Newcomer, & David, 2013). Thirty-four clinical demonstration interviews were conducted and coded. The video demonstration interviews were coded for adherence using a series of items asking if different therapy techniques were either present ("yes") or not present ("no"). If present, items were then rated for competence or skill in delivery of the different therapy techniques on a 5-point Likert scale of 1 ("Unacceptable") to 5 ("Superior").

Each item is scored on a scale of 0-5 (0 = not present, 1-5 = level of skillfulness from unacceptable to superior). An overall domain score for each of the three TF-CBT domains assessed were based on averaging the ratings of all the items in the TF-CBT domain: Introducing and Pitching TF-CBT to a Parent score (average of 16 items), Starting the Trauma Narrative with a Reluctant Child (average of 6 items), and Cognitive Processing of the Trauma with a Parent (average of 5 items). In addition to TF-CBT domain scores, single global items were rated including an Overall Adherence item

inquiring about the extensiveness of the TF-CBT skills covered and an Overall Skill item that rates the therapist's overall skillfulness in implementing TF-CBT strategies.

Coder Training. Prior to beginning coding training, the three graduate students completed the online 10-hour introductory training in TF-CBT, read the TF-CBT treatment manual, watched the four live webinars presented by the developers of TF-CBT covering different topics, and watched four brief video demonstrations of TF-CBT components delivered by a certified TF-CBT trainer to gain foundational knowledge of TF-CBT. Then, the three graduate students independently rated practice tapes and had weekly meetings in which they compared their coding on the practice tapes, discussed questions and differences, and established a coding system in order to reach a consensus with each other and the coding of the certified TF-CBT trainer and to prevent coder drift. After graduate students reached an acceptable interrater reliability at the individual item level ($M = 0.83$, $SD = .14$, "excellent" agreement) on practice tapes with the certified TF-CBT trainer and each other, each coder rated their assigned clinical demonstration interviews independently.

Assignment and Coding of Clinical Demonstration Interviews. Thirty-four clinical demonstration interviews were conducted and coded; twenty percent (N = 8) of the clinical demonstration interviews were randomly selected to be coded by all four coders. The remaining clinical demonstration interviews were only coded by one rater. The certified TF-CBT trainer rated 18 clinical demonstration interviews and the graduate students coded 16 clinical demonstration interviews. Coders were unaware of the clinician's level of training completed or assigned training group (i.e., TG, CG).

Statistical Analysis Plan

Baseline Analyses. Descriptive analyses will yield means, standard deviations, and frequency distributions for the response (e.g., knowledge, use, and skill) and explanatory variables (e.g., extent of training completed) in the study. The assumptions of the models were examined via tests of normality, homoscedascity, and independence. The functional form of the relationship in the data was considered depending on the candidate model proposed for each analysis.

Aim 1 Analyses. Aim 1 compared receiving training (TG) versus not receiving training (CG) on TF-CBT knowledge, use, and fidelity at 6 months. We performed independent *t*-tests to compare group differences between TG and CG on 1) TF-CBT Knowledge Total Score; 2) self-reported TF-CBT Prescribed Strategy Use, TF-CBT Allowed Strategy Use, and TF-CBT Proscribed Strategy Scores; and 3) demonstrated TF-CBT Fidelity, including adherence and skill.

Aim 2 Analyses. Aim 2 examined the association between extent of training completed and knowledge, use, and fidelity in TF-CBT. We ran correlations to examine this association in the full group of clinicians (both the TG and CG).

Aim 3 Analyses. Aim 3 analyses were to determine what predicts the extent of training a clinician completes to understand the variability in training completion in the full group of clinicians (both the TG and CG). Aim 3 predicted training completion by evaluating whether a) provider characteristics measured at baseline (e.g., attitudes, practice context) or b) providing incentives played a role in training completion. Based on previous literature and theories examining motivation and behavior change (Ajzen, 1985; Bandura, 1982; Bandura, Adams, & Beyer, 1977; Powell et al., 2014), we included the following variables in the regression analyses for Aim 3a: EBP attitudes, clinician

theoretical orientation, clinician age, pre-training self-reported competency working with traumatized youth, pre-training self-reported competency working with traumatized youth's parents, previous TF-CBT training, and clinician's percent of child cases with a trauma history. More specifically, Powell and colleagues (2014) found client fit, alignment with one's theoretical orientation, and being taught new or different skills to be motivators for investing in a training. The Theory of Planned Behavior proposes that one's attitude toward the behavior or action, subjective norms of the behavior, and perception of behavioral control predict one's intentions, which in turn predicts actual behavior (Ajzen, 1985). Finally, Self-Efficacy Theory posits that one's perceived self-efficacy, or one's belief in their capacity to successfully perform or behave, can influence how one thinks, feels, performs, and behaves (Bandura, 1982; Bandura et al., 1977).

For Aim 3b, to compare the incentive group versus no incentive group on completion of training activities, we performed Mann-Whitney U Tests.

Aim 4 Analyses. Aim 4 involved evaluating the short- and long term outcomes of the training using the Therapist Training Evaluation Outcomes Framework (TTEOF; Decker et al., 2011) among the full group of clinicians (TG and CG). The TTEOF is comprised of six outcome domains including: 1-Therapist reactions to the training experience, 2a-Therapist attitudes, 2b-Acquisition of knowledge, 2c-Acquisition of Skills, 3-Behavior change in practice [transfer of new skills to practice settings], 4-Improvement in client outcomes. The latter two outcomes (i.e., behavior change in practice, client outcomes) have been identified as long-term outcomes, while the other four outcomes are considered short-term outcomes. Table 2 delineates the methods for measuring each outcome of the TTEOF.

Results

Missing Data Comparison

We conducted analyses examining missing data and if the data were missing at random. Less than 5% of the pre-training data was missing; however, more than 5% of data was missing at post-training assessments. Consequently, we performed analyses to check for nonrandom missingness. We found no significant results for Little's MCAR test, suggesting the data are missing at random. We created a dummy variable for clinicians missing data and clinicians not missing data at each assessment point (i.e., 6-month, 12-month) to test for differences on demographic, practice, and other pre-training variables (e.g., pre-training knowledge score) using *t*-tests and chi-square tests. We found a statistically significant difference at the 6-month assessment on hours worked per week ($t(160) = 2.19$, $p = .03$), with the clinicians with missing data endorsing working more hours than those without missing data on the pre-training assessment. The same statistically significant result was found for the 12-month assessment ($t(160) = 2.36$, $p = .02$). Additionally, clinicians in the control group (CG) were significantly more likely to have missing data at the 12-month assessment, $\chi^2 (1) = 6.01$, $p = .01$.

Interrater Reliability

We dropped three items from the fidelity analyses because of low variability and/or their ICCs were below .40, which reflects "poor agreement" (Cicchetti, 1994). In addition, five items in the Cognitive Processing of the Trauma with a Parent domain were collapsed into one item, taking the highest score from the five items. We collapsed these items because they were very similar and had low variability. Collapsing the five items into one item improved reliability from an average of 0.21 for the five items to 0.53.

After removing these items and collapsing five of the items, the average interrater reliability for the individual items was "excellent" (see Table 3). The ICCs ranged from 0.494 to 1 and the average ICC was 0.845 (*SD* = .13). The average interrater reliability for domain scores was "excellent." The average ICC for the Introducing and Pitching TF-CBT to a Parent fidelity domain was .86 (SD = .11, range .65 to .98); the average ICC for the Starting the Trauma Narrative with a Reluctant Child fidelity domain was .88 (SD = .05, range .83 to .96); the average ICC for the Cognitive Processing of the Trauma with a Parent domain was .84 (SD = .18, range .53 to 1); the average ICC for the Skill domain was .76 (SD = .18, range .49 to .95).

Training Completion

There was large variability in the extent of training completed by clinicians (see Table 4). At the intent-to-train points (6-months for the TG, 12-months for the CG), 25.4% (*N* =16/63 clinicians who responded to the assessment) of TG clinicians and 25.0% of the CG clinicians (*N* = 9/36 clinicians who responded to the assessment) had not participated in any training. The training components with the highest participation rates were the weekly emailed TF-CBT clinical and implementation tips (*N* = 67 completed at least "a little bit" of the training component, on average the extent to which clinicians completed this training component "somewhat" to "mostly"), online 10-hour introductory training in TF-CBT (*N* = 64 completed at least "a little bit" of the training component, on average clinicians completed this training component "somewhat" to "mostly"), and the toolkit of supplementary TF-CBT and trauma materials (*N* = 62 completed at least "a little bit" of the training component, on average clinicians completed this training component "a little bit" to "somewhat"). While the training

components with the lowest participation rates were the learning partner for discussion and practice of TF-CBT skills ($N = 29$ completed at least "a little bit" of the training component, on average the extent to which clinicians completed this training component was less than "a little bit") and the online discussion forum ($N = 18$ completed at least "a little bit" of the training component, on average the extent to which clinicians completed this training component was less than "a little bit").

Aim 1

To evaluate differences in TF-CBT knowledge, use, and fidelity between the TG and CG at 6-months, we performed independent *t*-tests. Prior to analysis, we examined the explanatory and response variables for data accuracy, missing values, and the assumptions of independent *t*-tests. Examination of histograms, box plots, and z-scores revealed no univariate outliers. The Shapiro-Wilk test indicated non-normality for the response variables: Starting a Trauma Narrative with a Reluctant Child (CG: $p = .035$, TG: $p = .84$) and Cognitive Processing of the Trauma with a Parent (CG: $p = .002$, TG: $p = .073$). Finally, all of the parametric analyses met the assumption of the Levene's Test for the Equality of Variances. We found no statistically significant difference in percent correct on the TF-CBT knowledge test, $t(92) = -1.92$, $p = .85$, $d = .04$, between the TG ($M = .72$, $SD = .11$) and CG ($M = .73$, $SD = .11$). Similarly, we found no statistically significant differences in self-reported TF-CBT Prescribed Strategy Use ($t(58) = -1.10$, $p = .28$, $d = .30$; TG: $M = 2.76/4.00$, $SD = .72$; CG: $M = 2.96/4.00$, $SD = .57$), Allowed Strategy Use ($t(59) = -.46$, $p = .65$, $d = .12$; TG: $M = 2.85/4.00$, $SD = .69$; CG: $M = 2.93/4.00$, $SD = .66$), or Proscribed Strategy Use ($t(59) = .40$, $p = .69$, $d = .10$; TG: $M = 2.43/4.00$, $SD = .63$; CG: $M = 2.36/4.00$, $SD = .74$). For the demonstration interviews, we

identified a statistically significant difference in the Introducing and Pitching TF-CBT to a Parent fidelity domain, $t(26) = 4.39$, $p < .01$, $d = 1.57$ (TG: $M = 1.35/5.00$, $SD = .68$; CG: $M = .52/5.00$, $SD = .30$), with the TG clinicians demonstrating more fidelity than the CG clinicians. We conducted Mann-Whitney U Tests to evaluate differences between TG and CG clinicians among the Starting the Trauma Narrative with a Reluctant Child domain, Cognitive Processing of the Trauma with a Parent domain, global adherence and skill items. A Mann-Whitney U Test indicated a statistically significant difference in Overall Skill for TG ($Mdn = 2.00/5.00$, $SD = .99$) and CG ($Mdn = .00/5.00$, $SD = .93$) clinicians, $U = 36.00$, $z = -2.96$, $p < .01$, with a large effect size, $r = -.56$ (Cohen, 1988). Differences in Overall adherence, $U = 60.00$, $z = -1.84$, $p = .12$, $r = -.35$ (TG: $Mdn = 2.00/5.00$, $SD = 1.11$; CG: $Mdn = .00/5.00$, $SD = .81$), Starting the Trauma Narrative with a Reluctant Child domain, $U = 83.00$, $z = -.496$, $p = .64$, $r = .09$ (TG: $Mdn = 1.50/5.00$, $SD = .69$; CG: $Mdn = 1.50/5.00$, $SD = .69$), and Cognitive Processing of the Trauma with a Parent domain, $U = 56.00$, $z = -1.83$, $p = .08$, $r = -.34$ (TG: $Mdn = .40/5.00$, $SD = .52$; CG: $Mdn = .40/5.00$, $SD = .32$), was not significantly different between the two groups.

Aim 2

We performed bivariate correlations to assess the relations between the extent of training completed and TF-CBT knowledge, use, and fidelity in the full group of clinicians (TG and CG). Similar to Aim 1 baseline analyses, we examined variables for data accuracy, missing values, and the assumption of correlations. We identified no outliers, but Shapiro-Wilk test indicated non-normality for several variables (TF-CBT knowledge, $p = .031$; self-reported TF-CBT Prescribed Strategy Use, $p = .032$; self-reported TF-CBT Proscribed Strategy Use, $p = .043$; demonstrated adherence to

Introducing and Pitching TF-CBT to a Parent, $p = .02$; demonstrated adherence to Cognitive Processing of the Trauma with the Parent, $p < .00$; Overall Skill, $p < .00$; Overall Adherence, $p < .00$; Extent of Training Completed, $p < .00$; Extent of Training Completed at the time of the clinical demonstration interview, $p < .01$). Due to the study's small sample size and the large number of tied ranks in the data, we used the non-parametric correlation coefficient, Kendall's Tau, for Aim 2 analyses (see Table 5 and 6). There was a relatively strong, positive correlation between extent of training completed and post-training TF-CBT knowledge, $\tau = .17$, $n = 84$, $p = .03$, with clinicians who completed more training having higher knowledge scores. We found a significant, positive relation between extent of training completed and post-training self-reported prescribed TF-CBT strategy use, $\tau = .29$, $n = 53$, $p < .01$, and allowed TF-CBT strategy use, $\tau = .21$, $n = 54$, $p = .03$; completing more training was associated with more prescribed TF-CBT strategy use and more allowed TF-CBT strategy use. There was a strong, positive correlation between demonstrated adherence to Introducing and Pitching TF-CBT to a Parent and extent of training completed ($\tau = .28$, $n = 34$, $p = .03$), with more training completed related to more demonstrated skill. We also observed a strong, positive relation between extent of training completed and overall demonstrated skill, $\tau = .30$, $n = 34$, $p = .04$; more training completed was related to more overall TF-CBT skill. No statistically significant correlations were found between extent of training completed and post-training self-reported proscribed TF-CBT strategy use ($\tau = .08$, $n = 54$, $p = .44$), demonstrated adherence to Starting the Trauma Narrative with a Reluctant Child ($\tau = -.06$, $n = 34$, $p = .63$), Cognitive Processing of the Trauma with a Parent ($\tau = .23$, $n = 34$, $p = .08$), or Overall adherence ($\tau = .21$, $n = 34$, $p = .15$).

Aim 3a

We investigated predicting training completion based on baseline characteristics using multiple regression in the full group of clinicians (TG and CG). We performed preliminary analyses to confirm that there were no violations of the assumptions of multiple regression. Because the ordinal predictor self-reported competency working with traumatized youth consisted of more than one level and more than one level had a small sample size, we collapsed the variable into a dichotomous variable of less competent (consisting of "not at all competent," "little bit competent," "somewhat competent") and more competent ("very much competent," "exceptionally competent"). We identically collapsed the ordinal predictor self-reported competency working with traumatized youth's parents. The full model consisted of seven explanatory variables including clinicians' attitudes toward EBPs, clinicians' theoretical orientation, clinicians' age, self-reported competency working with traumatized youth, self-reported competency working with the parents of traumatized youth, previous TF-CBT training, and clinicians' percent of child cases with a trauma history. We found the full model to be statistically significant, F (7, 80) = 5.45, $p < .01$ (see Table 7). A large effect size was found for the model (Cohen's $f^2 = .48$) and the total variance explained by the model was 32.3% (Cohen, 1988).

Previous TF-CBT training ($\beta = .31$, $p < .01$, $r = .43$) made the strongest unique contribution to explaining the model when the variance explained by all other variables in the model was controlled for. The predicted extent of training completed was about 8 points higher for clinicians who had previously completed the online introductory TF-CBT training than those who had not completed this training prior to the study (B =

8.16). Attitudes towards EBPs (β= .29, $p < .01$, $r = .33$) and clinician age (β= .30, $p < .01$, $r = .22$) also uniquely contributed to explaining the extent of training completed by clinicians. For every unit increase in attitudes towards EBPs, a 6.64-point increase in the extent of training completed was predicted, holding all other variables constant. For every unit increase in clinician age, there was a 0.23-point increase in extent of training completed. We found clinicians' theoretical orientation, competency working with traumatized youth, competency working with traumatized youths' parents, and percent of child cases with a trauma history to not be statistically significant in predicting extent of training completed.

Aim 3b

To compare the incentive group and no incentive group on training completion, we conducted Mann-Whitney U tests. Review of histograms, box plots, and z-scores showed no outliers. Shapiro-Wilk test showed non-normality for the two dependent variables. Consequently, we ran the non-parametric Mann-Whitney U Test for Aim 3b analyses. We found no significant difference in completion of the online 10-hour introductory training in TF-CBT ($U = 1125.00$, $z = -.18$, $p = .86$, $r = -.02$) between the incentive ($Mdn = 3.00/4.00$, $SD = 1.76$) and no incentive group ($Mdn = 3.00/4.00$, $SD = 1.82$). There was also no statistically significant difference in completion of the live webinars on TF-CBT topics ($U = 879.50$, $z = -1.61$, $p = .11$, $r = .17$; Incentive: $Mdn = 3.00/4.00$, $SD = 1.83$; No incentive: $Mdn = 1.38/4.00$, $SD = 1.68$) between groups.

Aim 4

The results for each of the TTEOF domains can be found in Table 2. For the first level of evaluation, reactions to the training, we found clinicians to be generally satisfied

with the training components (*M*=2.96/4.00, *SD*=.52, Range=1.9 to 3.9). The next level of the TTEOF framework addresses attitudes. For the current study's training, clinicians found the training components to be useful (*M*=3.07/4.00, *SD*=.41, Range=2.45 to 3.82) and the training to be compatible (*M*=2.90/4.00, *SD*=.88) and useful with their clinical practice (*M*=2.96/4.00, *SD*=.83). At post-training, around 70% of clinicians rated feeling at least "very much competent" in providing therapy services with traumatized children and adolescents and about 60% of clinicians reported feeling at least "very much competent" in providing therapy services with parents of traumatized children and adolescents. Regarding the knowledge level of evaluation, clinicians averaged 72% of questions correct on the TF-CBT Knowledge test. For the skills level of evaluation, clinicians showed minimal skillfulness in the implementation of TF-CBT components on average (*M*=1.19/5.00, *Mdn*=1.15/5.00, *SD*=.53, Range=.11 to 2.37) in clinical demonstration interviews at post-training. The last two levels of evaluation, behavior change in practice and client outcomes, examine the long-term outcomes of the training. For behavior change, clinicians reported frequently using Prescribed TF-CBT strategies (*M*=2.84/4.00, *SD*=.66) on average, after participating in the current study's training. Clinicians reported using the entire TF-CBT protocol with 1/3 of their recent child and adolescent trauma cases and using the entire TF-CBT treatment protocol with an average of 3.36 (*SD* = 6.94, Range = 0 to 50) cases thus far. Clinicians indicated using at least something they learned in the TF-CBT training with 2/3 of their recent youth trauma cases and using something they learned with an average of 8.82 (*SD* = 12.62, Range = 0 to 75) cases. Finally, the last level of evaluation is client outcomes. Clinicians self-

reported a 56% decrease in their client's PTSD symptoms post-training (*SD* = 24.18%, Range = 0 to 98% decrease).

Discussion

The current study evaluated an inexpensive, accessible approximation of the gold standard of training clinicians in EBPs. For aim one, we found no differences between receiving training (TG) and not receiving training (CG) in TF-CBT knowledge and TF-CBT prescribed strategy use at the intent-to-train point. While there were significant differences between the TG and CG in a couple of TF-CBT skill domains, specifically Introducing and Pitching TF-CBT to a Parent fidelity domain and Overall Skill, the level of skill demonstrated by the TG was still minimal and often did not reach an acceptable level of skillfulness. However, there was large variability in the extent of training completed among clinicians across both training groups, and aim two analyses indicated a relationship between more training and better training outcomes. Moreover, clinicians underutilized the training components with the most support for behavior change (e.g., those that provide ongoing support, such as consultation; Beidas & Kendall, 2010; Herschell et al., 2010), including the learning partner, group consultation, and online discussion forum, in the current study.

Thus, in aim three, we explored what clinician characteristics predicted training completion. A web-based survey administered to therapists inquiring about what motivates and inhibits therapists to seek training found that therapists indicated seeking trainings that taught advanced skills over basic skills, fit with the needs of their clients, and provided continuing education credit (Powell et al., 2014). In the current study, having previously completed the online, introductory TF-CBT training provided through the MUSC significantly predicted completing more training. This finding may align with a clinician's desire to be taught advanced skills over basic skills. For instance, clinicians

completed the current training because they desired more advanced training and they already had background and initial TF-CBT training. Interestingly, although clinicians have endorsed a trainings' fit with the needs of their clients to be a motivator to invest in training (Powell et al., 2014), we did not find clinicians' percent of child cases with a trauma history in their caseload to be a statistically significant predictor of training completion in the current study.

In addition to previous TF-CBT training, we found attitudes towards EBPs to be a significant predictor of training completion. Attitudes towards EBPs have been a previously identified factor that may influence EBP skill and adherence following training (e.g., Beidas et al., 2014). The current study corroborates this prior research, expanding EBP attitude's influence to training completion. Future trainings should address clinicians' EBP attitudes from initial training enrollment and throughout training to increase training completion rates. Additionally, clinician age was a significant predictor of training completion. Fascinatingly, we found older clinicians to complete more training than younger clinicians. This finding may be due to a number of reasons. For example, younger clinicians may have already received training in TF-CBT in their graduate work, while older clinicians were less familiar with TF-CBT. Another possibility may be that more advanced clinicians had more time to complete the training than the younger clinicians in the study.

The aforementioned study (Powell et al., 2014) also found that the time most therapists reported willing to invest in training were insufficient of the training requirements necessary to learn EBPs, and previous studies have found web-based trainings to have low completion rates (Liyanagunawardena, Adams, & Williams, 2013).

Unfortunately, the current study supported these findings with a quarter of clinicians who responded to the follow-up assessments having completed no training at post-training and substantial variability in the extent of training completed by clinicians, with clinicians completing less than half of the training on average. Therefore, an understanding of how to better motivate therapists to invest in and complete trainings is needed. Aim 3b investigated this question by evaluating the role of financial incentives on training completion and found no differences in the completion of training activities between the incentive and no incentive group. According to Self-Determination Theory, intrinsic motivation is related to more persistence on a task and conceptual understanding than extrinsic motivation (Reeve, 2008), which is motivation that emerges from incentives or consequences, e.g., money (Ryan & Deci, 2000). The current study targeted the latter form of motivation, extrinsic motivation. Future research should examine what motivates (i.e., intrinsic and/or extrinsic motivation) therapists to participate in and complete a training and whether these motivations ultimately affect training outcomes, as this could have important implications for the development of trainings and improving training outcomes.

More studies are needed to advance our understanding of what features make web-based trainings appealing and engaging to providers and successful in changing practice. Training outcomes often focus on the short-term outcomes of knowledge, attitudes, and use, but few examine outcomes across multiple of these domains and long-term outcomes. The current study used the Therapist Training Evaluation Outcomes Framework (TTEOF; Decker et al., 2011) to evaluate both the short-term and long-term outcomes of the study's training. In regards to short-term outcomes, clinicians were

generally satisfied with the training and found the training components to be useful and compatible. Most clinicians rated feeling at least "very much competent" in providing therapy services with traumatized children and adolescents and their parents, corroborating previous findings of positive attitudes towards web-based trainings among clinicians (Becker & Jensen-Doss, 2014; Heck et al., 2015). However, clinicians averaged 72% of questions correct on the TF-CBT knowledge test, which was below the 80% proficiency cut-off often used in other training evaluations (e.g., Beidas & Kendall, 2010; Sholomskas et al., 2005). Similarly, on average clinicians demonstrated a minimal level of TF-CBT skill in the clinical demonstration interviews. This may be due to clinicians not having enough opportunity (e.g., only having one or two new trauma cases) to use their newly acquired TF-CBT skills before the clinical demonstration interviews. Jackson, Herschell, Schaffner, Turiano, and McNeil (2017) found an interaction between caseload and consultation calls, indicating that skill development may necessitate an interplay of ongoing support as well as experience using these new skills.

For long-term training outcomes, clinicians reported frequently delivering prescribed TF-CBT strategies, but only used the full protocol with around a third of recent trauma cases. Additionally, of the nine core components of TF-CBT, clinicians reported using the trauma narrative, in vivo mastery of trauma reminders, and conjoint session with parent and child the least, despite recent research demonstrating TF-CBT with the trauma narrative to be more effective at alleviating youths' general anxiety and abuse-related fear than without the trauma narrative (Deblinger, Mannarino, Cohen, Runyon, & Steer, 2011). A similar pattern of preferred core components was also found

among clinicians working in children's advocacy centers, of whom more than three-quarters had been trained in TF-CBT (Allen & Johnson, 2012).

Limitations & Future Directions

The current study was not without limitations. A primary limitation was the primary reliance on clinician self-report. Although clinicians were under no external pressure (e.g., no mandates, no agency oversight) to respond in any way, self-report is subject to numerous well-known biases (e.g., response bias, social desirability; Dillman, 2000; Hurlburt, Garland, Nguyen, & Brookman-Frazee, 2010). In addition to the knowledge test and the clinical demonstration interviews, Medicaid treatment plans and youth and caregiver report were originally part of the measurement plan. According to study design, clinicians were asked to describe the study to youth clients and caregivers who would then provide permission for the investigative team to contact them for consent. The goal was for each clinician to recruit one case for participation; however, only one family was successfully recruited and this component was eventually dropped from the study. In addition, despite agreement with the state Medicaid office to provide de-identified treatment plans to the investigative team, no trauma-related treatment plans were submitted by participating clinicians during the study. Finally, there were sharply declining response rates from 0 to 12-months, lowering the sample size and power of the study. This may be due to the large amount of turnover that occurs in community mental health (typically 40-60% over a one year period; Woltmann et al., 2008). Indeed, most respondents used work emails for communication with the researchers; for several respondents, the emails bounced back as undeliverable, and for at least two for whom the email was seemingly delivered, we eventually received a response from a supervisor apparently monitoring the account informing the research team that the provider was no longer with the agency.

Future studies should focus on dismantling training protocols rather than examining the protocol as a whole to determine which training components are necessary to attain behavior change and proficient knowledge and skill in TF-CBT (Jackson et al., 2017). Furthermore, future training efforts should collect information on client (e.g., symptoms) and service outcomes (e.g., effectiveness), as the current study was unable to acquire treatment plans or youth and caregiver reports. Despite community-based clinicians indicating they would prefer to participate in EBP trainings that fit with their schedules, did not take time away from clients, and are not costly (Herschell, Reed, Person Mecca, & Kolko, 2014), most clinicians completed less than half of the current training and numerous clinicians did not complete any training in the current study. One reason may be that for self-paced trainings, such as this study, lack of accountability has been identified as a problem for clinicians (McMillen et al., 2015). As a result, future studies should incorporate accountability and engagement mechanisms to examine how these influence both training completion and training outcomes.

Conclusion

The current study evaluated an inexpensive, accessible approximation of the gold standard of training in EBPs. Following the training, clinicians were modestly knowledgeable in TF-CBT, demonstrated a minimal level of skill, and were using some TF-CBT strategies in their practice but not the entire TF-CBT protocol. While the current study did not find a between-group difference, there was considerable variability in the extent of training completed by clinicians, and more training was associated with better training outcomes. Low-cost, web-based, accessible trainings, such as the current study's training, may have the potential to increase widespread dissemination of EBPs, as they provide a more accessible and less expensive alternative to training for many therapists. Nevertheless, understanding how to better engage therapists in completing web-based trainings and implementing EBPs is needed and critical to improving mental health care.

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APPENDIX

Table 1

Measures Administration Timeline

Assessments	0-Months	6-Months	12-Months
Clinician Demographics, Current Practice, and Trauma Caseload and Training	X		
Evidence-Based Practice Attitudes Scale-50 (EBPAS-50; Aarons, Cafri, Lugo, & Sawitzky, 2012)	X		
Trauma Efficacy	X	X	X
TF-CBT Strategy Use Survey	X	X	X
TF-CBT Knowledge Questionnaire (Heck et al., 2015; National Crime Victims Research & Treatment Center, 2007)	X	X	X^{CG}
Training Participation		X	X
TF-CBT Protocol Implementation		X	X
Client Improvement			X
Usefulness, Satisfaction, & Compatibility of Training Components			X
Clinical Demonstration Interview		X	X
Qualitative Interviews		X^{a}	X^{b}

Note. [CG]indicates that only the CG was administered the measure. [a]indicates that only a subset of the TG completed the Qualitative Interviews. [b]indicates that only a subset of the CG completed the Qualitative Interviews.

Table 2

Therapist Training Evaluation Outcomes Framework (TTEOF) Adapted from Decker et al. (2011)

Level of Evaluation	Measurement	Results
1 - Reactions to training	Satisfaction items in 12-month assessment	Clinicians were generally satisfied with the training components (M=2.96/4.00, SD=.52, Range=1.9 to 3.9).
2a - Attitudes	1) Attitudes towards TF-CBT: Usefulness and Compatibility Items	1) Clinicians found the training components useful (M=3.07/4.00, SD=.41, Range=2.45 to 3.82), with training practices compatible (M=2.9/4.00, SD=.88) and useful with their practice (M=2.96/4.00, SD=.83).
	2) Self-rated Competence: Self-efficacy/self-rated competence item	2) 69.4% of clinicians rated feeling at least "very much competent" in providing therapy services with traumatized youths, and 61.5% in providing therapy services with traumatized youths' parents.
2b - Knowledge	TF-CBT Knowledge Test Score	Clinicians averaged 72% of questions correct on the TF-CBT Knowledge test.

2c - Skills	Skill demonstrated in the Clinical Demonstration Interviews	Clinicians showed minimal skillfulness in implementation of TF-CBT components on average (M=1.19/5.00, SD=.53, Range=.11 to 2.37), with more training associated with more skillfulness: τ =.30, p < .05.
3 - Behavior change in practice	1) TF-CBT Strategy Use measure 2) Application of TF-CBT components and protocol	1) Clinicians reported frequently using Prescribed TF-CBT strategies (M=2.84/4.00, SD=.66) on average 2) Clinicians used the full protocol with 1/3 of cases and at least some of the protocol with almost 2/3 of cases. Of the main components of TF-CBT, clinicians reported using Trauma Narrative (87.5%), In Vivo Mastery of Trauma Reminders (64.5%), Conjoint sessions with parent and child (83.9%).
4 - Client outcomes	Therapist-report of client outcomes (e.g., improvement in trauma symptoms).	Clinicians reported a 56% (*SD* = 24.18) decrease in client PTSD symptoms.

Table 3

TF-CBT Coding Item Descriptions and Item Interrater Reliability

Item Description	*ICC M*	*M (SD)*
Introducing and Pitching TF-CBT to a Parent		
1. Provide a rationale for the treatment model	.935	1.50 (1.19)
2. Provide an overview of the treatment	.981	1.35 (1.04)
3. Discuss the child's trauma-related symptoms	.704	.68 (1.01)
4. Discuss the importance of getting treatment as early as possible as a means of preventing long-term problems in children	.888	1.24 (1.30)
5. Discuss the importance of talking about the trauma to help children cope with their experiences	.889	1.18 (1.24)
6. Explain that the child will first be taught knowledge and skills to help them cope with their discomfort	.967	1.41 (1.05)
7. Explain that talking about the trauma with the child will be done gradually	.799	.50 (1.02)
8. Explain that talking about the trauma with the child will be done with a great deal of support and focus on effective coping (e.g., use of relaxation skills)	.961	.71 (1.14)
9. Help the parent understand his or her role in the child's treatment	.799	1.53 (1.05)

10. Reassure the parent that their input, questions, and suggestions are welcome throughout all phases of treatment	.654	.62 (1.16)
11. Specify that joint sessions will occur with child and parent together	.89	1.18 (1.24)
12. Explain the rationale for joint parent-child sessions	.672	.47 (.86)
13. Describe that the child and parent will demonstrate accurate and/or healthy knowledge about trauma and PTSD	.813	.44 (.89)
14. Describe that the child and parent will learn and practice relaxation techniques that could include breathing, progressive relaxation, meditation or mindfulness	.977	1.00 (1.33)
15. Describe that the child will be writing, drawing or completing a trauma narrative (or story of the trauma)	.895	1.21 (1.27)
16. Describe that the child will be processing the trauma to identify healthier ways of thinking about the trauma (i.e. identify cognitive distortions or unhealthy thinking)	.944	.74 (1.11)
Starting the Trauma Narrative with a Reluctant Child		
1. Presents the idea of writing a trauma narrative	.861	1.65 (1.15)
2. Offers children appropriate control over how trauma is discussed	.865	1.94 (1.18)

3. List creative, age-appropriate suggestions to facilitate creation of the narrative (e.g. ask for one detail about the trauma; plan a fun activity for afterward; create a narrative with songs, colors, etc.; have the child use dolls or puppets to tell the narrative, etc.)	.832	1.38 (1.26)
4. Provide positive feedback or praise the child for beginning to work on the narrative (beginning to talk about or describe the trauma)	.962	1.09 (1.38)
6. Encourage child to use previously learned skills and knowledge to facilitate work on the narrative	.927	1.41 (1.35)
7. Have the child write, draw or otherwise begin a trauma narrative that describes the traumatic experiencing including sensory details and thoughts and feelings they experienced during the trauma	.825	1.12 (1.32)
Cognitive Processing of the Trauma with a Parent		
1. Help the parent to understand that inaccurate or unhealthy beliefs are commonly experienced by parents after a traumatic experience and often exacerbate feelings of distress	.941	1.12 (1.25)
2. Ask the parent to generate examples of how he/she has been thinking about the traumatic event, and to use the cognitive triangle to understand the impact of those thoughts on his/her feelings and behaviors	.871	.09 (.51)

3. Identify cognitive errors (inaccurate or unhelpful thoughts; e.g. "I should have known this would happen and kept my child safe" or "My child will never be happy again.") that the parent has regarding the trauma event and/or the child's behavior with regard to the trauma, Teach the parent to examine his/her own thoughts for both accuracy and helpfulness, Teach the parent to identify and modify the original thought so that it is more balanced and helpful, Model the cognitive-processing techniques and have the parent practice challenging his/her own inaccurate or unhelpful thoughts, Help parent distinguish between regret over the occurrence of a traumatic event (which is healthy) versus being personally responsible for the traumatic event (which is inaccurate and unhelpful)	.534	1.59 (1.28)
4. Ask the parent to share any additional troubling feelings or thoughts he/she may have had concerning the trauma his/her child suffered	1	.18 (.72)
8. Assign homework to the parent to track inaccurate or unhelpful thoughts between sessions and to modify these thoughts to be more accurate and/or helpful	100% agreement[a]	.18 (.76)
Therapeutic Skill		
1. Clearly demonstrates knowledge of the model and therapeutic skill needed to effectively implement TF-CBT	.946	1.50 (1.19)

2. Communicates warmth or genuineness with clients to establish a relationship of trust	.618	2.88 (.73)
4. Respects the perspective of the child and parent even when questioning or challenging certain cognitions or parent practices	.494	2.76 (.96)
5. Responds appropriately to both the overt and latent content of what is being communicated by the child and parent	100% agreement[a]	2.97 (.17)
6. Is skillful in implementing TF-CBT strategies in the role-play	.946	1.38 (1.16)
7. Extensively or thoroughly covers the relevant TF-CBT skills in the role-play	.805	.79 (1.04)

Note. ICC = Intraclass correlation coefficient; All items were rated on a Likert scale of 0 to 5, with 0 indicating "Not present," 1 "Unacceptable," 3 "Acceptable," 5 "Superior." [a]Because of zero variance in coding of the item, percent agreement was observed.

Table 4

Training Component Completion

Training Components	*N* (% total sample, % who completed any training)	Extent to which Component Completed *M (SD)*
Weekly emailed TF-CBT clinical and implementation tips	67 (41.1%, 72.0%)	2.27 (1.66)
Online 10-hour Introductory training in TF-CBT (http://tfcbt.musc.edu/)	64 (39.3%, 66.0%)	2.24 (1.78)
Toolkit of supplementary TF-CBT and trauma materials	62 (38.0%, 64.6%)	1.73 (1.52)
TF-CBT treatment manual (Cohen, Mannarino, & Deblinger, 2006)	61 (37.4%, 63.5%)	1.53 (1.42)
Four live webinars presented by the developers	59 (36.2%, 62.8%)	2.06 (1.79)
Four brief video demonstrations of TF-CBT components being delivered	43 (26.4%, 44.8%)	1.00 (1.32)
Learning partner for discussion and practice TF-CBT skills	29 (17.8%, 30.5%)	.72 (1.24)
Online discussion forum	18 (11.0%, 18.8%)	.33 (.79)

Note. Extent to which training component completed items were rated on a 5-point Likert scale of 0 to 4, with 0 indicating "Not at all," 1 "A little bit," 2 "Somewhat," 3 "Mostly," 4 "Completely."

Table 5

Bivariate Correlations Between Extent of Training Completed and Post-Training TF-CBT Knowledge and Strategy Use

Variables	1	2	3	4	5
1. Extent of Training Completed	-	**.17***	**.29****	**.21***	.08
2. Post-Training Knowledge		-	**.19***	.16	-.10
3. Post-Training Prescribed Strategy Use			-	**.67****	**.20***
4. Post-Training Allowed Strategy Use				-	**.22***
5. Post-Training Proscribed Strategy Use					-

Note: Kendall's Tau correlation coefficient were performed for all variables. * $p < .05$, ** $p < .01$

Table 6

Bivariate Correlations Between Extent of Training Completed and Fidelity Outcomes

Variables	1	2	3	4	5	6
1. Extent of Training Completed	-	**.28***	-.06	.23	**.30***	.21
2. Introducing TF-CBT to a Parent		-	**.32****	**.34****	**.63****	**.44****
3. Starting Trauma Narrative with Reluctant Child			-	.05	**.42****	.15
4. Cognitive Processing of the Trauma with a Parent				-	**.55****	**.46****
5. Overall Skill					-	**.62****
6. Overall Adherence						-

Note: Kendall's Tau correlation coefficient were performed for all variables. * $p < .05$, ** $p < .01$

Table 7

Multiple Regression Predicting Extent of Training Completed (N = 87)

Predictor	B	SE (B)	β	*t*	*p*
Previous TF-CBT Training	**8.16**	**2.61**	**0.31**	**3.13****	**.002**
EBP Attitudes	**6.64**	**2.35**	**0.29**	**2.82****	**.006**
Clinician Age	**0.23**	**0.08**	**0.30**	**2.97****	**.004**
Competency working with Traumatized Youth	3.09	2.25	0.16	1.37	.175
Percent of child cases with trauma history	0.01	0.03	0.02	0.18	.858
Competency working with Traumatized Youths' Parents	-2.35	2.21	-0.13	-1.06	0.29
Clinician Theoretical Orientation	1.48	1.71	0.08	0.86	0.39

Note. EBP = evidence-based practice; The Previous TF-CBT Training variable was dummy coded 0 = no previous TF-CBT training, 1 = previous TF-CBT training. The Competency working with Traumatized Youth variable was dummy coded 0 = less competent, 1 = more competent. The Competency working with Traumatized Youths' Parents variable was dummy coded 0 = less competent, 1 = more competent.

**Denotes a significant *t* statistic, $p < .01$

Figure 1

Consort Diagram