Empirical Article

Childhood Maltreatment is Linked to Larger Preferred Interpersonal Distances Towards Friends and Strangers Across the Globe

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Author Note

An umbrella ethics approval was obtained from Saarland University (Identification number: 21-07). In addition, local ethics approvals were obtained in countries requiring a separate application. All study procedures were preregistered in September 2021. We have no conflict of interest to disclose.

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Abstract

Childhood maltreatment (CM) is thought to be associated with altered responses to social stimuli and interpersonal signals. Correspondingly, first studies found that CM is linked to larger comfortable interpersonal distance (CID). However, studies were limited in statistical power and only examined individuals from the European region. Moreover, little is known about the effects of CM on CID towards different interaction partners and whether CID is linked to social functioning and attachment. To address these outstanding issues, adults (N=2986) from diverse cultures and socio-economic strata completed an online task evaluating CID. Higher CM was linked to larger CID towards both friends and strangers. Moreover, insecure attachment styles and less social support were associated with a larger CID. Given the importance of social relationships for mental health, our findings suggest that maltreated individuals should be supported in CID regulation (e.g., by means of tailored interventions).

Introduction

Childhood maltreatment (CM, i.e., abuse or neglect of children and adolescents by their caregivers) is a global problem. Depending on gender and continent, prevalence rates vary between 6-61% (emotional abuse), 22-60% (physical abuse), 6-27% (sexual abuse), and 17-65% (neglect) (Moody et al., 2018). Individuals exposed to CM are at increased risk for mental and physical disorders (Pfaltz et al., 2022). Moreover, CM has been linked to social dysfunction, including isolation, withdrawal (de-Heer et al., 2022), and an increased risk of affected children to be bullied, victimized (Xiao et al., 2021), and rejected by peers (Yoon, 2020). CM has further been linked to low levels of social support (Evans et al., 2013), elevated rates of separation and divorce, problems related to parenting, intimate partner aggression perpetration and victimization (Labella et al., 2018; White & Widom, 2003; Zamir, 2021), loneliness, and social isolation (Shevlin et al., 2015).

Research assessing factors that might underlie problems in social functioning points to altered responses to different types of social stimuli and situations. For example, compared to unexposed adults, adults exposed to CM seem to detect facial expressions of happiness less easily but recognize negative facial expressions more easily, rapidly, and at lower intensity (Bérubé et al., 2021; Passardi et al., 2018). Moreover, they tend to interpret neutral facial expressions as negative (Catalan et al., 2020; Hautle et al., submitted for publication a; Pfaltz et al., 2019) and were found to respond with discomfort and increased neural reactivity to social touch (Maier et al., 2020). Similarly, enhanced amygdala responses to negative facial expressions (e.g., Dannlowsky et al., 2013) and a link between CM and neural hyperreactivity to unfamiliar neutral faces were found (Edmiston & Blackford, 2013). Based on adverse interpersonal learning experiences, and given a generally heightened threat sensitivity (McCrory et al., 2011; Teicher & Samson, 2016), individuals exposed to CM might thus respond

negatively to a broad range of social stimuli. In line with this assumption, comfortable interpersonal distance (CID) is an important factor that appears to be affected by CM.

CID refers to the physical distance humans prefer to take towards others during social encounters. It is typically assessed by asking participants to stop an approaching person when they start to feel uncomfortable (i.e., stop-distance paradigm; Hayduk, 1987). The development of CID takes place during childhood (Aiello & De Carlo Aiello, 1974) and CID varies, depending on the relationship to the approaching person, age and gender of the approached person (Sorokowska et al., 2017), culture (e.g., Beaulieu, 2004; Ozdemir, 2008), and temperature within a geographical region (Sorokowska et al., 2017). For example, with increasing living density (more individuals per room), there seem to be differences in the perception of one's home as crowded (Evans et al. 2000), whichhave been linked (Ozdemir, 2008) to contact vs. noncontact (Beaulieu, 2004) and to collectivistic vs. individualistic cultures (McSweeney, 2002). Consistent with the assumption that maintaining a CID serves to protect against dangers to one's physical and emotional well-being (Hall, 1990), larger CID has further been linked to person related factors such as higher levels of trait anxiety (Lachini et al., 2015). Relatedly, Cole et al. (2013) showed that adults perceive threatening stimuli, including other persons, to be closer than non-threatening stimuli.

Research on the association between CM and CID is scarce. Using the stop-distance procedure, studies found an increased CID in physically abused children (Vranic, 2003) and adults with mixed types of CM (Maier et al., 2020; Lüönd et al., 2022. This finding was replicated by Lüönd et al. (2022) and by Hautle et al. (manuscript submitted for publication b), with mixed findings regarding the impact of depressive symptoms: Lüönd et al. (2022) found that in adults with CM and symptoms of depression, all subtypes of CM were linked to a larger CID. In the absence of depressive symptoms, only adults exposed to emotional abuse showed an increased CID. In contrast, Hautle et al. (manuscript submitted for publica-

tion b) found that all subtypes of CM were related to a larger CID, independent of symptoms of depression.

Overall, previous research thus suggests that CM is related to larger CID and discomfort with physical proximity to others, with distinct findings for different subtypes of CM. However, sample sizes of existing studies are small, limiting reliability and conclusions that can be drawn. Moreover, existing findings stem from Croatia (Vranic, 2003), Germany (Maier et al., 2020), and Switzerland (Hautle et al., manuscript submitted for publication b; Lüönd et al., 2022), i.e., from limited geographical and cultural contexts, limiting generalizability. The complete absence of transcultural research and the lack of studies involving populations outside of Europe is problematic, given cultural and geographical effects on the processing of socio-emotional signals in general (e.g., Liddell & Williams, 2019; Matsumoto et al., 2010) and on CID in particular (Beaulieu, 2004; Evans et al., 2000; Ozdemir, 2008; Sorokowska et al., 2017). Finally, unlike other research on CID (e.g., Haim-Nachum et al., 2021), all of the previous studies on CID in CM have focused exclusively on CID towards strangers (Hautle et al., manuscript submitted for publication b; Lüönd et al., 2022; Maier et al., 2020; Vranic, 2003). It is thus unknown whether larger CID in individuals exposed to CM is restricted to strangers or extends to known others, as was found for individuals with high levels of social anxiety (Perry, 2013) and for individuals suffering from adjustment disorder with depressed mood (Ponizovsky et al., 2013).

The first aim of the present study was to assess whether the link between CM and CID can be replicated in a large sample of participants from various countries. We predicted that CM is a significant predictor of larger CID toward strangers (Hypothesis 1). Second, we tested whether the previously found relationship between CM and CID towards strangers extends to CID towards friends (Hypothesis 2). Third, we explored whether the expected associations between CM and CID (Hypotheses 1 and 2) differ between friend and stranger con-

ditions, i.e., whether the interaction between CM and interaction partner (stranger, friend) predicts CID (Hypothesis 3). Beyond these hypotheses, we examined whether the association between CM and CID could be generalized across countries. We further hypothesized that the associations mentioned in Hypotheses 1 and 2 are present for all subtypes of CM (Hypothesis 4). Known correlates of CM and CID (i.e., gender, social anxiety, depressive symptoms, symptoms of posttraumatic stress disorder (PTSD), and COVID-19-related anxiety) were introduced as covariates in all of these analyses.

Finally, given the broad impairments in social functioning in individuals affected by CM, we explored whether CID is related to different aspects of social functioning in real life. Insecure attachment in particular is known to be linked to CM (Cyr et al., 2010) and to alterations in CID (Akbarian et al., 2020; Kaitz et al., 2004; Yukawa et al., 2007). Thus, we hypothesized that lower levels of social support, higher levels of social strain, and insecure (anxious and avoidant) attachment would predict larger CID toward friends and strangers (Hypothesis 5).

Methods

Participants

As part of the *Child Maltreatment: Identifying Socio-Emotional Consequences* (CM-SEC) research group (https://www.global-psychotrauma.net/cm-sec) of the Global Collaboration on Traumatic Stress (Schnyder et al., 2017; Olff et al., 2020), a total of 3656 participants were recruited from the general population around the globe (for a detailed description of the countries, see Table 1). Selection of countries focused on representation of diverse cultures to maximize socio-economic variation. Sample size was based on the detection of medium-sized associations (r = .15; one sided) between CM and interpersonal distance, with a power of .80, using G*Power software (Faul et al., 2007). Therefore, we ini-

tially sought to recruit a minimum of 270 participants per country. Unexpectedly, response rates differed widely across countries and several individuals who were not from the predefined target populations (Australia, Cameroon, Ethiopia, France, Germany, India, Iraq, Israel, Japan, Peru, South Africa, Spain, Sweden, Switzerland, Turkey, UK, and USA) completed the study. However, widely varying sample sizes were accounted for by means of multilevel (ML) analyses.

Participants were recruited via personal contacts, online platforms and (social) media advertisements (e.g., Facebook ads, Qualtrics service). Eligible participants were at least 18 years old and had sufficient reading skills and understanding of the local language.

Participants were excluded if: 1) they did not complete a minimum of 75% valid trials of the CID task; 2) they did not complete a minimum of 50% valid trials of the CID task for each trial category (i.e., friend, stranger, speed; for details see *Assessment of preferred interpersonal distance*); 3) the variance in their reaction times (RTs) of control trials exceeded three interquartile ranges above the upper quartile. Criterion 1 and 2 were specified after data collection because participants showed an unexpected high number of missing responses during the CID task. In the preregistration, we initially intended to remove participants that did not complete all necessary measures.

In total, 670 participants were excluded based on these criteria, resulting in n=2986 participants (69.2% female, M_{age} = 31.27, SD_{age} = 13.36; see Table 2 for detailed sample characteristics). Data was collected online, from October 2021 through March 2022, using the software Qualtrics (Provo, USA).

Table 1. List of countries and participants

Country	***n***
South Africa	475
India	401
Switzerland	400

Israel	314
Germany	292
Sweden	228
UK	172
Turkey	168
France	157
Japan	88
Iraq	64
Cameroon	45
US	45
Spain	30
Ethiopia	22
Peru	21
Australia	19
Austria	4
Namibia	4
Zimbabwe	4
Canada	3
Brazil	2
Greece	2
Kenya	2
Kuwait	2
Lesotho	2
Liechtenstein	2
Netherlands	2
Albania	1
Columbia	1
Hong Kong	1
Iran	1
Italy	1
Malaysia	1
Mexico	1
Mozambique	1
Norway	1
Philippines	1
Russia	1
South Korea	1
Thailand	1
Uruguay	1
Zambia	1

Table 2. Demographics and psychometric characteristics

Variables	**Mean (*SD*)**
Age (years)	31.28 (13.35)
Female/Male/Else (*n*)*	2066/896/24
Education (years)	15.48 (4.06)

Social ladder rank	6.29 (1.61)
CID – friend	1.66 (1.17)
CID – stranger	1.13 (1.13)
Total CTQ score	47.35 (11.97)
Emotional abuse	8.9 (4.59)
Physical abuse	6.54 (3.05)
Sexual abuse	6.68 (3.81)
Emotional neglect	8.76 (3.9)
Physical neglect	7.37 (2.92)

Note: CID = Comfortable Interpersonal Distance, CTQ = Childhood Trauma Questionnaire. *The values for Female/Male and households represent frequencies.

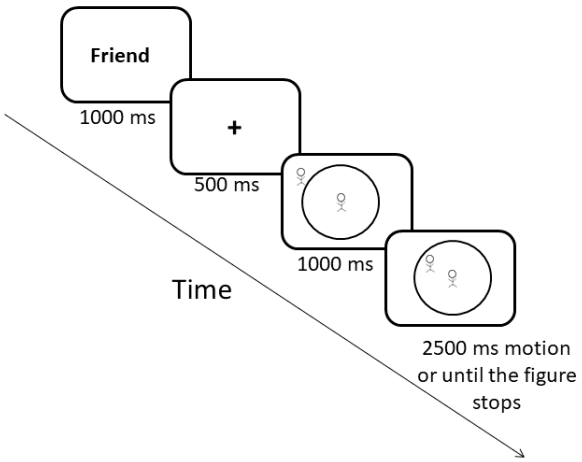
Procedure

An umbrella ethics approval was obtained from Saarland University (Identification number: 21-07). In addition, local ethics approvals were obtained in countries requiring a separate application. All study procedures were preregistered in September 2021 (available at As Predicted). Study data can be accessed via the Open Science Framework. The study was offered in Afrikaans, Arabic, Amharic, English, French, German, Hebrew, Japanese, Spanish, Swedish, Turkish, and Xhosa. Before starting the experiment, participants received information on the study procedures and provided informed consent. They first completed a modified online version of the well-established CID task (Perry et al., 2013). They then provided demographic information (age, gender, country of residence, birth country, and socioeconomic status). Finally, they completed questionnaires assessing CM (Bernstein et al., 1994), lifetime trauma exposure (Weathers et al., 2013), PTSD symptoms (Cloitre et al., 2018), social anxiety (Connor et al., 2001), depression (Kroenke et al., 2001), social support (Zimet et al., 1988), interpersonal stress in close relationships (Bancila & Mittelmark, 2009), attachment styles (Wei et al., 2007), and fear of COVID-19 (Mertens et al., 2020) (for details see Supplementary File). Participating psychology students were given course credits.

Measures

Assessment of preferred interpersonal distance

We programmed an online version of the CID task (Perry et al., 2013) to assess the main dependent variable, CID. The validated task correlates with different interpersonal distance measures, including real-life distance between participants and strangers (Duke & Nowicki, 1972; Perry et al., 2015). During the task, participants see a circular room on the screen with a line-figure standing in the center. They are instructed to imagine they are the figure. In each trial, they see another figure at the entrance approaching them. In half of the trials, participants are asked to imagine the approaching figure is a friend. In the remaining trials, they are asked to imagine the approaching figure is a stranger. Thereafter, the figure representing the friend or stranger approaches the participant in the center of the room. Participants are requested to press the spacebar when they want the approaching figure to stop/as soon as they start feeling uncomfortable with the distance between themselves and the approaching figure (see example Figure 1). The task includes eight different radii (entrances) corresponding to 0°, 45°, 90°, 135°, 180°, 225°, 270°, and 315°. Each of the two figures (stranger/friend) appears 48 times: six repetitions per radius. To account for device specific timing errors, participants completed eight intermixed control trials or "speed trials" (for a total of 56 trials) during which they saw the same room with the two figures and were instructed to press the spacebar as soon as the trial began, and the room appeared on their screen. We accounted for RTs on these trials when analysing RTs during interpersonal distance trials. Moreover, to avoid responses based on a desire to shorten the task, each trial lasted 5s, regardless of the chosen distance.



"During the task, you will see a circular room on the screen with a small figure standing in the center. Imagine you are the figure. In each trial, you will see another person approaching you. In some of the trials, we ask you to imagine the approaching person is a friend, and in other trials, we ask you to imagine the approaching person is a stranger. This information will be provided at the beginning of each trial. Please press the spacebar as soon as you start feeling uncomfortable with the distance between you and the approaching person."

Figure 1. Example of an experimental trial, including instructions for participants.

The outcome variable was the RT, with higher RTs reflecting smaller CID. For Hypotheses 1, 2, and 3, RTs of individual trials (minus mean RTs on control trials) were subjected to the analyses. Since Hypotheses 4 and 5 did not focus on differences in RTs related to the AI, RTs were collapsed across trials for the respective analyses, reducing model complexity. The mean RT (minus the mean RT on control trials) was thus subjected to analyses.

Data analyses

A series of multilevel models was fit to investigate associations between the CTQ score, CID, and outcomes of socio-emotional functioning. The acquired data were nested in a three-level structure, such that trials (Level 1) were nested in participants (Level 2), which were nested in countries (Level 3). For Hypotheses 1, 2, and 3, ML models included the Level 2 (L2) predictor CTQ score, the Level 1 (L1) predictor Approaching Individual (AI), and their interaction. In addition, we introduced country-level CTQ mean as an L3 predictor to investigate whether level of CM in a given country accounted for differences in CID

between individuals. To account for further sources of variance, the Level 2 predictors Gender, MINI-SPIN score, ITQ score, PHQ score, and FCQ score were introduced as covariates. For Hypotheses 1, 2, and 3, all variables were group-mean centered on participant (L2 variables) or trial level (L1 variable - AI) (Kreft et al., 1995). First, we tested a random intercept model comprising CTQ score, AI, and their interaction as fixed effects (Model 1). Then, we tested the improvement of model fit after inclusion of covariates (Model 2). Thereafter, random slopes for AI (Model 3) and CTQ score (Model 4) were subsequently entered. Final model selection was based on significant improvements of model fit. Generalizability of the association between CTQ scores and CID between countries was assessed by evaluating the random slope of CTQ score. Since including this slope did not yield a significant improvement of model fit – indicating a lack of substantial between-country variability in the association between CTQ score and CID – we refrained from examining potential country-level moderators (explorative analyses mentioned in the preregistration).

Since Hypotheses 4 and 5 did not focus on effects of AI, RTs were aggregated across trials resulting in a 2-level structure with participants (L1) being nested in countries (L2). Deviating from our preregistration, we tested Hypothesis 4 by conducting separate analyses for each CTQ subscale rather than introducing these in a combined model because the high level of intercorrelation between subscales in fact precluded such analyses. For Hypothesis 4, ML models thus included the respective CTQ subscale as L1 predictor as well as Gender, MINI-SPIN score, ITQ score, PHQ score, and FCQ score as L1 covariates. In addition, we introduced country-level CTQ subscale mean as an L2 predictor to investigate whether the level of CM in a given country accounted for differences in CID between individuals. All variables were group-mean centered on participant-level (Kreft et al., 1995). In a first step, we tested a random intercept model comprising the respective CTQ subscale score (Model 1). Then, we tested the improvement of model fit after inclusion of covariates (Model 2).

Thereafter, a random slope for the respective CTQ subscale (Model 3) was entered and model fit was re-evaluated. Final model selection was based on significant improvements of model fit.

For Hypothesis 5, the ML model included ECR-S subscales, MSPSS subscales, and BSRS scores as L1 predictors. All variables were group-mean centered on participant-level (Kreft et al., 1995). A random intercept model comprising all predictors was tested.

All multilevel models were fit using restricted maximum likelihood estimation and the lme4 package (Bates, 2010; Bates et al., 2014) in R (R Core Team, 2022). Interactions were probed using simple slopes techniques implemented in the R package reghelper (Hughes, 2017). The two-sided α level was set to .05 for all analyses. Degrees of freedom varied across analyses, given missing data.

Results

Sample Characteristics

A total of 67.31% of the sample experienced any type of CM (Emotional abuse: 39.8%, Physical abuse: 20%, Sexual abuse: 29.3%, Physical neglect: 37.3%, Emotional neglect: 39.7%). 89.8% of the sample experienced at least one potentially traumatic event. 7.04% met the cut-off for PTSD only and 9.76% met the cut-off for both PTSD and C-PTSD. 50.5% reported mild-to-moderate depression and 12.4% reported (moderately) severe depression. 35.2% met the cut-off for social anxiety disorder and generalized social anxiety.

Hypotheses 1, 2, & 3: Link between CTQ total score and CID. Observations were non-independent as reflected in an ICC of .88. The model including the covariates fitted our data significantly better than the baseline model (χ^2diff(5) = 17.01, p = .005). Moreover, including a random slope for AI further improved model fit (χ^2diff (2) = 25114.50, p < .001). However, including a random slope for CTQ resulted in no further improvements of model

fit (χ^2diff(2) = 5.46, p = .065). Thus, the effect of AI on CID varied substantially between participants, whereas this was not the case for the effect of CTQ scores on CID (see Figure 2). Table 3 provides an overview of intercepts and slopes as well as estimated variance of fixed effects accounted for by each model.

Table 3. Model summaries of linear mixed model analyses for Hypotheses 1, 2, & 3

	Model 1 Random Intercept			**Model 2 + Covariates**			**Model 3 + Random Slope AI**			**Model 4 + Random Slope CTQ**		
Predictors	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*
(Intercept)	1.28	1.05 – 1.51	**<.001**	1.28	1.05 – 1.51	**<.001**	1.28	1.06 – 1.51	**<.001**	1.29	1.06 – 1.51	**<.001**
CTQ	-0.01	-0.01 – -0.01	**<.001**	-0.01	-0.01 – -0.00	**<.001**	-0.01	-0.01 – -0.00	**<.001**	-0.01	-0.01 – -0.00	**.002**
AI	0.54	0.53 – 0.54	**<.001**	0.54	0.53 – 0.54	**<.001**	0.53	0.52 – 0.55	**<.001**	0.53	0.52 – 0.55	**<.001**
Country-level CTQ	0.01	-0.02 – 0.03	.675	0.01	-0.02 – 0.03	.673	0.00	-0.02 – 0.03	.720	0.00	-0.02 – 0.03	.781
CTQ:AI	0.00	0.00 – 0.00	**.003**	0.00	0.00 – 0.00	**.003**	0.00	-0.00 – 0.00	.419	0.00	-0.00 – 0.00	.419
FCQ				0.00	-0.00 – 0.01	.527	0.00	-0.00 – 0.01	.466	0.00	-0.00 – 0.01	.447
Gender				0.07	-0.02 – 0.15	.115	0.06	-0.02 – 0.14	.143	0.06	-0.02 – 0.15	.124
PHQ-9				-0.01	-0.01 – 0.00	.157	-0.01	-0.01 – 0.00	.150	-0.01	-0.01 – 0.00	.149
MINI-SPIN				0.02	0.01 – 0.04	**<.001**	0.02	0.01 – 0.04	**<.001**	0.02	0.01 – 0.04	**<.001**
ITQ – PTSD				-0.00	-0.01 – 0.00	.438	-0.00	-0.01 – 0.00	.423	-0.00	-0.01 – 0.00	.393
Random effects												
σ^2	0.25			0.25			0.20			0.20		

τ_{00}	0.99 $_{\text{Country:ID}}$	0.98 $_{\text{Country:ID}}$	0.99 $_{\text{Country:ID}}$	0.98 $_{\text{Country:ID}}$
	0.35 $_{\text{Country}}$	0.35 $_{\text{Country}}$	0.34 $_{\text{Country}}$	0.34 $_{\text{Country}}$
Random effects				
τ_{11}			0.22 $_{\text{Country:ID.AI}}$	0.22 $_{\text{Country:ID.AI}}$
				0.00 $_{\text{Country.CTQ}}$
ρ_{01}			0.05 $_{\text{Country:ID}}$	0.06 $_{\text{Country:ID}}$
				-0.59 $_{\text{Country}}$
ICC	.84	.84	.88	.88
Marginal R^2	.050	.053	.053	.050

Note: CTQ = Childhood Trauma Questionnaire, AI = Approaching Individual (Stranger vs. Friend), FCQ = Fear of the Coronavirus Questionnaire, PHQ-9 = Patient Health Questionnaire – 9, MINI-SPIN = Mini-Social Phobia Inventory, ITQ = International Trauma Questionnaire, PTSD = Posttraumatic Stress Disorder, ID = Participant ID, ICC = Intraclass correlation.

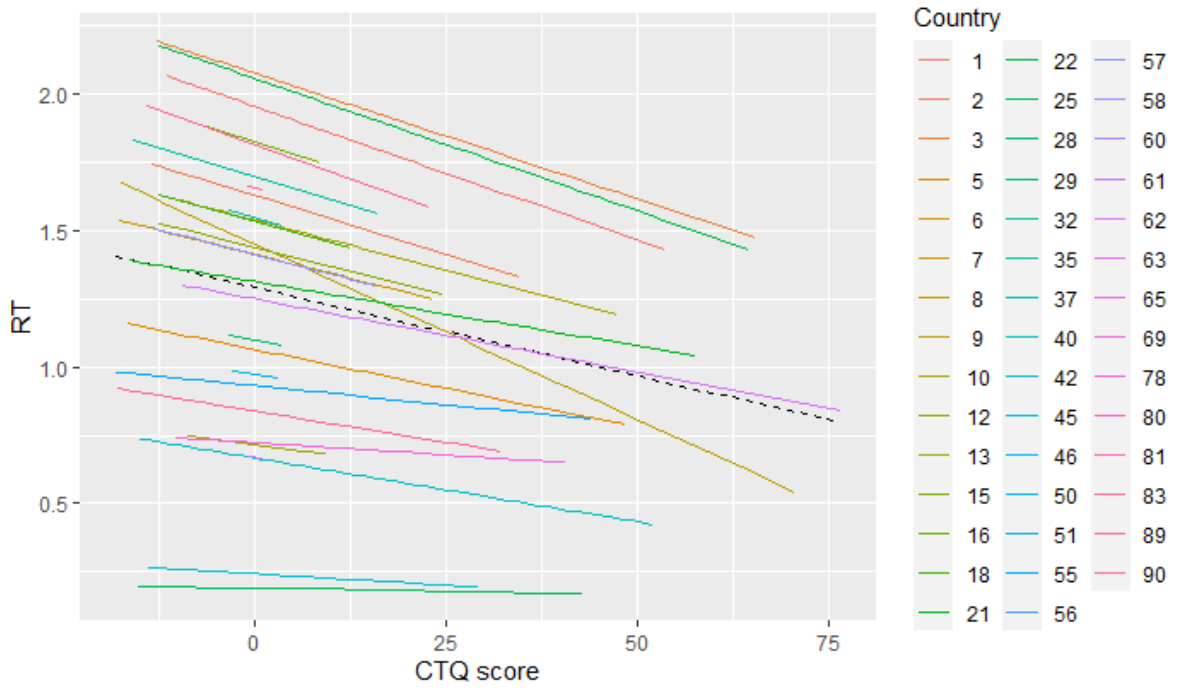


Figure 2. Association between childhood maltreatment (CM) and comfortable interpersonal distance (CID) in different countries. CTQ = Childhood Trauma Questionnaire.

In the final model (Model 3), fixed effects were estimated to account for 5.3% of variance in CID. As expected, the model yielded a significant effect of AI on CID, reflecting that participants preferred larger distances towards strangers than towards friends (β = .21, $p < .001$). Critically, a significant effect of the CTQ score emerged, indicating that individuals with higher levels of CM showed larger CID than individuals with lower levels of CM (β = -.08, $p < .001$). The CTQ x AI interaction failed to reach significance (β = .003, $p = .403$). Accordingly, simple slopes analyses revealed significant and similarly sized associations between CTQ scores and CID to friends ($B = -.0082$, $p < .001$) and strangers ($B = -.0077$, $p < .001$). In addition, a significant effect of the MINI-SPIN score was evident, reflecting that participants with higher levels of social anxiety preferred shorter distances towards others than those with lower levels of social anxiety (β = .06, $p < .001$).

Hypothesis 4: Associations between CTQ subscale scores and CID. Separate analyses for each subscale revealed significant effects of physical abuse (β = -.09, $p < .001$),

sexual abuse (β = -.04, p = .019), emotional neglect (β = -.04, p = .031), and physical neglect (β = -.12, p < .001) on CID. All effects reflected that higher levels of abuse/neglect were linked with larger CID. Moreover, effects were most pronounced for the physical domain (i.e., physical abuse and physical neglect). No significant effect emerged for emotional abuse (β = -.03, p < .110). Detailed model comparisons and statistics are provided in the Supplementary File.

Hypotheses 5: Associations between socio-emotional functioning and CID. Analyses revealed significant effects of social support by significant others (β = .22, p < .001), anxious attachment (β = -.12, p < .001), and avoidant attachment (β = -.09, p < .001) on CID, whereby less social support, more anxious, and more avoidant attachment were linked to greater CID. Significant support by family (β = -.04, p = .058) and friends (β = .02, p = .243) and social strain (β = -.03, p = .066) had no significant impact on CID. The fixed effects were estimated to account for 2.3% of variance in CID. Table 4 provides an overview of intercepts and slopes.

Table 4. Model summary of linear mixed model analyses for Hypothesis 5

Random intercept model			
Predictors	*Estimates*	*CI*	*p*
(Intercept)	1.29	1.06 – 1.52	**<.001**
MSPSS – SO	0.21	0.16 – 0.25	**<.001**
MSPSS – FR	0.02	-0.01 – 0.05	.245
MSPSS – FA	-0.03	-0.06 – 0.00	.059
ECR-S – ANX	-0.02	-0.03 – -0.01	**<.001**
Random intercept model			
Predictors	*Estimates*	*CI*	*p*
ECR-S – AVO	-0.01	-0.02 – -0.01	**<.001**

BSRS	-0.01	-0.02 – 0.00	.065
Random Effects			
σ^2		0.98	
$\tau_{00\ Country}$		0.34	
ICC		.26	
Marginal R^2		.023	

Note: MSPSS = Multidimensional Scale of Perceived Social Support, SO = Significant Others, FR = Friends, FA = Family, ECR-S = Experiences in Close Relationship Scale – Short Form, Anx = Anxiety, Avo = Avoidance, BSRS = Bergen Social Relationships Scale, ICC = Intraclass correlation.

Discussion

This study investigated the relationship between CM and CID towards friends and strangers in 2986 adults with varying cultural backgrounds, residing in various countries. Overall, higher levels of different types of CM were linked to larger CID towards both friends and strangers. Analyses further suggested that this effect was comparable across countries (i.e., lack of model improvement by including CTQ random slope). Distal outcomes analyses showed that insecure attachment styles were associated with a larger CID. Furthermore, while levels of interpersonal stress were unrelated to CID, individuals reporting less social support preferred a larger CID. No significant gender differences were found in any of the analyses.

In line with our first hypothesis, CM predicted larger CID towards strangers. Although effect sizes were small, we were able to demonstrate significant associations between CM and larger CID towards strangers across countries. Thus, while other long-term effects of CM such as depressive symptoms and borderline personality disorder seem to be affected by cultural background (Levey et al., 2017; Roxburgh & MacArthur, 2014; Sunley et al., 2020), the effect of CM on CID might more strongly and universally be driven by factors such as CM induced changes in anatomical structures associated with CID such as the amygdala

(Kennedy et al., 2009; McCrory et al., 2011; Teicher & Samson, 2016). Future research should investigate whether CID is associated with behavioral and social problems related to CM such as loneliness or social isolation (Shevlin et al., 2015) and whether the impact of CID differs depending on culture.

Furthermore, our study shows for the first time that associations between CM and CID are also present when an imagined friend was approaching. Given the association of CM with parenting stress and marital separation (Hughes & Cossar, 2016; Labella et al., 2018; Zamir, 2021), larger CID towards close others might contribute to disruptions in relationships experienced by adult survivors of CM, e.g., through discomfort associated with social touch (Maier et al., 2020). Intact social relationships, however, have the potential to protect victims of CM from developing both physical and mental disorders (Holz et al., 2020; Yule et al., 2019) and to promote well-being in a broad sense (Pfaltz et al., 2022). Individuals exposed to CM might thus benefit from interventions aimed at improving social functioning. Importantly, associations between CM and CID did not differ between the friends and stranger condition, even though the approaching figure's effect on CID varied substantially between countries. This highlights that in the case of CM, CID might be generally, i.e., across different interaction partners, elevated, potentially impairing the development and maintenance of supportive social relationships (de Heer et al., 2022; Labella et al., 2018; Pfaltz et al., 2022).

In line with this assumption, we found that individuals reporting less social support by significant others preferred larger CID. However, interpersonal stress was not associated with CID. One factor that might explain this difference is loneliness, which has been associated with CM (de Heer et al., 2022), lower relationship satisfaction (Mund et al., 2022), and larger CID (Lieberz et al., 2021; Saporta et al., 2021). Notably, Saporta et al. (2021) found that while chronic loneliness is linked to increased CID, situational loneliness (e.g., during

the COVID-19 pandemic) is linked to decreased CID. Thus, situational loneliness might serve an adaptive function towards social connectedness (Tomova et al., 2020), whereas individuals who are chronically lonely tend to avoid social contact (Spithoven et al., 2017). Although our measures of social support and interpersonal stress did not ask for the duration of the reported experiences (Bancila & Mittelmark, 2009; Zimet et al., 1988), social support and social strain might reflect levels of chronic and acute loneliness to a different degree. The fact that no effects of COVID-19 or fear thereof were found in our study might be mainly due to the low reliability of our corresponding measures. To better understand the relationship between CM, CID, and both social support and interpersonal stress, future studies should thus collect information on the chronicity of these experiences and on loneliness.

Individuals affected by CM tend to develop insecure (anxious or avoidant) attachment styles (Baer & Martinez, 2006; Muller et al., 2000). Given the protective role of CID, we had hypothesized that participants high in attachment avoidance and anxiety would prefer larger CID, which was confirmed by our results. This is in line with previous findings of larger CID in adults with insecure attachment styles (Akbarian et al., 2020; Kaitz et al., 2004; Yukawa et al., 2007) and might suggest that individuals with CM show a lower threshold to respond with unpleasant feelings and corresponding physiological states (Åhs et al., 2015; Hayduk, 1978) to the presence of others. These responses might affect their behavior, including non-verbal signals (e.g., body posture), and negatively impact social interactions. Interventions might thus aim at increasing a sense of safety and security, e.g. through body-oriented approaches (Kuhfuß et al., 2021).

Contrasting previous findings (Givon-Benjio et al., 2020; Givon-Benjio & Okon-Singer, 2020; Hautle et al., submitted for publication b; Perry et al., 2013), we found that individuals with higher levels of social anxiety preferred smaller CID compared to those with lower levels of social anxiety. However, we assessed social anxiety using the Mini-SPIN, a

three item measure with low positive predictive value (52.5%) for social anxiety disorder (Connor et al., 2001). Given that previous studies were either conducted in clinical populations (Givon-Benjio et al., 2020) or used a more extensive questionnaire to assess social anxiety (Givon-Benjio & Okon-Singer, 2020; Hautle et al., submitted for publication b; Perry et al., 2013), these results should be replicated, e.g., in clinical populations, and interpreted with caution.

Regarding the impact of CM subtypes on CID, our results are partly in line with Hautle et al. (submitted for publication b) who found associations of CM with all subtypes of CM, and suggest that both abuse and neglect have the potential to interfere with socioemotional development (Kinard, 1999; Mattar, 2018; Vachon et al., 2015). Yet, in contrast to Lüönd et al. (2022), we found that emotional abuse was not associated with larger CID. Although subtypes frequently co-occur (Vachon et al., 2015), specific neural and behavioral differences between abuse and neglect have been documented (Iffland & Neuner, 2020; Teicher & Samson, 2016). As the experience of neglect is distinct from abuse (McLaughlin et al., 2014) and behavioral differences between abused and neglected adults are documented (Paradis & Boucher, 2010), individuals who predominantly experienced neglect might also show different nonverbal reactions to intrusions of their personal space compared to those who predominantly experienced abuse. For example, they might feel insecure when confronted with (too much) physical closeness as it is something they are not familiar with. Conversely, abused individuals might associate physical closeness with potential danger of being hurt and display protective, aggressive non-verbal behavior (Fitton et al., 2020). Future studies should thus investigate whether nonverbal behavior associated with intrusion of personal space differs depending upon the subtype of CM.

Strengths and Limitations

We included data from 43 countries, representing a wide range of cultures, including individuals from non-WEIRD[1] countries. However, while we statistically accounted for varying sample sizes between countries, future studies should aim for more balanced sample sizes. Furthermore, using a virtual reality paradigm might help to assess and control for the impact of age and gender of the approaching figure (Riem et al., 2019), which, to simplify our paradigm, we did not attempt. Finally, studies using both a computerized version of the CID task and the stop-distance method did not report different results between the two (Givon-Benjio & Okon-Singer, 2020). Also, the computerized version of the CID task is a validated (Perry et al., 2015), often-used procedure (Givon-Benjio et al., 2020; Givon-Benjio & Okon-Singer, 2020; Haim-Nachum et al., 2021; Perry et al., 2013) that correlates with real-life distance between participants and strangers (Duke & Nowicki, 1972; Perry et al., 2015). Nevertheless, results should be replicated using closer to real-life conditions (Hayduk, 1983).

Conclusion

Our findings suggest that child maltreatment (CM) is linked to distorted regulation of comfortable interpersonal distance (CID) across cultures, with a history of CM being linked to larger CID towards strangers and close others. Furthermore, CID was larger in individuals with insecure attachment and in those reporting low levels of social support. Given the importance of social relationships on mental health, exploring ways to support individuals affected by CM in the regulation of interpersonal distance might contribute to the development of effective preventive and therapeutic interventions. Such research would be especially important considering the similar effects we found across cultures.

[1] WEIRD = Western, Educated, Industrialised, Rich, and Democratic

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Supplementary File

Description of questionnaires

Childhood trauma. The *Childhood Trauma Questionnaire* (CTQ; Bernstein et al., 1994) measures the severity of five CM subscales: Emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect. For each item, participants respond in the context of "when you were growing up", ranging from 1 = "never" to 5 = "very often", producing scores of 5 to 25 for each subscale. Cut-off scores were computed according to the manual of the CTQ (Bernstein et al., 2003). Internal consistency coefficients in the current sample ranged between $\alpha = .65$ (physical neglect), $\alpha = .83$ (physical abuse), $\alpha = .86$ (emotional neglect), $\alpha = .87$ (emotional abuse), and $\alpha = .91$ (sexual abuse).

Trauma exposure. *Life Events Checklist* (LEC; Weathers et al., 2013). Participants were screened for 16 potentially traumatic events. For each event, they indicated if it directly happened to them, they witnessed it happen to someone else; they learned about it happening to a person close to them; and/or they were exposed to it as part of their job; or if it did not apply. If more than one event occurred, participants were asked to describe the event that currently bothers them the most and estimate how long ago it happened.

Trauma-related symptoms. The *International Trauma Questionnaire* (ITQ; Cloitre et al., 2018) focuses on the core features of PTSD and complex PTSD (C-PTSD), screening for symptoms including re-experiencing, avoidance, and sense of current threat as well as affective dysregulation, negative self-concept, and disturbances in relationships. An additional item screens for the effect of these symptoms on participants' functioning, including social and work-related functioning. Internal consistency in the current sample was $\alpha = .92$.

Depression. The *Patient Health Questionnaire-9* (PHQ-9; Kroenke et al., 2001) is a brief instrument designed to identify individuals with nine depressive symptoms experienced over the past two weeks (e.g., anhedonia, sleep disturbances, low self-esteem, concentration difficulties). Responses are scored from 0 "not at all" to 3 "nearly every day". Symptom severity

was assessed by summing all item scores. Internal consistency in the current sample was α = .89.

Social phobia. We applied the *Mini-Social Phobia Inventory* (MINI-SPIN; Connor et al., 2001) which contains three items about avoidance of social activities and fear of embarrassment during the past week. Items are rated from 0 "not at all " to 4 "extremely"; higher scores indicate greater levels of social phobia. Internal consistency in the current sample was α = .85.

Perceived social support. The *Multidimensional Scale of Perceived Social Support* (MSPSS; Zimet et al., 1988) is a 12-item scale, assessing respondents' self-perceived level of support from family, friends, and significant others. Each item is rated on a scale from 1 "very strongly disagree" to 7 "very strongly agree". Internal consistency in the current sample ranged between α = .93 (family), α = .94 (friends), and α = .95 (significant others).

Social stress. The *Bergen Social Relationships Scale* (BSRS; Bancila & Mittelmark, 2009) assesses social strain (i.e., interpersonal stress that occurs in relationships with significant others who cause stress even when they do not mean to). The measure includes six types of social situations that could be seriously stressful (e.g., criticism, high demands). Response alternatives range from "does not describe me at all" to "describes me very well", with higher scores reflecting higher levels of social stress. Internal consistency in the current sample was α = .80.

Attachment style. We used the *Experiences in Close Relationship Scale* – Short Form (ECR-S; Wei et al., 2007) to measure adult attachment. The scale measures how individuals generally experience close relationships (e.g., close friends, family members, romantic partners). Respondents are asked to rate their agreement with each of the 12 items on a 7 point-Likert scale. Results consist of two scores for two separate factors; attachment *anxiety* (e.g., fear of rejection, dependence on partners) and attachment *avoidance* (e.g., excessive need for self-reliance, reluctance to self-disclose). Higher scores on either or both of these factors reflect

insecure attachment style. The overall internal consistency of the scale in the current study was .76 (α = .73 and α = .71, for anxiety and avoidance, respectively).

COVID-19. To account for effects driven by the COVID-19 pandemic, we asked participants to indicate whether they have ever tested positive for SARS-CoV-2 and which level of restrictions were in place where they lived at the time of study.

We further used the *Fear of the Coronavirus Questionnaire* (FCQ; Mertens et al., 2020) to assess the potential impact of COVID-19-related fears on interpersonal distance. Respondents rate their agreement level with eight items from 1 = "strongly disagree" to 5 = "strongly agree". Sample items: "I am very worried about the coronavirus", "I am taking precautions to prevent infection", and "I am constantly following all news updates regarding the virus". Internal consistency in the current sample was α = .51.

Translation of questionnaires

Questionnaires that were not available in all study languages were translated according to predefined criteria which were based on available guidelines (Wild et al., 2005). Two forward and two backward translators were used per target language. All translators were native speakers of the target language and were fluent in the source language. To generate the final translated questionnaire, both independent versions were compared with each other, and discrepancies resolved.

Detailed Analyses of Hypothesis # 4

Analysis of Emotional Neglect as Predictor of CIPD

The model including the covariates fitted our data significantly better than the baseline model (χ^2diff(5) = 20.34, p = .001). Including a random slope for the CTQ Emotional Neglect (EN) subscale did not result in any further improvements of model fit (χ^2diff (2) = 1.74, p = .420). Supplementary Table 1 provides an overview of intercepts and slopes as well as the estimated variance of fixed effects accounted for by each model.

In the final model (Model 2), the fixed effects were estimated to account for 0.8% of variance in CIPD. The model yielded a significant effect of the CTQ EN subscale on CIPD, indicating that individuals with higher levels of EN preferred larger distances towards others than individuals with lower levels of EN (β = -.04, p = .031). In addition, significant effects of the MINI-SPIN score (β = .07, p < .001) and the PHQ-9 score (β = -.03, p = .020) were evident, reflecting that participants with higher levels of social anxiety and lower levels of depression preferred shorter distances towards others than those with lower levels of social anxiety and higher levels of depression.

Analysis of Physical Neglect as Predictor of CIPD

The model including the covariates fitted our data significantly better than the baseline model (χ^2diff(5) = 14.88, p = .011). Moreover, including a random slope for the CTQ Physical Neglect (PN) subscale further improved model fit (χ^2diff (2) = 7.26, p = .026). Supplementary Table 2 provides an overview of intercepts and slopes as well as the estimated variance of fixed effects accounted for by each model.

In the final model (Model 3), the fixed effects were estimated to account for 2.3% of variance. The model yielded a significant effect of the CTQ PN subscale on CIPD, indicating that individuals with higher levels of PN preferred larger distances towards others than individuals with lower levels of PN (β = -.12, p < .001). In addition, a significant effect of the MINI-SPIN score (β = .06, p < .001) emerged, reflecting that participants with higher levels of social anxiety preferred shorter distances towards others than those with lower levels of social anxiety.

Analysis of Physical Abuse as Predictor of CIPD

The model including the covariates fitted our data significantly better than the baseline model (χ^2diff(5) = 16.27, p = .006). Moreover, including a random slope for the CTQ Physical Abuse (PA) subscale further improved model fit (χ^2diff (2) = 9.32, p = .009). Supplementary Table 3

provides an overview of intercepts and slopes as well as the estimated variance of fixed effects accounted for by each model.

In the final model (Model 3), the fixed effects were estimated to account for 1.2% of variance. The model yielded a significant effect of the CTQ PA subscale on CIPD, indicating that individuals with higher levels of PA preferred larger distances towards others than individuals with lower levels of PA (β = -.09, p < .001). In addition, a significant effect of the MINI-SPIN score (β = .07, p < .001) emerged, reflecting that participants with higher levels of social anxiety preferred shorter distances towards others than those with lower levels of social anxiety.

Analysis of Sexual Abuse as Predictor of CIPD

The model including the covariates fitted our data significantly better than the baseline model (χ^2diff(5) = 19.86, p = .001). Including a random slope for the CTQ Sexual Abuse (SA) subscale did not result in any further improvements of model fit (χ^2diff (2) = 0.36, p = .835). Supplementary Table 4 provides an overview of intercepts and slopes as well as the estimated variance of fixed effects accounted for by each model.

In the final model (Model 2), the fixed effects were estimated to account for 0.7% of variance. The model yielded a significant effect of the CTQ SA subscale on CIPD, indicating that individuals with higher levels of SA preferred larger distances towards others than individuals with lower levels of SA (β = -.04, p = .019). In addition, significant effects of the MINI-SPIN score (β = .07, p < .001) and the PHQ-9 score (β = -.05, p = .015) were evident, reflecting that participants with higher levels of social anxiety and lower levels of depression preferred shorter distances towards others than those with lower levels of social anxiety and higher levels of depression.

Analysis of Emotional Abuse as Predictor of CIPD

The model including the covariates fitted our data significantly better than the baseline model (χ^2diff(5) = 20.07, p = .001). Including a random slope for the CTQ Emotional Abuse (EA) subscale did not result in any further improvements of model fit (χ^2diff (2) = 2.49, p = .289).

Supplementary Table 5 provides an overview of intercepts and slopes as well as the estimated variance of fixed effects accounted for by each model.

In the final model (Model 2), the fixed effects were estimated to account for 1.1% of variance. The model did not yield a significant effect of the CTQ EA subscale on CIPD (β = -.03, p = .110). Significant effects of the MINI-SPIN score (β = .07, p < .001) and the PHQ-9 score (β = -.04, p = .032) were evident, reflecting that participants with higher levels of social anxiety and lower levels of depression preferred shorter distances towards others than those with lower levels of social anxiety and higher levels of depression.

Supplementary Table 1. Model summary of linear mixed model analyses for Hypothesis # 4 – Emotional Neglect

	Model 1 Random Intercept			**Model 2 + Covariates**			**Model 3 + Random Slope CTQ**		
Predictors	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*
(Intercept)	1.28	1.05 – 1.51	**<0.001**	1.28	1.05 – 1.51	**<0.001**	1.28	1.05 – 1.51	**<0.001**
CTQ_EN	-0.01	-0.02 – -0.00	**0.006**	-0.01	-0.02 – -0.00	**0.031**	-0.01	-0.02 – 0.00	0.150
Country-level CTQ_EN	0.04	-0.06 – 0.13	0.466	0.04	-0.06 – 0.13	0.464	0.04	-0.06 – 0.13	0.430
FCQ				0.00	-0.00 – 0.01	0.498	0.00	-0.00 – 0.01	0.521
Sex				0.07	-0.01 – 0.15	0.103	0.07	-0.01 – 0.15	0.092
PHQ-9				-0.01	-0.02 – -0.00	**0.020**	-0.01	-0.02 – -0.00	**0.023**
MINI-SPIN				0.02	0.01 – 0.04	**<0.001**	0.02	0.01 – 0.04	**<0.001**
ITQ – PTSD				-0.01	-0.01 – 0.00	0.054	-0.01	-0.01 – 0.00	0.053
Random Effects									
σ^2	1.00			1.00			1.00		
τ_{00}	0.35 $_{Country}$			0.35 $_{Country}$			0.35 $_{Country}$		
τ_{11}							0.00 $_{Country.CTQ\_EN}$		
ρ_{01}							-0.52 $_{Country}$		
ICC	0.26			0.26			0.26		
Marginal R^2	0.003			0.008			0.007		

Note. CTQ = Childhood Trauma Questionnaire, EN = Emotional Neglect, PHQ = Patient Health Questionnaire, FCQ = Fear of the Coronavirus Questionnaire, PHQ-9 = Patient Health Questionnaire – 9, MINI-SPIN = Mini-Social Phobia Inventory, ITQ = International Trauma Questionnaire, ICC = Intraclass correlation.

Supplementary Table 2. Model summary of linear mixed model analyses for Hypothesis # 4 – Physical Neglect

	Model 1 Random Intercept			**Model 2 + Covariates**			**Model 3 + Random Slope CTQ**		
Predictors	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*
(Intercept)	1.31	1.09 – 1.53	**<0.001**	1.31	1.09 – 1.53	**<0.001**	1.31	1.08 – 1.53	**<0.001**
CTQ_PN	-0.05	-0.07 – -0.04	**<0.001**	-0.05	-0.07 – -0.04	**<0.001**	-0.05	-0.07 – -0.03	**<0.001**
Country-level CTQ_PN	-0.05	-0.14 – 0.04	0.276	-0.05	-0.14 – 0.04	0.277	-0.04	-0.13 – 0.05	0.430
FCQ				0.00	-0.00 – 0.01	0.481	0.00	-0.00 – 0.01	0.485
Sex				0.05	-0.03 – 0.14	0.199	0.06	-0.03 – 0.14	0.180
PHQ-9				-0.01	-0.01 – 0.00	0.091	-0.01	-0.01 – 0.00	0.101
MINI-SPIN				0.02	0.01 – 0.04	**0.001**	0.02	0.01 – 0.04	**0.001**
ITQ – PTSD				-0.00	-0.01 – 0.00	0.277	-0.00	-0.01 – 0.00	0.362
Random Effects									
σ^2	0.98			0.98			0.98		
τ_{00}	0.32 $_{\text{Country}}$			0.32 $_{\text{Country}}$			0.33 $_{\text{Country}}$		
τ_{11}							0.00 $_{\text{Country.CTQ\_PN}}$		
ρ_{01}							-0.65 $_{\text{Country}}$		
ICC	0.24			0.24			0.25		
Marginal R^2	0.019			0.023			0.019		

Note. CTQ = Childhood Trauma Questionnaire, PN = Physical Neglect, PHQ = Patient Health Questionnaire, FCQ = Fear of the Coronavirus Questionnaire, PHQ-9 = Patient Health Questionnaire – 9, MINI-SPIN = Mini-Social Phobia Inventory, ITQ = International Trauma Questionnaire, ICC = Intraclass correlation

Supplementary Table 3. Model summary of linear mixed model analyses for Hypothesis # 4 – Physical Abuse

	Model 1 Random Intercept			**Model 2 + Covariates**			**Model 3 + Random Slope CTQ**		
Predictors	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*
(Intercept)	1.29	1.06 – 1.52	**<0.001**	1.29	1.06 – 1.52	**<0.001**	1.30	1.07 – 1.53	**<0.001**
CTQ_PA	-0.04	-0.06 – -0.03	**<0.001**	-0.04	-0.06 – -0.03	**<0.001**	-0.03	-0.05 – -0.01	**0.001**
Country-level CTQ_PA	-0.00	-0.11 – 0.10	0.932	-0.00	-0.11 – 0.10	0.933	-0.01	-0.12 – 0.09	0.790
FCQ				0.00	-0.00 – 0.01	0.454	0.00	-0.00 – 0.01	0.443
Sex				0.05	-0.04 – 0.13	0.264	0.05	-0.04 – 0.13	0.272
PHQ-9				-0.01	-0.01 – 0.00	0.087	-0.01	-0.01 – 0.00	0.074
MINI-SPIN				0.02	0.01 – 0.04	**<0.001**	0.02	0.01 – 0.04	**<0.001**
ITQ – PTSD				-0.00	-0.01 – 0.00	0.347	-0.00	-0.01 – 0.00	0.350
Random Effects									
σ^2	0.99			0.99			0.98		
τ_{00}	0.35 $_{Country}$			0.35 $_{Country}$			0.35 $_{Country}$		
τ_{11}							0.00 $_{Country.CTQ\_PA}$		
ρ_{01}							-0.73 $_{Country}$		
ICC	0.26			0.26			0.27		
Marginal R^2	0.012			0.016			0.012		

Note. CTQ = Childhood Trauma Questionnaire, PA = Physical Abuse, PHQ = Patient Health Questionnaire, FCQ = Fear of the Coronavirus Questionnaire, PHQ-9 = Patient Health Questionnaire – 9, MINI-SPIN = Mini-Social Phobia Inventory, ITQ = International Trauma Questionnaire, ICC = Intraclass correlation

Supplementary Table 4. Model summary of linear mixed model analyses for Hypothesis # 4 – Sexual Abuse

	Model 1 Random Intercept			**Model 2 + Covariates**			**Model 3 + Random Slope CTQ**		
Predictors	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*
(Intercept)	1.30	1.07 – 1.53	**<0.001**	1.30	1.07 – 1.53	**<0.001**	1.30	1.07 – 1.53	**<0.001**
CTQ_SA	-0.01	-0.02 – -0.00	**0.003**	-0.01	-0.02 – -0.00	**0.019**	-0.01	-0.02 – 0.00	0.072
Country-level CTQ_SA	0.03	-0.09 – 0.14	0.646	0.03	-0.09 – 0.14	0.645	0.03	-0.09 – 0.14	0.648
FCQ				0.00	-0.00 – 0.01	0.503	0.00	-0.00 – 0.01	0.489
Sex				0.08	-0.01 – 0.16	0.067	0.08	-0.00 – 0.16	0.065
PHQ-9				-0.01	-0.02 – -0.00	**0.015**	-0.01	-0.02 – -0.00	**0.015**
MINI-SPIN				0.02	0.01 – 0.04	**<0.001**	0.02	0.01 – 0.04	**<0.001**
ITQ – PTSD				-0.01	-0.01 – 0.00	0.108	-0.01	-0.01 – 0.00	0.099
Random Effects									
σ^2	1.00			1.00			1.00		
τ_{00}	0.35 $_{Country}$			0.35 $_{Country}$			0.35 $_{Country}$		
τ_{11}							0.00 $_{Country.CTQ\_SA}$		
ρ_{01}							-0.21 $_{Country}$		
ICC	0.26			0.26			0.26		
Marginal R^2	0.002			0.007			0.007		

Note. CTQ = Childhood Trauma Questionnaire, SA = Sexual Abuse, PHQ = Patient Health Questionnaire, FCQ = Fear of the Coronavirus Questionnaire, PHQ-9 = Patient Health Questionnaire – 9, MINI-SPIN = Mini-Social Phobia Inventory, ITQ = International Trauma Questionnaire, ICC = Intraclass correlation.

Supplementary Table 5. Model summary of linear mixed model analyses for Hypothesis # 4 – Emotional Abuse

	Model 1 Random Intercept			**Model 2 + Covariates**			**Model 3 + Random Slope CTQ**		
Predictors	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*
(Intercept)	1.27	1.04 – 1.49	**<0.001**	1.27	1.04 – 1.49	**<0.001**	1.27	1.04 – 1.50	**<0.001**
CTQ_EA	-0.01	-0.02 – -0.00	**0.017**	-0.01	-0.02 – 0.00	0.110	-0.00	-0.02 – 0.01	0.392
Countrylevel_CTQ_EA	0.06	-0.02 – 0.14	0.141	0.06	-0.02 – 0.14	0.141	0.05	-0.03 – 0.13	0.207
FCQ				0.00	-0.00 – 0.01	0.530	0.00	-0.00 – 0.01	0.522
Sex				0.07	-0.01 – 0.16	0.077	0.08	-0.01 – 0.16	0.074
PHQ-9				-0.01	-0.02 – -0.00	**0.032**	-0.01	-0.02 – -0.00	**0.027**
MINI-SPIN				0.02	0.01 – 0.04	**<0.001**	0.02	0.01 – 0.04	**<0.001**
ITQ – PTSD				-0.01	-0.01 – 0.00	0.083	-0.01	-0.01 – 0.00	0.080
Random Effects									
σ^2	1.00			1.00			1.00		
τ_{00}	0.33 $_{Country}$			0.33 $_{Country}$			0.33 $_{Country}$		
τ_{11}							0.00 $_{Country.CTQ\_EA}$		
ρ_{01}							-0.84 $_{Country}$		
ICC	0.25			0.25			0.25		
Marginal R^2	0.006			0.011			0.009		

Note. CTQ = Childhood Trauma Questionnaire, EA = Emotional Abuse, PHQ = Patient Health Questionnaire, FCQ = Fear of the Coronavirus Questionnaire, PHQ-9 = Patient Health Questionnaire – 9, MINI-SPIN = Mini-Social Phobia Inventory, ITQ = International Trauma Questionnaire, ICC = Intraclass correlation.