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Complex trauma and Trauma-Focused Cognitive-Behavioral Therapy: How do trauma chronicity and PTSD presentation affect treatment outcome?

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ABSTRACT

Background: Traumatic experiences are common in youth and can be classified as acute (one incident or short-term) or complex (chronic exposure to multiple traumas) experiences. Post-traumatic stress disorder (PTSD) is a common response to trauma, often co-occurring with other mental health symptoms. According to the International Classification of Diseases, 11th Edition (World Health Organization, 2018), complex PTSD includes difficulties with affect regulation, interpersonal relationships, and self-blame.
Objective: The aims of this study were to evaluate trauma chronicity and PTSD presentation as moderators of outcomes of trauma-focused cognitive behavior therapy (TF-CBT).
Participants and Setting: Participants included 176 youth and caregiver dyads who were participants in an ongoing effectiveness study of TF-CBT at a community-based clinic in NYC.
Methods: Multilevel modeling was used to examine longitudinal, within-subject variability. Moderation analyses were used to assess the role of trauma chronicity and levels of PTSD on change in the outcomes.
Results: There were no baseline differences between youth with acute versus chronic trauma. At baseline, participants who had PTSD plus 2 or 3 of the ICD-11 Complex PTSD symptom domains had significantly worse functioning than those with simple PTSD. We found significant improvement on most measures of PTSD and complex PTSD domains. Level of improvement was found to vary based on PTSD presentation at baseline.
Conclusions: This is the first study to evaluate both trauma chronicity and PTSD presentation in the context of evidence-based treatment, and findings support the effectiveness of TF-CBT for simple and complex PTSD for youth who have experienced acute and chronic trauma.

1. Introduction

Over 60% of youth report experiencing at least one traumatic experience during childhood (Copeland, Keeler, Angold, & Costello, 2007; McLaughlin et al., 2013). Exposure to one incident of one form of trauma or one that is short in duration has been referred to as

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"acute trauma." (Wamser-Nanney & Vandenberg, 2013). In contrast, the term "complex trauma" is defined as chronic (i.e., repeated) exposure to multiple types of trauma, most often in childhood or adolescence, and perpetrated by adult caregivers who are expected to be protectors and trustworthy (Herman, 1992; Lawson & Quinn, 2013). Complex trauma tends to include as least one interpersonal trauma, defined as those that are intentionally perpetrated by another person (e.g., physical or sexual abuse), whereas non-interpersonal traumas may include experiences like exposure to natural disasters or serious accidents (Wamser-Nanney & Vandenberg, 2013). Following exposure to a traumatic event, approximately 16% of youth meet criteria for posttraumatic stress disorder (PTSD). The prevalence varies by trauma type, with approximately 10% having PTSD after a non-interpersonal trauma (e.g., natural disaster) versus 25% having PTSD after an interpersonal trauma (Alisic et al., 2014). Some trauma experts have asserted that the diagnostic criteria for PTSD does not fully encapsulate the difficulties experienced by victims of complex trauma and have proposed additional diagnoses to account for such areas of dysfunction. Complex PTSD was included in the 11th revision of the International Classification of Diseases (ICD-11; World Health Organization, 2018) and is defined as including the criteria for PTSD plus difficulties with affect regulation, self-concept, and relationships with others. What complicates this area of research is that some trauma experts define complex trauma by the experience (e.g., multiple incidents of multiple types of trauma) whereas other experts define complex trauma by the reactions to the trauma (e.g., complex PTSD). In turn, there is little clarity about how either of these concepts may influence response to trauma-specific therapies. Thus, the goal for this study was to examine trauma experience (i.e., acute versus chronic) and trauma reactions (i.e., simple versus complex PTSD) as moderators of treatment outcome for Trauma-Focused Cognitive-Behavioral Therapy (TF-CBT; Cohen, Mannarino, & Deblinger, 2017).

1.1. Relations between Trauma Experience and Symptom Severity

Within the trauma literature, there is recognition that characteristics of trauma occurrence (e.g., interpersonal versus non-interpersonal, frequency, duration) can define complexity of experience and in turn, predict symptom presentation. Despite there being a consensus that chronicity matters, only two studies were identified that have specifically evaluated and distinguished acute versus chronically traumatized youth as correlates of symptoms (Jonkman, Verlinden, Bolle, Boer, & Lindauer, 2013; Wamser-Nanney & Vandenberg, 2013). Wamser-Nanney & Vandenberg, (2013) found that youth who experienced complex trauma exhibited more PTSD and internalizing symptoms and general emotional and behavioral problems than youth who experienced acute trauma. Jonkman and colleagues (2013) found that a single-trauma group was higher on PTSD, whereas a chronic-maltreatment group experienced more severe behavior problems (e.g., conduct problems, hyperactivity, peer relations, and prosocial behavior). These findings suggest that PTSD severity may not be a consequence of chronic trauma. Rather, it may be the difference in the type of trauma typically experienced by the two groups that accounts for differences in PTSD severity. In contrast, the higher rates of behavior problems for the maltreatment group suggest a relation between trauma *chronicity* and behavior problems. One limitation in fully understanding these findings, however, is that the single-trauma group included youth who experienced a trauma that could have been either interpersonal or non-interpersonal.

Although both studies found that the complex trauma group experienced more symptoms in multiple areas of dysfunction, the studies had somewhat differing findings on the effect of trauma chronicity on symptomatology. This may be due to differences in trauma experiences within and between their samples. Both studies predated the proposal of ICD-11 complex PTSD and therefore only considered PTSD and general emotional and behavioral symptoms. Nonetheless, both studies provide useful information regarding the relationship of trauma chronicity and symptomatology, and further study is warranted to clarify how the findings may be relevant to treatment outcomes.

1.2. Relations between PTSD Presentation and Type and Severity of Other Symptoms

Similar to the highlighted limitations of the field about complex trauma experience, few studies have empirically examined the ways in which simple and complex PTSD differ in youth. Two studies have evaluated symptoms of youth trauma survivors that correspond to PTSD and the self-organization symptoms which align with complex PTSD (e.g., affect dysregulation, negative self-concept, and interpersonal issues) and identified sub-groups based on these symptom areas (Perkonigg et al., 2016; Sachser, Keller, & Goldbeck, 2017). These are the only studies identified by the authors that evaluated complex PTSD symptoms in youth that align with the criteria as defined by ICD-11. Neither study evaluated trauma chronicity and the PTSD presentation together, which would allow us to compare trauma as an experience versus set of mental health reactions. The present study aims to add to the literature by evaluating how trauma chronicity and PTSD presentation (simple versus complex) may influence treatment outcomes in TF-CBT.

To understand the range of simple to complex PTSD, we need an incremental approach that considers different levels of psychopathology. In the present study, ICD-11 definitions of PTSD presentations were used; complex PTSD was evaluated using the full definition (PTSD + three other symptom domains) as well as a sub-clinical group (PTSD + two other symptom domains) in comparison to the ICD-11 criteria for simple PTSD. These comparison groups were chosen because they likely represent the full range of responses to trauma (i.e., simple PTSD with or without anxiety and/or depression and/or behavioral problems, levels of complex PTSD; (Linning & Kearney, 2004; Copeland et al., 2007).

1.3. Complex Trauma Outcomes and TF-CBT

The most well-studied psychosocial intervention for children's trauma-related symptoms is Trauma-Focused Cognitive-Behavioral Therapy (TF-CBT; Cohen et al., 2017). More than 20 randomized controlled trials have shown that TF-CBT is efficacious for the

treatment of PTSD (see De Arellano et al., 2014, and Dorsey et al., 2017, for reviews). Using meta-analysis, Lenz and Hollenbaugh (2015) found that TF-CBT versus waitlist/no treatment comparisons yielded a mean effect size of -1.48 (CI 95 = [-2.13, -.83]). Morina, Koerssen, and Pollet (2016)) found that TF-CBT resulted in medium to large effect sizes when compared to wait list (Hedge's $g = 1.44$) and active control conditions (e.g., treatment as usual, supportive counseling, and psychoeducation; $g = 0.66$). Furthermore, the TF-CBT developers have highlighted that 70% of their samples have been exposed to more than one form of trauma, acute and chronic, suggesting that the model is efficacious for treating youth with varied trauma histories, including complex trauma. Murray et al. (2015) found significant improvements in symptoms in youth who, on average, had experienced 5 different types of traumas. That said, to the authors' knowledge, no study has been conducted to evaluate whether complex trauma experience (i.e., acute versus chronic) moderates outcomes.

A series of studies have been conducted to examine whether PTSD presentation is associated with treatment outcome for TF-CBT. Sachser and colleagues (2017) evaluated ICD-11 PTSD and complex PTSD symptoms over the course of TF-CBT. They found that youth with PTSD and complex PTSD experienced significant improvements in posttraumatic stress symptoms with no differences in response rates. The researchers also reported medium-to-high effect sizes for emotion dysregulation, interpersonal problems, and negative self-concept, providing preliminary support for the use of TF-CBT with complex PTSD. Of note, youth categorized as having complex (versus simple) PTSD endorsed statistically- and clinically-higher symptoms of PTSD at post-treatment. One limitation of this study is that they did not examine trauma chronicity (i.e., acute versus chronic) as a moderator.

Although Sachser et al. (2017) were the only group to study the impact of TF-CBT on complex PTSD, other researchers have examined the influence of TF-CBT on emotion regulation, self-blame, and/or interpersonal relations. Thornback and Muller (2015) found significant improvements, though small effect sizes, in emotion regulation areas of inhibition, dysregulation, and lability/negativity at post-treatment. In turn, these improvements were predictive of improvements in PTSD symptoms at 6-month follow-up. In an evaluation of moderating effects of emotion regulation, Sharma-Patel and Brown (2016) found that youth with low-medium level of dysregulation reported significant reductions of PTSD by mid-treatment (following psychoeducation and coping skills) whereas those with high dysregulation did not show significant reductions until post-treatment (following exposure and conjoint work with caregivers). In terms of negative self-concept, a number of studies have shown that TF-CBT leads to decreases in maladaptive attributions (Cohen, Deblinger, Mannarino, & Steer, 2004; Deblinger, Mannarino, Cohen, & Steer, 2006; King et al., 2000). Recently, Jensen, Holt, Morup Ormhaug, Fjermestad, and Wentzel-Larson (2018)) reported that decreases in negative trauma cognitions mediated decreases in PTSD. Similarly, studies have shown improvements in prosocial behavior (O'Callaghan, McMullen, Shannon, Rafferty, & Black, 2013) and interpersonal problems (Sachser et al., 2017).

The aforementioned studies provide support for the use of TF-CBT with children with both simple and complex PTSD; however, the majority of TF-CBT outcome studies: (1) do not include assessments of complex PTSD or include only some of the symptom areas, (2) use differing measurement tools and/or definitions for domains, and (3) lack details specifying chronicity of the trauma experience. Also, no study has examined whether changes in treatment are moderated by trauma complexity. Given the recent addition of complex PTSD to the ICD-11, more studies are indicated to better assess the validity of the ICD criteria for complex PTSD as well as observe changes across groups over the course of treatment.

1.4. Current study

The aim of this preliminary study was to extend previous research on children's complex trauma exposure and reactions by evaluating both trauma chronicity and PTSD presentations as moderators of outcomes of TF-CBT. In a sample of youth presenting to an urban mental health clinic specializing in trauma, we examined trauma history (acute versus chronic) and PTSD type (simple, 2 Domains of ICD-11 criteria for Complex PTSD, 3 Domains of ICD-11 criteria for Complex PTSD). First, we hypothesized that youth with both acute and chronic trauma histories would evidence similar improvements in symptoms, with the latter presenting a slower rate of change. Based on Sachser et al.'s (2017) findings, we hypothesized that youth in both groups (PTSD, Complex PTSD) would demonstrate significant improvements in PTSD and complex PTSD domains, predicting that youth with complex PTSD would have higher baseline and post treatment symptoms.

2. Method

2.1. Participants

Participants were drawn from an ongoing effectiveness study at a community-based clinic in New York City that provides TF-CBT for youth aged 4-17 who have experienced interpersonal trauma, including child sexual abuse (CSA), child physical abuse (CPA), traumatic bereavement, and/or witness to domestic violence (DV). Caregiver participation in treatment was required. For a period of the study, there was no minimum symptom criteria, which shifted to requiring sub-clinical symptoms of PTSD, depression or behavior problems in 2017. For the current study, participants who presented with at least sub-clinical PTSD symptoms were included (at least 5 symptoms of PTSD, Mannarino, Cohen, Deblinger, Runyon, & Steer, 2012). Exclusion criteria included: acute psychosis, severe conduct disorder, or pervasive developmental disorder or other diagnoses that significantly impair cognitive functioning or language abilities.

As presented in the Consort Diagram (see Fig. 1), of the 255 who completed the intake evaluation, 176 children met at least sub-clinical PTSD symptom criteria and attended at least 1 therapy session. A total of 120 (68%) children completed the mid-treatment evaluation, and 86 (48%) children completed treatment. The present study included 176 as an intent-to-treat sample and 86

completers. Demographic characteristics and trauma histories are presented in Table 1. Participants were more likely to be female, from racially/ethnically diverse backgrounds, and victim-survivors of multiple traumas.

2.2. Measures

2.2.1. Trauma Exposure

The *Schedule for Affective Disorders and Schizophrenia Present and Lifetime Version, Kiddie Version, PTSD module, Trauma Screener* (KSADS-PL; Kaufman et al., 1997) was used to assess youth lifetime exposure to a range of traumatic events (e.g., interpersonal trauma types and others including fire, accidents, and bereavement). The KSADS-PL overall demonstrates high inter-rater reliability (98%), and concurrent validity (Kaufman et al., 1997). The child needed to endorse at least one of the inclusion criteria trauma types. Participants endorsed an average of 3.76 trauma types ($SD = 1.49$).

The KSADS-PL trauma screener was followed by the Traumatic Events Characteristics Survey (TECS; Brown & Sharma-Patel, 2010). The TECS contains a series of questions about a trauma (e.g., perpetrator, frequency, duration) and administered for each endorsed interpersonal trauma. Youth-reported details of frequency and duration were used to determine chronicity. Wamser-Nanney and Vandenberg's (2013) definition was used to differentiate chronically- and acutely-traumatized youth; chronic trauma was defined as multiple episodes of trauma, single instances of trauma perpetrated by different individuals, or different types of traumatic events that occurred over the course of 6 months or longer. Of the 176 youth, 87 (49%) reported were classified as having had acute versus 89 chronic (51%) trauma experiences.

2.2.2. PTSD

The Child PTSD Symptom Scale (CPSS; Foa, Asnaani, Zang, Capaldi, & Yeh, 2018; Foa, Johnson, Feeny, & Treadwell, 2001) was administered to assess symptoms based on the Diagnostic Statistical Manual for Mental Disorders, 4thand 5th editions (American Psychiatric Association, 2000, 2013) criteria. The CPSS-4 has one item for each of the 17 symptoms; children rate the symptom frequency for a two-week period on a 4-point Likert scale from 0 (*not at all*) to 3 (*5 or more times a week*). The CPSS-5 includes 20 items to account for the additional symptom cluster of cognition and mood as specified by the DSM-5, with items rated on a 5-point scale from 0 (*not at all*) to 4 (6 *or more times a week/almost always in the past month*). For both versions, the total severity score is a sum of all items. For the CPSS-4, scores range from 0-51 (0-10, below threshold; 11-15, subclinical; 16-20, mild; 21-25, moderate; 26-30 moderately severe; 31-40; severe, 41-51, extremely severe). For the CPSS-5, scores range from 0-80 (0-10, minimal; 11-20, mild; 21-40, moderate; 41-60, severe; 61-80, very severe). Both versions have demonstrated high internal consistency and test-retest reliability (2018, Foa et al., 2001). Foa and colleagues (2001) found that a cutoff score of 11 could be used to distinguish between high and low PTSD symptoms on CPSS, and as such, this cutoff was used to establish sub-clinical PTSD status. CPSS Total Severity score was used in analyses. Due to the differences between the versions of the CPSS, total scores were converted to z-scores ($M = 0$; $SD = 1$) for analyses.

Using the CPSS, youth were coded to have met criteria for Simple PTSD (i.e., 6 symptoms, 2 per cluster as defined by ICD-11), 2

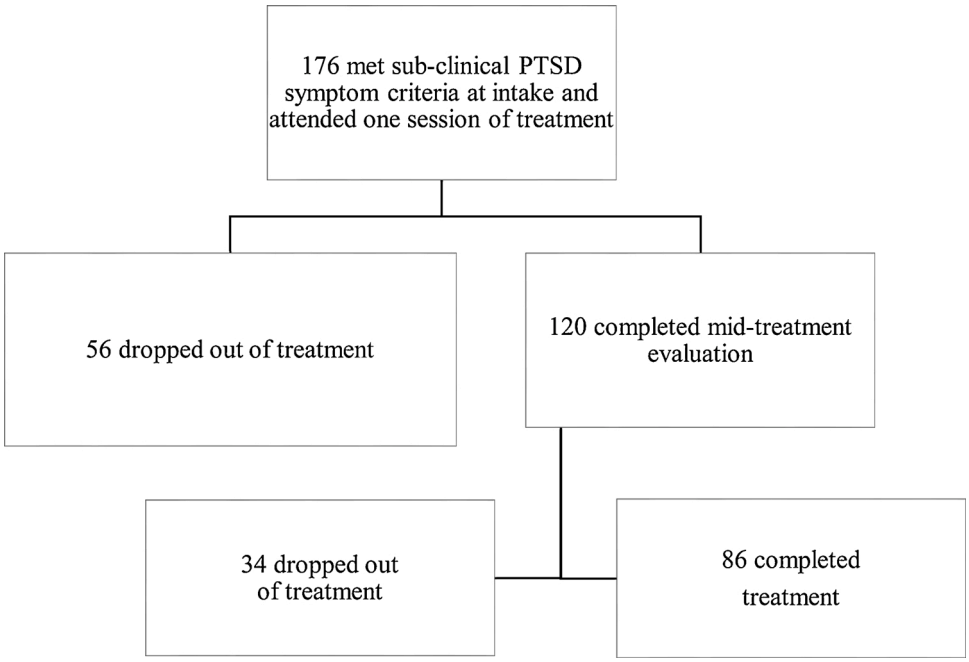

Fig. 1. Consort Diagram.

Table 1
Sample characteristics

	(*N* = *176*)	
	Frequency	Valid %
Age: Adolescents (age 13+)	87	49
Gender: Female	131	74
Race/Ethnicity		
Latino w/unspecified race	55	31
African American/Black	39	22
Multiracial	32	18
Caucasian	15	9
Latino White	12	7
West Indian	11	6
Latino Black	6	3
Asian	6	3
Caregiver Relation to Child		
Biological Mother	115	71
Biological Father	13	8
Foster Mother	12	7
Adoptive Mother	10	6
Grandmother	9	6
Stepmother	3	2
Grandfather	1	1
Types of Trauma Experiences		
Sexual Abuse	120	68
Physical Abuse	75	43
Witness Domestic Violence	84	48
Peer Sexual Assault	26	15
Other traumatic experience	131	74

Domains of ICD-11 Criteria for Complex PTSD (i.e., meeting criteria for dysregulation for only two domains) and 3 Domains of ICD-11 for Complex PTSD, as mutually exclusive categories. Of the 176 youth, 79 (45%) were categorized as having Simple PTSD, 65 (37%) as meeting 2 ICD Criteria and 32 (18%) as meeting 3 ICD Criteria for Complex PTSD.

Because there are no current measures for complex PTSD, the ones described below are measures of convenience, meaning that they were selected from the data collected within the study protocol. Our aim is not to diagnosis complex PTSD but to assess symptoms associated with it.

The Behavior Assessment System for Children (BASC-2 and 3; Reynolds & Kamphaus, 2004, 2015) is a multidimensional rating scale of psychosocial functioning and emotional and behavioral symptoms in youth, with the Parent Rating Scale (PRS) and Self Report of Personality (SRP) used in current study. Reliability and validity of the PRS and SRP subscales are supported with good internal consistencies (0.80), high test-retest reliability (0.80-0.90), and good inter-rater reliability (0.69 -0.77, Reynolds & Kamphaus, 1998). The clinical scales score ranges are classified as "average" (0-59), "at-risk" (60-69), and "clinical" (70+; *SD* = 10). For adaptive scales, lower scores are worse (41+ considered "average", 31-40 considered "at-risk," and scores of 0-30 considered "clinical"). We are using the SRP-Interpersonal Relations adaptive scale and clinical scales of SRP-Sense of Inadequacy, PRS-Emotional Self-Control. To categorize for PTSD presentation, scores at "at-risk" level were considered threshold met for a domain.

2.2.3. Interpersonal Difficulties

The BASC SRP-Interpersonal Relations scale measures the child's report of success in relating to others and the degree of enjoyment derived from interactions with peers and adults.

2.2.4. Negative Self-Concept

The BASC SRP-Sense of Inadequacy measures youths' views of themselves, both in terms of physical and global characteristics, and lack of self-confidence as manifested by the perception of being unsuccessful and tendency not to persevere. Youth also completed the *PERceptions of Children Exposed to Interpersonal ViolencE* (PERCEIVE; Brown, 2000), developed to assess attributions about their interpersonal violence exposure. The PERCEIVE is comprised of 64 items on blame attributions related to self, perpetrator, family, and the world at large, rated on a Likert scale, from 0 (*Not at all*) to 2 (*A lot*). Multiply-traumatized participants were asked to consider the "worst" interpersonal trauma. Factor analysis has supported the aforementioned subscales (Siu, Sharma-Patel, Brown, Chaplin, & Campbell, 2011, unpublished). The Self-Blame scale (9 items) was used in the current study with higher scores reflecting more self-blame. To categorize for PTSD presentation, absence of presence of self-blame was used to consider threshold met for a domain.

2.2.5. Affect Dysregulation

The BASC PRS-Emotional Self-Control was used to assess affect dysregulation, measuring the child's ability to regulate one's affect and emotions in response to environmental changes. The Life Problems Inventory (LPI; Rathus & Miller, 1995) was administered to adolescents to measure problems in emotional dysregulation and impulsivity. The LPI has been found to have good internal consistency (subscale alphas range from 0.82-0.90; current sample Cronbach's Alpha = .90), and demonstrate criterion validity,

differentiating between borderline personality disorder features (Emotion Dysregulation $M = 49$), depression without borderline features (Emotion Dysregulation $M = 30$), and non-psychiatric participants (Emotion Dysregulation $M = 21$; Rathus, Wagner, & Miller, 2015). For the current study, we used the LPI Emotional Dysregulation scale.

2.3. Treatment

TF-CBT is for traumatized children and their nonoffending caregivers and includes the following components: Psychoeducation, Parenting skills, Relaxation, Affective modulation, Cognitive coping and processing, Trauma narration and processing, *In Vivo* Exposure, Conjoint child-caregiver sessions, and Enhancing future safety (Cohen, Mannarino, & Deblinger, 2006; see Silverman et al., 2008 for detailed description). The mean number of sessions at mid-treatment was 11.77 ($SD = 5.01$). Mean number of sessions for participants completing treatment was 26.82 ($SD = 9.81$), ranging from 11 to 64 sessions. The large majority of participants (84%) received 30 or fewer sessions, 10% with 30-40 and six percent with more than 40 sessions. For youth categorized as having acute trauma, mean number of sessions was 16.63 ($SD = 11.06$), and chronic, 19.69 ($SD = 13.40$). For level of PTSD, mean number of sessions for Simple PTSD was 18.83 ($SD = 11.47$), 2 ICD Domains was 16.37 ($SD = 11.48$) and 3 ICD Domains was 21.47 ($SD = 15.51$).

2.4. Training

All therapists had at least a master's level education and training in social work, clinical, or school psychology. The majority of clinicians were in their fourth year of doctoral training and had two years of therapy experience, some of which was CBT with children and families. Demographically, the majority of therapists identified as female and were in their late 20s-early 30s. Therapists self-selected to conduct therapy by taking part in an advanced trauma-specific practicum, externship, or postgraduate training program. All clinicians received a 2-day didactic training on the treatment and were provided with weekly supervision that included review of audio recordings. Supervisors consisted of an approved national TF-CBT trainer and supervisor who met weekly to discuss therapist training, treatment, and other clinical issues.

2.5. Treatment Adherence

All clinicians were required to complete therapy content logs to code components used of TF-CBT. Clinic co-directors listened to all audio recordings to ensure treatment adherence. Weekly feedback was provided to clinicians on treatment fidelity and competence.

2.6. Procedures

A phone screen determined whether referrals met inclusion criteria. Eligible families participated in pre-treatment evaluations conducted by Master's-level doctoral students in clinical/school psychology and trained post-Baccalaureates. Following consent and assent, caregivers and children individually reported on the child's trauma histories, mental health symptoms, and parenting practices. Caregivers reported on demographics. Assessments were repeated at mid-treatment (prior to initiation of trauma narrative) and post-treatment. For each assessment, children were compensated with $10 Barnes and Noble and/or Amazon gift certificates. Caregivers were compensated with $20, $15, and $20-30 (decreased from $30 to $20 in July 2012) per child for the pre-, mid-, and post evaluations, respectively.

2.7. Data Analysis

Statistical analyses were performed using SPSS version 24 (2016). Analyses were conducted for intent-to-treat (ITT; $N = 176$) and for completers ($n = 86$) to isolate results for those who participated in all phases of TF-CBT. Multilevel modeling (MLM; Raudenbush, 1989) was used to examine longitudinal, within-subject variability within a nested dataset. Multilevel modeling accounts for missing data and does not require missing data techniques; However, for participants who had less than 15% of data missing for individual items on the scales CPSS Total Severity, PERCEIVE Blame and LPI Emotion Dysregulation, we used the expectation-maximization (EM) algorithm to estimate values for items to calculate scale scores, which were used in analyses. No more than 5% of an item was missing on any scale. BASC scales were not replaced. No participants were deleted list-wise.

The majority of families had one child participate; therefore, 2-level analyses (evaluation time point nested within child/adolescent) using maximum likelihood estimation, specifying participants as random effects, with an unstructured covariance matrix were conducted to test primary hypotheses. Intercept-only models provided ICC estimates for the six outcomes for participants as the cluster (grouping variable). Number of Sessions in Treatment was used to create moderator terms to examine treatment effects over time. All models converged. Standardized effect sizes were calculated by subtracting the residual variance with predictors from the residual variance of the intercepts-only model, and dividing by residual variance without the predictor.

For the first aim, moderation analyses were conducted to examine the effects of trauma chronicity. This trauma variable, Chronicity (acute coded as 0 versus chronic as 1) was added in as a fixed effect moderator. For the second aim, moderation analyses were conducted to examine the effects of PTSD presentation (Simple PTSD versus 2 ICD Complex PTSD domains versus 3 ICD Complex PTSD domains). Of note, SPSS uses the highest numbered category as the reference group. As such, for the MLM analyses examining chronicity, the effects for chronicity are included in the intercept estimation, so the provided estimates for main and interaction effects are for acute trauma and were used accordingly to calculate means for tables and plot interactions. Similarly, for the MLM analyses

examining the effects of PTSD presentation, the effect for 3 ICD Complex PTSD domains is in the intercept, with estimates provided for the main and interaction effects for Simple PTSD when compared to 2 and 3 ICD Complex PTSD Domains that were used accordingly for means and plots.

Because the data used for these analyses were drawn from an existing dataset, we did not conduct an a priori power analysis to estimate sample size. Rather, we conducted a post-hoc power analysis (Cohen, 1988) for a range of effect sizes (conventionally labeled small, moderate, and large) with the available sample size to determine our power to detect effects of different sizes. This provided a context for interpreting the statistical significance, or lack thereof, of our results. Specifically, we set our alpha level (Type I error rate) at .05, two tailed, we specified a sample size of 176 for the intent-to-treat analysis and 86 for the completers analysis, and estimated the statistical power for each of the three effect sizes. We did this in the context of a mixed effects regression model to evaluate moderator effects. For the intent to treat analysis our estimated power is .26, .98, and .99 for small, moderate, and large effects, respectively. For the completers analysis the corresponding power estimates are .15, .81, and .99, respectively. Thus, only moderate to large effects were likely to be detected and because effect sizes for moderator effects are likely to be small due to their conditional nature (Chaplin, 1991), non-significant findings should not be taken as indicating the absence of any effect, but as the absence of a moderate to large effect.

3. Results

3.1. Baseline Characteristics of Complex Trauma Exposure and PTSD presentation

In Table 2, we present the frequency and percentages of chronicity-by-PTSD presentation. For youth reporting acute trauma, approximately 44% met criteria for simple PTSD, with the remainder having dysfunction across ICD Complex PTSD domains. For youth reporting chronic trauma, 46% met criteria for simple PTSD, with the remainder having dysfunction for two or three ICD Complex PTSD domains. Approximately the same percentage of youth with acute and chronic trauma met criteria for 2 and 3 ICD Complex PTSD domains.

3.2. Comparison of Completers and Dropouts on Outcomes

Independent-sample t-tests were computed to compare treatment completers to youth who dropped out on outcomes. There was a significant difference on PRS Emotional Control between treatment completers ($M = 58.63$; $SD = 13.36$) and dropouts ($M = 64.50$; $SD = 13.26$), $t(174) = 2.93$, $p = .004$. None of the other comparisons were significant.

Pearson chi-square tests were computed to compare groups on trauma history (acute versus chronic) and PTSD presentation (Simple PTSD versus 2 ICD Complex PTSD domains versus 3 ICD Complex PTSD domains). Neither was significant, χ^2 (1, $N = 176$) = .208, $p = .649$ and χ^2 (2, $N = 176$) = 1.74, $p = .410$, respectively.

3.3. Trauma History and Number of Sessions

ANOVAs were conducted to determine whether the number of sessions differed by trauma history or PTSD presentation. Neither was significant, $F(1, 175) = 2.71$, $p = .10$ and $F(2, 173) = 1.86$, $p = .16$, respectively.

3.4. Interclass Correlations (ICC) of Intercept-only Models

Individuals (group) nested within time (repeated measures), intercept-only models yielded the following ICC estimates: .28 for z-scored CPSS Total Severity, .61 for SRP Interpersonal Relations, .64 for SRP Sense of Inadequacy, .54 for Self-Blame, .56 for PRS Emotional Control and .54 for LPI Emotion Dysregulation. As expected, ICC values were high indicating that significant differences between individuals (i.e., group) to be higher than within individuals (i.e., repeated measures).

3.5. Trauma Chronicity as a Moderator of Symptom Change across Number of Sessions

MLM analyses with the ITT sample were conducted to evaluate whether trauma chronicity moderated the within-subjects effect of treatment. There were no significant interaction effects, indicating that the rate of change across sessions did not differ between groups. There also were no significant effects of trauma chronicity for any outcomes, indicating that there were no baseline differences between youth with acute versus chronic trauma. For all outcomes, Number of Sessions in treatment was significant, indicating that the change in symptoms per session was statistically significant. Model parameters and effect sizes are reported in Table 4. Effect sizes

Table 2
Frequency and Percent of Chronicity-by-PTSD Level

	Simple PTSD		2 ICD Criteria Met		3 ICD Criteria Met		Total
	Frequency	%	Frequency	%	Frequency	%	
Acute	38	48	34	52	15	47	87
Chronic	41	52	31	48	17	53	89
Total	79	100	65	100	32	100	176

ranged from .09 to .34. See Table 5 for estimated means for groups across sessions.

MLM analyses for completers yielded the same results (see Table 6), except that for PRS Emotional Control, the interaction was significant. Specifically, youth with acute trauma had a larger per-session rate of change than those with chronic trauma (Fig. 2). See Table 3 for overall and subgroup raw means across assessment.

3.6. Level of PTSD as a Moderator of Symptom Change across Number of Sessions

MLM analyses with the ITT sample were conducted to evaluate whether Level of PTSD moderated the within-subjects effect of treatment. For all but one variable, SRP Interpersonal Relations, there were no significant interactions, indicating that the rate of change across treatment did not differ for the groups; improvements in interpersonal relations was larger per session for youth with Simple PTSD than those meeting 2 ICD Complex PTSD Domains (Fig. 3). Number of Sessions in treatment was significant only for PRS Emotional Self Control. For all outcomes, there were significant effects of 2 ICD Complex PTSD domains versus Simple PTSD, and also for 3 ICD Complex PTSD domains versus Simple PTSD, indicating that at baseline, those meeting 2 and 3 ICD Complex PTSD Domains reported worse symptoms than those with Simple PTSD. Model parameters and effect sizes are reported in Table 7. Effect sizes ranged from .26 to .44. See Table 8 for estimated means for groups across sessions in treatment.

The MLM analyses for completers yielded comparable results (see Table 9). For all but one variable, interaction effects were not significant; for z-scored CPSS Total Severity, the rate of change was larger per session for youth with Simple PTSD than those meeting 2 ICD Complex PTSD Domains (Fig. 4). Like the ITT analyses, Number of Sessions in treatment was significant only for PRS Emotional Self Control; there were significant differences at baseline between groups on most outcomes such that those meeting 2 and 3 ICD Complex PTSD Domains presented with worse scores than those with simple PTSD. See Table 3 for means.

4. Discussion

The current study aimed to empirically examine the debate in the field regarding the importance of trauma history and PTSD symptomatology as moderators of treatment outcomes in TF-CBT. This study was conducted in a community clinic and therefore included a range of trauma experiences and PTSD presentations. In addition, the current study extended previous research by evaluating trauma chronicity as a moderator and by investigating the impact of TF-CBT among youth who report complex PTSD using ICD-11 criteria. This is the first study to evaluate the effectiveness of TF-CBT for simple and complex PTSD with a diverse, treatment-seeking sample of children and adolescents who experienced interpersonal trauma. For the most part, findings for the ITT and completer samples were comparable.

4.1. Relationship between Trauma history and PTSD presentations

We found that participants who reported acute versus chronic trauma did not differ significantly on symptoms of PTSD or complex PTSD at baseline; in fact, we found a relatively even distribution of PTSD presentation for acute and chronic trauma. Although theoreticians and researchers discuss the varied and elevated symptomatology that presents with complex trauma experiences (Cook et al., 2005; Wamser-Nanney & Vandenberg, 2013), this pattern did not manifest in our sample. Interestingly, those with chronic trauma were no more likely than those with acute trauma to experience complex PTSD, therefore suggesting that trauma chronicity may not be the key factor in predicting later symptoms. These findings differ from recent studies (Wamser-Nanney & Vandenberg, 2013; Jonkman et al., 2013). The inconsistent findings among studies suggest that other factors may be contributing to or compounding the development of trauma sequelae, such as history of pre-trauma or family history of psychiatric concerns and

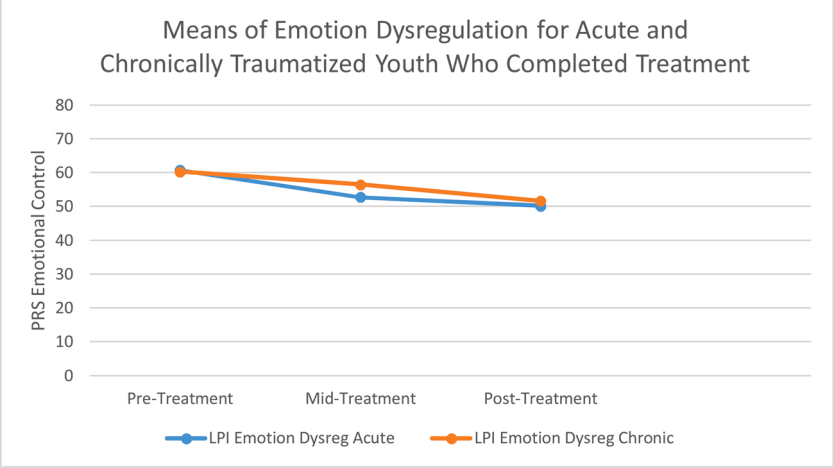

Fig. 2. Means of Emotion Dysregulation for Acute and Chronically Traumatized Youth Who Completed Treatment.

Table 3
Means Across Assessments for Outcome Variables

	Pre-treatment		*Mid-treatment*		*Post-treatment*	
	Mean	SD	Mean	SD	Mean	SD
PTSD Symptom Severity						
CPSS for DSM IV[a](N = 60)	23.33	7.63	18.81	10.60	12.21	9.93
Acute	22.18	7.27	20.33	10.57	12.58	11.90
Chronic	24.33	7.91	17.50	10.62	11.90	10.48
Simple PTSD	22.46	7.48	17.43	10.07	12.30	10.18
ICD 2 Domains	21.68	6.74	20.45	10.03	11.42	10.08
ICD 3 Domains	31.57	5.97	20.29	14.73	14.00	9.56
CPSS for DSM 5[b] (N = 26)	33.12	18.15	29.00	17.71	17.15	13.74
Acute	30.00	11.07	23.40	18.13	11.20	9.98
Chronic	41.69	18.07	37.78	13.46	23.31	14.35
Simple PTSD	25.80	11.55	23.50	15.52	9.30	10.00
ICD 2 Domains	35.67	12.28	28.67	6.68	23.33	10.63
ICD 3 Domains	52.86	11.68	45.43	17.62	26.00	15.02
Emotion Regulation						
BASC PRS Emotional Self Control	61.63	13.59	56.11	11.29	50.56	10.70
Acute	60.67	13.91	53.65	10.66	49.59	10.32
Chronic	62.57	13.29	58.28	11.47	51.40	11.07
Simple PTSD	55.61	11.83	53.53	10.30	51.46	11.68
ICD 2 Domains	65.34	12.52	56.83	11.10	51.04	10.59
ICD 3 Domains	68.97	13.80	60.29	12.51	47.14	7.58
LPI Emotional Dysregulation	38.34	12.83	30.56	11.88	28.62	13.17
Acute	38.48	11.54	30.62	14.56	25.71	16.69
Chronic	38.27	13.58	30.54	10.73	29.68	11.98
Simple PTSD	28.65	9.37	25.07	10.53	25.90	15.04
ICD 2 Domains	41.33	12.53	30.20	10.28	28.78	12.05
ICD 3 Domains	44.47	10.77	38.55	12.09	32.29	12.72
Negative Self Concept						
BASC SRP Sense of Inadequacy	59.54	13.95	54.99	11.81	50.80	11.36
Acute	59.80	13.01	53.41	12.05	49.85	10.64
Chronic	59.31	14.79	56.19	11.60	51.45	11.92
Simple PTSD	50.89	10.29	49.80	8.41	47.77	10.69
ICD 2 Domains	64.38	12.38	55.56	12.18	50.65	9.82
ICD 3 Domains	69.10	13.17	63.82	11.67	58.23	12.47
PERCEIVE Self Blame	2.62	3.49	2.04	3.15	1.07	1.97
Acute	2.35	3.30	1.64	3.04	0.89	1.62
Chronic	2.88	3.67	2.43	3.25	1.22	2.22
Simple PTSD	0.91	2.16	1.21	2.40	0.67	1.56
ICD 2 Domains	3.94	4.08	2.90	4.12	1.58	2.44
ICD 3 Domains	3.94	3.05	2.39	2.62	1.28	1.91
Interpersonal Problems						
BASC SRP Interpersonal Relations	45.96	13.01	48.06	12.56	51.22	10.14
Acute	44.73	13.75	47.76	13.55	50.19	11.61
Chronic	47.07	12.26	48.32	11.77	52.00	8.93
Simple PTSD	52.85	6.48	52.50	8.03	54.44	5.92
ICD 2 Domains	48.00	11.15	51.39	9.53	51.25	11.94
ICD 3 Domains	26.78	7.59	33.92	14.19	43.36	11.25

Note. CPSS = The Child PTSD Symptom Scale; BASC PRS = Behavioral Assessment System for Children-Parent Rating Scale; LPI = The Life Problems Inventory; BASC SRP = Behavioral Assessment System for Children-Self Report of Personality; PERCEIVE = PERceptions of Children Exposed to Interpersonal ViolencE; Ns vary across assessment and time point.

[a] CPSS-4 scores range from 0-51 (0-10, below threshold; 11-15, subclinical; 16-20, mild; 21-25, moderate; 26-30 moderately severe; 31-40; severe, 41-51, extremely severe).

[b] CPSS-5 scores range from 0-80 (0-10, minimal; 11-20, mild; 21-40, moderate; 41-60, severe; 61-80, very severe).

family/caregiver functioning (Pine & Cohen, 2002) or perhaps other trauma-related factors such as severity and relationship to perpetrator (Jackson, Gabrielli, Fleming, Tunno, & Makanui, 2014; Kiser et al., 2014). Further study of such factors within our sample was outside the scope of this paper, though would be helpful to pursue in the future.

4.2. Change in Symptoms over the Course of TF-CBT

We hypothesized that TF-CBT would be associated with significant improvements in symptoms and adaptive functioning for youth with both acute and chronic trauma histories. Overall, we found this to be the case, such that there were statistically significant

Table 4
Results of ITT Multilevel Modeling Analyses: Moderation of Treatment Effects by Acute versus Chronic Trauma History

		B	*SE*	*p*	95% CI
PTSD Symptom Severity					
CPSS Total Severity (z-scores) ($\eta^2 = .32$)	Intercept-Chronic	.708	.088	<.001	.535, .882
	Acute Trauma	.132	.126	.298	-.381, .117
	Number of Sessions	-.030	.004	<.001	-.038, -.022
	Acute by Number of Sessions	-.005	.007	.426	-.018, .008
Emotion Regulation					
BASC PRS Emotional Self Control ($\eta^2 = .32$)	Intercept-Chronic	61.95	1.28	<.001	58.42, 64.49
	Acute Trauma	−1.70	1.84	.355	−5.33, 1.92
	Number of Sessions	-.267	.048	<.001	-.360, -.173
	Acute by Number of Sessions	-.140	.076	.067	-.289, .010
LPI Emotional Dysregulation (*Adolescents Only; N = 87*) ($\eta^2 = .34$)	Intercept-Chronic	37.48	1.86	<.001	33.78, 41.18
	Acute Trauma	.375	3.21	.907	−6.02, 6.77
	Number of Sessions	-.302	.063	.001	-.427, -.178
	Acute by Number of Sessions	-.104	.141	.463	-.384, .176
Negative Self Concept					
BASC SRP Sense of Inadequacy ($\eta^2 = .19$)	Intercept-Chronic	59.03	1.44	<.001	56.18, 61.87
	Acute Trauma	.318	2.13	.882	−3.88, 4.52
	Number of Sessions	-.181	.050	<.001	-.279, -.082
	Acute by Number of Sessions	-.137	.083	.103	-.300, .020
PERCEIVE Self Blame ($\eta^2 = .09$)	Intercept-Chronic	2.92	.332	<.001	2.26, 3.57
	Acute Trauma	-.632	.477	.187	−1.57, .309
	Number of Sessions	-.043	.014	.002	-.067, -.015
	Acute by Number of Sessions	-.004	.023	.878	-.049, .041
Interpersonal Problems					
BASC SRP Interpersonal Relations ($\eta^2 = .09$)	Intercept-Chronic	47.094	1.293	<.001	44.54, 49.64
	Acute Trauma	−2.018	1.885	.286	−5.74, 1.70
	Number of Sessions	.132	.049	.008	.036,.229
	Acute by Number of Sessions	.075	.081	.352	-.084, .234

Note. η^2 = effect size; CPSS = The Child PTSD Symptom Scale; BASC PRS = Behavioral Assessment System for Children-Parent Rating Scale; LPI = The Life Problems Inventory; BASC SRP = Behavioral Assessment System for Children-Self Report of Personality; PERCEIVE = PERceptions of Children Exposed to Interpersonal ViolencE.

Table 5
Multilevel Modeling Analyses: Estimated Means of Outcomes by Chronicity of Trauma History

		Number of Sessions			
		0	12	26	64
PTSD Symptom Severity					
CPSS Total Severity (z-scores)	Acute	0.58	0.16	−0.34	−1.67
	Chronic	0.71	0.35	−0.07	−1.20
Emotion Regulation					
BASC PRS Emotional Self Control	Acute	60.25	55.37	49.68	34.22
	Chronic	61.95	58.74	54.01	45.86
LPI Emotional Dysregulation (*Adolescents Only; N = 87*)	Acute	37.86	32.98	27.29	11.85
	Chronic	37.48	33.85	29.62	18.13
Negative Self Concept					
BASC SRP Sense of Inadequacy	Acute	59.34	55.53	51.06	39.02
	Chronic	59.02	56.86	54.32	47.46
PERCEIVE Self Blame	Acute	2.29	1.73	1.09	0.00
	Chronic	2.92	2.41	1.81	0.20
Interpersonal Problems					
BASC SRP Interpersonal Relations	Acute	45.08	47.57	50.47	58.36
	Chronic	47.09	48.68	50.54	55.56

Note. CPSS = The Child PTSD Symptom Scale; BASC PRS = Behavioral Assessment System for Children-Parent Rating Scale; LPI = The Life Problems Inventory; BASC SRP = Behavioral Assessment System for Children-Self Report of Personality; PERCEIVE = PERceptions of Children Exposed to Interpersonal ViolencE. Means presented at baseline (0), average number of sessions completed at mid-treatment evaluation (12), average number of sessions completed at post-treatment evaluation (26), and highest number of sessions completed at post-treatment evaluation (64). *N* = 176.

improvements in almost all symptom areas (PTSD, sense of inadequacy, self-blame, parent report of youth emotion dysregulation, and adolescent reported emotion dysregulation) across groups. This is consistent with previous research on TF-CBT (e.g., Cohen et al., 2004; Deblinger, Mannarino, Cohen, Runyon, & Steer, 2011; Jensen et al., 2014; Sachser et al., 2017; Webb, Hayes, Grasso, Laurenceau, & Deblinger, 2014), and adds to the literature suggesting that TF-CBT is effective for the treatment of simple as well as complex PTSD. Across groups, parent report of youth emotion dysregulation decreased from the at-risk range to non-clinical over the course of treatment, and sense of inadequacy followed a similar pattern but started just under the at-risk range. Interpersonal relations

Table 6
Results of Completers Multilevel Modeling Analyses: Moderation of Treatment Effects by Acute versus Chronic Trauma History

		B	*SE*	*p*	95% CI
PTSD Symptom Severity					
CPSS Total Severity (z-scores) (Cohen's D = .46)	Intercept-Chronic	.659	.120	<.001	.422, .897
	Acute Trauma	.154	.175	.382	-.502, .193
	Number of Sessions	-.031	.004	<.001	-.039, -.022
	Acute by Number of Sessions	-.001	.007	.830	-.015, .012
Emotion Regulation					
BASC PRS Emotional Self Control (Cohen's D = .81)	Intercept-Chronic	58.48	1.61	<.001	55.29, 61.67
	Acute Trauma	−1.32	2.36	.578	−5.99, 3.36
	Number of Sessions	-.221	.049	<.001	-.317, -.125
	Acute by Number of Sessions	-.159	.079	.045	-.314, -.003
LPI Emotional Dysregulation (*Adolescents Only*) (Cohen's D = .76)	Intercept-Chronic	37.16	2.80	<.001	31.47, 42.86
	Acute Trauma	−1.41	5.54	.801	−12.65, 9.32
	Number of Sessions	-.301	.066	<.001	-.433, -.168
	Acute by Number of Sessions	-.040	.157	.801	-.384, .176
Negative Self Concept					
BASC SRP Sense of Inadequacy (Cohen's D = .63)	Intercept-Chronic	58.58	1.99	<.001	54.62, 62.54
	Acute Trauma	-.311	3.06	.919	−6.39, 5.77
	Number of Sessions	-.198	.052	<.001	-.301, -.096
	Acute by Number of Sessions	-.096	.088	.276	-.269, .078
PERCEIVE Self Blame (Cohen's D = .44)	Intercept-Chronic	2.63	.381	<.001	1.87, 3.38
	Acute Trauma	-.627	.561	.266	−1.74, .482
	Number of Sessions	-.041	.014	.003	-.068, -.014
	Acute by Number of Sessions	-.004	.023	.860	-.049, .041
Interpersonal Problems					
BASC SRP Interpersonal Relations (Cohen's D = .40)	Intercept-Chronic	47.910	1.654	<.001	44.63, 51.19
	Acute Trauma	−2.547	2.469	.305	−7.44, 2.35
	Number of Sessions	.145	.051	.005	.045, .245
	Acute by Number of Sessions	.051	.084	.545	-.115, .217

Note. CPSS = The Child PTSD Symptom Scale; BASC PRS = Behavioral Assessment System for Children-Parent Rating Scale; LPI = The Life Problems Inventory; BASC SRP = Behavioral Assessment System for Children-Self Report of Personality; PERCEIVE = PERceptions of Children Exposed to Interpersonal ViolencE.

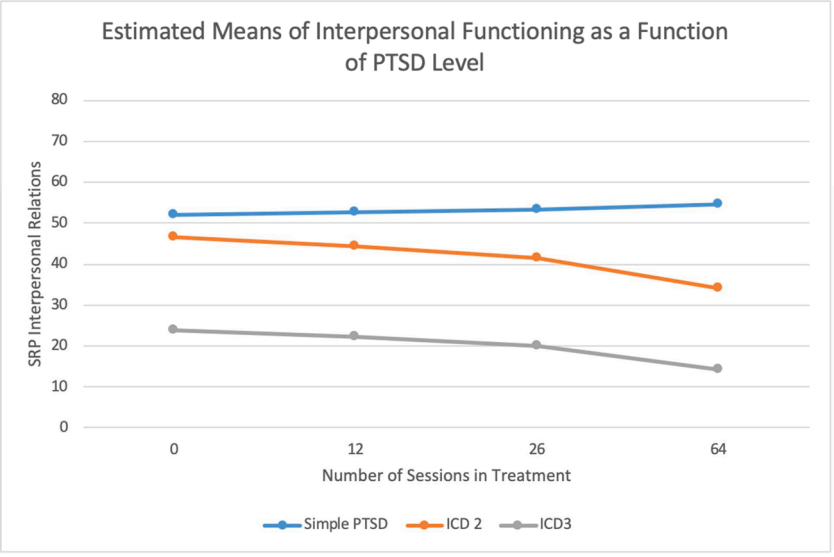

Fig. 3. Estimated Means of Interpersonal Functioning as a Function of PTSD Level.

remained in the non-clinical range for both acute and chronic groups. Furthermore, trauma history did not moderate treatment outcome for most symptoms, which provides additional evidence supporting TF-CBT as an appropriate treatment option for trauma-exposed youth regardless of the chronicity of their trauma experience. Notably, for completers, similar to Sharma-Patel and Brown (2016), youth with acute trauma demonstrated improvements in emotion dysregulation at a faster rate than those with chronic trauma. The present study also improves upon the similar findings from Sachser and colleagues (2017), as they assessed complex PTSD domains using items from PTSD and trauma-specific measures, whereas the current studies used general assessment tools.

Table 7
Results of ITT Multilevel Modeling Analyses: Moderation of Treatment Effects by PTSD Level

		B	*SE*	*p*	95% CI
PTSD Symptom Severity					
CPSS Total Severity (z-scores) ($\eta^2 = .34$)	Intercept-ICD 3 Criteria	1.44	.177	<.001	1.09, 1.79
	Number of Sessions	.001	.014	.937	-.026, .028
	Simple PTSD (versus ICD2)	-.300	.115	.009	-.526, -.074
	Simple PTSD (versus ICD3)	-.725	.152	<.001	−1.02, -.425
	Number of Sessions x ICD2 = 0	-.015	.008	.056	-.031, .000
	Number of Sessions x ICD3 = 0	-.015	.011	.197	-.038, .008
Emotion Regulation					
BASC PRS Emotional Self Control ($\eta^2 = .43$)	Intercept-ICD 3 Criteria	76.94	2.18	<.001	72.65, 81.22
	Number of Sessions	-.390	.150	.010	-.686, -.093
	Simple PTSD (versus ICD2)	−9.27	1.35	<.001	−11.93, -6.61
	Simple PTSD (versus ICD3)	−11.75	1.84	<.001	−15.37, -8.13
	Number of Sessions x ICD2 = 0	.122	.089	.169	-.052, .296
	Number of Sessions x ICD3 = 0	.099	.129	.440	-.154, .353
LPI Emotional Dysregulation (*Adolescents Only; N = 87*) ($\eta^2 = .44$)	Intercept-ICD 3 Criteria	55.24	3.16	<.001	48.99, 61.49
	Number of Sessions	-.153	.191	.428	-.533, .228
	Simple PTSD (versus ICD2)	−11.06	2.23	<.001	−15.47, -6.65
	Simple PTSD (versus ICD3)	−14.84	2.76	<.001	−20.30, -9.39
	Number of Sessions x ICD2 = 0	.005	.124	.971	-.242, .251
	Number of Sessions x ICD3 = 0	-.015	.161	.925	-.336, .306
Negative Self Concept					
BASC SRP Sense of Inadequacy ($\eta^2 = .26$)	Intercept-ICD 3 Criteria	78.49	2.30	<.001	73.97, 83.02
	Number of Sessions	-.001	.159	.997	-.313, .312
	Simple PTSD (versus ICD2)	−10.94	1.50	<.001	−13.90, -7.98
	Simple PTSD (versus ICD3)	−15.10	1.94	<.001	−18.92, -11.27
	Number of Sessions x ICD2 = 0	.004	.096	.966	-.185, .193
	Number of Sessions x ICD3 = 0	-.089	.135	.512	-.355, .177
PERCEIVE Self Blame ($\eta^2 = .12$)	Intercept-ICD 3 Criteria	6.59	.622	<.001	5.36, 7.81
	Number of Sessions	-.075	.048	.120	-.169, .019
	Simple PTSD (versus ICD2)	−2.51	.416	<.001	−3.32, -1.69
	Simple PTSD (versus ICD3)	−2.88	.534	<.001	−3.93, -1.83
	Number of Sessions x ICD2 = 0	.037	.028	.180	-.017, .091
	Number of Sessions x ICD3 = 0	.034	.042	.419	-.048, .116
Interpersonal Problems					
BASC SRP Interpersonal Relations ($\eta^2 = .25$)	Intercept-ICD 3 Criteria	23.94	1.94	<.001	20.12, 27.60
	Number of Sessions	-.150	.147	.308	-.440, .139
	Simple PTSD (versus ICD2)	5.55	1.28	<.001	3.04, 8.06
	Simple PTSD (versus ICD3)	22.66	1.66	<.001	19.39, 25.92
	Number of Sessions x ICD2 = 0	.235	.086	.007	.066, .405
	Number of Sessions x ICD3 = 0	-.045	.127	.722	-.295, .204

Note. η^2 = effect size; CPSS = The Child PTSD Symptom Scale; BASC PRS = Behavioral Assessment System for Children-Parent Rating Scale; LPI = The Life Problems Inventory; BASC SRP = Behavioral Assessment System for Children-Self Report of Personality; PERCEIVE = PERceptions of Children Exposed to Interpersonal ViolencE.

4.3. Treatment Outcome as a Function of PTSD Presentation

The present study evaluated whether change over the course of treatment was influenced by baseline levels of PTSD (simple PTSD, 2 ICD Complex PTSD domains, or 3 ICD Complex PTSD domains). The 2 and 3 ICD Complex PTSD domain groups experienced significantly higher symptoms at baseline of PTSD, parent and adolescent reported emotional dysregulation, sense of inadequacy, self-blame, and interpersonal problems than the simple PTSD group. These findings were as expected. Identifying that both complex PTSD groups experienced significantly higher symptoms than simple PTSD supports recognition that even the experience of PTSD plus two areas of dysfunction can lead to significantly higher symptoms overall.

Although in the previous set of analyses we noted overall improvements in functioning, degree of improvement over the course of treatment varied by PTSD presentation (i.e., simple versus complex) for only two outcomes. Hence, we conclude that, although overall changes were demonstrated, PTSD presentation at baseline did not significantly influence degree of improvement per session. For youth who completed treatment, the interaction effect of the rate of change across sessions for PTSD severity indicated that although both the simple PTSD and the 2 ICD-11 domain groups generally improved, the 2 ICD-11 domain group changed at a slower rate. This pattern did not manifest when comparing to ICD-11 criteria for 3 Domains. This partly differs from Sachser and colleagues' finding of parallel slopes of PTSD symptom improvement over the course of TF-CBT (2017). Given the smaller number of youth meeting full ICD-11 criteria (as compared to the simple PTSD and ICD-11 criteria for 2 Domains), the current study may not have been able to detect differences of change for this group.

For the ITT analyses, there was a significant interaction effect for interpersonal relations, in which the youth meeting ICD-11 Criteria for 2 Domains changed at a slower rate than those with simple PTSD; however, in examining the estimated means of the

Table 8
Multilevel Modeling Analyses: Estimated Means by PTSD Level

		Number of Sessions			
		0	12	26	64
PTSD Symptom Severity					
CPSS Total Severity (z-scores)	Simple PTSD	0.42	0.04	−0.41	−1.61
	2 ICD Criteria Met	0.72	0.52	0.29	−0.34
	3 ICD Criteria Met	1.44	1.43	1.41	1.37
Emotion Regulation					
BASC PRS Emotional Self Control	Simple PTSD	55.92	53.90	51.54	45.14
	2 ICD Criteria Met	65.19	61.70	57.64	46.60
	3 ICD Criteria Met	76.94	72.26	66.80	51.99
LPI Emotional Dysregulation (*Adolescents Only; N = 87*)	Simple PTSD	29.34	27.37	25.09	18.88
	2 ICD Criteria Met	40.40	38.38	36.03	29.65
	3 ICD Criteria Met	55.24	53.41	51.27	45.48
Negative Self Concept					
BASC SRP Sense of Inadequacy	Simple PTSD	52.46	51.44	50.25	47.01
	2 ICD Criteria Met	63.40	62.33	61.08	57.69
	3 ICD Criteria Met	78.49	78.49	78.48	78.46
PERCEIVE Self Blame	Simple PTSD	1.20	1.15	1.10	0.95
	2 ICD Criteria Met	3.71	3.22	2.64	1.09
	3 ICD Criteria Met	6.59	5.69	4.65	1.81
Interpersonal Problems					
BASC SRP Interpersonal Relations	Simple PTSD	52.15	52.63	53.18	54.70
	2 ICD Criteria Met	46.60	44.25	41.51	34.07
	3 ICD Criteria Met	23.94	22.14	20.03	14.31

Note. CPSS = The Child PTSD Symptom Scale; BASC PRS = Behavioral Assessment System for Children-Parent Rating Scale; LPI = The Life Problems Inventory; BASC SRP = Behavioral Assessment System for Children-Self Report of Personality; PERCEIVE = PERceptions of Children Exposed to Interpersonal ViolencE. Means presented at baseline (0), average number of sessions completed at mid-treatment evaluation (12), average number of sessions completed at post-treatment evaluation (26), and highest number of sessions completed at post-treatment evaluation (64). *N = 176*.

ITT sample, it appeared that neither complex PTSD group improved over the course of treatment. Although there is significant focus on caregiver-child relationship throughout TF-CBT, this finding could be due to the measure's broader definition of relationships (e.g., including peer relationships) and therefore including areas that are less specifically addressed in treatment. Of note, youth who completed treatment demonstrated clinically-significant improvements (i.e., all group means were in the 'average' range by the end of treatment), suggesting that TF-CBT might be able to address these interpersonal difficulties, with future research identifying mediators for those with complex PTSD. TF-CBT does emphasize emotional regulation and correcting unhelpful trauma-related cognitions regarding the self, which likely explains the consistent findings of improvements in emotion dysregulation and self-blame (as related to the trauma) while not for sense of inadequacy as evaluated by a more general measure of functioning.

4.4. Clinical Implications

Findings from the current study suggest that patients with diverse trauma histories (acute and chronic) and presenting levels of PTSD may experience similar results from participation in TF-CBT, particularly for those who complete treatment. As a result, differentiation between acute and chronic trauma histories and among PTSD presentation is not necessary for the selection of assessment and treatment. Assessment of trauma for clients referred for a mental health problem in the absence of knowledge about trauma remains critical to treatment planning (i.e., assignment to TF-CBT). In contrast, a detailed description of trauma may not be warranted, though specifics about type, frequency, and duration may be useful for tailoring treatment, such as psychoeducation. PTSD assessment at baseline is critical to treatment selection given that TF-CBT was developed as a treatment for CSA-related PTSD. Current findings indicate that the assessment of the ICD definition of complex PTSD also is important as youth meeting this definition report more severe symptoms, some of which improve at a rate slower than simple PTSD. Lastly, findings emphasize the value of repeated assessment over the course of TF-CBT.

The fact that TF-CBT was effective for participants with a variety of backgrounds suggests a number of important clinical implications. First, TF-CBT can be used with clients who have complex trauma histories and complex trauma reactions. Second, the fact that TF-CBT had meaningful outcomes with a range of clients is cost effective in two ways: (1) clients only have to attend one form of short-term therapy to relieve a variety of trauma-related symptoms and (2) clinicians only have to learn one treatment model for child trauma, which saves costs in training time, supervision needs, and requirements for the maintenance of competency. Lastly, the flexibility of TF-CBT can address the diverse type and severity of mental health problems. For example, clients with significant interpersonal effectiveness deficits can be provided with enhanced or additional treatment elements to focus on such needs. Similarly, although assistance with unhelpful trauma-related cognitions like self blame is a major focus of TF-CBT, clients who present with more general feelings of inadequacy may benefit from additional support. More broadly, the study's findings illustrate that youth reporting complex PTSD symptoms may require adjunctive services (e.g., medication, peer group) to fully address their trauma sequelae.

Table 9
Results of Completers Multilevel Modeling Analyses: Moderation of Treatment Effects by PTSD Level

		B	*SE*	*p*	95% CI
PTSD Symptom Severity					
CPSS Total Severity (z-scores) (Cohen's D = .46)	Intercept-ICD 3 Criteria	1.47	.239	<.001	.997, 1.94
	Number of Sessions	.006	.014	.681	-.022, .034
	Simple PTSD (versus ICD2)	-.176	.146	.229	-.464, .112
	Simple PTSD (versus ICD3)	-.883	.203	<.001	−1.28, -.483
	Number of Sessions x ICD2 = 0	-.019	.008	.024	-.035, -.003
	Number of Sessions x ICD3 = 0	-.017	.012	.173	-.041, .007
Emotion Regulation					
BASC PRS Emotional Self Control (Cohen's D = .81)	Intercept-ICD 3 Criteria	73.72	2.80	<.001	68.20, 79.23
	Number of Sessions	-.323	.154	.037	-.627, -.020
	Simple PTSD (versus ICD2)	−9.85	1.63	<.001	−13.06, -6.28
	Simple PTSD (versus ICD3)	−10.49	2.30	<.001	−15.02, -5.96
	Number of Sessions x ICD2 = 0	.172	.090	.059	-.007, .350
	Number of Sessions x ICD3 = 0	.006	.133	.962	-.256, .269
LPI Emotional Dysregulation (*Adolescents Only*) (Cohen's D = .76)	Intercept-ICD 3 Criteria	60.16	4.01	<.001	52.17, 68.15
	Number of Sessions	-.200	.184	.282	-.568, .169
	Simple PTSD (versus ICD2)	−13.43	2.76	<.001	−18.94, -7.92
	Simple PTSD (versus ICD3)	−19.72	3.34	<.001	−26.37, -13.07
	Number of Sessions x ICD2 = 0	.014	.124	.911	-.233, .261
	Number of Sessions x ICD3 = 0	-.084	.157	.592	-.230, .399
Negative Self Concept					
BASC SRP Sense of Inadequacy (Cohen's D = .63)	Intercept-ICD 3 Criteria	77.39	3.15	<.001	71.18, 83.61
	Number of Sessions	.044	.165	.790	-.283, .371
	Simple PTSD (versus ICD2)	−10.79	1.96	<.001	−14.66, -6.93
	Simple PTSD (versus ICD3)	−13.74	2.60	<.001	−18.87, -8.61
	Number of Sessions x ICD2 = 0	-.016	.101	.878	-.215, .184
	Number of Sessions x ICD3 = 0	-.142	.143	.322	-.424, .140
PERCEIVE Self Blame (Cohen's D = .44)	Intercept-ICD 3 Criteria	6.43	.767	<.001	4.92, 7.94
	Number of Sessions	-.071	.047	.133	-.165, .022
	Simple PTSD (versus ICD2)	−2.43	.493	<.001	−3.41, -1.46
	Simple PTSD (versus ICD3)	−2.87	.655	<.001	−4.16, -1.58
	Number of Sessions x ICD2 = 0	.034	.027	.213	-.020, .087
	Number of Sessions x ICD3 = 0	.031	.042	.467	-.052, .113
Interpersonal Problems					
BASC SRP Interpersonal Relations (Cohen's D = .40)	Intercept-ICD 3 Criteria	24.66	2.59	<.001	19.56, 29.77
	Number of Sessions	-.003	.150	.982	-.299, .292
	Simple PTSD (versus ICD2)	5.56	1.61	.001	2.39, 8.73
	Simple PTSD (versus ICD3)	21.56	2.18	<.001	17.27, 25.86
	Number of Sessions x ICD2 = 0	.173	.089	.053	-.002, .348
	Number of Sessions x ICD3 = 0	-.123	.130	.346	-.379, .133

Note. CPSS = The Child PTSD Symptom Scale; BASC PRS = Behavioral Assessment System for Children-Parent Rating Scale; LPI = The Life Problems Inventory; BASC SRP = Behavioral Assessment System for Children-Self Report of Personality; PERCEIVE = PERceptions of Children Exposed to Interpersonal ViolencE.

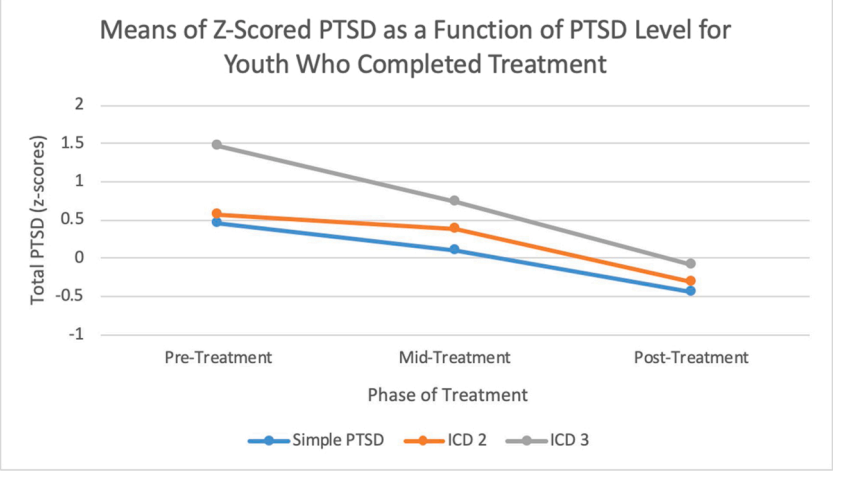

Fig. 4. Means of Z-Scored PTSD as a Function of PTSD Level for Youth Who Completed Treatment.

4.5. Limitations and Future Directions

Our study had several limitations that may impact interpretations of results and inform future studies. First, the measures used to evaluate complex PTSD were measures of convenience; that is, the effectiveness trial from which this sample originated was not created with this study's specific goals. However, given that ICD-11 is very recent, and that the domains of complex PTSD (other than PTSD symptoms) have not been concretely defined, we chose to use these measures to assist in identifying components of complex PTSD, which is similar methodology to other studies of complex PTSD (Perkonigg et al., 2016; Sachser et al., 2017). Further study, including standardized definitions, comparison of measures, and broader use of measures within larger populations may help to identify tools that are most useful and accurate. Second, there is no consensus on the operational definition for the experience of "complex trauma," which has led to the discrepancies that are apparent within the field of research, including the present study. Notably, the sample size was small, precluding the detection of moderating effects that are generally small. Finally, we conducted intent-to-treat analyses to obtain conservative estimates of change, as well as examined effects for youth who completed treatment. Findings were similar to analyses on completers, bolstering our conclusions; however, including a comparison group (treatment as usual, waitlist) would better elucidate the impact of TF-CBT on complex PTSD.

Further directions for research may include hypothesizing other, or more specific, predictors of at-risk or clinical level symptoms at baseline to better understand sample characteristics that could differentiate average from more clinically symptomatic youth and evaluate treatment changes. Future directions also may include understanding mediators or moderators of change, such as parenting behaviors or parent-child relationship. We encourage an empirical examination of the subset of TF-CBT clients who require more than 40 sessions to explore potential moderators and mediators of their treatment course (e.g., engagement, proportion of sessions on specific components, exposure). Finally, this study consisted of a community-based, treatment-seeking sample, and therefore further evaluation using larger samples, both similar in participants as well as other settings and levels of care may be beneficial to determine possible differences between sample presentations and levels of dysfunction.

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