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Cumulative Childhood Maltreatment and Executive Functioning in Adulthood

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Abstract

Maltreatment during childhood has detrimental consequences for survivors. Among children, maltreatment predicts deficits in cognition and impairment in academic and emotional functioning. Although studied extensively in children, the extent to which cognitive deficits are evident in adulthood has been examined to a lesser extent. Executive functioning (EF) is a set of cognitive processes that help to guide behavior toward goals and is characterized by a prolonged maturational time course. As such, it is particularly vulnerable to the effects of early stress, which confers risk for psychopathology. Thus, it is critical to assess the potential impact of childhood trauma on adult EF. The present study sought to assess the impact of a history of childhood maltreatment on EF during adulthood using both self-reported and task-based measures of EF processes. Higher levels of cumulative childhood maltreatment predicted poorer EF. Furthermore, deficits were not accounted for by current symptoms of depression and anxiety, indicating that the impact of childhood maltreatment on cognitive functioning in adulthood is not the result of current internalizing psychopathology.

Keywords

Childhood maltreatment; adults; executive function; cognitive functioning

Introduction

Often hidden from the public and underreported, maltreatment (e.g., emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect) is an unfortunate reality for millions of children in the United States every year (Baker & Maiorino, 2010; Mennen et al., 2010; United States Department of Health and Human Services, 2020). Maltreatment predicts a myriad of negative outcomes during childhood, including emotion

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dysregulation, altered emotion processing, anxiety, and depression (Eckenrode et al., 1993; Mezzacappa et al., 2001; Shackman et al., 2007). The effects of maltreatment are not restricted to childhood, as research indicates that a history of childhood maltreatment contributes to impairment across the lifespan, including increasing risk for depression, anxiety, eating disorders, alcohol and substance use disorders, and personality disorders (Horwitz et al., 2001; Kessler et al., 2010; Young et al., 1997).

Investigations of the impact of a history of childhood maltreatment in adulthood (i.e., beyond childhood and adolescence) have generally focused on emotional functioning and emotion processing (e.g., Bernet & Stein, 1999; Briere & Runtz, 1990; Brodsky et al., 2001; Chapman et al., 2004; Gibb et al., 2007), whereas fewer studies have examined the impact of childhood maltreatment on cognitive functioning, including executive functioning (EF; e.g., Gould et al., 2012; Majer et al., 2010; Navalta et al., 2006). The impact of childhood maltreatment on EF is important to assess given that EF deficits predict outcomes across several important domains, including occupational performance, antisocial behavior, current psychopathology symptoms, and future psychopathology symptoms (Barkley & Murphy, 2010, 2011; Knouse et al., 2013). Because EF is strongly supported by frontal lobe functioning, which is vulnerable to disruption by the effects of trauma and stress throughout childhood and adolescence (Mezzacappa et al., 2001; for a discussion of the relationship between child maltreatment and brain development, see; Andersen et al., 2008 & Twardosz & Lutzker, 2010), early traumatic experiences may affect normative EF development. Thus, it is plausible that early maltreatment could have consequences for EF beyond childhood and adolescence.

Prominent definitions of EF propose that it reflects a set of mental processes that help guide behavior toward a goal, especially in nonroutine situations (Banich, 2009; Mesulam, 2002). Theorized to be a multi-component construct, many cognitive processes are purported to fall under the EF umbrella, including planning, problem-solving, inhibiting, shifting, working memory (WM), and updating WM (Banich, 2009; Miyake et al., 2000). Research indicates that subtypes of childhood maltreatment (e.g., sexual abuse, physical abuse, etc.) predict impairment in several EF processes in adulthood, such as spatial WM (Gould et al., 2012; Majer et al., 2010), inhibition (Navalta et al., 2006), and shifting (Gould et al., 2012; Nikulina & Widom, 2013). Maltreatment subtypes also predict self-reported broadly defined EF (Pluck et al., 2011).

A notable limitation of prior research that has assessed the impact of childhood maltreatment history on EF is that most studies have not accounted for current symptoms of depression and anxiety on EF. This is critical because a history of childhood maltreatment is strongly associated with depression and anxiety (Bernet & Stein, 1999; Chapman et al., 2004; Fergusson et al., 2013), and that depression and anxiety predict poorer EF and less efficient functioning in brain regions purported to support EF (for reviews, see Castaneda et al., 2008; Snyder, 2013). Although some of the prior studies have controlled for depression and/or anxiety as clinical diagnoses, (e.g., Majer et al., 2010; Navalta et al., 2006), they have not accounted for separable dimensions of depression and anxiety While depression can be deconstructed into low positive affect and depressed mood, anxiety can be deconstructed into anxious apprehension, which is characterized by worry and perseverative thinking,

and anxious arousal, which is characterized by hypervigilance and somatic symptoms (Nitschke et al., 2001). Distinctions among these dimensions have been established with regard to symptoms, physiological manifestations, neural correlates, and outcome measures (Bredemeier et al., 2010; Engels et al., 2010; Sass et al., 2010). Failure to take these distinct dimensions into account could obscure or distort important relationships between child maltreatment and its impact on EF.

Building on prior work, the present study sought to examine the relationship between cumulative childhood maltreatment and EF using both self-reported and task-based measures. The present study included both measures of EF because this provides a more comprehensive understanding of how EF is impacted by childhood maltreatment than the use of either measure alone (Barkley & Murphy, 2011, 2010; Knouse et al., 2013; Toplak et al., 2013). Whereas task-based assessments measure the behavioral impact of EF under well-controlled circumstances (maximizing reliability and internal validity), self-reported EF measures are designed to index performance in daily life, not always captured by task-based assessments. Nonetheless, self-reported EF predicts a meaningful portion of variance in important outcomes, including depression (Knouse et al., 2013) and occupational functioning (Barkley & Murphy, 2010), beyond what is predicted by task-based measures. In the current study, multiple EF domains (inhibition, shifting, and WM) were selected to be assessed using a self-report measure because these have all previously been found to be affected by maltreatment. In addition, a task-based measure of updating WM, which is defined as the active revision of information in WM and is modality independent (Baddeley, 2003; Miyake et al., 2000), was employed to assess EF, as prior research has found this aspect of EF to be sensitive to a history of childhood maltreatment (Gould et al., 2012; Majer et al., 2010; Raine et al., 2001).

Although looking at whether specific types of childhood maltreatment contribute to particular profiles of EF impairment is important, maltreatment types are highly associated with one another, as specific types of maltreatment often do not occur in isolation (Arata et al., 2005; Kessler et al., 2010; Min et al., 2013). Previous studies that have focused on the occurrence of maltreatment broadly (e.g., Anda et al., 2006; Schilling et al., 2007) indicate that there is a dose-dependent relationship between childhood maltreatment (regardless of subtype) and important adult physical and mental health outcomes, including autoimmune diseases, obesity, sleep disturbances, anxiety, depression, and substance use (Arata et al., 2005; Chapman et al., 2004; Dube et al., 2009; Wells et al., 2014). Thus, the present study focused on the impact of cumulative childhood maltreatment on EF.

Based on prior research, it was hypothesized that greater cumulative childhood maltreatment would predict poorer EF on both the self-reported and task-based EF measures. Furthermore, it was hypothesized that childhood maltreatment would contribute to EF deficits beyond the contribution of current depression and anxiety.

Methods

Participants

One hundred and sixty-two undergraduates aged 18 years and older were recruited via introductory psychology courses to complete a computer task and questionnaires during the fall of 2013 (*M* age = 18.1 years, range: 18–22, n = 122 females and n = 40 males). All procedures were approved by the IRB at a large, public Midwestern university and were followed in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2000. All participants provided informed consent, completed questionnaires, and were financially compensated ($10).

Measures

Participants completed the short form (28-item) version of the Childhood Trauma Questionnaire (CTQ), which has excellent psychometric properties in both clinical and nonclinical samples (Bernstein & Fink, 1998; Bernstein et al., 2003). The CTQ is a self-report questionnaire that assesses childhood and adolescent maltreatment experiences in 5 domains: emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect. Each domain is assessed via 5 items that consist of a 5-point Likert scale from 1 (*never true*) through 5 (*very often true*). Higher scores for each maltreatment domain are indicative of more frequent and severe maltreatment experiences. In addition, there are 3 validity items (e.g., “I had the perfect childhood”). The CTQ can be used to classify individuals’ scores categorically or used dimensionally, and the CTQ scores from each domain can be summed together to create a composite maltreatment score. Although subscale score averages are reported for reference, only the total score is used in the present analyses to specifically examine the impact of cumulative maltreatment on EF. In the present study, the internal consistency for the CTQ was in the acceptable range (Cronbach α =.85).

Executive functioning in daily life was measured with select EF questions from the Behavior Rating Inventory of Executive Function – Adult Version (BRIEF-A), which exhibits good internal consistency, interrater reliability, and test-retest reliability (Roth et al., 2005). The BRIEF-A (75 items) is a self-report measure intended to assess EF over the past 6 months in an ecologically sensitive manner (Rabin et al., 2011). For the present study, the Inhibit, Shift, and Working Memory (WM) subscales were used to assess EF components. Higher Inhibit, Shift, and WM scores represent worse EF. The internal consistency for the BRIEF-A subscales were all in the acceptable range (Cronbach α’s for Inhibition: α = .76, Shifting: α = .81, and WM: α = .86). Participants completed the BRIEF-A before the CTQ, so it is unlikely that reporting of childhood maltreatment primed responses related to EF.

Current depressive symptoms were assessed using the 8-item version of the Mood and Anxiety Symptom Questionnaire – Anhedonic Depression subscale (MASQ-AD; see Nitschke et al., 2001; Watson et al., 1995b, 1995a), which predicts DSM-based depression better than the 14- and 22-item versions of the MASQ-AD (Bredemeier et al., 2010). Two measures were used to assess separate dimensions of anxiety (Nitschke et al., 2001). The Mood and Anxiety Symptom Questionnaire – Anxious Arousal subscale

(MASQ-AA, 17 items; Watson et al., 1995b, 1995a) captured anxious arousal, which is associated with physiological arousal and panic symptoms, whereas the Penn State Worry Questionnaire (PSWQ, 16 items; Meyer et al., 1990; Molina & Borkovec, 1994) captured anxious apprehension, which is associated with worry and somatic tension. These measures all exhibit good psychometric properties, including convergent and discriminant validity (Nitschke et al., 2001), and the internal consistencies for the MASQ-AD8, MASQ-AA, and PSWQ in the present study were in the acceptable range (Cronbach's α = .80, α = .82, and α = .83, respectively).

Procedures

Updating WM was assessed via visuospatial and verbal versions of the 2-back task (Bredemeier & Berenbaum, 2013). The order that participants completed the visuospatial and verbal 2-back versions was counterbalanced across participants to reduce the likelihood that factors such as attention and fatigue systematically affected performance on one of the task versions. Each version of the 2-back task consisted of 5 blocks of 20 trials, with the first block representing a practice block that is not included in analyses. Because a new sequence is presented at the beginning of each block, responses during the first two trials of each block did not count toward participant accuracy. Thus, for each version of the task, 4 blocks of 18 trials were scored for accuracy for each task (i.e., trials scored per task version = 72).

During the visuospatial version of the task, which assesses the manipulation and revision of visual/spatial information in WM (Baddeley, 2003), participants indicated whether the currently presented letter was in the same location on the computer screen as the letter presented 2 trials back by pressing either the "s" (*same*) or "d" (*different*) key on the keyboard. During the verbal version of the task, which assesses the manipulation and revision of verbal information (e.g., words, letters) in WM (Baddeley, 2003), participants indicated whether the currently presented letter was the same as the letter presented 2 trials back by pressing either "s" or "d" on the keyboard. Both uppercase and lowercase letters were included to counter the use of visual memory alone in the verbal condition, but individuals were informed that letter case was irrelevant (in other words, an uppercase "A" was equivalent to a lowercase "a"). Each location/letter was presented on the screen for 500 millisecond (ms), with a 2000 ms intertrial interval. Participants completed questionnaires following the completion of the 2-back tasks.

Data analysis

The outcome measure for each 2-back task was accuracy (out of 72 possible responses). Following Bredemeier and Berenbaum (2013), a 2-back score was created by averaging the standardized accuracy scores from both the verbal and spatial 2-back tasks to capture the executive, updating component of WM. Because only two possible responses are available on each trial (same or different), guessing was controlled by excluding individuals who scored at or below chance (50%) accuracy either 2-back task. A series of regressions were used to assess whether the CTQ maltreatment total score predicted: 1) self-reported EF and 2) task-based EF. Additional regression analyses included symptoms of depression and anxiety to identify the impact of childhood maltreatment on EF beyond current internalizing symptoms.

Results

Sample demographics

Of the 162 participants who completed the questionnaires and 2-back tasks, 35 had less than 50% accuracy on either the verbal and/or spatial 2-back task and were excluded from analyses. An additional three participants were excluded for having extreme questionnaire scores greater than two standard deviations away from average responses, yielding a final sample of 124 participants. Ninety-two participants self-identified as female (74%) and the average age of participants was 18.7 years (SD = .95, range: 18–22). The most prevalent self-identified ethnicity was White (N = 82, 66%), followed by Asian (N = 16, 13%), Hispanic or Latino (N = 16, 13%), Black or African American (N = 9, 7%), and American Indian or Alaskan (N = 1, 1%). Sixteen individuals (13%) self-identified with more than one race and three (2%) indicated that they preferred not to answer or that their race was unknown. Means and standard deviations for the CTQ Total, BRIEF-A subscales, 2-back task, and depressive and anxious symptoms are reported in Table 1.

Notably, participants' CTQ scores were comparable those of previous studies that assessed maltreatment within non-clinical and community samples (Baker & Maiorino, 2010; Scher et al., 2001).

Childhood maltreatment and self-reported executive function

To assess whether childhood maltreatment predicts EF in daily life, the CTQ Total score was entered as a predictor of self-reported EF in three separate regressions. As predicted, child maltreatment accounted for a significant portion of variance in each EF domain. As shown in Figure 1, higher levels of childhood maltreatment predicted poorer inhibition, R^2 = .26, B = .51, $F(1, 122) = 42.78$, $p < .001$, shifting, R^2 = .20, B = .44, $F(1, 122) = 29.59$, $p < .001$, and WM, R^2 = .14, B = .37, $F(1, 122) = 19.57$, $p < .001$ (note: higher scores on the BRIEF reflect poorer EF).

Next, a series of hierarchical regressions were used to assess whether childhood maltreatment predicts self-reported EF after controlling for current depressive and anxiety symptoms. In a series of three separate regressions, psychopathology symptom measures were entered into the first step and the CTQ Total score was entered into the second step predicting 1) inhibition, 2) shifting, and 3) WM. Childhood maltreatment predicted inhibition, shifting, and WM beyond the contribution of current psychopathology symptoms (see Table 2). When psychopathology symptoms and the CTQ were entered into regression models simultaneously as predictors of each EF process, only total childhood maltreatment and anhedonic depression predicted a unique portion of variance in inhibition (CTQ Total: B = .41, $t(119) = 5.25$, $p < .001$, MASQ-AD8: B = .26, $t(119) = 2.91$ p = .004) and WM (CTQ Total: B = .28, $t(119) = 3.29$, p = .001, MASQ-AD8: B = .22, $t(119) = 2.19$, p = .030). For shifting, child maltreatment, anhedonic depression, and anxious apprehension were unique predictors (CTQ Total: B = .30, $t(119) = 4.21$, $p < .001$, MASQ-AD8: B = .29, $t(119) = 3.46$, $p < .001$, and PSWQ: B = .40, $t(119) = 5.27$, $p < .001$).

Childhood maltreatment and task-based executive functioning

To examine whether childhood maltreatment predicts EF task performance, the CTQ Total score was entered as a predictor of the 2-back updating WM average accuracy score in a regression model. As shown in Figure 2, greater levels of childhood maltreatment predicted poorer 2-back accuracy, $R^2 = .06$, $B = -.24$, $F(1, 122) = 7.30$, $p = .008$. Next, a hierarchical regression was used to assess whether this relationship holds after accounting for the impact of psychopathology symptoms on updating WM. In the hierarchical regression, psychopathology symptoms were entered into the first step and the CTQ Total score was entered into the second step as predictors of 2-back accuracy. Childhood maltreatment accounted for a significant portion of variance in updating WM after statistically controlling for current symptoms of depression and anxiety, Total $R^2 = .09$, $F(4, 119) = 2.94$, $\Delta R^2 = .06$, *F-change* $(1, 119) = 8.20$, $p = .005$. With all predictors included in simultaneously in a regression model, only child maltreatment predicted a unique portion of variance in updating WM, CTQ Total: $B = -.26$, $t(119) = -2.78$, $p = .006$.

Discussion

The present study found that, as hypothesized, childhood maltreatment predicted executive function (EF) impairment, and further that childhood maltreatment's impact on EF was not accounted for by symptoms of anhedonic depression, anxious apprehension, or anxious arousal. EF impairment was evident on multiple EF measures, including an ecologically sensitive measure of EF deficits and a task-based neuropsychological assessment of EF capturing updating WM. Results indicate that individuals with a history of maltreatment in childhood have difficulty with effectively engaging EF in daily life, where there is often little structure and support to guide one's behavior, as well as on well-structured and relatively brief tasks that require EF. Results also suggest that deficits in the context of a history of childhood maltreatment are not entirely attributable to current internalizing psychopathology.

One pathway through which early maltreatment may affect EF in adulthood is via aberrant frontal lobe development resulting from a chronically-activated stress response during childhood. Chronic psychosocial stress has been associated with EF deficits that coincide with altered neural connectivity in frontal regions (e.g., decoupling of left and right dorsolateral prefrontal cortex; Liston et al., 2009). It has been suggested that chronically-elevated levels of glucocorticoids, which under normal circumstances are involved in reducing inflammation as part of the stress response (Rhen & Cidlowski, 2005), could account for alterations in prefrontal cortex structure and function (Mizoguchi et al., 2004; for a discussion, see Heim et al., 2004). Given the foundational neural organization that occurs during childhood, ongoing chronic stress experienced during childhood may disrupt typical neurodevelopment, leading to long-lasting effects on brain structure and function. Supporting this possibility, adults who have experienced chronic early life stress and maltreatment exhibit altered neural structure and connectivity in prefrontal brain regions that implement EF, including dlPFC (Philip et al., 2014), medial prefrontal cortex (Van Harmelen et al., 2010), and anterior cingulate cortex (Van der Werff et al., 2013). Furthermore, there

is at least some evidence that these relationships are not accounted for by psychopathology (Philip et al., 2014; Van der Werff et al., 2013).

Early maltreatment may also contribute to compromised EF via the development of reduced approach motivation, which is the tendency for individuals' behavior to be energized toward positive stimuli or events (Elliot, 2006). Higher levels of approach motivation are associated with increased anterior left relative to right hemisphere resting state activity recorded via electroence-phalogram (EEG; Davidson et al., 1990). Although multiple brain regions are active during tasks that require EF, left dlPFC plays a particularly important role in imposing a task set and maintaining the representation of goals online (Banich, 2009), which is a process that may be shared or "common" across multiple EFs (Friedman & Miyake, 2017).

In the present study, the impact of childhood maltreatment on EF was similar in magnitude to, but non-redundant with, the impact of current depressive symptoms. This is notable, as a consistent and meaningful association between depression and EF is evident across the literature (Snyder, 2013). Although there are mood-related effects of depression on cognitive functioning, including EF (Paelecke-Habermann et al., 2005), some studies have reported that EF impairment persists even after depressive symptoms have improved significantly or remitted (Bora et al., 2013; Hasselbalch et al., 2011). To date, few studies have longitudinally assessed for the presence of cognitive deficits prior to the onset of depression. Given the strong relationship between depression (including increased risk and a more chronic course) and a history of childhood maltreatment (e.g., Bernet & Stein, 1999; Chapman et al., 2004; Danese et al., 2009), it is possible that at least some deficits in EF could be the result of earlier maltreatment experiences that precede the onset of depression.

There are several limitations of the present study, including the use of retrospective self-reported childhood maltreatment. Although self-reports are often imprecise reflections of past events, self-reported maltreatment correlates with documented abuse and informant reports (Goodman et al.,2003;. It has been suggested that a variety of factors influence disclosure of maltreatment (e.g., age of abuse, cultural factors), which generally tend to be associated with under-reporting (e.g., being too young to remember the maltreatment, feelings of shame) rather than reporting of maltreatment that did not occur (Futa et al., 2001; Goodman et al., 2003; Hardt & Rutter, 2004. Thus, self-reports likely underestimate prevalence of childhood maltreatment, which impinges on the ability to detect relationships between abuse and EF. Ideally, multiple forms of assessment should be used, including records of abuse and parent and sibling reports that would provide further support for the present findings. Another limitation of the present study was the inclusion of young adults, between the ages of 18 and 22. Because some EF processes continue to develop into the mid-twenties (Romine & Reynolds, 2005), which may affect the degree to which childhood maltreatment impacts adult EF, future studies should assesses the relationship between childhood maltreatment and EF in other samples of adults.

For survivors of childhood maltreatment, the events that occurred may be in the past, but the impact of these events often is not. Increasingly, attention is being paid to the impact of child maltreatment on multiple outcomes in adulthood, including EF. This is an important endeavor that highlights the long-lasting impact of maltreatment, and which

is supported by the results of the present study. In the future, research should focus on assessing the impact of childhood maltreatment on a broad range of EF processes and latent EF factors, identifying the pathways through which EF deficits emerge in response to childhood maltreatment, and whether specific abuse experiences lead to different profiles of EF deficits. Given that EF deficits affect daily life skills, work performance, and psychopathology risk (Barkley & Murphy, 2010; Letkiewicz et al., 2014), future research should assess the clinical relevance of targeting EF deficits in adults with a history of childhood maltreatment (e.g., via mindfulness intervention).

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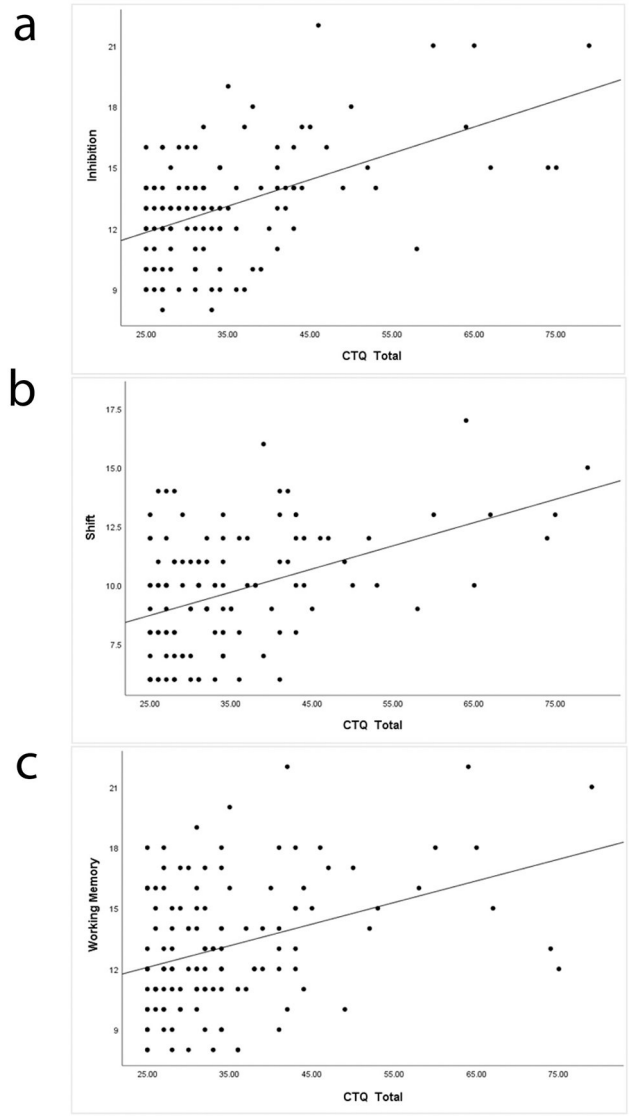

Figure 1.

Scatterplots depicting the relationships between the childhood trauma questionnaire total maltreatment and self-reported executive functioning in the domains of A) Inhibition, B) Shifting, and C) Working memory (note: higher self-reported EF represents poorer functioning).

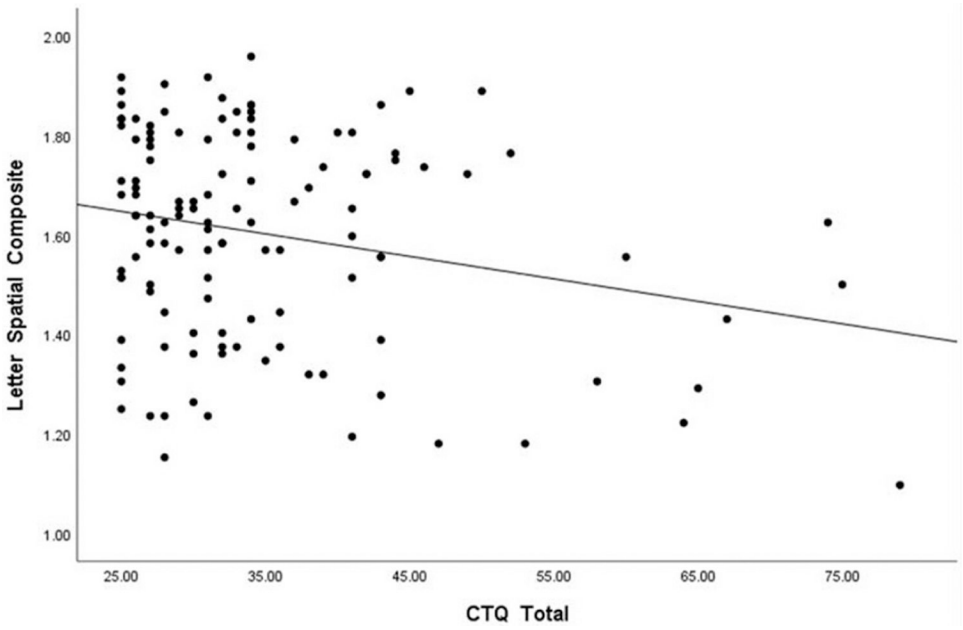

Figure 2.

Scatterplot depicting the relationship between the childhood trauma questionnaire total maltreatment and updating working memory (i.e., task-based executive functioning).

Table 1.

Descriptive statistics.

N = 124	Means	Standard Deviations
Maltreatment		
CTQ Total	34.90	11.02
Emotional Abuse	8.14	3.51
Physical Abuse	6.28	2.46
Sexual Abuse	5.67	2.55
Emotional Neglect	8.63	3.82
Physical Neglect	6.19	2.43
Self-reported Executive Function (EF)		
BRIEF Inhibit	13.10	2.81
BRIEF Shifting	9.70	2.55
BRIEF WM	13.14	3.20
Updating WM, EF Task		
2-back % Accuracy (average)	80.12	10.56
Psychopathology Symptoms		
MASQ-AD8	16.27	4.81
MASQ-AA	27.43	6.97
PSWQ	51.10	14.12

CTQ = Childhood Trauma Questionnaire; MASQ-AD8 = Mood and Anxiety Symptom Questionnaire, 8-item Anhedonic Depression Subscale; MASQ-AA = Mood and Anxiety Symptom Questionnaire, Anxious Arousal Subscale; PSWQ = Penn State Worry Questionnaire; BRIEF = Behavior Rating Inventory of Executive Function, Adult Version

Table 2.

Hierarchical regression analysis results, with childhood maltreatment predicting the self-reported EF domains, controlling for psychopathology symptoms.

i. Dependent Variable (DV): BRIEF Inhibition **Independent Variables (IVs):**						
Step 1	**R^2 Total**	***F*(3,120)**	***p*-value**			
MASQ-AD8, MASQ-AA, PSWQ	.21	10.39	<.001			
Step 2	**R^2 Total**	***F*(4,119)**	***p*-value**	**ΔR2**	***F-change* (1,119)**	***p*-value**
CTQ Total	.36	16.41	<.001	.15	27.57	<.001
ii. DV: BRIEF Shifting						
Step 1	**R^2 Total**	***F*(3,120)**	***p*-value**			
MASQ-AD8, MASQ-AA, PSWQ	.37	23.05	<.001			
Step 2	**R^2 Total**	***F*(4,119)**	***p*-value**	**ΔR2**	***F-change* (1,119)**	***p*-value**
CTQ Total	.45	24.13	<.001	.08	17.76	<.001
iii. DV: BRIEF WM						
IVs:						
Step 1	**R^2 Total**	***F*(3,120)**	***p*-value**			
MASQ-AD8, MASQ-AA, PSWQ	.15	7.04	<.001			
Step 2	**R^2 Total**	***F*(4,119)**	***p*-value**	**ΔR2**	***F-change* (1,119)**	***p*-value**
CTQ Total	.22	8.42	<.001	.07	10.81	.001

CTQ = Childhood Trauma Questionnaire; MASQ-AD8 = Mood and Anxiety Symptom Questionnaire, 8-item Anhedonic Depression Subscale; MASQ-AA = Mood and Anxiety Symptom Questionnaire, Anxious Arousal Subscale; PSWQ = Penn State Worry Questionnaire; BRIEF = Behavior Rating Inventory of Executive Function, Adult Version