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**LONGITUDINAL INVESTIGATION OF CHILDHOOD TRAUMA AND
EMOTIONDRIVEN IMPULSIVITY**

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LONGITUDINAL INVESTIGATION OF CHILDHOOD TRAUMA AND EMOTION-
DRIVEN IMPULSIVITY

BY SVETLANA GONCHARENKO

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN
BEHAVIORAL SCIENCE

UNIVERSITY OF RHODE ISLAND

2022

DOCTOR OF PHILOSOPHY IN BEHAVIORAL SCIENCE

OF

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ABSTRACT

Exposure to childhood trauma is associated with numerous adverse psychological, physical, and behavioral health consequences. This highlight childhood trauma as a major public health problem. Addressing important gaps in the existing research, the proposed study clarifies the bidirectional and unique prospective associations between childhood trauma and both negative and positive emotion-driven impulsivity. This study utilized a sample of 11,872 participants from the ABCD study and conducted Cross Lagged Panel Models to evaluate the bisectional associations between childhood trauma and positive and negative emotion-driven impulsivity. Findings showed that earlier childhood trauma was associated with higher levels of later negative and positive emotion-driven impulsivity; this association was comparable for both positive and negative emotion-driven impulsivity. Further, higher levels of earlier positive, but not negative, emotion-driven impulsivity was associated with later childhood trauma. Finally, the strength of the relationship between childhood trauma and emotion-driven impulsivity did not differ by gender. Results of this study have important implications for future research and treatment aimed at preventing and treating childhood trauma.

AKNOWLEDGMENTS

I would like to thank my mentor, Dr. Nicole Weiss for her unwavering support since my first day on-board. I knew this then and I am even more certain of this now – she is one of a kind. I would also like to thank my co-mentor Dr. Manshu Yang, who adopted me as her student in the past year – I am beyond grateful for her support and mentorship. In addition, I would like to thank Drs. Molly Greaney, Steven Cohen, and Amy Stamates, the other members of my dissertation committee, for being an integral part of my academic journey in the past years and for crossing the finish line with me.

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Chapter 1.

INTRODUCTION

According to the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), traumatic exposure may result from exposure to actual or threatened death, serious injury, or sexual violence (American Psychiatric Association, 2013). Among children, these events may be experienced directly (e.g., the child is physically assaulted), witnessed (e.g., the child sees another person being physically assaulted), or learned of (e.g., the child hears that a family member was physically assaulted). Nationally representative samples of children in the United States indicate that childhood trauma is a widespread public health problem (Finkelhor et al., 2005; Kilpatrick et al., 2000). Among one large epidemiological survey, 53% of children aged 2-17 had experienced a physical assault; 14% had experienced child maltreatment; 8% had experienced sexual victimization; and 36% had witnessed violence (e.g., in the community and/or at school; Finkelhor et al., 2005). Further, trauma-exposed children in this study had a 69% chance of revictimization – or subsequent traumatic exposure – during a single year. Associations between childhood trauma and a wide range of deleterious physical, psychological, and behavioral health outcomes are well documented in the literature (Kendler et al., 2000; Kilpatrick et al., 2013; Messman-Moore et al., 2010). These studies consistently show robust links between childhood trauma and social, emotional, and cognitive impairments (Anda et al., 2006; Briere et al., 2008; Felitti et al., 1998); adoption of health risk behaviors (Brown et al., 2010; Felitti et al., 1998; Fuemmeler et al., 2009); and disease and disability that manifest into adulthood (Anda et al., 2006; Brown et al., 2010; Dube et al., 2009; Felitti et al., 1998), including marked reductions in life expectancy (Brown et al., 2010; Friedman et al., 2007). The number

and severity of such consequences is alarming and highlights childhood trauma as a major public health problem.

Relatedly, intense emotional reactions are common in the aftermath of trauma and may overwhelm the regulatory capacities of children, leading them to rely on maladaptive strategies for modulating emotional experiences (Cicchetti et al., 1991; Cyders & Smith, 2008). Indeed, childhood trauma interferes with both the acquisition and implementation of adaptive emotion regulation skills (Cicchetti et al., 1991; Dvir et al., 2014). Emotion-driven impulsivity is one construct that has recently gained growing attention in the context of such maladaptive strategies, and refers to the tendency to engage in rash action in response to intense affective states (Cyders & Smith, 2008). The role of emotions in preparation for an action is thought to be fundamentally adaptive (Depue, 1996). Yet, while emotions initiate and drive purposeful actions, intense emotional experiences may avert access to available cognitive resources (Inzlicht & Schmeichel, 2012; Muraven & Baumeister, 2000) or interfere with rational decision-making (Bechara, 2004; Bechara et al., 2000; Loewenstein & Lerner, 2003; Shiv et al., 2005), increasing the likelihood of impulsive actions to diminish the intensity of emotional experiences (Larson, 2000). These findings suggest that childhood trauma may result in deficits in emotional processes that result in the development, maintenance, and/or exacerbation of emotion-driven impulsivity (Linehan, 1993). Consistent with this assertion, retrospective reports from adults indicate heightened levels of emotion-driven impulsivity among those with a history of childhood trauma (Dvir et al., 2014).

To date, research examining the relation between childhood trauma and emotion-driven impulsivity has relied on cross-sectional designs, precluding determination of the

nature and direction of this association. It is possible that the association between childhood trauma and emotion-driven impulsivity is bidirectional, whereby childhood trauma leads to emotion-driven impulsivity and emotion-driven impulsivity increases risk for childhood trauma. Regarding the latter, consistent with the high-risk hypothesis, emotion-driven impulsivity has been associated with engagement in high-risk behaviors that subsequently increase the likelihood of childhood trauma. For instance, substance use is associated with emotion-driven impulsivity (Cyders & Smith, 2008; Smith & Cyders, 2016) and may increase risk for childhood trauma by placing children in high-risk situations (Windle, 1994) or by impairing detection of danger cues in the environment (Davis et al., 2009). Alternatively, experiencing a traumatic event may disrupt developmental processes linked to emotion-driven impulsivity (Cicchetti et al., 1991; Cyders & Smith, 2008). For instance, childhood trauma may interfere with the development of skills for modulating intense emotional experiences (Linehan, 1993), increasing the likelihood of rash action in the context of intense emotion states among individuals with exposure to childhood trauma. Empirical examination of the potential bidirectional association between childhood trauma and emotion-driven impulsivity has important implications for preventative interventions aimed at populations characterized by – or at risk for – childhood trauma.

Notably, recent evidence suggests that emotion-driven impulsivity may stem from intense negative *and* positive emotions (Cyders & Smith, 2007, 2008). However, the relation between positive emotion-driven impulsivity in particular and childhood trauma is not well understood. Early research in this area shows that both negative and positive emotion-driven impulsivity result in engagement in high-risk behaviors (Cyders & Smith,

2008; Cyders et al., 2010; Smith & Cyders, 2016); these behaviors may subsequently increase the likelihood of childhood trauma (Haller & Chassin, 2014). Moreover, there is growing evidence that childhood trauma may result in both positive and negative emotion-driven impulsivity. For example, childhood trauma may overwhelm regulatory capacities (Cloitre et al., 2005), making it difficult to modulate intense emotional states (Mennin et al., 2005), including that associated with some positive emotions (e.g., excitement). As a result, children exposed to trauma may be more likely to engage in rash action in the context of intense negative and positive emotions (Weiss et al., 2012). Of note, while both negative and positive emotion-driven impulsivity result in similar levels of high-risk behavior (Cyders & Smith, 2007, 2008; Cyders et al., 2010; Smith & Cyders, 2016), and thus may contribute equally to risk for childhood trauma, research shows that negative affect is more prominent following childhood trauma (Vujanovic et al., 2013). As such, it is possible that negative (versus positive) emotion-driven impulsivity is more elevated following childhood trauma. Investigations that identify the relative and unique relations of negative and positive emotion-driven impulsivity to childhood trauma will speak to the utility of targeting both negative and positive emotion-driven impulsivity in detection and intervention efforts for populations characterized by childhood trauma.

The goal of the current study is to explore bidirectional and unique prospective associations between childhood trauma and both negative and positive emotion-driven impulsivity. Hypothesis 1: Earlier childhood trauma will be associated with higher levels of later negative and positive emotion-driven impulsivity; this association will be stronger for negative emotion-driven impulsivity. Hypothesis 2: Higher levels of earlier negative and positive emotion-driven impulsivity will increase the likelihood of later

childhood trauma; the strength will be comparable for negative and positive emotion-driven impulsivity. In addition, follow-up analysis will examine the influence of sex on the between negative and positive emotion-driven impulsivity and childhood trauma, as evidence suggests that sex may moderate these associations (Cole, 2014; Nolen-Hoeksema et al., 2015; Sweeney et al., 2010; Tocci et al., 2010; Wade et al., 2016).

Chapter 2.

METHODOLOGY

Participants and Procedure.

The sample is comprised of 11,872 participants from the ABCD study, a large-scale longitudinal study tracking 9- to 10-years-olds recruited from 21 research sites across the United States. The sample reflects the nation's sociodemographic diversity and inter-individual variation in an epidemiologically informed manner (for a detailed description of the ABCD sampling, see: Garavan et al., 2018). Parents provided written informed consent and permission and all children provided assent to participate in the study. Data utilized in the current study were collected across two time points (baseline and two-year follow-up) using semi-structured interviews and computerized self-report questionnaires. All procedures were approved by a central institutional review board.

Measures.

Trauma Exposure. The ABCD Adverse Life Events Scale – Child Version (Bernnstein et al., 1997). The Adverse Life Events Scale is a self- or proxy-administered, 25-item questionnaire that reports events experienced, prior to the baseline and since baseline assessment, over which the child had little or no control (e.g. being involved in a car accident, being involved in a fire, witnessing a disaster, being victim of a violent crime). The respondent reviews the list of items and indicates which events have occurred (*yes/no*) and to what extent such events affected them (*Not at all / a little / some / a lot*). The Adverse Life Events Scale has good interrater reliability and concurrent validity (Bernnstein et al., 1997). In the current sample Cronbach's alpha for baseline was .85 and .87 for two-year follow-up.

Emotion-Driven Impulsivity. The Urgency, Premeditation, Perseverance, Sensation Seeking, and Positive Urgency Impulsive Behavior Scale (UPPS-P; Cyders & Smith, 2007) is a 59-item self-report questionnaire that assesses multiple dimensions of impulsivity, including negative urgency, positive urgency, sensation seeking, lack of premeditation, and lack of perseverance. For the purposes of the current study, only the negative and positive urgency subscales were utilized. Participants rate each item on a 4-point Likert-type scale (1 = *rarely/never true*, 4 = *almost always/always true*). The UPPS-P has shown adequate internal consistency reliability as well as convergent, discriminant, and predictive validity (Cyders et al., 2009; Cyders & Smith, 2007; Cyders et al., 2007). In the current sample Cronbach's alpha for positive urgency was .82 at baseline and .88 at two-year follow-up. For negative urgency, Cronbach's alpha was .80 at baseline and .79 for two-year follow-up.

Data Analysis.

A preliminary model that will include all the potential paths using the Cross Lagged Panel Model (CLPM) technique will be created. Two sets of CLPM analyses will be conducted to assess the directionality and magnitude of associations across two time points. The overall longitudinal associations for the entire sample will be first examined to test Hypothesis 1 and 2. Next, the directionality and magnitude of associations for male will be compared to those for female. The CLPM is widely used in psychological research to assess bi-directional relationships in data derived from nonexperimental, longitudinal research designs (Finkel, 1995; Hamaker et al., 2015). Model fit will be assessed using the chi-square statistic, the comparative fit index (CFI; Bentler, 1990), the Tucker-Lewis Index (TLI; Tucker & Lewis, 1973), the root-mean-square error of

approximation (RMSEA; Browne & Cudeck, 1993) and the standardized root mean square residual (SRMR; Yuan, 1995). To determine model acceptability, the following cut-offs will be used: > 0.95 for the CFI and TLI, $< .06$ for the RMSEA, and $< .08$ for the SRMR (Marsh et al., 2004). Standardized regression coefficients (β s) will be evaluated to determine the strength and direction of the time-lagged relations between childhood trauma and emotion-driven impulsivity while controlling for their stability over time (i.e., autoregression). The absolute values of these β s will be examined comparatively in each model, with larger values indicating stronger associations. In addition, to examine the moderating role of sex on the associations, the likelihood ratio test will be conducted, by comparing a constrained CLPM with the same regression coefficients for male and female to a more lenient CLPM allowing regression coefficients to differ by sex.

Chapter 3.

FINDINGS

Sample characteristics for pertinent demographic variables at baseline are summarized in Table 1. Bivariate correlations and descriptive statistics between childhood trauma and emotion-driven impulsivity at two time points are summarized in Table 2. Emotion-driven impulsivity was assessed at baseline and two-year follow-up, while childhood trauma was assessed at one-year follow-up and two-year follow-up, because baseline childhood trauma data were not available.

The cross-lagged panel model testing the temporal interplay between childhood trauma and emotion-driven impulsivity showed good model fit: CFI = 0.983, TLI = 0.896, RMSEA = 0.063, SRMR = 0.026, $\chi^2(2) = 97.503$, $p < .001$. Standardized regression coefficients for all model paths are presented (in Table 4) along with the path diagram (Figure 1). All autoregressive paths were statistically significant with small to moderate effect sizes indicative of a high degree of temporal stability in both childhood trauma and emotion-driven impulsivity over the assessed time frame (see Table 4 for detailed results). Results revealed comparably significant cross-lagged relationships of childhood trauma at Time 1 predicting both positive and negative emotion-driven impulsivity at Time 2 (Hypothesis 1). Further, results showed a significant cross-lagged relationship of positive, but not negative, emotion-driven impulsivity at Time 1 predicting childhood trauma at Time 2 (Hypothesis 2).

In addition, to test the role of sex on the relationship between childhood trauma and emotion-driven impulsivity, two CLPMs were examined (See Table 3 for detailed outcomes), with Model 1 constraining unstandardized regression coefficients to be the

same for male and female, and Model 2 allowing regression coefficients to differ by sex. As shown in Table 3, both models showed good model fit and the Likelihood ratio test comparing Model 1 to Model 2 yielded non-significant difference between the two, demonstrating that the temporal relationship between childhood trauma and emotion-driven impulsivity did not significantly differ by sex.

Chapter 4.

DISCUSSION

Extant research provides support for an association between childhood trauma and emotion-driven impulsivity (Dugal et al., 2020; Dougal et al., 2021; Wardell et al., 2016). The goal of the current study was to advance existing literature by exploring bidirectional and longitudinal relations between childhood trauma and emotion-driven impulsivity among a large national sample of children aged 9 through 12 years old. Partially consistent with expectations, earlier childhood trauma was associated with higher levels of later negative and positive emotion-driven impulsivity, though this association was comparable in strength for both positive and negative emotion-driven impulsivity (Hypothesis 1). Also partially consistent with hypotheses, higher levels of earlier positive, but not negative, emotion-driven impulsivity were associated with later childhood trauma (Hypothesis 2). Notably, the strength of the relations between childhood trauma and emotion-driven impulsivity did not differ by sex. These findings provide preliminary evidence for longitudinal and bidirectional relations between childhood trauma and emotion-driven impulsivity, underscoring the potential utility of targeting emotion-driven impulsivity in the prevention of childhood trauma and treatment of individuals who have a history of childhood trauma for both females and males.

Consistent with our first hypothesis, results of the present study showed that earlier childhood trauma was associated with later positive and negative emotion-driven impulsivity. Childhood trauma has been shown to interfere with both the acquisition and implementation of adaptive emotion regulation skills, inclusive of emotion-driven impulsivity (Cicchetti et al., 1991; Dvir et al., 2014). Indeed, robust evidence suggests

that childhood trauma may overwhelm regulatory capacities of children (Cloitre et al., 2005), making it difficult for them to modulate distress and arousal (Mennin et al., 2005). Further, it may hinder their ability to identify and describe emotion states (Kooiman et al., 2004). In turn, individuals with a history of childhood trauma may be more likely to rely on maladaptive regulation strategies when experiencing intense emotions, including those that are impulsive (Weiss et al., 2012; 2015). Notably, and only partially consistent with this hypothesis, the strength of the association between childhood trauma and both positive and negative emotion-driven impulsivity was comparable. While past research suggests that negative affect and related adverse outcomes are more prominent following childhood trauma (Vujanovic et al., 2013), there is a growing body of evidence to suggest that individuals with a history of childhood trauma also exhibit difficulties controlling impulsive behaviors when experiencing positive emotions (Goncharenko et al., 2021). Specifically, this research posits that individuals with a history of childhood trauma may be more likely to engage in impulsive behaviors in the context of positive emotions because they negatively evaluate positive emotions (Weiss et al., 2015), perhaps due to distressing physiological arousal (Raudales et al., 2021) or interfering negative cognitions (Frewen et al., 2012). Individuals with a history of childhood trauma who experience positive emotions as aversive may subsequently engage in efforts to down-regulate positive emotion states (Roemer et al., 2001), including through the use of impulsive behavior (Weiss et al., 2020; 2021).

These findings highlight the need for future investigations to further explicate the longitudinal relations between childhood trauma and both positive and negative emotion-driven impulsivity. For instance, research is needed to better understand the timing and

contexts in which these relations develop over time. Findings from such studies may speak to the need for intervening within high-risk periods or risky contexts. Further, studies are needed to identify subgroups that may be at particular risk for positive and negative emotion-driven impulsivity following childhood trauma. For instance, it may be that individuals who experience interpersonal trauma—such as sexual or physical victimization—are at particular risk for developing positive and negative emotion-driven impulsivity. Finally, research in this area would benefit from exploring the role of trauma-related psychopathology such as posttraumatic stress disorder symptoms in the relations from childhood trauma to positive and negative emotion-driven impulsivity.

With regard to the second hypothesis, results were partially consistent with expectations. Specifically, higher levels of earlier positive, but not negative, emotion-driven impulsivity were associated with later childhood trauma. While no studies to date have explored the effect of positive emotion driven-impulsivity on later childhood trauma, an extensive body of literature highlights the role of maladaptive responses to positive emotions in adverse outcomes (Frewen et al., 2012; Norman et al., 2014; Ramakrishnan et al., 2019; Weiss et al., 2015; 2018; 2019). Specifically, research suggests that individuals may engage in risky behaviors when experiencing heightened positive emotional states as means of increasing emotional states that are perceived as pleasurable or countering or distracting from emotional states that are perceived as distressing (Weiss et al., 2015; 2018). In the current sample, it is possible that the significant association between positive, but not negative, emotion-driven impulsivity and later childhood trauma may have been a function of the specific developmental period examined. Young adolescents may be particularly susceptible to positive emotion-

driven impulsivity, consistent with evidence that they are more likely to engage in sensation seeking behaviors (MacPherson et al. 2010; Steinberg et al., 2018). Such thrill-seeking behavior place adolescents in a greater number of high-risk situations, which, subsequently, may increase their likelihood of trauma exposure (Volkert et al., 2013), consistent with the *high-risk hypothesis* (Windle, 1994). Conversely, impulsive behaviors that are tied to negative emotions may be relatively less prevalent among adolescents. Indeed, drinking linked to positive emotions (i.e., enhancement) has been shown to be more prevalent than drinking linked to negative emotions (i.e., coping) among adolescents samples (Sjödín et al., 2021).

Future research would benefit from exploring the associations between earlier positive and negative emotion-driven impulsivity and later childhood trauma both within and across different developmental periods (e.g., young adults). Such findings may speak to the generalizability of our findings to diverse age groups. Relatedly, research is needed with different follow-up periods (shorter and longer) to identify when exactly the relation between positive emotion-driven impulsivity and later childhood trauma emerges, and whether an association between negative emotion-driven impulsivity and later childhood trauma ever appears. Finally, investigations are needed to better understand why positive emotion-driven impulsivity leads to later childhood trauma. For instance, given evidence that positive emotions increase distractibility (Dreisbach & Goschke, 2004) and narrow attention (Gable & Harmon-Jones, 2008), it may be that they impair one's ability to detect danger cues in the environment (Davis et al., 2009).

Notably, our findings indicate that the longitudinal and bidirectional associations between childhood trauma and emotion-driven impulsivity were consistent across sex.

Previous research suggests sex differences in both childhood trauma (Sweeney et al., 2010; Wade et al., 2016) and emotion-driven impulsivity (Davis-Becker et al., 2014; Scott et al., 2015). Our findings extend this work by examining whether sex differences affect the strength of the relations between childhood trauma and positive and negative emotion-driven impulsivity. Specifically, the results of the current study indicated that males and females who experienced childhood trauma were just as likely to subsequently develop positive and negative emotion-driven impulsivity. Further, they showed that males and females who reported positive and negative emotion-driven impulsivity were just as likely to subsequently experience childhood trauma. These findings have important implications for the development and implementation of treatments targeting childhood trauma and emotion-driven impulsivity, suggesting that treatments targeting emotion-driven impulsivity to reduce subsequent childhood trauma or childhood trauma to reduce subsequent emotion-driven impulsivity may work equally well across male and females. Future research would benefit from exploring other potential moderators that have been found to be relevant to both childhood trauma and emotion-driven impulsivity, such as age, race/ethnicity, previous trauma history, severity of childhood trauma, and comorbid psychological difficulties (Asnaani & Hall-Clark, 2017; Grassi-Oliveira et al., 2014; Lily & Valdez, 2012; Moulton et al., 2015; Pine et al., 2002; Trickey et al., 2012).

Results of this study have important implications for clinical practice.

Identification of emotion-driven impulsivity among children exposed to trauma may serve as a point of intervention to reduce subsequent risk for deleterious health outcomes. Indeed, recent evidence underscores the utility of addressing emotion-driven impulsivity as a target, outcome, and mechanism of psychological treatments (Gratz et al. 2015),

including those affecting individuals with a history of childhood trauma specifically (Cloitre et al., 2002). For instance, Skills Training in Affective and Interpersonal Regulation (STAIR) was developed to address negative emotion dysregulation, inclusive of emotion-driven impulsivity, experienced by individuals with a history of childhood trauma (Cloitre et al., 2002). Thus, one important next step would be to examine the possible benefits of STAIR modified to address dysregulation stemming from both negative and positive emotions. Research in this area may also examine the utility of specific strategies for improving positive and negative emotion driven-impulsivity, such as facilitating behavioral control in the context of positive and negative emotional states by redirecting attention to non-emotional stimuli and promoting more adaptive actions in the face of emotional arousal (Bornvovalova et al., 2012). Finally, identification of individuals with positive emotion-driven impulsivity at this developmental stage may identify those who are at greater risk for childhood trauma and its negative sequelae.

When interpreting the results of the current study, several limitations must be considered. First, the current study used two data points approximately two years apart and employed a sample of young adolescents in a specific developmental stage (9 to 12 years old). It is possible that hypothesized effects might unfold differently across different time frames (e.g., longer than two years apart) and developmental stages (e.g. older adolescents). Future studies employing other time frames and developmental stages could further test these possible alternative outcomes. Second, the current study relied on self-report measures, responses to which may be influenced by the respondent's willingness and ability to report accurately. Specifically, there is some evidence that response biases, such as the need for social desirability, may lead to the underreporting of

childhood trauma (Bernstein et al., 1997), which may influence the accuracy of the current analysis. However, the ABCD study employed novel and sophisticated design and data collection models aimed at increasing response accuracy (Garavan et al., 2018). Nevertheless, future studies in this area may benefit from the inclusion of objective measures of emotion-driven impulsivity (Cyders & Coskunpinar, 2012) and assessment of childhood trauma using structured interviews or multiple informants (Cooley & Jackson, 2022). Finally, our findings cannot be assumed to generalize to other populations. Thus, investigators need to replicate these findings in larger, more diverse samples, including among clinical and racially/ethnically diverse samples.

Despite these limitations, the current study's findings provide invaluable information regarding the association between childhood trauma and emotion-driven impulsivity, advancing theory, research, and practice. Specifically, the current findings add to existing body of research by using a large, nationally representative longitudinal survey of children aged 9 through 12 years old to better understand the directional nature of the relation between childhood trauma and emotion-driven impulsivity. Findings advance past work by showing that childhood trauma predicted both negative and positive emotion-driven impulsivity, and that childhood trauma predicted later positive emotion-driven impulsivity. Further, the strength of these relations did not differ by sex. Results of this study have practical significance for the development of effective intervention programs by identifying critical components relating to the development, maintenance, and exacerbation of childhood trauma and emotion-driven impulsivity.

Table 1.
Sample Characteristics at Baseline

	<i>M (SD)</i>	<i>n (%)</i>
<i>Age</i>	9.83 (0.61)	
<i>Sex at birth</i>		
Male		6169 (52.2%)
Female		5682 (47.8%)
<i>Ethnicity</i>		
Not Hispanic/Latinx		10050 (84.8%)
Hispanic/Latinx		1801 (15.2%)
<i>Race</i>		
White		6209 (52.4%)
Black		1588 (13.4%)
Asian		557 (4.7%)
More than one		498 (4.2%)
American Indian/Alaskan Native		95 (0.8%)
Native Hawaiian/Other Pacific Islander		24 (0.2%)
Other		35 (0.3%)

Table 2.
Bivariate Correlations and Descriptive Statistics for Childhood Trauma, Positive Emotion Driven Impulsivity, and Negative Emotion Driven Impulsivity, at Time 1 and Time 2

	1	2	3	4	5	6
1. Positive Emotion-Driven Impulsivity T1	-	0.329	0.494	0.235	0.130	0.116
2. Positive Emotion-Driven Impulsivity T2		-	0.209	0.527	0.159	0.163
3. Negative Emotion-Driven Impulsivity T1			-	0.235	0.113	0.087
4. Negative Emotion-Driven Impulsivity T2				-	0.172	0.164
5. Childhood Trauma T1					-	0.540
6. Childhood Trauma T2						-
<i>M</i>	7.93	7.34	8.48	7.70	29.53	30.06
<i>SD</i>	2.95	2.69	2.64	2.36	19.93	20.18
<i>Range</i>	4-16	4-16	4-16	4-16	0-145	0-167

Note: T1 = Time 1, T2 = Time 2, All correlations are significant at the $p < .01$ level.

Table 3.
Cross-Lagged Model Comparison

	Main Model (Entire Sample)	Model 1 (Equal Regression Coefficients for Male and Female)	Model 2 (Different Regression Coefficients for Male and Female)
X^2	97.503	103.713	95.479
df	2	11	4
p	0.000	0.000	0.000
$RMSEA$	0.063	0.038	0.062
$SRMR$	0.026	0.026	0.026
CFI	0.983	0.983	0.983
TLI	0.896	0.963	0.900
<i>Comparison of Model 1 and Model 2</i>			
ΔX^2			8.234
Δdf			7
p			0.312

Table 4.
Cross-lagged Panel Model Results – Entire Sample

	β	<i>SE</i>	<i>p</i>
<i>Cross-lagged relationship</i>			
CT T1 → NEG T2	0.145	0.012	0.000
CT T1 → POS T2	0.126	0.012	0.000
NEG T1 → CT T2	0.003	0.012	0.781
POS T1 → CT T2	0.038	0.012	0.002
<i>Autoregressions</i>			
CT T1 → CT T2	0.535	0.009	0.000
NEG T1 → NEG T2	0.247	0.011	0.000
POS T1 → POS T2	0.271	0.011	0.000

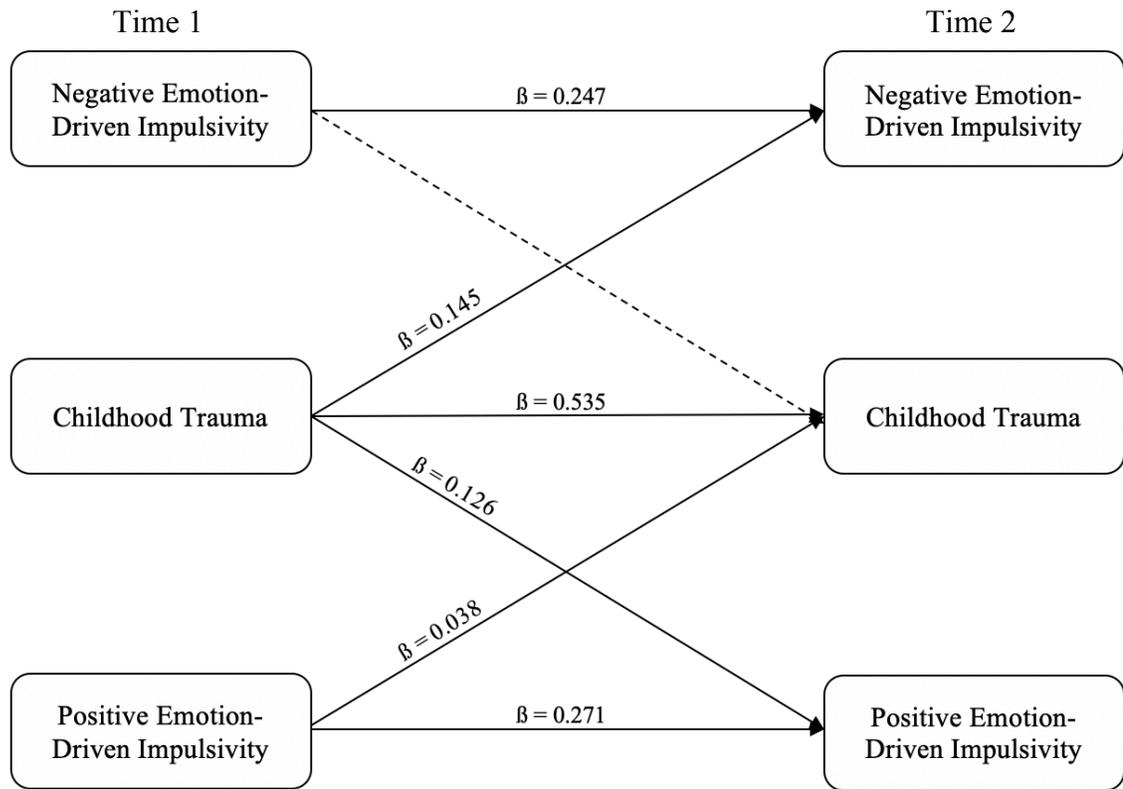
Note: β = standardized regression coefficients, POS = Positive emotion-driven impulsivity, NEG = Negative emotion-driven impulsivity, CT = Childhood trauma, T1 = Time 1, T2 = Time 2

Table 5.
Cross-lagged Panel Model Results – By Sex

	Model 1		Model 2	
	<i>β</i>	<i>SE</i>	<i>β</i>	<i>SE</i>
Female				
<i>Cross-lagged relationship</i>				
CT T1 → POS T2	0.129**	0.012	0.229**	0.015
CT T1 → NEG T2	0.145**	0.012	0.152**	0.017
NEG T1 → CT T2	0.005	0.012	-0.004	0.018
POS T1 → CT T2	0.038*	0.012	0.031	0.018
<i>Autoregressions</i>				
CT T1 → CT T2	0.529**	0.010	0.533**	0.013
NEG T1 → NEG T2	0.245**	0.011	0.147**	0.017
POS T1 → POS T2	0.270**	0.011	0.247**	0.015
Male				
<i>Cross-lagged relationship</i>				
CT T1 → POS T2	0.124**	0.012	0.106**	0.017
CT T1 → NEG T2	0.144**	0.012	0.139**	0.017
NEG T1 → CT T2	0.005	0.012	0.013	0.017
POS T1 → CT T2	0.039*	0.012	0.046*	0.017
<i>Autoregressions</i>				
CT T1 → CT T2	0.540**	0.010	0.537**	0.012
NEG T1 → NEG T2	0.246**	0.011	0.260**	0.017
POS T1 → POS T2	0.264**	0.011	0.286**	0.015

Note: * $p < .05$; ** $p < .001$. Model 1 assumes equal unstandardized regression coefficients for male and female, Model 2 allows different regression coefficients for male and female. β = standardized regression coefficients, POS = Positive emotion-driven impulsivity, NEG = Negative emotion-driven impulsivity, CT = Childhood trauma, T1 = Time 1, T2 = Time 2

Figure 1.
Standard Cross-lagged Panel Model Standardized Results



Note: Dotted line denotes insignificant finding.

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