



BASIC RESEARCH ARTICLE



Living under threat: adolescents' continuous traumatic stress reactions in relation to violence exposure

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ABSTRACT

Background: Adolescents exposed to violence are at a higher risk for mental health problems than their peers. Exposure to ongoing violence can potentially lead to Continuous Traumatic Stress (CTS). CTS reactions have never been studied in relation to violence exposure in adolescent samples.

Objective: We aimed to validate the Lithuanian version of the Continuous Traumatic Stress Response (CTSR) scale in the adolescent sample, to explore the adolescents' CTS reactions using the person-oriented approach, and to study the relationship between different types of violence and CTS reactions.

Method: In total, 321 adolescents ($M(SD)_{age} = 14.19 (1.26)$) from Lithuania were included in the current study, of which 181 (56.4%) were female, 135 (42.1%) were male, and 54.5% ($n = 175$) were continuously exposed to violence over their lifetime. Confirmatory factor analysis (CFA) with measurement invariance across genders and age groups was used to test the structural validity of the CTSR scale. A latent class-analysis approach was used to explore the patterns of CTS reactions.

Results: The results showed good structural, convergent, and differential validity of the CTSR scale. Exhaustion/Detachment, Rage/Betrayal, and Fear/Helplessness were more profound in continuous violence exposure versus non-exposure groups, with even higher CTS reactions when recently exposed to violence. Three groups of adolescents with *low*, *moderate*, and *high* CTS reactions were distinguished with the suggested cut-off sum score of CTSR ≥ 18 for severe CTS reactions. The intensity of exposure to neglect, psychological abuse, physical abuse, and sexual abuse positively predicted Continuous traumatic stress (CTS) response group membership.

Conclusions: These results stress the need for psychological support when exposed to continuous interpersonal violence in adolescence.

ARTICLE HISTORY

Received 30 October 2024

Revised 7 March 2025

Accepted 10 March 2025

KEYWORDS

Continuous traumatic stress; adolescence; violence; abuse; neglect

PALABRAS CLAVE

Estrés traumático continuo; adolescencia; violencia; abuso; negligencia

HIGHLIGHTS

- 8.4% of adolescents experienced severe Continuous traumatic stress (CTS) reactions.
- Exposure to different types of violence might trigger CTS reactions in adolescents.
- When exposed to more violence, there is a higher probability of severe CTS.

Viviendo bajo amenaza: las reacciones de estrés traumático continuo en adolescentes asociadas a la exposición a violencia

Antecedentes: Los adolescentes expuestos a violencia se encuentran en mayor riesgo de desarrollar problemas de salud mental que sus pares. La exposición a violencia continua podría, potencialmente, llevar a un estrés traumático continuo (ETC). Las reacciones de ETC no han sido estudiadas con anterioridad en relación con la exposición a violencia en muestras de adolescentes.

Objetivo: Validar la versión lituana de la escala de respuesta de estrés traumático continuo (CTSR por sus siglas en inglés) en una muestra de adolescentes, explorar las reacciones de ETC en adolescentes empleando un enfoque orientado en la persona, y estudiar la relación entre los diferentes tipos de violencia y las reacciones de ETC.

Métodos: En total, 321 adolescentes de Lituania (edad promedio = 14,19 años; desviación estándar = 1,26) fueron incluidos en el estudio, de los cuales 181 (56,4%) eran mujeres, 135 (42,1%) eran varones y el 54,5% ($n = 175$) eran expuestos de forma continua a violencia a lo largo de su vida. Para evaluar la validez estructural de la escala CTSR se empleó un análisis factorial confirmatorio con invariancia de medida entre géneros y grupos de edad. Para explorar los patrones de reacciones de ETC, se empleó un análisis de clases latentes.

Resultados: Se encontró una buena validez estructural, convergente y diferencial para la escala CTSR. El agotamiento/desapego, ira/traición y miedo/desesperanza fueron más profundos en la exposición a violencia continua en comparación con los grupos no expuestos, con reacciones de ETC incluso más intensas ante la exposición reciente a violencia. Se distinguieron tres grupos de adolescentes con reacciones de ETC leves, moderadas y severas empleando el punto de corte sugerido de un puntaje en la escala CTSR ≥ 18 para reacciones de ETC severas. La intensidad de la exposición a negligencia, abuso psicológico, abuso físico y abuso sexual predijo de forma positiva el pertenecer al grupo con una respuesta de ETC.

Conclusión: Estos resultados enfatizan la necesidad de soporte psicológico ante la exposición a violencia interpersonal continua durante la adolescencia.

1. Introduction

Adolescence is a critical developmental period marked by significant physical, emotional, and psychological changes (Sawyer et al., 2018). Yet, for many, it can also be a time of experiencing various traumatic events, particularly violence, encompassing abuse and neglect (UNICEF, 2023). A systematic review of the prevalence of past-year violence against children and adolescents (2–17 years) found that, at minimum, 50% experienced violence globally (Hillis et al., 2016). In European adolescent studies, physical abuse was reported by 19–76% of adolescents, psychological abuse – by 16–83%, neglect – by 6–48%, and sexual abuse by 1–40% of girls and 3–23% of boys (Hafstad et al., 2020; Jernbro & Janson, 2016; Kloppen et al., 2016; Mohler-Kuo et al., 2014; Nikolaidis et al., 2018). In Lithuania, 71% of adolescents reported at least one type of violence (physical, psychological, sexual abuse, or neglect) over their lifetime in a large-scale study of a sample closely resembling the general Lithuanian adolescent population (Zelviene et al., 2020).

The experience of abuse during formative years can have profound effects on adolescents, shaping their sense of self, relationships, and future developmental trajectories (Cicchetti, 2016). Children and adolescents surviving violent experiences are at a significantly higher risk for internalizing and externalizing problems than their peers (Jaffee, 2017). The research broadly documented the elevated risk for depression and anxiety disorders, self-injury and suicide attempts, conduct disorder, increased aggression, delinquency, antisocial behaviour, problematic sexual behaviour, substance use (Gilbert et al., 2009; Hodges et al., 2013; Lewis et al., 2019; Vachon et al., 2015; Vibhakar et al., 2019), as well as a reduction in learning skills and educational achievements (McLaughlin & Lambert, 2017; Perfect et al., 2016). The risk for mental health and social problems following childhood abuse experiences extends to adulthood (Jaffee, 2017; Kessler et al., 2010). Adult survivors of childhood abuse are at higher risk for various mental health disorders, physical health problems, violent and criminal behaviour, lower education, and unemployment (Danese et al., 2009; Gilbert et al., 2009; Kessler et al., 2010; Norman et al., 2012; Thoresen et al., 2015). Moreover, posttraumatic stress reactions are among the most commonly documented conditions in adolescence and adulthood related to experienced childhood abuse (Cloitre et al., 2019; McLaughlin et al., 2017; Nooner et al., 2012). However, posttraumatic stress should be measured a month after exposure to a traumatic event has ended (World Health Organization, 2018), but the experiences of violence in childhood are usually continuous (Hodges et al., 2013). Therefore, there is a lack of understanding about the traumatic stress reactions of

children and adolescents continuously exposed to abuse and neglect.

Continuous exposure to traumatic events, particularly in the context of ongoing violence, can lead to Continuous Traumatic Stress (CTS) (Eagle & Kaminer, 2013), which potentially could have significant implications for adolescent development and well-being. CTS symptoms can occur when trauma exposure is still ongoing and when the individual anticipates it in the future (Eagle & Kaminer, 2013). CTS places considerable significance upon the lack of a clear resolution or escape from the traumatic context and continuous anticipatory anxiety regarding realistic threatening situations and its impact (Stevens et al., 2013). CTS manifestation can be described by the temporal location of the stressor conditions being focused on the present and future trauma, as opposed to focusing on the past trauma, as in the case of Post-traumatic stress disorder (PTSD) and Complex PTSD (CPTSD). Furthermore, individuals experiencing continuous traumatic stress may have difficulties discerning between real and imagined threats, and there may also be a clear absence of external protective systems (Eagle & Kaminer, 2013). It is important to note that while people with CTS may exhibit changes in arousal and reactivity, negative cognitions and mood, as well as radical avoidance, they do not report experiencing any intrusive symptoms or flashbacks, as it would be in the cases of PTSD or CPTSD (Somer & Ataria, 2015). These findings demonstrate the need to research CTS as a separate reaction to trauma exposure from PTSD or CPTSD.

Continuous Traumatic Stress was first described in the context of directly observing war or conflict-affected individuals and was understood to occur when a substantial and long-lasting danger was present (Eagle & Kaminer, 2013; Farajallah, 2022; Somer & Ataria, 2015). More recently, studies also show that CTS may be prevalent in ongoing interpersonal violence cases, such as among victims of intimate partner violence (Hulley et al., 2023) or in cases of gender-based violence (Potluri & Patel, 2021). Therefore, a better understanding of CTS reactions in these cases is fundamental to providing efficient treatment to victims of abuse and neglect. However, there is still a significant lack of studies on CTS reactions among adolescents exposed to violence. Research shows that ongoing violence in adolescents, especially physical abuse, can lead to various adverse psychological and cognitive reactions (Agbaria et al., 2021; Pfeiffer et al., 2024; Yochman & Pat-Horenczyk, 2020), stronger repetitive aggression among boys (Hinsberger et al., 2016) and higher suicidality rates (Shi et al., 2024). Nonetheless, the majority of studies are retrospective and focuses on adverse reactions to violence exposure after it has already finished. A better understanding of violence in adolescents and their

CTS reactions would allow us to tailor more appropriate treatment to reduce psychological distress and foster resilience (Nuttman-Shwartz, 2019).

However, understanding and adequately assessing CTS reactions in adolescents exposed to violence is challenging due to the lack of widely validated instruments to measure continuous traumatic stress, as research in this field is still emerging. To our knowledge, one of the more frequently used instruments is the Continuous Traumatic Stress Response scale (Goral et al., 2021), which was previously used mainly to measure CTS reactions in war zones (Goral et al., 2021; Zasiiekina et al., 2024), and has not yet been adapted to measure CTS reactions after domestic violence such as abuse or neglect. With this study, we aimed to validate the Lithuanian version of the Continuous Traumatic Stress Response scale and adapt it to use in adolescent population samples. Also, we sought to understand better the continuous traumatic stress reactions in adolescence by using the person-oriented approach, allowing to identify the distinct patterns of these reactions (Bergman & Magnusson, 1997). Furthermore, we aim to study the relationship between CTS reactions and different types of violence.

2. Method

2.1. Participants and procedures

This study was approved by the Vilnius University Committees on Research Ethics (approval No. (1.13 E)250000-KT-16, 22 January 2024). The study was conducted in public schools participating in the violence prevention programme 'We Are Safe.' The current study's data were collected before the start of the programme. In total, eight schools from different regions of Lithuania participated in the study. Students aged 13–17 from at least two classes from each school were invited to participate in the study, and informed consents were obtained from parents/guardians and students. Overall, 429 students were invited to participate in this study – 86.2% of them provided parental consent, and 74.8% fully completed the survey. All students were asked to complete the study survey in the classroom using their mobile devices or school computers, with only students and researchers present in the classroom in order to ensure confidentiality. Researchers informed the students about the aims of this study and were ready to answer any questions the students may have or deal with any emotional reactions to ensure the safety and well-being of participants. All data were collected in February of 2024 using the secure online survey platform *Limesurvey*.

In total, 321 participants were included in the current study ($M(SD)_{age} = 14.19 (1.26)$), of which 181 (56.4%) were female and 135 (42.1%) were male. Over half (53.3%) of participants were from urban

Table 1. Sociodemographic characteristics of the study sample ($N = 321$).

	<i>n</i>	%
Gender		
Female	181	56.4
Male	135	42.1
Other	5	1.6
Age		
Mean (SD)	14.19 (1.26)	
Age range	13–17	
Age group		
Early adolescents (7th grade)	171	53.3
Middle adolescents (9th–10th grade)	150	46.7
Residence		
Urban	171	53.3
Rural	150	46.7
Living situation		
With both parents	239	74.5
Lives alternately with one parent	15	4.7
With one parent	66	20.6
With other relatives	1	0.3
Parent education		
Both have higher education	146	45.5
One has a higher education	79	24.6
None had higher education	19	5.9
Doesn't know	77	24.0
Parent employment		
Both employed	274	85.4
One employed	39	12.1
Both are un-employed	5	1.6
Doesn't know	3	0.9
Family's financial situation		
Worse than other families	6	1.9
Similar to other families	230	71.7
Better than other families	68	21.2
Doesn't know	17	5.3

areas. More detailed sociodemographic characteristics are presented in Table 1. In the sample of the current study, 54.5% ($n = 175$) of adolescents were continuously exposed to violence. Most reported type of continuous violence was psychological abuse ($n = 125$, 38.9%), then neglect ($n = 88$, 27.4%), sexual abuse from adults, peers, or online ($n = 75$, 23.4%), and physical abuse ($n = 30$, 9.3%). Of those exposed to any continuous violence, 52.0% ($n = 91$) were exposed to more than one type ($M(SD) = 1.81 (0.95)$ of violence types on average).

2.2. Measures

2.2.1. Lifetime Abuse Exposure Questionnaire

The lifetime violence exposure (physical, psychological, sexual abuse, and neglect) was measured using a questionnaire developed by the Norwegian Center for Violence and Traumatic Stress Studies (NKVTS) (Hafstad et al., 2020). The questionnaire comprises 37 questions measuring neglect (6 questions), psychological abuse (8 questions), physical abuse (6 questions), and sexual abuse: from adults (6 questions), peers (6 questions), and online (5 questions). For neglect questions, the participants rated the frequency of exposure on a 5-point Likert scale ranging from 'never' (0) to 'very often' (4). For all other forms of abuse, the frequency of exposure was rated on a 4-point scale ranging from 'never' (0) to 'often' (3). If

participants noted that they had experienced any abuse at least once, they had to answer an additional question about whether they had experienced that type of abuse in the past two months ('yes' (1) or 'no'(0)). The participant was considered continuously exposed to neglect, psychological, physical, or sexual abuse if they responded to any item in the corresponding category with 2 ('sometimes' for neglect or 'occasionally' for psychological, physical, and sexual abuse) or higher. If the participant was continuously exposed to any type of violence over a lifetime and responded 'yes' (1) to at least one question regarding the violence exposure in the past two months in the corresponding category, they were considered as continuously recently exposed to the particular type of violence. The Lithuanian version of the Lifetime Abuse Exposure Questionnaire was previously used in Lithuanian adolescent samples (Daniunaite et al., 2021; Zelviene et al., 2020). In the current sample, Cronbach's α coefficients for neglect, psychological, physical, sexual abuse subscales, and total abuse scale were 0.70, 0.79, 0.81, 0.89 and 0.91, respectively.

2.2.2. The Continuous Traumatic Stress Response Scale (CTSR)

The CTSR scale was used to measure continuous traumatic stress reactions (Goral et al., 2021). The measure was independently translated by three experts (PhDs in psychology with advanced English knowledge), and the final translated items were chosen upon agreement between them. The CTSR comprises 11 items in three subscales: Exhaustion/Detachment (5 items), Rage/Betrayal (3 items), and Fear/Helplessness (3 items). Two items from the Fear/Helplessness subscale were adapted for use in adolescent population surveys. These items are 'I feel that my life is in danger' (changed to: 'I feel that I am in danger') and 'I feel that I cannot protect those who depend on me' (changed to: 'I fear for the safety of my loved ones'). Participants were asked to rate every item on a scale from 'not at all' (0) to 'severe' (3). The score of each subscale was calculated by summing all answers in that subscale. The Exhaustion/Detachment (ED) subscale scores ranged from 0 to 15, the Rage/Betrayal (RB) subscale from 0 to 9, and the Fear/Helplessness (FH) subscale from 0 to 9. The range of the total CTSR sum score was 0–33. In the current sample, Cronbach's α coefficients for the ED, RB, FH subscales and the total CTSR scale were 0.85, 0.74, 0.68, and 0.90, respectively.

2.3. Data analysis

In the current study, we aimed to assess the reliability and the validity of the adolescent version of the Continuous Traumatic Stress Response (CTSR) scale, to indicate the groups of different types of CTS reactions, and to investigate the links between different types of

violence exposure and CTS reactions. As a preliminary analysis, we calculated Pearson correlations among CTSR sum scores and violence exposure sum scores (see Supplementary Table S1).

Confirmatory factor analysis (CFA) was used to test the structural validity of the CTSR scale. In addition to Cronbach's alpha, McDonald's omega internal consistency coefficients were calculated to account for the internal consistency of the subscales, that is, Exhaustion/Detachment (ED), Rage/Betrayal (RB), and Fear/Helplessness (FH), and the total CTSR score. Additionally, measurement invariance between genders and age groups was tested. Configural, metric, and scalar models were compared by examining the changes in fit indices (Chen, 2007). We have also calculated the Average Variance Extracted (AVE) to account for convergent validity and heterotrait–monotrait ratio of correlations to indicate the discriminant validity of the three subscales.

The Multivariate analysis of variance (MANOVA) with the sum scores of the CTSR subscales was used to test the differential validity of the scale. In particular, we compared the ED, RB, and FH sum scores in overall continuous violence exposure versus non-exposure groups and the groups of exposure versus non-exposure to continuous neglect, psychological abuse, physical abuse, and sexual abuse over the lifetime. Additionally, we have compared the ED, RB, and FH sum scores in the subsamples of non-recent and recent exposure to overall violence and particular types of violence.

The Latent Class Analysis (LCA) approach (Nylund et al., 2007) was used to identify the subgroups of participants based on the severity of the CTS reactions. We used factor scores obtained after performing the CFA for the LCA analysis. We decided on the best-fitting number of latent classes based on the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) statistics (should be lower for a solution with $k - 1$ classes in comparison to the solution with k classes), a statistically significant p -value of the Bootstrapped Likelihood Ratio Test (LMR-A), the relatively higher Entropy score, and the number of participants in the least numerous class that should be no less than 5% of the sample (Nylund et al., 2007).

The multinomial logistic regression analyses were applied to predict the CTS class membership with the total violence exposure sum score and sum scores of different types of violence exposure as independent variables. The SPSS 24.0 was used for logistic regression and MANOVA analyses. The Mplus 8.2 was used for CFA and LCA analyses. Model fit indices in CFA and LCA analyses were evaluated by using the Comparative Fit Index (CFI), the Tucker–Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA). CFI/TLI values higher than .90 indicated an acceptable fit, and values higher than

.95 represented a good fit; RMSEA/SRMR values below .08 indicated an acceptable fit, and values less than .05 suggested a good fit (Little, 2024). There were no missing data.

3. Results

3.1. Structural validity, invariance, and reliability of the CTSR scale

The Confirmatory factor analysis (CFA) results showed good structural validity of the CTSR scale (Figure 1). The CFA yielded identical results regarding the model fit and the item factor loadings for the correlated three-factor model (Figure 1(A)) and the second-order one-factor model with three latent indicators (Figure 1(B)). Both models fitted the data well ($\chi^2(41) = 77.41$, $p < .001$, CFI/TLI = .966/.954, RMSEA [90% CI] = .053 [.034, .070], SRMR = .042). The majority of factor loadings were above .60 threshold in the corresponding factor, except for item 11 in the Fear/Helplessness factor, being above the less conservative threshold of .40. In the correlated three-factor model, strong correlations were observed between all three factors, with a stronger link between Exhaustion/Detachment (ED) and Rage/Betrayal (RB) in comparison to the links between Fear/Helplessness (FH) and the other two factors.

Similarly, in the second-order one-factor model, ED and RB contributed more to the general Continuous traumatic stress factor than the FH factor. The results of measurement invariance showed that the CTSR scale is gender and age invariant at the scalar level (Table 2). The McDonald's omega internal consistency analysis indicated good reliability of the CTSR scale, as

Table 2. Results of measurement invariance of CTSR scale across genders and age groups.

Model	Model fit indices			Model comparisons	
	χ^2 (df)	CFI	RMSEA [90% CI]	Δ CFI	Δ RMSEA
Gender ($n = 316$)					
Configural	132.10 (82)	0.946	0.062 [.042, .081]	–	–
Metric	134.71 (90)	0.952	0.056 [.035, .075]	–0.006	0.006
Scalar	141.46 (98)	0.953	0.053 [.032, .071]	–0.001	0.003
Age group ($n = 321$)					
Configural	137.36 (82)	0.949	0.065 [.045, .083]	–	–
Metric	137.70 (90)	0.952	0.057 [.037, .076]	–0.003	0.008
Scalar	150.90 (98)	0.951	0.058 [.039, .076]	0.001	–0.001

Note: χ^2 = chi-square, df = degrees of freedom, CFI = comparative fit index, RMSEA = root mean square error of approximation, CI = confidence interval, Δ = change in the parameter.

the coefficients for ED, RB, and FH subscales were .86, .75, and .69, respectively. The McDonald's omega coefficient for the full scale was .90.

3.2. Differential, convergent, and discriminant validity of the CTSR scale

The results of Multivariate analysis of variance (MANOVA), including mean scores of variables in violence exposure versus non-exposure groups and F statistics, are presented in Table 3. The results indicated substantial differential validity of the CTSR scale. At the multivariate level, continuous exposure to at least one type of violence throughout the lifetime was associated with a higher total CTSR score (Wilk's $\lambda = .74$) and, at the univariate level, higher

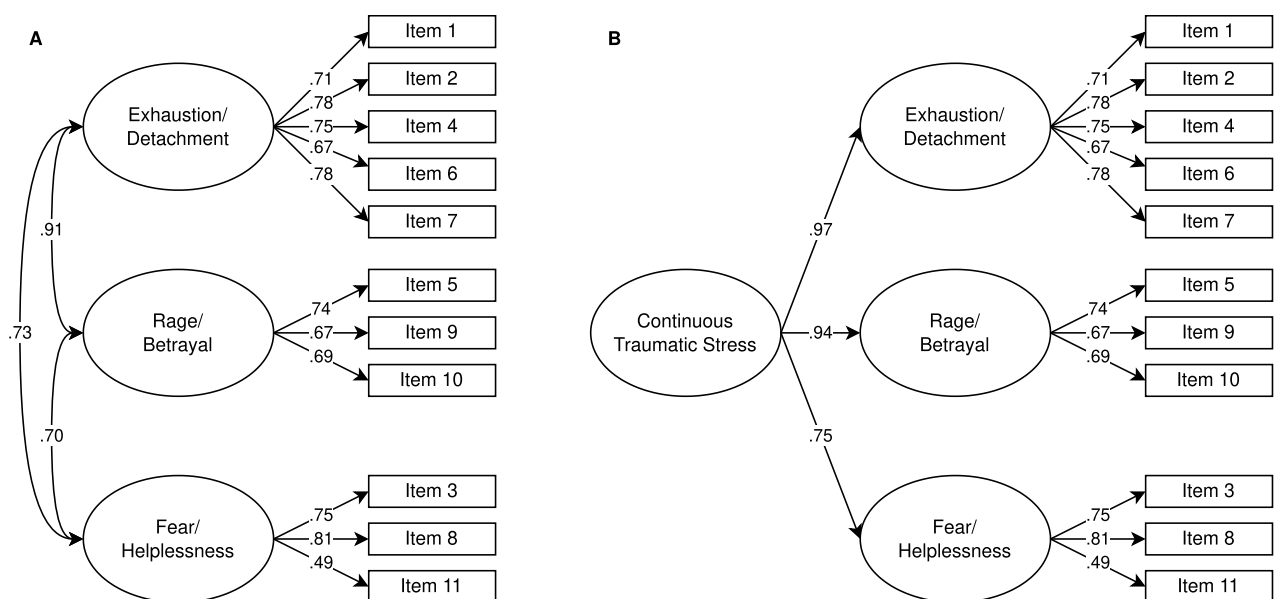


Figure 1. The results of confirmatory factor analysis of two alternative models: correlated three-factor model (A) and second-order one-factor model with three latent indicators (B) ($N = 321$).

Note: Standardized coefficients are presented, all coefficients are significant at $p < .001$.

Table 3. Means, standard deviations, and MANOVA results for continuous traumatic stress reactions in violence exposure groups.

Type of continuous violence	Exhaustion/ detachment		Rage/ betrayal		Fear/ helplessness		<i>F</i> (3, 317)	η_p^2
	<i>F</i> (1)/ <i>M</i>	η_p^2 /SD	<i>F</i> (1)/ <i>M</i>	η_p^2 /SD	<i>F</i> (1)/ <i>M</i>	η_p^2 /SD		
Neglect	78.57***	.20	61.06***	.16	48.03***	.13	29.87***	.22
No (<i>n</i> = 233)	4.08	3.37	1.83	1.95	0.74	1.37		
Yes (<i>n</i> = 88)	7.98	3.88	3.82	2.23	2.17	2.22		
Recent neglect	0.03	<.001	2.83	.03	0.09	.001	1.62	.06
No (<i>n</i> = 13)	8.15	4.36	4.77	2.24	2.00	2.65		
Yes (<i>n</i> = 75)	7.95	3.83	3.65	2.20	2.20	2.16		
Psychological abuse	73.24***	.19	52.37***	.14	27.20***	.08	25.60***	.20
No (<i>n</i> = 196)	3.80	3.30	1.71	1.96	0.74	1.31		
Yes (<i>n</i> = 125)	7.26	3.89	3.42	2.20	1.75	2.17		
Recent psychological abuse	11.13**	.08	4.07*	.03	8.82**	.07	4.43**	.10
No (<i>n</i> = 37)	5.54	3.24	2.81	1.88	0.89	1.49		
Yes (<i>n</i> = 88)	7.99	3.93	3.67	2.28	2.11	2.31		
Physical abuse	10.61**	.03	8.20**	.03	20.02***	.06	6.86***	.06
No (<i>n</i> = 291)	4.92	3.86	2.26	2.18	1.00	1.65		
Yes (<i>n</i> = 30)	7.33	3.82	3.47	2.28	2.47	2.27		
Recent physical abuse	0.85	.03	0.12	.004	0.41	.01	1.06	.11
No (<i>n</i> = 19)	6.84	3.96	3.58	2.27	2.26	2.16		
Yes (<i>n</i> = 11)	8.18	3.57	3.27	2.41	2.82	2.52		
Sexual abuse	29.24***	.08	16.07***	.05	11.68**	.04	9.74***	.08
No (<i>n</i> = 246)	4.52	3.68	2.11	2.18	0.95	1.65		
Yes (<i>n</i> = 75)	7.20	3.99	3.25	2.11	1.73	2.00		
Recent sexual abuse	8.89**	.11	6.05*	.08	10.14**	.12	3.97*	.14
No (<i>n</i> = 34)	5.76	3.42	2.62	1.50	0.97	1.38		
Yes (<i>n</i> = 41)	8.39	4.08	3.78	2.39	2.37	2.22		
At least one type of violence	99.81***	.24	79.84***	.20	37.75***	.11	36.55***	.26
No (<i>n</i> = 146)	3.05	2.82	1.29	1.67	0.51	1.04		
Yes (<i>n</i> = 175)	6.89	3.86	3.28	2.21	1.66	2.05		
Recent exposure to at least one type of violence	17.27***	.09	8.71**	.05	4.99*	.03	5.77**	.09
No (<i>n</i> = 35)	4.57	3.05	2.31	1.69	0.97	1.56		
Yes (<i>n</i> = 140)	7.47	3.83	3.52	2.26	1.82	2.13		

Note: * $p < .05$, ** $p < .01$, *** $p < .001$, statistically significant results are in bold.

Exhaustion/Detachment (ED), Rage/Betrayal (RB), and Fear/Helplessness (FH) scores. The same was true for exposure to continuous neglect (Wilk's $\lambda = .78$), psychological abuse (Wilk's $\lambda = .81$), physical abuse (Wilk's $\lambda = .94$), and sexual abuse (Wilk's $\lambda = .92$). MANOVA results also revealed that among participants exposed to any continuous violence, recent adversity (exposure to violence over the last two months) was associated with higher CTSR score (Wilk's $\lambda = .91$) as well as ED, RB, and FH scores. The same was true for recent exposure to psychological violence (Wilk's $\lambda = .89$) and sexual violence (Wilk's $\lambda = .86$) among participants continuously exposed to corresponding types of violence over their lifetime. Nevertheless, CTSR scores did not significantly differ between the subsamples of recent versus non-recent neglect (Wilk's $\lambda = .95$) and physical abuse (Wilk's $\lambda = .89$) exposure groups.

The percentage of Average Variance Extracted (AVE) indicated good convergent validity of the general CTS factor, as defined by three indicators of Exhaustion/Detachment (ED), Rage/Betrayal (RB), and Fear/Helplessness (FH) (AVE = .79). The AVE of the ED, RB, and FH factors were just above or slightly below the conventional threshold of .50 (.54, .49, and .49, respectively), indicating acceptable convergent validity of the three factors. The heterotrait-monotrait (HTMT) ratio of correlations indicated good discriminant validity between ED and FH factors

(HTMT ratio = .84), acceptable discriminant validity between RB and FH factors (HTMT ratio = .88), and potentially problematic discriminant validity between ED and RB factors (HTMT ratio = .93).

3.3. Clusters of continuous traumatic stress reactions

The Latent class analysis (LCA) results are presented in Figure 2. The LCA, conducted with factor scores drawn from the correlated three-factor CFA model, indicated that the three cluster solution fitter data best (Table 4). In the most numerous class (56.1% of the sample), the mean levels of all three continuous traumatic stress (CTS) reactions were below average (labelled *Low*). The second numerous class (35.5% of the sample) was characterized by mean levels of CTS reactions slightly above average (labelled *Moderate*). In the third class (8.4% of the sample), the scores of all CTS reactions were substantially above average (labelled *High*). The MANOVA results revealed that CTS reactions differed significantly across classes at the multivariate level (Wilk's $\lambda = .15$; $F(6,632) = 165.40$, $p < .001$, $\eta_p^2 = .61$) and the univariate level, with the highest scores of Exhaustion/Detachment (ED) ($F(1) = 442.78$, $p < .001$, $\eta_p^2 = .74$), Rage/Betrayal (RB) ($F(1) = 260.17$, $p < .001$, $\eta_p^2 = .62$), and Fear/Helplessness (FH) ($F(1) = 190.68$, $p < .001$, $\eta_p^2 = .55$) in the high CTS cluster ($M(SD)_{ED} = 12.81$ (2.24),

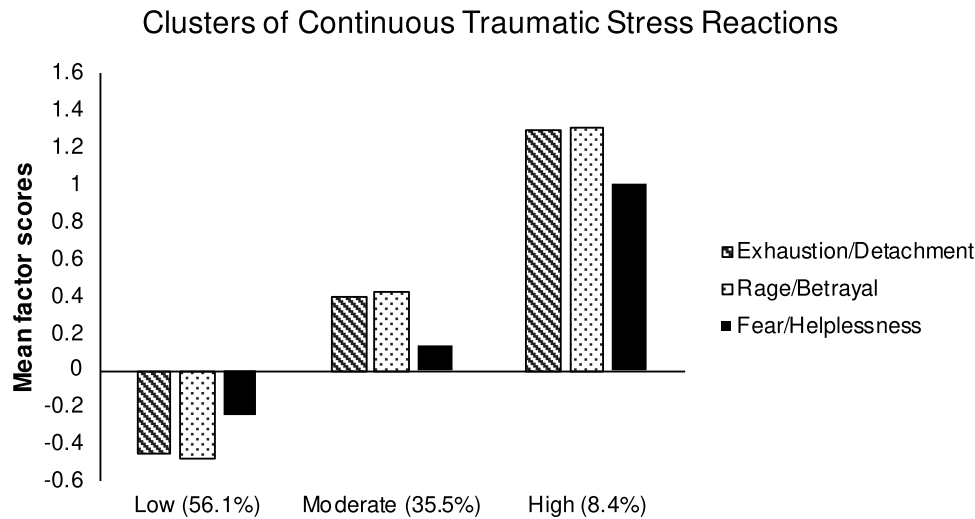


Figure 2. The results of latent class analysis of the continuous traumatic stress reactions ($N = 321$).

Table 4. Model fit indices of latent class analyses of the continuous traumatic stress reactions.

Solution	Loglikelihood	AIC	BIC	Entropy	BLRT p -value	Least numerous class
1 class	-786.88	1585.77	1608.40	–	–	
2 classes	-503.53	1027.07	1064.78	.912	<.001	25.2%
3 classes	-329.40	686.79	739.59	.938	<.001	8.4%
4 classes	-220.32	476.64	544.53	.935	<.001	4.4%

Note: AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; BLRT = Bootstrapped Likelihood Ratio Test (LMR-A). The best-fitting solution is in bold.

$M(SD)_{RB} = 5.96$ (1.93), $M(SD)_{FH} = 4.96$ (2.03)), lower in moderate CTS cluster ($M(SD)_{ED} = 7.62$ (2.26), $M(SD)_{RB} = 3.83$ (1.69), $M(SD)_{FH} = 1.55$ (1.54)), and lowest in low CTS cluster ($M(SD)_{ED} = 2.43$ (1.82), $M(SD)_{RB} = 0.92$ (0.99), $M(SD)_{FH} = 0.29$ (0.66)).

The overall CTSR sum score ranged in the high CTS cluster from 18 to 33, suggesting the possible cut-off score for severe continuous traumatic stress reactions of ≥ 18 . We have further evaluated this cut-off score and found that the mean CTS sum score was higher in the *high* CTS cluster ($M(SD) = 23.74$ (4.43)), compared to the total sample mean ($M(SD) = 8.66$ (7.00)) by more than two total sample SDs. Moreover, the overall violence sum score was higher in the *high* CTS cluster ($M(SD) = 21.41$ (17.67)), compared to the total sample mean ($M(SD) = 6.62$ (9.13)) by more than one total sample SDs.

3.4. Predicting continuous traumatic stress cluster from severity of different types of violence

The results of univariate multinomial logistic regression analysis are presented in Table 5. The results showed that the intensity of overall exposure to violence and the intensity of exposure to neglect, psychological abuse, physical abuse, and sexual abuse positively predicted Continuous traumatic stress (CTS) response group membership ($p < .001$ in all models). In particular, higher scores of all types of violence exposure

predicted a higher probability of moderate and high CTS in comparison to low CTS and a higher probability of high CTS in comparison to moderate CTS. Based on Cox and Snell and Nagelkerke coefficients, the intensity of overall violence exposure explained 27.8–33.3% of CTS group membership. The exposure to neglect, psychological, physical, and sexual abuse explained 23.4–28.1%, 24.1–28.9%, 8.7–10.4%, and 12.8–25.3% of CTS group membership, respectively. The increase in sum score of neglect by one increased the probability of high CTS versus low CTS by 90% and high CTS versus moderate CTS by 25%. Similarly, the increase in sum scores of psychological, physical, and sexual abuse by one increased the probability of high CTS

Table 5. Results of multinomial logistic regression analysis with intensity of different types of violence as predictors of continuous traumatic stress groups ($N = 321$).

Intensity of violence	Low vs. moderate CTS		Low vs. high CTS		Moderate vs. high CTS	
	OR [95% CI]	p	OR [95% CI]	p	OR [95% CI]	p
Neglect	1.51 [1.32–1.73]	<.001	1.90 [1.60–2.25]	<.001	1.25 [1.12–1.41]	<.001
Psychological abuse	1.45 [1.28–1.65]	<.001	1.89 [1.60–2.24]	<.001	1.30 [1.15–1.48]	<.001
Physical abuse	1.38 [1.13–1.69]	.002	1.77 [1.40–2.23]	<.001	1.28 [1.07–1.52]	.006
Sexual abuse	1.274 [1.13–1.44]	<.001	1.45 [1.26–1.66]	<.001	1.13 [1.04–1.24]	.005
Total abuse score	1.18 [1.12–1.25]	<.001	1.29 [1.21–1.38]	<.001	1.09 [1.05–1.14]	<.001

Note: CTS = Continuous Traumatic Stress; OR = odds ratio; CI = confidence interval.

(vs. low/moderate CTS) by 89/30%, 77/28%, and 45/13%, respectively. The increase of total violence sum score by one increased the probability of high CTS (vs. low/moderate CTS) by 29/9%.

4. Discussion

The aims of the current study were threefold. First, we investigated the reliability and validity of the adolescent version of the Continuous Traumatic Stress Response Scale (CTSR) in a sample of Lithuanian adolescents. Second, we explored the different types of continuous traumatic stress (CTS) reactions in adolescence based on the intensity of experiences of Exhaustion/Detachment, Rage/Betrayal, and Fear/Helplessness by using the person-oriented approach. Third, we explored the links between the intensity of violence exposure and different types of continuous traumatic stress reactions. Overall, we confirmed the reliability and validity of the adolescent version of the CTSR in the Lithuanian adolescent sample. In addition, we found that CTS reactions are best described in terms of *low*, *moderate*, and *high* CTS, with the intensity of Exhaustion/Detachment, Rage/Betrayal, and Fear/Helplessness experiences increasing consistently across the abovementioned groups and the CTSR sum score of 18 or higher being suggested as a cut-off score for *high* CTS reactions. Finally, we found that experiencing more interpersonal violence in adolescence increases the probability of high CTS.

Based on the Confirmatory factor analysis (CFA) results, we confirmed the CTSR scale's identical structure in a sample of Lithuanian adolescents, as in previous research with adults (Goral et al., 2021). We found that Exhaustion/Detachment and Rage/Betrayal contribute to the general CTS more than Fear/Helplessness, which also has slightly lower reliability in comparison to the other two factors. These findings are consistent with polyvagal theory, suggesting that fear might be the initial stress reaction, but continuous exposure might trigger more intense responses of anger or detachment (Porges, 2022). Moreover, previous research shows that even though the experiences of fear and helplessness during trauma exposure are important predictors of later posttraumatic stress disorder (PTSD), some victims of violence do not recall these feelings in times of trauma but rather experience anger or shame (Brewin et al., 2000).

The results of the current study also suggest that the CTS scores help differentiate adolescents exposed to violence. In particular, adolescents exposed to any form of violence, including neglect and psychological, physical, and sexual abuse more than once, were more likely to have more profound reactions of Exhaustion/Detachment, Rage/Betrayal, and Fear/Helplessness. For adolescents exposed to psychological or sexual abuse, higher levels of all three CTS reactions were helpful in differentiating those exposed over the last

two months in contrast to those who continuously experienced psychological or sexual abuse more than two months ago. Even though exposure to sexual abuse makes it more likely to have serious long-term effects on youth development than other types of traumatic experiences (Truskauskaite-Kuneviciene et al., 2020), based on the results, the initial reactions of withdrawal, anger, and fear after recent exposure to psychological abuse might be similarly intense. Nevertheless, we found that the reactions of anger, fear, and detachment when exposed to neglect or physical abuse were similarly high, independently on recency of experience. These findings could be explained by possibly continued feelings of threat experienced by adolescents (Porges, 2022) and expectancy to be neglected or physically abused in the future (Eagle & Kaminer, 2013), as the adolescents share the households with the perpetrators.

The person-oriented results of the current study showed that in terms of continuous traumatic stress (CTS) reactions, three groups of adolescents with low, moderate, or high CTS emerged. These results demonstrated that three CTS reactions of Exhaustion/Detachment, Rage/Betrayal, and Fear/Helplessness seem to manifest together at different intensities. Noticeably, Fear/Helplessness was relatively higher in the low CTS group and relatively lower in moderate and high CTS groups compared to Exhaustion/Detachment and Rage/Betrayal reactions. These results are not surprising in the general population sample. Even though living in violent households strongly induces a sense of threat and heightens the risk of an anxiety disorder (Miller, 2015), the experience of threat in war settings, where the CTS reactions were previously measured (Goral et al., 2021), is usually directly related to the threat to life, which has been shown to trigger stronger traumatic reactions (Heir et al., 2016).

The results of the current study also demonstrated that adolescents experiencing more violence, independently of the violence type, were more likely to belong to the high CTS group. These findings are in line with previous theoretical considerations (Eagle & Kaminer, 2013) and empirical findings from qualitative research on adult victims of interpersonal violence (Hulley et al., 2023). It also contributes to the large body of literature documenting the devastating effects of violence against children (e.g. Zelviene et al., 2020). Noticeably, in our study, the intensity of neglect and psychological abuse were found to be better predictors of high CTS than the intensity of physical or sexual violence. It might highlight that the effects of neglect and psychological abuse should not be underrated. Previous research shows that childhood neglect is linked with lower levels of emotional closeness and less social support from caregivers, resulting in worse psychological well-being over a lifetime

(Kong, 2018). Considering that closeness and intimacy are seen as basic human needs related to survival (Pittman & Zeigler, 2007), a more profound lack of love and care and more intense humiliation and rejection from caregivers might induce intense reactions of anger, fear, and alienation.

In general, our results showed a relatively high level of traumatic stress in the sample. Corporal punishment was widespread in Lithuania for many years and was prohibited by law in 2017 alongside other governmental measures of child protection (Tamutiene & Snieskiene, 2023). Since then, some parents/guardians have been changing their attitude towards children's safety and appropriate parenting (Gervinskaite-Paulaitiene et al., 2024). Nevertheless, our results show that many Lithuanian adolescents are still at risk of facing maltreatment, and society needs more measures to stop violence against children.

The results of the current study should be seen in light of its limitations. First, the study is based on self-reported results, which might introduce some measurement bias. Second, the study is cross-sectional, not allowing an investigation of the longitudinal links between violence exposure and CTS. Third, some subgroups (e.g. the non-recent neglect or recent and non-recent physical abuse) were relatively small, which might have increased the probability of Type II error. Finally, continuous violence was measured using the frequency scale, not allowing to identify whether the exposure to repeated violence was continuous or episodic, as the timing and duration of trauma exposure were not explicitly measured. Future studies should consider including specific measures to better capture the continuous nature of exposure to violence. Moreover, the results of the current study showed some overlap between CTSR factors of Exhaustion/Detachment and Rage/Betrayal, indicating the need for more research in the field and a potential need for conceptual reevaluation of these factors in the adolescent samples.

5. Conclusion

The current study demonstrated that the Continuous Traumatic Stress Response Scale (CTSR) is a reliable and valid tool to measure continuous traumatic stress (CTS) reactions in adolescents. Moreover, it showed that high CTS is characterized by high levels of Exhaustion/Detachment, Rage/Betrayal, and Fear/Helplessness and suggested the CTSR cut-off score (≥ 18) to differentiate adolescents with possible risk of high CTS. Finally, the study demonstrated that higher levels of all types of violence, including neglect and psychological, physical, and sexual abuse, are associated with an increased risk of high continuous traumatic stress in adolescence. These results stress the need for psychological support when exposed to continuous

interpersonal violence in adolescence. Nevertheless, as this was the first study exploring the CTS reactions in adolescent samples, more research is needed on youth from different cultural contexts. Moreover, longitudinal studies should follow to better understand the role of CTS reactions in adolescent development.

Acknowledgements

All procedures were performed in compliance with relevant laws and institutional guidelines and have been approved by the Vilnius University Committees on Research Ethics (approval No. (1.13 E)250000-KT-16, 22-01-2024). Written informed consents were obtained from parents/guardians and students. The study was conducted in collaboration with Children Support Centre, Lithuania.

Author contributions

IT: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Supervision; Validation; Visualization; Writing – original draft; Writing – review & editing; MK: Conceptualization; Investigation; Methodology; Project administration; Validation; Writing – original draft; Writing – review & editing; AG: Methodology; Validation; Writing – review & editing; ID: Conceptualization; Investigation; Methodology; Project administration; Validation; Writing – original draft; Writing – review & editing.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

The data analysed during the current study are available from the corresponding author upon reasonable request.

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