

BASIC RESEARCH ARTICLE



Emotional regulation and alexithymia as mediators in TF-CBT for sexually abused children

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ABSTRACT

Background: Trauma-Focused Cognitive Behavioral Therapy (TF-CBT) is an evidence-based intervention designed to address trauma-related symptoms in children. However, ways changes occur within TF-CBT are still understudied. Alexithymia and emotional regulation could be promising mediators.

Objective: This study evaluated the effectiveness of TF-CBT in reducing post-traumatic stress symptoms (PTSS), dissociation, and internalizing and externalizing difficulties, while also exploring the mediating roles of emotional regulation and alexithymia.

Method: A sample of 234 sexually abused children (mean age = 9.06) received TF-CBT at a Child Advocacy Center. Parents reported on children's dissociation, internalizing and externalizing behaviour problems, emotional regulation, and alexithymia. PTSS were assessed by both parents and clinicians.

Results: Participants showed significant improvements in PTSS ($d = .67$ and 1.61 for parent- and clinician-reported, respectively), dissociation ($d = .62$), and internalizing ($d = .70$), and externalizing ($d = .61$) behaviour problems from pretest to post-test. A series of within-subject parallel mediation models assessed whether changes in emotional regulation and alexithymia were associated to changes in outcomes. Gains in emotional regulation capacities significantly mediated improvements in PTSS, dissociation, and both internalizing and externalizing difficulties. In contrast, alexithymia was a significant mediator only for PTSS reported by clinicians, dissociation and internalizing difficulties, suggesting that reductions in alexithymia were linked to symptom alleviation in these areas. Changes in alexithymia were not significantly related to changes in parent-reported PTSS or externalizing difficulties.

Conclusion: These findings highlight the critical role of emotional regulation in TF-CBT's effectiveness across multiple symptom domains and underscore alexithymia's specific influence on dissociation and internalizing difficulties. Understanding these mediating mechanisms can help refine treatment approaches, leading to more targeted interventions that enhance therapeutic outcomes for sexually abused children.

Regulación emocional y alexitimia como mediadores en la TF-CBT para niños abusados sexualmente

Antecedentes: La Terapia Cognitivo-Conductual Focalizada en Trauma (TF-CBT por su sigla en inglés) es una intervención basada en la evidencia, diseñada para abordar los síntomas relacionados con el trauma en niños. Sin embargo, los mecanismos por los que se producen los cambios en la TF-CBT aún no se han estudiado lo suficiente. La alexitimia y la regulación emocional podrían ser mediadores prometedores.

Objetivo: Este estudio evaluó la eficacia de la TF-CBT para reducir los síntomas de estrés postraumático (SEPT), la disociación y las dificultades de internalización y externalización, a la vez que exploró el papel mediador de la regulación emocional y la alexitimia.

Método: Una muestra de 234 niños abusados sexualmente (edad media = 9,06) recibió TF-CBT en un Centro de Defensa de los Niños. Los padres informaron sobre la disociación, los problemas de conducta de internalización y externalización, la regulación emocional y la alexitimia de los niños. Los SEPT fueron evaluados tanto por padres como por profesionales clínicos.

Resultados: Los participantes mostraron mejoras significativas en los SEPT ($d = .67$ y 1.61 para los síntomas reportados por los padres y por el clínico, respectivamente), la disociación ($d = .62$) y los problemas de conducta internalizantes ($d = .70$) y externalizantes ($d = .61$) desde el pretest hasta el posttest. Una serie de modelos de mediación paralelos intrasujeto evaluaron si los cambios en la regulación emocional y la alexitimia se asociaban a cambios en los resultados. Las ganancias en las capacidades de regulación emocional mediaron significativamente las mejoras en los SEPT, la disociación y las dificultades tanto internalizantes como externalizantes. Por el contrario, la alexitimia fue un mediador significativo solo para los

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Abuso sexual infantil; terapia focalizada en trauma; mediadores; regulación emocional; alexitimia; niños

HIGHLIGHTS

- Trauma-Focused Cognitive Behavioral Therapy significantly reduces trauma-related symptoms including post-traumatic stress, dissociation, and emotional and behavioural difficulties among children receiving treatment in a Child Advocacy Center.
- Emotional regulation plays a key mediating role, explaining how therapy helps children manage distress and improve functioning across multiple outcomes.
- Reductions in alexithymia were associated to recovery, particularly by alleviating dissociation, internalizing symptoms, and clinician-reported PTSS, highlighting the importance of addressing difficulties in identifying and expressing emotions in therapy.

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SEPT reportado por los clínicos, la disociación y las dificultades internalizantes, lo que sugiere que las reducciones en la alexitimia se vincularon al alivio de los síntomas en estas áreas. Los cambios en la alexitimia no se relacionaron significativamente con los cambios en los SEPT reportado por los padres ni en las dificultades externalizantes.

Conclusión: Estos hallazgos destacan el papel crucial de la regulación emocional en la eficacia de la TF-CBT en múltiples dominios sintomáticos y resaltan la influencia específica de la alexitimia en la disociación y las dificultades de internalización. Comprender estos mecanismos de mediación puede ayudar a perfeccionar los enfoques de tratamiento, conduciendo a intervenciones más específicas que mejoren los resultados terapéuticos para niños víctimas de abuso sexual.

1. Introduction

Child sexual abuse is a public health concern that affects around 20% of girls and 15% of boys with rates significantly increasing if online abuse is considered (Cagney et al., 2025; Finkelhor et al., 2024). Although post-traumatic stress disorder (PTSD) is commonly recognized as a primary psychological consequence of sexual abuse, a broader range of sequelae has been documented, such as internalizing and externalizing behaviour problems (Lewis et al., 2016). Person-centered analyses have identified different profiles of symptoms in child victims of sexual abuse, with a fair proportion of children displaying symptoms of psychopathology and/or other socio-affective difficulties that warrant treatment (Alie-Poirier et al., 2020; Hébert et al., 2025).

Trauma-Focused Cognitive Behavioral Therapy (TF-CBT), as developed by Cohen et al. (2006, 2017) is the most extensively evaluated treatment protocol in youth exposed to trauma and considered to be the first-line treatment and one of the most effective therapies for PTSD in youth (Forbes et al., 2020; Hoppen et al., 2025; Mavranouzouli et al., 2020). A systematic review and meta-analysis conducted by Thielemann and colleagues (2022) reviewed empirical work on the effects of TF-CBT on 4,523 participants aged 3–21 years old. Results show a moderate effect of TF-CBT on post-traumatic stress symptoms reduction when compared to any control group, with a small effect compared to treatment as usual and active treatment, and a large effect compared to waitlist conditions. Of note, this meta-analysis also found significant and promising results for PTSS in effectiveness trials, which implies that the treatment application translates well into ‘real world’ settings. Several studies and meta-analyses offer evidence that TF-CBT as well improves secondary outcomes, such as dissociation, internalizing (anxiety and depression, mostly), and externalizing symptoms, and that improvements are stable in the long-term (Hébert & Amédée, 2020; Schreyer et al., 2024; Thielemann et al., 2022, 2024).

TF-CBT integrates elements of behavioural, cognitive, interpersonal, and family therapies (Cohen et al.,

2006, 2017). It comprises three phases: stabilization and skills building, trauma narrative and processing, and integration and consolidation. TF-CBT also includes sequential components that follow the acronym PRACTICE: Psychoeducation and parenting skills (P), Relaxation skills (R), Affective modulation skills (A), Cognitive coping skills (C), Trauma narrative and cognitive processing of the traumatic event (T), In vivo mastery of trauma reminders (I), Conjoint child–parent sessions (C), and Enhancing safety and development (E). Non-offending caregiver involvement is essential, given that caregivers play a critical role in supporting children’s recovery process and maintaining therapeutic gains outside of sessions. By promoting adaptive coping and reducing maladaptive reactions, caregiver involvement becomes a central mechanism supporting children’s recovery (Kliethermes et al., 2025). Although TF-CBT is generally considered a manualized or standardized treatment, it remains a flexible approach that can be tailored to children’s needs (Deblinger et al., 2011). Treatment typically spans over 12–16 sessions and was found to be effective in reducing symptomatology regardless of the number of sessions (Deblinger et al., 2011). Adjustments to the number, length, or sequencing of components may be made as clinically appropriate given the children’s symptoms (Deblinger et al., 2011).

Despite the wealth of studies supporting the efficacy of TF-CBT in reducing symptoms in child victims of sexual abuse and other clinical samples, very little work has explicitly examined *how* therapeutic change occurs during TF-CBT. In their narrative review of psychotherapies for PTSD, Schnyder et al. (2015) identified several possible mechanisms of change, including improvements in emotional regulation, cognitive processes, and the formation of corrective relational bonds. However, evidence-based research has lagged behind in testing these proposed mediators of change. Recently, Protić and colleagues (2024) conducted a systematic review of existing studies on the mediators of change in trauma-focused psychotherapy with youth (ages 10–29). Among the 15 eligible studies, the vast majority of mediators examined

were related to cognitions, while none pertained to emotional processes. Moreover, this review was limited to studies investigating the reduction of PTSD symptom severity only. It is important to identify mediators of change that contribute not only to PTSD symptom reduction but also to the alleviation of secondary symptoms commonly experienced by sexually abused children. Although rarely examined empirically, changes in emotional regulation capacities appear to represent a promising mechanism of change. Emotional regulation has been identified as a transdiagnostic pathway linking various forms of child maltreatment, including sexual abuse, to broad psychopathological outcomes in youth (Weissman et al., 2019).

A recent randomized controlled trial conducted in China extended this literature by examining mediators of change in group-based TF-CBT for children with PTSD (Li et al., 2024). The study identified reductions in maladaptive emotion regulation strategies and improvements in trauma memory quality and resilience as key mediators of symptom reduction, while adaptive emotion regulation strategies did not emerge as significant mechanisms. These findings provide empirical support for emotion- and resilience-related processes as potential pathways of therapeutic change. However, given the group-based format and focus exclusively on PTSD outcomes, the generalizability of these mediational pathways to individual TF-CBT and to broader symptom domains (e.g. internalizing, externalizing difficulties) remains unclear.

In one of the few studies to explore emotional regulation as a mechanism of change in individual TF-CBT, Thornback and Muller (2015) found that among 108 maltreated children aged 7–12 years, the use of maladaptive emotion regulation strategies significantly decreased over the course of treatment. Furthermore, improvements on specific emotion regulation dimensions were associated with reductions in post-traumatic stress symptoms as well as internalizing and externalizing difficulties. Despite these valuable contributions to the literature, the scope of the results is limited by their relatively small sample size, and the fact that the regression analyses were not integrated within a single mediation model. More rigorous analytic approaches are therefore warranted to clarify the influence of emotional regulation to therapeutic change within TF-CBT. The present study addresses this need by examining emotion regulation as a mechanism of change in individual TF-CBT among sexually abused children, using a mediation framework that extends prior group-based and preliminary correlational work.

Alexithymia may also constitute a key mechanism of change, as some evidence have highlighted its role in treatment efficacy. Conceptually, alexithymia reflects a deficit in emotion processing, characterized

by difficulties in identifying, describing, and attending to one's emotional experiences (Sifneos, 1972). A systematic review by Pinna and colleagues (2020) has observed that individuals with elevated alexithymic traits generally demonstrate poorer treatment outcomes. Impairment in emotional clarity, a component of alexithymia, was also found to be a significant predictor of treatment drop-out in a sample of adult meeting the PTSD criteria (Putica et al., 2024). Putica (2024) suggests that alexithymia could potentially interfere with several components of treatment, notably through maladaptive beliefs about emotions being dangerous or uncontrollable or difficulties in maintaining approach-based coping. From this perspective, targeting alexithymia through interventions may have a positive impact on symptom reduction.

While the association between PTSD and alexithymia has been well documented in adult samples (Frewen et al., 2008), comparatively little research has investigated this relationship among children exposed to trauma. Boisjoli and Hébert (2020) observed that children who had experienced sexual abuse reported significantly higher levels of alexithymia than their non-abused counterparts. In a sample of adult women with a history of childhood trauma, reductions in alexithymia across treatment were found to predict decreases in PTSD symptoms, dissociation, and interpersonal difficulties (Zorzella et al., 2020). However, to date, no studies have examined whether similar mechanisms operate among children receiving TF-CBT.

Building on these gaps, the present study aimed to explore alexithymia and emotional regulation as potential mechanisms of change in TF-CBT provided in a Child Advocacy Center. An exploratory approach was adopted given the limited prior empirical work on these mechanisms in TF-CBT, and the naturalistic, and uncontrolled, clinical setting. The first objective was to assess changes in alexithymia, emotional regulation, and clinical outcomes (clinician- and parent-rated PTSS, dissociation, and internalizing and externalizing behaviour problems) from pretest and post-test. It was expected that levels of alexithymia and symptom outcomes will decrease following participation in TF-CBT, whereas emotional regulation skills would improve. The second objective was to determine whether change in alexithymia and emotional regulation between pre- and post-test may mediate improvements in clinical outcomes over the course of treatment.

2. Methods

2.1. Participants and procedures

Children and their non-offending parents were recruited in a Child Advocacy Center located in Montreal, Quebec, Canada that offers specialized services

for child victims of sexual abuse and their family. Inclusion criteria were to be aged between 6 and 12 years old, to have experienced a substantiated sexual abuse, and to be accompanied by a non-offending caregiver. Children who had a diagnosis of intellectual deficiency were excluded. For the present study, only children who received TF-CBT were included.

Of the 362 participants that were initially recruited, 284 were given TF-CBT. Others were either not referred to treatment ($n = 19$), referred to another treatment modality, such as group therapy ($n = 20$), or dropped out of the study after intake ($n = 39$). All participants completed questionnaires at intake, while 244 (85.92%) participated in the post-test assessment. The number of sessions ranged between 2 and 45 ($M = 13.49$; $SD = 6.19$). Among those who were lost to follow-up, 28 discontinued therapy, while the remaining completed treatment, but did not complete the post-test assessment ($n = 12$). Ten dyads were excluded from the final sample because they had missing data on all variables of interest. Figure 1 presents a flowchart of the sample selection.

The analyzed sample consists of 234 dyads of child victims of sexual abuse and their non-offending caregiver. The mean age of children was 9.06 ($SD = 1.78$) and 69.7% ($n = 163$) were girls. Most caregivers were biological or adoptive mothers (69.7%). Other caregivers were biological or adoptive fathers (12.4%), foster parents (10.7%), a professional or legal tutor (3.9%), or another family member (3.4%). Almost

three quarter of the participants (67.9%) had an annual familial income of less than \$60K CAN. Approximately three on four children (75.2%) were sexually abused by a family member, 81.6% sustained multiple episodes of sexual abuse, and 54.7% were victims of penetration or an attempt of penetration.

Parents completed questionnaires at pretest and again after their child's completion of treatment with the help of a trained research assistant. Questionnaires were either administered in French or in English. Participants were informed that their refusal to participate in this study would not impact the quality of services they would receive. Written informed consent was obtained for all children and caregivers. The ethical approval for this study was given by the Centre Hospitalier Universitaire (CHU) Sainte-Justine and the Université du Québec à Montréal Ethics Boards.

2.2. Measures

2.2.1. Child Behavior Checklist

The Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2007) is a widely used, psychometrically sound clinical tool that assesses emotional and behavioural problems in children aged 6–18 years old. The checklist consists of 113 items referring to various behaviours. Parents are asked to report how frequently their child displays each of the behaviours on a three-point scale (0 = not true, 1 = somewhat or sometimes true, or 2 = very true or often true). The internalizing

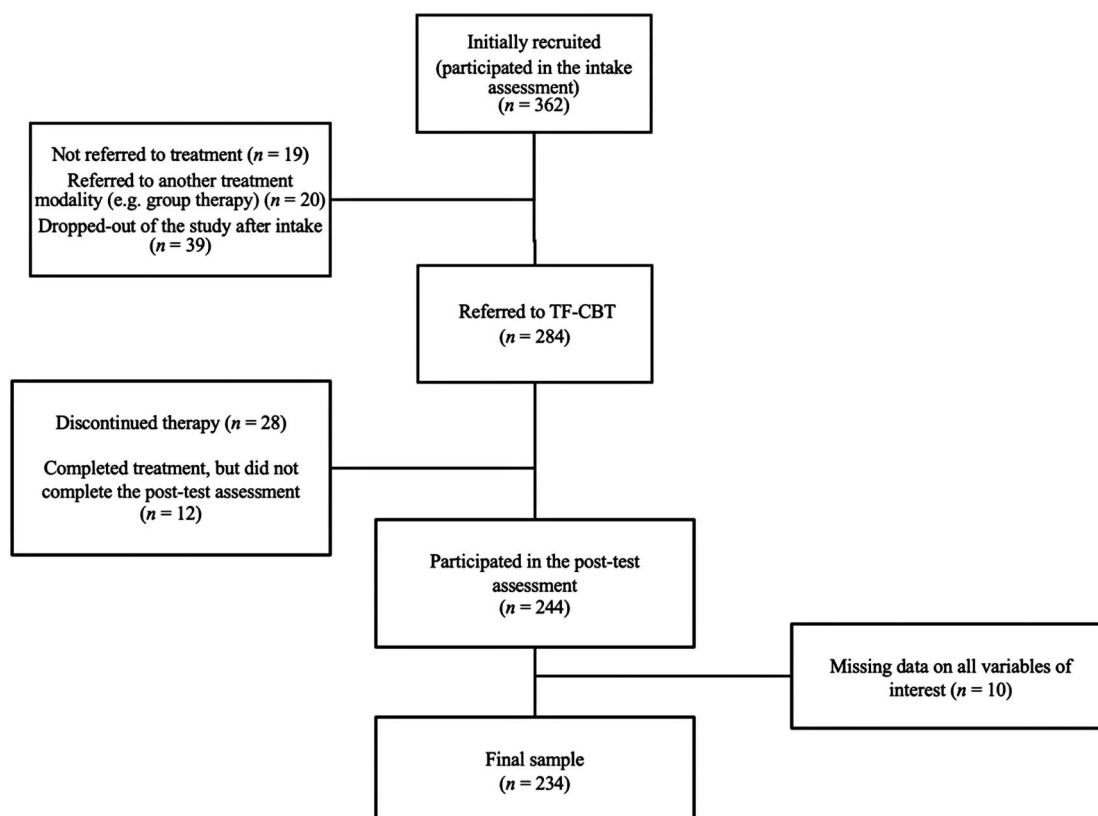


Figure 1. Participant flowchart.

and externalizing subscales of the CBCL were used to evaluate children's levels of internalizing and externalizing difficulties. Scores for both scales were standardized into T-scores. McDonald's omega ranged between $\omega = .88$ (pretest) and $.89$ (post-test) for the internalizing subscale, and from $\omega = .91$ to $.92$ for externalizing subscale.

The CBCL also provides scales referring to Diagnostic and Statistical Manual of Mental Disorders (DSM) diagnoses. The PTSD DSM-5-oriented scale from the CBCL (Achenbach & Rescorla, 2007) was used to assess children's level of post-traumatic stress symptoms. The scale comprises 14 items of the original instrument and yields a total score of 0–28, with a higher score indicating a greater symptom severity. The scale showed a good internal consistency in this sample at both time points ($\omega = .81$ and $\omega = .85$).

2.2.2. Kiddie Schedule for Affective Disorders and Schizophrenia

Clinicians assessed children's PTSS with the Kiddie Schedule for Affective Disorders and Schizophrenia for school-age Children (K-SADS-PL DSM-5; Kaufman et al., 2016). The K-SADS is a clinician administered semi-structured diagnostic interview and draws on information collected from both the child and accompanying caregiver. The K-SADS was conceived to support the diagnosis of many mental health disorders, but in this study, only the PTSD scale was used. Clinicians rated the presence (1) or absence (0) of 21 symptoms related to PTSD. A cumulative score ranging for 0–21 was calculated by summing the symptoms to reflect the number of symptoms displayed by children. As this scale was developed for the purpose of the current study, and is not validated, the analyses conducted with this variable are exploratory. The McDonald's omega for this measure was $\omega = .84$ at pre-test and $\omega = .78$ at post-test.

2.2.3. Child Dissociative Checklist

The French adaptation (Hébert & Parent, 2000) of the Child Dissociative Checklist (Putnam et al., 1993) was completed by parents and assessed their child's manifestations of dissociation. The scale comprises 20 items rated on a three-point scale (0 = Not true, 1 = Somewhat or sometimes true, 2 = Very true), which yields a total score ranging from 0 to 40. Internal consistency was adequate (from $\omega = .81$ to $.82$ for both assessment times).

2.2.4. Children's Alexithymia Measure

The French version (Hébert et al., 2021) of the Children's Alexithymia Measure (CAM; Way et al., 2010) was completed by parents to assess their child's level of alexithymia. The measure contains 14 items that can be answered on a four-point Likert scale (0 = almost never to 3 = almost always). As alexithymia

appears to be a dimensional rather than a categorical construct, a continuous score was computed by summing scores on all items (0–42). A higher score indicates heightened alexithymia, or a greater difficulty in identifying and expressing emotions. The internal consistency of the scale was excellent in this sample ($\omega = .92$ and $.91$).

2.2.5. Emotional Regulation Checklist

Caregivers evaluated children's emotional regulation using the Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1997). The scale is composed of 24 items rated on a 4-point Likert Scale (0 = never to 3 = almost always). Items pertain to both emotional regulation competencies and dysregulation. Following the method described by Shields and Cicchetti (1997), an emotional regulation competency total score was derived to yield a total score ranging from 0 to 72. Higher scores reflect good emotional regulation competencies, whereas lowers scores are indicative of emotional dysregulation. Internal consistency was high at both assessments ($\omega = .84$ and $.85$).

2.3. Statistical analysis

The missingness pattern was explored through the Little's Missing Completely at Random (MCAR) test, which revealed that data may be missing completely at random ($\chi^2 = 109.97$, $df = 98$, $p = .192$). To prevent potential bias in the missingness patterns, participants who completed both assessments ($n = 244$) were compared to those who did not complete post-test assessment or were excluded from the final sample ($n = 40$) on sociodemographic (child's age, gender) and abuse characteristics, and baseline values of mediator and outcome variables. None of the tested variables were found to differ significantly between the groups.

Pretest and post-test levels of treatment outcomes (PTSS, dissociation, internalizing and externalizing problems) were compared using a series of paired-sample t-tests. Paired-sample t-tests were also conducted to evaluate the difference at intake and discharge for the hypothesized mechanisms of change (alexithymia and emotional regulation). Cohen's d was used to measure effect sizes, and the following interpretation guidelines were used: small ($d = 0.20$), medium ($d = 0.50$), and large ($d \geq 0.80$).

To identify mechanisms of change, a series of five within-subjects mediation analyses were conducted using the method developed by Montoya and Hayes (2017) for mediation with repeated-measures designs. The mediation analyses were conducted with the MEMORE (Mediation and Moderation for Repeated Measures) macro in SPSS (Montoya & Hayes, 2017). In this model, the mediators are conceptualized as the difference between pretest and post-test levels of the mediators (or posited

mechanisms of change, namely emotional regulation and alexithymia), and the dependent variable is the difference between the outcome measurement in the two conditions (pre-test and post-test). In cases like such, when all participants are subjected to the same intervention, the independent variable is posited to be the passage of time, rather than the condition (e.g. treatment vs. control). These mediation analyses are hence exploratory and intended to generate hypotheses for future controlled studies. Therefore, results were reported unadjusted, and caution should be exercised when interpreting results. This method extends to the previous work of Judd et al. (2001) by allowing the inclusion of multiple parallel mediators. The significance of the indirect effects, total effects and direct effects were determined with the 95% confidence intervals (CIs) for the indirect effects through a 5000 percentile bootstrapped samples. A significant effect is determined by a 95% confidence interval excluding zero.

3. Results

3.1. Changes from pretest to post-test

Results of the paired t-tests are displayed in Table 1. Participants showed a significant improvement on all outcomes examined, namely parent- and clinician-reported PTSS, dissociation, and internalizing and externalizing difficulties following their participation to TF-CBT. Regarding the potential mediators of change, children showed a significant improvement of their emotional regulation capacities and a reduction of their alexithymia levels from pretest to post-test. Moreover, all effects were of moderate size, with the exception of clinician-reported PTSS, which was large.

3.2. Mediators of change

Correlations between mediators and outcomes at pretest were tested to illustrate baseline associations. Alexithymia was significantly and positively correlated

with all studied outcomes, with r s ranging from .36 to .50 (p s < .001). The correlations between emotional regulation and outcomes at pretest were all negative and significant, ranging from $r = -.33$, $p < .001$ for clinician-reported PTSS to $r = -.68$, $p < .001$ for externalizing difficulties.

A series of five parallel mediations were tested, one for each examined outcome, with both posited mediators included in the model at once (alexithymia and emotional regulation). Results are illustrated in Figures 2–6. For all studied outcomes, indirect effects of emotional regulation excluded zero, and were found to be significantly linked to a change in outcomes. In other words, an increase in emotional regulation skills was observed through the course of treatment, which was associated to a decrease in PTSS (reported by both clinician and parent), dissociation, and both internalizing and externalizing difficulties, from pretest to post-test. Additionally, the indirect effects through alexithymia for dissociation, internalizing difficulties, and clinician-reported PTSS were found to be significant upon inspection of the bootstrapped 95% confidence intervals. Children showed a reduction in alexithymia levels between pretest and post-test, which was then associated to a decrease in those symptoms. Change in alexithymia was not significantly related to changes in parent-reported PTSS and externalizing difficulties.

4. Discussion

TF-CBT is well established as an evidence-based treatment (Forbes et al., 2020). Despite numerous published studies attesting to its effectiveness for youth who have experienced various forms of trauma (e.g. sexual abuse, exploitation), few investigations have explored the possible mechanisms of change. This study sought to explore the role of two hypothesized mechanisms in a sample of child victims of sexual abuse receiving TF-CBT in a Child Advocacy Center, with the aim of generating preliminary insights to inform future research.

Table 1. Results of t-tests comparing pretest and post-test scores of hypothesized mediators and outcomes.

Variable	Pretest		Post-test		<i>df</i>	<i>t</i>	<i>p</i> value	Cohen's <i>d</i> [95% CI]
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Mediators								
Alexithymia	14.89	9.47	10.26	7.90	224	8.08	< .001	.54 [.40, .68]
Emotional regulation	47.46	10.09	52.23	9.55	221	−8.77	< .001	.59 [−.73, −.45]
Outcomes								
PTSS (CBCL)	9.28	5.01	6.30	4.73	218	9.97	< .001	.67 [.53, .82]
PTSS (K-SADS)	9.65	4.64	2.89	3.05	190	22.25	< .001	1.61[1.39, 1.82]
Dissociation	7.78	5.77	4.65	4.63	227	9.42	< .001	.62 [.48, .77]
Internalizing behaviour problems	61.79	11.14	54.74	11.66	218	10.31	< .001	.70 [.55, .84]
Externalizing behaviour problems	61.86	10.56	56.75	10.90	217	9.00	< .001	.61[.46, .75]

Note: PTSS = Post-traumatic stress symptoms; CBCL = Child Behavior Checklist; K-SADS = Kiddie Schedule for Affective Disorders and Schizophrenia; CI = Confidence intervals.

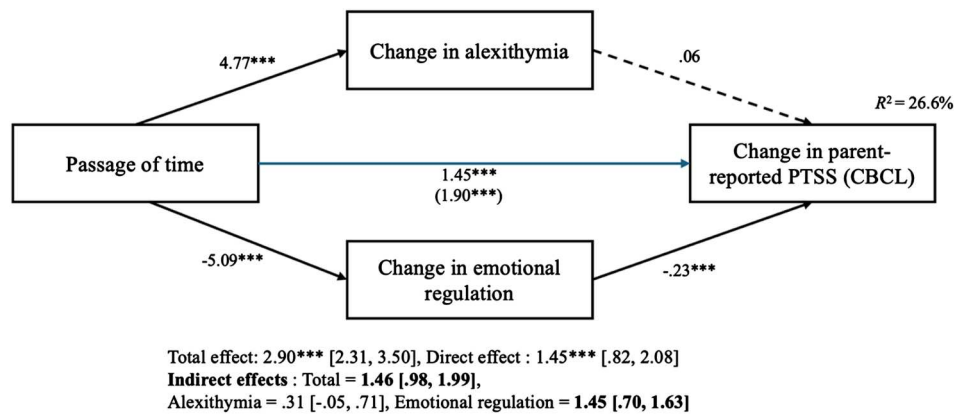


Figure 2. Within-subjects mediation of treatment outcomes for post-traumatic stress symptoms reported by parents (CBCL). Note: Significant indirect effects are indicated in bold. *** $p < .05$, ** $p < .01$, *** $p < .001$, [95% confidence intervals].

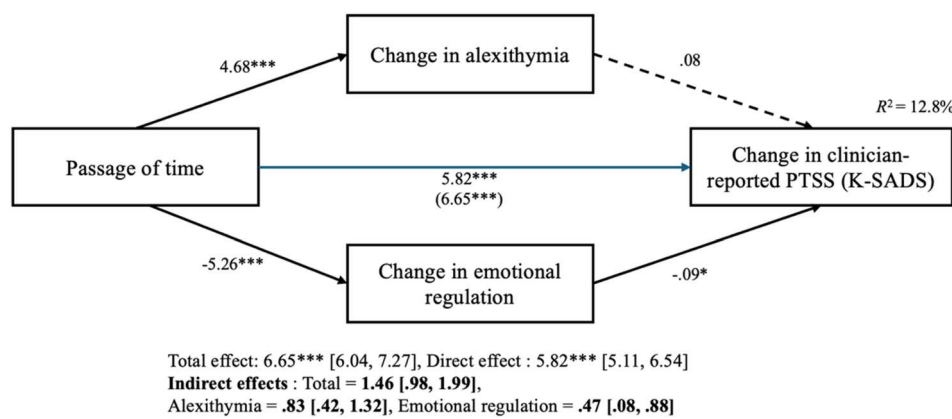


Figure 3. Within-subjects mediation of treatment outcomes for post-traumatic stress symptoms reported by clinicians (K-SADS). Note: Significant indirect effects are indicated in bold. *** $p < .05$, ** $p < .01$, *** $p < .001$, [95% confidence intervals].

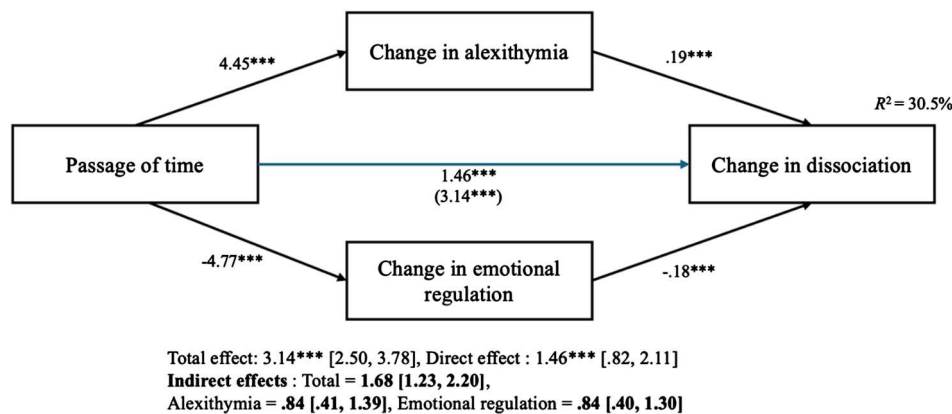


Figure 4. Within-subjects mediation of treatment outcomes for dissociation. Note: Significant indirect effects are indicated in bold. *** $p < .05$, ** $p < .01$, *** $p < .001$, [95% confidence intervals].

Participants showed a significant reduction of post-traumatic stress symptoms, dissociation, and behavioural problems from pretest to post-test. The observed improvements across all clinical outcomes are consistent with the robust empirical support for TF-CBT as an effective intervention for trauma-exposed children. The moderate to large effect sizes further indicate that changes were not only statistically

significant but also clinically meaningful. Of note, our results also reveal that participants displayed significant improvements in emotional regulation skills and lower levels of alexithymia following their participation to TF-CBT. These findings reinforce the notion that TF-CBT facilitates a broad therapeutic impact by addressing both trauma-specific and general emotional and behavioural difficulties.

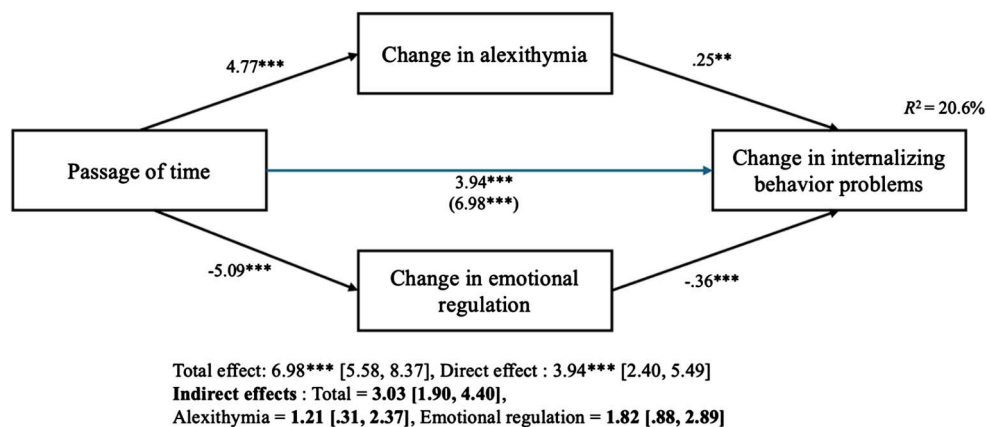


Figure 5. Within-subjects mediation of treatment outcomes for internalizing behaviour problems. Note: Significant indirect effects are indicated in bold. *** $p < .05$, ** $p < .01$, *** $p < .001$, [95% confidence intervals].

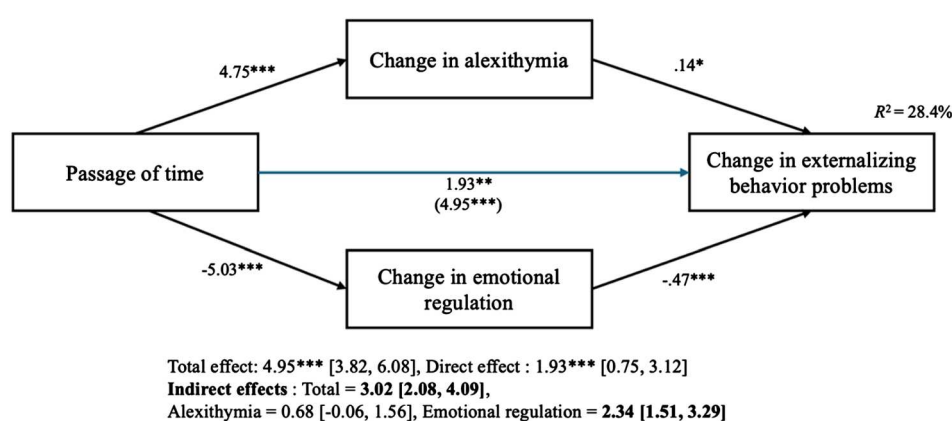


Figure 6. Within-subjects mediation of treatment outcomes for externalizing behaviour problems. Note: Significant indirect effects are indicated in bold. *** $p < .05$, ** $p < .01$, *** $p < .001$, [95% confidence intervals].

Our results suggest that improvements in emotion regulation capacities appear to be a central mechanism through which these benefits were achieved. TF-CBT includes components designed to enhance emotional awareness, labelling, and modulation such as psychoeducation, relaxation, affective modulation training, and cognitive coping skills (Cohen et al., 2006, 2017). Through these components, children likely gained tools to better identify emotional states, tolerate distress, and employ adaptive coping strategies. Enhanced regulatory capacities, in turn, may have enabled children to process traumatic memories more effectively during exposure, thereby reducing the emotional intensity associated with traumatic reminders. This interpretation aligns with transdiagnostic models positing emotion regulation as a pathway linking trauma exposure to diverse psychological symptoms (Weissman et al., 2019).

The finding that alexithymia also emerged as a mediator for several outcomes, namely dissociation, internalizing difficulties, and clinician-reported PTSS, underscores the role of emotion processing capacities in recovery. Sexually abused children often struggle to recognize or verbalize their emotional

experiences and tend to be more alexithymic than non-abused children (Boisjoli & Hébert, 2020). Alexithymia contributes to the use of maladaptive strategies and reactions to cope with intense emotions, such as affect avoidance and dissociation (De Berardis et al., 2020; Reyno et al., 2020). By helping children gain understanding of their bodily sensations and to relate them to emotional states, TF-CBT may reduce alexithymia, fostering greater emotional regulation and integration. Improvements in alexithymia may have been especially relevant for dissociative and internalizing behaviour problems, as both are closely tied to deficits in emotional awareness and expression (Kranzler et al., 2015; Reyno et al., 2020).

Results also suggest differential pathways for internalizing and externalizing difficulties. The absence of a significant effect of alexithymia on externalizing behaviours may imply that changes in internalizing symptoms rely both on gains in emotional awareness (alexithymia) and emotional regulation, while improvements in externalizing symptoms are more strongly tied to gains in emotional regulation. Alexithymia primarily reflects deficits in emotional awareness and verbalization, which are more directly related

to internalizing symptoms (e.g. anxiety, withdrawal, dissociation, somatization) than to externalizing or behavioural difficulties. Externalizing difficulties, on the other hand, could be more directly improved through the acquisition of skills to modulate behavioural responses and impulses through the behavioural components and parental training skills of TF-CBT (Deblinger et al., 2011). Although alexithymia was found to predict both internalizing and externalizing symptoms in a sample of child victims of CSA (Boisjoli et al., 2019), emotional regulation may account for the variance in externalizing difficulties that alexithymia would otherwise explain.

Emotion regulation and alexithymia, while related, represent distinct mechanisms. Regulation involves the modulation of emotional responses once identified, whereas alexithymia reflects difficulty in recognizing and labelling them in the first place. TF-CBT places substantial emphasis on regulatory skills (e.g. relaxation, cognitive coping, gradual exposure), which may exert a more immediate impact on symptom reduction. In contrast, improvements in alexithymia may unfold more gradually, serving as a precursor rather than a concurrent mediator of change (Putica, 2024). Alexithymia reflects foundational deficits in emotional awareness, identification, and labelling, which constitute prerequisites for the effective deployment of regulatory strategies. Longitudinal research with multiple assessment points could clarify whether reductions in alexithymia eventually facilitate clinical gains.

4.1. Limitations and future studies

Some limitations of the present study need to be considered. Perhaps the most salient one is the absence of a comparison or control group, which prevents us from conclusively determining that improvements are attributable to TF-CBT, rather than alternative explanations. Natural passage of time may account for symptom reductions insofar as some trauma-related difficulties may attenuate spontaneously as children develop greater cognitive, emotional, and contextual resources, independent of intervention. Non-specific therapeutic factors such as therapeutic alliance, caregiver engagement, expectancy effects, or increased structure and attention may also contribute to observed improvements regardless of the specific TF-CBT components delivered. Finally, regression to the mean may contribute to observed improvements, as children entering the study with high baseline symptom levels may show subsequent reductions over time due to statistical fluctuation rather than intervention-related change. Although the mediational analyses used in this context cannot establish causal mechanisms, they provide preliminary and exploratory information about

associations in change processes that may inform future controlled studies.

Second, most mediators and outcomes used were caregiver-reported, which raises concerns for shared method variance and caregiver bias. Future studies would benefit from multi-informant designs incorporating child self-reports and observational or clinician-rated measures as developmentally appropriate. The PTSS scales used in this study are not the most psychometrically sound instruments available. Because the PTSD scale derived from the K-SADS lacks formal validation, its reliability and sensitivity to change are uncertain, which may introduce measurement error and limits the interpretability of observed symptom change and mediation effects; accordingly, these findings should be considered exploratory and interpreted with caution. Although imperfect, two measures of PTSS were included in the study to help mitigate this drawback. Future research is needed with more robust PTSD instrument to support these exploratory analyses. Additionally, the study included only two assessment points, whereas the gold standard for establishing temporality in mediation analysis involves measuring potential mediators at a midpoint assessment. The study could also be improved by implementing measures at the end of each of the three phases of treatment. Our design does not allow us to determine how one process of change influences another. Future research would benefit from adopting longitudinal and multi-wave designs to determine whether improvements in alexithymia precede gains in emotion regulation, thereby clarifying their sequential influence on recovery. Although participants who completed both assessments and those who dropped out of the study did not differ on the clinical indicators included in the study, these two groups could differ on other clinical indicators that were not assessed, such as family instability, or treatment engagement. Future studies should integrate moderators, or at least control variables, to account for individual (e.g. age, severity, and chronicity of the sexual abuse experienced), familial (e.g. parental engagement), and therapeutic factors (e.g. number of sessions). Such efforts would advance a more nuanced understanding of how and for whom TF-CBT exerts its therapeutic effects, ultimately informing refinements to enhance its efficacy and reach.

4.2. Conclusion

Despite these limitations, the study provides some preliminary insights into mediators in TF-CBT. Overall, our findings highlight that TF-CBT's efficacy may, in part, be explained by its capacity to strengthen children's ability to recognize, label, and regulate emotions. Thus, the findings of the present study underscore the importance of addressing both

regulatory and processing dimensions of emotion within trauma-focused interventions for sexually abused children.

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Consent to participate

Informed consent was obtained from all individual participants included in the study.

Data availability statement

The data that supports the findings of this study are available from the corresponding author [MH], upon reasonable request.

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