

A six-year longitudinal study of the differential effects of abuse and neglect on executive
functioning and emotion regulation

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ABSTRACT

Child maltreatment impacts approximately one in seven children in the United States, leading to many adverse outcomes throughout life. Adolescence is a time period that is critical for the development of self-regulation, as it is when the prefrontal cortex is actively developing. Existing research demonstrates the numerous adverse effects maltreatment may have on self-regulation, which encompasses executive function and emotion regulation abilities. However, there is little research examining how abuse and neglect may differently affect the *developmental trajectories* of executive function and emotion regulation *throughout adolescence and into young adulthood*. In the current study, 167 adolescents participated approximately annually at six time points, from ages 14 to 20. At each of the six time points, adolescents completed three executive function tasks as well as self-report questionnaires on their emotion regulation abilities and strategies. Information on maltreatment experienced from ages 1 to 13 was collected when the adolescents were approximately 18 to 20 years of age. Conditional growth curve models were utilized to test the differential effects of abuse and neglect on the growth trajectories of executive function abilities and emotion regulation difficulties and strategy use. The results revealed that neglect was associated with developmental changes in working memory abilities, such that greater amounts of neglect were associated with slower increases in working memory abilities across ages 14 to 20. Further, abuse was associated with developmental changes in difficulties in emotion regulation abilities, such that greater amounts of abuse were associated with larger increases in difficulties in emotion regulation abilities from ages 14 to 20. Finally, neglect was

associated with the initial level (at age 14) of difficulties in emotion regulation abilities, such that greater levels of neglect were associated with higher initial levels of difficulties in emotion regulation abilities as compared to individuals with lesser amounts of experienced neglect. These findings suggest that working memory development during adolescence into young adulthood may be more vulnerable to childhood neglect and that both abuse and neglect in childhood may have adverse impacts on the development of emotion regulation abilities.

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GENERAL AUDIENCE ABSTRACT

Child maltreatment impacts approximately one in seven children in the United States, leading to many adverse outcomes throughout life. Adolescence is a time period that is critical for the development of self-regulation, which encompasses executive function and emotion regulation abilities. Existing research demonstrates the numerous adverse effects maltreatment may have on self-regulation. However, there is little research examining how abuse and neglect may differently affect the *developmental trajectories* of executive function and emotion regulation *throughout adolescence and into young adulthood*. In the current study, 167 adolescents participated approximately annually at six time points, from ages 14 to 20. At each of the six time points, adolescents completed three executive function tasks as well as self-report questionnaires on their emotion regulation abilities and strategies. Information on maltreatment experienced from ages 1 to 13 was collected when the adolescents were approximately 18 to 20 years of age. The results revealed that greater amounts of neglect were associated with slower increases in working memory abilities across ages 14 to 20. Further, greater amounts of abuse were associated with larger increases in difficulties in emotion regulation abilities from ages 14 to 20. Finally, neglect was associated with difficulties in emotion regulation abilities at age 14, such that greater levels of neglect were associated with higher levels of difficulties in emotion regulation abilities at age 14 compared to individuals with lesser amounts of experienced neglect. These findings suggest that working memory development during adolescence into young

adulthood may be more vulnerable to childhood neglect and that both abuse and neglect in childhood may have adverse impacts on the development of emotion regulation abilities.

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Introduction

Adolescence is a critical time for the development of self-regulation (Hardy et al., 2019), and it sets the stage for healthy development into young adulthood. Self-regulation is the ongoing and adaptive modulation of emotions, cognitions, or behaviors (Nigg, 2017), and it encompasses aspects of both executive function and emotion regulation. Research further suggests that different forms of poor self-regulation have been linked to many different forms of psychopathology in childhood and adolescence (Eisenberg et al., 2009; Wang et al., 2015; Zucker et al., 2011). Adolescence is the critical period for the emergence and development of both self-regulation and psychopathology because it is during adolescence when the prefrontal cortex is most actively developing (Steinberg, 2005), and also when, for most people, psychopathology emerges (Lee et al., 2014; Powers & Casey, 2015). Further, adolescence is a time when neurobiological and social factors involved in self-regulation and psychopathology seem particularly malleable. These factors include many changes such as decreasing involvement from parents, the occurrence of puberty, and synaptic pruning and plasticity that allow adolescents' brains to be more susceptible to their life experiences (Steinberg, 2005). Given the significance of self-regulation (encompassing both executive function and emotion regulation) in healthy development, these developmental changes create a time period that is crucial to examine in order to better understand how healthy development occurs and may be impacted. For the current study, we investigate the impacts childhood maltreatment (from ages 1 to 13) may have on the developmental trajectories of executive function and emotion regulation throughout adolescence and into young adulthood (ages 14-20).

The peak in emotional reactivity during adolescence that occurs as systems of cognitive control and emotion regulation are continuing to develop is the basis of models that explain the

increase in risk-taking behaviors and the origination of psychopathology in adolescence (e.g., Ernst, et al. 2006; Shulman et al., 2016; Somerville, et al., 2010). Among these models, the dual systems model proposes that there is a slow-developing cognitive control system that matures through late adolescence and a socioemotional system that follows an inverted U-shaped developmental course, causing an increase in risky behaviors (Shulman et al., 2016; Somerville et al., 2010; Steinberg, 2008; Steinberg et al., 2008). In the developing brain, the propensity during adolescence for reward and novelty seeking is explained by a strong reward system (including nucleus accumbens), a weak harm-avoidant system (including the amygdala), and/or inefficient supervisory system (including medial/ventral prefrontal cortex) (Ernst et al., 2006). These perspectives highlight the criticality of the prefrontal cortex maturation happening during adolescence with respect to the developmental changes of self-regulatory abilities related to cognition and emotion.

Relationships between a child and their parent lay the foundation for the development of healthy self-regulation skills, and maltreatment may hinder it. Thus far, the literature lacks studies that show the development of executive function and emotion regulation throughout adolescence, specifically in how it is related to child maltreatment. Child maltreatment impacts a large number of children, affecting approximately one in seven children in the United States (Finkelhor et al., 2015). Child maltreatment leaves enduring impacts on an individual's physical, emotional, cognitive, and behavioral functioning (Cicchetti & Toth, 2005). Existing literature indicates that individuals who have experienced maltreatment have deficiencies in self-regulation, which encompass difficulties with executive functioning and emotion regulation (Bozorgi Kazerooni & Gholamipour, 2023; Cicchetti & Toth, 2016; Shields et al., 1994). Disruptions of attention and cognitive abilities after experiencing interpersonal trauma may

manifest as disrupted executive functioning (Brieant et al., 2022; D'Andrea et al., 2012; Lund et al., 2020). Further, those who experienced childhood maltreatment tend to suffer from problems with emotion regulation (D'Andrea et al., 2012; Kim & Cicchetti, 2010; Kim et al., 2023).

Insights regarding the connection between child maltreatment and executive function and emotion regulation have been gained from human neuroimaging research. In the current literature regarding the link between maltreatment experiences and brain development, it has also been proposed that deprivation and threat have different impacts on the brain's development (Sheridan & McLaughlin, 2014). Sheridan and McLaughlin (2014) proposed the dimensional model of adversity and psychopathology positing that exposure to deprivation results in reductions in thickness and volume of areas of the association cortex most often recruited for processing complex cognitive inputs, as well as reduced performance on cognitive tasks that depend on these brain areas (e.g., executive functioning). On the contrary, exposure to threat results in altered neural circuits in the hippocampus, amygdala, and ventromedial that underlie emotional learning, which can affect emotion regulation. There is evidence indicating differential effects of neglect and abuse on neurodevelopment during adolescence. For example, while neglect led to slower neurodevelopment of areas involved in executive function, abuse was related to steeper development in these areas, indicating that the effects of neglect and abuse may alter neurodevelopment in differing ways. Additionally, evidence from behavioral studies supports this theory as well, showing that deprivation is related to deficits in cognitive control, whereas threat is related to deficits in emotion regulation (Lambert et al., 2017; Nikulina & Widom, 2013; Vogel et al., 2022).

Structural neuroimaging studies also reveal that childhood maltreatment may impact the sizes of brain regions underlying cognitive abilities. For example, hippocampal volume and

corpus callosum measured during young adulthood were significantly related to abuse experiences prior to age 16 (Andersen et al., 2008). This finding implies that abuse occurring at particular stages of development may have greater impacts on areas of the brain that are crucial in domains of executive functioning. Altogether, the existing literature shows the importance of understanding the differing ways in which neglect and abuse impact executive function and emotion regulation development.

Executive Functioning Development and Child Maltreatment

Executive function involves many higher-order cognitive skills, such as goal-directed behavior, representational capacity, planning, inhibition, and memory (Calkins & Marcovitch, 2010). Executive function plays a crucial role in adolescents' risk taking and in the trajectories toward psychopathology (Nigg, 2017). According to Miyake and colleagues' (2000) theoretical model, executive function abilities include the capacity to switch between different tasks or between mental sets (shifting), the ability to inhibit dominant responses (inhibitory control), and the updating and monitoring of information (working memory). These three abilities are distinct, yet highly correlated, and are believed to integrate together to demonstrate the latent construct of executive function (Friedman & Miyake, 2017; Xu et al., 2013). Developmentally, there is evidence suggesting that the degree of unity or diversity of these abilities varies from age to age, dependent upon the type of task (Best & Miller, 2010). As children transition to adolescence, the development of the prefrontal cortex leads executive function to maturity (Klingberg et al., 2002; Kwon et al., 2002) and executive function splits into the three-factor structure that includes shifting, inhibitory control, and working memory. Indeed, Lee and colleagues (2013) found in a cross-sectional design that at ages 6 and 13, executive function abilities conformed to a two-factor structure, but at age 15, the three-factor structure was identified. It has been also found in a

cross-sectional study of different age groups that executive functions (shifting, inhibitory control, and working memory) differentiated rapidly during early childhood and into school-age years (ages 3-10), steadily continuing this pattern of differentiation into adolescence (14-17) and then began to dedifferentiate during young adulthood (ages 18-39) (Karr et al., 2022). In younger children (i.e., from ages 4 to 9.5), it has also been suggested from cross-sectional data that working memory and inhibitory control are not separable, but as children grow and reach early adolescence (i.e., from ages 9.5 to 14.5), they separate into their two distinct categories (Shing et al., 2010). Importantly, regardless of differentiation patterns, past findings converge to suggest that adolescence is a time when executive functions continue developing due to the prefrontal cortex continuing to mature throughout an individual's early 20s.

Turning to individual domains of executive functions, there is evidence that both inhibitory control (Ferguson, 2021; Ordaz et al., 2013; Taylor et al., 2015) and working memory (Ferguson, 2021) continue developing throughout adolescence and young adulthood. For example, Ahmed and colleagues (2022) measured working memory abilities in youth aged 3-14 for three consecutive waves (spanning ages 3-19) and found rapid improvement during early childhood with a brief accelerated period of growth in earlier adolescence. Simmonds and colleagues (2017) compared individuals aged 8 to 30 and similarly found that working memory performance improves with age, all the way through the early 20s. Further, findings from neuroimaging research indicated that brain functioning underlying working memory performance reflects similar differentiation processes. For example, working memory is mainly supported by executive processing in childhood, and as individuals develop throughout early adolescence and into young adulthood working memory relies less on executive processes and

more on specialized brain regions that are specifically related to the domain of mnemonic requirements of working memory tasks (Simmonds et al., 2017).

Shifting, on the other hand, has been found to reach maturity earlier (i.e., by middle adolescence) than working memory and inhibitory control. For example, while simple shifting tasks (i.e., tasks with reduced inhibition demands) may not show development past early childhood (i.e., past age 6), individuals showed improvement on complex shifting tasks until age 15 (Best & Miller, 2010). Huizinga and van der Molen (2007) used a cross-sectional sample to examine 7, 11, 15, and 21-year-olds and found that shifting, as measured by the Wisconsin Card Sorting Task (WCST), displayed age-related increases up to age 15 but the difference between age 15 and 21 was not significant. Taken together, although available evidence suggests age-related improvement in shifting until middle adolescence, evidence regarding developmental patterns beyond middle adolescence is lacking, and importantly we note that these findings are based on cross-sectional examination of age differences instead of within-person developmental patterns.

Parenting and the environment in which a child develops are crucial for the development of executive functions (Fay-Stammbach et al., 2014). Early in life, a child relies on their parent to generate learning and provide social interactions. In cases of abuse or neglect, a child often does not get the necessary guidance they require from their parent to successfully develop adequate executive function abilities. It has been proposed that a lack of cognitive and social stimulation in childhood leads to worse executive function abilities, which has been shown in adolescents aged 13-17 who performed worse on parent-reported executive function for inhibition and global executive function (i.e., working memory, inhibition, monitoring, and organization) (Sheridan et al., 2017). Growing up in a state of chronic stress, such as in an

abusive or neglectful home, may also alter the development of the prefrontal cortex, which then increases the risk for deficits in executive functions (Lund et al., 2020). During adolescence, when there is already a slower-developing cognitive control system and a faster-growing socioemotional system, as proposed by the dual systems model (Casey et al., 2008; Steinberg, 2008), it is critical for individuals to have adequate executive function abilities to navigate new situations.

Existing models, such as the Dimensional Model of Adversity and Psychopathology, suggests that exposure to all kinds of maltreatment is associated with overall negative executive function outcomes, but that neglect, in particular, may be associated with overall deficits in cognitive functioning (Sheridan & McLaughlin, 2014). A growing body of research indicates that inhibitory control is impaired by childhood maltreatment, with more impediments occurring between the ages of 6 and 18 than earlier or later age ranges (van der Bij et al., 2020). There is also evidence suggesting that the prefrontal cortex has one of the most protracted developmental periods, and thus is especially vulnerable to chronic stress and traumatic experiences (Wilson et al., 2011), such as childhood maltreatment. For example, Nikulina and Widom (2013) found that childhood maltreatment (ages 0-11), but specifically neglect, predicted worsened executive functioning (i.e., cognitive flexibility) later in life (at age 41). These findings suggest that aspects of executive function that are associated with the prefrontal cortex are especially vulnerable to deprivation of material resources, cognitive stimulation, and social-educational interactions (Nikulina & Widom, 2013; Sheridan et al., 2017).

The current literature presents mixed findings in regard to the Dimensional Model of Adversity and Psychopathology. Consistent with the Dimensional Model of Adversity and Psychopathology, Hawkins and colleagues (2021) found evidence that early deprivation was

related to poorer working memory in young adults, whereas sexual abuse was not. In disagreement with the Dimensional Model of Adversity and Psychopathology, however, it has been suggested that worsened executive function performance might occur in children who have experienced maltreatment in general due to hypervigilance towards danger, which causes greater difficulties in processing verbal information, remembering what has been said, or following directions (Steele, 2002). For example, 8- to 12-year-olds who experienced abuse did significantly worse on a working memory task compared to children who had not experienced abuse (Augusti & Melinder, 2013). Yet this study did not compare the individuals who experienced abuse to individuals exposed to neglect. In a longitudinal study comparing the effects of abuse and neglect, abuse was related to accelerated neurodevelopment of frontoparietal activation during cognitive control (Kim-Spoon et al., 2021). It may be that abuse and neglect effects on executive functions are more domain-specific: in a systematic review, Johnson and colleagues (2021) reported that deprivation was associated with lower inhibitory control and working memory, whereas there was no difference observed for cognitive flexibility (i.e., shifting).

Emotion Regulation Development and Child Maltreatment

Emotion regulation is a crucial skill required to get by in day-to-day life. Emotions have been discussed for centuries, and philosophers have argued that a happy life requires one to be able to rein in their emotional impulses (Solomon, 1993). For example, Aristotle argued about when is and when is not appropriate to become angry, and what amount or intensity of anger is justified and defended the “moderation” of emotions (Solomon, 1993). Emotion regulation refers to how individuals attempt to influence which emotions are being experienced, when they are being experienced, and how they are expressed (Gross et al., 2006). These efforts can be

relatively automatic or controlled, and they can be conscious or unconscious (Gross et al., 2006). Emotion regulation can also involve an array of external influences, due to a considerable amount of emotion regulation occurring through the interventions of others (e.g., managing emotions by discussing a problem with another person and getting advice and/or support) (Thompson, 1994).

There are two forms of emotion regulation that are often discussed: cognitive reappraisal, a category of cognitive change that involves interpreting an emotion-eliciting situation in such a way that changes its emotional impact, and expressive suppression, a form of response modulation that involves inhibiting ongoing emotion-expressive behavior (Gross et al., 2006). According to the process model of emotion regulation, cognitive reappraisal is antecedent-focused (i.e., manipulating the *input* to the system) and expressive suppression is response-focused (i.e., manipulating the *output*) (Gross, 1998). Therefore, reappraisal can intervene early in the emotional process and has been shown to successfully down-regulate emotional experiences (Jackson et al., 2000). Contrastingly, expressive suppression follows emotion generation and is associated with little or no change in the emotional experience (Gross, 2002). It has been suggested that repeated implementation of reappraisal strategies may beneficially influence neural and behavioral influences over time (Goldin et al., 2008). Indeed, cognitive reappraisal has been consistently linked to positive psychological outcomes, such as greater well-being, satisfaction with life, and self-esteem, as well as being linked to lower anxiety and depression symptoms (Aldao et al., 2010; Gross & John, 2003; Troy et al., 2010). Further, reappraisal has been found to be related to better interpersonal functioning, whereas suppression has been found to be related to worse interpersonal functioning (Gross & John, 2003), and individuals who consistently suppress their emotions tend to experience and express fewer

positive emotions and experience greater negative emotions (Gross & John, 2003). Suppression is often considered a maladaptive emotion regulation strategy, and greater use of maladaptive strategies has been linked to greater levels of psychopathology (Aldao et al., 2010). Adaptive emotion regulation strategies, on the other hand, such as reappraisal, help to decrease subjective distress and maladaptive behavior and help to encourage the maintenance of an individual's short- and long-term goals (Bargh & Williams, 2007), and they are linked to lesser amounts of psychopathology (Aldao et al., 2010).

Studies of developmental changes in emotion regulation during adolescence are scarce. However, one available longitudinal study indicated that general emotion regulation abilities improved from early adolescence (age 11) to young adulthood (age 22) (Hardy et al., 2019), whereas the other longitudinal study indicated no significant change in emotion regulation abilities during adolescence, from age 13 to 17 (Herd et al., 2022). In addition to these studies examining emotion regulation abilities, other studies examining emotion regulation strategies suggest that cognitive reappraisal and suppression tend to develop and be used differently as individuals age. Specifically, cognitive reappraisal has been shown to remain relatively stable after an individual reaches adolescence, whereas expressive suppression appears to decrease from childhood to middle adolescence, then remain at a stable level into adulthood (Gresham & Gullone, 2012; Gullone et al., 2010). However, the findings regarding emotion regulation development during adolescence and into young adulthood are mixed. A cross-sectional study has reported age-related increases in cognitive reappraisal from early adolescence (i.e., ages 10-13) to young adulthood (i.e., ages 18-22) (McRae et al., 2012). However, a longitudinal study examining 9- to 15-year-olds across three years found no differences in the use of suppression or cognitive reappraisal across development using latent growth curve modeling analyses (Gullone

et al., 2010). Similarly, another longitudinal study using latent growth curve modeling study reported no significant developmental changes in cognitive reappraisal from ages 13 to 17 (Herd et al., 2022).

Parents play a crucial role in the healthy development of emotion regulation abilities. A nurturing and supportive home environment is essential for children to develop adaptive emotion regulation strategies (Jaffe et al., 2010). A healthy family environment (adaptive parent emotion regulation abilities, better parenting practices, and better relationship quality between a child and their parent) may promote effective emotion regulation in adolescents, providing a space for adolescents to effectively learn how to use adaptive emotion regulation skills (Herd et al., 2020). It has also been suggested that parents' socialization of emotion regulation may be especially important during adolescence (Morris et al., 2007), as this is a time with developmental shifts in neurological functioning that may directly impact emotion regulation abilities (Calkins & Bell, 1999). If a child experiences maltreatment while growing up, whether it be in an abusive home or a neglectful home with a lack of socialization, they are unlikely to experience the optimal environment that facilitates healthy development of emotion regulation skills thus exhibiting maladaptive developmental trajectories.

When a child experiences an abusive and/or neglectful environment, their surroundings undermine their development of beneficial behaviors, and this environment may further serve to promote ineffective emotion regulation strategies that have a later adverse impact on emotional functioning (Briere & Jordan, 2009; Gruhn & Compas, 2020; Shields & Cicchetti, 2001). Further, existing evidence shows that childhood abuse disturbs the acquisition of appropriate emotion regulation and interpersonal skills among school-aged children (Shields & Cicchetti, 1998). Similarly, in a study of mother-child dyads with children aged 6-12, it was found that

maltreating mothers tend to provide less emotion coaching and less validation in response to children's disclosures of negative emotion, have difficulty regulating their own emotional arousal, and lack the emotional understanding skills that are critical to responding appropriately to their children's disclosures and expressions of negative emotion (Shipman et al., 2007). Such parenting behaviors can disrupt the development of healthy emotion regulation development which then will affect how children interact with their surroundings as they move through adolescence. At a time of heightened malleability of neurobiology and social factors, it is crucial for adolescents to have the necessary emotion regulation skills to navigate new experiences and challenges. Additionally, emotion regulation develops throughout adolescence as the prefrontal cortex continues to develop, and the use of reappraisal may increase as adolescents' executive, verbal, and social cognitive skills continue to develop (Ahmed et al., 2015).

Existing literature indicates that maltreatment is significantly related to greater levels of emotion dysregulation, as well as being significantly associated with higher levels of *emotional* suppression (i.e., trying to dampen internal or external emotions; see Gruhn & Compas, 2020 for a meta-analysis). Specifically, the Dimensional Model of Adversity and Psychopathology argues that threat (e.g., abuse) alters emotional development in order to help in identifying potential dangers in the environment (McLaughlin et al., 2015). While altered emotional processing may be beneficial in the short term when an individual is actively in a threatening environment, it may have long-term costs on the ability to adaptively regulate one's emotions. There is evidence supporting this theory by demonstrating that violence exposure was related to worsened emotion regulation abilities among adolescents (16-17 years), whereas poverty (material deprivation) was not (Lambert et al., 2017). On the other hand, comparing the relative effects of maltreatment subtypes (sexual abuse, physical abuse, emotional maltreatment, and physical neglect) among

youth ages 6-12, both physical abuse (i.e., threat) and physical neglect (i.e., deprivation) were associated poor emotion regulation abilities (Kim & Cicchetti, 2010). The discrepancy in the findings from these two studies may reflect the differential effects between material deprivation (such as poverty) versus social deprivation (such as neglect), and it is important to distinguish the two types of deprivation (e.g., Dennison et al., 2019). Studies examining maltreatment effects on the emotion regulation strategies of cognitive reappraisal and expressive suppression are rare, as much of the current literature focuses on broad difficulties, although the link is expected theoretically as child maltreatment is thought to disrupt the process of gaining effective emotion regulation skills (Morris et al., 2007). One available study of children and adolescents aged 8-16 demonstrated maltreatment (abuse and exposure to violence) was associated with emotional reactivity and rumination, but not with reappraisal and suppression (Weissman et al., 2019). Further, another study examined adults (ages 18 to 55) with anxiety and/or depression who were exposed to child maltreatment and found that the severity of maltreatment was associated with greater amounts of expression suppression of positive, but not negative, emotions (Hoffman et al., 2023). However, this study was also examining adults that had anxiety and/or depression. Additionally, it is well documented that child maltreatment is associated with insecure attachment (Baer & Martinez, 2006; Cyr et al., 2010). It has been found that highly secure individuals report greater use of cognitive reappraisal in relationships, and insecurely attached individuals (i.e., either anxious or avoidant) report greater use of expressive suppression (Winterheld, 2015). The experience of child maltreatment could lead to a cascading effect from insecure attachment to greater use of maladaptive emotion regulation strategies (i.e., expressive suppression).

Altogether, previous findings point to the deleterious effects of abuse and neglect on the development of emotion regulation abilities in childhood and adolescence. Given the paucity of research on maltreatment and emotion regulation strategies, it is premature to draw a tentative conclusion regarding the effects of abuse and neglect on the development of emotion regulation strategies.

Present Study

The aim of the current study was to examine the change in the developmental trajectories of emotion regulation and executive function within and between individuals throughout adolescence and into young adulthood as well as to examine the effects child maltreatment (abuse and neglect) may have on these changes. The current study used data from six time points across adolescence and into young adulthood (ages 14 through 20) with approximately one year between time points. In accordance with the Dimensional Model of Adversity and Psychopathology (Sheridan & McLaughlin, 2014), the specific aims of this study were to examine how neglect and abuse in childhood (i.e., ages 1-13) experiences affect the growth trajectories of executive function and emotion regulation during adolescence and into young adulthood. Specifically, we examined the growth trajectories of an executive function composite made up of the three dimensions, as well as examining the growth trajectories of each individual dimension. Further, we examined the growth trajectories of difficulties in emotion regulation as well as suppression and reappraisal.

Hypotheses:

1. Neglect will predict lower initial levels of executive function abilities, but abuse will not have as strong of an effect as neglect. While it is expected to see positive growth in

executive function for the group as a whole, those who experienced neglect will experience slower growth trajectories as compared to individuals who did not experience neglect (including compared to individuals who experienced abuse), as is consistent with the Dimensional Model of Adversity and Psychopathology.

2. For individual components of executive function (inhibitory control, working memory, and shifting), the effects of neglect and abuse on the initial levels and growth trajectories of each dimension of executive function will be explored. Considering the mixed literature, there are no specific hypotheses.
3. Abuse will predict higher initial levels of difficulties in emotion regulation, greater use of suppression, and less use of reappraisal relative to individuals who experienced neglect. Further, there will be less growth (i.e., less reductions in difficulties in emotion regulation, less reductions in the use of suppression, and less increases in the use of reappraisal) for individuals who experienced abuse compared to those who did not. It is expected that the effects of abuse will be stronger on difficulties in emotion regulation, reappraisal, and suppression than neglect, as is consistent with the Dimensional Model of Adversity and Psychopathology.

Method

Participants

The current study used six waves of data that were collected as part of a longitudinal study. The sample includes 167 adolescents (47% females) and their primary caregiver (82% biological mothers, 13% biological fathers, 2% grandmothers, 1% foster parents, and 2% other).

At Time 1, adolescents were between the ages of 13 and 14 at Time 1 ($M = 14.07$, $SD = 0.54$ for Time 1, $M = 15.05$, $SD = 0.54$ for Time 2, $M = 16.07$, $SD = 0.56$ for Time 3, $M = 17.01$, $SD = 0.55$ for Time 4, $M = 18.39$, $SD = 0.67$ for Time 5, $M = 20.17$, $SD = 0.63$ for Time 6). At the study's onset, adolescents were identified as White (79%), Black (11%), and other (10%). Caregivers identified as 88.6% White, 10.8% Black, and .6% other. At Time 1, caregivers' age ranged from 31 to 61 ($M = 41.98$, $SD = 6.58$). At the first time point, 157 families participated. At the second time point, 10 families were added to account for attrition between Times 1 and 2, yielding a final sample of 167 parent-adolescent dyads. Attrition analyses were performed utilizing a general linear model (GLM) univariate procedure to examine if there were systematic procedures for any missing data. The results of the GLM indicated that the rate of participation (calculated as the ratio of years participated to years invited to participate) was not significantly predicted by demographic variables ($p = .546$ for income-to-needs ratio (ITN), $p = .591$ for income, $p = .829$ for sex, $p = .611$ for dichotomous race) or by study variables ($p = .221$ for WCST, $p = .690$ for MSIT, $p = .792$ for SBMD, $p = .532$ for DERS, $p = .478$ for suppression, $p = .879$ for reappraisal, $p = .099$ for abuse, $p = .147$ for neglect).

Measures

Demographic Interview: Adolescent participants reported sex and race, and parents reported their total income at each time point. Sex was coded dichotomously, with 0 indicating male and 1 indicating female. The options for race were Black, White, Latino or Hispanic, Biracial or Multiracial, Asian or Asian American, Native Hawaiian or Other Pacific Islander, American Indian/Alaska Native, or Other, and race was re-coded to be dichotomous, with 0 indicating White and 1 indicating non-White. Self-reported annual household income was measured using a 15-point scale (1-15) from "None" to "\$200,000 or more". Information on the

number in the household was used with income and poverty threshold levels designated by the US Census Bureau to calculate ITN ratios.

Maltreatment (Abuse and Neglect): Maltreatment was measured with the Maltreatment and Abuse Chronology of Exposure scale (MACE; Teicher & Parigger, 2015). MACE uses 52 items to examine the severity of exposure to various types of maltreatment throughout childhood (ages 1-18). Adolescents retrospectively reported at which ages they experienced the events. Abuse was made up of the subscales of sexual abuse (7 items), verbal abuse (4 items), physical abuse (6 items), and non-verbal abuse (6 items). Neglect was made up of the subscales of emotional neglect (5 items) and physical neglect (5 items). Items included “Intentionally pushed, pinched, slapped, kicked, etc.” (physical abuse), “Swore at you, called you names, said insulting things like you’re “fat”, “ugly”, “stupid”, etc.” (verbal abuse), “You had to wear dirty clothes” (physical neglect), and “Parents made inappropriate sexual comments or suggestions to you” (sexual abuse). The analyses in the current study utilized retrospective reports of maltreatment that occurred from ages 0-13 that were perpetrated by caregiver figures with the exception of sexual abuse. The subscale scores were scaled with an algorithm provided by Teicher and Parigger, 2015, with higher scores indicative of more maltreatment. Existing literature indicates excellent test-retest reliability (Teicher & Parigger, 2015). These subscale items were used for confirmatory factor analysis (CFA), and the factor scores for both neglect and abuse were extracted.

Emotion Regulation: Assessments of reappraisal, suppression, and general difficulties in emotion regulation were used for emotion regulation. The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) and the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) emphasize different and important components of emotion regulation. The DERS

concentrates on one's ability to regulate emotions more generally, while the ERQ gains insight into an individual's use of two distinct strategies. While the DERS may capture the larger picture of one's inability to properly regulate their emotions, the ERQ could offer further insight into if an individual is using common adaptive or maladaptive strategies. Indeed, emotion dysregulation is a pattern of emotion regulation that involves interference with an individual's goals (Beauchaine et al., 2015; Cole et al., 2013), either due to the failure of using any adaptive emotion regulation strategy or the habitual use of a maladaptive strategy, but these strategies may not necessarily be reappraisal or suppression.

A composite was created using two subscales of the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004): difficulty in engaging in goal-directed behavior when distressed and difficulties with controlling impulsive behaviors when distressed. Higher scores indicated greater difficulties with controlling one's emotions. The two subscales of the Emotion Regulation Questionnaire (ERQ) were also examined (Gross & John, 2003): cognitive reappraisal and expressive suppression. Items included "When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm" (cognitive reappraisal), and "I keep my emotions to myself" (expressive suppression). Cognitive reappraisal measures how an individual attempts to change how they think about a situation to change its emotional impact, while expressive suppression measures how an individual attempts to inhibit their behavioral expressions of their emotions.

Executive Functioning: An executive function composite was created for each time point and made up of three behavioral tasks that aim to depict the constructs underlying executive function: shifting, inhibitory control, and working memory (Miyake et al., 2000). Shifting was measured with the Wisconsin Card Sorting Task (WCST: Heaton & Staff, 2003) in

which participants are instructed to sort cards based on number, color, and shapes based on rules that change throughout the task. The number of perseverative errors was used, which are when participants continue to follow the wrong rule (i.e., perseverance), as a measure of shifting/cognitive flexibility. Inhibitory control was measured using the Multi-Source Interference Task (MSIT: Bush et al., 2003) in which participants were presented with a series of 3 digits, 1 of which was different. Participants were told to choose the identity (not the position) of this different number. In the neutral condition, the target number is congruent with the position of the number (e.g., “1” is in the first position of this sequence “122”). In the interference condition, the target number is not congruent with the position of the number (e.g., “1” is not in the first position of this sequence “212”). To examine task performance, intraindividual variability in reaction time and accuracy, indexed as intraindividual standard deviations (ISDs) (MacDonald et al., 2012) for correct responses in the interference condition, were used. Working memory was measured using the Stanford-Binet memory for digits (SBMD: Roid, 2003). Specifically, the measure in which participants were instructed to repeat back a series of numbers backward was used.

To create the composite for executive function, MSIT and WCST items were reverse coded so that higher scores indicated better executive function, consistent with SBMD. Then, the scores were each standardized using the mean of wave 1 for each individual component. For example, each wave of WCST was standardized by subtracting the mean from wave 1 and dividing it by the standard deviation of wave 1. Then, the component scores (WCST, MSIT, and SBMD) were averaged for each wave. An exploratory factor analysis using SPSS was completed to evaluate the percentage of variances explained as well as the factor loadings. The percentage of variance explained ranged from 43.493 – 49.890, and the factor loading for WCST ranged

from .640 to .731, from .672 to .733 for MSIT, and from .598 to .754 for SMBD (see Table 1 for all variances and factor loadings).

Data Analytic Plan

Descriptive statistics were analyzed to examine the normality of distributions and outliers for all variables, and skewness and kurtosis were also analyzed for all variable distributions. The acceptable levels were less than 3 and 10, respectively (Kline, 2011). Outliers were determined as values that were greater than 3.29 standard deviations from the mean, and any outliers were Winsorized to preserve statistical power (Ghosh & Vogt, 2012). Multivariate General Linear Modeling (GLM) analyses tested for demographic covariates (e.g., income, sex, and race). Full information maximum likelihood (FIML) estimation procedures were used for missing data, as this method is superior to other methods with listwise deletion (Schafer & Graham, 2002).

First, univariate growth curve modeling (GCM) was performed for the executive function composite, individual executive function components, and emotion regulation to fit the baseline models across six time points. The first latent factor was the intercept, and all of the factor loadings were fixed to one. The second latent factor was the slope, which was indicative of the growth of the function and changes over time. Nested model comparisons were utilized to compare the no-growth, linear growth, and latent basis growth models in order to determine the shape of the trajectories. In the no growth model, it is assumed that there is a non-significant change in the slope. In the linear growth model, it is assumed that there is a linear pattern of growth, and the factor loadings were fixed to 0, 1, 2, 3, 4, and 5. The latent basis growth model allows the data to estimate the shape of the growth trajectories by fixing the first time point to 0 and the last time point to 1 while allowing the other 4 time points to be freely estimated. The

Chi-square difference test was used to compare the models and the best-fitting, most parsimonious model was chosen. Model fit indices were examined by Chi-square value, degrees of freedom, the corresponding p-value, Root Mean Square Error of Approximation (RMSEA), and the Confirmatory Fit Index (CFI). RMSEA values of less than .08 were considered acceptable and CFI values that are greater than .90 were considered acceptable fits (Little, 2013). The χ^2 difference test was used to compare the nested models and the models that were most parsimonious and with acceptable fits were chosen as the best-fitting models.

To examine how abuse and neglect are differentially related to executive function and emotion regulation, seven separate models were tested: models comparing neglect and threat's effects on the growth of executive function, examining the executive function composite, and the individual executive function components, as well models comparing abuse and neglect's effects on the growth of emotion regulation, examining suppression, reappraisal, and the DERS composite. The hypothesized models are depicted in Figure 1.

Next, conditional univariate GCM models were tested. The best-fitting growth curve models from the unconditional univariate GCMs were used, and each univariate GCM was run with abuse and neglect to test the contributions of abuse and neglect separately. As shown in Figure 1, correlations were estimated between the intercepts and slope factors of executive function/emotion regulation and correlations were estimated between abuse and neglect.

Power

In order to estimate power, an a priori sample size calculator was used (Soper, 2022) for testing the desired sample size for hypothetical effect sizes of .10, .30, and .50 (small, medium, and large, as described by Cohen, 1988) with the desired power of .80. The sample sizes that were necessary for effect sizes .10, .30, and .50 were 947, 90, and 23, respectively. Effect sizes

between maltreatment and emotional dysregulation and emotional regulation ranged from .24 to .28, indicating a medium effect size (Gruhn & Compas, 2020). Effect sizes between trauma exposure in youth (e.g., maltreatment) and the executive function dimensions ranged from -.44 to -.49, indicating medium to large effect sizes (Op den Kelder et al., 2018). Thus, since prior studies demonstrated having medium to large effect sizes, and our calculations suggested a sample size of 90 for a medium effect size, our analyses had sufficient power (>.80) using our sample size of 167.

Results

Descriptive statistics for all study variables are presented in Table 2 and correlations for all study variables are presented in Tables 3 and 4. The results from the multivariate GLM testing the covariates showed that race was significantly associated with the executive function composite and each of the executive function components ($p < .001$ to $.942$); thus, race was added as a covariate to each of the executive functioning models. The other demographic variables were not significantly associated with the executive function composite and each of the executive function components ($p = .197$ to $.726$). None of the demographic variables were significantly associated with the emotion regulation variables ($p = .057$ to $.868$).

Baseline Growth Curve Models

Executive Functioning. Three alternative models were fit so that the shape of the executive functioning composite and of each individual dimension of executive functioning could be determined (see Table 5). For the executive functioning composite, a latent basis growth curve model provided the best fit for the data ($\chi^2 = 12.55$, $df = 17$, $p = .766$, RMSEA = 0.00, CFI = 1.00). There was significant variance of the intercept ($\sigma = 0.31$, $SE = 0.05$, $p < .001$) and slope ($\sigma = 0.17$, $SE = 0.05$, $p < .001$), indicating significant individual differences in initial

levels and growth in executive functioning abilities. The mean of the slope was positive and significant, indicating that executive functioning abilities increased over time ($M = 1.09$, $SE = 0.06$, $p < .001$). The mean of the intercept was not significantly different from zero ($M = -0.004$, $SE = 0.4$, $p = .937$).

For WCST, a latent basis growth curve model with theta freed, the time 1 residual set to 0, and correlated residuals at times 3 and 4, 3 and 6, and 5 and 6 provided the best fit for the data ($\chi^2 = 9.87$, $df = 10$, $p = .452$, $RMSEA = 0.00$, $CFI = 1.00$). There was significant variance for the intercept ($\sigma = 12.88$, $SE = 1.46$, $p < .001$) and the slope ($\sigma = 12.16$, $SE = 1.59$, $p < .001$), indicating significant individual differences in initial levels and growth in shifting. The means of the intercept ($M = -7.26$, $SE = 0.28$, $p < .001$) and slope ($M = 2.54$, $SE = 0.28$, $p < .001$) were significantly different from zero, indicating that cognitive flexibility abilities increased over time.

For MSIT, a latent basis growth curve model with theta freed and correlated residuals at times 5 and 6 provided the best fit for the data ($\chi^2 = 18.35$, $df = 11$, $p = .074$, $RMSEA = 0.06$, $CFI = 0.97$). There was significant variance for the intercept ($\sigma = .001$, $SE = 0.00$, $p < .001$) but not for slope ($\sigma = 0.00$, $SE = 0.00$, $p = .689$), showing that there were individual differences in initial levels of inhibitory control but not in growth. The means of the intercept ($M = -0.24$, $SE = 0.00$, $p < .001$) and slope ($M = 0.07$, $SE = 0.00$, $p < .001$) were significantly different from zero, indicating that inhibitory control abilities increased over time.

For SBMD, a latent basis growth curve model provided the best fit for the data ($\chi^2 = 15.22$, $df = 17$, $p = .580$, $RMSEA = 0.00$, $CFI = 1.00$). There was significant variance for the intercept ($\sigma = 1.77$, $SE = 0.30$, $p < .001$) and slope ($\sigma = 0.74$, $SE = 0.30$, $p = .014$), indicating significant individual differences in initial levels and growth in working memory. The means of

the intercept ($M = 5.56, SE = 0.14, p < .001$) and slope ($M = 1.40, SE = 0.17, p < .001$) were significantly different from zero, indicating that working memory abilities increased over time.

Emotion Regulation. Three alternative models were fit so that the shape of the trajectories of the DERS composite, reappraisal, and suppression could be determined (see Table 6).

For the DERS composite, a linear growth curve model provided the best fit for the data ($\chi^2 = 25.64, df = 21, p = .221, RMSEA = 0.04, CFI = 0.99$). There was significant variance for the intercept ($\sigma = 0.45, SE = 0.07, p < .001$) and slope ($\sigma = 0.02, SE = 0.00, p < .0014$), indicating significant individual differences in initial levels and growth in DERS. The mean of the intercept ($M = 2.37, SE = 0.06, p < .001$) was significantly different from zero but the mean of the slope ($M = -0.02, SE = 0.02, p = .126$) was not, indicating that the level of DERS did not change over time.

For reappraisal, a linear growth curve model provided the best fit for the data ($\chi^2 = 32.76, df = 17, p = .049, RMSEA = 0.06, CFI = 0.94$). There was significant variance for the intercept ($\sigma = 0.43, SE = 0.08, p < .001$) and slope ($\sigma = 0.04, SE = 0.01, p < .001$), indicating significant individual differences in initial levels and growth in reappraisal. The mean of the intercept ($M = 4.93, SE = 0.07, p < .001$) was significantly from zero and but the mean of the slope ($M = -0.03, SE = 0.02, p = .22$) was not, indicating that the level of reappraisal did not change over time.

For suppression, a linear growth curve model provided the best fit for the data ($\chi^2 = 24.77, df = 21, p = .257, RMSEA = 0.03, CFI = 0.99$). There was significant variance for the intercept ($\sigma = 0.93, SE = 0.14, p < .001$) and slope ($\sigma = 0.04, SE = 0.01, p < .001$), indicating significant individual differences in initial levels and growth in suppression. The means of the

intercept ($M = 3.77$, $SE = 0.09$, $p < .001$) and of the slope ($M = 0.05$, $SE = 0.02$, $p = .044$) were significantly different from zero, indicating that suppression use increased over time.

Conditional Growth Curve Models

Executive Functioning. Conditional growth curve models were used to examine the associations between maltreatment (abuse and neglect) and executive functioning. The best-fitting unconditional growth models for each of the composite and individual components were used to test the differential effects of abuse and neglect.

The conditional growth curve model that examined the effects of abuse and neglect on the composite of executive function demonstrated good fit ($\chi^2 = 37.89$, $df = 31$, $p = .184$, $RMSEA = 0.04$, $CFI = 0.99$). However, none of the regression paths estimating the effects of abuse and neglect on the growth factors of executive functioning were statistically significant (see Table 7 for unstandardized estimates).

The conditional growth curve model that examined the effects of abuse and neglect on WCST demonstrated good fit ($\chi^2 = 32.88$, $df = 24$, $p = .107$, $RMSEA = 0.05$, $CFI = 0.92$). However, none of the regression paths estimating the effects of abuse and neglect on the growth factors of WCST were statistically significant (see Table 8 for unstandardized estimates).

The conditional growth curve model that examined the effects of abuse and neglect on MSIT demonstrated good fit ($\chi^2 = 39.50$, $df = 25$, $p = .033$, $RMSEA = 0.06$, $CFI = 0.95$). However, none of the regression paths estimating the effects of abuse and neglect on the growth factors of MSIT were statistically significant (see Table 9 for unstandardized estimates).

The conditional growth curve model that examined the effects of abuse and neglect on SBMD demonstrated good fit ($\chi^2 = 39.48$, $df = 31$, $p = .141$, $RMSEA = 0.04$, $CFI = 0.98$). Neglect was a significant predictor of the slope of SBMD ($B = -0.33$, $SE = 0.16$, $p = .037$),

indicating that greater levels of neglect were associated with slower increases in SBMD (see Table 10 for unstandardized estimates). In addition, race was a significant predictor of the slope of SBMD ($B = -0.74$, $SE = 0.30$, $p = .015$) (see Table 10 for unstandardized estimates).

Emotion Regulation. Conditional growth curve models were used to examine the associations between maltreatment (abuse and neglect) and emotion regulation. The best-fitting unconditional growth models for each of the composite and individual components were used to test the differential effects of abuse and neglect.

The conditional growth curve model that examined the effects of abuse and neglect on the DERS composite demonstrated good fit ($\chi^2 = 43.22$, $df = 29$, $p = .043$, $RMSEA = 0.05$, $CFI = 0.96$). Abuse was a significant predictor of slope ($B = 0.05$, $SE = .02$, $p = .039$), indicating that greater amounts of abuse were associated with increases in difficulties in emotion regulation over time (see Table 11 for unstandardized estimates). Further, neglect was a significant predictor of the intercept ($B = 0.18$, $SE = 0.08$, $p = .028$), indicating that greater levels of neglect were associated with higher amounts of difficulties in emotion regulation at Time 1 (see Table 11 for unstandardized estimates).

The conditional growth curve model that examined the effects of abuse and neglect on reappraisal demonstrated good fit ($\chi^2 = 42.82$, $df = 29$, $p = .047$, $RMSEA = 0.05$, $CFI = 0.93$). However, none of the regression paths estimating the effects of abuse and neglect on the growth factors of reappraisal were statistically significant (see Table 12 for unstandardized estimates).

The conditional growth curve model that examined the effects of abuse and neglect on suppression demonstrated good fit ($\chi^2 = 42.00$, $df = 29$, $p = .056$, $RMSEA = 0.05$, $CFI = 0.95$). However, none of the regression paths estimating the effects of abuse and neglect on the growth

factors of suppression use were statistically significant (see Table 13 for unstandardized estimates).

Discussion

Existing literature suggests that by the age of 18, approximately half of adults have experienced at least one type of adversity or traumatic event (Kessler et al., 2010; Murphey & Bartlett, 2019). Research further suggests that adverse experiences such as child maltreatment are associated with altered brain development related to cognitive and affective functions (McCrory et al., 2017) that are phenotypically manifested in impaired regulatory abilities of cognition and emotion (Cicchetti & Toth, 2016; D'Andrea et al., 2012; Kim & Cicchetti, 2010; 2019; Shields et al., 1994). Sufficient self-regulation skills encompassing both executive function and emotion regulation are crucial for the healthy development of individuals, and lower self-regulation has been tied to a host of issues, such as psychopathology, substance use, and greater levels of risk-taking behaviors (Crockett et al., 2006; Eisenberg et al., 2009; Wang et al., 2015; Zucker et al., 2011). Thus, it is critical to examine how abuse and neglect experiences may affect the development of these skills. 4

The Dimensional Model of Adversity and Psychopathology, which is one of the prevailing theories regarding adversity effects, posits the differential impacts of threat (e.g., abuse) and deprivation (e.g., neglect) on the development of cognitive functioning (e.g., executive function) and emotional processing (e.g., emotion regulation) (Sheridan & McLaughlin, 2014). Understanding how abuse and neglect may differentially affect the development of executive function and emotion regulation would allow more precise targets for prevention and interventions of myriads of psychopathology problems among individuals who experienced child maltreatment. Adolescence is a particularly important developmental period to

study the development of executive function and emotion regulation because it is a time when both the cognitive control system is still developing, and emotional reactivity is at its peak (McRae et al., 2012; Steinberg, 2005). Therefore, the current study aimed to examine the differential effects that abuse and neglect have on the developmental trajectories of executive function and emotion regulation throughout adolescence and into young adulthood. Specifically, we used growth curve modeling to examine how abuse and neglect are associated with the development of executive function as a whole, as well as the individual components of executive function including shifting, inhibitory control, and working memory. Further, we used growth curve modeling to examine the effects that abuse and neglect have on the developmental trajectories of emotion regulation abilities, including difficulties in emotion regulation, reappraisal, and suppression.

Existing literature has shown conflicting evidence regarding developmental trajectories of executive function development throughout adolescence and into young adulthood. Indeed, the majority of prior studies thus far have looked at executive function development cross-sectionally or for a shorter amount of time than the current study. Findings so far have indicated that adolescence and young adulthood is a time when executive functions continue to develop due to the continued development of the prefrontal cortex (Karr et al., 2022; Shing et al., 2010). In general, there is evidence that inhibitory control and working memory develop throughout adolescence and young adulthood (Ferguson, 2021; Ordaz et al., 2013; Taylor et al., 2015) while shifting reaches maturity by middle adolescence (Best & Miller, 2010; Huizinga & van der Molen, 2007). Further, although one study reported increases in cognitive self-regulation from ages 11 to 22 (Hardy et al., 2019), they used parent and adolescent reports on questionnaires and did not measure behavioral performance of executive functions. Thus, the findings from the

current study offer an important insight into the developmental trajectories of task-based executive functions. Specifically, we found that executive functioning abilities as a whole increased from ages 14 to 20. Additionally, we found that each individual component of executive functions (shifting, inhibitory control, and working memory) increased over time. These findings offer insight into the development of executive function across adolescence and early young adulthood, showing that these abilities continuously develop from ages 14 to 20.

Our first hypothesis was that neglect would predict lower initial levels of overall executive function abilities (i.e., combined levels of shifting, inhibitory control, and working memory), and that abuse would not have as strong of an effect as neglect. Further, while we expected to see positive growth in executive function for the group as a whole, we expected that individuals who experienced neglect would experience slower growth compared to individuals who did not experience neglect (including compared to individuals who experienced abuse), as is consistent with the Dimensional Model of Adversity and Psychopathology. Our results did not fully support our first hypothesis. Specifically, while executive function abilities increased over the six years for the group as a whole, abuse or neglect did not predict individual differences in the initial levels and growth rates of executive function development. Further, we did not find that abuse nor neglect predicted different initial levels of executive function abilities. The findings from the current study are inconsistent with prior research indicating a significant association between child neglect and parent-reported overall executive function among adolescents (Sheridan et al., 2017). We believe that the discrepancy in the findings may be primarily due to the methodological approaches: our study used repeatedly measured (from ages 14 through 20) behavioral performance of three theoretical dimensions of executive function, whereas the prior study used parent-reported working memory and inhibition of their 13–17-

year-olds measured at one time point. Additionally, our findings are inconsistent with previous findings (Nikulina & Widom, 2013) that show that deprivation is associated with worse performance on an executive function composite that combined non-verbal reasoning and a cognitive flexibility task among middle-aged adults. The discrepancy in the findings may be attributed to the different ways that each study constructed the executive function composite. Further, Sheridan and colleagues (2017) examined the parent-reported executive functions, showing that neglect was associated with inhibition alone and global executive function (i.e., working memory, inhibition, monitoring, and organization), but not with working memory alone. In the current study, only working memory was impacted by childhood neglect, which is inconsistent with the findings from Sheridan and colleagues' (2017) study. The discrepancy in the findings is likely due to the way the executive function components were assessed. That is, the current study used behavioral tasks, whereas Sheridan and colleagues used parent-reported executive function abilities.

Our second aim was to explore the differential effects of abuse and neglect on the initial levels and growth trajectories of each individual dimension of executive function: shifting, inhibitory control, and working memory. First, with respect to shifting, we did not find that experiences of neglect or abuse affected the initial levels or the growth of shifting abilities (measured by the WCST). It has been proposed that shifting abilities moderate how well people can adapt to adverse experiences such that the ability to successfully shift attentional resources can modulate the mismatch between expected and real-world scenarios (Yao & Hsieh, 2019). Our finding of non-significant neglect effects on shifting development is inconsistent with a previous study that used a neuropsychological test focusing on cognitive impairment (i.e., Trail Making Test) and found deficits in cognitive flexibility among middle-aged adults who

experienced childhood neglect (Nikulina & Widom, 2013). In contrast, there is some existing literature that indicates that shifting is actually enhanced by early adversity. Specifically, Mittal and colleagues (2015) found in their meta-analysis that individuals growing up in unpredictable environments with regards to socioeconomic status were better at shifting; however, they found that individuals who grew up in stable low-socioeconomic status environments performed worse on shifting tasks. Further, Fields and colleagues (2020) also found support for exposure to unstable caregiving in childhood to promote better shifting abilities. The current study did not examine the construct of unpredictability per se, so future work should aim to see if there are differential effects between deprivation and unpredictability. One study found that childhood trauma, specifically physical abuse and physical neglect, was associated with perseverative errors on the WCST among adolescents (Spann et al., 2012). The current study examines physical neglect and emotional neglect as one dimension, and it is possible that physical abuse and physical neglect may have a more detrimental effect on shifting.

In our sample, the group as a whole had within-person developmental trajectories indicating that shifting abilities increased across ages 14 to 20. In contrast, a previous study reported that shifting reaches maturity around age 15 (Huizinga & van der Molen, 2007) based on comparing four different age groups (7-year-olds, 11-year-olds, 15-year-olds, and 21-year-olds). As such, our findings provide important information regarding development patterns of shifting, which was observed in intraindividual changes, clarifying that shifting is continuously developing from ages 14 to 20.

We did not find that experiences of neglect or abuse predicted the initial levels or the growth of inhibitory control (measured by the MSIT). A systematic review indicated that between the ages of 6 and 17, inhibitory control is particularly impaired by trauma (i.e., abuse,

neglect, institutionalization, witnessing death), including maltreatment, as compared to early in the life or in young adulthood (i.e., between the ages 2 and 5 or between the ages of 18 and 25) (see van der Bij et al., 2020 for a review). It is possible that in young adulthood (i.e., after age 17 as noted by van der Bij et al., 2020), maltreatment's effects on inhibitory control may wane, although this possibility could not be directly concluded from the systematic review that was based on comparisons across different age groups rather than longitudinal studies of within-person changes. In the current study, we did not find evidence that maltreatment hindered inhibitory control abilities between the ages of 14 and 20. We note, however, that the results of univariate growth curve modeling revealed non-significant variances of the slope, indicating limited individual differences in the growth of MSIT, which could have contributed in part to the weak effects of abuse and neglect. Further, there could be dose-response at play, such that greater levels of overall child maltreatment are related to worse inhibitory control. In our study, we examined composites of abuse and neglect separately and not the cumulative amount of adversity. Future work should aim to examine the possible effects of multiple subtypes or longer durations of maltreatment on inhibitory control. Additionally, future work could examine if there are waning effects of maltreatment on inhibitory control as individuals age using prospective longitudinal data.

We found that greater levels of neglect were significantly associated with the growth of working memory (measured by SBMD), such that individuals who experienced greater amounts of neglect had slower increases in working memory abilities over the six-year timespan. This is consistent with previous literature showing that experiences of deprivation (e.g., neglect) are significantly associated with worse working memory (see Johnson et al., 2021 for a review). For example, consistent with our finding of significant neglect effects on working memory

development, a cross-sectional study demonstrated a significant association between neglect (specifically physical neglect) and working memory deficits in adulthood (Majer et al., 2010). There are several possible mechanisms through which neglect may affect working memory. Early neglect may involve resource scarcity, such as in poverty, and thus may lead to a lack of enrichment activities that have been tied to better working memory (Sarsour et al., 2010). Further, the current study's construct of neglect included *emotional* neglect, which includes items such as not having a parent around to help with homework. This could also lead to worsened working memory. Additionally, latent vulnerability theory posits that childhood maltreatment results in various alterations to neurobiological and cognitive functioning in response to growing up in early maltreating or neglectful environments (McCrorry & Viding, 2015). There is evidence that early life stress is associated with less efficient brain recruitment patterns that require executive functions (Mueller et al., 2010). As proposed by McLaughlin and colleagues (2017), deprivation (e.g., neglect) may produce long-lasting alterations in different domains of cognitive development, and in the case of working memory, by way of accelerated neurodevelopmental processes of synaptic pruning and limited myelination in the regions that serve working memory development including dorsolateral prefrontal cortex (D'Esposito & Postle, 1999; Goldman-Rakic, 1987; Smith & Jonides, 1995).

Our findings have implications for possible interventions to prevent cascading effects. For example, lower working memory abilities have been tied to substance use and reduced delay discounting (Khurana et al., 2017; Mitchell et al., 2005). There is evidence that reduced working memory abilities are a mediator between child maltreatment and later substance use (Edalati & Krank, 2016). Further, research has suggested that working memory can be trained, and it is a significant predictor of delay discounting (i.e., the “decrease in value of a reward as a function of

the delay to its receipt” (Bickel & Marsh, 2001) which is a transdiagnostic mechanism that explains many forms of addiction including substance misuse (Bickel et al., 2011; Snider et al., 2017). For example, mindfulness meditation has been one intervention that has been shown to give rise to significant improvements in working memory abilities (Quach et al., 2016). Further, there are interventions designed to improve working memory by having individuals complete blocks of working memory tasks several times per week (Klingberg, 2010) or through computerized training programs (Bickel et al., 2014). There is further research showing that training on working memory can decrease delay discounting, specifically in those with stimulant addictions (Bickel et al., 2011). Thus, interventions aimed to increase working abilities may have the ability to prevent cascading effects into increased delay discounting or substance use, but future research is warranted.

We did not find that levels of neglect had an effect on the initial levels of working memory. This could be due to working memory still developing throughout adolescence and young adulthood. Although levels of neglect were not significantly associated with working memory at the first time point (i.e., around age 14), the change rate of working memory abilities from age 14 through 20 was predicted by childhood neglect. This finding may indicate that adolescence is an especially sensitive time during which the effects of childhood neglect culminate, manifested as impaired development of working memory in part due to the fact that the prefrontal regions involved in working memory mature faster during adolescence than in earlier years (Goldman-Rakic, 1987; van den Bosch et al., 2014).

Although there exists some research indicating the detrimental effects of child maltreatment on executive function, most past research fell short of distinguishing potentially differential effects between abuse and neglect regarding executive function development. For

example, in a study involving 3 to 9-year-olds, Cowell and colleagues (2015) found that children who experienced maltreatment had significantly lower scores on the working memory and inhibitory control task composite compared to non-maltreated children. However, they measured combined different adversity subtypes such as abuse, neglect, and exposure to violence, and also combined working memory and inhibitory control scores. Therefore, their results could not clarify whether the maltreatment effects were driven by abuse or neglect or both and whether working memory and inhibitory control were similarly or differentially affected by adverse experiences.

Early life experiences set the stage for the ability of individuals to successfully use emotion regulation abilities throughout their life. When a child experiences maltreatment, these abilities may be hindered (Briere & Jordan, 2009; Shields & Cicchetti, 1998, 2001). Further, individuals who experience maltreatment may also be more likely to use more maladaptive emotion regulation strategies such as suppression (Gruhn & Compas, 2020). Adolescence is a sensitive time for emotion regulation development due to many environmental influences and the extended development of the prefrontal cortex which plays an important role in emotional regulation (Blakemore, 2012; Wager et al., 2008). Specifically, it is a period involving development in cognitive, biological, and social systems, as well as cognitive control abilities that are critical in aiding emotion regulation abilities (Andrews et al., 2021; McRae et al., 2012; Steinberg, 2005). It is also a time when more overwhelming emotions occur, which, along with delayed cognitive responses, can lead to maladaptive shifts in self-regulation skills (Cracco et al., 2017; Krishnan, 2020). Emotion regulation difficulties have been found to lead to problems with psychopathology (Aldao et al., 2010; Moffitt et al., 2011; Wesarg et al., 2020), substance use

(Roos et al., 2020; Siegel, 2015), and risk-taking behaviors (Holmes et al., 2019; Magar et al., 2008) during adolescence.

Our third and final hypothesis was that greater levels of abuse experience would predict higher initial levels of difficulties in emotion regulation, less use of reappraisal, and greater use of suppression. We further expected there would be less growth (i.e., fewer reductions in difficulties in emotion regulation, fewer reductions in the use of suppression, and fewer increases in the use of reappraisal) for individuals who experienced abuse compared to those who did not. We also expected that the effects of abuse would be stronger on difficulties in emotion regulation, reappraisal, and suppression than the effects of neglect, as is consistent with the Dimensional Model of Adversity and Psychopathology. Our hypothesis was partially supported. While we found that difficulties in emotion regulation did not change over time for the group as a whole, we did find differences for individuals who experienced abuse. Specifically, we found that individuals who experienced greater levels of abuse exhibited an increase in difficulties in emotion regulation over time. These findings are consistent with previous literature suggesting that abuse has detrimental effects on emotion regulation abilities (Gruhn & Compas, 2020; Kim & Cicchetti, 2010). Because adolescence is a time when emotion reactivity is at its peak (McRae et al., 2012; Steinberg, 2005), those with early experiences of abuse may be especially vulnerable to difficulties in managing these heightened emotions during this time. Thus, it is crucial to understand the impacts abuse may have and how we can prevent the cascading effects of earlier abuse experiences to later psychopathology and substance use. Indeed, the use of maladaptive emotion regulation strategies (e.g., suppression) has been found to be tied to greater levels of psychopathology (see Aldao & Nolen-Hoeksema, 2010 for a review) and substance use (Stellern et al., 2021).

There are many mechanisms proposed for the leading from early abuse to adolescents experiencing more emotional dysregulation. One mechanism is heightened emotional reactivity, which interferes with emotion regulation (Weissman et al., 2019). Being on high alert all the time may be adaptive in situations that are threatening (e.g., living in an abusive home), but may lead to less adaptive functioning in other areas of life, such as worsened immune functioning or alienation from social environments due to aggressiveness or withdrawal that occurs with the heightened stress responses (Frankenhuis & Del Giudice, 2012; Shirtcliff et al., 2009; Del Giudice et al., 2011). Further, emotion regulation in early life is largely a learned behavior. In abusive homes, parents often model more maladaptive emotion regulation strategies and punish expressions of emotion rather than providing good modeling for adaptive emotion regulation abilities (Cicchetti et al., 1995; Kim & Cicchetti, 2010). Therefore, adolescents who grew up in abusive environments may not have had a role model of adaptive emotion regulation skills.

In addition to the significant abuse effects, we found that greater levels of neglect were significantly associated with greater difficulties in emotion regulation in early adolescence. This finding is consistent with prior research demonstrating that children who experienced neglect have fewer adaptive emotion regulation skills, lower levels of empathy, less emotional self-awareness, display less situationally appropriate emotional displays, as well as expecting less support and conflict when displaying negative emotions (Shipman et al., 2005). Further, individuals who experienced neglect have difficulties identifying and distinguishing emotional expressions (Pollak et al., 2000) which can contribute to difficulties in regulating emotions. Parenting plays a crucial role in the development of adaptive emotion regulation skills, and neglectful caregivers lack characteristics that are crucial to the development of emotion regulation (Riley et al., 2017), including less interaction with their children and less expression

of feelings (Bousha et al., 1984; Gaudin et al., 1996). Difficulties in emotion regulation involving a lack of emotional awareness and emotional clarity following neglect have further been found to lead to later difficulties in social relationships (Berzenski, 2019) as well as higher internalizing and externalizing symptoms later (Kim & Cicchetti, 2010), suggesting cascading effects of neglectful parenting.

By understanding how neglect and abuse affect the development of emotion regulation, we can target interventions focusing on emotion regulation abilities. For example, it has been found that mindfulness and exercise have decreased difficulties in emotion regulation (Bernstein & McNally, 2018; Roemer et al., 2015) by promoting the use of adaptive emotion regulation abilities and lessening the use of maladaptive strategies, such as rumination. It has also been suggested that mindfulness training helps individuals regulate amygdala activation, leading to reduced emotional distress and reactivity (Creswell et al., 2007). Further, exercise has been found to decrease anxiety and distressing emotions in general (Yeung, 1996). Additionally, therapies such as Dialectical Behavior Therapy (DBT), Acceptance and Commitment Therapy (ACT), and Cognitive Behavioral Therapy approaches (CBT) have been found to increase emotion regulation abilities (Forkmann et al., 2014; Hayes et al., 2004; Morton et al., 2012; Neacsiu et al., 2014) by providing skills to individuals that help facilitate emotion regulation.

We did not find any significant associations with abuse or neglect affecting the initial status or growth of reappraisal or suppression. The cognitive maturation model proposes that there is a positive association between age and cognitive regulation as a result of general maturation in cognitive skills during adolescence in which both cognitive adaptive (e.g., reappraisal) and cognitive suppression (e.g., suppression) are reported less often in late adolescence than in early adolescence (te Brinke et al., 2021). Our data demonstrated that

suppression use increased across adolescence as a whole group, whereas reappraisal use did not. This is contradictory to a prior study that examined 12- to 19-year-olds in a cross-sectional sample and reported higher use of adaptive strategies (i.e., cognitive or behavioral problem solving, humor enactment, forgetting, revaluation cognitive or behavioral acceptance, distraction) and lower use of maladaptive strategies (i.e., self-devaluation, rumination, withdrawal, giving up, aggressive actions) among older adolescents than younger adolescents (te Brinke et al., 2021). The discrepancy may be due to the fact that our study examined longitudinal within-person changes in emotion regulation across adolescence instead of assessing age-related differences, and that our study focused on one distinct adaptive emotion regulation strategy (i.e., cognitive reappraisal) and one maladaptive strategy (i.e., expressive suppression).

With respect to our findings of the non-significant effects of abuse and neglect on specific emotion regulation strategies, data seem to suggest that emotion regulation strategies, unlike emotion regulation abilities, may be less likely to be affected by parenting behaviors. Specifically, suppression has been found to be more heritable and less influenced by environmental aspects than reappraisal (McRae et al., 2017). There is also evidence that emotion regulation strategies during four years of adolescence were not significantly predicted by negative parenting experienced during adolescence (Herd et al., 2022). More research is needed to examine the impacts of diverse contextual factors including parenting on cognitive reappraisal and expressive suppression.

There is evidence from cross-sectional studies that the effectiveness of cognitive reappraisal at reducing negative affect increases from middle childhood through adolescence (McRae et al., 2012; Silvers et al., 2012, 2017). This continued development of the effectiveness of emotion regulation strategies in general across adolescence is proportionate to a peak of

emotional reactivity, as indicated by greater emotional volatility and intensity as compared to childhood and adulthood (Gunnar et al., 2009; Guyer et al., 2016; Stroud et al., 2009). However, one longitudinal study has found no differences in the use of suppression or cognitive reappraisal across ages 9 to 15 using latent growth curve modeling analyses (Gullone et al., 2010). Similarly, another latent growth curve modeling study suggests that there are no significant developmental changes in cognitive reappraisal (ages 13 to 17; Herd et al., 2022). Previous literature has found that tendencies to engage in cognitive reappraisal were not associated with child maltreatment (Weissman et al., 2019). These authors proposed that the capacity to utilize cognitive reappraisal effectively, rather than the capacity per se, may be diminished in children and adolescents who were exposed to maltreatment (Weissman et al., 2019). That is, even though there were no statistically significant associations between abuse and neglect experiences in childhood and self-reported emotion regulation strategies in adolescence, it is plausible that those who experienced abuse or neglect may not be able to use cognitive reappraisal as effectively. Alternatively, existing literature has shown that individuals who experienced multi-subtype, chronic maltreatment increased the likelihood of having emotion regulation difficulties overall, including increased use of expressive suppression (Kim & Cicchetti, 2010; Warmingham et al., 2022). The effects of multiple subtypes and chronicity of maltreatment on emotion regulation abilities and strategies warrant future research.

It has been suggested that while cognitive reappraisal is thought of as adaptive, there may be some indications that the adaptive nature changes depending on the context a person is in (McRae et al., 2016). For example, it has been suggested that reappraisal works best if an individual is in a situation that they cannot control (Troy et al. 2013). There is evidence that the uncontrollability of maltreatment experiences may cause children to believe that any stressor is

out of their control, which then teaches children to avoid stressors or their own responses to stressors (Gruhn & Compas, 2020). It has also been proposed that child maltreatment disrupts healthy emotion regulation development due to a lack of exposure to healthy emotion socialization, as well as experiencing stress that they are unable to cope with developmentally (Cicchetti & Toth, 2005). Further, while it may be useful while growing up in an abusive or neglectful home to hide one's emotions, it becomes harmful to normal development, with links to psychopathology (Compas et al., 2017). The lack of associations between abuse and neglect with suppression could be indicative of a type of resilience.

We found significant individual differences in the initial time points and growth of suppression and reappraisal. Considering adolescence is a time period when there are possible changes in the use of emotion regulation strategies, including a maladaptive shift in emotion regulation (Cracco et al., 2017), it may be a difficult time to entangle possible differences between individuals who have experienced maltreatment and those who have not. Further, the significant findings with difficulties in emotion regulation but not with reappraisal and suppression may indicate a broader impact that abuse has on emotion regulation abilities. While it may not directly affect the strategies, we did find that it impacted general emotion regulation abilities. These findings also indicate that general emotion regulation difficulties may be more malleable to change than specific strategies, and thus it may be more beneficial to target general difficulties rather than working on increasing or decreasing the use of specific strategies for individuals who experienced abuse or neglect.

There were limitations in the current study that should be addressed in future work. Although our analysis was a longitudinal design across six time points, the correlational data do not allow us to infer causality. Additionally, future work should aim to examine the trajectories

across even longer amounts of time. For example, significant associations may be present earlier in life, such as in late childhood. Finally, our sample was predominantly non-Hispanic Whites. While this was representative of the region in which our data was collected, the generalizability of our findings to a more ethnically and racially diverse population needs further replications. Further, considering that we found race had significant effects on executive function abilities, future work should aim to identify the source of race differences. For example, race may be a proxy for other social variables, such as good access to quality healthcare, that were not captured here (Sarullo et al., 2021).

However, despite the limitations noted, there were significant strengths of the present study. For one, there were multiple behavioral measures of executive function utilized. This allowed us to not only examine executive function as a construct as a whole but also piece apart the individual components. Further, we were able to examine trajectories of executive function abilities and emotion regulation abilities across six time points throughout adolescence and into young adulthood, which allows us to examine the developmental trajectories and the effects earlier abuse and neglect experiences have on them.

Conclusion

Overall, the current findings add to the existing literature that has proposed that abuse and neglect have differential impacts on executive function and emotion regulation abilities. For executive function, we found that greater amounts of neglect were associated with slower growth of working memory throughout adolescence and into young adulthood. We did not find that earlier abuse nor neglect predicted executive function abilities as a whole as well as shifting or inhibitory control abilities, suggesting that neglect was particularly influential on working memory development. For emotion regulation, we found that greater amounts of abuse were

associated with increasing difficulties in emotion regulation throughout adolescence and young adulthood and higher levels of neglect were associated with greater difficulties in emotion regulation in early adolescence. We did not find that abuse nor neglect impacted the use of reappraisal or suppression strategies, suggesting that abuse and neglect may impact emotion regulation abilities, but not emotion regulation strategies. These findings from longitudinal prospective analyses provide valuable support for the existing Dimensional Model of Adversity and Psychopathology (Sheridan & McLaughlin, 2014). Further, the findings show that there are particular facets of adolescent executive function and emotion regulation development that are more vulnerable to the detrimental effects of childhood abuse and neglect experiences that can be targeted by preventive intervention efforts.

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Table 1.

Results from the EFA showing the percentage of variance explained and the factor loadings for SBMD, MSIT, and WCST.

	% variance explained	Factor Loading SBMD	Factor Loading MSIT	Factor Loading WCST
Wave 1	46.827	.643	.724	.684
Wave 2	46.133	.632	.711	.693
Wave 3	47.633	.598	.733	.731
Wave 4	43.493	.666	.672	.640
Wave 5	48.458	.754	.682	.648
Wave 6	49.890	.670	.718	.731

Table 2. *Descriptive Statistics for Subtypes of Maltreatment, Executive Function Composite, Executive Function Components, Difficulties In Emotion Regulation, Reappraisal, Suppression, Sex, and Race.*

	M	SD	Min	Max
Sexual Abuse	0.51	1.51	0.00	7.00
Verbal Abuse	2.39	3.52	0.00	10.00
Non-Verbal Abuse	2.12	2.51	0.00	10.00
Physical Abuse	3.15	2.79	0.00	10.00
Emotional Neglect	1.74	2.33	0.00	10.00
Physical Neglect	1.03	1.84	0.00	6.00
EF Composite T1	-0.005	0.69	-2.02	1.70
EF Composite T2	0.50	0.63	-1.12	2.01
EF Composite T3	0.74	0.62	-1.03	2.12
EF Composite T4	0.97	0.69	-0.57	2.79
EF Composite T5	1.12	0.67	-0.55	2.60
EF Composite T6	1.13	0.66	-0.41	2.57
WCST T1	-7.23	3.58	-20.00	-3.00
WCST T2	-5.40	2.16	-13.00	-2.00
WCST T3	-4.80	1.44	-9.00	-2.00
WCST T4	-4.73	1.76	-12.00	-1.00
WCST T5	-4.84	1.41	-9.00	-2.00
WCST T6	-4.69	1.26	-8.00	-2.00
MSIT T1	-0.24	0.04	-0.35	-0.15
MSIT T2	-0.21	0.04	-0.30	-0.11
MSIT T3	-0.19	0.04	-0.32	-0.10
MSIT T4	-0.18	0.04	-0.31	-0.10
MSIT T5	-0.17	0.04	-0.28	-0.08
MSIT T6	-0.17	0.04	-0.29	-0.08
SBMD T1	5.56	1.75	2.00	10.00
SBMD T2	5.83	1.90	3.00	11.00
SBMD T3	6.11	2.09	2.00	11.00
SBMD T4	6.73	2.31	2.00	12.00
SBMD T5	7.25	2.44	3.00	12.00
SBMD T6	7.15	2.22	2.00	12.00
DERS T1	2.33	0.83	1.00	4.82
DERS T2	2.37	0.78	1.00	4.67
DERS T3	2.35	0.76	1.00	4.33
DERS T4	2.30	0.79	1.00	4.67
DERS T5	2.21	0.72	1.00	4.31
DERS T6	2.24	0.73	1.00	4.05
Reappraisal T1	4.93	0.94	2.33	7.00
Reappraisal T2	4.87	0.88	2.50	7.00

Reappraisal T3	4.92	1.07	1.67	7.00
Reappraisal T4	4.96	0.94	2.17	7.00
Reappraisal T5	4.84	1.13	1.67	7.00
Reappraisal T6	4.72	1.15	1.00	7.00
Suppression T1	3.78	1.17	1.25	7.00
Suppression T2	3.85	1.14	1.25	6.75
Suppression T3	3.78	1.16	1.25	6.25
Suppression T4	3.85	1.19	1.50	7.00
Suppression T5	3.90	1.14	1.00	6.50
Suppression T6	4.00	1.07	1.00	7.00
Sex (0 = male)	0.47	0.50	0.00	1.00
Race (0 = White)	0.20	0.40	0.00	1.00

Note. EF = Executive function; WCST = Wisconsin Card Sort Task; MSIT = MultiSource Interference Task; SBMD = Stanford Binet Memory for Digits; DERS = Difficulties in Emotion Regulation Scale

Table 3. *Correlations for Maltreatment Subtypes*

	1	2	3	4	5
(1) Sexual Abuse					
(2) Verbal Abuse	.44*				
(3) Non-Verbal Abuse	.36*	.67*			
(4) Physical Abuse	.37*	.57*	.50*		
(5) Emotional Neglect	.30*	.44*	.53*	.22*	
(6) Physical Neglect	.14	.22*	.15	.13	.54*

Note. * $p < .05$

Table 4. Correlations for All Study Variables, Part 1 (Executive Function Composite and WCST)

	1	2	3	4	5	6	7	8	9	10	11	12	13
(1) Abuse													
(2) Neglect	.33*												
(3) EF Composite T1	.09	.03											
(4) EF Composite T2	-.04	-.11	.62*										
(5) EF Composite T3	-.04	-.05	.57*	.66*									
(6) EF Composite T4	-.06	-.18*	.55*	.64*	.66*								
(7) EF Composite T5	-.03	-.15	.51*	.66*	.73*	.72*							
(8) EF Composite T6	-.07	-.15	.57*	.67*	.67*	.74*	.77*						
(9) WCST T1	.06	.03	.69*	.26*	.30*	.30*	.16	.20*					
(10) WCST T2	.14	-.07	.51*	.54*	.32*	.32*	.29*	.35*	.53*				
(11) WCST T3	-.13	-.05	.22*	.18*	.45*	.26*	.26*	.28*	.11	.10			
(12) WCST T4	-.08	-.16	.33*	.15	.15	.27*	.27*	.26*	.37*	.26*	.11		
(13) WCST T5	-.13	-.08	.23*	.22*	.32*	.44*	.44*	.33*	.18	.12	.31*	.29*	
(14) WCST T6	.11	.05	.33*	.22*	.30*	.33*	.33*	.49*	.21*	.33*	.04	.43*	.17

Note. EF = Executive Function; WCST = Wisconsin Card Sorting Task

* $p < .05$

Table 4. Correlations for all study variables, part 2 (MSIT and SBMD)

	Abuse	Neglect	3	4	5	6	7	8	9	10	11	12	13
(3) MSIT T1	.09	.03											
(4) MSIT T2	-.14	-.10	.49*										
(5) MSIT T3	.01	.02	.47*	.59*									
(6) MSIT T4	-.08	-.08	.39*	.60*	.53*								
(7) MSIT T5	.00	.01	.45*	.50*	.49*	.50*							
(8) MSIT T6	-.05	-.09	.42*	.39*	.37*	.53*	.64*						
(9) SBMD T1	.04	.02	.20*	.27*	.21*	.13	.15	.09					
(10) SBMD T2	-.03	-.08	.14	.18*	.16	.18	.06	.15	.58*				
(11) SBMD T3	-.04	-.10	.16	.28*	.18*	.12	.33*	.31*	.57*	.55*			
(12) SBMD T4	-.04	-.20*	.21*	.25*	.23*	.17*	.25*	.24*	.58*	.54*	.70*		
(13) SBMD T5	-.01	-.18*	.27*	.44*	.29*	.22*	.27*	.25*	.60*	.55*	.70*	.71*	
(14) SBMD T6	-.10	-.15	.30*	.44*	.22*	.26*	.34*	.22*	.68*	.60*	.71*	.73*	.72*

Note. MSIT = MultiSource Interference Task; SBMD = Stanford Binet Memory for Digits

* $p < .05$

Table 4. Correlations for All Study Variables, Part 3 (Executive Function Composite, WCST, MSIT, and SBMD)

	MSIT T1	MSIT T2	MSIT T3	MSIT T4	MSIT T5	MSIT T6	SBMD T1	SBMD T2	SBMD T3	SBMD T4	SBMD T5	SBMD T6
EF Composite T1	.70*	.44*	.42*	.34*	.34*	.33*	.67*	.37*	.45*	.47*	.46*	.53*
EF Composite T2	.45*	.73*	.50*	.51*	.38*	.37*	.57*	.74*	.53*	.51*	.65*	.69*
EF Composite T3	.40*	.55*	.73*	.41*	.53*	.44*	.52*	.45*	.78*	.61*	.64*	.63*
EF Composite T4	.37*	.51*	.46*	.70*	.46*	.44*	.48*	.43*	.55*	.79*	.64*	.68*
EF Composite T5	.40*	.57*	.46*	.43*	.69*	.51*	.52*	.43*	.66*	.64*	.86*	.69*
EF Composite T6	.44*	.51*	.36*	.47*	.58*	.74*	.54*	.48*	.66*	.65*	.64*	.81*
WCST T1	.24*	.16	.23*	.19*	.14	.20*	.17*	.03	.23*	.19*	.10	.11
WCST T2	.27*	.22*	.28*	.25*	.21*	.23*	.26*	.16*	.21*	.17*	.24*	.29*
WCST T3	.15	.23*	.25*	.20*	.20*	.14	.22*	.04	.17*	.18*	.16	.30*
WCST T4	.15	.13	.10	.15	.16	.11	.14	-.01	.11	.14	.19*	.21*
WCST T5	.09	.20*	.20*	.24*	.16	.26*	.23*	.11	.22*	.18	.25*	.24*
WCST T6	.26*	.18	.26*	.22*	.31*	.29*	.22*	.03	.23*	.20*	.24*	.25*

Note. EF = Executive Function; WCST = Wisconsin Card Sorting Task; MSIT = MultiSource Interference Task; SBMD = Stanford Binet Memory for Digits
 * $p < .05$

Table 4. *Correlations for All Study Variables, Part 4 (DERS, Reappraisal, and Suppression)*

	Abuse	Neglect	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
(3) DERS T1	.18*	.22*																	
(4) DERS T2	.17*	.10	.56*																
(5) DERS T3	.13	.14	.45*	.56*															
(6) DERS T4	.15	.13	.47*	.47*	.60*														
(7) DERS T5	.33*	.23*	.28*	.41*	.49*	.66*													
(8) DERS T6	.28*	.07	.28*	.39*	.47*	.53*	.64*												
(9) Reappraisal T1	-.08	.05	-.20*	-.20*	-.09	-.16	-.16	-.15											
(10) Reappraisal T2	-.20*	-.05	-.13	-.25*	-.27*	-.11	-.15	-.07	.44*										
(11) Reappraisal T3	-.11	-.13	-.08	-.27*	-.24*	-.01	-.13	-.13	.30*	.53*									
(12) Reappraisal T4	-.12	-.06	-.25*	-.30*	-.24*	-.32*	-.44*	-.25*	.33*	.28*	.42*								
(13) Reappraisal T5	-.10	.03	.03	-.20*	-.23*	-.27*	-.33*	-.29*	.29*	.24*	.29*	.56*							
(14) Reappraisal T6	-.05	.11	-.01	-.22*	-.14	-.17	-.33*	-.33*	.14	.25*	.38*	.53*	.59*						
(15) Suppression T1	.004	.06	.14	.15	.16	.09	.06	.16	.04	-.07	-.09	-.02	.04	-.14					
(16) Suppression T2	.05	-.01	.22*	.21*	.11	.02	.09	.15	-.05	-.06	.02	-.05	-.01	-.06	.58*				
(17) Suppression T3	.14	.05	.13	.07	.05	.02	.04	.03	-.05	-.14	-.01	-.07	-.08	-.10	.53*	.62*			
(18) Suppression T4	.14	.16	.10	.18*	.11	-.06	-.03	-.05	.001	-.05	-.14	-.10	-.10	-.15	.44*	.49*	.61*		
(19) Suppression T5	-.13	.04	.13	.09	.06	-.07	-.01	-.09	-.04	-.01	-.08	-.14	-.06	-.07	.33*	.32*	.52*	.51*	
(20) Suppression T6	.15	.08	.05	.03	.04	-.01	-.004	-.09	.13	.02	-.01	-.07	.01	.01	.18	.24*	.46*	.42*	.50*

Note. DERS = Difficulties in Emotion Regulation Scale

* $p < .05$

Table 5. *Fit Indices of Univariate Growth Curve Models for Executive Function Composite and Components*

Model Label	χ^2	<i>df</i>	<i>p</i>	RMSEA	CFI	$\Delta \chi^2$	Δdf	<i>p(d)</i>
Executive Function Composite								
No growth	572.45	24	.000	0.37	0.00			
Linear	107.62	21	.000	0.16	0.83	464.83	3	<.001
Latent	12.55	17	.766	0.00	1.00	95.07	4	<.001
Wisconsin Card Sorting Task								
No growth	484.86	24	.000	0.34	0.00			
Linear	262.12	21	.000	0.26	0.00	222.75	3	<.001
Latent	51.87	17	.000	0.11	0.67	210.24	4	<.001
Latent Theta Freed with Time 1 Residual = 0 and Residual Correlations	9.87	10	.452	0.00	1.00	42.00	7	<.001
Multi Source Interference Task								
No growth	447.10	24	.000	0.33	0.00			
Linear	85.04	21	.000	0.13	0.78	326.07	3	<.001
Latent	31.77	17	.160	0.07	0.95	53.26	4	<.001
Latent Theta Freed, Residual Correlations Between Times 5 and 6	18.35	11	.074	0.06	0.97	13.43	1	<.001
Stanford Binet Backward DigitSpan								
No growth	207.55	24	.000	0.21	0.60			
Linear	34.45	21	.032	0.06	0.97	173.10	3	<.001
Latent	15.22	17	.580	0.00	1.00	19.24	4	<.001

Table 6. *Fit Indices of Univariate Growth Curve Models for Emotion Regulation*

Model Label	χ^2	<i>df</i>	<i>p</i>	RMSEA	CFI	$\Delta \chi^2$	Δdf	<i>p(d)</i>
Difficulties in Emotion Regulation Scale								
No growth	64.11	24	.000	0.10	0.87			
Linear	25.64	21	.221	0.04	0.99	38.48	3	<.001
Latent	22.44	17	.168	0.04	0.98	3.20	4	0.525
Reappraisal								
No growth	78.26	24	.000	0.12	0.73			
Linear	32.76	21	.049	0.06	0.94	45.50	3	<.001
Latent	29.59	17	.030	0.07	0.94	3.17	4	0.842
Suppression								
No growth	65.33	24	.000	0.10	0.85			
Linear	24.77	21	.257	0.03	0.99	40.57	3	<.001
Latent	23.35	17	.138	0.05	0.98	1.42	4	0.842

Table 7. Results of Conditional Growth Curve Models of Abuse and Neglect Effects on the Executive Function Composite.

<i>Parameters</i>	<i>Executive Function</i>			
	Estimate (Est)	Std. Error (SE)	Est/SE	<i>p</i>
<u><i>Factor Loadings</i></u>				
<i>Time 1 → EF Slope</i>	0 =			
<i>Time 2 → EF Slope</i>	0.45	.03	13.28	<.001
<i>Time 3 → EF Slope</i>	0.66	.04	18.91	<.001
<i>Time 4 → EF Slope</i>	0.87	.04	22.94	<.001
<i>Time 5 → EF Slope</i>	1.00	.04	24.37	<.001
<i>Time 6 → EF Slope</i>	1 =			
<u><i>Regression effects on slope</i></u>				
<i>Abuse → EF Slope</i>	-0.09	.08	-1.13	.259
<i>Neglect → EF Slope</i>	-0.07	.06	-1.11	.268
<i>Race → EF Slope</i>	-0.20	.12	-1.57	.117
<u><i>Regression effects on intercept</i></u>				
<i>Abuse → EF Intercept</i>	0.06	.08	0.78	.438
<i>Neglect → EF Intercept</i>	0.01	.07	0.09	.931
<i>Race → EF Intercept</i>	-0.16	.13	-1.23	.209
<u><i>Factor covariances</i></u>				
<i>EF Intercept ↔ EF Slope</i>	-0.08	.04	-2.38	.017
<i>Abuse ↔ Neglect</i>	0.20	.05	3.71	<.001

Note. EF = Executive Function

Table 8. Results of Conditional Growth Curve Models of Abuse and Neglect Effects on the Shifting, as measured by the Wisconsin Card Sorting Task.

<i>Parameter</i>	<i>Shifting (WCST)</i>			
	Estimate (Est)	Std. Error (SE)	Est/SE	<i>p</i>
<u><i>Factor Loadings</i></u>				
<i>Time 1 → WCST Slope</i>	0 =			
<i>Time 2 → WCST Slope</i>	0.69	.04	18.18	<.001
<i>Time 3 → WCST Slope</i>	0.99	.04	26.22	<.001
<i>Time 4 → WCST Slope</i>	0.92	.04	26.42	<.001
<i>Time 5 → WCST Slope</i>	0.97	.04	27.20	<.001
<i>Time 6 → WCST Slope</i>	1 =			
<u><i>Regression effects on slope</i></u>				
<i>Abuse → WCST Slope</i>	-0.46	.46	-0.99	.323
<i>Neglect → WCST Slope</i>	0.11	.39	0.28	.778
<i>Race → WCST Slope</i>	0.39	.72	0.54	.587
<u><i>Regression effects on intercept</i></u>				
<i>Abuse → WCST Intercept</i>	0.43	.47	0.91	.362
<i>Neglect → WCST Intercept</i>	-0.10	.39	-0.24	.807
<i>Race → WCST Intercept</i>	-0.93	.73	-1.28	.202
<u><i>Factor covariances</i></u>				
<i>WCST Intercept ↔ WCST Slope</i>	-12.11	1.42	-8.53	<.001
<i>Abuse ↔ Neglect</i>	0.20	0.05	3.71	<.001

Note. WCST = Wisconsin Card Sorting Task

Table 9. Results of Conditional Growth Curve Models of Abuse and Neglect Effects on Inhibitory Control, as measured by the MultiSource Interference Task.

<i>Parameter</i>	<i>Inhibitory Control (MSIT)</i>			
	Estimate (Est)	Std. Error (SE)	Est/SE	<i>p</i>
<u><i>Factor Loadings</i></u>				
<i>Time 1 → MSIT Slope</i>	0 =			
<i>Time 2 → MSIT Slope</i>	0.45	.04	11.05	<.001
<i>Time 3 → MSIT Slope</i>	0.64	.05	14.13	<.001
<i>Time 4 → MSIT Slope</i>	0.80	.05	15.84	<.001
<i>Time 5 → MSIT Slope</i>	0.91	.04	21.68	<.001
<i>Time 6 → MSIT Slope</i>	1 =			
<u><i>Regression effects on slope</i></u>				
<i>Abuse → MSIT Slope</i>	-0.01	.01	-1.08	.282
<i>Neglect → MSIT Slope</i>	0.001	.01	0.30	.767
<i>Race → MSIT Slope</i>	-0.02	.01	-1.85	.064
<u><i>Regression effects on intercept</i></u>				
<i>Abuse → MSIT Intercept</i>	0.002	.01	0.33	.743
<i>Neglect → MSIT Intercept</i>	0.001	.004	0.12	.903
<i>Race → MSIT Intercept</i>	-0.002	.01	-0.30	.765
<u><i>Factor covariances</i></u>				
<i>MSIT Intercept ↔ MSIT Slope</i>	0.00	.00	-0.08	.934
<i>Abuse ↔ Neglect</i>	0.20	.05	3.71	<.001

Note. MSIT = MultiSource Interference Task

Table 10. Results of Conditional Growth Curve Models of Abuse and Neglect Effects on Working Memory, as measured by the Stanford Binet Memory for Digits.

<i>Parameter</i>	<i>Working Memory (SBMD)</i>			
	Estimate (Est)	Std. Error (SE)	Est/SE	<i>p</i>
<u><i>Factor Loadings</i></u>				
<i>Time 1 → SBMD Slope</i>	0 =			
<i>Time 2 → SBMD Slope</i>	0.13	.09	1.37	.170
<i>Time 3 → SBMD Slope</i>	0.44	.09	5.00	<.001
<i>Time 4 → SBMD Slope</i>	0.86	.10	9.01	<.001
<i>Time 5 → SBMD Slope</i>	1.18	.11	10.37	<.001
<i>Time 6 → SBMD Slope</i>	1 =			
<u><i>Regression effects on slope</i></u>				
<i>Abuse → SBMD Slope</i>	0.06	.19	0.34	.738
<i>Neglect → SBMD Slope</i>	-0.33	.16	-2.08	.037
<i>Race → SBMD Slope</i>	-0.74	.30	-2.43	.015
<u><i>Regression effects on intercept</i></u>				
<i>Abuse → SBMD Intercept</i>	-0.004	.21	-0.02	.985
<i>Neglect → SBMD Intercept</i>	-0.01	.17	-0.07	.941
<i>Race → SBMD Intercept</i>	-0.32	.32	-0.99	.323
<u><i>Factor covariances</i></u>				
<i>SBMD Intercept ↔ SBMD Slope</i>	0.53	.20	2.70	.007
<i>Abuse ↔ Neglect</i>	0.20	.05	3.70	<.001

Note. SBMD = Stanford Binet Memory for Digits.

Table 11. Results of Conditional Growth Curve Models of Abuse and Neglect Effects on Difficulties in Emotion Regulation, as measured by the Difficulties in Emotion Regulation Scale.

<i>Difficulties in Emotion Regulation (DERS)</i>				
	Estimate (Est)	Std. Error (SE)	Est/SE	<i>p</i>
<u>Factor Loadings</u>				
<i>Time 1 → DERS Slope</i>	0 =			
<i>Time 2 → DERS Slope</i>	1 =			
<i>Time 3 → DERS Slope</i>	2 =			
<i>Time 4 → DERS Slope</i>	3 =			
<i>Time 5 → DERS Slope</i>	4 =			
<i>Time 6 → DERS Slope</i>	5 =			
<u>Regression effects on slope</u>				
<i>Abuse → DERS Slope</i>	0.05	.02	2.06	.039
<i>Neglect → DERS Slope</i>	-0.03	.02	-1.70	.089
<u>Regression effects on intercept</u>				
<i>Abuse → DERS Intercept</i>	0.08	.10	0.73	.468
<i>Neglect → DERS Intercept</i>	0.18	.08	2.20	.028
<u>Factor covariances</u>				
<i>DERS Intercept ↔ DERS Slope</i>	-0.05	.01	-3.61	<.001
<i>Abuse ↔ Neglect</i>	0.20	.06	3.73	<.001

Note. DERS = Difficulties in Emotion Regulation Scale.

Table 12. Results of Conditional Growth Curve Models of Abuse and Neglect Effects on Reappraisal.

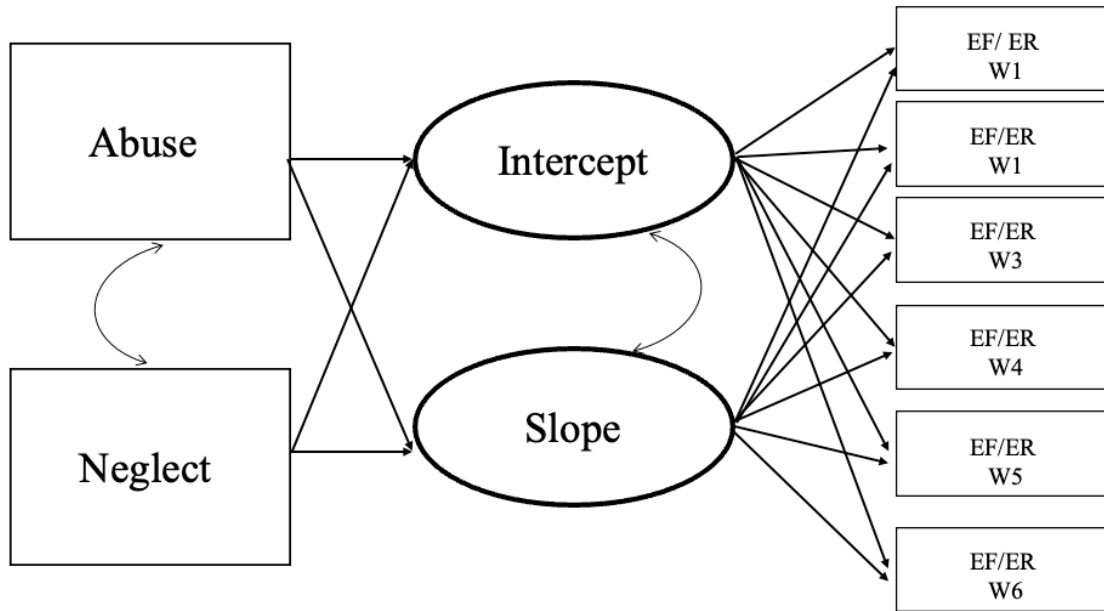
<i>Parameter</i>	<i>Reappraisal</i>			
	Estimate (Est)	Std. Error (SE)	Est/SE	<i>p</i>
<u><i>Factor Loadings</i></u>				
<i>Time 1 → Reappraisal Slope</i>	0 =			
<i>Time 2 → Reappraisal Slope</i>	1 =			
<i>Time 3 → Reappraisal Slope</i>	2 =			
<i>Time 4 → Reappraisal Slope</i>	3 =			
<i>Time 5 → Reappraisal Slope</i>	4 =			
<i>Time 6 → Reappraisal Slope</i>	5 =			
<u><i>Regression effects on slope</i></u>				
<i>Abuse → Reappraisal Slope</i>	-0.01	.04	-0.26	.796
<i>Neglect → Reappraisal Slope</i>	0.04	.03	-1.21	.228
<u><i>Regression effects on intercept</i></u>				
<i>Abuse → Reappraisal Intercept</i>	-0.14	.11	-1.20	.232
<i>Neglect → Reappraisal Intercept</i>	-0.04	.09	-0.41	.685
<u><i>Factor covariances</i></u>				
<i>Reappraisal Intercept ↔ Reappraisal Slope</i>	-0.05	.02	-2.22	.027
<i>Abuse ↔ Neglect</i>	0.20	.05	3.71	<.001

Table 13. Results of Conditional Growth Curve Models of Abuse and Neglect Effects on Suppression.

<i>Parameter</i>	<i>Suppression</i>			
	Estimate (Est)	Std. Error (SE)	Est/SE	<i>p</i>
<u><i>Factor Loadings</i></u>				
<i>Time 1 → Suppression Slope</i>	0 =			
<i>Time 2 → Suppression Slope</i>	1 =			
<i>Time 3 → Suppression Slope</i>	2 =			
<i>Time 4 → Suppression Slope</i>	3 =			
<i>Time 5 → Suppression Slope</i>	4 =			
<i>Time 6 → Suppression Slope</i>	5 =			
<u><i>Regression effects on slope</i></u>				
<i>Abuse → Suppression Slope</i>	-0.002	.04	-0.05	.957
<i>Neglect → Suppression Slope</i>	0.02	.03	0.50	.620
<u><i>Regression effects on intercept</i></u>				
<i>Abuse → Suppression Intercept</i>	0.07	.15	0.45	.653
<i>Neglect → Suppression Intercept</i>	0.00	.12	0.04	.997
<u><i>Factor covariances</i></u>				
<i>Suppression Intercept ↔ Suppression Slope</i>	-0.11	.03	-3.55	<.001
<i>Abuse ↔ Neglect</i>	0.20	.05	3.71	<.001

Figure 1.

Conceptual growth curve model of executive function/emotion regulation predicted by abuse and neglect.



Appendix A

Maltreatment and Abuse Chronology of Exposure Scale

MACE

<p>Sometimes parents, stepparents or other adults living in the house do hurtful things. If this happened during your childhood (first 18 years of your life) please provide your best estimate of your age at the time(s) of occurrence. Please check all ages that apply.</p>																																					
<p><i>For example item 1. Swore at you, called you names, said insulting things like your "fat", "ugly", "stupid", etc. more than a few times a year.</i></p> <p><i>If at ages 6-8 your father swore at you and at ages 8-10 your mother insulted you, and at age 17 your mother's new live-in boyfriend called you names; you would check off as follows:</i></p> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td><td></td><td></td><td>✓</td><td></td> </tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18						✓	✓	✓	✓	✓							✓		<p style="text-align: center;"> <input checked="" type="radio"/> Yes <input type="radio"/> No </p>
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
					✓	✓	✓	✓	✓							✓																					
<p>1. Swore at you, called you names, said insulting things like your "fat", "ugly", "stupid", etc. more than a few times a year. Please check all ages that apply.</p> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<p style="text-align: center;"> <input type="radio"/> Yes₁ <input type="radio"/> No₀ </p>
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
<p>2. Said hurtful things that made you feel bad, embarrassed or humiliated more than a few times a year. Please check all ages that apply.</p> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<p style="text-align: center;"> <input type="radio"/> Yes₁ <input type="radio"/> No₀ </p>
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
<p>3. Acted in a way that made you afraid that you might be physically hurt. Please check all ages that apply.</p> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<p style="text-align: center;"> <input type="radio"/> Yes₁ <input type="radio"/> No₀ </p>
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
<p>4. Threatened to leave or abandon you. Please check all ages that apply.</p> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<p style="text-align: center;"> <input type="radio"/> Yes <input type="radio"/> No₀ </p>
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
<p>5. Locked you in a closet, attic, basement or garage. Please check all ages that apply.</p> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<p style="text-align: center;"> <input type="radio"/> Yes₁ <input type="radio"/> No₀ </p>
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				

<p>6. Intentionally pushed, grabbed, shoved, slapped, pinched, punched or kicked you. Please check all ages that apply.</p> <table border="1" data-bbox="256 285 1170 352"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
<p>7. Hit you so hard that it left marks for more than a few minutes. Please check all ages that apply.</p> <table border="1" data-bbox="256 443 1170 510"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
<p>8. Hit you so hard, or intentionally harmed you in some way, that you received or should have received medical attention. Please check all ages that apply.</p> <table border="1" data-bbox="256 653 1170 720"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
<p>9. Spanked you on your buttocks, arms or legs. Please check all ages that apply.</p> <table border="1" data-bbox="256 842 1170 909"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
<p>10. Spanked you on your bare (unclothed) buttocks. Please check all ages that apply.</p> <table border="1" data-bbox="256 1031 1170 1098"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
<p>11. Spanked you with an object such as a strap, belt, brush, paddle, rod, etc. Please check all ages that apply.</p> <table border="1" data-bbox="256 1220 1170 1287"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
<p>12. Made inappropriate sexual comments or suggestions to you. Please check all ages that apply.</p> <table border="1" data-bbox="256 1409 1170 1476"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
<p>13. Touched or fondled your body in a sexual way. Please check all ages that apply.</p> <table border="1" data-bbox="256 1598 1170 1665"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
<p>14. Had you touch their body in a sexual way. Please check all ages that apply.</p> <table border="1" data-bbox="256 1776 1170 1843"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				

Sometimes parents, stepparents or other adults living in the house do hurtful things to your siblings (brother, sister, stepsiblings). If this happened during your childhood (first 18 years of your life) please provide your best estimates of your age at the time(s) of occurrence.

Please check all ages that apply.

15. Hit your sibling (stepsibling) so hard that it left marks for more than a few minutes.
Please check all ages that apply. Yes₁ No₀

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

16. Hit your sibling (stepsibling) so hard, or intentionally harmed him/her in some way, that he/she received or should have received medical attention.
Please check all ages that apply. Yes₁ No₀

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

17. Made inappropriate sexual comments or suggestions to your sibling (stepsibling).
Please check all ages that apply. Yes₁ No₀

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

18. Touched or fondled your sibling (stepsibling) in a sexual way.
Please check all ages that apply. Yes₁ No₀

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Sometimes adults or older individuals NOT living in the house do hurtful things to you. If this happened during your childhood (first 18 years of your life) please provide your best estimates of your age at the time(s) of occurrence.

Please check all ages that apply.

19. Had you touch their body in a sexual way.
Please check all ages that apply. Yes₁ No₀

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

20. Actually had sexual intercourse (oral, anal or vaginal) with you.
Please check all ages that apply. Yes₁ No₀

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Sometimes intense arguments or physical fights occur between parents, stepparents or other adults (boyfriends, girlfriends, grandparents) living in the household.

If this happened during your childhood (first 18 years of your life) please provide your best estimates of your age at the time(s) of occurrence.

Please check all ages that apply.

21. Saw adults living in the household push, grab, slap or throw something at your mother (stepmother, grandmother).
Please check all ages that apply.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Yes₁ No₀

22. Saw adults living in the household hit your mother (stepmother, grandmother) so hard that it left marks for more than a few minutes.
Please check all ages that apply.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Yes₁ No₀

23. Saw adults living in the household hit your mother (stepmother, grandmother) so hard, or intentionally harm her in some way, that she received or should have received medical attention.
Please check all ages that apply.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Yes₁ No₀

24. Saw adults living in the household push, grab, slap or throw something at your father (stepfather, grandfather).
Please check all ages that apply.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Yes₁ No₀

25. Saw adults living in the household hit your father (stepfather, grandfather) so hard that it left marks for more than a few minutes.
Please check all ages that apply.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Yes₁ No₀

Sometimes children your own age or older do hurtful things like bully or harass you.

If this happened during your childhood (first 18 years of your life) please provide your best estimates of your age at the time(s) of occurrence.

Please check all ages that apply.

26. Swore at you, called you names, said insulting things like your “fat”, “ugly”, “stupid”, etc. more than a few times a year.
Please check all ages that apply.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Yes₁ No₀

27. Said hurtful things that made you feel bad, embarrassed or humiliated more than a few times a year.
Please check all ages that apply.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Yes₁ No₀

28.	<p>Said things behind your back, posted derogatory messages about you, or spread rumors about you. Please check all ages that apply.</p> <table border="1" data-bbox="256 289 1166 359"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																						
29.	<p>Intentionally excluded you from activities or groups. Please check all ages that apply.</p> <table border="1" data-bbox="256 451 1166 520"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																						
30.	<p>Acted in a way that made you afraid that you might be physically hurt. Please check all ages that apply.</p> <table border="1" data-bbox="256 590 1166 657"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																						
31.	<p>Threatened you in order to take your money or possessions. Please check all ages that apply.</p> <table border="1" data-bbox="256 747 1166 819"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																						
32.	<p>Forced or threatened you to do things that you did not want to do. Please check all ages that apply.</p> <table border="1" data-bbox="256 936 1166 1005"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																						
33.	<p>Intentionally pushed, grabbed, shoved, slapped, pinched, punched, or kicked you. Please check all ages that apply.</p> <table border="1" data-bbox="256 1110 1166 1182"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																						
34.	<p>Hit you so hard that it left marks for more than a few minutes. Please check all ages that apply.</p> <table border="1" data-bbox="256 1289 1166 1360"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																						
35.	<p>Hit you so hard, or intentionally harmed you in some way, that you received or should have received medical attention. Please check all ages that apply.</p> <table border="1" data-bbox="256 1495 1166 1566"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																						
36.	<p>Forced you to engage in sexual activity against your will. Please check all ages that apply.</p> <table border="1" data-bbox="256 1667 1166 1738"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																						
37.	<p>Forced you to do things sexually that you did not want to do. Please check all ages that apply.</p> <table border="1" data-bbox="256 1839 1166 1877"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																			<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																						

Please indicate if the following happened during your childhood (first 18 years of your life). Please provide your best estimates of your age at the time(s) of occurrence. Please check all ages that apply.																				
38.	You felt that your mother or other important maternal figure was present in the household but emotionally unavailable to you for a variety of reasons like drugs, alcohol, workaholic, having an affair, heedlessly pursuing their own goals. Please check all ages that apply.																<input type="radio"/>	<input type="radio"/>		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Yes ₁	No ₀
39.	You felt that your father or other important paternal figure was present in the household but emotionally unavailable to you for a variety of reasons like drugs, alcohol, workaholic, having an affair, heedlessly pursuing their own goals. Please check all ages that apply.																<input type="radio"/>	<input type="radio"/>		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Yes ₁	No ₀
40.	A parent or other important parental figure was very difficult to please. Please check all ages that apply.																<input type="radio"/>	<input type="radio"/>		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Yes ₁	No ₀
41.	A parent or other important parental figure did not have the time or interest to talk to you. Please check all ages that apply.																<input type="radio"/>	<input type="radio"/>		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Yes ₁	No ₀
42.	One or more individuals in your family made you feel loved. Please check all ages that apply.																<input type="radio"/>	<input type="radio"/>		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Yes ₁	No ₀
43.	One or more individuals in your family helped you feel important or special. Please check all ages that apply.																<input type="radio"/>	<input type="radio"/>		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Yes ₁	No ₀
44.	One or more individuals in your family were there to take care of you and protect you. Please check all ages that apply.																<input type="radio"/>	<input type="radio"/>		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Yes ₁	No ₀
45.	One or more individuals in your family were there to take you to the doctor or Emergency Room if the need ever arose, or would have if needed. Please check all ages that apply.																<input type="radio"/>	<input type="radio"/>		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Yes ₁	No ₀

Please indicate if the following statements were true about you and your family during your childhood, and your age at the time(s) you felt this to be true.

Please check all ages that apply.

46.	You didn't have enough to eat. Please check all ages that apply.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀																																				
	<table border="1" style="width: 100%; text-align: center;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																						
47.	You had to wear dirty clothes. Please check all ages that apply.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀																																				
	<table border="1" style="width: 100%; text-align: center;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																						
48.	You felt that you had to shoulder adult responsibilities. Please check all ages that apply.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀																																				
	<table border="1" style="width: 100%; text-align: center;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																						
49.	You felt that your family was under severe financial pressure. Please check all ages that apply.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀																																				
	<table border="1" style="width: 100%; text-align: center;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																						
50.	One or more individuals kept important secrets or facts from you. Please check all ages that apply.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀																																				
	<table border="1" style="width: 100%; text-align: center;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
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51.	People in your family looked out for each other. Please check all ages that apply.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀																																				
	<table border="1" style="width: 100%; text-align: center;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																						
52.	Your family was a source of strength and support. Please check all ages that apply.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀																																				
	<table border="1" style="width: 100%; text-align: center;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
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Appendix B

Difficulties in Emotion Regulation Scale (Times 1-6)

DERS

We would like to ask you some questions about your emotional life. For each item, please answer using the following scale:

+

	1) Almost never (0-10%)	2) Sometimes (11-35%)	3) About half the time (36-65%)	4) Most of the time (66-90%)	5) Almost always (91-100%)
1. I experience my emotions as overwhelming and out of control.	①	②	③	④	⑤
2. When I'm upset, I have difficulty getting work done.	①	②	③	④	⑤
3. When I'm upset, I become out of control.	①	②	③	④	⑤
4. When I'm upset, I have difficulty focusing on other things.	①	②	③	④	⑤
5. When I'm upset, I feel out of control.	①	②	③	④	⑤
6. When I'm upset, I can still get things done.	①	②	③	④	⑤
7. When I'm upset, I feel I can remain in control over my behaviors.	①	②	③	④	⑤
8. When I'm upset, I have difficulty concentrating.	①	②	③	④	⑤
	1) Almost never (0-10%)	2) Sometimes (11-35%)	3) About half the time (36-65%)	4) Most of the time (66-90%)	5) Almost always (91-100%)
9. When I'm upset, I have difficulty controlling my behaviors.	①	②	③	④	⑤
10. When I'm upset, I lose control over my behaviors.	①	②	③	④	⑤
11. When I'm upset, I have difficulty thinking about anything else.	①	②	③	④	⑤

Appendix C

Emotion Regulation Questionnaire (Times 1-6)

ERQ

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

1-----2-----3-----4-----5-----6-----7
strongly disagree **neutral** **strongly agree**

]

- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. When I want to feel a more <i>positive</i> emotion (such as joy or amusement), I <i>change what I'm thinking about</i> . | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 2. I keep my emotions to myself. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 3. When I want to feel a less <i>negative</i> emotion (such as sadness or anger), I <i>change what I'm thinking about</i> . | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 4. When I am feeling <i>positive</i> emotions, I am careful not to express them. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 5. When I'm faced with a stressful situation, I make myself <i>think about it</i> in a way that helps me stay calm. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |

1-----2-----3-----4-----5-----6-----7
strongly disagree **neutral** **strongly agree**

6. I control my emotions by *not expressing them*. ① ② ③ ④ ⑤ ⑥ ⑦

7. When I want to feel a more *positive* emotion, I *change the way I'm thinking* about the situation. ① ② ③ ④ ⑤ ⑥ ⑦

8. I control my emotions by *changing the way I think* about the situation I'm in. ① ② ③ ④ ⑤ ⑥ ⑦

9. When I am feeling *negative* emotions, I make sure not to express them. ① ② ③ ④ ⑤ ⑥ ⑦

10. When I want to feel a less *negative* emotion, I *change the way I'm thinking* about the situation. ① ② ③ ④ ⑤ ⑥ ⑦