



Master's thesis

*Childhood maltreatment and emotion  
 dynamic processes*

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## **Abstract**

Childhood maltreatment (CM) is experienced by ~40% of all children at major personal and societal costs. Studies show its adverse consequences on emotional functioning and regulation. However, the distinctive effect of the five types of CM is often omitted, and the outline of emotion dynamic patterns in adults with history of CM is understudied. In this master thesis, I conduct an explorative study on the effect of the five types of CM on five emotion dynamic measures using Ecologically Momentary Assessment (EMA) of emotions and explore whether social contact frequency moderated these relationships. I used a subset of HowNutsAreTheDutch (HND) crowdsourcing study (N=290). CM was measured retrospectively using Childhood Trauma Questionnaire (CTQ), and emotions and social contact were reported three times a day for 30 days in a diary study. Physical abuse (PA) was the only type of CM not associated with emotion dynamics measures. We could distinguish specific pattern in abuse and neglect. Furthermore, emotional abuse (EA), sexual abuse (SA), and physical neglect (PN) were all associated mostly with negative emotions, whereas emotional neglect (EN) relates primarily to positive emotion dynamics measures. Differences in high and low arousal were also observed. Social contact frequency did not moderate the associations between emotion dynamics and CM. The study's results suggest that each CM type underlines different emotional processes in adulthood with implications for theory and practice.

*Key words:* childhood maltreatment, emotion dynamic, EMA

## Introduction

The World Health Organisation (WHO, 2006) defined childhood maltreatment (CM) as different types of abuse, neglect, and exploitation of children by a caretaker or close family member (>80% of all instances) or authority agent, friends, strangers, or health care workers that compromise their health, development and dignity (Gilbert et al., 2009; Scher et al., 2004). CM is a common experience reported by ~40% of all human (Stoltenborgh et al., 2015). European community estimates of emotional neglect (EN ~18%) and abuse (EA ~29%), physical neglect (PN ~16%) and abuse (PA ~23%), and sexual abuse (SA ~10%) identify these five types of CM as a key societal issue (e.g., Gilbert et al., 2009; Sethi et al., 2013). Childhood maltreatment can have drastic downstream consequences, including heightened risk of developing depression, suicidality, obesity, and substance abuse, as well as heart disease, cancer, stroke, and diabetes, which are the leading causes of death and disability worldwide, and convey a major personal, financial, and societal burden (Cuijpers et al., 2011; Hughes et al., 2021; WHO, 2006; Sethi et al., 2013).

Different types of CM such as acts of commission/harmful input and acts of omission/inadequate input seem to have different consequences in terms of psychological and physical health (Eilers et al., 2022; Harms et al., 2019; Waxman et al., 2014). In this study I aim to describe how different types of abuse and neglect associate with five emotion dynamic parameters, namely, how intense, variable, instable, inert, and diverse these humans report their emotions to be (see Table 2 for details). A deeper understanding of CM effects on adult emotion dynamics may be informative about the ontogenesis and functioning of emotions, and can help to identify what is well-adjusted and dysfunctional emotional development (e.g., Cicchetti & Ng, 2014). Below, these five most popular emotion dynamics are used as my yardstick to study patterns of association between CM types and indicators of emotion functioning. We assume that emotion dynamics can inform us on when, how, and why the

different CM types impact mental health and well-being, which may also help us better understand the characteristics of “healthy emotion functioning” that underlies the mental and physical health and resilience most people show against or despite psychopathology and major adversity (American Psychiatric Association, 2022; Bonanno et al., 2004). By doing so, I hope these differences between CM types may help guide our field to tailored interventions that foster resilience and positive outcomes.

Before I present my model and study results, I first introduce the different CM types, my conceptualization of five emotion dynamics, and what is known about their connections, and conclude with a synthesis and discussion of the results.

### **Maltreatment and developmental outcomes**

The typical explanation for the downstream risk of CM on emotions, physical and mental health and well-being is a hypothalamic–pituitary–adrenal (HPA)-axis dysregulation and subsequent hormone secretion and wear-and-tear on the body, called “allostatic load” (see Kuzminskaite et al., 2021; Schenk et al., 2018; van der Kolk, 2014). Previous studies showed effects of CM severity and specific types of abuse (EA/PA/SA) and neglect (EN/PN) on a range of outcomes, such as fewer and lower intensity positive emotions, and more frequent and intense negative emotions (Infurna et al., 2015; Lavi et al., 2019; Turiano et al., 2017), and these differences in frequency and arousal are in keeping with a “better safe than sorry” or conservative behavioral strategy (Nesse, 2019; Van den Bergh et al., 2021). CM predicts both internalizing and externalizing symptoms (Spinoven et al., 2016; Waxman et al., 2014), while EN/EA seems to convey a specific heightened risk of developing anxiety and depression (Kuzminskaite et al., 2021), and EN of developing avoidant and schizoid personality disorders (Waxman et al., 2014), among others.

In terms of physical health, CM associates with a chronic inflammatory state independent of clinical comorbidities (Coelho et al., 2014). Specific CM types associate with

specific symptom clusters, such as EA with gastrointestinal and general symptoms, and SA with cardiopulmonary, musculoskeletal, and general symptoms (Eilers et al., 2022). Brain functioning studies showed specificity of SA to alterations in reward circuits, EA to fronto-limbic socioemotional network malfunctioning, and EN to white matter integrity and connectivity disruptions (Cassiers et al., 2018). CM types evidently have unique sequela in terms of mental and physical health and well-being, neuroanatomical organization, and differences in one's emotional landscape and behavioral repertoire.

Examples of CM effects on emotional development include characteristic differences in the intensity and variability of specific emotions, and differences in the perception, recognition (e.g., alexithymia), understanding, expression, regulation, and categorization and/or diversity of the emotion concepts one uses (Cicchetti & Ng, 2014; Cicchetti & Toth, 2015; Harms et al., 2019). Differential imprint of some CM types on emotional development has been observed in children as early as 3 months of age onwards (Cicchetti & Ng, 2014; Cicchetti & Toth, 2015). From the perspective of emotion theory, person and event constitute a dissociable whole, because emotions serve to establish, maintain, change, or terminate the relation between the person and the environment on matters of significance to personal goals, which may connect to past (CM) experiences, such as a stronger need for safety, physical integrity, or autonomy (Barrett, 2017; Campos et al., 1994).

It has been hypothesized that acts of omission, essentially an environment of neglect that deprives a child from a basic human need, is a profoundly different experience than acts of commission, such as abuse, that threaten a child's safety. Such divergent experiences may have instigated the development of different adaptation strategies and patterns of emotional functioning, as I shall now argue below. There are also practical differences between the CM types, such as the signs of physical abuse being typically visible (e.g., bruising, scratches, burns, scars), whereas emotional and sexual abuse are largely out of sight, and rely on the

child's statement (see Table 1). Partly, therefore, there may also be grave underreporting of specific CM types (Gilbert et al., 2009).

### *Maltreatment and emotions*

Next to the general effects of CM on emotion functioning there are also more specific effects. Neglected children have been observed to show attenuated emotional experiences or “flat affect”, for example, and more difficulties in emotional expression recognition, whereas physically abused children show a sensitivity bias in response to or perception of anger (Cicchetti & Toth, 2015). Physical and sexual abuse and physical neglect are associated with emotional dysregulation, but not emotional maltreatment (Kim & Cicchetti, 2010).

Furthermore, the heterogeneity in the definition of CM types across studies can also result in differences in how CM types associate with adult emotional functioning. Similarly, age effects may also influence the observed associations between CM and emotional functioning, as emotional delays and scars are most prominent in children, and may get “under the skin” over adolescence and adulthood (Lavi et al., 2019). Furthermore, in older generations more people may have experienced childhood neglect (e.g., Bullinger et al., 2020). The common overlap between different maltreatment types may obfuscate their independent (“unique”) associations with emotion dynamics, which one can estimate in statistical models with mutual adjustment, and may help identify specific mechanisms (see Table 1). Unadjusted estimates may also overestimate the strength of CM-outcome relationships (Green et al., 2010; Scott et al., 2010). Hitherto the differential impact of commonly studied CM types (as conceptualized by Bernstein et al., 2003) on adult emotional functioning remains understudied, and different objective and subjective features of CM may shape the functioning of emotions accordingly, see Table 1.

**Table 1.***Different types of childhood maltreatment (CM) and observed associations with adult affect intensity and emotion dynamics and functioning*

			PA	NA	Emotion Dynamics	Emotion Functioning
<b>Total CM</b>	CM		-- a,i,k	++ i,k	Higher variability of PA and NA <sup>k</sup>	Dysregulation. <sup>b, n</sup> Higher NA intensity after daily stress. <sup>j</sup>
<b>Abuse</b>		PA and/or SA and/or EA combined. Prime examples are verbal abuse, humiliation, and acts that scare or terrorize a child.				Lower experienced intensity response to negative pictures and higher intensity to positive than non abused. <sup>f</sup>
<b>Neglect</b>		PN and EN combined, primarily inadequate health care, supervision, and protection from hazards, and unmet basic needs (clothing/food) and inattentiveness to a child's emotional and development needs.				Lower sensitivity to affect words. <sup>b</sup> Lower positive picture recognition. <sup>d</sup> No effect on emotional intensity in response to the picture. <sup>f</sup>
<b>Sexual Abuse</b>	SA	Unwanted and/or coercive (attempted) sexual contact and exposure to age-inappropriate sexual material or environments, or sexual exploitation. A dependent, developmentally immature child/adolescent is exposed to sexual activities which they do not fully comprehend, for which they are unable to give consent, and/or that violate the social taboos or family roles.				Positive pictures recognition bias. <sup>d</sup> Impulse control. <sup>c</sup>
<b>Physical abuse</b>	PA	Actual or attempted infliction of physical pain with or without use of an object or weapon and including use of severe corporeal punishment. Examples include beating, shaking, choking, slapping, biting, and throwing objects.				Less accuracy in neutral picture recognition. <sup>d</sup>
<b>Emotional Abuse</b>	EA	Acts of commission against a minor child (other than SA/PA) that caused or could have caused conduct, cognitive, affective or other mental disturbance, such as verbal abuse, emotional abuse, excessive demands on a child's	-- <sup>1</sup>	++ <sup>1</sup>		Dysregulation, i.e., behavior control difficulties in response to NA. <sup>c</sup> Response focused difficulties, i.e., behavioral control in response to NA, deficiencies in regulation strategies. <sup>g*</sup>

performance that may lead to negative self-image and disturbed behaviour. Examples include disregard for a child's requests or needs and manipulation of emotions, e.g., withholding affection, intimidation/threats, or gaslighting.

Dysregulation - multiple types.<sup>e</sup>

<b>Physical Neglect</b>	PN	Failure to provide for a child's basic survival needs, such as nutrition, clothing, shelter, hygiene, and medical care (e.g., caries). Physical neglect may also involve inadequate supervision of a child and other forms of reckless disregard of the child's safety and welfare, such as seeking needed medical care (e.g., untreated wounds or bones).		
<b>Emotional Neglect</b>	NA	Acts of omission against a minor child that caused or could have caused conduct, cognitive, affective or other mental disturbance, such as emotional neglect or intentional social deprivation. One example is failure of parent to arrange appropriate education or knowingly permitting maladaptive behavior.	-- <sup>h*</sup>	Antecedent-focused difficulties in emotion regulation, lack of emotion awareness and emotional clarity. <sup>g*</sup>

*Note.* Majority of the studies did not account for the effects of all five types of CM. PA = Positive affect. NA = Negative affect. \*Studies that account for all five types of CM. References: <sup>a</sup>Somers et al. (2017). <sup>b</sup>Warmingham et al. (2022). <sup>c</sup>Oshri et al. (2015). <sup>d</sup>Young and Widom (2014). <sup>e</sup>Burns et al. (2010). <sup>f</sup>Wooten et al. (2022). <sup>g</sup>Berzenski (2019). <sup>h</sup>Volgenau et al. (2022). <sup>i</sup>Xiang et al. (2020). <sup>j</sup>Glaser et al. (2006). <sup>k</sup>Infurna et al. (2015). <sup>l</sup>Turiano et al. (2017) <sup>m</sup>Glaser et al. (2006). <sup>n</sup>Jennissen et al. (2016).

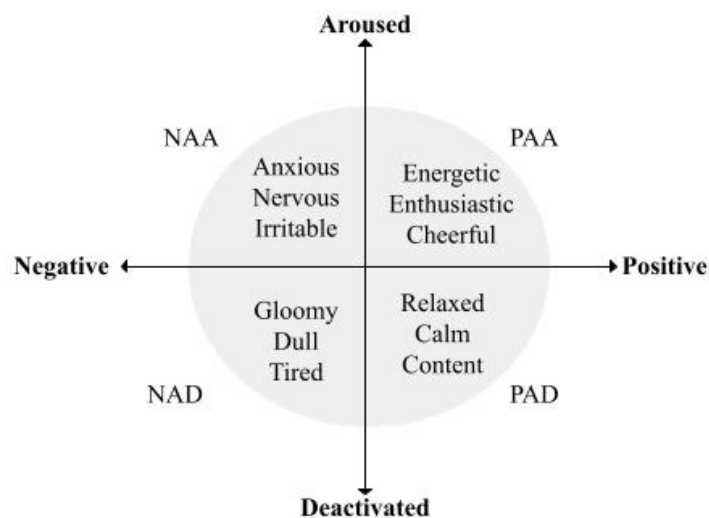


## Emotion dynamics

The five most commonly studied measures of emotion dynamics are emotion *intensity, variability, instability, inertia* and *emodiversity* patterns (Dejonckheere et al., 2019; Houben et al., 2015), which are defined in Table 2, where also prominent connections to various mental health states are shown.<sup>1</sup> These five measures of emotion dynamics cover the intensity and fluctuation patterns of emotions, which were categorized according to their positive or negative valence (“affect colour” i.e., PA/NA) and arousal or bodily activation, following the structure of the affect circumplex (Russell, 1980; Yik et al., 1999), as illustrated in Figure 1.

### Figure 1.

*Circumplex model of positive and negative affect (PA/NA) adapted from Russell (1980) and Yik et al. (1999) containing the 12 emotions under study.*



*Note.* PAA = Positive Affect Activation. PAD = Positive Affect Deactivation. NAA = Negative Affect Activation. NAD = Negative Affect Deactivation.

<sup>1</sup> Extensive reviews of associations between emotion dynamics and mental health are given elsewhere by Houben, M., Van Den Noortgate, W., & Kuppens, P. (2015, Jul). The relation between short-term emotion dynamics and psychological well-being: A meta-analysis. *Psychol Bull*, 141(4), 901-930. <https://doi.org/10.1037/a0038822>, Kuppens, P., & Verduyn, P. (2017, October 1). Emotion dynamics. *Current Opinion in Psychology*, 17, 22-26. <https://doi.org/https://doi.org/10.1016/j.copsyc.2017.06.004> and Reitsema, A. M., Jeronimus, B. F., van Dijk, M., & de Jonge, P. (2022a). Emotion dynamics in children and adolescents: A meta-analytic and descriptive review. *Emotion*, 22(2), 374-396. <https://doi.org/10.1037/emo0000970>.

Functionally, emotions may serve as precautionary systems designed to identify and handle essential contextual information to minimize the threats to our reproductive fitness and well-being (Barrett, 2017; Tamir et al., 2020). Negative emotions have an alarm function, and signal one's welfare is threatened ("avoidance/defend"), whereas positive emotions signal safety, which in turn allows people to invest in growth and play ("approach"), and prepare for a wider range of potential futures (Rozin & Royzman, 2001; Tugade, 2010). Positive and negative affect can be independent of each other, implying that a reduction in NA does not necessarily lead to improvements in PA (Keyes, 2014; Kim & Hamann, 2007), and therefore risk/protective factors could have different effects on NA compared to PA. Furthermore, with age, most people tend to increase in mean intensity PA and decrease in their mean intensity NA, a negativity bias in youth that fades with age (Carstensen et al., 2011), especially in more aroused emotions; but whether and how emotion *dynamics* vary with age is less clear (Reitsema et al., 2022a).

Emotion socialization (e.g., Eisenberg et al., 1998) allows humans to acquire their emotional repertoire and flexibility that is required to adjust to environment demands and personal goals (Barrett, 2017; Tamir et al., 2020). Arousal is not only costly at the physiological level, it also reduces one's sensitivity to other relevant environmental stimuli (Lyubomirsky, 2011), and such emotion intensity (arousal) should therefore be regulated down ("hedonic adaptation") to allow the mind to shift to contextual novelty and change (Reitsema et al., 2022b). Functionally, an optimal emotional response lays at the middle of a hypothetical continuum that runs from being insensitive or "rigid" (emotional inertia) to being "flexible" or "overwhelmed" (emotional instability), see Bos et al., (2019), Bosley et al. (2019) and Reitsema et al. (2022c).

In terms of emotion dynamics, inflexibility can be expressed through high *inertia*, whereas *variability* can be a sign of sensitivity to environmental cues, and both low and high

sensitivity and high inertia have been considered to reflect disruptive emotion fluctuations (Kuppens & Verduyn, 2015). High emotion intensity, especially of NA, can also indicate disruptive or inflexible emotional functioning, as the system is unable to reduce negative emotions. Adaptive patterns of emotion functioning are characterized by low emotion intensity, low variability, instability, and inertia for both PA and NA (Ernst et al., 2020; Gruber et al., 2013; Houben et al., 2015). In this paper I zoom into the link between CM types and the most commonly studied emotion dynamics.

**Table 2.**

*Overview of emotion dynamic of interest in this study and associated mental health states.*

<b>Emotion Dynamic</b>	<b>Definition and Operationalization</b>	<b>Mental health associations</b>
<b><i>Intensity</i></b>	Baseline, average intensity Average (M)	NA+ with internalizing disorder $D_x$ . <sup>g</sup>
<b><i>Variability</i></b>	Range of fluctuations Standard deviation (SD) or variance	NA+ with depression disorder ( $D_x$ ), <sup>b</sup> bipolar spectrum $D_x$ ; <sup>c</sup> PA- with depression $D_x$ , <sup>b</sup> with internalizing disorder $D_x$ <sup>g</sup> and eudaimonic well-being, <sup>b</sup>
<b><i>Instability</i></b>	The magnitude of fluctuations; Average change in emotional intensity between two successive measurement occasions; Mean squared successive difference (MSSD)	NA+ and PA+ associate with current anxiety $D_x$ , <sup>a</sup> depression $D_x$ , and NA+ with bipolar spectrum $D_x$ <sup>c</sup> and hypomanic personality; <sup>c</sup> NA- was associated with eudaimonic well- being, <sup>b</sup> PA/NA, and life satisfaction. <sup>b</sup>
<b><i>Inertia</i></b>	Persistence of same affect, inflexibility Autocorrelation	NA+ and PA+ associate with depression $D_x$ , <sup>d</sup> and PA with hyperthymic temperament <sup>c*</sup> , PA+ externalizing disorder $D_x$ . <sup>g</sup> NA- associates with satisfaction with life, <sup>b</sup> PA/NA eudemonic well-being. <sup>b</sup>
<b><i>Emodiversity</i></b>	Variety of one's emotional repertoire. Gini coefficient: the weighted sum of the frequencies of various same-valanced emotions divided by the product of the total frequency of all same valence emotions, and the total number of emotion categories.	NA+/PA+ is protective against depression $S_x$ , <sup>e</sup> NA+ more anxiety/depression $S_x$ . <sup>f</sup>

*Note.* PA = Positive Affect. NA = Negative Affect.  $D_x$ = diagnosis.  $S_x$  = symptoms

<sup>a</sup>Schoevers et al. (2021) <sup>b</sup>Houben et al. (2015), <sup>c</sup>Sperry et al. (2020), <sup>d</sup>Kuppens et al. (2010),

<sup>e</sup>Quoidbach et al. (2014), <sup>f</sup>Urban-Wojcik et al. (2022), <sup>g</sup>Scott et al. (2020).

\* Hyperthymic temperament refers to low-grade mania.

## **This study**

Despite a booming emotion literature, our understanding of how specific childhood maltreatment histories shape emotion landscapes and dynamics remains largely uncharted territory (see overview in Table 1), and most previous work pertained to emotional reactivity to stressors or positive experiences (Glaser et al., 2006; Infurna et al., 2015). The present study was aimed to expand on such work by testing whether the adverse downstream consequences of CM on five emotion dynamic measures that play a key role in mental health and well-being, namely, the *intensity*, *variability*, *instability*, *inertia*, and *diversity* of emotions (see Table 2; this association is hypothesis 1 [H1])<sup>2</sup>, as has been shown in children and adolescents (Reitsema et al., 2022a) and adults (Houben et al., 2015; Kuppens & Verduyn, 2017). The specific CM types and their association with emotion dynamics were examined in a way that statistically adjusted for all other CM types to identify their unique contribution to differences in adult emotion functioning. I expected that the different CM types showed unique associations with the diverse dynamic measures (H2). Third, I examined whether daily social support moderated these CM-emotion associations (H3). Previous work showed that social support is protective to post-CM adjustment in terms of mental and somatic health and well-being, and social support may help normalise maladaptive emotion dynamic patterns in CM populations (Brewin et al., 2000; Cicchetti, 2013), which is known as the “stress buffering” hypothesis (Cohen & Wills, 1985).

## **Method**

### **Participants**

Data were derived from 14,418 participants of the “HowNutsAreTheDutch” crowd-sourcing study of the general population (HND, van der Krieke et al., 2016), from which 456

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<sup>2</sup> Hypotheses were preregistered ([osf.io/4jbcy](https://osf.io/4jbcy)), see method section for details.

participants were selected, who both completed a 30-days diary study and Childhood Trauma Questionnaire (CTQ, Thombs et al., 2009). Participants who had not completed at least 65% (58/90) of measurements ( $n = 166$ ) were also excluded from the main analyses. Other requirements for participation included to be aged 18 or older, have a phone with an internet connection, and not to be engaged in daily routine disruptions (e.g., shift work, planned trips) during the 30 days study period. Before enrolling, participants had to give approval for their anonymised data being used in scientific research. The inclusion criteria resulted in a final sample ( $n = 290$ , 64%) with an age range from 19-73 and mean age of 41.2 years (standard deviation (*SD*) of 13.5). In comparison with the general HND pool of participants, my sample comprised more women (83% vs 65%), and more highly educated (93% vs 75%) and slightly younger participants (mean age 41 versus 45).

### **Procedure**

The diary data collection launched in the Netherlands on the 22<sup>nd</sup> of May 2013 through an online platform (<https://www.hoegekis.nl/>) as an extension of the cross-sectional study started in December 2013 (for the detailed procedure see van der Krieke et al., 2016). Participants were invited through different media such as radio, television, newspapers, magazines, social media, etc. For my study, participants had to participate in both cross-sectional and 30 days diary study. In the cross sectional study, after completing four mandatory modules (“start”, living situation, affect/mood, and well-being), participants could choose to complete the childhood trauma (CTQ) questionnaire ( $n = 1595$ ). Diary study participants had to complete a block of questions regarding their mood and daily life activities three time a day (maximum of 90 assessments) with a six-hour interval and on the exact time point schedule, which they could choose at the beginning of the enrolment (e.g., 9:00 am, 3:00 pm and 9:00 pm). After receiving a text message, they had to complete questions within one hour after the invitation. All the data were extracted on the 19<sup>th</sup> of

December 2018. The study was approved by Medical Ethical Committee of the University Medical Centre Groningen (registration number: M13.147422 and M14.160855).

## Measures

**Affect dynamics.** All the affect dynamic measures were calculated per participant based on 12 momentary emotional items selected based on the circumplex model of affect, which distinguishes emotions according to the valence and arousal/activation dimensions of affect (Barrett & Russell, 1999; Yik et al., 1999). I distinguished between aroused positive affect (PAA), measured with feeling energetic, enthusiastic, or cheerful, and deactivated positive affect (PAD), measured with the emotions relaxed, calm, and content. Aroused negative affect (NAA) was measured with the emotions anxious, nervous, and irritable. Deactivated negative affect (NAD) combines the emotions gloomy, dull, and tired. Consequently, the PAA variable reflects the mean of feeling energetic, enthusiastic, and cheerful per assessment on a slider scale ranging from “Not at all” (0) to “Very much” (100). Similarly, the NAD variable reflects the mean of feeling gloomy/ dull/ tired per assessment on a slider scale ranging from “Not at all” (0) to “Very much” (100).

For each person, a set of summary statistics of most dynamic measures *mean*, *variability* (SD), *instability* (square root of the mean squared successive difference, MSSD), and *inertia* (autocorrelation) were calculated separately for four composite affect measures (PAA, PAD, NAA, NAD), across all 90 measurement occasions. For the main analyses, the missing values were omitted, and emotion dynamic measures summarized all available data. For the sensitivity analyses, missing values were imputed. Autocorrelation was defined as correlation of the original variable (e.g., PAD) with the lagged score on the same variable (lag-PAD). *Emodiversity* scores are typically operationalized with a Gini (*G*) coefficient that ranges from 0-1 (Benson et al., 2018).<sup>3</sup> The *G* score was calculated based on the frequency of

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<sup>3</sup> The values of *G* coefficient are on a scale 0-1 where low numbers imply high diversity. For the simplicity of interpretation we inverted it via 1-*G* where high coefficients would denote high emodiversity.

same valanced emotions, over 90 measurement occasions, where the intensity of the emotions was rated above 10 on the scale 0-100, following the example of Dejonckheere et al. (2019). The cut-off point of  $\geq 10/100$  was chosen because the values 0-9 could be unintentionally marked when moving the slider down to 0 (on 0-100 scale).

**Social contact.** I calculated social contact frequency using the item “most of the time since the last measurement I was alone/in company” (categorical)” over the 90 measurements.

**Childhood Maltreatment.** Childhood maltreatment was measured with a retrospective self-report Dutch version of the short form of Childhood Trauma Questionnaire (CTQ-SF, Bernstein et al., 2003; Thombs et al., 2009). CTQ measures types of abuse and neglect that are reflected in WHO (2006) definition of child maltreatment, and the CTQ is widely used in research (Viola et al., 2016). The instrument consists of 24 items that distinguish three types of abuse (physical, emotional and sexual) and two types of neglect (physical and emotional) scored on 5-point Likert scale (1 = *never true*, 2 = *rarely true*, 3 = *sometimes true*, 4 = *often true*, 5 = *very often true*). In the Dutch version one item for sexual abuse was omitted (“I believe I was molested”) because of translational non-equivalence (Thombs et al., 2009). In our sample, the overall trauma scale showed good reliability score (Cronbach’s  $\alpha = .91$ ) as well as the subscales for Physical Abuse (.81), Emotional Abuse (.85), Sexual Abuse (.93), Emotional Neglect (.85). However, the reliability score for Physical Neglect was moderate (.57), which has previously been reported in community samples (Hagborg et al., 2022; Scher et al., 2001; Thombs et al., 2009).

### **Statistical procedures**

All the analyses were performed in R software (Team, 2021) and were pre-registered ([osf.io/4jbcy](https://osf.io/4jbcy)). The distribution of childhood maltreatment (see Table 3; Figure 2A) was marked by high skewness and kurtosis, and especially positive emodiversity was highly kurtotic (see Supplement Figure S1). This non-normality of our data made us employ

Spearman correlations (Schober et al., 2018) to assess the associations between maltreatment types and CTQ score, and non-parametric test for group comparison (i.e., bootstrap). To calculate emotion dynamic measures, we excluded missing values for the main analysis, and imputed data to check for robustness. The final data structure did not hold missing values since emotion dynamics and social frequency were calculated for each participant, and all participants completed the maltreatment (CTQ) questionnaire. The value of variance inflation factor for each type of maltreatment ranged from 1.38 to 3.31, all far below the tolerance cut-off of 5 for multicollinearity (Gareth et al., 2015).

To examine the associations between five types of maltreatment as predictors and 18 emotion dynamics as an outcome, I used Structural Equation Modelling (SEM), estimated using the *lavaan* package (Rosseel, 2012). To account for normality violations in the data, I used a robust maximum likelihood estimator (MLM in *lavaan*) to fit my SEM models with the Satorra-Bentler scaling correction for  $\chi^2$ , to derive robust SE and fit indices, especially the Root Mean Square Error of Approximation (RMSEA) and the Bentler Comparative Fit Index (CFI), which I use to compare nested models.

A stepwise backward selection procedure was used to reduce an unrestricted SEM model in which all paths between the five emotion dynamics and five types of maltreatment were estimated, to derive a most parsimonious Final model (see Table 5). Nested models were compared using the Satorra-Bentler corrected  $\Delta\chi^2$  difference test, until a most restricted “Final model” was selected for which the  $\Delta\chi^2$  difference test was below  $p < .05$ ; all model selection details are provided in Supplement Table S1). The goodness of fit of the Final model was assessed based on cut-off values of four criteria recommended by Kline (2016):  $\chi^2$  test statistics ( $df$ ) and  $p$  value, RMSEA ( $< .08$ ), Standardized Root Mean Squared Residual (SRMR  $< .10$ ) and CFI ( $> .95$ ). A posterior power analysis was calculated for the final SEM model with *SemPower* package (Jobst et al., 2021) and based on obtained sample size,  $df$ ,



RMSEA and alpha, a power of .93 was achieved for our SEM model. Note that the power to reliably detect each specific path in the SEM model may be lower.

To test the moderation effect of social contact frequency, first, an interaction effect for each significant variable in the model was created as suggested by Schoemann and Jorgensen (2021) and then added to the Final model.

For the robustness analyses I imputed missing values for each participant's time series with *imputeTS* package (Moritz & Bartz-Beielstein, 2017). Moving average mean level method was used, with one window observation, meaning mean values were computed based on one prior and posterior observation for every missing value. When two or more consecutive observations were missing, the closes previous and posterior observations were used. The Final SEM model and interaction effects were estimated with imputed dataset.

### **Effect sizes**

Three effect size indices are common to express results in psychology: correlations ( $r$ ), Cohen's  $d$ , and partial regression coefficients ( $\beta$ ). We classified correlations ( $r$ ) and beta's as small if between 0.10 and 0.19, moderate between 0.20 and 0.29, and large from 0.30, based on the effect sizes commonly found in social psychology (Peterson & Brown, 2005; Richard et al., 2003). To reach the average effect in personality and social psychology over the past century ( $r \approx .20$  Richard et al., 2003) studies need at least 150 participants, and ideally up to 250 participants to reduce estimation error in correlations (Schönbrodt & Perugini, 2013).

## **Results**

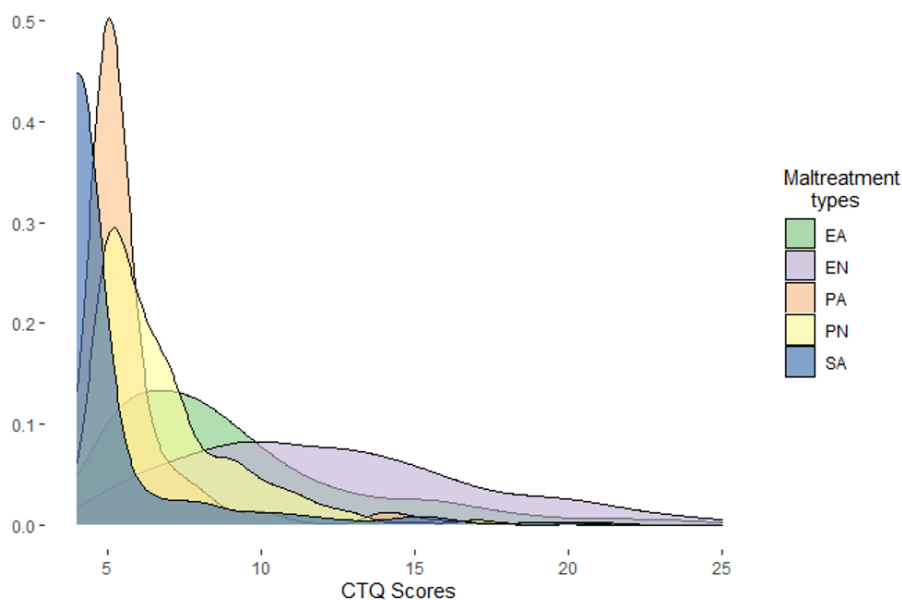
### **Sample description**

In comparison with the full HND sample the participants who completed the trauma questionnaire (CTQ) were four times more likely to participate in diary study (29% versus 7%). In our sample, 36% ( $n = 166$ ) did not complete the minimally required 58 datapoints,

and were excluded from the analyses. Group comparisons showed no salient differences between the 290 diary study compliers and 166 non-compliers in age ( $t_{(454)} = -1.22, p = .36$ ), gender ( $\chi^2_{(1)} = 0.81, p = .37$ ), or education level ( $\chi^2_{(7)} = 10.25, p = .17$ ), and neither in the pre-diary measure of positive affect ( $t_{(443)} = -1.66, p = .06$ ), or overall maltreatment (CTQ) scores ( $t_{(454)} = 1.88, p = .30$ ). Compliers did report slightly more pre-diary negative affect ( $t_{(443)} = 1.89, p = .02$ ).

**Figure 2A.**

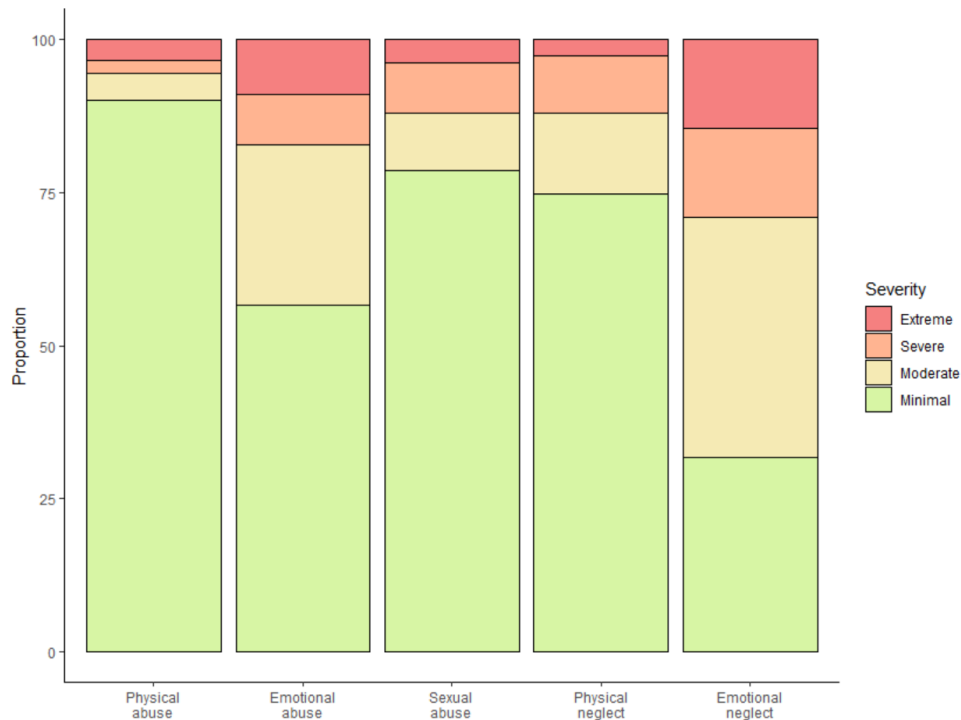
*CTQ Scores distribution across maltreatment types*



*Note.* EA= Emotional Abuse. EN= Emotional Neglect. PA= Physical Abuse. PN= Physical Neglect. SA= Sexual Abuse. CTQ= Childhood Trauma Questionnaire.

**Figure 2B.**

*The prevalence of the five types of child abuse and neglect in our sample*



We checked for outliers (participants who never scored above 0 on any of the emotion items or social contact frequency), but none were identified. The distribution of positive affect emodiversity indicated high kurtosis and most of the maltreatment types showed deviations from normality (see Figure 2A and Table 3).

**Table 3**

*Descriptive statistics*

Variable	Mean	SD	Min	Max	Skew	Kurtosis
Age	41.22	13.5	19	73	0.15	-1.04
Mean						
PAA	52.74	12.73	3.75	90.23	-0.29	1.25
PAD	59.88	12.12	3.32	95.92	-0.47	2.29
NAA	21.44	14.09	1.86	88.61	1.21	1.94
NAD	30.25	14.78	4.25	89.39	0.91	1.22
Variability						
PAA	14.6	3.98	5.73	27.15	0.33	0.09

PAD	12.95	3.53	3.02	23.88	0.36	0.23
NAA	11.43	3.97	1.91	23.28	0.14	-0.14
NAD	13.57	3.56	4.67	23.97	0.17	-0.14
Instability						
PAA	16.51	5.06	5.86	40.2	0.58	0.94
PAD	14.3	4.29	4.35	27.9	0.51	0.13
NAA	12.8	4.62	2.51	28.83	0.52	0.68
NAD	15.24	4.33	4.19	29.08	0.38	0.03
Inertia						
PAA	0.21	0.18	-0.24	0.69	0.02	-0.28
PAD	0.25	0.18	-0.25	0.79	0.12	0.05
NAA	0.22	0.18	-0.18	0.78	0.34	-0.07
NAD	0.21	0.19	-0.36	0.69	-0.13	0.00
Emodiversity						
Positive Affect	0.98	0.04	0.64	1	<b>-6.20</b>	<b>45.67</b>
Negative Affect	0.73	0.17	0.22	1	-0.26	-0.69
Maltreatment (CTQ)						
Total score	38.84	11.85	24	97	1.55	3.19
Physical Abuse	5.81	2.14	5	21	<b>3.84</b>	<b>16.77</b>
Emotional Abuse	9.11	4.02	5	24	1.41	<b>1.78</b>
Sexual Abuse	4.93	2.49	4	20	<b>3.45</b>	<b>12.79</b>
Physical Neglect	6.82	2.30	5	19	1.92	<b>4.08</b>
Emotional Neglect	12.19	4.64	5	25	0.54	-0.03

Note. PAA = Positive Affect Activation. PAD = Positive Affect Deactivation. NAA = Negative Affect Activation. NAD = Negative Affect Deactivation. Variable considered non normally distributed when skewness > 2 and kurtosis > 7 (West et al., 1995) and are shown in bold.

The bivariate correlations between maltreatment types and emotion dynamic measures are presented in Table 4. Older and lower educated participants reported more CM, especially more neglect and emotional abuse, in line with previous reports and a societal focus on neglect prevention (Bullinger et al., 2020). The correlations illustrate the common co-occurrence of different trauma types, such as physical- and emotional abuse ( $r = .48$ ), and emotional abuse and neglect ( $r = .64$ ). The co-occurrence of sexual abuse and physical neglect was least likely ( $r = .18$ ). Finally, emotional abuse ( $r = .82$ ) and neglect ( $r = .90$ ) were the best indicators of “general CM” (total CTQ scores, see Table 4 and Figure 2A).

More childhood maltreatment associated with various emotion dynamic measures, positively with *mean* NAA/NAD intensity (“avoidance”) and negatively with PAA/PAD intensity (“approach”), in line with a more conservative behavioral strategy. Childhood maltreatment associated with aroused negative affect (NAA) *variability* and *instability*, but not with the other dynamic measures. Maltreatment also associated with a broader range and higher frequency of negative affect indicators (*emodiversity*), suggesting more frequent and

diverse negative emotions. All these effect sizes were small in magnitude. These data suggest that CM tends to most profoundly impact on adult negative emotion experiences, more than positive. Being older correlated with higher *mean* levels of PA and lower NA as well as lower *variability, instability* and *emodiversity* (NA). None of the emotion dynamic measures correlated significantly with education.

**Table 4**

*Spearman correlation between model variables*

	Age	Gen	PA	EA	SA	PN	EN	Total CTQ
Age			<b>.12</b>	<b>.20</b>	<b>.13</b>	<b>.22</b>	<b>.23</b>	<b>.25</b>
Gender <sup>a</sup>	.27		.07	-.04	-.08	.11	.11	.07
Education <sup>b</sup>	-.18	<b>-.10</b>	<b>-.12</b>	-.10	<b>-.12</b>	<b>-.20</b>	-.11	<b>-.15</b>
Mean								
PAA	<b>.13</b>	.09	-.06	<b>-.17</b>	-.05	<b>-.14</b>	<b>-.22</b>	<b>-.20</b>
PAD	.08	.11	-.03	<b>-.18</b>	-.03	<b>-.13</b>	<b>-.27</b>	<b>-.23</b>
NAA	<b>-.24</b>	-.10	.05	<b>.22</b>	.02	<b>.15</b>	<b>.22</b>	<b>.23</b>
NAD	<b>-.18</b>	<b>-.14</b>	.09	<b>.25</b>	.11	<b>.19</b>	<b>.26</b>	<b>.28</b>
Variability								
PAA	<b>-.23</b>	<b>-.19</b>	.05	.00	-.07	-.07	-.08	-.05
PAD	<b>-.17</b>	-.11	.03	.03	-.02	-.03	-.06	-.03
NAA	<b>-.30</b>	<b>-.21</b>	.08	<b>.15</b>	.09	-.01	<b>.13</b>	<b>.15</b>
NAD	<b>-.22</b>	<b>-.22</b>	.06	.08	.11	-.10	-.01	.03
Instability								
PAA	<b>-.21</b>	<b>-.14</b>	.06	-.02	-.08	-.05	-.10	-.07
PAD	<b>-.15</b>	<b>-.12</b>	.06	.02	-.01	-.02	-.06	-.02
NAA	<b>-.28</b>	<b>-.21</b>	.11	<b>.14</b>	.05	.02	.08	<b>.12</b>
NAD	<b>-.20</b>	<b>-.19</b>	.09	.06	.08	-.08	-.03	.02
Autocorrelation								
PAA	.05	-.06	.01	.04	.04	-.03	.08	.05
PAD	.01	-.03	-.10	-.04	-.05	-.07	.01	-.04
NAA	-.05	-.08	-.02	.05	.06	-.01	<b>.14</b>	.09
NAD	-.01	-.05	-.03	.02	.04	.02	.06	.05
Emodiversity								
Positive Affect	<b>.13</b>	<b>.16</b>	-.10	<b>-.14</b>	.00	-.05	-.09	-.11
Negative Affect	<b>-.18</b>	-.07	.05	<b>.22</b>	.03	<b>.16</b>	<b>.22</b>	<b>.23</b>
PA				<b>.48</b>	<b>.23</b>	<b>.26</b>	<b>.38</b>	<b>.52</b>
EA					<b>.28</b>	<b>.49</b>	<b>.64</b>	<b>.84</b>
SA						<b>.18</b>	<b>.26</b>	<b>.42</b>
PN							<b>.56</b>	<b>.68</b>
EN								<b>.90</b>

Note. Correlations  $\geq .12$  significant at  $p < .05$ ,  $\geq .15$  at  $p < .01$ , and  $\geq .22$  at  $p < .001$ . All significant correlations are shown in bold. PA= Physical Abuse. EA= Emotional Abuse. SA= Sexual Abuse. PN= Physical Neglect. EN= Emotional Neglect. PAA= Positive Affect Activation. PAD= Positive Affect Deactivation. NAA= Negative Affect Activation. NAD= Negative Affect Deactivation. <sup>a</sup> Gender coded as 0 = woman, 1 = man, meaning negative values are for man group.

<sup>b</sup> Educational level ranged from 1 (elementary school not finished) to 8 (academic degree).

## Childhood maltreatment and emotion dynamics

The most unrestricted model estimating all possible associations between five maltreatment types and five emotion dynamics comprised 68 associations (“paths”) that could be removed without worsening the model fit (see Supplementary Table S1 for step-by-step details). Fit indices of the Final model indicated a good statistical fit to the data ( $\chi^2 = 49.94$ ,  $df = 68$ ,  $p = .95$ ; with CFI = 1, RMSEA = 0.00 [95% CI = 0.00, 0.00]), SRMR = 0.04). Some emotion dynamic measures (*inertia* and *emodiversity*) had low variances (e.g., 0.03), which could potentially have hampered the estimation of associations between specific maltreatment types and these variables.

The path coefficients of all significant associations are presented in Table 5. In the Final model, four types of abuse uniquely predicted ~15 emotion dynamic measures with little overlap in pattern of emotional experiences. Physical abuse was not associated with any adult emotion dynamic measure. Below I describe how five types of maltreatment differentially associate with five commonly used emotion dynamic indices.

The Final model shows how abuse and neglect could be differentiated by an increasing versus decreasing pattern (see positive and negative beta coefficients, respectively), which might suggest distinct consequences of acts of commission and omission on emotional experiences. Data also suggest that emotional valence is influenced by distinct types of maltreatment. Emotional neglect, as a broad cluster of experiences, primarily influenced positive emotions (lower intensity (mean level), *variability* and *instability* of PAA/PAD), while differences in negative emotions were rare (exceptions were *inertia* and *variability* of NAA). Sexual Abuse also associated with a heightened risk of *instable* PAD ( $\beta = 0.04$ ) and less *inert* PAD ( $\beta = -0.09$ ) nevertheless, these effects were small in magnitude.

Other types of abuse and neglect impacted mostly on negative emotions. The strongest association was between emotional abuse and *mean* levels of negative affect and negative *emodiversity*. Interestingly, child physical neglect and sexual abuse, both predicted

negative affect *variability* (NAA/NAD) and *instability* (NAA/NAD), but in the opposite direction (SA increasing and PN decreasing values). We also observed the unexpected effect of physical neglect on higher *mean* levels intensity of PAD.

**Table 5.**

*Table present standardized ( $\beta$ ) regression coefficients between emotion dynamics and maltreatment types*

	Emotional Neglect		Physical Neglect		Sexual Abuse		Emotional Abuse	
	$\beta$	(SE)	$\beta$	(SE)	$\beta$	(SE)	$\beta$	(SE)
Mean								
PAA	-.09*	(.04)						
PAD	-.18***	(.04)	.09**	(.03)				
NAA							.17**	(.05)
NAD							.16***	(.04)
Variability								
PAA	-.11*	(.05)						
PAD	-.11*	(.05)						
NAA	.04*	(.02)	-.10*	(.05)	.14**	(.06)		
NAD			-.14**	(.05)	.12**	(.04)		
Instability								
PAA	-.10*	(.04)						
PAD	-.10*	(.04)			.04*	(.02)		
NAA			-.09*	(.05)	.13*	(.04)		
NAD			-.12**	(.04)	.11**	(.04)		
Inertia								
PAD					-.09*	(.04)		
NAA	.11**	(.04)						
Emodiversity								
Negative affect							.17**	(.05)

*Note.* PAA = Positive Affect Activation. PAD = Positive Affect Deactivation. NAA = Negative Affect Activation. NAD = Negative Affect Deactivation. Note that positive affect emodiversity and inertia PAA/NAD were unrelated and therefore not part of the Final model. Significant at \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

### **Moderation effect of social contact frequency.**

None of the moderation effects were significant, which does not support the hypothesis that social support moderates the relationships between emotion dynamic and childhood maltreatment. Model fit indices were acceptable but worse than the model fit without interactions, and all details and Model fit indices are provided in Supplement S2.

### **Sensitivity analyses**

The final SEM model was fit to my imputed dataset, as outlined in the statistical procedure section. The model fit indices showed equally good statistical fit to the data than

for my unimputed model ( $\chi^2 = 52.86$ ,  $df = 68$ ,  $p = .91$ ; with CFI = 1, RMSEA = 0.00 [95% CI = 0.00, 0.02]), SRMR = 0.05). The standardized  $\beta$  coefficients changed slightly for the majority of the paths. The most prominent changes were observed in the association between PN and variability NAA that disappeared, while associations between SA and the instability and variability of NAD reached significance at  $p = <.001$ ; all model path coefficients are provided in Supplement Table S3.

Additional regression analyses were conducted to test social contact frequency as a moderator of the link between CM and emotion dynamics. I fit 15 separate regression models for each significant emotion dynamic measure but none of the interaction effects was significant, in line with the Final SEM model including interaction effects.

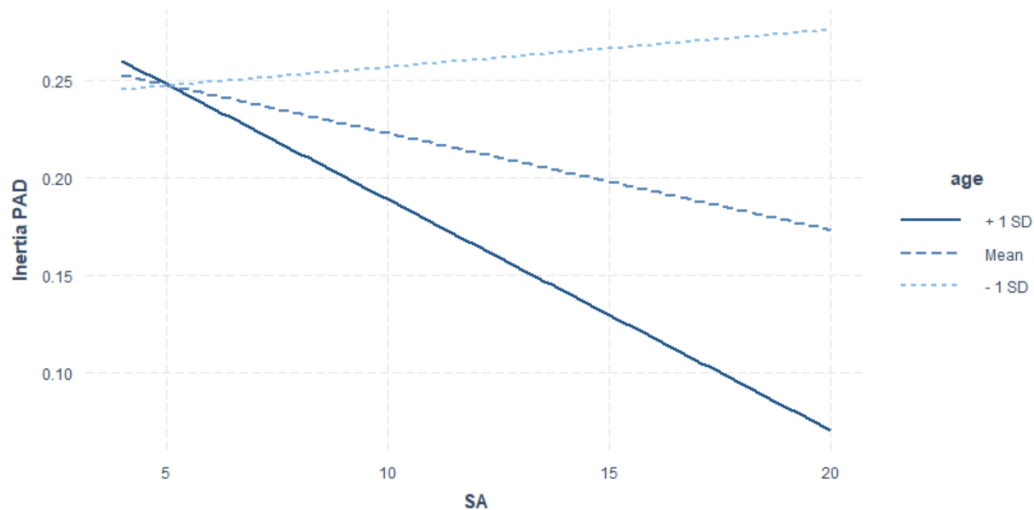
### **Post hoc analyses**

The high correlations between most of the emotion dynamic measures and age stimulated me to test whether age moderated the effect of CM on emotion dynamics in the Final model, as a post hoc analysis. The model fit indices showed good model fit to the data ( $\chi^2 = 106.570$ ,  $df = 121$ ,  $p = .82$ ; with CFI = 1, RMSEA = 0.00 [95% CI = 0.00, 0.02]), SRMR = 0.05). Only one path was significant, however, as in older participants, the effect of SA on the *inertia* of PAD was lower than in younger participants ( $\beta = -0.08$ ,  $p < .05$ ). It suggests that younger participants with a history of SA are better able to sustain feelings of relaxation, calmness, and content (see Figure 3). All the other moderation effects in the model did not change with age, which suggests that the impact of the abuse/neglect on the emotion dynamics persists over the lifespan.

### **Figure 3.**

*The influence of age on the association between sexual abuse and the autocorrelation of unaroused positive affect (PAD). Higher age is represented by one standard deviation (+1SD) above the mean.*





## Discussion

In this thesis the role of five childhood maltreatment types on five adult emotion dynamics patterns were examined, and I tested whether daily social contact played a protective role. My results showed a salient distinction between abuse and neglect (acts of commission and omission). Second, specific maltreatment types showed a differential primary influence on positive affect (EN) and negative affect (EA, SA, PN), or did not associate with all emotion dynamics (PA). Third, all emotion dynamics, *mean level intensity, variability, instability, inertia and emodiversity* were related to childhood maltreatment types in different ways, and none of the associations was moderated by social contact frequency. Fourth, CM effects on emotion dynamics showed to be long-lasting, and we may observe some generational differences in CM prevalence and emotion dynamics. These four key observations are now discussed in detail below.

In line with the proposed hypothesis, the effect of CM on emotion dynamics was found for aggregated scores (H1) and for specific types (H2). However, social relation frequency did not moderate the associations between CM and emotion dynamics (H3).

### Neglect versus Abuse

My final model showed salient differences between effects of abuse and neglect. More childhood abuse associated with altered negative emotion dynamics, whereas neglect

related to diminished *intensity, variability and instability* of positive and negative emotions in adulthood.

Our results on abuse do not directly align with the broader CM literature. While some studies associate abuse with impulse control (Oshri et al., 2015), in line with my results reflecting high *variability* and *instability* of emotions, other studies relate abuse to experiencing higher positive but lower negative affect in response to PA/NA pictures (Wooten et al., 2022). Saliently, results from the behavioral experimental studies cannot be directly comparable to emotions experienced in a more “natural” (ecologically valid) context, with its situated and momentary aspects (Colombo et al., 2020), which is one of the key arguments for an intensive time series study (van der Krieke et al., 2016). Studies on brain functioning associated abuse with reduced amygdala volume, increased amygdala reactivity in general, and reduced activity in downregulating negative emotion and anterior insula activation to threat (Cassiers et al., 2018; McLaughlin et al., 2019). These networks are known to be involved in emotion “generation” (Ochsner et al., 2012; Sturm et al., 2016), which could suggest difficulties in constructing and managing emotional responses.

My results do align with associations between neglect and attenuated emotional experiences in children (Cicchetti & Toth, 2015) and lower emotional knowledge and understanding (Shipman et al., 2005). In adults, neglect also associated with difficulties recognizing (positive) facial expressions (Doretto & Scivoletto, 2018; Young & Widom, 2014), lower sensitivity to affective words (Warmingham et al., 2022), and lack of emotional awareness and emotion clarity (Berzenski, 2019). However, not all studies found effects of childhood neglect, such as no differences in responding to affective pictures (Wooten et al., 2022). Studies on brain structures that are involved in emotional networks related to the attention to feelings and emotional perception (i.e., dorsolateral prefrontal cortex) have observed reduced cortical volume and thickness in neglected participants,

which connected to reduced response to happy faces and reduced reword anticipation (Cassiers et al., 2018; Lindquist et al., 2012; McLaughlin et al., 2019; Ochsner et al., 2012); in line with experimental studies on positive emotional processing described above. In sum, neglect could also be related to difficulties in constructing appropriate/healthy emotions.

The reviewed literature and my results suggest that abuse and neglect might elicit different sequelae, including how emotions are experienced and regulated, and one could speculate that neglect reduces emotion dynamics, as one has learned to become emotionally unresponsive to specific contextual information, and endures/ignores the associated and familiar negative emotions. There is an established connection between neglect and "flat [blunted] affect" in children once their needs are consistently disregarded, ignored, invalidated, or unappreciated, and the child goes into "I'm on my own" modus and becomes emotionally disconnected (see Ludwig & Rostain, 2009). This is a common intergenerational loop (e.g., Greene et al., 2020; Osborne et al., 2021) and flattened affect has even been reported in the context of overabundant wealth, when the family does not meet a child's emotional or safety needs (Ludwig & Rostain, 2009). In the following section I discuss my results for each specific type of maltreatment specifically, followed by a strengths and limitations section and conclusion.

## **Subtypes**

### **Physical Abuse**

Physical Abuse is one of the most salient and openly aggressive form of maltreatment, with numerous sequelae in childhood and/or adolescence (Institute of Medicine & National Research Council, 2014; Krugman & Korbin, 2022), but inconclusive evidence for a negative impact on adult mental health (Carr et al., 2013; Kong et al., 2018; Spinhoven et al., 2010; Spinhoven et al., 2016; Volgenau et al., 2022). Some studies did not account for other types of maltreatment when assessing the consequence of PA, and in research on emotional

functioning, for example, PA was no longer associated with emotional (dys-)regulation when the other types of CM were part of the model (Burns et al., 2010; Oshri et al., 2015). One plausible explanation is that PA survivors are the most resilient, or that the relative visibility of PA is more likely to result in help or support than the other CM types we distinguished. An intriguing notion is that childhood PA is also unrelated to adult violence (Weeks & Widom, 1998) or sexual offenses (Jespersen et al., 2009), in contrast to experiences of childhood neglect and SA.

In clinical psychology, it is well established that emotional problems (e.g., dysregulations) mediate the relationship between CM and range of outcomes in psychopathology (Burns et al., 2010; Heleniak et al., 2015; Jennissen et al., 2016; Miu et al., 2022). Although individual differences play significant role, it seems that PA had the smallest impact on adult emotional functioning (see Table 4), and was therefore removed from our model (Table 5). Going even further, child PA has also been found to associate with an array of positive adult outcomes, such as higher positive and lower negative affect and depression, more happiness, self-acceptance, or personal autonomy (Jeronimus et al., 2022). Previously we argued that once the child becomes an adult, and no longer can be physically hurt, they may feel that their future is unlikely to be as bad as their past has been (a sense of control), which may result in some positive growth. An alternative explanation, in the given sample, is that most of the individuals reported low levels of PA (see Figure 2B), resulting in lower statistical power for detecting (mal-)adaptive associations with emotion dynamics, as previous work reported poor emotion regulation in children exposed to PA, resulting in more aggressive and disruptive behavior (Teisl & Cicchetti, 2008). Future work could therefore focus on evaluating the consequences of PA on adult functioning in more detail, such as dissecting differences in PA frequency and intensity, and especially in adult general population samples, and ideally in a longitudinal or lifespan study.

## **Emotional abuse**

EA found to be associated with fewest emotion dynamics indicators (after PA which showed none), but of all types of abuse, only EA associated with more intense negative affect, both from low and high arousal emotions. Previous research described such increased mean levels of negative affect as a consequence of CM in general, but this study was able to confirm the unique association with EA. Elevated NA intensity levels associate with lower well-being and are the core of common pathological states (Stanton & Watson, 2014). Therefore, it is important to consider the unique contribution of EA on elevated levels of NA to foster strategies that promote well-being in adults with history of EA, which requires us to study the aetiology of such association in more detail.

Higher levels of emotional abuse were also associated with more negative *emodiversity*, which means their negative emotion are not only more intense, but also more frequent, and they experience a broader range of negative emotions. Higher negative affect *emodiversity* has previously been implicated in depression and anxiety (Urban-Wojcik et al., 2022; Werner-Seidler et al., 2020). Although controversies exist in associations between *emodiversity* and mental health functioning, methodological diversities may explain different findings (Brown & Coyne, 2017; Quidbach et al., 2014). The absence of associations between CM types and positive *emodiversity* is in line with absent associations between positive *emodiversity* and behavioral adaptation or mental health, which seems to be a constant in the emotion granularity literature (Hoemann et al., 2022; O'Toole et al., 2020) thus not specific to CM. It may be that the availability and education of proper coping strategies can help survivors of childhood abuse to avoid or substitute dysfunctional coping strategies such as substance use (Milojevich et al., 2019) or taking feelings out on others (Mills et al., 2015). Emotional abuse has been specifically connected to reduced adult resilience capacity (Nishimi et al., 2020). More research into emotional abuse would be very

relevant as our results are not in conflict with previous studies that identified emotional abuse as one of the most damaging forms of maltreatment (e.g., Dye, 2020).

### **Sexual abuse**

SA was primarily associated with negative affect dynamics, namely higher *variability* and *instability* of both high and low arousal (NAA/NAD), although slightly stronger in the higher arousal spectrum. Studies on emotional functioning associated SA with high impulsivity (Oshri et al., 2015) which reflects an inability to downregulate negative emotions (Houben et al., 2015). Although higher SA was also associated with higher PAD *instability* and PAD *inertia*, these smaller effect sizes indicate that the impact of SA on positive emotions is less clear (e.g., there may be subgroups, such as the moderating effect we observed of age on the link between SA and PAD *inertia*). High *variability* and *instability*, regardless of valence, is a reflection of low well-being and shared by many psychological disorders (Houben et al., 2015). This study shows that the unique impact of SA (adjusted for other CM types) is associated with more fluctuating negative emotions.

### **Physical Neglect**

PN associated with *variability* and *instability* of high and low arousal of negative affect (NAA/NAD), just as SA, but there were two major differences. First, unlike SA, the PN reduced the fluctuations of negative emotions. Second, unlike SA, the effect of PN on low arousal (NAD) was slightly stronger than on high arousal (NAA). Such findings once again highlight the fundamental difference in the consequences of a child being exposed to acts of commission versus omission, even if both experiences are physical and impact on negative emotions, we observed differences in emotion fluctuation and arousal.

Lower emotion *variability* and *instability*, in general, has been associated with higher levels of well-being, and especially low NA *instability* with higher eudemonic well-being (Houben et al., 2015), which at first sight can be counterintuitive as it suggests better

adaptation in adults with a history of physical neglect. Very low fluctuation of emotions could also reflect insensitivity to the environment, which is maladaptive in adulthood (Kuppens & Verduyn, 2015). These findings highlight our rudimentary understanding of what makes emotion functioning (mal-)adaptive and stress the need to study how emotion regulation repertoires can be contextually (mal-)adaptive as they may have been protective in the abusive childhood, but became a source of psychopathology in adulthood.

A contra-intuitive effect of PN on higher *mean* intensity of PAD can reflect some subgroup differences not analyzed in this study, and I observed no age effect.

### **Emotional neglect**

EN is the only type of CM that is predominantly associated with dynamics of positive emotion, namely *mean* intensity level, *variability* and *instability* of PAA/PAD. For the mean levels the effect is stronger for PAD, but is equal for high and low arousal in emotion fluctuation. As was observed in the case of EA and lower mean levels of NA, previous studies show associations between total CM and lower PA (Infurna et al., 2015; Somers et al., 2017; Xiang et al., 2020). In contrast, my results shows that only EN associates with lower levels of PA, in line with recent findings when all five types of CM were controlled for (Volgenau et al., 2022). As opposed to my finding, previous studies also suggest an association between EA and lower mean levels of PA, but in models that did not account for EN (Turiano et al., 2017); and higher PA variability when analyzing effects of total CM (Infurna et al., 2015). The literature and my results suggest that not taking into account all the types of maltreatment when evaluating its consequences can lead to building a body of knowledge with misleading and contradicting data, which is not desirable in practice.

As argued in previous sections, lower levels of positive affect and lower emotional fluctuations can be maladaptive, as they may reflect a reduced sensitivity to the environment, and low approach behavior. Clinical levels of depression have also been associated with

lower PA variability (Houben et al., 2015), and the inability to experience pleasure (anhedonia) is not only a key symptom of depression, but also connected to emotional maltreatment (Cohen et al., 2019). This connects to the observation that association between EN and negative emotion functioning<sup>4</sup> were comparatively weak, which indicates that this insensitivity to the environment primarily pertains the positive emotions, thus motivational reward systems. Positive emotion insensitivity in adulthood could reflect the lasting effects of developing brain reorganization as a consequence of insufficient positive experiences (see Cicchetti & Toth, 2015) which somehow are related especially to EN. This does connect to another line of work in which EN associates with attachment avoidance (interpersonal distance), which in turn reduces positive emotional experiences and relationship satisfaction (Müller et al., 2019).

The high persistence of NAA (*inertia*) associated with EN is a reflection of rigid and maladaptive emotional states, as reflected in low well-being and increased risk of psychopathology (Houben et al., 2015; Kuppens et al., 2010). Such persistence of NAA could reflect a limitation in use of adaptive coping strategies such as talking to someone to downregulate high aroused negative emotions, as was found in adults with history of EN (Mills et al., 2015).

This maladaptive combination of rigid and persistent negative emotions and low sensitivity to positive emotions and reward can be especially harmful, given that EN is the strongest predictor in adult psychopathology (Simon et al., 2009; Spinhoven et al., 2016). Moreover, the deficits in experiences of positive affect, important in resilience to stress and adaptation, may be limiting a person with a history of EN in coping with daily stress (Tugade, 2010). Given that EN has the highest prevalence (see Figure 2B) and one of the most persistent impacts on adult functioning (Bullinger et al., 2020; Sethi et al., 2013) studies into

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<sup>4</sup> Given week effect size of NAA variability this results will not be interpreted.



the mechanisms underlying such adverse consequences could be of special value to care practices. The link between CM and psychopathology is mediated by more difficulties, rumination, suppression, and reappraisal (Miu et al., 2022), among others, and future work could also identify more of such CM type specific mediators, and tackle them.

### **Emotion dynamics**

Previous studies defined healthy emotional functioning as a profile with less variable, unstable, and inert emotion dynamics (Gruber et al., 2013; Houben et al., 2015). However, exceptions exist, such as low variable positive emotions, which have been associated with depression/anhedonia and social aloofness and other negative symptoms of psychoticism (Scott et al., 2020), suggesting that certain low levels of PA variability can also be maladaptive. In my study, I observed associations between higher CM and lower levels of variability and instability for PA and NA, which suggest that low emotion fluctuation could indicate an emotional scar, and is potentially maladaptive. Despite the vast literature on emotion dynamics and healthy/unhealthy emotional functioning, there is no complete picture of which affect dynamics are (mal-)adaptive. My research also demonstrates the need for further work in building a body of literature that could clearly describe adaptive and flexible emotion dynamic patterns.

### **Strengths and limitations**

My thesis presents the first study of how differences in adult emotion dynamics associate with specific CM types. Such studies can offer a window of opportunity to deepen the knowledge on (mal-)adaptive emotion functioning, guided by the unique associations between adult dynamic indices and specific types of childhood abuse and neglect. Given the common co-occurrence of CM (Vachon et al., 2015), the unique effect of each maltreatment type on the emotion dynamic indicators was statistically separated, which allowed us to estimate their differentiating impact on each of the emotion dynamics. In addition, this is one

of the few studies on emotions that categorized affect scores not only by valence (positive/negative) but also an arousal dimension (low to high), following the emotion circumplex, which helped identify some small but informative differences. However, using broad composite affect scales (PAA/PAD/NAA/NAD) could obscure the existence of different patterns of dynamics of the single emotions that these scales contain (see Ernst et al., 2020; Reitsema et al., 2022c), and which could explain individual differences in mental health and well-being.

A major limitation of my work is that the resilience capacity of CM survivors was not taken into account (Cicchetti, 2013), which potentially generates a “noise” in my attempt to isolate the true adverse consequences of specific CM types (Nishimi et al., 2020). For instance, the study of Warmingham et al. (2022) identified six clusters or emotion regulation profiles among emerging adults with CM histories, and two profiles associated with healthy emotional functioning (e.g., characterized by high positive affect and adaptive regulation strategies), and were present in 27% of the sample. Future studies should not ignore the effect of resilience, especially in general population samples.

The present study is also limited by retrospective bias when measuring CM, and particularly in the design, as participants themselves decided to take CTQ survey (Baldwin et al., 2019). In CM studies one must keep in mind that the subjective perceptions of CM relate to downstream negative consequences, as the risk of psychopathology is minimal in individuals whom did not report CM, despite being identified as victims of CM in legal cases (Danese & Widom, 2020). Perhaps it is partly the impact of CM on identity formation and the expectation of heightened risk of adverse outcomes that propels aversive outcomes.

The present study examined only linear measures of emotions dynamics, and between CM types and dynamic measures, whereas a broad range of options on nonlinear emotion dynamics could offer a broader view on emotion functioning (Kunnen et al., 2019).

Finally, a SEM with many variables, such as my baseline unrestricted model, can also benefit from a bigger sample size, however, intensive time series are costly, and our focus on the population of CM survivors reduces the number of eligible participants. Based on our power calculations and model strategy we feel confident about our results but undoubtedly missed the weaker associations that one might also observe in much larger samples.

### **Conclusion**

Hitherto most studies on childhood maltreatment and emotions focused on emotion dysregulation and maladaptive coping strategies and differences in emotional processing. In the present study, we expanded this knowledge base (see Table 2) and identified how specific types of child abuse and neglect connect to differences in adult emotion functioning using the five most popular dynamic indices. We observed that physical abuse stood out because no associations with the studied emotion dynamics were observed. Emotional neglect associated with reduced positive affect and more fixed emotion patterns, whereas physical neglect associated with reduced NA fluctuations. Sexual abuse associated with more variable negative affect and emotional abuse with more intense, diverse and frequent negative emotions. This study shows that each CM type is connected to different emotional experiences in adulthood, setting the groundwork for further research into how CM types differentially shape adult health and well-being.

## References

- American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders: DSM-5-TR* (5th ed, text revision. ed.). American Psychiatric Association Publishing.
- Baldwin, J. R., Reuben, A., Newbury, J. B., & Danese, A. (2019, March 20). Agreement between prospective and retrospective measures of childhood maltreatment: A systematic review and meta-analysis. *JAMA Psychiatry*, *76*(6), 584-593.  
<https://doi.org/10.1001/jamapsychiatry.2019.0097>
- Barrett, L. F. (2017). *How emotions are made: the secret life of the brain*. Houghton Mifflin Harcourt.
- Barrett, L. F., & Russell, J. A. (1999). The structure of current affect: Controversies and emerging consensus. *Current Directions in Psychological Science*, *8*(1), 10-14.  
<https://doi.org/10.1111/1467-8721.00003>
- Benson, L., Ram, N., Almeida, D. M., Zautra, A. J., & Ong, A. D. (2018). Fusing biodiversity metrics into investigations of daily life: Illustrations and recommendations with emodiversity. *The Journals of Gerontology: Series B*, *73*(1), 75-86.  
<https://doi.org/10.1093/geronb/gbx025>
- Bernstein, D. P., Stein, J. A., Newcomb, M. D., Walker, E., Pogge, D., Ahluvalia, T., Stokes, J., Handelsman, L., Medrano, M., Desmond, D., & Zule, W. (2003, February). Development and validation of a brief screening version of the Childhood Trauma Questionnaire. *Child Abuse & Neglect*, *27*(2), 169-190.  
[https://doi.org/10.1016/s0145-2134\(02\)00541-0](https://doi.org/10.1016/s0145-2134(02)00541-0)
- Berzenski, S. R. (2019, May). Distinct emotion regulation skills explain psychopathology and problems in social relationships following childhood emotional abuse and neglect.

*Developmental Psychopathol*, 31(2), 483-496.

<https://doi.org/10.1017/s0954579418000020>

Bonanno, G. A., Papa, A., Lalande, K., Westphal, M., & Coifman, K. (2004, July 1). The importance of being flexible: The ability to both enhance and suppress emotional expression predicts long-term adjustment. *Psychological Science*, 15(7), 482-487.

<https://doi.org/10.1111/j.0956-7976.2004.00705.x>

Bos, E. H., de Jonge, P., & Cox, R. F. A. (2019, November). Affective variability in depression: Revisiting the inertia-instability paradox. *British Journal of Psychology*, 110(4), 814-827. <https://doi.org/10.1111/bjop.12372>

Bosley, H. G., Soyster, P. D., & Fisher, A. J. (2019). Affect dynamics as predictors of symptom severity and treatment response in mood and anxiety disorders: Evidence for specificity. *Journal for Person-Oriented Research*, 5(2), 101-113.

<https://doi.org/10.17505/jpor.2019.09>

Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology*, 68(5), 748-766. <https://doi.org/10.1037/0022-006X.68.5.748>

Brown, N. J. L., & Coyne, J. C. (2017, September). Emodiversity: Robust predictor of outcomes or statistical artifact? *Journal of Experimental Psychology: General*, 146(9), 1372-1377. <https://doi.org/10.1037/xge0000330>

Bullinger, L. R., Feely, M., Raissian, K. M., & Schneider, W. (2020, April 4). Heed neglect, disrupt child maltreatment: A call to action for researchers. *International Journal on Child Maltreatment: Research, Policy and Practice*, 3(1), 93-104.

<https://doi.org/10.1007/s42448-019-00026-5>

Burns, E. E., Jackson, J. L., & Harding, H. G. (2010, November 18). Child Maltreatment, Emotion Regulation, and Posttraumatic Stress: The Impact of Emotional Abuse.

*Journal of Aggression, Maltreatment & Trauma*, 19(8), 801-819.

<https://doi.org/10.1080/10926771.2010.522947>

- Campos, J. J., Mumme, D. L., Kermoian, R., & Campos, R. G. (1994). A functionalist perspective on the nature of emotion. *Monographs of the Society for Research in Child Development*, 59(2-3), 284-303.
- Carr, C. P., Martins, C. M., Stingel, A. M., Lemgruber, V. B., & Juruena, M. F. (2013, December). The role of early life stress in adult psychiatric disorders: a systematic review according to childhood trauma subtypes. *The Journal of Nervous and Mental Disease*, 201(12), 1007-1020. <https://doi.org/10.1097/nmd.0000000000000049>
- Carstensen, L. L., Turan, B., Scheibe, S., Ram, N., Ersner-Hershfield, H., Samanez-Larkin, G. R., Brooks, K. P., & Nesselroade, J. R. (2011, March). Emotional experience improves with age: evidence based on over 10 years of experience sampling. *Psychology and Aging*, 26(1), 21-33. <https://doi.org/10.1037/a0021285>
- Cassiers, L. L. M., Sabbe, B. G. C., Schmaal, L., Veltman, D. J., Penninx, B. W. J. H., & Van Den Eede, F. (2018, August 3). Structural and functional brain abnormalities associated with exposure to different childhood trauma subtypes: A systematic review of neuroimaging findings. *Frontiers in Psychiatry*, 9(329). <https://doi.org/10.3389/fpsy.2018.00329>
- Cicchetti, D. (2013). Annual research review: Resilient functioning in maltreated children – past, present, and future perspectives. *Journal of Child Psychology and Psychiatry*, 54(4), 402-422. <https://doi.org/https://doi.org/10.1111/j.1469-7610.2012.02608.x>
- Cicchetti, D., & Ng, R. (2014). Emotional development in maltreated children. In Lagattuta, K.H (Ed.), *Children and Emotion. New Insights into Developmental Affective Sciences* (pp. 106-118). Karger. <https://doi.org/10.1159/000354349>

- Cicchetti, D., & Toth, S. L. (2015). Child maltreatment. In M. E. Lamb & R. M. Lerner (Eds.), *Handbook of child psychology and developmental science: Socioemotional processes* (Vol. 3, pp. 513-563). John Wiley & Sons.
- Coelho, R., Viola, T. W., Walss-Bass, C., Brietzke, E., & Grassi-Oliveira, R. (2014, March). Childhood maltreatment and inflammatory markers: A systematic review. *Acta Psychiatrica Scandinavica*, *129*(3), 180-192. <https://doi.org/10.1111/acps.12217>
- Cohen, J. R., McNeil, S. L., Shorey, R. C., & Temple, J. R. (2019, October). Maltreatment subtypes, depressed mood, and anhedonia: A longitudinal study with adolescents. *Psychological Trauma*, *11*(7), 704-712. <https://doi.org/10.1037/tra0000418>
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, *98*(2), 310-357. <https://doi.org/10.1037/0033-2909.98.2.310>
- Colombo, D., Fernández-Álvarez, J., Suso-Ribera, C., Cipresso, P., Valev, H., Leufkens, T., Sas, C., Garcia-Palacios, A., Riva, G., & Botella, C. (2020, February). The need for change: Understanding emotion regulation antecedents and consequences using ecological momentary assessment. *Emotion*, *20*(1), 30-36. <https://doi.org/10.1037/emo0000671>
- Institute of Medicine and National Research Council. (2014). *New directions in child abuse and neglect research*. The National Academies Press.
- Cuijpers, P., Smit, F., Unger, F., Stikkelbroek, Y., ten Have, M., & de Graaf, R. (2011, November 1). The disease burden of childhood adversities in adults: A population-based study. *Child Abuse & Neglect*, *35*(11), 937-945. <https://doi.org/https://doi.org/10.1016/j.chiabu.2011.06.005>
- Danese, A., & Widom, C. S. (2020, August 1). Objective and subjective experiences of child maltreatment and their relationships with psychopathology. *Nature Human Behaviour*, *4*(8), 811-818. <https://doi.org/10.1038/s41562-020-0880-3>

- Dejonckheere, E., Mestdagh, M., Houben, M., Rutten, I., Sels, L., Kuppens, P., & Tuerlinckx, F. (2019). Complex affect dynamics add limited information to the prediction of psychological well-being. *Nature Human Behaviour*, 3(5), 478-491.  
<https://doi.org/10.1038/s41562-019-0555-0>
- Doretto, V., & Scivoletto, S. (2018, January 6). Effects of early neglect experience on recognition and processing of facial expressions: A systematic review. *Brain Science*, 8(1). <https://doi.org/10.3390/brainsci8010010>
- Dye, H. L. (2020, December). Is emotional abuse as harmful as physical and/or sexual abuse? *Journal of Child & Adolescent Trauma*, 13(4), 399-407.  
<https://doi.org/10.1007/s40653-019-00292-y>
- Eilers, H., aan het Rot, M., & Jeronimus, B. F. (2022). *The Body Keeps the Score: Childhood Trauma and Somatic Symptoms in Adulthood*. Manuscript submitted for publication.
- Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental Socialization of Emotion. *Psychological Inquiry*, 9(4), 241-273. [https://doi.org/10.1207/s15327965pli0904\\_1](https://doi.org/10.1207/s15327965pli0904_1)
- Ernst, A. F., Albers, C. J., Jeronimus, B. F., & Timmerman, M. E. (2020). Inter-individual differences in multivariate time-series: Latent class vector-autoregressive modeling. *European Journal of Psychological Assessment*, 36(3), 482-491.  
<https://doi.org/10.1027/1015-5759/a000578>
- Gareth, J., Witten, D., Hastie, T., & Tibshirani, R. (2015). *An Introduction to Statistical Learning with Applications in R*. Springer.
- Gilbert, R., Widom, C. S., Browne, K., Fergusson, D., Webb, E., & Janson, S. (2009). Burden and consequences of child maltreatment in high-income countries. *The Lancet*, 373(9657), 68-81. [https://doi.org/10.1016/S0140-6736\(08\)61706-7](https://doi.org/10.1016/S0140-6736(08)61706-7)
- Glaser, J. P., van Os, J., Portegijs, P. J., & Myin-Germeys, I. (2006, August). Childhood trauma and emotional reactivity to daily life stress in adult frequent attenders of



general practitioners. *Journal of Psychosomatic Research*, 61(2), 229-236.

<https://doi.org/10.1016/j.jpsychores.2006.04.014>

Green, J. G., McLaughlin, K. A., Berglund, P. A., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2010). Childhood adversities and adult psychiatric disorders in the national comorbidity survey replication I: Associations with first onset of DSM-IV disorders. *Archives of General Psychiatry*, 67(2), 113-123.

<https://doi.org/10.1001/archgenpsychiatry.2009.186>

Greene, C. A., Haisley, L., Wallace, C., & Ford, J. D. (2020, August). Intergenerational effects of childhood maltreatment: A systematic review of the parenting practices of adult survivors of childhood abuse, neglect, and violence. *Clinical Psychology Review*, 80, 101891. <https://doi.org/10.1016/j.cpr.2020.101891>

Gruber, J., Kogan, A., Quoidbach, J., & Mauss, I. B. (2013). Happiness is best kept stable: positive emotion variability is associated with poorer psychological health. *Emotion*, 13(1), 1-6. <https://doi.org/10.1037/a0030262>

Hagborg, J. M., Kalin, T., & Gerdner, A. (2022, March 30). The Childhood Trauma Questionnaire—Short Form (CTQ-SF) used with adolescents – methodological report from clinical and community samples. *Journal of Child & Adolescent Trauma*.

<https://doi.org/10.1007/s40653-022-00443-8>

Harms, M. B., Leitzke, B. T., & Pollak, S. D. (2019). Maltreatment and emotional development. In V. LoBue, K. A. Buss, & K. Pérez-Edgar (Eds.), *Handbook of emotional development* (pp. 767-786). Springer.

Heleniak, C., Jenness, J. L., Vander Stoep, A., McCauley, E. A., & McLaughlin, K. A. (2015). Childhood maltreatment exposure and disruptions in emotion regulation: A transdiagnostic pathway to adolescent internalizing and externalizing psychopathology. *Cognitive Therapy and Research*, 40, 394-415.

- Hoemann, K., Lee, Y., Kuppens, P., Gendron, M., & Boyd, R. L. (2022, January 21). Emotional granularity is associated with daily experiential diversity. *PsyArXiv Preprints*. [https://doi.org/ https://doi.org/10.31234/osf.io/24mpf](https://doi.org/https://doi.org/10.31234/osf.io/24mpf)
- Houben, M., Van Den Noortgate, W., & Kuppens, P. (2015, Jul). The relation between short-term emotion dynamics and psychological well-being: A meta-analysis. *Psychological Bulletin*, *141*(4), 901-930. <https://doi.org/10.1037/a0038822>
- Hughes, K., Ford, K., Bellis, M. A., Glendinning, F., Harrison, E., & Passmore, J. (2021, November). Health and financial costs of adverse childhood experiences in 28 European countries: a systematic review and meta-analysis. *Lancet Public Health*, *6*(11), e848-e857. [https://doi.org/10.1016/s2468-2667\(21\)00232-2](https://doi.org/10.1016/s2468-2667(21)00232-2)
- Infurna, F. J., Rivers, C. T., Reich, J., & Zautra, A. J. (2015). Childhood trauma and personal mastery: their influence on emotional reactivity to everyday events in a community sample of middle-aged adults. *PLOS ONE*, *10*(4), e0121840. <https://doi.org/10.1371/journal.pone.0121840>
- Jennissen, S., Holl, J., Mai, H., Wolff, S., & Barnow, S. (2016, December 1). Emotion dysregulation mediates the relationship between child maltreatment and psychopathology: A structural equation model. *Child Abuse & Neglect*, *62*, 51-62. <https://doi.org/https://doi.org/10.1016/j.chiabu.2016.10.015>
- Jeronimus, B. F., Myroniuk, S., Reitsema, A. M., De Jonge, P., & Laceulle, O. M. (2022). *Childhood abuse and neglect and adult well-being: Who rekindled the light after darkness?* Manuscript in preparation.
- Jespersen, A. F., Lalumière, M. L., & Seto, M. C. (2009, March 1). Sexual abuse history among adult sex offenders and non-sex offenders: A meta-analysis. *Child Abuse & Neglect*, *33*(3), 179-192. <https://doi.org/https://doi.org/10.1016/j.chiabu.2008.07.004>

- Jobst, L., Bader, M., & Moshagen, M. (2021, June 9). A Tutorial on assessing statistical power and determining sample size for structural equation models. *Psychological Methods*. <https://doi.org/10.1037/met0000423>
- Keyes, C. L. M. (2014). Mental health as a complete state: How the salutogenic perspective completes the picture. In G. F. Bauer & O. Hämmig (Eds.), *Bridging Occupational, Organizational and Public Health: A Transdisciplinary Approach* (pp. 179-192). Springer Netherlands. [https://doi.org/10.1007/978-94-007-5640-3\\_11](https://doi.org/10.1007/978-94-007-5640-3_11)
- Kim, J., & Cicchetti, D. (2010). Longitudinal pathways linking child maltreatment, emotion regulation, peer relations, and psychopathology. *Journal of Child Psychology and Psychiatry*, 51(6), 706-716. <https://doi.org/https://doi.org/10.1111/j.1469-7610.2009.02202.x>
- Kim, S., & Hamann, S. (2007, June 1). Neural correlates of positive and negative emotion regulation. *Journal of cognitive neuroscience*, 19, 776-798. <https://doi.org/10.1162/jocn.2007.19.5.776>
- Kline, R. B. (2016). *Principles and practice of structural equation modeling*. Guilford publications.
- Kong, J., Moorman, S. M., Martire, L. M., & Almeida, D. M. (2018). The role of current family relationships in associations between childhood abuse and adult psychological functioning. *The Journals of Gerontology: Series B*, 74(5), 858-868. <https://doi.org/10.1093/geronb/gby076>
- Krieke, L. V. D., Jeronimus, B. F., Blaauw, F. J., Wanders, R. B. K., Emerencia, A. C., Schenk, H. M., Vos, S. D., Snippe, E., Wichers, M., Wigman, J. T. W., Bos, E. H., Wardenaar, K. J., & Jonge, P. D. (2016). HowNutsAreTheDutch (HoeGekIsNL): A crowdsourcing study of mental symptoms and strengths. *International Journal of*

*Methods in Psychiatric Research*, 25(2), 123-144.

<https://doi.org/https://doi.org/10.1002/mpr.1495>

Krugman, R. D., & Korbin, J. E. (2022). *Handbook of child maltreatment* (2nd ed. ed.).

Springer. <https://doi.org/10.1007/978-3-030-82479-2>

Kunnen, E. S., De Ruiter, N. M., Jeronimus, B. F., & Van der Gaag, M. A. (2019).

*Psychosocial development in adolescence: Insights from the dynamic systems approach*. Routledge.

Kuppens, P., Allen, N. B., & Sheeber, L. B. (2010). Emotional inertia and psychological maladjustment. *Psychological Science*, 21(7), 984-991.

<https://doi.org/10.1177/0956797610372634>

Kuppens, P., & Verduyn, P. (2015). Looking at emotion regulation through the window of emotion dynamics. *Psychological Inquiry*, 26(1), 72-79.

<https://doi.org/10.1080/1047840X.2015.960505>

Kuppens, P., & Verduyn, P. (2017, October 1). Emotion dynamics. *Current Opinion in*

*Psychology*, 17, 22-26. <https://doi.org/https://doi.org/10.1016/j.copsyc.2017.06.004>

Kuzminskaite, E., Penninx, B. W. J. H., van Harmelen, A.-L., Elzinga, B. M., Hovens, J. G.

F. M., & Vinkers, C. H. (2021, March 15). Childhood trauma in adult depressive and anxiety disorders: An integrated review on psychological and biological mechanisms in the nesda cohort. *Journal of Affective Disorders*, 283, 179-191.

<https://doi.org/https://doi.org/10.1016/j.jad.2021.01.054>

Lavi, I., Katz, L. F., Ozer, E. J., & Gross, J. J. (2019). Emotion reactivity and regulation in maltreated children: A meta-analysis. *Child Development*, 90(5), 1503-1524.

<https://doi.org/https://doi.org/10.1111/cdev.13272>

- Lichtwarck-Aschoff, A., Kunnen, S. E., & van Geert, P. L. (2009). Here we go again: A dynamic systems perspective on emotional rigidity across parent–adolescent conflicts. *Developmental psychology*, 45(5), 1364-1375. <https://doi.org/10.1037/a0016713>
- Lindquist, K. A., Wager, T. D., Kober, H., Bliss-Moreau, E., & Barrett, L. F. (2012). The brain basis of emotion: A meta-analytic review. *Behavioral and Brain Sciences*, 35(3), 121-143. <https://doi.org/10.1017/S0140525X11000446>
- Ludwig, S., & Rostain, A. (2009). Family function and dysfunction. In W. B. Carey, A. C. Crocker, W. L. Coleman, E. R. Elias, & H. M. Feldman (Eds.), *Developmental-behavioral pediatrics (4th ed.)* (pp. 103-118). W.B. Saunders. <https://doi.org/https://doi.org/10.1016/B978-1-4160-3370-7.00010-9>
- Lyubomirsky, S. (2011). Hedonic adaptation to positive and negative experiences. In S. Folkman (Ed.), *The Oxford handbook of stress, health, and coping* (pp. 200–224). Oxford University Press.
- McLaughlin, K. A., Weissman, D., & Bitrán, D. (2019). Childhood adversity and neural development: A systematic review. *Annual Review of Developmental Psychology*, 1(1), 277-312. <https://doi.org/10.1146/annurev-devpsych-121318-084950>
- Mills, P., Newman, E. F., Cossar, J., & Murray, G. (2015, January 1). Emotional maltreatment and disordered eating in adolescents: Testing the mediating role of emotion regulation. *Child Abuse & Neglect*, 39, 156-166. <https://doi.org/https://doi.org/10.1016/j.chiabu.2014.05.011>
- Milojevich, H. M., Norwalk, K. E., & Sheridan, M. A. (2019, August). Deprivation and threat, emotion dysregulation, and psychopathology: Concurrent and longitudinal associations. *Development and psychopathology*, 31(3), 847-857. <https://doi.org/10.1017/s0954579419000294>

- Miu, A. C., Szentágotai-Táatar, A., Balázsi, R., Nechita, D., Bunea, I., & Pollak, S. D. (2022, April). Emotion regulation as mediator between childhood adversity and psychopathology: A meta-analysis. *Clinical Psychology Review*, *93*, 102141.  
<https://doi.org/10.1016/j.cpr.2022.102141>
- Moritz, S., & Bartz-Beielstein, T. (2017). imputeTS: time series missing value imputation in R. *The R Journal*, *9*(1), 207-218.
- Müller, L. E., Bertsch, K., Bülau, K., Herpertz, S. C., & Buchheim, A. (2019, 2019/02/01/). Emotional neglect in childhood shapes social dysfunctioning in adults by influencing the oxytocin and the attachment system: Results from a population-based study. *International Journal of Psychophysiology*, *136*, 73-80.  
<https://doi.org/https://doi.org/10.1016/j.ijpsycho.2018.05.011>
- Nesse, R. M. (2019). *Good reasons for bad feelings: insights from the frontier of evolutionary psychiatry*. Penguin.
- Nishimi, K., Choi, K. W., Davis, K. A., Powers, A., Bradley, B., & Dunn, E. C. (2020). Features of childhood maltreatment and resilience capacity in adulthood: Results from a large community-based sample. *Journal of Traumatic Stress*, *33*(5), 665-676.  
<https://doi.org/https://doi.org/10.1002/jts.22543>
- O'Toole, M. S., Renna, M. E., Elkjær, E., Mikkelsen, M. B., & Mennin, D. S. (2020, January 1). A systematic review and meta-analysis of the association between complexity of emotion experience and behavioral adaptation. *Emotion Review*, *12*(1), 23-38.  
<https://doi.org/10.1177/1754073919876019>
- Ochsner, K. N., Silvers, J. A., & Buhle, J. T. (2012). Functional imaging studies of emotion regulation: a synthetic review and evolving model of the cognitive control of emotion. *Annals of the New York Academy of Sciences*, *1251*, E1-E24.  
<https://doi.org/10.1111/j.1749-6632.2012.06751.x>

- World Health Organization. (2006). *Preventing child maltreatment: a guide to taking action and generating evidence*. <https://apps.who.int/iris/handle/10665/43499>
- Osborne, K., Duprey, E., Caughy, M. O., & Oshri, A. (2021, December). Parents' maltreatment histories, dimensions of emotion regulation, and connections to offspring self-regulation: A sex-specific transmission pathway. *Journal of Psychopathology and Behavioral Assessment*, 43(4), 717-729. <https://doi.org/10.1007/s10862-021-09881-4>
- Oshri, A., Sutton, T. E., Clay-Warner, J., & Miller, J. D. (2015). Child maltreatment types and risk behaviors: Associations with attachment style and emotion regulation dimensions. *Personality and Individual Differences*, 73, 127-133.
- Peterson, R., & Brown, S. (2005, February 2). On the use of beta coefficients in meta-analysis. *The Journal of applied psychology*, 90, 175-181. <https://doi.org/10.1037/0021-9010.90.1.175>
- Quoidbach, J., Gruber, J., Mikolajczak, M., Kogan, A., Kotsou, I., & Norton, M. I. (2014, December). Emodiversity and the emotional ecosystem. *Journal of Experimental Psychology: General*, 143(6), 2057-2066. <https://doi.org/10.1037/a0038025>
- Reitsema, A. M., Jeronimus, B. F., van Dijk, M., & de Jonge, P. (2022a). Emotion dynamics in children and adolescents: A meta-analytic and descriptive review. *Emotion*, 22(2), 374-396. <https://doi.org/10.1037/emo0000970>
- Reitsema, A. M., Jeronimus, B. F., Bos, E., Jonge, P., Leander, P., & Cristea, M. (2022b). *Age differences in hedonic adaptation to societal restrictions? Positive and negative affect trajectories during the first wave of the COVID-19 pandemic in 33 nations*. Manuscript submitted for publication.

- Reitsema, A. M., Jeronimus, B. F., van Dijk, M., Ceulemans, E., van Roekel, E., Kuppens, P., & de Jonge, P. (2022c). *Profiles distinguishing dimensions of emotion dynamics across 12 emotions in adolescents' daily lives*. Revision submitted.
- Richard, F. D., Bond, C. F., & Stokes-Zoota, J. J. (2003, December 1). One hundred years of social psychology quantitatively described. *Review of General Psychology*, 7(4), 331-363. <https://doi.org/10.1037/1089-2680.7.4.331>
- Rosseel, Y. (2012, May 24). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, 48(2), 1 - 36. <https://doi.org/10.18637/jss.v048.i02>
- Rozin, P., & Royzman, E. B. (2001). Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review*, 5(4), 296-320. [https://doi.org/10.1207/s15327957pspr0504\\_2](https://doi.org/10.1207/s15327957pspr0504_2)
- Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*, 39(6), 1161-1178. <https://doi.org/10.1037/h0077714>
- Schenk, H. M., Jeronimus, B. F., van der Krieke, L., Bos, E. H., de Jonge, P., & Rosmalen, J. G. M. (2018, February/March). Associations of positive affect and negative affect with allostatic load: A lifelines cohort study. *Psychosomatic Medicine*, 80(2), 160-166. <https://doi.org/10.1097/psy.0000000000000546>
- Scher, C. D., Forde, D. R., McQuaid, J. R., & Stein, M. B. (2004, February 1). Prevalence and demographic correlates of childhood maltreatment in an adult community sample. *Child Abuse & Neglect*, 28(2), 167-180. <https://doi.org/https://doi.org/10.1016/j.chiabu.2003.09.012>
- Scher, C. D., Stein, M. B., Asmundson, G. J. G., McCreary, D. R., & Forde, D. R. (2001, October 1). The Childhood Trauma Questionnaire in a community sample: Psychometric properties and normative data. *Journal of Traumatic Stress*, 14(4), 843-857. <https://doi.org/10.1023/A:1013058625719>



Schober, P., Boer, C., & Schwarte, L. A. (2018). Correlation coefficients: Appropriate use and interpretation. *Anesthesia & Analgesia*, *126*(5), 1763-1768.

<https://doi.org/10.1213/ane.0000000000002864>

Schoemann, A. M., & Jorgensen, T. D. (2021, July 30). Testing and interpreting latent variable interactions using the semtools package. *Psych*, *3*(3), 322-335.

<https://doi.org/https://doi.org/10.3390/psych3030024>

Schoevers, R. A., van Borkulo, C. D., Lamers, F., Servaas, M. N., Bastiaansen, J. A., Beekman, A. T. F., van Hemert, A. M., Smit, J. H., Penninx, B., & Riese, H. (2021, August). Affect fluctuations examined with ecological momentary assessment in patients with current or remitted depression and anxiety disorders. *Psychological Medicine*, *51*(11), 1906-1915. <https://doi.org/10.1017/s0033291720000689>

Schönbrodt, F. D., & Perugini, M. (2013, October 1). At what sample size do correlations stabilize? *Journal of Research in Personality*, *47*(5), 609-612.

<https://doi.org/https://doi.org/10.1016/j.jrp.2013.05.009>

Scott, J., Varghese, D., & McGrath, J. (2010). As the twig is bent, the tree inclines: Adult mental health consequences of childhood adversity. *Archives of General Psychiatry*, *67*(2), 111-112. <https://doi.org/10.1001/archgenpsychiatry.2009.188>

Scott, L. N., Victor, S. E., Kaufman, E. A., Beeney, J. E., Byrd, A. L., Vine, V., Pilkonis, P. A., & Stepp, S. D. (2020, May 1). Affective dynamics across internalizing and externalizing dimensions of psychopathology. *Clinical Psychological Science*, *8*(3), 412-427. <https://doi.org/10.1177/2167702619898802>

Sethi, D., Bellis, M., Hughes, K., Gilbert, R., Mitis, F., & Galea, G. (2013). *European report on preventing child maltreatment*. World Health Organization. Regional Office for Europe. <https://apps.who.int/iris/handle/10665/326375>

- Shipman, K., Edwards, A., Brown, A., Swisher, L., & Jennings, E. (2005, September). Managing emotion in a maltreating context: a pilot study examining child neglect. *Child Abuse & Neglect*, 29(9), 1015-1029. <https://doi.org/10.1016/j.chiabu.2005.01.006>
- Simon, N. M., Herlands, N. N., Marks, E. H., Mancini, C., Letamendi, A., Li, Z., Pollack, M. H., Van Ameringen, M., & Stein, M. B. (2009). Childhood maltreatment linked to greater symptom severity and poorer quality of life and function in social anxiety disorder. *Depress Anxiety*, 26(11), 1027-1032. <https://doi.org/10.1002/da.20604>
- Somers, J. A., Ibrahim, M. H., & Luecken, L. J. (2017, August). Biological sensitivity to the effects of childhood family adversity on psychological well-being in young adulthood. *Child Maltreatment*, 22(3), 236-244. <https://doi.org/10.1177/1077559517711041>
- Sperry, S. H., Walsh, M. A., & Kwapil, T. R. (2020, January 1). Emotion dynamics concurrently and prospectively predict mood psychopathology. *Journal of Affective Disorders*, 261, 67-75. <https://doi.org/https://doi.org/10.1016/j.jad.2019.09.076>
- Spinhoven, P., Elzinga, B. M., Hovens, J. G. F. M., Roelofs, K., Zitman, F. G., van Oppen, P., & Penninx, B. W. J. H. (2010, October 1). The specificity of childhood adversities and negative life events across the life span to anxiety and depressive disorders. *Journal of Affective Disorders*, 126(1), 103-112. <https://doi.org/https://doi.org/10.1016/j.jad.2010.02.132>
- Spinhoven, P., Elzinga, B. M., Van Hemert, A. M., de Rooij, M., & Penninx, B. W. (2016, February 1). Childhood maltreatment, maladaptive personality types and level and course of psychological distress: A six-year longitudinal study. *Journal of Affective Disorders*, 191, 100-108. <https://doi.org/https://doi.org/10.1016/j.jad.2015.11.036>

- Stanton, K., & Watson, D. (2014, September 1). Positive and negative affective dysfunction in psychopathology. *Social and Personality Psychology Compass*, 8(9), 555-567.  
<https://doi.org/https://doi.org/10.1111/spc3.12132>
- Stoltenborgh, M., Bakermans-Kranenburg, M. J., Alink, L. R. A., & van IJzendoorn, M. H. (2015). The prevalence of child maltreatment across the globe: Review of a series of meta-analyses. *Child Abuse Review*, 24(1), 37-50.  
<https://doi.org/https://doi.org/10.1002/car.2353>
- Sturm, V. E., Haase, C. M., & Levenson, R. W. (2016). Emotional dysfunction in psychopathology and neuropathology: Neural and genetic pathways. In T. Lehner, B. L. Miller, & M. W. State (Eds.), *Genomics, Circuits, and Pathways in Clinical Neuropsychiatry* (pp. 345-364). Academic Press.  
<https://doi.org/https://doi.org/10.1016/B978-0-12-800105-9.00022-6>
- Tamir, M., Vishkin, A., & Gutentag, T. (2020). Emotion regulation is motivated. *Emotion*, 20(1), 115-119. <https://doi.org/10.1037/emo0000635>
- R Core Team (2021). R: A language and environment for statistical computing. *R Foundation for Statistical Computing*. <https://www.R-project.org/>
- Teisl, M., & Cicchetti, D. (2008). Physical abuse, cognitive and emotional processes, and aggressive/disruptive behavior problems. *Social Development*, 17(1), 1-23.  
<https://doi.org/https://doi.org/10.1111/j.1467-9507.2007.00412.x>
- Thombs, B. D., Bernstein, D. P., Lobbestael, J., & Arntz, A. (2009, August). A validation study of the Dutch Childhood Trauma Questionnaire-Short Form: factor structure, reliability, and known-groups validity. *Child Abuse & Neglect*, 33(8), 518-523.  
<https://doi.org/10.1016/j.chiabu.2009.03.001>

- Tugade, M. M. (2010). Positive emotions and coping: Examining dual-process models of resilience. In S. Folkman (Ed.), *The Oxford Handbook of stress, health, and coping*. <https://doi.org/10.1093/oxfordhb/9780195375343.013.0010>
- Turiano, N. A., Silva, N. M., McDonald, C., & Hill, P. L. (2017). Retrospective reports of childhood misfortune are associated with positive and negative affect in adulthood: Exploring the moderating role of control beliefs. *The International Journal of Aging & Human Development*, 84(3), 276-293. <https://doi.org/10.1177/0091415016688480>
- Urban-Wojcik, E. J., Mumford, J. A., Almeida, D. M., Lachman, M. E., Ryff, C. D., Davidson, R. J., & Schaefer, S. M. (2022, June). Emodiversity, health, and well-being in the Midlife in the United States (MIDUS) daily diary study. *Emotion*, 22(4), 603-615. <https://doi.org/10.1037/emo0000753>
- Vachon, D. D., Krueger, R. F., Rogosch, F. A., & Cicchetti, D. (2015). Assessment of the harmful psychiatric and behavioral effects of different forms of child maltreatment. *JAMA Psychiatry*, 72(11), 1135-1142. <https://doi.org/10.1001/jamapsychiatry.2015.1792>
- Van den Bergh, O., Brosschot, J., Critchley, H., Thayer, J. F., & Ottaviani, C. (2021, March). Better safe than sorry: A common signature of general vulnerability for psychopathology. *Perspectives on Psychological Science*, 16(2), 225-246. <https://doi.org/10.1177/1745691620950690>
- van der Kolk, B. (2014). *The body keeps the score: Brain, mind, and body in the healing of trauma* Viking.
- van der Krieke, L., Jeronimus, B. F., Blaauw, F. J., Wanders, R. B. K., Emerencia, A. C., Schenk, H. M., de Vos, S., Snippe, E., Wichers, M., Wigman, J. T. W., Bos, E. H., Wardenaar, K. J., & de Jonge, P. (2016). HowNutsAreTheDutch (HoeGekIsNL): A crowdsourcing study of mental symptoms and strengths. *International Journal of*

*Methods in Psychiatric Research*, 25(2), 123-144.

<https://doi.org/https://doi.org/10.1002/mpr.1495>

Viola, T. W., Salum, G. A., Kluwe-Schiavon, B., Sanvicente-Vieira, B., Levandowski, M. L., & Grassi-Oliveira, R. (2016, January). The influence of geographical and economic factors in estimates of childhood abuse and neglect using the Childhood Trauma Questionnaire: A worldwide meta-regression analysis. *Child Abuse & Neglect*, 51, 1-11. <https://doi.org/10.1016/j.chiabu.2015.11.019>

Volgenau, K. M., Hokes, K. E., Hacker, N., & Adams, L. M. (2022, January 30). A network analysis approach to understanding the relationship between childhood trauma and wellbeing later in life. *Child Psychiatry & Human Development*.  
<https://doi.org/10.1007/s10578-022-01321-y>

Warmingham, J. M., Duprey, E. B., Handley, E. D., Rogosch, F. A., & Cicchetti, D. (2022, Mar 15). Patterns of childhood maltreatment predict emotion processing and regulation in emerging adulthood. *Development and psychopathology*, 1-16.  
<https://doi.org/10.1017/s0954579422000025>

Waxman, R., Fenton, M. C., Skodol, A. E., Grant, B. F., & Hasin, D. (2014). Childhood maltreatment and personality disorders in the USA: Specificity of effects and the impact of gender. *Personality and Mental Health*, 8(1), 30-41.  
<https://doi.org/https://doi.org/10.1002/pmh.1239>

Weeks, R., & Widom, C. S. (1998, June 01). Self-reports of early childhood victimization among incarcerated adult male felons. *Journal of Interpersonal Violence*, 13(3), 346-361. <https://doi.org/10.1177/088626098013003003>

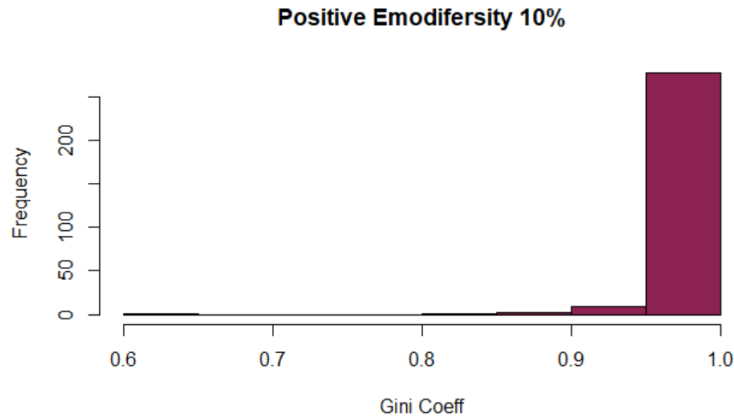
Werner-Seidler, A., Hitchcock, C., Hammond, E., Hill, E., Golden, A.-M., Breakwell, L., Ramana, R., Moore, R., & Dalgleish, T. (2020, August 01). Emotional complexity across the life story: Elevated negative emotion diversity and diminished positive

- emodiversity in sufferers of recurrent depression. *Journal of Affective Disorders*, 273, 106-112. <https://doi.org/10.1016/j.jad.2020.04.060>
- West, S. G., Finch, J. F., & Curran, P. G. (1995). Structural equation models with nonnormal variables. Problems and remedies. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications*. Sage.
- Wooten, W., Laubaucher, C., George, G. C., Heyn, S., & Herringa, R. J. (2022, March). The impact of childhood maltreatment on adaptive emotion regulation strategies. *Child Abuse & Neglect*, 125, 105494. <https://doi.org/10.1016/j.chiabu.2022.105494>
- Xiang, Y., Yuan, R., & Zhao, J. (2020, 2021/11/01). Childhood maltreatment and life satisfaction in adulthood: The mediating effect of emotional intelligence, positive affect and negative affect. *Journal of Health Psychology*, 26(13), 2460-2469. <https://doi.org/10.1177/1359105320914381>
- Yik, M. S. M., Russell, J. A., & Barrett, L. F. (1999). Structure of self-reported current affect: Integration and beyond. *Journal of Personality and Social Psychology*, 77(3), 600-619. <https://doi.org/10.1037/0022-3514.77.3.600>
- Young, J. C., & Widom, C. S. (2014, August). Long-term effects of child abuse and neglect on emotion processing in adulthood. *Child Abuse & Neglect*, 38(8), 1369-1381. <https://doi.org/10.1016/j.chiabu.2014.03.008>

## Supplementary materials

**Figure S1**

Figure shows distribution of emodiversity scores of Positive emotions.



*Note.* High PA Emodiversity in our sample (10%) indicates that almost everyone reported to experience all six positive emotions over the study period (with scores >10 on scale 0-100). For NA the Gini scores were more nuanced, as some people only reported specific NA emotions and some emotion(s) was/were rarely reported ( $\geq 10$  on scale 0-100).

**Table S1**

Model selection

Path n°	Maltrea tment type	Path direction	Emotion dynamic	$p$ (path)	Step	DF	Model test $\Delta\chi^2$	$p^{\text{dif}}$	Result	$\beta$
54	SA	→	Emodiversity NA	.963	1	1	0.00215	.963	x	
45	SA	→	Instability PAA	.930	2	2	0.00771	.930	x	
60	PN	→	Variability PAD	.948	3	3	0.00429	.948	x	
63	PN	→	Instability PAA	.891	4	4	0.01878	.891	x	
83	EN	→	Instability NAA	.859	5	5	0.03142	.859	x	
72	PN	→	Emodiversity NA	.836	6	6	0.04319	.835	x	
41	SA	→	Variability PAA	.837	7	7	0.04233	.837	x	
11	PA	→	Instability NAA	.815	8	8	0.05265	.819	x	
8	PA	→	Variability NAD	.874	9	9	0.02548	.873	x	
6	PA	→	Variability PAD	.865	10	10	0.02846	.866	x	
58	PN	→	Mean NAD	.804	11	11	0.06349	.801	x	
42	SA	→	Variability PAD	.755	12	12	0.10146	.750	x	
31	EA	→	Inertia PAA	.729	13	13	0.12007	.729	x	
20	EA	→	Mean PAD	.656	14	14	0.20128	.654	x	
19	EA	→	Mean PAA	.841	15	15	0.04006	.841	x	

13	PA	→	Inertia PAA	.826	16	16	0.04855	.826	x
35	EA	→	Emodiversity PA	.729	17	17	0.12016	.729	x
17	PA	→	Emodiversity PA	.760	18	18	0.09059	.763	x
34	EA	→	Inertia NAD	.699	19	19	0.14792	.701	x
33	EA	→	Inertia NAA	.664	20	20	0.18693	.666	x
80	EN	→	Variability NAD	.605	21	21	0.26508	.607	x
84	EN	→	Instability NAD	.584	22	22	0.29998	.584	x
71	PN	→	Emodiversity PA	.590	23	23	0.28814	.591	x
32	EA	→	Inertia PAD	.571	24	24	0.3184	.573	x
55	PN	→	Mean PAA	.573	25	25	0.33416	.563	x
57	PN	→	Mean NAA	.580	26	26	0.30679	.580	x
49	SA	→	Inertia PAA	.554	27	27	0.33682	.562	x
39	SA	→	Mean NAA	.514	28	28	0.40697	.524	x
52	SA	→	Inertia NAD	.513	29	29	0.40544	.524	x
70	PN	→	Inertia NAD	.428	30	30	0.63202	.427	x
64	PN	→	Instability PAD	.419	31	31	0.63582	.425	x
38	SA	→	Mean PAD	.387	32	32	0.75295	.386	x
37	SA	→	Mean PAA	.724	33	33	0.11942	.730	x
53	SA	→	Emodiversity PA	.451	34	34	0.56337	.453	x
5	PA	→	Variability PAA	.380	35	35	0.71395	.398	x
40	SA	→	Mean NAD	.359	36	36	0.87162	.351	x
16	PA	→	Inertia NAD	.327	37	37	0.94212	.332	x
14	PA	→	Inertia PAD	.333	38	38	0.96826	.325	x
86	EN	→	Inertia PAD	.385	39	39	0.76239	.383	x
88	EN	→	Inertia NAD	.395	40	40	0.76933	.380	x
7	PA	→	Variability NAA	.367	41	41	0.79401	.373	x
15	PA	→	Inertia NAA	.511	42	42	0.44773	.503	x
51	SA	→	Inertia NAA	.350	43	43	0.81359	.371	x
59	PN	→	Variability PAA	.297	44	44	1.11470	.291	x
67	PN	→	Inertia PAA	.584	45	45	0.29277	.589	x
68	PN	→	Inertia PAD	.251	46	46	1.21500	.270	x
27	EA	→	Instability PAA	.256	47	47	1.15720	.282	x
30	EA	→	Instability NAD	.357	48	48	0.83636	.360	x
1	PA	→	Mean PAA	.144	49	49	2.02140	.155	x
2	PA	→	Mean PAD	.414	50	50	0.69416	.405	x
4	PA	→	Mean NAD	.315	51	51	1.04430	.307	x
3	PA	→	Mean NAA	.197	52	52	1.40080	.237	x



18	PA	→	Emodiversity NA	.377	53	53	0.76133	.383	x
10	PA	→	Instability PAD	.218	54	54	1.66870	.196	x
26	EA	→	Variability NAD	.163	55	55	2.02950	.154	x
12	PA	→	Instability NAD	.267	56	56	1.14040	.286	x
9	PA	→	Instability PAA	.304	57	57	1.15080	.283	x
69	PN	→	Inertia NAA	.137	58	58	2.48260	.114	x
85	EN	→	Inertia PAA	.125	59	59	2.09810	.148	x
25	EA	→	Variability NAA	.124	60	60	2.11060	.146	x
29	EA	→	Instability NAA	.834	61	61	0.04248	.837	x
28	EA	→	Instability PAD	.313	62	62	0.96466	.326	x
24	EA	→	Variability PAD	.330	63	63	0.92881	.335	x
23	EA	→	Variability PAA	.282	64	64	1.07230	.300	x
90	EN	→	Emodiversity NA	.105	65	65	2.44860	.118	x
75	EN	→	Mean NAA	.421	66	66	0.61658	.432	x
76	EN	→	Mean NAD	.056	67	67	3.57440	.059	x
89	EN	→	Emodiversity PA	.069	68	68	3.05200	.081	x
46	SA	→	Instability PAD	.048	69	69	4.07720	.045	.037
21	EA	→	Mean NAA	.002					.166
22	EA	→	Mean NAD	< .000					.157
36	EA	→	Emodiversity NA	.001					.166
43	SA	→	Variability NAA	.009					.138
44	SA	→	Variability NAD	.002					.121
47	SA	→	Instability NAA	.011					.128
48	SA	→	Instability NAD	.002					.110
50	SA	→	Inertia PAD	.015					-.094
56	PN	→	Mean PAD	.008					.088
61	PN	→	Variability NAA	.040					-.102
62	PN	→	Variability NAD	.002					-.137
65	PN	→	Instability NAA	.047					-.094
66	PN	→	Instability NAD	.006					-.117
73	EN	→	Mean PAA	.036					-.087
74	EN	→	Mean PAD	< .000					-.181
77	EN	→	Variability PAA	.020					-.112
78	EN	→	Variability PAD	.021					-.106
79	EN	→	Variability NAA	.037					.043
81	EN	→	Instability PAA	.035					-.095
82	EN	→	Instability PAD	.028					-.096

*Note.* EA - Emotional Abuse, EN – Emotional Neglect, PA – Physical Abuse, PN – Physical Neglect, SA – Sexual Abuse. PAA - Positive Affect Activation, PAD - Positive Affect Deactivation, NAA - Negative Affect Activation, NAD - Negative Affect Deactivation.  $\Delta\chi^2$  Satorra-Bentler corrected chi square difference test between two nested model.  $p^{\text{dif}}$  is the  $p$ -value of the difference between two models. *Step* is the step number in model taken to close insignificant paths; in this case equals to the model  $df$  since only one path was closed in each step.

## S2

In model fitted with interaction effects, any significant path was identified. The model parameters with interaction effect:  $\chi^2 = 144.33$ ,  $df = 121$ ,  $p = .07$ , CFI = .996, RMSEA (95% CI) = .03 (.00, .04), SRMR = .05

**Table S3**

*Final SEM model with imputed missing values*

	Emotional Neglect		Physical Neglect		Sexual Abuse		Emotional Abuse	
	$\beta$	(SE)	$\beta$	(SE)	$\beta$	(SE)	$\beta$	(SE)
Mean								
PAA	-.10*	(.04)						
PAD	-.17***	(.04)	.07**	(.03)				
NAA							.18**	(.05)
NAD							.18***	(.05)
Variability								
PAA	-.10*	(.05)						
PAD	-.10*	(.04)						
NAA	<b>.04</b>	(.02)	-.11*	(.05)	.13**	(.05)		
NAD			-.15**	(.05)	<b>.14***</b>	(.04)		
Instability								
PAA	-.10*	(.04)						
PAD	-.09*	(.04)			.04*	(.02)		
NAA			-.10*	(.05)	.12*	(.05)		
NAD			-.14**	(.05)	<b>.13***</b>	(.04)		
Inertia								
PAD					-.08*	(.03)		
NAA	.09**	(.04)						
Emodiversity								
Negative affect							.14**	(.05)

*Note.* In bold values that significantly changed (i.e., reached the cut-off of  $p < .001$  or  $p > .05$ ) in comparison with the original model with omitted missing values.