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The roles of attachment and emotion dysregulation in the association between childhood maltreatment and PTSD in an inner-city sample[☆]

Thomas M. Crow^a, Kenneth N. Levy^a, Bekh Bradley^{b,d}, Negar Fani^c,
Abigail Powers^{b,*}

^a Department of Psychology, Pennsylvania State University, USA

^b Department of Psychiatry and Behavioral Sciences, Emory University School of Medicine, USA

^c Emory University School of Medicine, USA

^d Atlanta VA Medical Center, Mental Health Services, USA

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ABSTRACT

Background: Most people will experience a traumatic event in their lifetime, but only a subset (<10%) will develop posttraumatic stress disorder (PTSD).

Objective: To facilitate prevention and intervention of PTSD, it is important to understand how risk and resilience factors interact with one another to explain individual differences in risk for PTSD, especially in underprivileged groups, who often experience greater burden of trauma and PTSD.

Method: The current study utilized multiple and moderated regression to examine the relation between childhood maltreatment and adulthood PTSD risk in the context of various attachment patterns and emotion dysregulation in a sample ($n = 856$) of mostly low-income, African American participants.

Results: Moderation analysis indicated that the strongest association between self-reported childhood maltreatment and PTSD symptoms was manifest in participants reporting the highest levels of both attachment anxiety and attachment avoidance ($b = 0.22$, 95% CI [0.15, 0.29], $p < .001$), whereas, among those low on both these dimensions (i.e., more securely attached participants), there was no significant association between childhood maltreatment and current PTSD ($b = 0.07$, 95% CI [-0.01, 0.14], $p = .07$). Separately, multiple regression predicting current PTSD symptoms revealed an effect size for the two attachment dimensions similar to that of emotion dysregulation, while controlling for childhood maltreatment.

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* Corresponding author at: Attn: Grady Trauma Project, 49 Jesse Hill Jr Drive, Atlanta, GA 30303, USA.

E-mail address: adpower@emory.edu (A. Powers).

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Conclusions: These findings suggest more secure attachment may buffer against the deleterious effects of childhood maltreatment, and both attachment difficulties and emotion dysregulation serve as robust correlates of adulthood PTSD.

More than 70% of Americans are expected to experience a traumatic event in their lifetime (Breslau, 2009), and a subset (<10%) will go on to develop posttraumatic stress disorder (PTSD). PTSD is characterized by experiencing at least one month of symptoms that are divided into four clusters: intrusions (e.g., nightmares; flashbacks related to the trauma); avoidance (e.g., efforts to avoid internal and external reminders of the trauma); negative alterations in cognition and mood (e.g., persistent negative affect; anhedonia); and hyperarousal (e.g., exaggerated startle response; sleep disturbance; American Psychiatric Association, 2013). PTSD is associated with impairments in quality of life generally and in multiple life domains including relationships, work functioning, and physical health (Campbell & Renshaw, 2018; Olatunji et al., 2007; Pacella et al., 2013; Vogt et al., 2017), and comorbid PTSD is associated with decreased response to treatment for other disorders (Green et al., 2006). Because fewer than 10% of individuals actually go on to develop PTSD following trauma exposure, it is important to understand what risk factors increase vulnerability to PTSD, and how these factors may interact.

Childhood maltreatment (i.e., abuse or neglect) has consistently been shown to increase risk for later development of PTSD (Collishaw et al., 2007; Powers et al., 2017; Schalinski et al., 2016), and poverty may exacerbate both of these issues (Drake & Jonson-Reid, 2014; Parto et al., 2011). In particular, past research with low-income African American men and women in urban centers has highlighted increased risk for chronic trauma exposure and PTSD in this population (Gillespie et al., 2009; Goldmann et al., 2011). Thus, it is important to identify and examine factors protective against PTSD in low-income, urban dwelling African Americans, both generally and in the context of well-established risk factors such as childhood maltreatment.

Although childhood maltreatment likely confers risk for PTSD in adulthood through several pathways, one pathway that has received considerable attention is emotion dysregulation. Broadly defined, emotion dysregulation reflects difficulty maintaining emotional homeostasis (Dvir et al., 2014). Several studies have shown that the capacity for healthy emotion regulation is disrupted by childhood maltreatment because maltreatment leads to maladaptive schemas and is associated with impairments in emotion socialization and quality of familial relations (Maughan & Cicchetti, 2002; Wright et al., 2009). In turn, emotion dysregulation increases risk for the development of psychopathology (McLaughlin et al., 2011) and is seen as a core transdiagnostic feature of many psychiatric disorders, including PTSD (Aldao et al., 2010; Seligowski et al., 2016).

Despite the robust link between childhood maltreatment and later PTSD risk, many individuals with childhood maltreatment histories will remain resilient to the effects of trauma later in life, as evidenced in research that examines differences in PTSD and other psychopathology among individuals with histories of childhood abuse or neglect (Collishaw et al., 2007; Ohashi et al., 2018; Stevens et al., 2016). These studies all underscore the important fact that individuals respond differently to trauma: despite high levels of childhood maltreatment, some individuals are relatively non-susceptible to PTSD and other psychopathology in adulthood. It is thus important to identify contextual factors that may support resilience following childhood maltreatment. One such factor is individual differences in attachment, which is shaped early in life and has been robustly associated with resilience and risk for psychopathology, including PTSD (Lim et al., 2019; Sippel et al., 2017; Woodhouse et al., 2015). Attachment theory holds that infants first develop a secure attachment when their primary caregiver is emotionally attuned and consistently responsive in times of distress and need (Bowlby, 1982). Over the course of development, securely attached children gradually internalize the attuned, responsive caregiver. Securely attached children thus develop the capacity for healthy close relationships as well as the capacity to regulate their own distress in a flexible way, as they can call forth the soothing mental representation of their caregiver. Attachment theory thus provides a developmental framework for understanding emotion regulation and its development: children with histories of absent, inconsistent, or abusive parental relationships often develop insecure attachment styles associated with maladaptive coping and other problems when carried into adolescence and adulthood (Doyle & Cicchetti, 2017; Madigan et al., 2013; van den Dries et al., 2009). Several longitudinal studies have shown stability of attachment classifications over time (Hamilton, 2000; Waters et al., 2000; Weinfield et al., 2000). Additionally, attachment security in adulthood confers similar benefits as in earlier developmental periods. More specifically, compared with insecure attachment, secure attachment in adulthood is associated with more adaptive emotion regulation strategies (Mikulincer & Shaver, 2019; Shaver & Mikulincer, 2007) and decreased severity across multiple psychological disorders (e.g., Manning et al., 2017; Marganska et al., 2013). These benefits of secure attachment provide the basis for understanding how healthy attachment patterns can be protective against risk factors like childhood maltreatment even in adulthood.

In adulthood, attachment can be understood in terms of two dimensions on which self-report measures of adult attachment converge: attachment anxiety and attachment avoidance, with secure attachment constituted by low scores on both (Ravitz et al., 2010). These dimensions are theoretically orthogonal, although they manifest small to moderate correlations in practice, depending on the measure used (Cameron et al., 2012). Attachment anxiety refers to worry about the availability and responsiveness of others, and attachment avoidance refers to discomfort with intimacy and difficulty depending on others. A growing body of literature suggests that attachment-avoidant and attachment-anxious adults can be differentiated by the emotion regulation strategies they use in responding to stressors (see Mikulincer & Shaver, 2019 for a brief review). Attachment-anxious adults tend to regulate emotions through intensification of emotion, whereas attachment-avoidant adults are likely to suppress emotions, especially threat-related states such as anger, fear, and anxiety (i.e., those most likely to activate attachment behavior). These strategies tend to be less adaptive across situations than those employed by securely attached adults, suggesting that securely attached individuals should be more resilient to stressful life events. Indeed, a large body of literature confirms that securely attached adults handle trauma and stressors more

effectively than their insecurely attached counterparts (Lim et al., 2019; Woodhouse et al., 2015). To date, two studies have shown that adult attachment is a moderator in the association between childhood maltreatment and adulthood PTSD (Busuito et al., 2014; Tamman et al., 2017). However, these studies have either examined the two attachment dimensions in separate two-way moderation analyses or used a categorical measure with the two groups of insecure participants collapsed into one “insecure” group for the purposes of the analysis. Such analytic designs may preclude more granular insights which can arise from a model examining all possible combinations of interactions among childhood maltreatment and the two attachment dimensions. Furthermore, emotion dysregulation was often mentioned but rarely analyzed in these studies. It is important to examine unique and differential aspects of attachment and emotion regulation, because, as described above, emotion regulation may be a central mechanism through which insecure attachment increases PTSD risk.

The goal of the present study was to examine the relation between childhood maltreatment and adulthood PTSD risk in the context of various attachment patterns and emotion dysregulation. Specifically, we sought to test the hypothesis that the well-established association between childhood maltreatment and PTSD risk would be attenuated in individuals reporting comfort with intimacy and autonomy in relationships (i.e., more attachment security) and exacerbated by higher levels of insecure attachment. Given the conceptual overlap between attachment and emotion regulation, we also sought to examine the unique predictive value of these constructs alongside childhood maltreatment in predicting PTSD symptom severity. We investigated these questions in a mostly low-income, African American sample recruited in an urban public hospital. Risk and resilience factors are important to study in this demographic group, because past studies have shown high rates of trauma and PTSD in this and similar populations (Gillespie et al., 2009; Goldmann et al., 2011). To our knowledge, this is the first study to examine these questions in such a sample, and one of the first studies to employ a three-way interaction model to examine simultaneously the moderating role of attachment anxiety and attachment avoidance on childhood maltreatment (rather than examining each two-way interaction in separate models).

Based on theory and past research on attachment in the context of psychopathology risk, we had several hypotheses regarding associations among childhood maltreatment, attachment, emotion dysregulation, and PTSD. First, given past findings on the impact of childhood maltreatment, adult attachment, and emotion dysregulation on adult psychopathology (Aldao et al., 2010; Dvir et al., 2014; Mikulincer & Shaver, 2012), as well as the developmental overlap among all three of these constructs (Rincón-Cortés & Sullivan, 2014), we hypothesized that these three variables and PTSD symptoms would all be significantly correlated. Based on past research suggesting secure attachment as a buffer between various risk factors and PTSD (Busuito et al., 2014; Tamman et al., 2017), we hypothesized that attachment would moderate the relation between current PTSD symptoms and self-reported childhood maltreatment, such that the least securely attached individuals (i.e., high on both attachment anxiety and avoidance) would show a significantly stronger association between childhood maltreatment and current PTSD symptoms. Given past research highlighting other mediators in the attachment-PTSD association, including trauma-related cognitions (Ogle et al., 2016), object relations (Ortigo et al., 2013), and social support (Besser & Neria, 2012), we also hypothesized that both emotion dysregulation and adult attachment anxiety and avoidance would uniquely predict PTSD severity.

Table 1
Sample characteristics.

	<i>n</i> (<i>N</i> = 856)	%
Gender		
Male	219	25.58
Female	637	74.42
Ethnicity		
African-American/Black	810	94.63
Hispanic or Latino	4	0.47
Asian	0	0.00
Caucasian/White	27	3.15
Mixed	8	0.93
Other	7	0.82
Education		
Less than 12th grade	191	22.31
High school graduate	292	34.11
GED	48	5.61
Some college or tech school	197	23.01
Tech school graduate	46	5.37
College graduate	69	8.06
Graduate school	13	1.52
Monthly household income		
\$0–250	235	27.45
\$250–499	76	8.88
\$500–999	230	26.87
\$1000–1999	201	23.48
\$2000 or more	114	13.32

1. Method

1.1. Participants

Eight hundred and fifty-six participants were recruited as part of the Grady Trauma Project, an NIH-funded study of risk and protective factors for PTSD and associated psychopathology (see [Procedure](#) for details). Of these participants, 652 (74.5%) were women and 223 (25.5%) were men. Participants' ages ranged from 18 to 65 years ($M = 41.5$, $SD = 11.73$). The large majority (94.3%) of participants were African American. See [Table 1](#) for full sample characteristics.

1.2. Procedure

Participants were recruited for a larger study of PTSD risk factors in a low socioeconomic, urban minority population. Participants were recruited from waiting rooms in the diabetes, gynecology, and primary care medical clinics at a publicly funded hospital in Atlanta, Georgia. Rather than narrowing recruitment to specific criteria, we approached any individual in the waiting room. Inclusion criteria were age between 18 and 65 and capacity to provide informed consent [see [Gillespie et al., 2009](#) for additional information about study procedures]. The investigation was carried out in accordance with the latest version of the Declaration of Helsinki and informed consent of the participants was obtained after the nature of the procedures had been fully explained. The informed consent was approved by the Emory Institutional Review Board and the Research Oversight Committee of Grady Memorial Hospital. After signing the consent form, trained research assistants administered an interview with questionnaires regarding trauma history and psychological variables. This interview took approximately 45–75 min. Interviewers approached potential participants in the waiting rooms during regular clinic hours and asked if they had a few minutes to answer questions while waiting. After an initial explanation of the sensitive nature of the questions and a subsequent informed consent process, the interviewers read the questionnaire battery to the participants to ensure clear understanding of measures given relatively high illiteracy in this population. Interviewers recorded participant verbal responses onto a tablet computer. Interviewers for the study ranged in education from current bachelor's students to current doctoral students. Participants were paid \$15.00 for participation in this phase of the study, whose recruitment had reached $N = 7978$ as of the time these data were prepared for analysis (in 2015).

A subgroup of participants were called back and returned to our laboratory for a separate, but related study and were given structured clinical interviews and additional self-report measures (approximately two weeks post-initial assessment). Participants were offered the opportunity to participate in this clinical assessment portion based on eligibility for other ongoing studies in the lab, including studies on risk and resilience for PTSD, intergenerational trauma in mothers and children, and comorbidities between physical health and psychiatric problems. This portion was conducted by interviewers with additional training in administering structured clinical interviews and who were supervised by a licensed clinical psychologist on staff. Participants were paid an additional \$60.00 if they returned to complete this phase of the study. Only individuals that participated in the both the screening assessment and the structured clinical interview were included in the present analysis. Some variability in sample size occurred due to missing data on screening measures that were not finished during the second visit. The presented data were collected between 2008 and 2015.

1.3. Measures

Childhood Trauma Questionnaire, Short Form (CTQ-SF; Bernstein et al., 2003). The CTQ-SF is a 28-item self-report questionnaire that assesses frequency of five categories of childhood maltreatment: physical abuse (e.g., “I was punished with a belt, a board, a cord, or some other hard object”), sexual abuse (e.g., “Someone made me do or watch sexual things”), emotional abuse (e.g., “People called me things like stupid, lazy or ugly”), physical neglect (e.g., “I didn't have enough to eat”), and emotional neglect (“People in my family felt close to each other;” reverse-scored). Each item begins with, “When I was growing up...” and interviewers explicitly asked that participants report on their experience prior to age 18. Ratings are made on a five-point scale: never true, rarely true, sometimes true, often true, and always true. Childhood maltreatment was measured continuously, with a total composite score and five subscores.

The CTQ-SF has demonstrated good reliability and validity in both clinical and community populations ([Bernstein et al., 2003](#)) as well as within the current population ([Binder et al., 2008](#), p. 1295). Furthermore, [Bernstein et al. \(2003\)](#) found moderate levels of agreement between therapist observation ratings and CTQ-SF subscale scores (correlations as high as 0.75 for sexual abuse) and good internal consistency scores among different samples (physical abuse = 0.81–0.86, physical neglect = 0.61–0.78, emotional abuse = 0.84–0.89, emotional neglect = 0.85–0.91, and sexual abuse = 0.92–0.95). Internal consistency was generally good in the current sample (physical abuse = 0.84, physical neglect = 0.69, sexual abuse = 0.95, emotional abuse = 0.85, emotional neglect = 0.87). Because we were interested in overall levels of childhood maltreatment, and because moderation analyses with all five subscales would be untenable, we used the total composite score in our analysis in the current study.

Emotion Dysregulation Scale, short version (EDS-SV; Powers et al., 2015). The EDS-SV is a 12-item self-report measure adapted from the Emotion Dysregulation Scale (EDS; [Bradley et al., 2011](#)). Items are rated on a 7-point Likert scale and assess areas of emotional experiencing (e.g., “Emotions overwhelm me”), cognition (e.g., “When I'm feeling bad, I have trouble remembering anything positive; everything just feels bad”), and behavior (e.g., “When my emotions are strong, I often make bad decisions”). The EDS has demonstrated good criterion validity in relation to a number of psychopathology variables including depression, suicide history, and subjective sense of adaptive functioning ([Bradley et al., 2011](#)), and substance abuse problems. It has also shown good construct validity: The EDS-SV related as expected to higher levels of depression, lifetime substance and alcohol abuse, PTSD symptoms, suicide

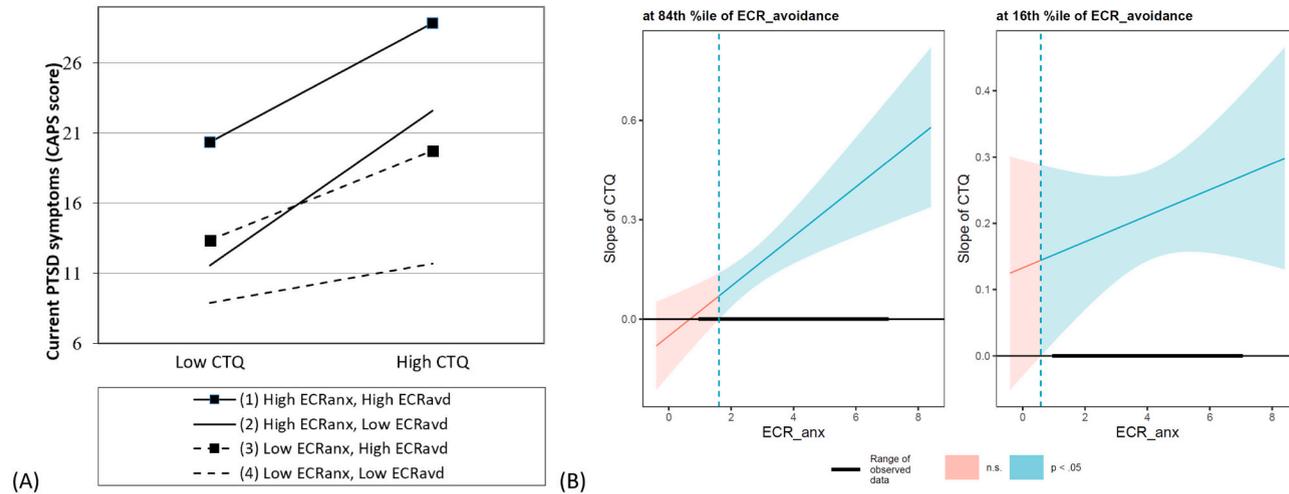


Fig. 1. PTSD severity (CAPS score) as a function of the significant three-way interaction between childhood maltreatment, attachment anxiety, and attachment avoidance.

Note (1A). High and low scores on each measure correspond to 84th and 16th percentiles, respectively. See [Results](#) for descriptions of each of these four slopes. CAPS = Clinician-administered PTSD Scale; CTQ = Childhood Trauma Questionnaire, Short Form; ECRanx = Attachment Anxiety subscale of Experiences in Close Relationships, Revised; ECRavd = Attachment Avoidance subscale of Experiences in Close Relationships, Revised. Slopes for the effect of CTQ-SF on CAPS were significant across the range of both ECRanx and ECRavd at $p < .001$, except in the range where both values were low (i.e., the Low ECRanx, Low ECRavd slope), $p = .07$.

Note (1B). Johnson-Neyman plot depicting simple slope analysis: the effect of childhood maltreatment (CTQ) on CAPS scores (PTSD) across the range of values for attachment anxiety (ECR_anx), at high (84th %ile) vs low (16th %ile) levels of attachment avoidance (ECR_avd). In participants reporting high attachment avoidance, childhood maltreatment was associated with PTSD at all but the lowest reported levels of attachment anxiety.

attempts, and borderline pathology (Powers et al., 2015). The EDS-SV was also strongly correlated with scores on the Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004). Internal consistency of the EDS-SV has been high (α range = 0.93–0.95) across samples (Powers et al., 2015). Internal consistency in the current sample was high ($\alpha = 0.94$). For this study, the total EDS-SV score was used.

Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995; Weathers et al., 2013). The CAPS is an interviewer-administered diagnostic instrument for PTSD that shows strong psychometric properties and is well-validated across a large number of studies and varied civilian and veteran populations (Weathers et al., 2001, 2018). The CAPS assesses current PTSD symptoms based on DSM criteria, and it yields both a categorical diagnosis and a dimensional score for total symptom severity and severity of each PTSD symptom cluster based on frequency and intensity of symptoms. Because the DSM-5 was released during the course of data acquisition for this study, both CAPS for DSM-IV and for DSM-5 were used: a majority of the current participants ($n = 731$; 83.7%) were assessed with the CAPS for DSM-IV. A sum of PTSD symptoms based on CAPS items was used as the measure of PTSD symptoms. In order to combine CAPS-IV and CAPS-5, all scores were weighted to balance the number of items (17 for CAPS-IV and 20 for CAPS-5) and to factor in that scoring for CAPS-IV frequency and intensity scores were separated (2 scores for each item) and for CAPS-5 scoring frequency and intensity scores were combined into one severity rating. The severity rating is derived based on the scores for frequency and intensity for each item, which are still scored separately for each item, and thus represents the same components of the ratings as CAPS-IV (Weathers et al., 2018). More specifically, for DSM-IV CAPS, the frequency and intensity scores were averaged together by adding them and then dividing by 2 for each criterion, and these 17 criteria were summed and divided by 17. Then, for DSM-5 CAPS, the criteria were summed and divided by 20. This created an average CAPS criterion score with each version's criteria in the same metric. Finally, this CAPS score (now in the same metric across both measures) was multiplied by 20 to reflect an overall CAPS symptom severity score.

Extensive training of all CAPS interviewers for this study was completed over a one-to-two month long period, and included in-person observations, weekly supervision, and tape review with a licensed clinical psychologist. Interrater reliability (IRR) has previously been examined in the Grady Trauma Project sample for both instruments. Prior analyses with CAPS-IV using a random selection of 20 participant videos showed good IRR for PTSD diagnosis ($\kappa = 0.64$). IRR for CAPS-5 was calculated on a subsample of participants ($n = 12$) in a prior published paper and showed good IRR for diagnosis of PTSD ($\kappa = 0.83$; Powers et al., 2017). Additionally, reliability of presence/absence of all PTSD symptoms on CAPS-5 was examined with 25 randomly chosen videos and results showed good IRR across all items ($\kappa = 0.77$). In the current sample, 27% ($n = 232$) met criteria for PTSD.

Experiences in Close Relationships, Revised (ECR-R; Fraley et al., 2000). The ECR-R is a 36-item self-report measure of adult attachment. It assesses two theoretically orthogonal dimensions in two subscales, attachment anxiety and avoidant attachment. Attachment anxiety is preoccupation about others' affection and fear of abandonment by others. Attachment anxiety items include "I often worry that people do not really love me" and "My desire to be very close sometimes scares people away." Attachment avoidance items include "I prefer not to be too close to people" and "I find it easy to depend on people" (reverse-scored). In the present study we used "other people" rather than "romantic partner" in order to assess attachment more generally (Mikulincer & Shaver, 2007). Despite being orthogonal in theory, these dimensions manifest a small correlation across many studies of $r = 0.15$ in the original ECR measure and a moderate correlation of $r = 0.41$ in the ECR-R, according to a recent meta-analysis (Cameron et al., 2012). In the current sample with the ECR-R, the moderate correlation observed between these dimensions fell between these two estimates ($r = 0.32, p < .001$). Internal consistency was high for both attachment anxiety ($\alpha = 0.92$) and attachment avoidance ($\alpha = 0.84$).

1.4. Data analysis

Bivariate correlations were examined for all variables of interest. Regression-based moderation analysis was used to predict PTSD symptomatology (CAPS) scores in a model accounting for all two- and three-way interactions among CTQ-SF total scores, attachment anxiety, and attachment avoidance, covarying for age, gender, and income. Further regression modeling was conducted to examine

Table 2
Summary of intercorrelations, sample sizes, means, and standard deviations for scores on the CTQ-SF, ECR-R Avoidance and Anxiety, EDS-SV, and CAPS.

Measure	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. CAPS	16.83	14.47	856	-	-	-	-
2. CTQ-SF	40.99	17.61	0.42***	856	-	-	-
3. ECR-R Anxiety	3.04	1.40	0.43***	0.35***	856	-	-
4. ECR-R Avoidance	4.06	1.10	0.38***	0.29***	0.34***	856	-
5. EDS-SV	37.75	21.29	0.45***	0.33***	0.55***	0.34***	779

Note. The shaded diagonal contains sample size for each variable. The lower diagonal depicts Pearson's correlations.

***All correlations were significant at $p < .001$.

CAPS = Clinician-Administered PTSD Scale; CTQ-SF = Childhood Trauma Questionnaire, Short Form; ECR-R = Experiences in Close Relationships, Revised; EDS-SV = Emotion Dysregulation Scale, Short Version.

simple slopes, i.e., the conditional effect of childhood maltreatment on current PTSD symptoms across low and high values of the attachment variables. Next, a separate multiple regression was used to assess the combined effects of attachment variables, emotion dysregulation, and childhood maltreatment on PTSD symptoms. All analyses were conducted using IBM SPSS Statistics v25 with the PROCESS macro (version 3.4; Hayes, 2018). R version 4.0.2 was also used with the *interactions* package (J. A. Long, 2019) to clarify and check results, and for the Johnson-Neyman plot in Fig. 1B. The three-way interaction was graphed using Professor Jeremy Dawson's Excel tool for plotting interactions (<https://www.jeremydawson.com/slopes.htm>).

2. Results

The bivariate correlations (Pearson's r), means, and standard deviations for attachment (anxious and avoidant), childhood maltreatment, PTSD, and emotion dysregulation measures are documented in Table 2. As the table shows, the observed correlations varied somewhat around a moderate effect size. In order to examine the combined and interacting effects of self-reported childhood maltreatment and adult attachment on PTSD symptoms, we conducted a regression-based moderation analysis. In this linear regression model, dimensional CAPS score was the outcome variable. The predictors, all mean-centered before analysis, were childhood maltreatment (CTQ-SF), ECR attachment anxiety, ECR attachment avoidance, and all possible interactions among these, resulting in four interaction terms including the three-way interaction. The model also included three covariates: age, gender, and income. To account for some heteroskedasticity, the robust estimator HC3 was used (J. S. Long & Ervin, 2000). Overall model fit was good, $F(10,845) = 40.42$, $R^2 = 0.32$, $p < .001$. The only significant covariate was gender ($p = .031$); age ($p = .30$) and income ($p = .07$) were non-significant. The three-way interaction between childhood maltreatment and the attachment variables was significant ($b = -0.03$, 95% CI $[-0.047, -0.004]$, $t(855) = -2.31$, $p = .02$). Interpreted with regards to childhood maltreatment, our predictor of focus, this pattern of interactions indicates that the effect size of childhood maltreatment on adulthood PTSD risk depends on the levels of attachment anxiety and attachment avoidance in combination. The only significant two-way interaction in this model was between childhood maltreatment and attachment anxiety ($b = 0.05$, 95% CI $[0.02, 0.08]$, $t(855) = 3.11$, $p = .002$), indicating that the effect of childhood maltreatment also depends on the level of attachment anxiety alone.

In order to examine the association between childhood maltreatment history and current PTSD symptoms at high (84th percentile) and low (16th percentile) levels of attachment anxiety and attachment avoidance, we next conducted simple slope analyses. Given the significant three-way interaction, the simple slopes analysis allowed us to probe the question: how strongly does the focal predictor (childhood maltreatment) relate to the outcome variable (PTSD symptom severity) at different values of the moderators (i.e., lower or higher scores on the two attachment variables)? There is nothing special about these specific low and high values: the "pick-a-point" approach used here simply allows efficient description of the changing effect of our focal predictor on the outcome at differing values of the two moderators in question, i.e., how the effect of childhood maltreatment on current PTSD symptom scores changes as a function of scores on the two attachment dimensions. The interaction effects plotted as four lines in Fig. 1A correspond to the four slopes we describe next.

The relation between childhood maltreatment scores (CTQ-SF) and PTSD symptom severity (CAPS score) was significant in all but the range of the regression surface where scores were low on both attachment anxiety and attachment avoidance (i.e., the range containing the most securely attached participants; $b = 0.07$, 95% CI $[-0.01, 0.14]$, $t(855) = 1.83$, $p = .07$). We describe the other three slopes (i.e., the conditional association between childhood maltreatment and current PTSD symptoms) in ascending order: low anxiety, high avoidance range ($b = 0.16$, 95% CI $[0.05, 0.28]$, $t(855) = 2.78$, $p < .001$); the high anxiety, high avoidance range ($b = 0.22$, 95% CI $[0.15, 0.29]$, $t(855) = 6.13$, $p < .001$); and the high anxiety, low avoidance range ($b = 0.29$, 95% CI $[0.19, 0.39]$, $t(855) = 5.77$, $p < .001$). Because the CTQ-CAPS association was significant in all cases other than when both attachment anxiety and avoidance were low, we used the Johnson-Neyman technique to discover the precise value on attachment anxiety – the more impactful of the two moderators – below which the effect of childhood maltreatment was no longer significant when attachment avoidance was low (at the 16th percentile). We found this value to be 1.605 on the 1–7 scale of the ECR-R. Flipping these variables around (i.e., holding attachment anxiety at the 16th percentile and probing the cutoff value below which attachment avoidance is not a significant predictor of PTSD scores), the value is 3.066 on the 1–7 scale. Fig. 1B depicts these simple slopes in a Johnson-Neyman plot.

Table 3

Hierarchical multiple regression predicting PTSD severity (CAPS score).

	Model 1			Model 2		
	b (SE B)	β	t	b (SE B)	β	t
Childhood Trauma (CTQ total score)	0.22 (0.02)	0.29***	9.23	0.17 (0.02)	0.23***	7.34
Emotion Dysregulation (EDS-SV)	0.23 (0.02)	0.36***	11.18	0.15 (0.02)	0.22***	6.18
Attachment anxiety (ECR-R)				1.70 (0.36)	0.17***	4.74
Attachment avoidance (ECR-R)				2.40 (0.40)	0.19***	5.98
R^2	0.281			0.339		
F model	155.09***			101.37***		

Note. This regression was repeated in the subset of the data with only the CAPS for DSM-IV as the outcome ($N = 717$), with similar findings. The CAPS for DSM-5 subset was too small to evaluate separately.

b = unstandardized regression coefficient; β = standardized regression coefficient.

*** $p < .001$. $N = 798$.

In a separate analysis, we employed hierarchical regression analysis to assess the effect of attachment patterns in predicting adulthood PTSD severity, controlling for emotion dysregulation and childhood maltreatment. The results of this analysis are depicted in Table 3. Attachment anxiety and attachment avoidance both manifested significant correlations with PTSD symptoms, controlling for childhood maltreatment and emotion dysregulation, also significant predictors. Entering the attachment variables into the model added 5.8% variance explained in PTSD symptoms, incrementing on the other two predictors. At neither stage of this model were the covariates age, gender, or income significant predictors of PTSD symptoms (p range = 0.12–0.92), therefore they were omitted from the models.

Because some participants ($n = 195$) were administered the CAPS based only on trauma that happened in childhood, we sought to examine whether this fact might have confounded our analyses by inflating the association between our childhood maltreatment and PTSD measures. Thus we re-conducted all analyses, now controlling for an additional variable we coded to represent whether the trauma queried in the CAPS took place in childhood. The effect of this covariate (and the respective interaction terms in which it was included) was nonsignificant in all regression analyses and thus did not influence any of the results. That is, whether a participant's index trauma (their reported worst trauma, on which the CAPS score was based) happened in childhood or adulthood did not significantly affect any of our reported results.

3. Discussion

We examined PTSD symptoms in relation to self-reported childhood maltreatment, adult attachment, and emotion dysregulation in a sample of mostly low-income, African American adults recruited in the medical clinic waiting rooms of a public hospital. We found that the relation between self-reported childhood maltreatment and PTSD severity was moderated by adult attachment, such that self-reported childhood maltreatment was no longer significantly associated with current PTSD symptomatology among participants reporting both low attachment anxiety and low attachment avoidance (i.e., around or lower than the range of 16th percentile). Self-reported low scores on both these variables constitute secure attachment, and thus these findings are consistent with the idea that secure attachment may buffer the negative effects of childhood maltreatment on adult PTSD symptoms, especially if they are replicated in a prospective study. At minimum, our finding echoes a large body of empirical literature suggesting that more securely attached adults fare better in the face of stress and trauma than their less securely attached counterparts. This is consistent with attachment theory, in which secure attachment is thought to buffer against deleterious effects of negative experiences throughout the lifespan.

Although attachment anxiety and avoidance were both related to PTSD symptom severity, only attachment anxiety significantly interacted independently with childhood maltreatment, such that higher attachment anxiety (but not avoidance) on its own was associated with a stronger relation between self-reported childhood maltreatment and PTSD severity. The focus on attachment anxiety in our study of trauma is consistent with a substantial body of research suggesting that attachment-anxious individuals respond more strongly to stressors compared with avoidant individuals or more secure individuals (Declercq & Willemsen, 2006; Flair et al., 2015; Mikulincer et al., 2003). If findings similar to ours play out longitudinally in future studies, attachment anxiety could thus potentially be understood as a vulnerability factor for the development of PTSD in the face of new trauma exposure when a history of childhood maltreatment is present. On the other hand, attachment avoidance played no significant independent moderating role in the relation between childhood maltreatment and later PTSD risk in our analyses. That is, the effect of childhood maltreatment on PTSD scores did not depend on attachment avoidance alone.

We also found that adult attachment was significantly associated with PTSD severity after accounting for the effects of emotion dysregulation and childhood maltreatment. This is important because emotion dysregulation is a past hypothesized mediator of the attachment-psychological distress association (Benoit et al., 2010), and we were thus interested in examining whether attachment would explain additional variance in a model already accounting for emotion dysregulation. In our analyses, we have shown that attachment patterns play a role in PTSD symptoms that is not only independent, but similar in effect size to emotion dysregulation. This finding suggests that either 1) emotion dysregulation is only one of multiple mechanisms to explain the relation between adult attachment and PTSD severity, 2) the EDS-SV employed in this study did not capture certain aspects of emotion dysregulation which may more fully account for the attachment-PTSD relationship (i.e., it may be that emotion regulation as a construct does indeed fully or mostly explain the relationship between attachment and PTSD, but our instrument did not fully capture the construct), or 3) both. Given that the EDS-SV assesses only some aspects of emotion dysregulation, it is certainly possible that adult attachment is related to PTSD severity through other aspects of emotion dysregulation. For example, EDS-SV scores are more correlated with certain subscales of the commonly-used Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004) such as regulatory strategies and impulse control, and less with emotion awareness, emotion clarity, and emotion acceptance (Powers et al., 2015). Past research indeed suggests that all these facets of emotion dysregulation are related to adult attachment (Goodall et al., 2012; Oshri et al., 2015).

Our study had a number of important strengths. First, our sample size was sufficient for the power to fully specify our regression model by including the three-way interaction and all two-way interactions among our predictors of interest. Our moderation analysis thus allows a more nuanced understanding of adult attachment processes in the context of childhood maltreatment and adulthood PTSD risk, and hence more accurate interpretations can be drawn from these data. Our sample, comprising mostly low-income African American adults, also represents a significant strength as this population remains understudied in the attachment literature. Despite the uniqueness of the sample, our findings are consistent with the tenet in attachment theory that secure attachment serves as a buffer against negative experiences in adulthood. In other words, these data provide no indicators that these attachment-related processes operate differently in this population than in other populations studied in past literature. However, given the homogeneity of our sample, we were unable to test this directly.

Our study also had a number of limitations. First, three out of four of the measures employed in this study were self-report

measures. Second, our data were cross-sectional, limiting possible interpretations about causation. Third, given that our sample was composed of mostly low-income, primarily African American individuals, its generalizability to other populations is unknown. Fourth, our analyses did not model the potential effects of childhood maltreatment on adult attachment other than in the initial correlation matrix. While there is a body of literature which suggests that childhood maltreatment impacts attachment style, this question was not considered in the present study, and the nature of the regression analysis allowed us to sidestep this question by asking about the relation between childhood maltreatment and adulthood PTSD when attachment variables are held constant at high or low levels. Next, consistent with a recent meta-analysis (Cameron et al., 2012), the two attachment dimensions measured by the ECR-R were moderately correlated in our sample, despite the supposition in attachment theory that they are orthogonal. This raises theoretical issues which, although interesting, were outside the scope of this paper, and our regressions nevertheless accounted for their shared variance by including them at the same step in the regression models. Finally, switching from the CAPS for DSM-IV to CAPS for DSM-5 midway through a multi-year study is not ideal given possible variance associated with such a switch.

In light of these findings, future research should examine a wider range of both outcomes and predictors whose relations may be moderated by attachment. For example, attachment may interact with other PTSD risk factors such as peritraumatic dissociation, family history of psychopathology, and trauma severity. Similarly, attachment may exhibit a similar moderation effect on childhood trauma in relation to other psychopathology (generalized anxiety, depression, personality disorders). Future research should also continue examining mechanisms through which attachment security may be protective, especially in prospective and experimental studies.

Taken together, our findings underscore the importance of attachment in PTSD symptomology and suggest that attachment variables may correlate with PTSD severity at a similar effect size to a well-studied transdiagnostic factor, emotion dysregulation. Furthermore, our study adds to a growing body of literature highlighting the protective effects of attachment security in adulthood (Cook et al., 2017; Crow & Levy, 2019; Ehrental et al., 2018), even in the context of a robust risk factor like childhood maltreatment. Ours and similar findings suggest that therapy targeting (explicitly or not) individual attachment patterns may have broad effects on the individual's ability to not only have healthier relationships and utilize social support broadly, but to better regulate emotions and cope effectively in the face of stressors (see Levy & Johnson, 2019 for a review of findings on attachment and psychotherapy).

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