



Differentiating Adverse Childhood Experience Exposure from ADHD Symptoms in Children: A Logistic Regression Analysis

Jenel Cassidy^{1*}, Halle Bonner², and Grace Garron²

¹Assistant Professor, Department of Mental Health Counseling, College of Pharmacy and Health Sciences, Belmont University, Nashville, TN, United States.

²PhD Candidate, Advanced Clinical Practice, Teaching, and Supervision, Belmont University, Nashville, TN, United States.

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***Corresponding Author:** Jenel Cassidy, PhD., LPC-MHSP, Assistant Professor, Department of Mental Health Counseling, College of Pharmacy and Health Sciences, Belmont University, Nashville, TN, United States.

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Abstract

Childhood trauma, or Adverse Childhood Experiences (ACE), is prevalent and associated with considerable psychological and behavioral responses that resemble those of children with attention deficit hyperactivity disorder (ADHD), raising concerns regarding the nature of these coinciding characteristics. Research has suggested that responses to ACE and ADHD symptoms co-occur. Archival, de-identified cases from the Child and Adolescent Needs and Strengths (CANS) assessment were examined (N = 480) to determine the ability of 8 ACE-related responses to significantly predict ACE exposure among children with ADHD symptoms. Participants were divided into two groups: children with ADHD symptoms without ACE (ADHD; n = 124), and children with ADHD symptoms and at least one ACE (ADHD/ACE; n = 356). Binary logistic regression analysis indicated that *depression, anxiety, and attachment difficulties* significantly increased the likelihood of ADHD/ACE, and *psychosis and school behavior problems* significantly decreased the likelihood of ADHD/ACE. In contrast, *oppositional behavior, self-harm, and social behavior problems* did not significantly impact the likelihood of ADHD/ACE, suggesting that these responses may be core ADHD symptoms regardless of exposure to ACE. Findings suggest ACE-related responses parallel symptoms of ADHD and assessment for ACE among children with ADHD symptoms is warranted.

Keywords: Inattention, Impulsivity, ACE-related Responses, Trauma-Informed Treatment

Introduction

Childhood trauma (ACE) has been long recognized as a significant public health concern and has been shown to produce both short- and long-term psychological and behavioral difficulties [1]. More specifically, a body of research illustrates that children who have been exposed to ACE often demonstrate behavioral and emotional

responses, such as poor attention/focus, poor impulse control, mood dysregulation, anxiety, and attachment impairment [2-7]. Many of these responses parallel symptoms of attention-deficit/hyperactivity disorder (ADHD), notably one of the most frequently diagnosed neurodevelopmental conditions affecting an estimated 7 million children, ages 8-12, in the U.S. [2, 8]. In particular, the core ADHD symptoms of inattention and impulsivity are mimicked by responses to ACE exposure [3, 9].

Standard ADHD treatments like stimulant medication and behavior modification are customarily utilized in both clinical and school settings. However, evidence suggests these approaches may not adequately reduce symptoms, particularly for children from adverse and/or unstable environments [2, 9, 10]. In these cases, inattentive and impulsive behaviors attributed to ADHD may instead reflect underlying trauma-related processes [10-12]. For example, anxiety and emotional dysregulation following exposure to ACE exposure often presents as restlessness or poor self-control [9, 13]. Conversely, ACE-related depression or attachment difficulties may be misconstrued as an inability to maintain age-appropriate attention or impulse control levels [3, 14].

Existing research demonstrates overlapping responses to ACE exposure and ADHD symptomology, suggesting that many children may be misdiagnosed with ADHD and, subsequently, mistreated with medication and behavior modification while their ACE-related trauma responses remain overlooked [15, 16]. Interestingly, Biederman et al. [17]; Fuller-Thomson & Lewis [18], & Sanderud et al. [19] found that children exhibiting ADHD symptoms are at greater risk than their peers for experiencing maltreatment or adverse household environments. Further, Jimenez et al. [6] and Zhang et al [20] discovered that children with histories of ACE exposure are

more likely to have an ADHD diagnosis. This clashing of etiologies is especially salient in the school setting, where children spend most of their days and where behaviors and emotions are pronounced. However, school-based interventions tend to be broad and generic; they most often do not offer individualized, trauma-informed assessment or treatment interventions [12]. Hence, relying on behaviors without thorough evaluation may camouflage the origin of childhood impairment and promote inapt treatment.

Rationale for Study

Understanding empirically supported responses to trauma is important for identifying potential overlap with ADHD symptoms [3]. For this study, eight psychological and behavioral responses (assessed by the CANS) were used as predictor variables as they align with trauma-response patterns reported in the existing literature. Table 1 outlines those trauma responses and the corresponding studies that identified them.

Variable	Findings	Studies
<i>School Behavior</i>	Association likely due to a disruption in cognitive skills that can result in decreased school engagement and academic performance. Further, students exposed to ACEs exhibit higher levels of truancy and excessive tardiness.	[21-23]
<i>Social Behavior</i>	Associated with ACE/trauma exposure in that external behaviors are widely known to reflect internal state and commonly referred to as coping mechanisms.	[13, 24-27]
<i>Depression and Anxiety</i>	Universally recognized as responses to ACE exposure.	[3, 6, 7, 9, 10, 14, 28, 29, 30]
<i>Psychosis</i>	Link to ACE exposure and explained by the stress-vulnerability model. ACE exposure interferes with the brain's development of a healthy stress response system. ACEs have also been identified as a risk factor for schizophrenia.	[3, 9, 10, 14, 20, 30, 31, 32, 33]
<i>Attachment Difficulties</i>	Understood to be a consequence of ACE exposure and serve as a mechanism linking later psychological/behavioral outcomes. Literature suggests that ACE exposure disrupts the development of secure attachment and results in insecure attachment patterns.	[24, 27, 29, 34]
<i>Oppositional Behaviors</i>	Linked to ACE exposure. Abused children are more likely to exhibit rigid and aggressive behavior patterns including defiance to adult requests, resistance to transitions/changes.	[14, 15, 35, 36]
<i>Self-Harm</i>	One of the most cited responses to trauma exposure during childhood. Research demonstrates that the majority of those who engage in self-harm practices (50-60%) have been exposed to one or more ACEs.	[3, 37, 38]

Table 1: Evidence-Based Predictor Variables/Trauma Responses

Theoretical Framework

Despite these findings, it is still unclear which ACE-related responses uniquely differentiate ADHD children from those exhibiting responses to ACE exposure. However, developmental theories provide insight for understanding the co-occurrence of responses. Developmental theories infer that exposure to adverse/traumatic experiences during childhood disrupts emotional and physiological processes and can create affective dysregulation, interpersonal challenges, cognitive disturbances, and behavioral problems, most of which overlap with symptom criteria for ADHD [39, 40]. Developmental theories of trauma posit that these responses should not be interpreted as ADHD (or another neurodevelopmental disorder). Instead, they should be conceptualized as adaptive responses to environmental adversity. Integrating trauma theory with existing ADHD research highlights the need for more precise differentiation between these conditions.

Therefore, there is a significant gap regarding which ACE-related responses most explicitly distinguish children with ADHD *and* ACE exposure from children with ADHD *without* ACE exposure. Identifying discerning features could encourage comprehensive assessment and reduce inaccurate diagnosis. This study addresses this gap by analyzing data from children with ADHD symptoms of inattention and impulsivity to isolate ACE-related responses that uniquely differentiate individuals with ACE histories from those

without. Although prior research has established associations between ACE exposure and ADHD, much of the research has relied on descriptive or correlational approaches. Thus, little is known about whether specific ACE-related psychological and behavioral indicators can reliably discern between children exhibiting responses to ACE exposure and children with ADHD. This discernability has important implications for assessment and treatment. Accurate identification of ACE exposure among children may facilitate appropriate trauma-informed intervention strategies as opposed to blanket behavioral and/or pharmacological treatments. Ultimately, improving the ability to distinguish between ADHD symptom presentation and responses to ACE exposure not only has the potential to refine clinical decision-making and promote effective outcomes for children, but addressing this gap is critical for improving diagnostic accuracy and ensuring that children receive appropriate, targeted interventions.

Methods

The present study sought to determine whether ACE-related psychological and behavioral responses significantly predicted ACE exposure among children exhibiting ADHD symptoms of inattention and impulsivity. By analyzing a sample of children who exhibit ADHD symptoms of inattention and impulsivity, this study aimed to identify responses that assist in differentiating children with or without a history of ACE exposure within a clinically relevant

population. Two groups were compared: (0) children with ADHD symptoms without ACE exposure and (1) children with ADHD symptoms with ACE exposure. The study focused on eight psychological and behavioral variables that represent responses to ACE exposure - *psychosis, oppositional behavior, depression, anxiety, self-harm, attachment difficulties, social behavior problems, and school behavior problems* - to assess predictability of prior ACE exposure among kids with ADHD. The analysis aimed to clarify whether core ADHD behaviors (inattention and impulsivity) reflect ACE exposure with clinical implications for trauma informed treatment strategies.

Research Design

The present study used a quantitative, nonexperimental, ex post facto design with archival data of children ages 8-12 from the Child and Adolescent Needs and Strengths (CANS). The CANS is used to assess mental/emotional, and behavioral needs of children and adolescents on a 0-3 Likert-type scale. Binary logistic regression was performed to determine the extent to which 8 ACE responses significantly predicted ACE exposure among children exhibiting ADHD symptoms. Children 8-12 years old were selected to reflect the typical stages of ADHD symptom presentation. Cases were placed in either of two groups: (0) ADHD (ADHD symptoms without ACE exposure) and (1) ADHD/ACE (ADHD symptoms with ACE exposure).

Sample

The dataset used in this study was requested and obtained from the Child and Adolescent Needs and Strengths (CANS) assessment designer who, at the time, was a primary researcher at the University of Chicago. A general research plan accompanied the request. The de-identified archival dataset consisted of data from children, ages 8-12, who resided in the urban Midwest, and were assessed by mental health professionals within the child welfare services system [41]. As mentioned, this age range was selected based on the observability of ADHD symptoms during the primary school years [42]. The complete dataset consisted of 716 cases in SPSS format. From these cases, 480 children who exhibited ADHD symptoms of inattention & impulsivity were identified and included in the analysis (N=480). Cases included children from diverse genders, racial and ethnic backgrounds, and socioeconomic statuses and had been referred for mental and/or behavioral health concerns. From the final sample (N=480), cases were divided into two groups based on reports of ACE exposure: Group (0) = no ACE exposure (ADHD) (n = 124) and Group (1) = yes ACE exposure (ADHD/ACE) (n = 356). ACE exposure was defined as reported traumatic experiences and determined by a report of "yes" for CANS items that assessed physical, sexual, or emotional abuse; neglect; exposure to family or community violence; family member substance use, family member incarceration, or exposure to disaster. An a priori power analysis (power = .90, α = .05, OR = 0.60) indicated a minimum sample size of 190 participants. The larger sample of N=480 allowed the unequal group sizes to be retained while preserving the validity of logistic regression estimates [43].

Materials/Instrument

The Child and Adolescent Needs and Strengths (CANS) is a structured assessment designed to evaluate children's (ages 0-18) mental/emotional, and behavioral health across multiple domains [44]. The CANS derived from the Childhood Severity of Psychiatric Illness (CSPI) survey and aims to assist mental health professionals in making clinical treatment decisions and managing services to children and families in need of life improvements. The CANS gathers ordinal data along eight primary domains: *Exposure to Potentially Traumatic/Adverse Childhood Experiences, Symptoms Related to Traumatic/Adverse Childhood Experiences, Child Strengths, Life Domain Functioning, Acculturation, Child*

Behavioral/Emotional Needs, Child Risk Behaviors, and Caregiver Strengths and Needs for a total survey consisting of 87 items [44, 45]. Each domain is designed to assess the presence and severity of that domain. Items in the *Exposure to Potentially Traumatic/Adverse Childhood Experiences* domain consist of physical, sexual, and emotional abuse, neglect, and witness to family violence. Items in the *Symptoms Related to Traumatic/Adverse Childhood Experiences* domain include affective and physiological dysregulation and hyperarousal. The *Child Strengths* domain includes questions about family, education, and interests. *Life Domain Functioning* includes developmental, intellectual, and recreational items. The *Acculturation* domain consists of language and culture items. The domain *Child Behavioral/Emotional Needs* assesses behavioral responses such as psychosis, depression, and anxiety. *Child Risk Behaviors* includes suicide risk and self-harm. Lastly, the *Caregiver Strengths and Needs* domains consist of items such as parental substance use and family resources [44, 45]. While the CANS consists of 87 total items, only the items that reported ADHD symptoms of inattention, impulsivity and ACE exposures were included in group formations. CANS items are rated on a 4-point Likert-type scale (0 = no evidence to 3 = severe need), with higher scores indicating greater clinical concern. The threshold ratings for response/symptom presence were ≥ 2 . Ratings of 1 were excluded as they represented "suspicion of occurrence" as opposed to a definitive occurrence. Each item reflects a specific clinical need of interest [44]. For the present study, variables were:

Attention deficit/impulsivity was operationalized using the corresponding CANS item (based on threshold ratings ≥ 2).

ACE (trauma) exposure was defined by endorsed experiences of abuse (physical, sexual, emotional), neglect, violence exposure, parental substance use, parental incarceration, or disaster (based on threshold ratings ≥ 2).

Predictor variables included eight behavioral and psychological ACE indicators: psychosis, oppositional behavior, depression, anxiety, self-harm, attachment difficulties, social behavior problems, and school behavior problems.

Outcome variable consisted of group placement in either the ADHD group or the ADHD/ACE group.

Primary Research Question and Hypothesis

RQ: Which psychological and behavioral ACE-related responses are significantly associated with ACE/trauma exposure in children who exhibit ADHD symptoms of inattention and impulsivity?

H₁: At least 1 of the 8 ACE-related responses will be significantly associated with ACE/trauma exposure in children who exhibit ADHD symptoms of inattention and impulsivity.

H₀: None of the 8 ACE-related responses will be significantly associated with ACE/trauma exposure in children who exhibit ADHD symptoms of inattention and impulsivity.

Data Collection Procedure

Purposive sampling was used to select cases of children ages 8-12 from an existing CANS dataset. Of the total 716 de-identified cases, 480 met inclusion criteria by indicating that inattentive and impulsive ADHD symptoms were exhibited. Inclusion required a rating of 2 or 3 on the CANS Attention Deficit/Impulse Control item. Cases of children who indicated having a developmental or intellectual disability were excluded from the sample. From this primary sample (N=480), cases were placed into groups based on ACE exposure. ACE exposure was identified by CANS ratings indicating moderate to severe experiences of abuse (physical, sexual, or emotional), neglect, family/community violence, parental substance use or incarceration, or disaster. The resulting 2 groups were: Group (0) = ADHD symptoms without ACE exposure (ADHD) (n=124) and Group (1) = ADHD symptoms with ACE exposure; ADHD/ACE) (n=356). Group membership was coded dichotomously (0 = no ACE exposure, 1 = ACE exposure).

Preliminary Analyses

Data were screened prior to analysis to ensure that assumptions of binary logistic regression were met. The outcome variable (group placement) was dichotomous, and predictor variables were categorically derived from ordinal CANS ratings. Linearity and multicollinearity tests showed that all correlations were below .40. Expected cell frequencies met recommended thresholds (all > 1 , with fewer than 20% < 5) and no outliers were identified.

Data Analysis

Data was obtained from the CANS (0-3 scale) of children ages 8-12, organized, and prepared for analysis using IBM SPSS. The 8 predictor variables were coded to reveal presence (0 = no; 1 = yes). A dichotomous outcome variable was established to determine group placement in either the (0) ADHD group or the (1) ADHD/ACE group. Binary logistic regression was conducted to investigate whether 8 ACE response variables significantly predicted ACE exposure among children exhibiting symptoms of ADHD. Statistical

significance was gauged using regression coefficients, or B 's, and associated tests (i.e. F-test). The dataset had been de-identified prior to being shared.

Ethical Approval and Consent

This study was deemed ethically sound and received approval from Capella University's Institutional Review Board (IRB) under Capella's Research Integrity Standard Operating Procedures (RI SOPs).

Results

Sample Characteristics

The final sample included 480 children, ages 8–12, who indicated the presence of clinically significant ADHD symptoms of inattention and impulsivity. Of these 480 cases, 356 participants (74.2%) reported a history of ACE exposure, and 124 (25.8%) reported having no history of ACE exposure. The age of the sample varied with most cases being 12 years of age (32.1%). Table 2 displays sample demographics for gender, age/ethnicity, and socioeconomic status (SES).

Age (years)	CASES		
8	55 (11.5%)		
9	67 (14.0%)		
10	92 (19.2%)		
11	112 (23.3%)		
12	154 (32.1%)		
Total	480 (100%)		

Variable	ADHD	ADHD/ACE	Overall
Gender			
Female	37 (29.8%)	116 (32.6%)	153 (31.9%)
Male	86 (69.4%)	237 (66.6%)	323 (67.3%)
Race/Ethnicity			
AFR	87 (70.2%)	249 (69.9%)	336 (70.0%)
HLX	21 (16.9%)	61 (17.1%)	82 (17.1%)
WNH	11 (8.9%)	32 (9.0%)	43 (9.0%)
MOT	5 (4.0%)	14 (3.9%)	19 (4.0%)
SES			
POV	56 (45.2%)	160 (44.9%)	216 (45.0%)
NOP	68 (54.8%)	196 (55.1%)	264 (55.0%)

Table 2: General Demographic Characteristics of the Sample (N = 480)

Note. AFR = Black/African American; HLX = Hispanic/Latinx; WNH = White/Non-Hispanic; MOT = Multiracial/Other; POV = Poverty; NOP = Not Poverty

Descriptive statistics for the ACE response variables implied moderate levels across most domains, with *attachment difficulties* and *oppositional behavior* having the highest mean and psychosis the

lowest. Table 3 displays the means and standard deviations for each predictor variable.

CANS Variable	M	SD
CANS Psychosis	.53	.756
CANS Self Harm	.76	.812
CANS Anxiety	1.28	.772
CANS Depression	1.36	.711
CANS School Behavior	1.49	.851
CANS Social Behavior	1.51	.858
CANS Attachment Difficulties	1.56	.924
CANS Oppositional Behavior	1.65	.738

Table 3: Predictor Variable Means and Standard Deviations

Note. M = mean; SD = standard deviation

Summary of Results

A binary logistic regression analysis was performed to examine whether 8 psychological and behavioral ACE response variables significantly predicted ACE exposure among children with ADHD symptoms. The overall model was statistically significant, $\chi^2(8) = 49.17$, $p < .001$, indicating that the predictor variables, together, reliably differentiated children with ACE exposure from children without ACE exposure. The model explained a modest proportion of variance in ACE exposure (Cox & Snell $R^2 = .10$; Nagelkerke $R^2 = .15$). A statement of findings for each predictive relationship is as follows: School Behavior, Psychosis, Depression, Anxiety, and Attachment Difficulties were significantly associated with ACE exposure in children with ADHD symptoms. School Behavior significantly predicted group placement ($B = -.298$, $Exp(B) = .742$, $Wald = 4.193$, $p < .05$). Psychosis significantly predicted group placement ($B = -.391$, $Exp(B) = .676$, $Wald = 6.616$, $p < .05$).

Depression significantly predicted group placement ($B = .515$, $Exp(B) = 1.674$, $Wald = 9.112$, $p < .05$). Anxiety significantly predicted group placement ($B = .465$, $Exp(B) = 1.593$, $Wald = 8.501$, $p < .05$). Oppositional behavior did not significantly predict group placement ($B = -.244$, $Exp(B) = .784$, $Wald = 2.091$, $p > .05$). Attachment difficulties significantly predicted group placement ($B = .299$, $Exp(B) = 1.348$, $Wald = 5.243$, $p < .05$). Self-harm did not significantly predict group placement ($B = .093$, $Exp(B) = 1.097$, $Wald = .389$, $p > .05$). Social behavior did not significantly predict group placement ($B = .220$, $Exp(B) = 1.246$, $Wald = 2.286$, $p > .05$). Table 4 shows the means of predictor variables for the dependent groups. The ADHD group represented the reference group; the odds ratio ($Exp(B)$) associated with exposure to ACE specified if those children with ACE had higher or lower odds of presenting each ACE-response predictor variables.

CANS Variable	ADHD	ADHD/ACE
School Behavior	1.58	1.45
Depression	1.12	1.44
Psychosis	0.05	0.61
Anxiety	1.02	1.37
Oppositional Behavior	1.70	1.63
Attachment Difficulties	1.30	1.65
Self-Harm	0.67	0.79
Social Behavior	1.40	1.55

Table 4: Means of Predictor Variables by Trauma Exposure Group

Table 5 illustrates the predictability of the ACE response variables and group membership. Results revealed that the ACE responses collectively accounted for a significant level of variability in the probability that children who exhibit ADHD symptoms also exhibited psychological and behavioral responses to ACE exposure, $R^2 = .101$ (Cox & Snell), $.149$ (Nagelkerke). According to the findings, $\chi^2(8) = 49.171$, $p = .000$, it can be Inferred that School Behavior ($B = -.298$, $Exp(B) = .742$, $Wald = 4.193$, $p < .05$), Psychosis ($B = -.391$, $Exp(B) = .676$, $Wald = 6.616$, $p < .05$), Depression ($B = .515$, $Exp(B) = 1.674$, $Wald = 9.112$, $p < .05$), Anxiety ($B = .465$, $Exp(B) = 1.593$, $Wald = 8.501$, $p < .05$), and Attachment Difficulties ($B = .299$, $Exp(B) = 1.348$, $Wald = 5.243$, $p < .05$) are independent features that significantly increased the likelihood of placement in the ADHD/ACE group. With odds ratios greater than 1, children with Depression, Anxiety, and Attachment Difficulties were positively associated with the likelihood of exhibiting ADHD symptoms and responses to ACE exposure. In other words, the odds of a child

exhibiting ACE responses are 1.67 times greater for children who report ADHD symptoms of inattention and impulsivity and depression, relative to those who do not. Further, the odds of a child who reports ADHD symptoms and anxiety also reporting ACE exposure is 1.59 times the likelihood of a child who does not report anxiety. The likelihood that a child with ADHD symptoms and attachment difficulties would exhibit responses to ACE is 1.35 times higher than a child without attachment difficulties. In contrast, School Behavior and Psychosis were negatively associated with the probability that a child demonstrating ADHD symptoms will also demonstrates ACE-related responses. The odds that a child with school behavior problems and ADHD symptoms would also exhibit ACE-related responses is .74 times the odds of child who does not exhibit school behavior problems. Lastly, the probability that a child exhibiting ADHD symptoms and psychosis would also exhibit responses to ACE exposure is .68 times those of a child without psychosis.

Variable	B	SE	Wald	df	p	OR (Exp(B))	Lower 95% CI	Upper 95% CI
School Behavior	-0.298	0.146	4.193	1	.041	0.742	0.558	0.987
Psychosis	-0.391	0.152	6.616	1	.010	0.676	0.502	0.911
Depression	0.515	0.170	9.112	1	.003	1.674	1.198	2.338
Anxiety	0.465	0.160	8.501	1	.004	1.593	1.165	2.178
Oppositional Behavior	-0.244	0.168	2.091	1	.148	0.784	0.563	1.090
Attachment	0.299	0.130	5.243	1	.022	1.348	1.044	1.741
Self-Harm	0.093	0.149	0.389	1	.533	1.097	0.820	1.469
Social Behavior	0.220	0.146	2.286	1	.131	1.246	0.937	1.658
Constant	0.095	0.386	0.060	1	.807	1.099	—	—

Table 5: Summary of Logistic Regression Analysis for Variables Predicting Group Membership (N = 480)

Note. SE = standard error; OR = odds ratio; CI = confidence interval. Significant predictors ($p < .05$).

Five variables emerged as significant predictors of trauma exposure: Depression ($B = .515$, $OR = 1.67$, $p < .01$), Anxiety ($B = .465$, $OR = 1.59$, $p < .01$), Attachment Difficulties ($B = .299$, $OR = 1.35$, $p < .05$), Psychosis ($B = -.391$, $OR = 0.68$, $p < .05$), and School Behavior Problems ($B = -.298$, $OR = 0.74$, $p < .05$). Children who reported higher levels of depression, anxiety, and attachment difficulties were significantly more likely to have ACE exposure. Specifically, the odds of a child having prior exposure to ACE were 1.67 times greater for children who reported depression and 1.59 times greater for children who reported anxiety. Attachment Difficulties were also correlated with greater odds of ACE exposure. In contrast, Psychosis and School Behavior Problems were negatively correlated with ACE exposure, illustrating less likelihood of ACE exposure among children with greater levels of these responses. The following variables did not significantly predict trauma exposure: Oppositional Behavior ($p > .05$), Self-harm ($p > .05$), and Social Behavior Problems ($p > .05$).

Discussion

Overview of Findings

The present study examined whether specific psychological and behavioral responses predict trauma exposure among children exhibiting attention deficit/impulsivity. Findings indicated that several ACE-related responses significantly differentiated children with trauma exposure from those without, even within a sample characterized by ADHD symptoms. Specifically, depression, anxiety, attachment difficulties, psychosis, and school behavior problems emerged as significant predictors of trauma exposure. These results extend existing literature demonstrating substantial overlap between ADHD symptoms and ACE-related responses. Importantly, these findings provide empirical support for the assertion that behavioral indicators commonly attributed to ADHD, specifically inattention and impulsivity, may, in some cases, reflect underlying trauma-related processes rather than a primary neurodevelopmental disorder.

Consistent with prior research, internalizing symptoms, particularly depression and anxiety, were among the strongest predictors of trauma exposure. These findings align with theories of trauma that identify affective dysregulation as a core reaction to traumatic experiences. Children with ACE exposure may exhibit difficulties with emotional regulation that manifest behaviorally as inattention or impulsivity, thereby mimicking ADHD symptomology. Attachment difficulties also predicted ACE exposure, reinforcing the central role of developmental and relational disruption in theories of childhood trauma. Given that many ACE occur within caregiving relationships, attachment disturbances may serve as a salient clinical marker distinguishing ACE exposure from ADHD alone.

Interestingly, psychosis and school behavior problems were negatively associated with trauma exposure, suggesting a more complex pattern of response expression. Although literature regarding childhood trauma has documented associations with dissociation/psychosis and perceptual disturbances, the directionality observed here may reflect variation in how these symptoms are captured within structured assessments or identified within school or service systems. Similarly, school behavior problems, which often creates a primary pathway to ADHD identification, may not reliably differentiate ACE exposure, highlighting the limitations of relying solely on observable behavior for evaluation and diagnosis. In contrast, oppositional behavior, self-harm, and social behavior problems were not significant predictors, deviating from existing literature. This discrepancy may indicate variability in how these constructs manifest across developmental stages or in measurement approaches. It further underscores the importance of multidimensional assessment when evaluating children who present with ADHD symptoms.

Summary of Results

Results indicated a significant association between ACE exposure

and several ACE-related psychological and behavioral responses among children with ADHD symptoms. Specifically, Psychosis, Depression, Anxiety, Attachment Difficulties, and School Behavior significantly predicted ADHD/ACE group membership, supporting the overlap between ADHD symptoms and ACE responses. In contrast, Oppositional Behavior, Self-harm, and Social Behavior were not significant predictors. These findings reinforce existing literature suggesting that ACE-related emotional dysregulation and behavioral impairments can mimic ADHD symptoms inattention and impulsivity. Fundamentally, results emphasize that children presenting with ADHD symptoms require further assessment for ACE exposure. The identification of depression, anxiety, attachment difficulties, and psychosis as significant predictors supports developmental theories of trauma, which asserts that trauma/ACE exposure disrupts emotional regulation, cognition, and interpersonal functioning. These responses may manifest behaviorally as inattention and impulsivity, leading to potential misclassification as ADHD. From a clinical perspective, these findings raise concerns regarding treatment interventions. Stimulant medications, commonly used to treat ADHD, may trigger ACE-related responses like anxiety or psychosis while failing to address ACE-related needs. In contrast, trauma-informed interventions have demonstrated effectiveness in reducing responses to ACE exposure and supporting recovery.

Clinical Implications

The findings of this study have direct implications for clinical practice, particularly in assessment, diagnosis, and treatment planning. First, results underscore the importance of comprehensive ACE screening when children present with inattention and impulsive behaviors. Given the substantial proportion of children with these ADHD symptoms who also reported ACE exposure in this sample, clinicians should consider trauma assessments as critical components of differential diagnosis. Second, the identified predictors - particularly Depression, Anxiety, and Attachment Difficulties - may serve as clinical indicators prompting further trauma assessment. Incorporating these guidelines into evaluation protocols could reduce improve diagnostic accuracy.

Third, the findings raise important concerns regarding treatment alignment. Children whose symptoms are rooted in ACE exposure are not likely to benefit from ADHD interventions such as stimulant medication or behavior modification plans. In fact, these interventions are more likely to adversely affected children who do not have ADHD. Instead, children with histories of ACE exposure require trauma-informed, evidence-based interventions, such as Somatic Experiencing (SE), Mindfulness, and Trauma-Focused Cognitive Behavioral Therapy (TF-CBT), which directly target underlying trauma processes. Finally, these results have implications for school-based interventions. Since behavior disturbances are apparent in the school setting, and are frequently the initial basis for referral, educators and school-based counselors play a critical role in recognizing when kids' behaviors reflect ACE (trauma) exposure rather than a neurodevelopmental disorder.

Limitations

Several limitations should be considered when interpreting this study's findings. First, the use of archival data restricts control over measurement and data quality, especially as CANS variables were originally collected for clinical rather than research purposes. Second, the sample was confined to children who were 8–12 years of age and within an urban geographic region, which could limit generalizability to other, more rural populations or developmental stages. Third, the study relied on a limited set of ACE indicators that largely reflected behavioral responses. The absence of data that reflected broader trauma-related symptoms, including dissociation and hyperarousal, restrict the scope of the findings and their ability to fully depict

trauma-related responses. Fourth, the CANS dataset used in this study did not identify formal ADHD diagnoses. Although it included indicators of psychological and behavioral functioning, the lack of diagnostic assessment data limited the ability to determine whether participants were clinically diagnosed with ADHD. Finally, the cross-sectional and ex post facto design impedes causal inference.

Recommendations for Future Research

Future research should expand upon this study's findings by examining additional responses to ACE exposure and their associations with ADHD symptoms. Particularly, trauma-related responses such as dissociation, hyperarousal, intrusion, and constriction should be explicitly examined in relation to ADHD symptoms. These responses are particularly relevant in the post-COVID-19 era, given that increased attention has been directed toward understanding changes in psychological and behavioral functioning following the pandemic. Moreover, associations could be strengthened by using a sample of children with a formal ADHD diagnosis instead of relying on symptoms alone. Longitudinal designs would be particularly valuable in clarifying the developmental pathways linking ACE exposure and attentional difficulties. Further investigation is also needed to evaluate treatment efficacy for children with co-occurring ADHD symptoms and ACE exposure, particularly regarding the use of medication versus trauma-informed interventions. In addition, research that explores timing and sequencing of ACE exposure and ADHD symptom expression or diagnosis can provide further insight into the origins of co-occurring behaviors, developmental influences, and treatment planning. Finally, expanding samples to include more diverse populations would also augment the understanding of how ACE exposure manifests across varied clinical contexts.

Conclusion

This study contributes to a growing body of research showcasing the overlap between symptoms of ADHD and responses to ACE exposure in children. Findings suggest that certain psychological and behavioral ACE responses - particularly depression, anxiety, attachment difficulties, psychosis, and school behavior problems - are associated with ACE exposure among children presenting with inattention and impulsivity. These results emphasize the importance of careful differential diagnosis and the integration of comprehensive assessment practices. Without accurate symptom identification, children with ACE exposure are at risk of receiving treatments that fail to address the origin of the problem. By increasing recognition of ubiquitous responses to ACE exposure within ADHD populations, mental health professionals can align treatment approaches with needs to support developmentally appropriate, effective outcomes.

Competing Interests: The authors report no conflict or competing interests.

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