Research on Child and Adolescent Psychopathology (2026) 54:17
https://doi.org/10.1007/s10802-026-01427-0

Indirect and Conditional Associations Between ADHD and Risky Internet Use in Elementary School Children With Parent-child Conflict and Maternal Childhood Trauma

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Received: 28 October 2025 / Accepted: 14 January 2026

Abstract

Prior work links Attention-Deficit/Hyperactivity Disorder (ADHD) with risky internet use (RIU), yet the family and intergenerational processes that might underlie this association remain uncertain. This study examined whether the ADHD-RIU association was statistically accounted for by parent-child conflict and whether maternal childhood trauma moderated these associations. The sample comprised 120 children aged 6–12 years (58% boys, M = 8.73, SD = 1.80), including 60 with a first-time ADHD diagnosis and 60 controls. Standardized parent- and self-report measures were used to assess RIU, parent-child conflict, and maternal childhood trauma. A dual first- and second-stage moderated mediation model (PROCESS Model 58) tested whether the ADHD-RIU association was linked to parent-child conflict and whether maternal trauma moderated both the ADHD-conflict and conflict-RIU associations. Analyses statistically controlled for child sex, age, parental education, and maternal depression and anxiety. ADHD status was significantly associated with parent-child conflict (0.75, 95% CI [0.42, 1.08]), which was significantly associated with RIU (0.42, 95% CI [0.22, 0.62]). Conditional indirect associations via conflict at low (-1 SD), mean, and high (+1 SD) levels of maternal childhood trauma were 0.17, 0.31, and 0.49, respectively, indicating a stronger association at higher trauma levels, while no significant direct ADHD-RIU association remained after accounting for conflict. Findings suggest that the ADHD-RIU link was largely shared with parent-child conflict, and this shared association was more pronounced when mothers reported higher trauma histories. These findings highlight potential relevance for trauma-informed, family-focused approaches that address conflict when considering RIU in children with ADHD.

Keywords ADHD · Risky internet use · Parent-child relationship · Maternal trauma

Highlights

- ADHD status was related to higher levels of parent-child conflict and risky internet use (RIU).
- An indirect statistical association between ADHD and RIU via parent-child conflict was observed.
- Maternal childhood trauma was associated with stronger indirect ADHD-RIU associations via conflict, consistent with contextual amplification of risk.
- Patterns are compatible with a trauma-informed, family-process perspective, within the limits of cross-sectional data.

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Published online: 29 January 2026

Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is among the most common neurodevelopmental conditions, with youth prevalence estimates near 8% and some reports placing lifetime diagnosis above 11% (Ayano et al., 2023; Danielson et al., 2024; Li et al., 2021; Catalá-López et al., 2012; Salari et al., 2023; Ercan et al., 2013). Beyond its cardinal symptoms of inattention, hyperactivity, and impulsivity (American Psychiatric Association, 2022) ADHD is accompanied by wide-ranging functional difficulties, including family discord (Anastopoulos et al., 2009), sleep disturbances and self-harm risk (Derin et al., 2025), behavioral addictions (Derin et al., 2023b) and elevated engagement in digital risk behaviors such as risky-internet-use (RIU) (Augner et al., 2023; Derin et al., 2025).

RIU refers to a pattern of excessive and poorly controlled online engagement in children, characterized by social withdrawal, interference with daily functioning, distress or deprivation when offline, and persistent difficulty limiting use (Young, 2009). Although RIU is not a formal diagnosis in DSM-5-TR or ICD-11, the construct is widely used in developmental research to capture this maladaptive behavioral pattern (Young, 2009). Empirically, RIU tends to co-occur with greater overall screen exposure: youth scoring in the problematic range on internet-addiction or PIU scales report longer daily internet use and are more likely to neglect offline activities, even though time spent online alone is not sufficient to define problematic use, which requires loss of control and functional impairment (Celik et al., 2025; Kuss & Lopez-Fernandez, 2016; Mythily et al., 2008; Niskier et al., 2024). Meta-analytic findings further show that ADHD symptoms are associated with higher levels of RIU (Augner et al., 2023; Wang et al., 2017), and converging evidence from child and adolescent samples, including work in elementary school populations, similarly links ADHD with elevated RIU and related social difficulties (Derin et al., 2025).

The Interaction-of-Person-Affect-Cognition-Execution (I-PACE) model proposes that predispositional neurocognitive vulnerabilities (e.g., impulsivity) interact with affective and executive processes to foster maladaptive online habits (Brand et al., 2016, 2019, 2025). These habits are emerging earlier than ever: research suggests that many families do not fully adhere to the 'no screens under two' recommendations, with most infants now being exposed to screens before age two and often for longer than advised (Duch et al., 2013; Rikkers et al., 2016), while school-age surveys report that 18% of children meet criteria for problematic internet use and 11–12% of adolescents show clinically relevant social-media or gaming risk (Brushe et al., 2023; Onguner et al., 2024; Boniel-Nissim et al., 2024; Rideout et al., 2003; Rideout, 2015). In neurodevelopmental conditions, more pronounced child difficulties have been linked to higher screen use, and parental regulatory capacities appear closely related in these contexts (Sadeghi et al., 2022, 2023). Consistent with this, prior work in ADHD clinical samples has linked parental mental health difficulties with higher levels of RIU (Derin et al., 2023a). These patterns suggest that child neurodevelopmental vulnerabilities and parental factors jointly shape digital engagement. Thus, identifying early transactional risks during this developmental window is therefore a public-health priority.

Within Bronfenbrenner's bioecological model, the family microsystem is the proximal context in which children's predispositions interact with everyday environmental influences (Bronfenbrenner & Morris, 2006). In this microsystem, parent-child relationship quality is consistently linked to children's digital behaviors (Derin et al., 2023a; Zhu et al., 2022), and parent-child conflict is associated with both ADHD and risky internet use (RIU) (Chen et al., 2024; Taghizade et al., 2022). Although many studies assess conflict without distinguishing caregivers, caregiver roles may differ in salience and impact. For example, population-based evidence suggests greater mental health burden among mothers of children with ADHD, whereas comparable associations are not consistently observed among fathers (Ko & Jeong, 2024). Longitudinal and cross-sectional findings further indicate that ADHD symptoms are associated with more persistent family conflict (Dantchev et al., 2024), and that higher conflict is associated with increases in children's problematic internet use (Zhang et al., 2025; Bonnaire & Phan, 2017; Nielsen et al., 2020; Mihara & Higuchi, 2017; Kapetanovic et al., 2025). Together, this work supports parent-child conflict as a plausible mechanism linking ADHD to RIU, but this pathway has not been directly tested.

Intergenerational factors may further condition this conflict-based pathway. Consistent with the intergenerational trauma literature, which has largely focused on maternal childhood maltreatment and its implications for parenting, we examine maternal trauma in the present study. Systematic reviews show that maternal childhood maltreatment is associated with harsher and more conflictual parenting, partly via long-term difficulties in emotion regulation (Greene et al., 2020; Van Ee & Meuleman, 2024; Plant et al., 2017). Related evidence indicates that maternal depression is associated with less optimal attentional and behavioral outcomes in youth (Selman et al., 2025), underscoring the broader importance of maternal factors for child adjustment. From a stress-sensitization perspective, where early adversity heightens reactivity to later stressors, mothers with higher trauma histories may be more reactive to the daily demands of raising a child with ADHD, increasing conflict and fostering maladaptive reliance on digital media

for coping or regulation (Greene et al., 2020; McLaughlin et al., 2010; Rowell & Neal-Barnett, 2021; Wattanatchariya et al., 2024). Consistent with this account, maternal trauma amplifies associations between daily stressors and parenting behavior and is linked to children's externalizing and technology-related problems (Kong et al., 2019; Ribas et al., 2024; Cooke et al., 2021; Zhang et al., 2025). Accordingly, maternal childhood trauma may strengthen conflict-based pathways from ADHD to RIU.

The Present Study

The present study tested a dual moderated path model in which ADHD status is associated with child RIU via parent-child conflict, with maternal childhood trauma moderating both the ADHD to conflict and conflict to RIU links (Fig. 1). Based on the prior literature, we predicted that: (H1) children with ADHD would show higher conflict than controls; (H2) conflict would be associated with greater RIU; and (H3) the indirect ADHD-RIU association through conflict would strengthen as maternal trauma increases. By integrating child clinical status, family dynamics, and intergenerational adversity, this investigation aims to clarify a multi-layered risk mechanism and to highlight trauma-informed, family-based leverage points for preventing maladaptive internet use in middle childhood.

Methods

We provide a detailed explanation of the procedures followed for data exclusions, sample size determination, study manipulations, and measurement selection in the study, consistent with reporting standards for quantitative research (Appelbaum et al., 2018; Simmons et al., 2012). The complete dataset, analysis code, and study materials are available upon request from the corresponding author via email. This study was not preregistered, as preregistration was not part of our standard research protocol at the time of the study's design. Ethical approval was granted by the Institutional Review Board of the Bezmialem Vakif University Faculty of Medicine, No: E-35700536-108.99.99-164296; Date: December 31, 2024).

Participants

A total of 120 children aged between 6 and 12 years and their mothers participated in the study. Participants were recruited from the Child and Adolescent Psychiatry Outpatient Clinic at Bezmialem Vakif University, which provides specialized services for diverse childhood mental health conditions. The clinical group consisted of children who had recently received a first-time diagnosis of Attention-Deficit/Hyperactivity Disorder (ADHD) based on the Kiddie Schedule for Affective Disorders and Schizophrenia-Present and Lifetime Version for DSM-5 (K-SADS-PL-DSM-5; Kaufman et al., 1997), a semi-structured clinical interview designed to evaluate current and lifetime psychopathology in children and adolescents.

The K-SADS-PL-DSM-5 was administered by a child and adolescent psychiatrist. Separate interviews were conducted with the child and the parent, and diagnostic decisions were made according to DSM-5 criteria using integrated information from both interviews and available clinical and school records. All children in the clinical group met criteria for ADHD, were medication naïve at the time of assessment; comorbidity was limited (tic disorder, encopresis, social anxiety disorder, anxiety disorder, and nocturnal enuresis; each $n=1$; oppositional defiant disorder, $n=4$). Children with indications of intellectual disability were excluded based on clinical evaluation, developmental history, and available school records; however, standardized cognitive testing was not administered. The control group was composed of age- and gender-matched children and recruited through convenience and snowball sampling via online and offline community announcements. All participating children and their mothers provided written informed consent and assent prior to data collection. Descriptive characteristics of the participants are summarized in Table 1.

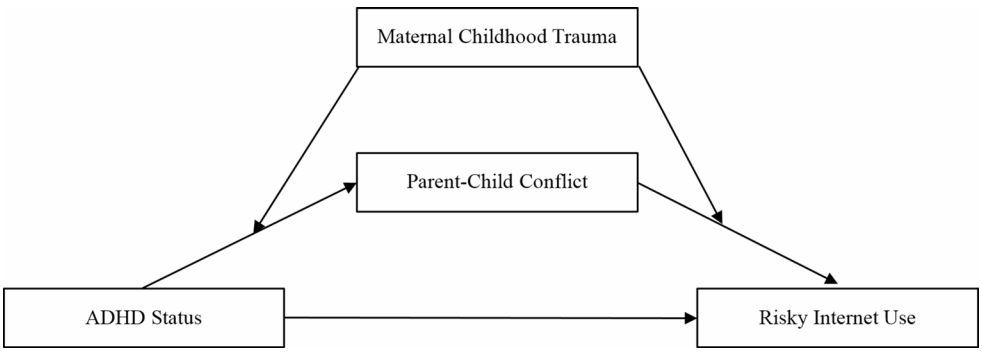


Fig. 1 Conceptual model illustrating the indirect association between ADHD status and risky internet use via parent-child conflict, with maternal childhood trauma moderating both the ADHD-conflict and conflict-risk pathways

Table 1 Child and family characteristics

	Case ($N=60$)	Control ($N=60$)	p
Child Sex (Girl)	15 (25.0%)	35 (58.3%)	<0.001
Child Age (Year)	8.30 (1.58) [6.00, 12.0]	9.15 (1.91) [6.00, 12.0]	0.009
Mother Age (Year)	36.6 (4.77) [28.0, 46.0]	37.9 (4.74) [30.0, 47.0]	0.118
Mother Education			
Middle School	12 (20.0%)	7 (11.7%)	0.036
High School	19 (31.7%)	10 (16.7%)	
University	29 (48.3%)	43 (71.7%)	
Mother Occupation			
Housewife	32 (53.3%)	27 (45.0%)	0.514
Private Sector	14 (23.3%)	17 (28.3%)	
Self Employed	6 (10.0%)	3 (5.0%)	
Civil Servant	6 (10.0%)	11 (18.3%)	
Worker	2 (3.3%)	1 (1.7%)	
Retired	0 (0%)	1 (1.7%)	
Father Age	40.2 (5.86) [30.0, 65.0]	42.3 (5.31) [34.0, 60.0]	0.040
Father Education			
Middle School	12 (20.0%)	7 (11.7%)	0.010
High School	24 (40.0%)	13 (21.7%)	
University	23 (38.3%)	40 (66.7%)	
NA	1 (1.7%)	0 (0%)	
Father Occupation			
Private Sector	13 (21.7%)	21 (35.0%)	0.016
Self Employed	30 (50.0%)	17 (28.3%)	
Civil Servant	4 (6.7%)	13 (21.7%)	
Worker	10 (16.7%)	8 (13.3%)	
Retired	1 (1.7%)	1 (1.7%)	
NA	2 (3.3%)	0 (0%)	
Household Income			
Below Minimum Wage	0 (0%)	0 (0%)	0.477
Minimum Wage	5 (8.3%)	3 (5.0%)	
Twice Minimum Wage	21 (35.0%)	27 (45.0%)	
More Than Twice Minimum Wage	34 (56.7%)	30 (50.0%)	

Continuous variables are presented as mean and standard deviation (M, SD) [minimum, maximum]; categorical variables are presented as counts and percentages (N, %); p-values were calculated using independent two-sample t-tests for continuous variables and chi-squared tests of independence for categorical variables. *NA* in father education indicates one participant without a father and one in father occupation with an unemployed father

Group Assignment

All children and their mothers underwent a detailed clinical evaluation to determine eligibility. Sixty children were assigned to the ADHD group based on the following criteria: (1) referral to the Child and Adolescent Psychiatry Clinic for behavioral concerns such as inattention, hyperactivity, or impulsivity reported by parents or teachers; (2) a formal ADHD diagnosis made by a certified child psychiatrist using the K-SADS-PL-DSM-5, conducted with both child and mother to assess DSM-5 symptoms across settings; (3) clinical evaluation indicated no signs of intellectual disability (standardized cognitive testing was not administered) and (4) additional teacher input obtained via a structured phone interview covering attention, classroom behavior, academics, and school adjustment, along with standardized ratings using the Conners Teacher Rating Scale.

Sixty children were assigned to the control group based on the following inclusion criteria: (1) no history of psychiatric diagnosis as determined through the K-SADS-PL-DSM-5 interview with the child and parent; (2) a developmental history within normal limits, as reported by the mother. Control group participants were recruited via community networks, including local schools, parent referrals, and online outreach. exclusion criteria for both groups included (a) significant neurological, sensory, or motor impairments, (b) seizure history, (c) current or past psychotic symptoms, (d) intellectual disability, or (e) autism spectrum disorder.

Measures

Psychiatric Diagnosis

Psychiatric diagnoses were assessed using the Kiddie Schedule for Affective Disorders and Schizophrenia -Present and Lifetime Version for DSM-5 (K-SADS-PL-DSM-5; Kaufman et al., 1997), a semi-structured clinical interview designed to evaluate current and lifetime psychopathology in children and adolescents aged 6–18 years according to DSM-5 criteria. The interview covers a broad range of disorders, including mood, psychotic, anxiety, externalizing and disruptive behavior disorders, attention-deficit/hyperactivity disorder (ADHD), substance use, eating, and tic disorders. Modules consist primarily of yes/no screening questions followed, when indicated, by detailed symptom lists with severity ratings. Information from separate child and parent/guardian interviews is integrated to yield a comprehensive diagnostic evaluation. The psychometric properties of the K-SADS-PL-DSM-5 have been well established in the Turkish population (Unal et al., 2019).

Attention-Deficit/Hyperactivity Disorder Symptoms

ADHD symptoms were assessed using the Conners Parent Rating Scale-Revised Short (CPRS-RS; Conners et al., 1998a) and the Conners Teacher Rating Scale-Revised Short (CTRS-RS; Conners et al., 1998b). The CPRS-RS is a parent-report questionnaire that assesses behavioral and emotional problems over the past month, with an emphasis on ADHD symptoms. It consists of 27 items rated on a four-point Likert scale (0 = "*never*," 1 = "*sometimes*," 2 = "*often*," 3 = "*very often*"), with higher scores indicating

greater symptom severity. Items form three subscales, oppositional, inattention/cognitive problems, and hyperactivity, and an ADHD index score. The Turkish adaptation was conducted by Kaner et al. (2013a, b). In the present sample, the CPRS-RS showed excellent internal consistency (Oppositional α = 0.92, Inattention α = 0.96, Hyperactivity α = 0.94, ADHD Index α = 0.96).

The CTRS-RS is a teacher-report questionnaire that captures behavioral and emotional difficulties in the school context during the past month. It consists of 28 items rated on the same four-point Likert scale (0 = "*never*," 1 = "*sometimes*," 2 = "*often*," 3 = "*very often*"), with higher scores reflecting greater symptom severity. Items yield three subscales, oppositional, cognitive problems/inattention, and hyperactivity, as well as an ADHD index score. The Turkish adaptation was also conducted by Kaner et al. (2013a, b). In this sample, CTRS-RS subscales demonstrated good to excellent internal consistency (Oppositional α = 0.90, Inattention α = 0.79, Hyperactivity α = 0.92, Inattention Index α = 0.82, Hyperactivity Index α = 0.88).

Conners Teacher Rating Scale-Revised Short (CTRS-RS; Conners et al., 1998b) is a teacher-report scale that assesses behavioral and emotional problems in school-age children and adolescents with an emphasis on ADHD symptoms during the past month. The scale consists of 28 items rated on a four-point Likert-type scale (0 = "never", 1 = "sometimes", 2 = "often", 3 = "very often"). Higher scores reflect greater symptom severity. Items are grouped into three subscales: oppositional, cognitive problems/inattention, and hyperactivity; the scale also provides an ADHD Index score. The Turkish adaptation study was conducted by Kaner et al. (2013a, b). CTRS-RS subscales also showed good to excellent reliability in this sample (Oppositional α = 0.90, Inattention α = 0.79, Hyperactivity α = 0.92, Inattention Index α = 0.82, Hyperactivity Index α = 0.88).

Risky Internet Use

Risky internet use was assessed using the Parent-Child Internet Addiction Test-20-Item Version (PCIAT-20; Young, 2009), a parent-report questionnaire that evaluates the severity of problematic internet use in children as perceived by their parents. The scale consists of 20 items grouped into four subscales: social isolation, dysfunction, deprivation, and difficulty in control. Items are rated on a 6-point Likert scale (0 = "*not applicable*" to 5 = "*continuously*"), and total scores can range from 0 to 120. Items capture the spillover of internet-related difficulties into family and daily life, for example, the child preferring to spend time online rather than with family, neglecting daily responsibilities to use the internet, becoming defensive or secretive when asked about online activities, or failing to comply with time limits set by parents. Higher total scores indicate greater symptom severity and functional impact. The Turkish parent version of the PCIAT-20 used in this study has well-documented psychometric properties (Eşgi, 2014), and the PCIAT-20 total score showed good reliability in this sample (α = 0.94).

Child-Parent Conflict

Child-parent conflict was assessed using the conflict subscale of the Child-Parent Relationship Scale (CPRS; Pianta, 1992). Mothers completed the CPRS with respect to their own relationship with the target child; thus, scores index conflict specifically within the mother-child dyad rather than across multiple caregivers. In the present study, only the 14-item conflict subscale was used. Items tap recurrent arguing, criticism, and relational strain (e.g., the parent and child often being in conflict, the child becoming angry easily with the parent, or the parent feeling dissatisfied with how they get along). Higher conflict scores indicate greater relationship tension and a more negative mother-child relationship. The Turkish version of the CPRS has demonstrated sound psychometric properties (Akgün & Yeşilyaprak, 2010), and internal consistency in the current sample was good (α = 0.83).

Maternal Childhood Trauma

Maternal childhood trauma was assessed using the Childhood Trauma Questionnaire (CTQ; Bernstein et al., 1994). The original CTQ-28 is a self-report measure of emotional, physical, and sexual abuse and emotional and physical neglect, plus three minimization/denial items. In this study, we used the Turkish adaptation of the expanded 33-item Turkish version (CTQ-33; Şar et al., 2020), which adds a 5-item overprotection/overcontrol (OP-OC) subscale to the five original trauma subscales while retaining the three minimization/denial items. Items are rated on a 5-point Likert scale (1 = "*never true*" to 5 = "*very often true*"), with each trauma subscale (including OP-OC) ranging from 5 to 25 and the overall trauma score (sum of six subscales) ranging from 30 to 150; higher scores indicate greater exposure to childhood maltreatment and overcontrolling caregiving. The Turkish version of CTQ and CTQ-33 versions have demonstrated good reliability and validity in clinical and community samples (Şar et al., 2012, 2020), and the CTQ-33 total score showed good internal consistency in this sample (α = 0.92).

Sociodemographic Characteristics

Sociodemographic characteristics were assessed using a brief parent-report questionnaire completed by mothers.

Items covered child sex and age; maternal and paternal age, education, and occupation; and household income. These variables were used to describe the sample (Table 1) and were considered as potential covariates in the statistical analyses.

Covariates

To control for factors that might bias the estimates, a set of socioeconomic and demographic characteristics of youth and families that have been theoretically or empirically linked with the main study variables was used as control variables drawing upon previous studies (Li et al., 2021; Ercan et al., 2013; Zhu et al., 2022; Chen et al., 2024; Dantchev et al., 2024) and were further informed by significant group differences and bivariate correlations observed in preliminary analyses. These covariates encompassed child sex (Ayano et al., 2023) (0 = boy, 1 = girl), child age (Danielson et al., 2024), mother's and father's educational level (0 = not literate, 1 = primary school, 2 = middle school, 3 = high school, 4 = college/university) (Taghizade et al., 2022). To control for current maternal depression and anxiety symptoms, Beck Depression Inventory (BDI; Beck, 1961) for Turkish population (Hisli, 1989) and Beck Anxiety Inventory (BAI; Beck, 1988) for Turkish population (Ulusoy et al., 1998) were used, with higher scores indicating greater symptomatology (Cronbach's α = 0.88, and 0.94, respectively).

Analysis Plan

Descriptive statistics (means, standard deviations) for all variables are reported in Table 2. Group differences in sociodemographic and study variables between children with ADHD and controls were examined using independent-samples t-tests and chi-square tests, as appropriate. Effect sizes were interpreted using conventional benchmarks (Cohen's d: 0.20 small, 0.50 medium, 0.80 large; correlations r: 0.10 small, 0.30 medium, 0.50 large; Cohen, 1988).

For the primary analysis, a dual first- and second-stage moderated path model (PROCESS Model 58; Hayes, 2022) was estimated to assess whether the association between diagnostic group (X; ADHD = 1, control = 0) and youth risky internet use (Y) was statistically accounted for by parent-child conflict (M) and whether maternal childhood trauma (W) was associated with variations in both the a- and b-paths. X was coded 0/1; M, Y, and W were z-standardized. Continuous covariates were mean-centered. Interaction terms XW and MW were computed from the centered/standardized variables.

Covariates were selected a priori based on prior literature and supplemented by variables showing significant group differences or notable bivariate correlations in preliminary analyses. Maternal depressive symptoms and maternal anxiety were included as covariates on M; child age and parental education were included on Y; and child sex, child age, and parental education were included on X. The structural equations were specified as: $M = i_M + a_1X + a_2W + a_3XW + m_1DeP + m_2Anx + e_M$, and $Y = i_Y + c'X + b_1M + b_2W + b_3MW + t_1ParEd + t_2ChildAge + e_Y$, with a supplementary equation $X = i_X + v_1Sex + v_2ChildAge + v_3ParEd + e_X$ to account for covariate associations with X.

When moderation occurs in both the a- and b-paths, the conditional indirect association is a quadratic function of W, and no single index of moderated mediation is available (Hayes, 2022, p. 476). Moderation was therefore probed using Hayes's pick-a-point approach at W =

Table 2 Group differences in ADHD symptoms, risky internet use, parent-child relationship, maternal childhood trauma, maternal depression and anxiety symptoms

	Case	Control	d	*p*
CPRS-RS - Oppositional	10.4 (5.48)	4.50 (3.46)	1.29	<0.001
CPRS-RS - Inattention/ Cognition	15.0 (4.03)	3.68 (4.14)	2.78	<0.001
CPRS-RS - Hyperactivity/ Impulsivity	13.1 (4.50)	2.25 (3.14)	2.79	<0.001
CPRS-RS - ADHD Index	29.0 (6.45)	9.28 (7.27)	2.86	<0.001
CTRS-RS - Oppositional	5.40 (4.75)	-	-	-
CTRS-RS - Inattention	6.90 (4.12)	-	-	-
CTRS-RS - Hyperactivity/ Impulsivity	15.2 (5.50)	-	-	-
CTRS-RS - Inattention Index	14.4 (3.36)	-	-	-
CTRS-RS - Hyperactivity/ Impulsivity Index	11.4 (3.59)	-	-	-
PCIAT20 - Risky Internet Use Total Score	21.6 (19.3)	16.4 (14.7)	0.3	0.101
CPRS - Child Parent Relationship - Conflict Subscale Score	36.3 (10.5)	28.4 (8.28)	0.83	<0.001
CTQ - Mother Childhood Trauma Total Score	44.6 (14.7)	47.7 (15.1)	−0.21	0.256
BDI - Mother Depression Symptoms	10.6 (7.07)	9.73 (8.88)	0.1	0.571
BAI - Mother Anxiety Symptoms	10.9 (10.4)	10.3 (11.4)	0.05	0.783

Variables are presented as mean and standard deviation (M, SD); *d* represents Cohen's *d*, an estimate of effect size; p-values were calculated using independent two-sample *t*-tests. CPRS-RS = Conners Parent Rating Scale–Revised: Short Form; CTRS-RS = Conners Teacher Rating Scale–Revised: Short Form; PCIAT20 = Parent–Child Internet Addiction Test, 20-item version; CPRS = Child-Parent Relationship Scale; CTQ = Childhood Trauma Questionnaire; BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory; ADHD = Attention Deficit and Hyperactivity Disorder

−1 SD, 0, and +1 SD, with bootstrap confidence intervals computed for each conditional indirect association. Maternal childhood trauma (W) was modeled as a continuous, z-standardized moderator, and parent-child conflict (M) was modeled as a continuous intermediate variable. In addition, simple-slope functions were estimated for the a- and b-paths across W.

Analyses were conducted in R 4.2.3 with lavaan 0.6–15 using maximum likelihood (ML) estimation and full-information maximum likelihood (FIML) for missing data. Inference relied on two-tailed tests and 95% percentile bootstrap confidence intervals based on 5,000 resamples with a fixed seed (12345). Path and conditional link estimates with bootstrap confidence intervals are reported (Hayes, 2022), with model fit indices presented descriptively according to Hu and Bentler's (1999) criteria (CFI≥0.95, TLI≥0.95, RMSEA≤0.06 with 90% CI, SRMR≤0.08). For the path model, standardized coefficients (β) and 95% bootstrap confidence intervals serve as effect size estimates.

Hypothesis testing included: (1) examining a_1 and b_1 along with the interaction terms a_3 (X×W) and b_3 (M×W); (2) estimating conditional indirect associations at W = −1 SD, 0, and +1 SD with bootstrap CIs; and (3) evaluating moderated mediation from changes in conditional indirect associations across W (or from significant interactions). Because the data are cross-sectional and observational, all models are correlational and cannot establish causal direction.

Results

Preliminary Analysis

Demographic Differences

Descriptive characteristics are summarized in Table 1 (N=120; 60 ADHD, 60 control). Compared with controls, the ADHD group included a higher proportion of boys (75.0% vs. 41.7%, p<.001) and was younger (M=8.30, SD=1.58 vs. M=9.15, SD=1.91; p=.009). Maternal age did not differ (p=.118), whereas fathers in the control group were slightly older on average (p=.040). Educational attainment was lower in the ADHD group: 48.3% of mothers held a university degree versus 71.7% in controls (p=.036), and fathers in the control group were more often university graduates (p=.010). Maternal occupational status did not differ overall (p=.514). In contrast, paternal occupation differed significantly (p=.016): self-employment was more frequent in the ADHD group (50.0% vs. 28.3%), whereas private-sector and civil-service roles were more common among controls. Household income did not differ by group (p=.477).

Group Comparisons

Table 2 reports means and standard deviations by group. Relative to controls, youth with ADHD scored substantially higher on all CPRS-RS domains, oppositional behavior (d=1.29), inattention/cognition (d=2.78), hyperactivity/impulsivity (d=2.79), and the ADHD Index (d=2.86), representing large-to-very-large group differences (all p<.001). They were also rated as having greater parent-child conflict (d=0.83, p<.001), a large effect. In contrast, risky internet use did not differ between groups on the PCIAT-20 total score (d=0.30, p=.101), indicating a small and nonsignificant difference. Maternal childhood trauma and mothers' current depressive and anxiety symptoms also did not differ between groups (all |d| ≤ 0.21, all p≥.256), consistent with small group differences. (Full test statistics are provided in Table 2.)

Bivariate Correlations

As shown in Table 3, the ADHD Index was strongly related to diagnostic group (r=.82; large) and moderately related to child-parent conflict (r=.49; medium-to-large). ADHD symptoms were also lower among girls (r=−.42; medium) and modestly lower among older children (r=−.20; small) and those with more educated parents (rs≈−0.22 to −0.26; small-to-medium). RIU was positively associated with maternal depressive symptoms (r=.27; small-to-medium) and negatively associated with paternal education (r=−.21; small). Maternal childhood trauma correlated positively with maternal depressive symptoms (r=.45; medium) and anxiety (r=.29; small-to-medium), and showed a small positive association with youth RIU (r=.20; small).

Primary Analysis

The dual first- and second-stage moderated path model (PROCESS Model 58) provided an excellent fit to the data, $\chi^2(13)=12.63$, p=.48, CFI=1.00, TLI=1.01, RMSEA=0.00 (90% CI [0.00, 0.09]), SRMR=0.034, meeting Hu and Bentler's (1999) recommended cutoffs (CFI≥0.95, TLI≥0.95, RMSEA≤0.06, SRMR≤0.08). See Table 4 for complete parameter estimates. Figure 2 illustrates the direct and indirect pathways linking ADHD status, RIU, parent-child conflict, and maternal childhood trauma.

Parameter labels in parentheses correspond to those in Table 4. Inference for indirect and conditional links is based on 95% percentile bootstrap CIs; p-values for defined parameters are not interpreted. ADHD status (a1) was positively associated with parent-child conflict; children with ADHD scored, on average, 0.75 SD higher on conflict (95% CI [0.42, 1.08]) Maternal childhood trauma (a2) showed a

Table 3 Correlations among the study variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Group													
2. Child Sex	−0.34**												
3. Child Age	−0.24**	0.17											
4. Mother Age	−0.14	0.16	0.25**										
5. Mother Education	−0.21*	0.04	−0.01	0.00									
6. Father Age	−0.19*	0.22*	0.13	0.67**	0.07								
7. Father Education	−0.24**	0.13	−0.04	0.01	0.61**	0.01							
8. Household Income	0.03	0.05	−0.15	−0.05	0.36**	0.05	0.39**						
9. Depression Symptoms	0.05	−0.10	−0.07	−0.13	−0.23*	−0.11	−0.21*	−0.13					
10. Anxiety Symptoms	0.03	−0.03	−0.05	−0.13	−0.39**	−0.03	−0.25**	−0.10	0.72**				
11. ADHD Index	0.82**	−0.42**	−0.20*	−0.25**	−0.22*	−0.27**	−0.26**	−0.00	0.15	0.07			
12. RIU	0.15	−0.14	0.19*	0.05	−0.17	0.05	−0.21*	−0.13	0.27**	0.18	0.33**		
13. Child-Parent Conflict	0.39**	−0.22*	−0.20*	−0.14	−0.19*	−0.21*	−0.12	−0.12	0.34**	0.18	0.49**	0.41**	
14. Maternal Trauma	−0.09	−0.10	0.01	−0.10	−0.07	−0.08	−0.13	0.05	0.45**	0.29**	0.03	0.20*	0.17

Group coded as 1 = case, 0 = control. Child sex coded as 0 = boy, 1 = girl. Child age is measured in years. Maternal and paternal education represent years of formal education, with higher values indicating more years completed. * indicates $p < .05$. ** indicates $p < .01$

near-zero association with conflict (0.03, 95% CI [−0.14, 0.24]), and the ADHD × trauma interaction (a3 = 0.08, 95% CI [−0.22, 0.42]) was small and not different from zero, suggesting that the ADHD-conflict association was relatively stable across trauma levels. Conflict was positively associated with RIU (b1 = 0.42, 95% CI [0.22, 0.62]). The conflict × trauma interaction (b3 = 0.17, 95% CI [−0.06, 0.34]) suggested a strengthening with trauma, though the CI included zero. Neither the association between ADHD and RIU controlling for conflict (c′ = 0.06, 95% CI [−0.28, 0.38]) nor the association between trauma and RIU (b2 = 0.10, 95% CI [−0.07, 0.26]) was statistically significant.

Conditional indirect associations suggested that the ADHD-RIU link via conflict was stronger at higher trauma levels: 0.17 (95% CI [0.007, 0.40]) at −1 SD trauma (ind_Wm1), 0.31 (95% CI [0.13, 0.54]) at the mean (ind_W0), and 0.49 (95% CI [0.14, 0.92]) at +1 SD (ind_Wp1). Corresponding total associations showed a similar pattern: 0.22 (95% CI [−0.12, 0.57]) at low trauma, 0.37 (95% CI [0.04, 0.69]) at the mean, and 0.55 (95% CI [0.11, 1.00]) at high trauma. Given that both stages are moderated in this model, the conditional indirect path is quadratic in W; therefore, we tested pairwise differences between conditional indirect association, using 95% percentile bootstrap CIs (5,000 resamples) rather than a single index. The between-level differences did not reach 95% significance: Δ(+1 vs. −1 SD) = 0.323, 95% CI [−0.119, 0.772]; Δ(+1 vs. 0 SD) = 0.175, 95% CI [−0.068, 0.460]; Δ(0 vs. −1 SD) = 0.148, 95% CI [−0.053, 0.321], consistent with a monotonic increase in the indirect path across W.

Simple-slope analyses indicated that the ADHD-conflict association was positive across the trauma range, from 0.67 (95% CI [0.21, 1.11]) at low trauma to 0.83 (95% CI [0.39, 1.32]) at high trauma. The conflict-RIU association increased from 0.25 (95% CI [0.02, 0.52]) at low trauma to 0.42 (95% CI [0.22, 0.62]) at average trauma, and 0.59 (95% CI [0.24, 0.88]) at high trauma. Among covariates, maternal depression (m1) was positively associated with conflict (0.36, 95% CI [0.05, 0.63]), older child age (t2) was positively associated with RIU (0.17, 95% CI [0.07, 0.26]), and girls (v1) were less likely than boys to be in the ADHD group (−0.29, 95% CI [−0.46, −0.12]).

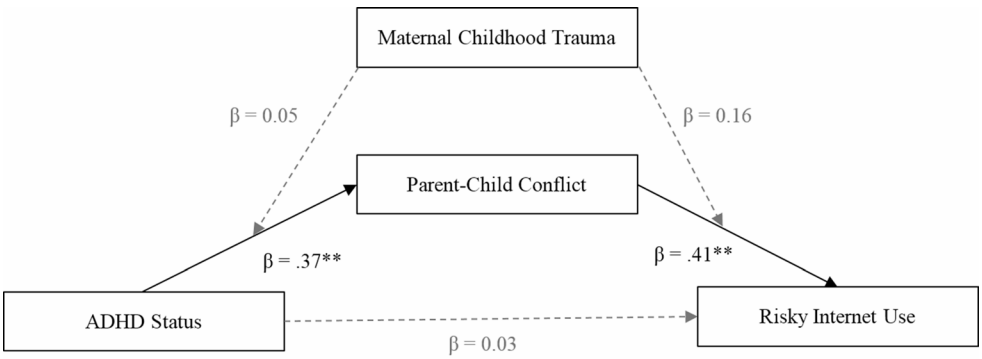
Discussion

This study examined whether the association between ADHD status and children's risky internet use (RIU) was statistically accounted for by parent-child conflict, and whether maternal childhood trauma moderated this pathway. Consistent with our hypotheses, children with ADHD showed higher levels of conflict than controls, greater

Table 4 Parameter estimates for the dual moderated-mediation model linking ADHD status to RIU via parent–child conflict as a function of maternal childhood trauma

Parameter (label)	B	SE	95% CI	*p*	β
Structural paths					
X → M (a1)	0.751	0.167	0.419, 1.080	<0.001	0.374
W → M (a2)	0.032	0.094	–0.141, 0.244	0.734	0.032
X × W → M (a3)	0.081	0.162	–0.218, 0.424	0.618	0.056
M → Y (b1)	0.417	0.103	0.215, 0.616	<0.001	0.411
M × W → Y (b3)	0.170	0.103	–0.061, 0.337	0.100	0.161
X → Y (direct, c′)	0.057	0.170	–0.278, 0.377	0.737	0.028
W → Y (b2)	0.100	0.084	–0.073, 0.259	0.233	0.098
Covariates					
Depression → M (m1)	0.363	0.146	0.049, 0.628	0.013	0.360
Anxiety → M (m2)	–0.114	0.138	–0.348, 0.197	0.409	–0.113
Parental edu → Y (t1)	–0.171	0.119	–0.410, 0.058	0.150	–0.169
Child age → Y (t2)	0.165	0.049	0.067, 0.259	0.001	0.285
Sex → X (v1)	–0.285	0.087	–0.457, −0.117	0.001	–0.281
Child age → X (v2)	–0.055	0.025	–0.103, −0.006	0.026	–0.194
Parental edu → X (v3)	–0.171	0.065	–0.302, −0.045	0.009	–0.343
Conditional indirect path					
W = −1 SD (ind_Wm1)	0.165	0.102	0.007, 0.402	0.106	0.080
W = 0 SD (ind_W0)	0.313	0.104	0.131, 0.541	0.003	0.154
W = +1 SD (ind_Wp1)	0.488	0.198	0.139, 0.919	0.013	0.246
Conditional total path					
W = −1 SD (total_Wm1)	0.222	0.179	–0.119, 0.569	0.214	0.100
W = 0 SD (total_W0)	0.370	0.168	0.040, 0.694	0.027	0.182
W = +1 SD (total_Wp1)	0.545	0.226	0.107, 1.002	0.016	0.291
Simple slopes: X → M (a-path)					
W = −1 SD (slope_a_Wm1)	0.670	0.233	0.205, 1.114	0.004	0.294
W = 0 SD (slope_a_W0)	0.751	0.167	0.419, 1.080	<0.001	0.374
W = +1 SD (slope_a_Wp1)	0.832	0.232	0.392, 1.318	<0.001	0.455
Simple slopes: M → Y (b-path)					
W = −1 SD (slope_b_Wm1)	0.247	0.126	0.017, 0.517	0.050	0.244
W = 0 SD (slope_b_W0)	0.417	0.103	0.215, 0.616	<0.001	0.411
W = +1 SD (slope_b_Wp1)	0.587	0.163	0.241, 0.880	<0.001	0.578

1. X = diagnostic group (1 = ADHD, 0 = control); M = parent–child conflict (z-scored); Y = risky-internet-use (z-scored); W = maternal childhood trauma (z-scored). Path labels follow: a-paths link X to M, b-paths link M to Y, c′ is the direct X→Y path, and numeric suffixes denote the moderator's role (e.g., a3 = X × W→M; b3 = M × W→Y). m1–m2 = maternal depression/anxiety covariates on M; t1–t2 = parental education and child-age covariates on Y; v1–v3 = sex, child age, and parental education covariates on X



Conditional indirect paths (standardized β; 95% percentile-bootstrap CIs):

W = −1 SD: β = .080; CI [.007, .402]; p = .106

W = 0 SD: β = .154; CI [.131, .541]; p = .003

W = +1 SD: β = .246; CI [.139, .919]; p = .013

Fig. 2 Path model of ADHD status in relation to risky internet use via parent-child conflict, with maternal childhood trauma moderating both stages. Standardized path coefficients (β) are shown, with significance levels indicated: **p*<.05, ***p*<.01, ***p*<.001. Conditional indirect paths are displayed for low (−1 SD), mean, and high (+1 SD) levels of maternal childhood trauma (5 000 bootstrap samples)

conflict was associated with more RIU, and the indirect ADHD-RIU association via conflict tended to be stronger when mothers reported higher trauma histories.

The pathway from ADHD to RIU seemed primarily indirect via parent-child conflict, with minimal residual association after controlling for conflict, in line with accounts that locate digital risk in person-context transactions rather than diagnosis alone. In the Interaction of Person-Affect-Cognition-Execution (I-PACE) framework, a person's self-regulatory vulnerabilities (e.g., impulsivity), affective states, and cognitive processes work together over time to shape how they use and potentially overuse digital technologies (Brand et al., 2019), and our data echo exactly this chain. Thus, ADHD-related vulnerabilities may be most consequential for RIU insofar as they contribute to a more conflictual family climate, which in turn appears more proximally tied to children's maladaptive digital engagement than diagnostic status itself. From a bioecological view, the family microsystem may be decisive; in macrosystems saturated with screens, group mean differences in RIU may remain small absent relational stressors (Bronfenbrenner & Morris, 2006). Meta-analytic evidence likewise ties poorer parent-child relationship quality to greater problematic internet use, reinforcing a family-process interpretation of the present results (Zhu et al., 2022).

Although the formal interaction terms were small with CIs that included zero, the conditional patterns were monotonic, such that the indirect association between ADHD and RIU through conflict increased with higher levels of maternal childhood trauma. This is compatible with an intergenerational stress-sensitization account in which parental adverse childhood experiences (ACEs) erode regulation and caregiving consistency, heightening the probability that everyday child challenges cascade into conflict and, subsequently, dysregulated digital behavior (McLaughlin et al., 2010; Plant et al., 2017). In this sense, maternal childhood trauma may operate partly as a proxy for heightened arousal, stress reactivity, and less consistent or more dysfunctional parenting styles, rather than a single isolated mechanism, which aligns with prior work on parental ACEs and caregiving difficulties (Lange et al., 2019; Rowell & Neal-Barnett, 2021). Systematic reviews and emerging meta-analytic evidence show that parental ACEs predict harsher, less consistent parenting and a range of child socio-behavioral problems (Greene et al., 2020; Racine et al., 2018; Rowell & Neal-Barnett, 2021; Weistra et al., 2024; Zhang et al., 2022), may be a context in which conflict-related risk is more likely to emerge. Our findings therefore suggest amplification (not qualitative moderation) of a family-conflict pathway under higher maternal trauma load.

Our results dovetail with quantitative syntheses showing robust associations between ADHD symptoms and RIU, while adding that the bridge appears relational rather than direct.

Recent meta-analytic and large-sample studies link attention and impulsivity dimensions with RIU (Augner et al., 2023), but these associations often weaken once parenting context is taken into account (Liu et al., 2023), a pattern that parallels our finding that the direct association between ADHD and RIU was close to zero after accounting for parent-child conflict. The present findings therefore help reconcile mixed reports about ADHD-RIU association by specifying a proximal family mechanism (Brand et al., 2019).

If conflict is the main conduit from ADHD to RIU, then interventions should prioritise reducing coercive cycles, sharpening limit-setting around digital media, and improving emotion coaching and monitoring, especially in families with maternal trauma histories. Behavioral parent trainings, recommended as first-line and supported by replicated benefits across child ADHD, parenting practices, and parent stress (Doffer et al., 2023; Lee et al., 2012; Phillips et al., 2024), may be augmented with trauma-informed elements for caregivers with ACEs in ways that align with our moderation pattern (McBain et al., 2023; Yu et al., 2025). Embedding structured digital-parenting modules within parent training programs may directly interrupt the conflict-RIU link observed here.

Conceptually, the pattern supports a context-over-diagnosis interpretation: the ADHD-RIU association was largely shared with parent-child conflict, and this shared association intensified at higher maternal trauma levels. This is compatible with stress-sensitization accounts (McLaughlin et al., 2010) of caregiving in which caregiver adverse childhood experiences heighten reactivity to daily child challenges (Luo et al., 2023; Zhang et al., 2025), increasing the likelihood that conflictual exchanges translate into dysregulated digital behavior (Wei et al., 2025). Clinically, the results highlight trauma-informed, family-focused strategies, reducing coercive cycles, strengthening emotion coaching, and tightening digital limit-setting and monitoring (Brand et al., 2019; Liu et al., 2024; Werner et al., 2024), as promising levers to blunt RIU risk in middle childhood, particularly in families with higher caregiver trauma load.

Strengths and Limitations

This study advances the ADHD-RIU literature by testing a theory-driven family mechanism in which ADHD status relates to RIU via parent-child conflict, with maternal childhood trauma amplifying both the a- and b-paths. A simultaneous first- and second-stage moderation framework (PROCESS Model 58) curbs post hoc specification and clarifies that the pattern aligns with graded amplification of the

indirect path rather than a categorical transition. Model performance was excellent and inference for indirect and conditional associations used percentile bootstrap confidence intervals based on 5,000 resamples, which are appropriate for product terms. Analytic decisions followed standard multivariate analysis texts (Hair et al., 2019; Hayes, 2022) and were consistent with related work (Sadeghi-Bahmani et al., 2025). Analyses statistically controlled for child sex and age, parental education, and internalizing symptoms, helping isolate the family-process pathway. Internal validity is supported by clinically anchored measurement, ADHD status derived from K-SADS-PL-DSM-5 interviews by a certified child psychiatrist with standardized teacher reports, and RIU and parent-child relationship quality assessed using validated Turkish scales with strong internal consistency.

Maxwell et al. (2011) highlight two core threats to causal interpretation in cross-sectional mediation: the absence of temporal ordering and the temptation to treat statistical associations as causal links. These concerns apply here. Our model posits that ADHD status relates to RIU indirectly through elevated parent-child conflict, with maternal childhood trauma conditioning both the ADHD to conflict and conflict to RIU links. Although this pathway is theoretically grounded (e.g., I-PACE and family-process accounts; Brand et al., 2019; Han et al., 2024; Liu et al., 2025; Weistra et al., 2024) and our estimates are consistent with that mechanism, the cross-sectional design cannot confirm sequence or exclude alternative explanations, including potential bidirectional associations (e.g., RIU aggravating conflict) and unmeasured confounding. Accordingly, we interpret the findings as evidence of an associated, conflict-shared pathway, not causal proof, and emphasize the need for prospective, multi-informant, longitudinal studies to test temporal precedence and reduce common-method bias.

Power was benchmarked to Fritz and MacKinnon (2007) for the percentile bootstrap. Using their path-size conventions, our estimates correspond to L-M (a ≈ 0.75 ~ large; b ≈ 0.42 ~ medium), with 59 participants sufficient to detect an indirect path of this size under simple mediation. With $N = 120$, the analysis was therefore well powered to detect the average indirect path. By contrast, our model tests dual moderated mediation (a×W, b×W), which typically requires substantially larger samples than simple mediation. In addition, covariate adjustment (sex, age, parental education, maternal depression/anxiety) increases model complexity and further reduces precision. Consistent with these expectations, the indirect path was detected, whereas pairwise differences between conditional indirects had wide confidence intervals and did not reach 95% significance, evidence of limited power for moderation despite adequate power for the mediation under the percentile-bootstrap framework.

Beyond issues of temporal precedence and statistical power, several additional design and measurement limitations warrant consideration. RIU was assessed as a broad composite, and we did not collect domain-specific indicators (e.g., gaming vs. social media) or total screen-time/objective digital-use metrics, limiting our ability to align I-PACE consistent pathways with particular online activities or overall exposure. ADHD was modeled as a categorical diagnostic status rather than continuous symptom dimensions, and we did not differentiate inattention from hyperactivity/impulsivity, which may obscure within-group heterogeneity in how specific symptom profiles relate to conflict and RIU; future work should therefore employ dimensional indices and examine inattention and hyperactivity/impulsivity pathways separately. Standardized cognitive or performance-based attention tests were not administered, so inferences about cognitive abilities and attentional control rely on clinical evaluation and should be interpreted cautiously. In addition, the ADHD group was drawn from a clinical outpatient setting and compared with community controls, which may limit the generalizability of the findings to other service settings, health systems, and sociocultural contexts.

A further set of limitations concerns informants and parental psychopathology. All caregiver questionnaire data, including maternal childhood trauma, parent-child conflict, and reports of child ADHD-related behaviors and RIU, were provided by mothers, making the study vulnerable to recall bias, social desirability effects, and shared-method variance and leaving father perspectives unavailable. Although we use the term parent-child conflict, dynamics may differ across caregivers (e.g., mothers vs. fathers) and may also reflect broader coparenting processes within the family system. Future work should explicitly examine fathers' involvement and father-child relationship quality, ideally using multi-informant data.

Although ADHD diagnoses were confirmed via K-SADS-PL-DSM-5 clinical interviews and supported by teacher reports, teacher ratings were used only for diagnostic confirmation in the ADHD group and were not included in the analyses, and objective or performance-based attention measures were not obtained, which may reduce external validity and obscure context-specific symptom patterns. Furthermore, although comorbidity was generally low, several children met K-SADS-PL-DSM-5 criteria for additional disorders ($n = 9$), which may have contributed to variability in parenting processes and RIU and could partially confound ADHD-specific associations.

In addition, given the high familial co-occurrence of ADHD, unmeasured parental ADHD symptoms may partially account for associations between child ADHD, parenting processes, and RIU. Moreover, the study lacks a comprehensive assessment of parental psychopathology,

including ADHD, and instead relies on maternal report of any prior psychiatric diagnosis for mothers and fathers; although only 6 versus 2 mothers and 2 versus 0 fathers in the case and control groups, respectively, were reported to have a psychiatric condition, unmeasured or subclinical parental symptoms may still have influenced both child outcomes and symptom reporting. Importantly, however, we statistically controlled for current maternal internalizing symptoms, depressive and anxiety symptoms, which helps reduce, though not eliminate, potential confounding related to maternal mood and anxiety at the time of reporting. Future research should adopt multi-method, multi-informant designs that explicitly assess parental psychopathology (including ADHD) and integrate teacher ratings, observer-coded tasks, and, where feasible, ecological momentary or digital-trace data.

Future Directions

Future work should establish temporal dynamics using prospective, multi-informant, longitudinal designs to test transactional mediation and bidirectionality between conflict and RIU. Construct precision may be improved by disaggregating RIU into domain-specific outcomes and incorporating digital trace/app-use telemetry to reduce common-method variance; trials comparing standard parenting interventions with trauma-informed, digital-parenting-enriched variants, moderated by caregiver trauma load and conflict reactivity, could clarify who benefits most. Measurement batteries should add dimensional ADHD indices, observational conflict tasks, and caregiver stress/regulation measures to map intergenerational mechanisms with greater fidelity. Implementation studies in pediatric ADHD services should evaluate routine caregiver-trauma screening, stepped-care referrals to parent training, and the scalability of digital-parenting components in real-world clinics.

Conclusion

Taken together, the evidence indicates that ADHD-linked vulnerabilities manifest in RIU primarily through family processes, especially conflict, and that maternal trauma amplifies this pathway. This nuance helps reconcile mixed reports of direct ADHD-RIU links and points to trauma-informed, family-focused intervention targets with clear translational relevance.

Authors' Contributions SD: Concept/design, data collection, materials/technical support, critical revision, final approval. SBS: Concept/design, data analysis/interpretation, materials/technical support, drafting of manuscript, critical revision, final approval. AFE: Concept/design, data collection, data analysis/interpretation, drafting of manuscript, materials/technical support, critical revision, final approval. TEE: Materials/technical support, critical revision, drafting of manuscript, final approval.

Funding Not applicable.

Data Availability The data that support the findings of this study are available on request from the corresponding author. The current study was not preregistered.

Declarations

Ethical Approval Ethical approval was granted by the Institutional Review Board of Bezmialem Vakif University, Faculty of Medicine (No: E-35700536-108.99-164296; Date: December 31, 2024). Written informed consent was obtained from all participants prior to data collection.

Consent for Publication All authors provided consent for publication.

Consent To Participate and Consent to Publish All participants provided written informed consent to participate in the study and consented to publication of anonymized data.

Competing interests Not applicable.

Conflict of interest The authors declare no conflicts of interest related to this work.

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