Exploring the intersection of adverse childhood experiences and Attention-Deficit/Hyperactivity Disorder symptoms in adulthood: Differential vulnerability and resilience factors

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Abstract

Attention-Deficit/Hyperactivity Disorder (ADHD) is a prevalent neurodevelopmental disorder that persists into adulthood. Studies have shown that Adverse Childhood Experiences (ACEs) are associated with ADHD symptoms and emotional dysregulation. Additionally, research suggests that resilience factors may play a protective role on the impact of ACEs on ADHD symptoms and emotional dysregulation. This study investigates the relationship between ACEs with ADHD symptom severity and co-occurring Emotion Regulation (ER) in adults, and examines how resilience may moderate the association between ACEs and ADHD symptoms as well as ACEs and ER in adult populations. Three hundred and six participants between the ages of 18 to 55 years with diagnosed or high self-reported ADHD symptoms completed surveys measuring ADHD symptoms, ER, ACES, and resilience. Correlational analyses examined relationships between ADHD symptoms, ACES, ER, and resilience. Significant results showed a negative association between ACES and ER, ADHD symptoms and ER, and ACEs and resilience, along with a positive relationship between resilience and ER. Additionally, exploratory analyses demonstrated that ACEs were associated with the Predominantly Inattentive Presentation of ADHD, and that resilience specific to family cohesion and social resources were potential moderators. These findings highlight the complex interplay between ACEs, resilience, and ADHD symptoms.

Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder marked by persistent inattention and/or hyperactivity-impulsivity that significantly hampers functioning (American Psychiatric Association, 2022). Prevalence estimates for ADHD worldwide range from 5% to 12%, making it one of the most common neurodevelopmental disorders in childhood (Polanczyk et al., 2007). Although ADHD is recognized as the most prevalent neurodevelopmental disorder in childhood, ongoing research repeatedly underscores that its symptoms endure into adulthood, frequently influencing numerous facets of an individual's life (Faraone & Biederman, 2005). Numerous studies provide extensive evidence suggesting that ADHD is a lifelong condition associated with a wide array of challenges (Kooij et al., 2019). These challenges include learning difficulties, school dropout, financial and relational struggles, elevated suicide and mortality rates, chronic fatigue, addiction, and intimate partner violence, among others (Kooij et al., 2019).

Building on this understanding, it is crucial to consider the broader health and comorbidity implications associated with adult ADHD. Kooij and colleagues (2019) discovered a correlation between ADHD with chronic physical disorders and autoimmune diseases attributed to forgetfulness and lifestyle challenges such as inadequate eating, sleeping difficulties, and lack of healthcare follow-up. Additionally, ADHD is commonly associated with a range of other disorders, including mood, anxiety, and substance use disorders, as highlighted by Kessler and colleagues (2006). These overlapping conditions not only contribute to the complexity of diagnosing and treating ADHD but also significantly amplify the burden faced by individuals navigating their health and well-being.

Considering all of the persistent challenges and coexisting conditions associated with adult ADHD, there are clear financial implications. Studies have highlighted significant societal costs linked to psychological and physical disorders that commonly co-occur with ADHD, and these estimates do not include the impact of co-occurring ADHD (Kessler et al, 2006). The combined direct and indirect costs of ADHD amount to approximately $200 billion annually in the United States, with adult patients representing about three-quarters of this total (Stibbe et al., 2020). Overall, it is evident that ADHD can affect individuals in various ways, and has broader impact on society as a whole. Continued research efforts in this field will be crucial for advancing targeted interventions and dispelling misconceptions surrounding ADHD, ultimately fostering increased acceptance and support for individuals with this condition.

DSM-V-TR Diagnostic Features of ADHD

The Diagnostic and Statistical Manual of Mental Disorders-V Text Revision (DSM-V TR) categorizes ADHD into three distinct presentations: Predominantly Inattentive Presentation, Predominantly Hyperactive-Impulsive Presentation, and Combined Presentation (American Psychiatric Association, 2022). Each presentation is defined by a specific set of symptoms that influence attention, activity level, and impulse control. ADHD, Predominantly Inattentive Presentation is characterized by difficulties in maintaining attention, being easily distracted, and making careless mistakes (American Psychiatric Association, 2022). In contrast, ADHD, Predominantly Hyperactive-Impulsive Presentation, entails symptoms such as fidgeting, restlessness, and frequent interruptions. Of note, while hyperactivity in childhood often manifests as constant movement, it can present as excessive physical activity, fidgeting, talking, and/or internal restlessness in adulthood (American Psychiatric Association, 2022). Similarly, impulsivity in adulthood can involve spontaneous, unplanned actions that may carry a high risk

of negative outcomes (American Psychiatric Association, 2022). Lastly, ADHD, Combined Presentation involves symptoms of both inattention and hyperactivity-impulsivity (American Psychiatric Association, 2022). Given these varied symptom patterns, diagnosing ADHD involves assessing specific symptoms and the level of impairment. As a neurodevelopmental disorder, ADHD typically begins in childhood, with the diagnostic requirement that several symptoms be evident before the age of 12. (American Psychiatric Association, 2022). Additionally, to confirm an ADHD diagnosis, symptoms must be present in multiple settings, such as at home and school or home and work (American Psychiatric Association, 2022).

Mild delays in language, motor, or social development frequently co-occur with ADHD, though they are not exclusive to ADHD (Korrel et al., 2017). Emotional dysregulation, or impulsivity with respect to emotions, is a common trait in both children and adults with ADHD (American Psychiatric Association, 2022). Individuals with ADHD often describe themselves—and are described by others—as quick to anger, easily frustrated, and prone to intense emotional reactions (Shaw et al., 2014; van Stralen, 2016). As well, even in the absence of a diagnosed Specific Learning Disorder, individuals with ADHD often experience difficulties in academic and/or occupational settings (American Psychiatric Association, 2022). In addition, individuals with ADHD often display neurocognitive deficits across various domains, including working memory, set shifting, reaction time variability, response inhibition, vigilance, and planning/organization (Pievsky & McGrath, 2018).

Development and Presentation of ADHD

Many parents first notice signs of excessive motor activity in their child during the toddler years, though it is challenging to differentiate these symptoms from the wide range of typical behaviours seen in children at that stage (American Psychiatric Association, 2022).

ADHD is most often identified during the elementary school years, when inattention symptoms in school settings become increasingly prominent and disruptive. The disorder generally remains stable through early adolescence. However, some individuals may experience a worsening of symptoms, including the emergence of antisocial behaviours (American Psychiatric Association, 2022). For most people with ADHD, the noticeable symptoms of motoric hyperactivity decrease during adolescence and adulthood, although challenges with internal restlessness, inattention, poor planning, and impulsivity often continue (Turgay et al., 2012). A substantial number of children with ADHD continue to experience impairment into adulthood, underscoring the importance of viewing ADHD as a chronic condition. This persistence of symptoms into adulthood emphasizes the need for mental health professionals to be vigilant in recognizing and managing ADHD symptoms across all developmental stages (Turgay et al., 2012).

As researchers continue to examine the developmental trajectory of ADHD, attention has also turned to how symptom presentation may vary across demographic factors such as sex and gender. Research in this area has used the terms, “sex” and “gender” interchangeably; therefore, the terminology used here will align with the authors’ usage. According to the DSM-V-TR (2022), females are more likely than males to primarily exhibit inattentive features of ADHD. These sex differences in the severity of ADHD symptoms may stem from varying genetic and cognitive liabilities, influencing how ADHD manifests in each gender (DSM-V-TR, 2022).

Scholars specializing in ADHD have investigated sex differences in ADHD symptom presentation in child samples. Studies generally show that males with ADHD are more likely to display externalizing symptoms, such as hyperactivity and impulsivity, while females tend to exhibit internalizing behaviours, like inattention. For instance, Skogli and colleagues (2013) explored sex differences in a clinical sample of children and adolescents with ADHD and found

that females with ADHD reported higher levels of anxiety, whereas males displayed more parent-reported rule-breaking behaviours, which could indicate internalizing and externalizing symptoms (Skogli et al., 2013). Similarly, Gaub and Carlson (1997) conducted a meta-analysis examining sex differences in ADHD symptoms and diagnostic trends. They reported that boys were more frequently diagnosed due to overt externalizing symptoms, while girls were often underdiagnosed because of subtler internalizing behaviours like inattention and anxiety (Gaub and Carlson, 1997). This result aligns with Skogli and colleagues' (2013) findings, further emphasizing the role of gender-sensitive diagnostic practices.

Adding to this body of evidence, Elkins and colleagues (2011) investigated sex differences in academic, interpersonal, and behavioural challenges among preadolescent children with ADHD, along with differences in ADHD presentation (also known as subtype based on prior DSM versions). They found that girls with the inattentive subtype faced greater academic and social difficulties than boys with the same subtype, such as lower Grade Point Averages, reduced academic motivation, fewer positive peer relationships, and lower self-concept. Furthermore, girls with the inattentive subtype are at higher risk of being bullied compared to boys with the same subtype, overall making girls more at risk for future mental health and social challenges in adolescence. In contrast, boys with the combined subtype experienced lower exposure to positive peer models compared to girls with the same subtype. Additionally, boys with the hyperactive-impulsive and combined subtype showed significantly higher externalizing behavioural disorders, such as conduct disorder and oppositional defiant disorder. As a result, both subtypes (hyperactive-impulsive and combined) are at potential risk for substance abuse in the future. These findings are consistent with prior research by Gaub and Carlson (1997), which also identified the unique challenges faced by girls with inattentive symptoms of ADHD in

domains like academic performance, social adjustment, and self-concept. Expanding on these gender differences, Gershon and Gershon (2002) conducted a comprehensive meta-analysis of differences in symptoms and comorbidities among children, adolescents, and adults with ADHD. They found that females exhibited fewer externalizing behaviours but showed more internalizing problems compared to males, echoing findings by other researchers.

The progression of ADHD into adulthood shows patterns that remain relatively consistent with earlier findings of child samples. For instance, Stibbe and colleagues (2020) investigated cognitive differences between male and female adults with ADHD using DSM-IV criteria and performance-based measures such as the Test of Attentional Performance (TAP). Their findings revealed significant gender differences in cognitive performance, with females showing slower reaction times and more errors in working memory tasks compared to males (Stibbe et al., 2020). Despite similar self-reported symptom severity, females exhibited more pronounced inattentive symptoms, suggesting a subtler and under-recognized presentation of ADHD in adult women (Stibbe et al., 2020). Faheem and colleagues (2022) systematically reviewed studies on adult ADHD, focusing on gender differences in prevalence and functional impairments. Although ADHD was generally more prevalent in males, the gender gap narrowed in adulthood, likely due to later or missed diagnoses in females. The review highlighted adult females with ADHD experienced greater impairments in social functioning, stress management, and mood disorders compared to males with ADHD (Faheem et al., 2022).

Interestingly, Wilens and colleagues (2009) systematically assessed the presenting symptoms of ADHD in adults using DSM-IV criteria, focusing on the persistence of inattentive symptoms and the role of psychiatric comorbidities, sex, and age in shaping symptom presentation. The results convey that both male and female adults with ADHD had high rates of

inattentive symptoms, with no significant differences in the total number of inattentive or hyperactive-impulsive symptoms between sexes. However, females were significantly more likely to endorse the inattentive symptom of losing things. When examining psychiatric comorbidity, men had significantly higher lifetime rates of comorbid conduct disorder and alcohol abuse, while women had higher rates of dysthymia, panic disorder, agoraphobia, simple phobia, and generalized anxiety disorder. The findings suggest that, although core ADHD symptoms may be similar between sexes, there are notable differences in the comorbidities associated with the disorder. Additionally, the study may suggest that inattentive symptoms are more prominent in adulthood perhaps due to socialization and learned behavioural adaptations which play a role in the shift from hyperactive-impulsive symptoms (more common in childhood) to inattentive symptoms in adulthood. Supporting this claim is the study conducted by Millstein and colleagues (1997) which found that inattention is the predominant symptom in adult ADHD, with 93% of the sample falling into either inattentive or combined subtypes. Additionally, they found that women tended to have fewer hyperactive-impulsive symptoms both currently and over their lifetime, which aligns with past research indicating inattentive symptoms being more prominent in female children (Millstein et al., 1997). The authors suggest that ADHD symptoms tend to decrease over time, with hyperactive-impulsive symptoms declining more significantly, while inattentive symptoms remain more persistent (Millstein et al., 1997).

Research shows that ADHD symptoms change over time, with differences in how they manifest across childhood and adulthood. In child samples, boys are more likely to exhibit externalizing behaviours such as hyperactivity and impulsivity, leading to higher diagnosis rates, whereas girls tend to display internalizing symptoms like inattention and anxiety, often resulting in underdiagnosis (Gaub & Carlson, 1997; Skogli et al., 2013; Quinn & Madhoo, 2014).

Additionally, girls with inattentive ADHD experience greater academic and social challenges, including lower self-concept and higher risks of being bullied (Elkins et al., 2011). As individuals age, studies suggest that hyperactivity declines while inattentive symptoms remain dominant, with females particularly endorsing these symptoms such as disorganization and forgetfulness (Wilens et al., 2009; Stibbe et al., 2020). However, findings on ADHD in adulthood are mixed; some studies show decreased hyperactive-impulsive symptoms with both sexes exhibiting more inattention (Millstein et al., 1997; Wilens et al., 2009), while others report greater inattention in females (Stibbe et al., 2020). The narrowing gender gap in ADHD diagnoses in adulthood may reflect missed diagnoses in childhood rather than an actual increase in prevalence among women (Faheem et al., 2022; Quinn & Madhoo, 2014). Overall, these mixed findings suggest that while ADHD symptoms evolve over time, the variability in symptom persistence and presentation across adulthood could be influenced by biological, environmental, and social factors, highlighting the need for further longitudinal research to better understand how ADHD manifests across different life stages (Quinn & Madhoo, 2014).

Difficulties in Emotion Regulation and Sex Differences

While studies have recognized the core symptoms of ADHD in adults as outlined above, the DSM-V-TR criteria does not include other symptoms that researchers have identified as core when studying this population. The DSM-V-TR acknowledges emotional dysregulation and emotional impulsivity as associated features of ADHD in both children and adults; however, it has not yet classified these as core symptoms when diagnosing ADHD in adults (American Psychiatric Association, 2022). Hirsch and colleagues (2018) examined ER difficulties in adults with ADHD, identifying significant challenges with adaptive ER and heightened negative affect. Their findings suggest a reinforcing cycle of poor self-concept and emotional dysregulation,

emphasizing the prominence of ER deficits in adults with ADHD (Hirsch et al., 2018). This research highlights the prominence of ER deficits in adults with ADHD. Additionally, Surman and colleagues (2011) investigated the familial transmission of ADHD with Deficient Emotional Self-Regulation (DESR) in adults between 18 and 55 years of age. They found that DESR co-segregates with ADHD, with siblings of individuals with ADHD+DESR showing significantly higher rates of DESR compared to ADHD-only or non-ADHD groups (Surman et al., 2011). The study identified ADHD+DESR as a distinct familial subtype of ADHD, rather than a secondary manifestation or an expression of other psychiatric disorders, highlighting that difficulties in ER are not just incidental but core to ADHD for individuals. These findings highlight the need to further explore the interplay between ADHD and ER deficits. To understand how these challenges manifest in individuals with ADHD, research has also focused on sex and gender differences in emotional regulation and related clinical presentations.

Consistent with findings from other studies, research suggests that girls with ADHD experience more pronounced emotional difficulties compared to boys. Klefsjö and colleagues (2020) examined gender differences in diagnostic procedures and treatments for ADHD in children and adolescent samples, girls were more often referred for emotional problems, received ADHD diagnoses later, and required more visits before diagnosis (Klefsjö et al., 2020). Additionally, girls were more likely to receive treatments targeting emotional issues, such as individual and family counseling (Klefsjö et al., 2020). As previously mentioned, Gershon and Gershon (2002) conducted a meta-analytic review revealing that in child and adult samples, girls with ADHD have higher levels of anxiety and depression compared to boys, which indicates that girls may experience more internalizing emotional challenges. Similarly, Mowlem and colleagues (2019) explored sex differences in ADHD symptoms and diagnosis among children

with high ADHD symptoms. Their study revealed that girls with ADHD exhibited higher emotional problems and greater impairments in emotional, conduct, and peer relationships compared to boys (Mowlem et al., 2019). Prosocial behaviours in girls appeared to often mask hyperactive/impulsive symptoms, contributing to underdiagnosis (Mowlem et al., 2019). These findings highlight that emotional problems are a hallmark of ADHD in girls compared to boys. Together, these studies emphasize the importance of considering emotional regulation challenges and internalizing symptoms in the diagnostic and treatment processes, particularly for girls with ADHD.

Similar to research on ER difficulties in children with ADHD, studies on adults show somewhat consistent findings regarding these challenges. The research conducted by Shaw and colleagues (2014) explored this in depth. The authors conducted a literature search for relevant articles and performed a meta-analysis. They found that emotion dysregulation is a common feature in ADHD, with clinic-based studies reporting it in 34%-70% of adults with ADHD (Shaw et al., 2014). Additionally, they found that the combination of ADHD and emotion dysregulation leads to significant impairment in social and occupational functioning with these individuals showing greater difficulties in peer relationships, family life and academic performance (Shaw et al., 2014). Similar findings were found in the study conducted by Liu and colleagues (2022) who found that adults with ADHD exhibited higher levels of emotion dysregulation. Imaging analyses suggested that ADHD participants had abnormal functional connectivity patterns in regions associated with ER, such as the right amygdala and prefrontal cortex (Liu et al., 2022). Additionally, in a scoping review done by Bodalski and colleagues (2023), five out of six studies found that females or individuals identifying as women with ADHD are more likely to experience emotional dysregulation than their male counterparts

(Anker et al., 2020; Hirsch et al., 2019; Surman et al., 2015; Welkie et al., 2020), with some studies highlighting stronger associations between ADHD and emotional regulation difficulties in females (Welkie et al., 2020), and others finding that males were more likely to experience emotional fluctuations (Lundervold et al., 2020). While ER difficulties are present in both adult males and females with ADHD, the findings are mixed, with some studies suggesting that adult females may experience more pronounced issues (Anker et al., 2020; Hirsch et al., 2019; Surman et al., 2015; Welkie et al., 2020).

Early Life Experiences and ADHD in Child Samples

Research on the relationship between Adverse Childhood Experiences (ACEs) and ADHD has gained traction in recent years. As previously stated, attention and concentration difficulties, impulsivity, and emotional regulation challenges are hallmark symptoms of ADHD, particularly in adulthood. Several studies have explored the interplay between early life experiences and ADHD symptoms, with the majority examining the association in childhood. Dekkers and colleagues (2021) explored the relationship between early life experiences and ADHD symptoms in children, focusing on the role of attachment representations and parenting influences. The study included 74 children diagnosed with ADHD (44 with Combined Presentation, 21 with Predominantly Inattentive Presentation, and 9 with Predominantly Hyperactive/Impulsive presentation) and 30 Typically Developing (TD) children. Results revealed that ADHD symptoms may be shaped by both child-specific and environmental factors. Early life stress, such as parental rejection, unresolved maternal mourning, and relational problems, was found to be associated with the development of ADHD, possibly through its impact on brain maturation and self-regulatory capacities. Insecure attachment relationships were found to impair children's ability to regulate emotions and behaviour, potentially exacerbating

ADHD symptoms. The study emphasized that both the inattentive and impulsive behaviours of children with ADHD along with parenting challenges—such as inconsistent caregiving—may interact in a reciprocal manner to reinforce attachment difficulties. Building on this, Humphreys and colleagues (2018) conducted a longitudinal study examining the impact of early life stress and ADHD symptoms and brain development in 214 children aged 9-13 years. They found that exposure to stressful life events, particularly those before age 5, significantly predicted the severity of ADHD symptoms (Humphreys et al., 2018). Additionally, brain imaging revealed structural changes linked to both stress and ADHD symptoms, suggesting that early adversity may impact brain areas related to attention and executive functioning (Humphreys et al., 2018). Similarly, Brown and colleagues (2017) focused on the association between early life experiences and ADHD symptoms in a large sample of children. The study sample included children aged 4 to 17 years, with parents providing responses regarding ADHD symptoms, severity, and their child's exposure to nine types of ACEs: socioeconomic hardship, divorce, death, domestic violence, neighborhood violence, substance abuse, incarceration, familial mental illness, and discrimination. The findings revealed a significant association between the number of ACEs and the likelihood of a parent-reported ADHD diagnosis. Children with higher ACEs scores had progressively higher odds of having parent-reported ADHD. Of the 9 ACEs examined, socioeconomic hardship, parental divorce, familial mental illness, neighborhood violence, and familial incarceration were significantly associated with a higher likelihood of having parent-reported ADHD. Children with socioeconomic hardship and parental mental illness were more likely to have moderate to severe ADHD symptoms, rather than mild levels of symptoms. In summary, these studies suggest that early life stress, attachment issues, and exposure to ACEs are associated with the higher ADHD symptoms in child samples.

Early Life Experiences and ADHD in Adult Samples

Research has also explored the long-term effects of early life experiences on ADHD symptoms in adult populations. The meta-analytic review by Cavicchioli and colleagues (2023) synthesized findings from 26 cross-sectional and longitudinal studies exploring the relationship between attachment patterns and ADHD symptoms in children and adolescents. Results indicated significant associations between insecure attachment styles and ADHD symptoms, specifically linking dismissive/avoidant and disorganized attachment to inattention, and ambivalent/preoccupied attachment to hyperactivity (Cavicchioli et al., 2023). Both cross-sectional and longitudinal correlations supported a transactional developmental model, suggesting mutual reinforcement between attachment insecurity and core ADHD features (Cavicchioli et al., 2023).

Storebø and colleagues (2016) expanded this line of inquiry by exploring the mediating role of environmental factors in the relationship between insecure attachment and ADHD. The review encompassed twenty-nine studies, including prospective, retrospective, cross-sectional designs and one case study. Three prospective studies (Lifford et al., 2008; Rochford, 2005; Skovgaard, 2010) found that parental rejection, unresolved maternal mourning (unprocessed grief), and parent–child relational problems in early childhood significantly increased the risk for ADHD in school-age children. These studies emphasized the importance of addressing ADHD symptoms early to prevent the development of attachment problems later on. Additionally, ten retrospective and cross-sectional studies identified risk factors for ADHD, including maternal depression, harsh parenting, and maternal insecure attachment (Audet & Le, 2010; Green et al., 2007; Karabekiroglu & Rodopman-Arman, 2011). A case study by Crittenden and Kulbotten (2007) suggested that ADHD could serve as a self-protective mechanism in families where

children feel insecure and unsafe. In terms of childhood ADHD and insecure attachment, three prospective studies (Fearon & Belsky, 2004; Pinto et al., 2006; Bohlin et al., 2012) demonstrated that children with disorganized attachment early on were more likely to develop ADHD symptoms later. These studies showed that disorganized attachment and inhibition were linked to ADHD and externalizing behaviours. Additionally, six cross-sectional and retrospective studies found that children with ADHD often have insecure attachment styles. For example, the Storebø et al. (2012) found that 93% of children with ADHD had some form of insecure attachment, while Green and colleagues (2007) showed that ADHD symptoms were associated with higher levels of attachment disorganization, particularly when maternal expressed emotion was high. Regarding adult ADHD and insecure attachment, three retrospective and cross-sectional studies (Brown, 2004; Edel et al., 2010; Miller, 2003) suggested that adults with ADHD were more likely to have experienced child abuse, which was linked to insecure attachment in their relationships. Edel and colleagues (2010) found that adults who recalled ADHD symptoms in their parents were more likely to experience attachment problems in their current relationships. Lastly, three retrospective and cross-sectional studies (Abdel-Hamid et al., 2011; McCoy, 2004; Pazvantoglu et al., 2011) found that adults with ADHD had a significantly higher incidence of insecure attachment styles than the general population. Abdel-Hamid et al. (2011) noted that adults with ADHD reported lower relationship quality, experiencing less romantic love and greater fear of attachment, which suggested that these issues should be addressed in therapy. These findings emphasize the intricate relationship between ADHD and attachment issues, highlighting the significance of early attachment in the development of ADHD symptoms across the lifespan, from childhood to adulthood.

In addition to the link between early attachment and ADHD symptoms, research has explored the relationship between childhood abuse/maltreatment and ADHD symptoms. Sanderud and colleagues (2016) explored the relationship between different typologies of child maltreatment (emotional, sexual, overall abuse, and no abuse), and the presence of co-occurring maltreatment and ADHD symptoms in young adulthood. Using data from a Danish national study of young adults, they assessed ADHD symptoms and revealed a significant association between childhood abuse and a 2- to 5-fold increase in the risk of ADHD symptoms in adulthood, with the strongest effect observed in the overall abuse group (Sanderud et al., 2016). Specifically, individuals with a history of abuse reported higher rates of ADHD symptoms, including restlessness, difficulty sitting still, and impulse control problems, compared to non-abused individuals (Sanderud et al., 2016). In addition to the latent class analysis, a chi-square analysis confirmed the association between different abuse categories and ADHD symptoms, with emotional abuse showing a particularly strong relationship (Sanderud et al., 2016). This result aligns with findings from studies by Rucklidge and colleagues (2006) and Alfonso and colleagues (2024), which found that adults with ADHD retrospectively reported higher levels of childhood trauma and exposure to early life stressors compared to those without ADHD. The reviewed studies provide important insights into the relationship between early life experiences, particularly attachment disruptions, and the development of ADHD symptoms across the lifespan. While the research demonstrates significant associations, there are some critical considerations and limitations that need to be addressed. Overall, while research suggests attachment disruptions are a significant factor in ADHD, further exploration is needed to better understand this association.

Trauma and ADHD

Boodoo and colleagues (2022) conducted a comprehensive review to explore the complex relationship between ADHD and childhood trauma, particularly in the context of ACEs and Post-Traumatic Stress Disorder (PTSD). The review integrated research across several key domains, including epidemiology, neurobiology, clinical presentation, assessment methods, and treatment strategies. By synthesizing existing literature, the authors highlighted a significant overlap in the symptoms of ADHD and PTSD, particularly in areas such as inattention, irritability, impulsivity, and emotional dysregulation. The study emphasized that while ADHD is traditionally considered a neurodevelopmental disorder linked to biological dysfunction, particularly involving the fronto-striatal circuit, PTSD is more commonly viewed as a psychological condition that stems from traumatic experiences, often leading to biological changes. However, the distinction between these two conditions becomes increasingly blurred in early childhood, where chronic trauma—such as maltreatment—can significantly impair neurobiological development, thereby contributing to both ADHD symptoms and an increased vulnerability to PTSD. The authors conducted a scoping review of literature, including some cross-sectional, retrospective, prospective designs, some large-scale population surveys, and meta-analyses, finding a high prevalence of both ADHD and trauma exposure, with many cases involving co-occurrence of the two conditions. The overlapping symptoms between ADHD and PTSD, including difficulties with concentration, hyperactivity, sleep disturbances, and emotional dysregulation, contribute to diagnostic challenges and complicated treatment. The results from a meta-analysis by Spencer and colleagues (2016) further revealed a bidirectional relationship between the two disorders: individuals with ADHD have a four times higher risk of developing PTSD compared to normal controls, while those with PTSD have twice the risk of developing

ADHD. Moreover, Ford and Connor (2009) found that individuals with ADHD and PTSD often experience exacerbated the severity of symptoms for each disorder, leading to a heightened risk of psychiatric comorbidities such as anxiety and depression. The review emphasized the importance of thorough clinical assessments to distinguish between the symptoms of ADHD and PTSD, and recommended integrated treatment approaches that address both conditions simultaneously.

The study conducted by Szymanski and colleagues (2011) aimed to investigate the relationship between trauma exposure and ADHD symptomatology in children and adolescents, particularly exploring the effects of trauma on ER, behaviour regulation, and cognitive functioning. The methodology used in the study involved a clinical sample of children and adolescents, and addressed two key questions regarding the trauma-ADHD association: First, does exposure to trauma increase the risk of developing ADHD? Second, could ADHD diagnoses potentially misrepresent symptoms stemming from traumatic experiences? The results revealed that children diagnosed with ADHD were significantly younger than those without ADHD, and that a substantial portion of the ADHD group had experienced early and chronic trauma, particularly in the form of physical abuse and foster care placements. The research highlighted the strong relationship between trauma exposure and difficulties with emotion and behaviour regulation, as well as cognitive functioning. The study noted that trauma-exposed children often exhibited symptoms that overlapped with ADHD, such as inattention, impulsivity, hyperactivity, and emotional dysregulation, which could be misattributed to ADHD. Furthermore, the study identified the high risk of misdiagnosis, with a 4:1 ratio of ADHD to PTSD diagnoses in the sample, suggesting that PTSD symptoms, such as hyperarousal and avoidance, were often incorrectly classified as ADHD symptoms. Similar to the findings of

Boodoo and colleagues (2022), the results suggest that the overlap between PTSD and ADHD symptoms can lead to misclassification, and trauma in childhood appears to be associated with the development and/or exacerbation of ADHD symptoms.

These findings emphasize the complex relationship between trauma and ADHD, highlighting the need for careful clinical assessment to differentiate between the two conditions. Boodoo and colleagues (2022) emphasized that early adversity, particularly in the form of childhood maltreatment and other ACEs, may contribute to the development and exacerbation of ADHD symptoms. The high prevalence of trauma exposure among individuals with ADHD suggests that environmental stressors and neurobiological vulnerabilities interact, increasing susceptibility to both ADHD and PTSD (Spencer et al., 2016). Furthermore, the increased risk of PTSD among individuals with ADHD—and vice versa—demonstrates the overlapping nature of these disorders, complicating diagnostic clarity. The findings of Szymanski and colleagues (2011) further support the notion that trauma-exposed children frequently exhibit symptoms such as inattention, impulsivity, hyperactivity, and emotional dysregulation, which can be misattributed to ADHD rather than trauma-related psychopathology. Notably, their study identified a 4:1 ratio of ADHD to PTSD diagnoses, suggesting a high risk of misdiagnosis and inadequate treatment planning. These results highlight the critical role of early life experiences in shaping attentional and behavioural outcomes in both childhood and adulthood, suggesting that adverse experiences may not only contribute to symptom expression but also influence long-term developmental trajectories. Given the significant symptom overlap, clinicians must adopt trauma-informed assessment strategies to avoid misclassification and ensure appropriate interventions (Ford & Connor, 2009).

Resilience Factors and ADHD

Studies have shown that individuals with higher ACEs report greater ADHD symptoms, suggesting that early life stressors and trauma may exacerbate or contribute to the severity of ADHD symptoms in adulthood, although it is also possible that a third variable such as shared familial vulnerabilities may be responsible for causing both higher ADHD and greater early life stressors. When examining resilience factors in ADHD, research has highlighted the importance of both individual and environmental influences in promoting positive outcomes for individuals with ADHD. Several studies have identified key resilience factors, such as supportive family environments, positive self-perception, and adaptive coping strategies, that help mitigate the challenges of ADHD and improve overall well-being. Dangmann (2024) emphasized that resilience can be fostered through individual-level strategies for managing ADHD and the presence of supportive relationships. This study is part of the larger Lillehammer Neurodevelopmental Follow-Up Study (LINEUP), which tracks children diagnosed with ADHD, Autism, or Tourette's syndrome over a ten-year period. Participants were recruited from child and adolescent mental health clinics in Norway, with 10 young adults (5 girls, 5 boys) from the original cohort consenting to in-depth semi-structured interviews at ages 21 to 24, exploring their lived experiences with ADHD. Participants in the study, who were followed from adolescence into early adulthood, reported that their life improved over time, largely due to factors such as recognizing the positives of ADHD, developing meaningful relationships, and receiving tailored support. This pattern of results aligns with findings from Modesto-Lowe and colleagues (2011), who reviewed literature on resilience factors for children with ADHD. Their review highlighted the importance of responsive parenting, family support, and positive peer relationships in improving long-term outcomes for children with ADHD. Children who received treatment and

had supportive environments showed better academic and social progress, whereas those with more severe symptoms struggled to achieve similar outcomes.

Mackenzie (2018) further reinforced these findings, noting that educational, interpersonal, and cognitive factors are essential in building resilience for children with ADHD. Interventions such as inclusive classroom practices and Cognitive-Behavioural Therapy (CBT) were found to enhance executive functions and social skills, contributing to improved peer relationships and better self-regulation. The study also pointed out that a positive self-concept, even in the face of challenges, plays a crucial role in preserving emotional well-being for children with ADHD. These studies collectively suggest that resilience in ADHD is shaped by a combination of internal coping mechanisms and external support systems, including family, peers, and therapeutic interventions. These factors contribute to better long-term outcomes, helping individuals with ADHD adapt and thrive despite early challenges.

Resilience Factors, ACEs and ADHD

Research has consistently shown that resilience factors can mitigate the negative effects of ACEs on mental health outcomes, including ADHD. Okwori (2022) aimed to explore the role of individual, family, and community resilience in moderating the effects of ACEs on mental health outcomes, particularly ADHD, among children in the United States. Utilizing data from the 2018 National Survey of Children's Health (NSCH), the research analyzed responses from 26,572 noninstitutionalized children aged 3 to 17 years. The study assessed ACEs and resilience factors at the individual, family, and community level. These measures allowed the researchers to examine the moderating role of resilience in the relationship between ACEs and mental health outcomes (including ADHD). Their findings indicated a significant dose-dependent relationship between ACEs and mental health issues, with each additional ACE increasing the likelihood of

ADHD, behaviour disorders, anxiety, and depression. Children exposed to four or more ACEs were found to have the highest prevalence of ADHD and other mental health problems. Importantly, resilience factors at the individual, family, and community levels significantly mitigated the adverse effects of ACEs, with children demonstrating high levels of resilience reporting substantially fewer mental health difficulties despite high ACE exposure. Individual resilience, as measured by persistence, curiosity, and emotional regulation, was particularly effective in reducing ADHD symptoms, while strong family and community support further decreased the risks of anxiety and depression. Similarly, Schneider and colleagues (2019) employed data from the 2016 National Survey of Children's Health (NSCH) to explore the intersection of ACEs, family resilience, and neurodevelopmental diagnoses, including ADHD. The study analyzed responses from 2,083 children aged 6 to 17 years, comparing ACE exposure and family resilience across different groups (ADHD, Autism Spectrum Disorder, and neurotypical children) (Schneider et al., 2019). Their findings indicated that family resilience, particularly in families of neurotypical children, was crucial for mitigating the effects of ACEs (Schneider et al., 2019). Findings from the research conducted by Uddin and colleagues (2020) demonstrated consistent results. They analyzed data from the NSCH and focused on 44,684 children aged 6 to 17 years, to investigate how parenting stress and family resilience mediate the relationship between ACEs and ADHD (Uddin et al., 2020).

The findings of this study highlight the significant role of parenting stress as a mediator in the relationship between ACEs and children's mental health and ADHD outcomes. The mediation analysis revealed that each additional adverse exposure increased the likelihood of reported mental health and ADHD symptoms, with parenting stress acting as a crucial pathway through which ACEs affected children's well-being. This finding aligns with psychopathological

models suggesting that dysfunctional family environments, such as those involving violence or substance abuse, contribute to parental affective disorders like depression and anxiety, which in turn negatively impact parenting practices. The study's results emphasize the importance of addressing parenting stress in intervention strategies, as it appears to exacerbate the mental health toll of ACEs, leading to more severe behavioural and emotional challenges for children.

In contrast, family resilience emerged as a protective factor that buffered the harmful effects of ACEs on children's mental health and ADHD outcomes. The analysis found that family resilience and connection significantly mitigated the negative consequences of ACEs, supporting previous research that has emphasized the importance of positive family dynamics in promoting better health outcomes for children. Resilience factors, such as strong family support and functioning, helped reduce the impact of ACEs, suggesting that enhancing family relationships and coping strategies could serve as a critical component of interventions for children affected by ACEs.

Research demonstrates that resilience factors—whether at the individual, family, or community level—play a crucial role in mitigating the negative effects of ACEs on mental health outcomes, including ADHD. Studies utilizing large national datasets have shown a strong dose-dependent relationship between ACE exposure and increased risk of ADHD, anxiety, depression, and behavioural disorders, with children experiencing four or more ACEs facing the highest prevalence of these challenges (Okwori, 2022; Uddin et al., 2020). However, resilience factors such as emotional regulation, persistence, and curiosity at the individual level, as well as strong family and community support, have been found to buffer these negative effects (Okwori, 2022; Schneider et al., 2019). Parenting stress has been identified as a key mediator in this relationship, exacerbating the impact of ACEs by contributing to dysfunctional parenting behaviours and

increasing children's vulnerability to mental health issues (Uddin et al., 2020). Conversely, family resilience, characterized by supportive relationships and positive coping mechanisms, significantly reduces the risk of ADHD and other psychological difficulties (Schneider et al., 2019). These findings highlight the importance of incorporating resilience-building strategies into interventions aimed at children with ADHD, particularly those exposed to adversity. Despite this growing body of evidence, there remains a critical gap in understanding how resilience factors function across different developmental stages, particularly in adults with histories of ACEs and ADHD. Future research is needed to explore the long-term effects of resilience and identify effective strategies for fostering protective factors across the lifespan (Okwori, 2022; Uddin et al., 2020).

Current Study

Although research has demonstrated a consistent association between ACEs and ADHD symptoms, there are several gaps in the literature that need to be addressed. First, while there is extensive research focusing on children, there is a lack of investigation into how ACEs are associated with ADHD symptoms and ER in adult populations. This information is crucial for understanding the progression of ADHD symptoms over time and the potential role of ACEs in shaping these symptoms into adulthood, highlighting the long-term impact. Additionally, by investigating resilience factors, this research aims to identify protective factors that may moderate the impact of ACEs on ADHD symptoms and emotional dysregulation in adults. This information could guide the development of more focused interventions that target these protective factors, which is crucial for developing effective interventions that address the unique needs of individuals with a history of ACEs and ADHD.

It is hypothesized that adults with greater exposure to ACEs exhibit more severe ADHD symptoms compared to those with fewer ACEs. In addition, adults with greater exposure to ACEs are expected to exhibit lower levels of Emotion Regulation (ER) compared to those with fewer ACEs. Further, resilience is expected to moderate the relationship between ACEs and ADHD symptoms, as well as the relationship between ACES and ER in this sample. In addition, while previous studies have examined sex disparities in ADHD symptom presentations, this research builds upon existing knowledge by investigating in an exploratory manner how ADHD symptom may differ depending on sex. Additionally, another area of exploration was in how particular resilience factors may moderate the impact of ACEs on ADHD symptoms and ER. This broader examination provides a deeper understanding of the potential differences between sexes, enhancing diagnostic accuracy and facilitating personalized treatment approaches that address the unique needs of individuals with ADHD. By uncovering the associations of ACEs with ADHD symptoms and ER in adults, understanding sex differences in ADHD symptoms, and exploring the role of resilience factors, this research provides valuable information that can inform targeted interventions and treatments for adults with ADHD. This information is crucial for improving outcomes and ensuring that adults with ADHD receive appropriate care and support.

Methods

Recruitment

Research Ethics Board approval was obtained by Saint Paul University and the University of Ottawa. Membership access to the INSPIRE core facility, with its associated student participant pool, at the University of Ottawa was obtained for recruitment and data

collection purposes. Financial support for the project was granted through the Graduate Student Support Program at Saint Paul University. The study utilized the Qualtrics survey platform, providing a web-based interface for participants to complete surveys. The Integrated System of Participation in Research (ISPR) student pool initiative served as a conduit for researchers to disseminate their proposed studies to students enrolled in affiliated undergraduate courses. This program offered students the opportunity to contribute to research endeavors, earning course credits in return for their efforts, while concurrently providing researchers with access to a sizable undergraduate cohort. Students from the University of Ottawa were able to view the study details through the ISPR database and determine whether they met the eligibility criteria. If they chose to participate, they were provided direct access to the Qualtrics survey link to complete the survey. Online platforms, paper recruitment posters, emails to listservs, and word of mouth were also utilized in recruitment, particularly through engagement with pertinent social media and community groups in Ottawa and in Canada. Individuals interested in participating were encouraged to contact the thesis student via email for more information about the study. Those who expressed interest via email were provided with a Qualtrics survey link to complete the survey.

Inclusion and Exclusion Criteria for Participants

Criteria for participant inclusion was set to guarantee the sample's relevance and suitability. Participants must be 18 years or older and possess a proficient understanding of the English language due to the study questionnaires being in English. Additionally, participants were asked to self-identify if they had ADHD, and this self-report was also confirmed based on their responses on the Barkley Current Symptoms Scale, by exhibiting at least 6 symptoms from the inattention and/or hyperactivity-impulsivity categories according to the DSM-V-TR criteria.

Participants were also required to report if they had a clinical diagnosis from a registered healthcare professional. Individuals under 18 years old, those with insufficient English language proficiency, or those who did not meet the minimum ADHD symptom count using the Barkley Current Symptoms scale and/or did not indicate a clinical diagnosis in the demographic questionnaire were excluded from this study. Participants were asked to provide informed consent to participate in the study. Participants who did not provide informed consent were also excluded from the study.

Participants

A total of six hundred and thirty-eight (638) participants participated in this study. The thesis student then applied the inclusion and exclusion criteria to confirm eligibility, and excluded any participants who did not meet the eligibility requirements. After applying the inclusion and exclusion criteria, a total of three hundred and six (306) participants were retained for the study. The study included 306 participants aged 18 to 55 years (N = 306), with an average age of 20 years. Regarding sex, the sample was comprised of 79 males, 222 females, 4 individuals who preferred not to disclose their sex, and 1 individual who did not respond. Participants' gender identities were reported as follows: 79 identified as men, 220 identified as women, 3 identified as non-binary or third gender, 1 preferred not to disclose their gender identity, and 1 identified as "Other", specifying that they use any pronouns. Out of the 306 participants, 157 identified as White, 28 as Black, 2 as Indigenous, 6 as Hispanic or Latinx, 50 as Asian, and 63 as "Other," which included Middle Eastern, mixed race, and other categories. Regarding participants' primary language, 196 reported English, 40 reported French, 53 reported being bilingual in English and French, and 17 reported "Other" without specifying a language. When examining highest level of education attained, 207 participants indicated a high school

education, 55 indicated some college education, 29 indicated a Bachelor's degree, five indicated a Master's degree, one indicated holding a professional degree, and nine selected "Other," which included undergraduate, college, and Collège d'enseignement general et professionnel **(**CEGEP). In terms of current occupation status, 229 participants reported being students, 47 reported being employed part-time, 11 reported being employed full-time, 7 reported being unemployed, and 12 reported "Other", specifying combinations such as being both a student and employed part-time, a student and employed full-time, or on leave. Participants had diverse socioeconomic statuses. Specifically, 58 reported an income of less than $10,000, 26 reported between $10,000 and $19,999, 11 reported between $20,000 and $29,999, seven reported between $30,000 and $39,999, 10 reported between $40,000 and $49,999, 11 reported between $50,000 and $59,999, 10 reported between $60,000 and $69,999, three reported between $70,000 and $79,999, 13 reported between $80,000 and $89,999, six reported between $90,000 and $99,999, 31 reported between $100,000 and $149,999, 36 reported an income of $150,000 or more, 83 preferred not to disclose their income, and one reported "Other" without specifying their income. Regarding marital status, 252 participants reported being single, 28 reported being married or in domestic partnerships, two reported being divorced, and 24 reported "Other," which included being in a relationship and/or dating. When asked about a clinical diagnosis of ADHD, 166 participants reported being clinically diagnosed by a licensed health professional. For those who reported "Yes," they were asked to specify the age of diagnosis, which ranged from 4 to 53 years. Participants were also asked to specify the subtype of ADHD they were diagnosed with. Fifty-one reported Inattention, 27 reported Hyperactive/Impulsive, 63 reported Combined, 58 reported Unknown, and 29 preferred not to disclose their diagnosis. A total of 140 participants reported "No" to being diagnosed by a licensed health professional. Regarding self-identification of

ADHD, 213 participants reported "Yes," 75 reported "Maybe," 16 reported "No," and two preferred not to disclose their self-identification status. Additionally, when asked about current stimulant medication use, 95 participants reported "Yes," 210 reported "No," and one participant did not respond. Refer to Table 1 in the Appendix for details.

Procedure

Participants were invited to participate in the study through the University of Ottawa's ISPR student pool. Additionally, a recruitment poster was shared online in various Facebook groups, and physical copies were posted at several establishments throughout the Ottawa region. Participants from the ISPR student pool were introduced to the study through the INSPIRE Lab's online platform, which provided a description of the study, inclusion and exclusion criteria, estimated survey completion time, and other relevant details. Students could then choose to sign up for the study and complete it online by following a link to the Qualtrics survey. Before beginning the survey, participants were asked to read the consent form and provide informed consent. Upon giving their consent, they were granted access to the questionnaires and proceeded to complete them. Community participants who saw the recruitment poster online or in various local establishments were instructed to contact the thesis student for more information, to clarify any questions, and to obtain the survey link. Once the thesis student confirmed the participant's interest, they were sent an anonymous link to the Qualtrics survey, where they could review the consent form and complete the associated questionnaires. The study measures included a demographic questionnaire, the Barkley Current Symptoms Scale (BCSS) to examine ADHD symptoms, the Difficulties in Emotion Regulation Scale (DERS) to assess emotional regulation, the Childhood Trauma Questionnaire (CTQ) to measure childhood trauma assessment, the Early Life Experiences Scale (ELES) to assess childhood experiences, and the

Resilience Scale for Adults (RSA) for resilience levels. The questionnaires were administered in the same order as outlined previously, maintaining consistency across all participants for methodological integrity.

Measures

Demographic Questionnaire

In the research study, participants were asked to complete a brief demographic questionnaire. This questionnaire aimed to gather essential information about the participants to ensure a comprehensive understanding of the sample demographics. Participants provided details on their age, gender identity, biological sex, ethnicity/race, highest level of education attained, current occupation, marital status, annual household income, country of residence, primary language, ADHD diagnosis by a licensed health professional (if applicable) or self-identification of ADHD (if applicable), age of diagnosis (if applicable), type of ADHD presentation (if applicable), name and dosage of stimulant medication for ADHD (if applicable), family members diagnosed with ADHD (if applicable), current and/or past treatment to manage ADHD symptoms and its effectiveness (if applicable), and other mental health diagnoses and health diagnoses from a licensed healthcare professional (if applicable).

Barkley Current Symptoms Scale – Self-Report (Short Version)

Barkley Current Symptoms Scale - Self-Report was employed to evaluate ADHD symptoms and specific presentations. This self-report instrument focuses on capturing both inattentive and hyperactive-impulsive symptoms of ADHD, as defined in the DSM-IV-TR (APA, 2000), reflecting behaviours over the past 6 months. By utilizing this measure, researchers can also identify individuals meeting the criteria for the Combined Presentation of ADHD. Comprising 18 items, each rated on a 4-point Likert-type scale (ranging from 0 for "never or

rarely" to 3 for "very often"), this scale ensures a comprehensive assessment of ADHD symptoms based on the DSM. Reliability analyses in the past yielded satisfactory results: .86 for the Inattention subscale, and .78 for the Hyperactivity-Impulsivity subscale (PsycTests Database Record APA, 2022). Studies have demonstrated that the BAARS-IV scale exhibits high internal consistency ($\alpha = 0.92$) for current ADHD symptoms and strong test-retest reliability ($r = 0.75$; Saleh et al., 2019). The Barkley Current Symptoms Scale - Self-Report Form thus offers a robust evaluation of ADHD symptoms, encompassing both inattentive and hyperactive-impulsive domains. This study assessed the total scores from the Inattention and Hyperactivity-Impulsivity subscales to evaluate the severity of ADHD symptoms and determine the various symptom presentations. Cronbach's alpha indicated good internal consistency ($\alpha = .80$) for the measure in this sample.

Difficulties in Emotion Regulation Scale (DERS)

The Difficulties in Emotion Regulation Scale ((DERS; Gratz & Roemer, 2004) is a comprehensive questionnaire aimed at evaluating an individual's challenges in regulating emotions, offering valuable insights into emotional functioning and psychological well-being. This scale comprises 36 items that assess six specific dimensions of ER. These dimensions are: (1) nonacceptance of emotional responses, reflecting negative reactions to one's emotions; (2) difficulties engaging in goal-directed behaviour during emotional arousal; (3) impulse control difficulties, measuring challenges in managing impulses and behaviours; (4) lack of emotional awareness, evaluating self-awareness of emotions; (5) limited access to ER strategies, assessing perceived ability to use effective strategies; and (6) lack of emotional clarity, reflecting difficulties in identifying and differentiating emotions. Respondents rate each item on a 5-point Likert scale, indicating how frequently they experience ER difficulty, ranging from "almost

never" to "almost always". Initial results indicate that the DERS exhibits strong internal consistency, reliable test-retest reliability, and satisfactory construct and predictive validity (PsycTests Database Record APA, 2021). According to Fowler and colleagues (2014), the DERS has good internal consistency (Cronbach's α from .80 to .89), test–retest reliability (r = .88), and construct validity. All DERS subscales, derived from the six factors identified in the factor analysis, demonstrated adequate internal consistency, with Cronbach's α exceeding .80 for each (Gratz and Roemer, 2004). This study used the total score to assess the severity of symptoms for adults with ADHD. Higher scores reflected higher ER abilities, while lower scores indicated lower ER abilities. Cronbach's alpha indicated good internal consistency (α = .88) for the measure in this sample.

Adverse Childhood Experiences (ACE)

In this study, ACEs were assessed using the Childhood Trauma Questionnaire (CTQ; Bernstein et al., 1994) and the Early Life Experiences Scale (ELES; Gilbert et al., 2003). Both measures utilize a 5-point Likert scale, allowing for direct comparability in scoring. To create a comprehensive index of ACEs, total scores from the CTQ and ELES were summed, with higher scores indicating greater adversity. Both scales were used in order to capture both discrete traumatic events as well as less discrete traumatic experiences of feeling threatened, subordinated, and unvalued growing up. Zhang and colleagues (2021) examined studies using various measures of childhood adversity, including the CTQ and ELES**,** highlighting their recognition as established tools. Their findings demonstrated significant heterogeneity in how child maltreatment is measured, suggesting that different instruments capture distinct but complementary aspects of adversity (Zhang et al., 2021). Given that the CTQ assesses severe trauma while the ELES captures relational and chronic adversity, combining these measures

provides a more comprehensive assessment of ACEs. The internal consistency of the combined measures in this sample was solid (α = .80). More information on each questionnaire is provided below. When the scores were combined and tested for reliability, the internal consistency was found to be good (α = .80).

Childhood Trauma Questionnaire – Short version

The Childhood Trauma Questionnaire (CTQ; Bernstein et al., 1994) is a commonly used self-report tool designed to evaluate the occurrence and severity of various types of childhood trauma. It assesses five types of traumas: emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect. The CTQ consists of 28 items, with five items dedicated to each type of trauma. Respondents rate each item on a 5-point Likert scale, indicating the frequency or severity of their experiences (ranging from "never true" to "very often true"). The CTQ displayed a Cronbach's alpha of 0.95 for the total scale, alongside favorable test-retest reliability within a subgroup of 40 individuals over a 2- to 6-month period (PsycTests Database Record APA, 2019). Regarding validity, patient reports on the CTQ remained highly consistent over time and across various instruments, with discriminant validity being affirmed (PsycTests Database Record APA, 2019). The CTQ subscale scores exhibit test-retest reliability coefficients ranging from .79 to .86 and internal consistency coefficients between .66 and .92 across initial validation samples (Liebschutz et al., 2019). CTQ scores offer valuable insights into the presence and impact of childhood trauma, aiding clinicians and researchers in understanding the link between early adverse experiences and psychological outcomes. Items were summed within subscales to form a total score, which were used in this study to assess severity of ACEs. Higher scores represented greater adversity, while lower scores indicated lower adversity. Cronbach's alpha was .60 for the measure in this sample.

The Early Life Experiences Scale (ELES)

The Early Life Experiences Scale (ELES; Gilbert et al., 2003) is a standardized instrument designed to assess ACEs across various domains. It measures respondents' recall of perceived threat and subordination in childhood in relation their parents and home environment. The scale comprises 15 items, and participants were instructed to indicate the frequency and truthfulness of each statement regarding their childhood experiences using a 5-point scale (1 = completely untrue, 2 = very occasionally true, 3 = sometimes true, 4 = fairly true, 5 = very true). The ELES demonstrates strong reliability, with Cronbach's alpha coefficients of 0.89 for Threat, 0.85 for Submissiveness, and 0.71 for (Un)valued. Moreover, the total scale exhibited high internal consistency, with an alpha coefficient of 0.92 (PsycTests Database Record APA, 2019). Items were summed to form a total score. Higher scores reflected greater adverse experiences, while lower scores indicated fewer adverse experiences. Cronbach's alpha indicated good internal consistency ($\alpha = .82$) for the measure in this sample.

Resilience Scale for Adults (RSA)

The Resilience Scale for Adults (RSA), developed by Friborg et al. in 2003, is a self-report assessment that measures resilience in adults. The original scale was comprised of 37 items, and the scale used in this study was a shorter version of 33 items. The RSA explores various aspects of resilience: (1) PoS = Personal Strength/Perception of Self, one factor of personal strength that measures an individuals' views of their own current strengths and abilities (Friborg et al., 2005), (2) PoF = Personal Strength / Perception of Future, one factor of personal strength that measures an individuals' beliefs about opportunities for realizing future plans and goals (Friborg et al., 2005), (3) SS = Structured Style measures an individuals' ability to uphold daily routines, to plan and organize (Friborg et al., 2003), (4) SC = Social Competence measures

an individuals' extraversion, social adeptness, cheerful mood, an ability to initiate activities, good communication skills and flexibility in social situations (Friborg et al., 2003), (5) FC = Family Cohesion measures an individuals' amount of family conflict, cooperation, support, loyalty and stability (Friborg et al., 2003), and (6) SR = Social Resources measures an individuals' access to external support from friends and relatives, intimacy, and the individual's ability to provide support (Friborg et al., 2003). The scale is designed to capture an individual's ability to navigate adversity and maintain psychological well-being. The Cronbach's alphas for the final 33-item version ($\alpha = 0.67–0.79$) were lower than those of the original 37-item version (Friborg et al., 2003). However, reliability estimates using structural equation modeling confirmed adequate internal consistency across all factors ($\alpha = 0.76–0.87$) (Friborg et al., 2005). The shorter version showed slightly reduced Cronbach's alpha due to unequal item loadings and fewer items, but structural equation modeling confirmed adequate to high internal consistency by accounting for these limitations (Friborg et al., 2005). The construct validity was substantiated through favorable correlations with other scales, such as the Sense of Coherence scale (SOC) and the Hopkins Symptom Checklist, indicating alignment with theoretical expectations (PsycTests Database Record APA, 2019). Items were summed within subscales to form a total score, which was used in this study to assess participants resilience. Higher scores reflected greater resiliency, while lower scores indicated lower resiliency. Cronbach's alpha indicated excellent internal consistency ($\alpha = .90$) for the measure in this sample.

Statistical Analysis

Means and standard deviations were calculated to summarize the responses. Bivariate correlations were conducted to examine the relationships among ACEs, ADHD symptoms, ER, and resilience. Regression models with interaction terms were employed to examine whether

resilience serves as a moderator of these associations. In terms of exploratory analyses, relationships between subscales of the main variables with total scores of other main variables were analyzed using bivariate correlations. Further, exploratory analyses examining interaction effects of specific resilience subscales on ACEs and ADHD symptoms were conducted. To determine if there are any statistically significant differences among sexes, Analysis of Variance (ANOVA) was used to compare the mean ADHD symptoms between males and females.

Results

In the current study, quantitative methods were used to assess ACEs, ADHD symptoms, difficulties in ER, and resilience in adults. A total of three hundred and six adults aged 18 to 55 years, all meeting research criteria for ADHD, participated in this study by completing online questionnaires assessing ACEs, ADHD symptoms, ER, and resilience. Specifically, it was expected that higher ACEs would be associated with higher ADHD symptoms, and that higher ACEs would be associated with higher ER symptoms, and it was predicted that resilience would moderate the relationship between ACEs and ADHD symptoms, as well as the relationship between ACEs and DERS.

Data Screening and Cleaning

Data screening and cleaning were conducted using SPSS 29.0. Before analysis, data were examined for accuracy, outliers, distribution, missing values, and normality assumptions. Values were missing at 6% of total data, and multiple imputation was conducted, yielding no significant differences in results. Linearity and homoscedasticity were assessed through bivariate scatterplots. Means and standard deviations of variables are presented in Table 2 (see Appendix), while correlations between the variables can be found in Table 3 (see Appendix). Additional main and exploratory results can be found in Tables 4 to 11 (see Appendix).

Correlations: Were adverse childhood experiences associated with ADHD symptoms and emotion regulation?

Pearson correlation analyses were conducted to examine the relationships between ADHD symptoms, ACEs, resilience, and ER. The findings indicate that ACEs were not significantly related to ADHD symptoms, nor were ADHD symptoms significantly related to total resilience. However, a moderate negative correlation was observed between ACEs and total ER score, indicating that higher ACEs are associated with lower ER, $r = -.36$, $p < .01$. A moderate negative correlation was found between total ADHD symptoms and total ER score, such that higher ADHD symptoms were related to lower emotion regulation, $r = -.33$, $p < .01$. Similarly, a negative correlation was identified between ACEs and resilience, indicating that individuals with higher ACEs scores tend to have significantly lower resilience, $r = -.60$, $p < .01$. Lastly, a moderate positive correlation was found between resilience and total ER, showing that higher resilience is associated with greater emotion regulation, $r = .51$, $p < .01$. Results were similar after covarying sex.

Regression Analysis: Does resilience moderate a relationship between ACEs and ADHD symptoms?

A regression analysis was conducted to examine whether resilience moderates a relationship between ACEs and ADHD symptoms. The model included ACEs, resilience, and the interaction between ACEs and resilience as predictors. The dependent variable was ADHD symptoms. The model summary indicated that the predictors accounted for only 2% of the variance in ADHD symptoms, $R^2 = .02$, Adjusted $R^2 = .01$). The overall model was not statistically significant, $F(3, 259) = 1.78$, $p = .15$, showing that ACEs, resilience, and their interaction did not significantly predict ADHD symptoms. Similar to the bivariate correlation

results, the relationship between ACEs and ADHD symptoms was not significant, and resilience was also not significantly related to ADHD symptoms (The interaction was also non-significant. These findings do not show support for the idea that resilience buffers the relationship between ACEs and ADHD symptoms. Results were similar after covarying sex.

Regression Analysis: Does resilience moderate the relationship between ACEs and ER?

A regression analysis was conducted to examine whether resilience moderates the relationship between ACEs and DERS. The model included ACEs, resilience, and the interaction between ACEs and resilience as predictors. The dependent variable was total ER. The model summary indicated that the predictors accounted for 28.50% of the variance in ER, $R^2 = .29$, Adjusted $R^2 = .28$. The overall model was statistically significant, $F(3, 252) = 33.47$, $p < .001$, suggesting that at least one of the predictors significantly contributed to explaining variations in ER. The relationship between ACEs and ER was nonsignificant. However, resilience was a significant predictor of ER, such that higher resilience was associated with greater ER, $\beta = 0.48$, $p < .001$. The interaction term was not significant. Overall, the findings show that resilience is significantly associated with ER abilities, but it does not significantly moderate the relationship between ACEs and ER abilities. Results were similar after covarying sex.

Exploratory Analyses

Correlation Analysis: ADHD Presentations with ACEs, DERS, and Resilience

A correlation analysis was conducted to examine the relationships between ADHD presentations (inattention and hyperactivity/impulsivity) and the main variables in this study, that is, ACEs, resilience, and ER. Results indicated a small but significant positive correlation between ACEs and inattentive ADHD symptoms, $r = .18$, $p < .01$), showing that individuals with

higher ACEs scores tended to report more inattentive symptoms. Additionally, resilience was negatively correlated with inattentive ADHD symptoms, indicating that individuals with higher resilience reported fewer inattentive symptoms, $r = -.28$, $p < .001$. ER was also negatively correlated with inattentive ADHD symptoms, suggesting that lower ER was associated with higher inattentive symptoms, $r = -.35$, $p < .001$. For hyperactive/impulsive ADHD symptoms, ER was negatively correlated with these symptoms, indicating that lower ER abilities were associated with greater hyperactive/impulsive symptoms, $r = -.19$, $p = .001$). No significant correlation was found between hyperactive/impulsive symptoms and ACEs nor resilience.

Correlation Analysis: ACEs questionnaires, ADHD symptoms, ER, and Resilience

Correlation analyses were conducted to examine the relationships between the two questionnaires used to form the ACEs measure (CTQ-sf & ELES), ADHD symptoms (BAARS), ER (DERS), and resilience (RSA). The CTQ-sf and ELES were strongly positively correlated, indicating substantial concordance between these two measures of childhood adversity, $r = .84$, $p < .01$. Regarding ADHD symptoms, neither CTQ-sf nor ELES were significantly correlated with BAARS scores, suggesting that childhood adversity was not directly associated with ADHD symptomatology. For ER abilities, both CTQ-sf and ELES were negatively correlated with ER scores, $r = -.37$, $p < .01$, $r = -.31$, $p < .01$, respectively. These results show that higher levels of childhood adversity were associated with greater difficulties in regulating emotions. In terms of resilience, significant negative correlations were found between both CTQ-sf and ELES with resilience scores, $r = -.57$, $p < .01$, $r = -.59$, $p < .01$, respectively. These findings indicate that greater childhood adversity was associated with lower resilience. Overall, these results suggest that greater childhood adversity, as measured by both the CTQ-sf and ELES, is linked to greater emotional regulation difficulties and lower resilience, but not associated with ADHD symptoms.

Correlation Analysis: Resilience Subscales, ACEs, ADHD symptoms, and ER

Correlation analyses were conducted to examine the relationships between resilience subscales, ADHD symptoms, ER, and ACEs. ADHD symptoms showed a small but significant negative correlation with the Perception of Self subscale and Social Resources subscale, indicating that individuals with higher ADHD symptoms reported lower confidence in their personal strengths and perceived fewer external social supports. $r = -.13$, $p < .01$, $r = -.12$, $p < .01$. Additionally, the Structured Style subscale of resilience was negatively correlated with ADHD symptoms, indicating that individuals with greater ADHD symptoms were less likely to engage in structured routines and organization, $r = -.23$, $p < .01$. No significant correlations were found between ADHD symptoms and the other resilience subscales. ER was positively correlated with all resilience subscales, including Perception of Self, $r = .60$, $p < .01$, Perception of Future, $r = .430$, $p < .01$, Structured Style, $r = .19$, $p < .01$, Social Competence, $r = .26$, $p < .01$, Family Cohesion, $r = .28$, $p < .01$, and Social Resources, $r = .32$, $p < .01$. these results suggest that individuals with stronger resilience factors, including higher self-perception, optimism about the future, structured planning, social skills, family support, and external social resources, reported greater emotional regulation abilities. ACEs were negatively correlated with all resilience subscales, including Perception of Self, $r = -.34$, $p < .01$, Perception of Future, $r = -.28$, $p < .01$, Structured Style, $r = -.24$, $p < .01$, Social Competence, $r = -.21$, $p < .01$, Family Cohesion, $r = -.72$, $p < .01$, and Social Resources, $r = -.54$, $p < .01$. These findings suggest that higher exposure to childhood adversity was associated with lower levels of personal strength, optimism about future opportunities, structured planning, social competence, family support, and external social resources.

Regression Analyses

Resilience Subscales, ACEs and ADHD symptoms

A series of moderated regression analyses were conducted to explore whether the six resilience factors moderate the relationship between ACEs and ADHD symptoms. The primary focus was on interaction effects to determine if resilience factors moderated the association between ACEs and ADHD symptom severity. Notably, interaction terms with ACES and two resilience factors—Family Cohesion and Social Resources emerged as significant moderators. The interaction between ACEs and Family Cohesion was significant, $\beta = -0.12$, $p = .04$. The simple slopes analysis for Family Cohesion as a moderator of the relationship between ACEs and ADHD symptoms revealed however that neither high nor low slopes (at mean +/- 1 *SD*) were significantly different from zero. However, the simple slopes analysis for ACEs as a moderator of the relationship between Family Cohesion and ADHD symptoms showed that at high levels of ACEs, Family Cohesion marginally significantly predicted ADHD symptoms, $p = .08$. However, at low levels of ACEs, Family Cohesion did not significantly predict ADHD symptoms, indicating that the slope was not significantly different from 0. Similarly, the interaction between ACEs and Social Resources was significant, $\beta = -0.14$, $p = .02$. The simple slopes analysis showed that the at low Social Resources, ACEs significantly predicted ADHD symptoms, $p < .01$, indicating a slope that was significantly different from zero. The simple slopes analysis showed that at low levels of ACEs, Social Resources marginally significantly predicted ADHD symptoms, $p = .07$, showing a slope that was significantly different from zero.

Resilience Subscales, ACEs and ER

Results indicated that Perception of Self was a significant predictor of ER abilities, with higher levels of Perception of Self associated with greater ER, $\beta = 0.56$, $p < .001$. The overall model was highly significant ($F(3, 264) = 61.021$, $p < .001$), explaining 40.90% of the variance

in ER. However, the interaction term between ACEs and Perception of Self was marginally significant, β = 0.09, p = .057. Similarly, Perception of Future was a significant predictor, with higher levels associated with greater ER, βB = 0.37, p < .001. The overall model explained 24.80% of the variance in ER, F(3, 266) = 29.308, p < .001. However, the interaction term between ACEs and PoF was not significant. For Structured Style, the model was significant, F(3, 264) = 14.313, p < .001, explaining 14.00% of the variance in ER. Structured Style was a significant predictor, β = 0.12, p < .05. However, the interaction between ACEs and Structured Style was not significant. Social Competence also emerged as a significant predictor, with higher levels associated with greater ER, β = 0.21, p < .001. The model was significant, F(3, 264) = 17.42, p < .001, explaining 16.50% of the variance. However, the interaction between ACEs and SC was not significant. Regarding Family Cohesion, the model was significant (F(3, 265) = 13.63, p < .001), explaining 13.40% of the variance in ER. However, Family Cohesion itself was not a significant predictor, nor was the interaction between ACEs and Family Cohesion. Lastly, the model for Social Resources was significant (F(3, 263) = 18.01, p < .001), explaining 17.00% of the variance in ER. SR was a significant predictor, β = 0.18, p < .05, however, the interaction term was not significant.

ANOVA Analysis: Sex and ADHD Presentations

A one-way Analysis of Variance (ANOVA) was conducted to examine sex differences in ADHD symptom severity and presentation, including inattention, hyperactive/impulsive symptoms, and total combined ADHD symptoms. The "Prefer not to say" category was excluded from the analysis. The results revealed a significant association between sex and inattention symptoms, F(1, 296)=4.06, p < .05, η2=.03, indicating that ADHD inattention scores differed between males and females. Post hoc comparisons showed that females (M = 26.53) had

significantly higher inattention scores than males (M = 24.95). For hyperactive/impulsive symptoms, the ANOVA was not significant, indicating that hyperactive/impulsive ADHD symptoms did not differ significantly based on sex. However, there was a significant association of sex with total ADHD symptoms, $F(1, 292)=3.96$, $p < .05$. Post hoc comparisons indicated that females (M = 50.36) had significantly higher total ADHD symptom scores than males (M = 47.68), $p <.05$.

Discussion

This study examined the relationships between ACEs, ADHD symptoms, ER, and resilience, with a focus on understanding their interplay and potential moderating effects of resilience. The goal was to explore how childhood factors contribute to differences in ADHD symptom expression and emotional self-regulatory abilities, ultimately informing clinical interventions aimed at improving outcomes for individuals with ADHD and histories of childhood adversity. It was hypothesized that greater ACE exposure would be associated with higher ADHD symptom severity and poorer ER abilities. Additionally, resilience was expected to serve as a protective factor, moderating the associations between ACEs and ADHD as well as ER. Findings revealed no significant correlation between ACEs and total ADHD symptoms, suggesting that ADHD symptom severity may be better understood as being associated with a combination of variables outside of ACEs. A negative correlation was found between ACEs and ER abilities, reinforcing previous findings that childhood adversity can significantly impair self-regulatory development. Resilience was also significantly associated with better ER abilities, consistent with prior research indicating that resilience can act as a protective factor against emotional dysregulation. However, resilience as a whole did not moderate the relationship between ACEs and ADHD symptoms or ACEs and ER, suggesting that while resilience is

positively associated with emotion regulation, it does not appear to change how ACEs relates to ADHD and ER. In addition, exploratory analyses examined individual subscales of the main study variables. The inattentive ADHD presentation was positively correlated with ACEs, suggesting that increased childhood adversity is associated with greater inattention symptoms. Similar relationships were found between inattentive ADHD symptoms and ER, reinforcing the links between early adversity, ER difficulties, and ADHD. Resilience was negatively correlated with inattentive ADHD symptoms, indicating that lower resilience is associated with greater inattention severity. Additionally, when examining the specific questionnaires that comprise the ACEs construct (CTQ-sf and ELES), similar patterns emerged, further supporting these relationships. When analyzing resilience subscales, external protective factors such as family cohesion and social resources appeared to be relevant. These findings suggest that while individual resilience is beneficial, broader social and familial support systems may be more effective in mitigating the adverse effects of childhood adversity. Additionally, significant sex differences in ADHD symptom expression were observed, with females reporting higher inattention and total ADHD symptom severity compared to males.

Interpretation of Key Findings

Adverse Childhood Experiences and Attention-Deficit/Hyperactivity Disorder

The correlation analysis of ACEs and total ADHD symptoms was nonsignificant, indicating that ACEs is not related to ADHD symptoms as a whole. This finding aligns with previous literature suggesting that while early adversity plays a role in cognitive and self-regulatory difficulties, ADHD is a multifaceted disorder influenced by a complex interplay of genetic, neurobiological, and environmental factors (Kooij et al., 2019; Brown et al., 2017).

Several studies have highlighted that exposure to adverse experiences in childhood, such as neglect, trauma, and family dysfunction, is associated with an increased risk of attentional difficulties, impulsivity, and emotional dysregulation—core symptoms of ADHD (Sanderud et al., 2016; Humphreys et al., 2018; Brown et al., 2017; Rucklidge et al., 2006; Alfonso et al., 2024). Neurobiological research also supports this link by demonstrating that early life stress can disrupt the development of key brain structures involved in attention and impulse control, such as the prefrontal cortex and the striatum, potentially exacerbating ADHD-related impairments (Dekkers et al., 2021 and Humphreys et al., 2018). However, despite these theoretical connections, the non-significant correlation in the current study suggests that ACEs are not associated with ADHD symptom severity. It is possible that other factors may play a substantial role in determining ADHD symptom severity. The causes of ADHD are understood to be a blend of genetic, environmental, and neurobiological factors. Genetically, ADHD is highly heritable, with studies indicating that heritability accounts for approximately 80% of the variance in ADHD (Balogh, et al., 2022). This high heritability suggests that while environmental stressors such as ACEs may contribute to the expression or exacerbation of symptoms, they are unlikely to be the primary cause of ADHD. Additionally, some researchers argue that ADHD may predispose individuals to experience more adverse events rather than ACEs directly causing ADHD symptoms. ADHD can predispose individuals to experiencing ACEs by contributing to increased family stress, parental maladjustment, and environmental instability, for example (Lugo-Candelas et al., 2020). Children with ADHD often exhibit difficulties with impulse control, inattention, and emotional regulation, which can strain parent-child relationships and lead to increased parental psychopathology, negative parenting practices, and household conflict—factors that are commonly classified as ACEs (Margari et al., 2013; Schermerhorn et

al., 2012). Additionally, the inattentive presentation of ADHD, which is often underdiagnosed and undertreated, may prolong the persistence of symptoms into adulthood, increasing the likelihood of accumulating ACEs over time due to the cascading effects of academic struggles, social difficulties, and family dysfunction (Rohde et al., 2000; Sayal, Goodman, & Ford, 2006). This bidirectional relationship makes it challenging to determine whether ACEs contribute to ADHD symptomatology or whether pre-existing ADHD traits increase the risk of encountering adverse experiences (Spencer et al., 2016).

Adverse Childhood Experiences and Emotion Regulation

The moderate negative correlation between ACEs and ER abilities found in this study is consistent with a growing body of literature suggesting that childhood adversity significantly impacts the development of self-regulatory capacities. Research has demonstrated that early life stress disrupts key neural structures involved in emotional regulation, such as the prefrontal cortex and amygdala, leading to long-term deficits in emotional control and increased susceptibility to mental health disorders (Dekkers et al., 2020; Humphreys et al., 2018). These structural and functional changes may explain why individuals with higher ACE exposure struggle more with regulating emotions, managing stress, and responding adaptively to challenges. Additionally, prior research has extensively documented the association between ACEs and emotional dysregulation. For instance, studies have shown that individuals with a history of childhood trauma exhibit heightened emotional reactivity, increased impulsivity, and reduced capacity for cognitive reappraisal—skills essential for adaptive emotional regulation (Schneider et al., 2019; Hirsch et al., 2018). Liu and colleagues (2022) highlighted that individuals with higher exposure to ACEs often present with impairments in prefrontal-amygdala connectivity, which can manifest as difficulties in ER. Boodoo and colleagues (2022) highlighted

the significant overlap between ADHD and PTSD, particularly in areas such as emotional dysregulation, inattention, and impulsivity. Their findings suggest that chronic childhood trauma can impair neurobiological development, contributing to persistent difficulties in self-regulation and increasing vulnerability to comorbid conditions such as PTSD, which may further exacerbate attentional and emotional difficulties. The association between childhood adversity and ER difficulties also aligns with research on the role of attachment disruptions. Storebø and colleagues (2016) argued that early relational trauma, such as neglect or inconsistent caregiving, compromises the development of secure attachment, which is foundational for ER. Children who experience unstable or unpredictable caregiving environments often develop maladaptive coping mechanisms, such as emotional suppression or hyper-reactivity, which persist into adulthood and increase vulnerability to psychological distress (Storebø et al., 2016; Lifford et al., 2008; Rochford, 2005; Skovgaard, 2010). Given these findings, interventions aimed at strengthening resilience are crucial in addressing the long-term emotional dysregulation associated with ACEs.

Resilience and Attention-Deficit/Hyperactivity Disorder

There was a nonsignificant relationship between total ADHD symptoms and resilience, which suggests no association between the two. While prior research has identified resilience as a protective factor against various psychological difficulties, its direct association with ADHD symptom severity appears limited. This result aligns with findings that ADHD is primarily a neurodevelopmental disorder with strong genetic underpinnings, which may reduce the extent to which resilience alone can mitigate symptom severity (Kooij et al., 2019; Balogh et al., 2022). Resilience is often conceptualized as an individual's ability to adapt and recover from adversity, utilizing internal and external coping mechanisms such as problem-solving skills, social support, and emotional regulation strategies (Modesto-Lowe et al., 2011; Okwori, 2022). While resilience

has been shown to buffer against mental health difficulties such as depression and anxiety (Okwori, 2022), its role in ADHD is less straightforward. ADHD is associated with deficits in executive functioning, impulse control, and attentional regulation (Pievsky & McGrath, 2018), which may hinder the development and application of resilience-related skills. Individuals with ADHD often struggle with maintaining motivation, setting long-term goals, and utilizing adaptive coping strategies—factors that are integral to resilience (Schneider et al., 2019). Additionally, ADHD commonly co-occurs with mood, anxiety, and substance use disorders (Kessler et al., 2006), which may independently contribute to symptom severity and further diminish the protective effects of resilience. Research also suggests that resilience in individuals with ADHD is largely influenced by external support systems rather than internal coping mechanisms alone (Dangmann, 2024; Mackenzie, 2018). Studies have demonstrated that strong family support, stable peer relationships, and structured interventions (such as cognitive-behavioural therapy) can enhance resilience and improve ADHD-related outcomes (Uddin et al., 2020; Schneider et al., 2019). However, in the absence of these protective factors, resilience may have a diminished impact on ADHD symptom expression. The nonsignificant result found in this study may reflect the complexity of this relationship, emphasizing the need for a more nuanced understanding of how resilience interacts with ADHD symptoms over time.

Resilience and Emotion Regulation

The positive correlation between resilience and ER suggests that individuals with higher resilience tend to exhibit greater ER abilities, aligning with research showing that resilience serves as a protective factor in managing stress, adapting to challenges, and regulating emotions (Schneider et al., 2019; Okwori, 2022). Given that ER is crucial for psychological well-being, those with higher resilience often display greater flexibility in coping strategies, improved

cognitive reappraisal skills, and stronger problem-solving abilities (Modesto-Lowe et al., 2011). Resilience helps individuals navigate distressing situations with composure, reducing impulsive reactions and fostering adaptive ER strategies such as cognitive reappraisal and problem-solving, whereas lower resilience is associated with maladaptive responses like rumination and avoidance (Mackenzie, 2018; Hirsch et al., 2018). Neuroscientific research further supports this relationship, linking resilience to enhanced functioning in ER-related brain regions, including the prefrontal cortex and anterior cingulate cortex, which improve connectivity with the amygdala to regulate emotional responses and prevent excessive reactivity (Liu et al., 2022). This evidence suggests that resilience not only enhances adaptive coping behaviours but is also deeply embedded in the brain's regulatory mechanisms, reinforcing its critical role in ER.

Resilience and Adverse Childhood Experiences

The strong negative correlation between resilience and ACEs suggests that individuals with greater exposure to adverse childhood experiences tend to have significantly lower resilience. This finding aligns with extensive research demonstrating that early life adversity profoundly disrupts the development of resilience, impairing an individual's ability to cope with stress, regulate emotions, and adapt to challenges (Schneider et al., 2019; Okwori, 2022). Given that resilience is generally defined as the ability to recover from adversity and maintain psychological stability through adaptive coping strategies (Modesto-Lowe et al., 2011), the relatively large effect size observed in this study is consistent with the critical role ACEs play in shaping resilience levels. Exposure to ACEs, such as neglect, abuse, and household dysfunction, interferes with key developmental processes necessary for building resilience, leading to difficulties with emotional regulation, impulse control, and stress management—factors essential for adaptive coping (Boodoo et al., 2022). Additionally, the neurobiological impact of ACEs

further exacerbates these challenges, as early life trauma has been linked to structural and functional changes in brain regions such as the prefrontal cortex, hippocampus, and amygdala, all of which are crucial for stress regulation and emotional resilience (Liu et al., 2022). These findings reinforce the idea that ACEs not only hinder psychological resilience but also have lasting effects on the brain's ability to support adaptive coping mechanisms, highlighting the profound and enduring consequences of childhood adversity.

The relationship between ACEs and lower resilience can also be explained through attachment theory and social learning models. Storebø and colleagues (2016) found that children exposed to early relational trauma, such as neglectful or inconsistent caregiving, often develop insecure attachment styles, which impair their ability to form healthy relationships, seek social support, and develop effective coping strategies. This understanding aligns with findings from Schneider and colleagues (2019), which indicate that individuals with high ACEs scores often experience a lack of protective factors, such as parental warmth, stable social connections, and access to positive role models—key elements that contribute to resilience development. Similarly, Uddin and colleagues (2020) emphasized that exposure to multiple ACEs increases psychological vulnerability by reinforcing maladaptive coping mechanisms, such as avoidance, emotional suppression, and hypervigilance, rather than fostering adaptive resilience.

Resilience: Moderation of Adverse Childhood Experiences on Attention-Deficit/Hyperactivity Disorder

The multiple linear regression analysis examined whether resilience moderated the relationship between ACEs and ADHD symptoms. The predictors accounted for only 2% of the variance in ADHD symptoms, and the overall model was not statistically significant. These results indicate that neither ACEs, resilience, nor their interaction meaningfully predicted ADHD

symptom severity in this sample. The interaction effect, which was in the negative direction, was not strong enough to reach statistical significance. Previous research has linked ACEs with increased ADHD symptoms and has highlighted resilience as a protective factor against psychological distress. Studies have documented this association (Alfonso et al., 2024; Brown et al., 2017; Humphreys et al., 2018; Rucklidge et al., 2006; Sanderud et al., 2016) and supported resilience as a mitigating factor (Okwori, 2022; Schneider et al., 2019). However, the current findings are inconsistent with the idea that resilience significantly mitigates the impact of ACEs on ADHD symptoms. This outcome is somewhat inconsistent with previous evidence indicating that resilience moderates the effect of ACEs on mental health outcomes, suggesting that resilience factors might be more effective in buffering mood and anxiety disorders (Uddin et al., 2020). Additionally, the low explanatory power of the model suggests that additional factors not included in the analysis may play a more significant role in moderating the ACEs-ADHD relationship. For example, prior studies have identified parenting stress, social support, and executive functioning as important mediators that influence ADHD symptom severity in individuals with high ACEs exposure (Schneider et al., 2019; Uddin et al., 2020). Additionally, the role of sex differences in ADHD presentation should be considered, as research has shown that males and females exhibit different symptom patterns and coping strategies, which may influence the effectiveness of resilience as a moderator (Faheem et al., 2022; Quinn & Madhoo, 2014).

Overall resilience scores did not significantly moderate the relationship between ACEs and ADHD, and the resilience subscale analysis was exploratory. In the exploratory analysis, two resilience factors—Family Cohesion and Social Resources —appeared relevant in significant interaction effects with ACEs on ADHD symptoms. The significant interaction between ACEs

and Family Cohesion suggests a potential buffering moderation effect of resilience on the link between childhood adversity and ADHD symptoms, such that those with strong family support may experience a weaker link between childhood adversity and ADHD symptoms. Speaking to the potential relevance of family cohesion as well, a marginally significant association was found between high family cohesion and low ADHD symptom severity, but only at high levels of ACEs. Similarly, the interaction between ACEs and Social Resources suggests that greater access to external social support may help buffer the association between ACEs and ADHD. These findings align with research highlighting the protective role of family and community support in mitigating the effects of early adversity on neurodevelopmental outcomes (Schneider et al., 2019; Uddin et al., 2020). Supportive family environments promote emotional regulation and adaptive coping in individuals with ADHD (Modesto-Lowe et al., 2011), while access to social resources, such as peer support and mentorship, fosters resilience and reduces ADHD-related impairments (Okwori, 2022). However, because this analysis was exploratory, these findings should be interpreted with caution. More research is needed to determine the extent to which Family Cohesion and Social Resources moderate the ACEs-ADHD relationship, as well as the specific mechanisms through which these protective factors may operate. Indeed, future studies should examine these relationships in larger, more diverse samples and investigate potential confounding factors that may influence the observed effects. Given the exploratory nature of these findings, these results provide ideas for future research, such as focusing on specific types of resilience in understanding the associations between ACEs and ADHD.

Resilience: Moderation of Adverse Childhood Experiences on Emotion Regulation

The multiple linear regression analysis examining whether resilience as a whole moderate the relationship between ACEs and ER revealed that the predictors accounted for 28.5% of the

variance in DERS scores, with the overall model being statistically significant. This suggests that at least one of the predictors—ACEs, resilience, or their interaction—contributed meaningfully to explaining variations in ER abilities. However, while resilience emerged as a strong and significant predictor of ER, the interaction between ACEs and resilience was not significant, indicating that resilience does not necessarily buffer the effects of childhood adversity on ER difficulties. This finding suggests that while resilience is associated with greater ER abilities overall, it does not moderate the association of ACEs with ER difficulties. This finding is somewhat unexpected, given prior research demonstrating that resilience can act as a protective factor in mitigating the negative effects of early-life adversity (Schneider et al., 2019; Uddin et al., 2020). One possible explanation is that the detrimental effects of ACEs on ER may be more deeply ingrained and resistant to buffering by resilience alone. The long-term effects of ACEs on ER are thought to be mediated by chronic stress exposure, altered neural pathways, and maladaptive coping mechanisms that may persist even in individuals with high resilience (Liu et al., 2022; Humphreys et al., 2018). Furthermore, while general resilience may not significantly moderate the ACEs-ER relationship, specific resilience factors—such as strong social support, self-efficacy, or mindfulness—could play a more significant role in buffering the impact of ACEs (Okwori, 2022; Mackenzie, 2018). The exploratory analysis examines this in greater depth concerning resilience subscales.

It is important to note that overall resilience scores were not significant in moderating the relationship between ACEs and ADHD, and the resilience subscale analysis was exploratory. While several resilience factors were significant predictors of ER, they were not significant in terms of moderation effects. The interaction between ACEs and Perception of Self was marginally significant, suggesting a potential moderation trend where self-perception may

influence the relationship between ACEs and ER, though this effect did not reach full significance levels. This finding suggests that while a strong self-perception may support ER, it may not be sufficient to fully moderate the association of childhood adversity on emotional regulation. Although resilience factors such as emotional regulation, persistence, and external support can buffer the negative effects of ACEs (Schneider et al., 2019; Uddin et al., 2020), familial and community support may play a more significant role than individual resilience alone (Mackenzie, 2018). Overall, these findings reinforce the importance of resilience in promoting ER, but suggest that it does not necessarily act as a protective buffer against the effects of ACEs. This result highlights the need for targeted interventions that enhance ER skills in individuals with high ACE exposure. Therapeutic approaches such as mindfulness-based interventions, cognitive-behavioural therapy, and trauma-informed care may be particularly beneficial in helping individuals with a history of adversity develop stronger self-regulation strategies (Schneider et al., 2019; Uddin et al., 2020).

Exploratory Results

Attention-Deficit/Hyperactivity Disorder Presentations, Adverse Childhood Experiences, Emotion Regulation, and Resilience

This study found a small but significant positive correlation between ACEs and inattentive ADHD symptoms, indicating that greater exposure to early adversity is associated with higher inattentive symptoms in adulthood. This finding aligns with research suggesting that childhood trauma and attachment disruptions may impact cognitive and emotional development, increasing ADHD risk (Storebø et al., 2016; Brown et al., 2017; Humphreys et al., 2018; Cavicchioli et al., 2023). Additionally, ACEs have been linked to structural brain changes in executive functioning regions, such as the prefrontal cortex, which may contribute to inattention

(Humphreys et al., 2018). Since inattentive symptoms tend to persist into adulthood more than hyperactive-impulsive symptoms (Millstein et al., 1997; Wilens et al., 2009), the long-term effects of early adversity may be more pronounced in this presentation. Individuals with trauma histories may internalize distress, leading to cognitive impairments rather than overt impulsivity. This possibility is consistent with findings that females, who experience ACEs at higher rates, are more likely to present with inattentive rather than hyperactive/impulsive symptoms in adulthood (Stibbe et al., 2020; Quinn & Madhoo, 2014). Conversely, results demonstrated a significant negative correlation between resilience and inattentive symptoms, indicating that individuals with higher resilience report lower levels of inattention. This finding aligns with prior studies emphasizing the role of resilience in mitigating the effects of early adversity, particularly on inattentive symptoms (Okwori, 2022; Schneider et al., 2019). Key resilience factors, such as positive family environments, emotional regulation, and self-efficacy, have been shown to buffer against cognitive and emotional difficulties in individuals exposed to ACEs (Uddin et al., 2020).

The study found that ER difficulties were negatively correlated with both inattentive and hyperactive/impulsive ADHD symptoms, reinforcing research that highlights emotion dysregulation as a core feature of ADHD, despite its absence from DSM-V-TR diagnostic criteria (American Psychiatric Association, 2022; Hirsch et al., 2018). Shaw and colleagues (2014) noted that emotion dysregulation significantly impairs social and occupational functioning in individuals with ADHD. Poor emotional self-regulation may exacerbate inattentive symptoms by increasing distraction, rumination, and task avoidance, aligning with studies linking ADHD and internalizing symptoms such as anxiety and depression (Gershon & Gershon, 2002; Mowlem et al., 2019). Similarly, impulsive emotional responses contribute to behavioural inhibition difficulties, excessive talking, and poor frustration tolerance (Surman et

al., 2011). Liu et al. (2022) further linked these deficits to functional abnormalities in the amygdala and prefrontal cortex, reinforcing the neurobiological basis of emotional dysregulation in ADHD.

Adverse Childhood Experiences Subscales, Attention-Deficit/Hyperactivity Disorder symptoms, Emotion Regulation and Resilience

Contrary to expectations, neither the Childhood Trauma Questionnaire – short form (CTQ-sf) nor the Early Life Experiences Scale (ELES) was significantly correlated with ADHD symptoms. These results suggest that childhood adversity, whether involving discrete trauma (CTQ-sf) or less discrete adversities (ELES), may not directly predict ADHD symptomatology in adulthood. This finding contrasts with previous studies that have linked ACEs to increased ADHD symptoms (Brown et al., 2017; Humphreys et al., 2018). One possible explanation is that ADHD symptoms may be more strongly influenced by genetic and neurodevelopmental factors rather than early adversity alone (Kooij et al., 2019). Additionally, this study examined ADHD symptoms in an adult population—where inattentive symptoms tend to be more predominant than hyperactive/impulsive symptoms (Millstein et al., 1997; Wilens et al., 2009)—, and it is possible that examining ADHD symptoms as a whole rather than the specific inattention presentation may have influenced results. Alternatively, individuals who develop ADHD following adversity may experience symptom exacerbation due to comorbidities such as anxiety or PTSD, which were not accounted for in this analysis (Boodoo et al., 2022).

Both ACEs subscales were significantly negatively correlated with ER, indicating that individuals with greater childhood adversity experience greater difficulties in ER. As discussed previously, this finding aligns with extensive literature showing that early adversity disrupts the development of self-regulatory capacities, leading to heightened emotional reactivity and

impulsivity (Shaw et al., 2014; Storebø et al., 2016; Hirsch et al., 2018). Given that emotion dysregulation is a common feature of ADHD, ACEs may indirectly contribute to ADHD-related impairments through their impact on emotional self-regulation rather than directly influencing core symptoms (Surman et al., 2011). Neurobiological research further suggests that early adversity affects emotional processing regions in the brain, such as the amygdala and prefrontal cortex, leading to heightened stress sensitivity and reduced inhibitory control (Hirsch et al., 2018; Liu et al., 2022). Additionally, significant negative correlations were found between both ACEs subscales and resilience, suggesting that individuals with greater exposure to childhood adversity tend to report lower resilience in adulthood. This result is consistent with findings from researchers who identified ACEs as a key risk factor for reduced adaptive coping abilities (Schneider et al., 2019; Uddin et al., 2020; Okwori et al., 2022; Modesto-Lowe et al., 2011).

Resilience Subscales, Adverse Childhood Experiences, Attention-Deficit/Hyperactivity Disorder symptoms, and Emotion Regulation

ADHD symptoms were negatively correlated with Perception of Self, Social Resources, and Structured Style, suggesting that individuals with higher ADHD symptoms tend to report lower confidence in their abilities, perceive fewer external social supports, and struggle with maintaining structured routines. This finding aligns with research indicating that individuals with ADHD often experience executive functioning deficits that impair organizational skills, self-efficacy, and the ability to plan and maintain daily routines, contributing to functional impairments in academic, occupational, and social domains (Kooij et al., 2019; Pievsky & McGrath, 2018). These difficulties may further exacerbate stress, leading to a cycle in which reduced structure and support contribute to worsening ADHD symptoms. Given the significant role that external support systems and self-perception play in daily functioning, interventions

aimed at improving time management, social support, and self-efficacy may help mitigate some of these challenges.

All resilience subscales were positively correlated with ER, indicating that higher resilience is associated with better emotional regulation abilities. Specifically, individuals with stronger self-perception, optimism for the future, structured planning, social competence, family cohesion, and external social support reported fewer difficulties with ER. This finding aligns with research demonstrating that resilience serves as a protective factor against emotional dysregulation, particularly in individuals with ADHD, who often struggle with regulating their emotions effectively, and studies showing that maintaining structured routines and organization further supports emotional self-regulation by enhancing executive functioning (Hirsch et al., 2018; Shaw et al., 2014). Given the strong association between resilience and ER, interventions aimed at strengthening resilience factors—such as social support networks and structured planning—may be particularly beneficial for individuals with ADHD or those at risk for emotional dysregulation.

ACEs were negatively correlated with all resilience subscales, suggesting that individuals with greater exposure to childhood adversity report lower levels of personal strength, optimism, structured routines, social competence, family support, and social resources. The strongest negative correlation was between ACEs and Family Cohesion, highlighting that early adversity is particularly detrimental to the development of stable family relationships. This finding is consistent with research showing that ACEs contribute to weakened familial bonds and reduced emotional support systems, increasing vulnerability to psychological distress and maladaptive coping mechanisms (Schneider et al., 2019; Uddin et al., 2020). Furthermore, the negative correlation between ACEs and Social Competence suggests that early adversity may hinder the

development of essential social skills, potentially contributing to interpersonal difficulties later in life (Okwori, 2022). These findings reinforce the long-term impact of ACEs on both personal and social resilience, emphasizing the need for early interventions aimed at strengthening support systems and promoting adaptive coping strategies.

Sex and Attention-Deficit/Hyperactivity Disorder Presentations

The findings revealed significant differences between males and females in inattention and total ADHD symptom severity, with females reporting higher levels of both compared to males. However, no significant differences were found in hyperactive/impulsive symptoms. These findings align with previous research indicating that females with ADHD are more likely to exhibit inattentive symptoms, while males are more likely to present with hyperactive/impulsive behaviours (American Psychiatric Association, 2022; Gaub & Carlson, 1997; Quinn & Madhoo, 2014; Elkins et al., 2011). The finding that hyperactive/impulsive symptoms did not significantly differ between sexes is consistent with studies suggesting that hyperactivity tends to decline with age, particularly in females, while inattentive symptoms persist into adulthood (Millstein et al., 1997; Wilens et al., 2009). Furthermore, evidence indicates that females with ADHD may develop compensatory strategies to manage their symptoms, leading to differences in how ADHD presents across the lifespan (Stibbe et al., 2020).

Limitations

Several limitations should be acknowledged in the current study. First, the study utilized a cross-sectional design, which prevents causal inferences regarding the relationships between ACEs, ADHD symptoms, DERS, and resilience factors. This design limits the ability to determine whether ACEs directly contribute to ADHD symptom severity or whether other underlying mechanisms (e.g., genetic predispositions) play a more significant role such that

ADHD symptoms contribute to ACEs, or both. Longitudinal studies tracking individuals over time are necessary to establish clearer causal relationships and developmental trajectories. Second, the study relied on self-report measures, which are inherently subject to recall bias, response bias, and social desirability effects (Rösler et al, 2006). Participants may underreport or overreport their childhood adversity, ADHD symptoms, or emotional regulation difficulties due to subjective memory errors or reluctance to disclose sensitive information (Rösler et al, 2006). To mitigate these biases, future research could incorporate multi-informant reports (e.g., parental, clinician, or teacher assessments) and objective measures such as neurobiological indicators (e.g., functional Magnetic Resonance Imaging [fMRI] scans, physiological stress markers). Another significant limitation is the generalizability of findings. The sample predominantly consisted of individuals from Ottawa, Ontario, with a large proportion of participants recruited from the University of Ottawa. Given that university students tend to represent a higher socioeconomic status, higher cognitive ability, and unique stressors, the results may not be applicable to broader populations, particularly those from lower-income backgrounds or individuals without post-secondary education. Additionally, the sample had a higher proportion of female participants, which could skew results, especially concerning sex differences in ADHD presentations. Future studies should aim for a more diverse and representative sample across socioeconomic, geographic, and demographic factors to strengthen external validity. Additionally, the main analyses of the study examined resilience as a whole as a potential moderator, and future research should explore interaction effects in more depth examining specific types of resilience and perhaps incorporating qualitative methods to understand how resilience mechanisms operate in real-world contexts. Lastly, unmeasured confounding variables may have influenced the results. Factors such as parenting styles, early

interventions, comorbid mental health conditions (e.g., anxiety, depression), and genetic predispositions were not directly examined in the present study. These variables could mediate or moderate the relationships between ACEs, ADHD symptoms, DERS, and resilience factors. Future studies should expand the model to include a wider range of contextual and biological variables to obtain a more comprehensive understanding of these relationships. Despite these limitations, the study provides valuable insights into the interplay between ACEs, ADHD symptoms, DERS, and resilience in adulthood. Future research addressing these concerns will enhance the robustness and applicability of findings in clinical and research settings.

Implications and Future Directions

The findings of this study have several important implications for clinical practice, psychological research, and the development of interventions targeting individuals with ADHD and histories of ACEs. One of the key implications is the need for trauma-informed approaches in ADHD assessment and treatment. Given the association between ACEs and increased emotional dysregulation, clinicians should consider early life adversity as a potential contributing factor when evaluating ADHD symptoms in adulthood. Trauma histories may exacerbate emotion regulation issues, making it essential for mental health professionals to integrate trauma-focused interventions alongside traditional ADHD treatments. Strategies such as Cognitive-Behavioural therapy (CBT), Dialectical Behaviour Therapy (DBT), and Mindfulness-Based Interventions could help address the emotional dysregulation that often accompanies ADHD in individuals with high ACE exposure.

Additionally, these findings suggest the importance of resilience-building interventions for individuals with ADHD and a history of high ACEs. Particular attention to resilience related to family cohesion and social resources may be helpful. External social and familial support

systems can play a more significant role in mitigating the effects of childhood adversity than internal coping mechanisms alone. Future research should examine whether interventions should prioritize strengthening familial relationships, improving social support networks, and fostering community-based resilience programs to provide long-term protective effects for individuals with ADHD. Moreover, the study highlights the importance of considering sex differences in ADHD symptom presentation. The finding that females reported higher levels of inattentive symptoms compared to males aligns with existing literature, consistent with the idea that ADHD in women is often underdiagnosed due to its more subtle presentation. Future research should explore how sex and gender differences interact with ACEs and ADHD symptoms, potentially influencing coping mechanisms, resilience development, and treatment responses.

Although this study provided valuable insights, several areas warrant further exploration. First, longitudinal studies on ACEs and ADHD are necessary, as this study utilized a cross-sectional design, which limits the ability to determine causal relationships between ACEs, ADHD, and resilience. Future longitudinal studies should examine how ACE exposure may influence ADHD symptom progression over time and whether resilience factors are more or less effective across different developmental stages. Additionally, the mechanisms underlying resilience factors remain unclear. The mechanisms through which resilience factors, such as family cohesion and social resources, operate require further investigation. Future studies should explore how specific aspects of social and familial support, such as emotional validation, mentorship, and structured guidance, may contribute to ADHD symptom management in individuals with high ACE exposure.

Given that ADHD is strongly associated with neurodevelopmental factors, future research could integrate neurobiological assessments, such as fMRI studies and cortisol

measurements, to examine how ACEs impact brain structures involved in attention, impulse control, and emotional reactivity. Such studies could provide a more comprehensive understanding of the biological underpinnings of ADHD in the context of early adversity. Furthermore, while resilience appears to be important, there is limited empirical research on how to effectively enhance resilience in adults with ADHD. Future studies should improve upon structured interventions, such as peer support programs, social skills training, and adaptive coping workshops, to determine which approaches best support ADHD symptom management in individuals with histories of adversity. Another important area for future research is the consideration of cultural and socioeconomic factors. The study sample was largely composed of university students, which may not be representative of broader populations. Future research should examine how socioeconomic factors, cultural background, and access to mental health resources influence the interplay between ACEs, ADHD, and resilience. Understanding these factors will be crucial for developing equitable interventions that address the needs of diverse populations.

This study contributes to the growing body of literature exploring the complex relationships between ACEs, ADHD symptoms, and resilience, and the emerging body of literature on adult ADHD. The findings emphasize the need for trauma-informed ADHD treatment, resilience-building strategies, and increased attention to sex differences in ADHD presentations. Future research should prioritize longitudinal designs, neurobiological assessments, and culturally informed interventions to better understand and support individuals with ADHD who have experienced early life adversity. By understanding and incorporating these insights, clinicians and researchers can develop more effective, personalized, and sustainable interventions for this population.

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Appendix

Table 1.

Demographic Characteristics of Participants

Characteristic	n	Range or %
Sex		
Female	222	73
Male	79	26
Prefer not to disclose	4	1
No response	1	<1
Gender		
Female	220	72
Male	79	26
Non-binary or third gender	3	1
Prefer not to disclose	1	<1
Other (any pronouns)	1	<1
No response	2	<1
Clinical ADHD Diagnosis		
Yes	166	54
No	140	46
ADHD Presentation		
Inattentive	51	17
Hyperactive/Impulsive	27	9
Combined	63	21
Unknown	58	19
Prefer not to disclose	29	10
Self-Identification of ADHD		
Yes	213	70
Maybe	75	25
No	16	5
Prefer not to disclose	2	1
Current Stimulant Medication Use		
Yes	95	31
No	210	69
No response	1	<1

Note. ADHD = Attention-Deficit/Hyperactivity Disorder. Percentages may not total 100 due to rounding.

Table 2.

Means and Standard Deviations of Variables

Variables	*n*	*M*	*SD*
BAARS	298	49.60	7.90
DERS	287	104.54	24.08
ACEs	287	84.57	31.49
RSA	286	111.63	20.36

Note. BAARS = Barkley Adult ADHD Rating Scale. DERS = Difficulties in Emotion Regulation Scale. ACEs = Adverse Childhood Experiences construct. RSA = Resilience Scale for Adults.

Table 3.

Correlations for Study Variables

Variable	1.	2.	3.	4.
1. BAARS	-	.10	-.08	-.33**
2. ACEs	.10	-	-.60**	-.36**
3. RSA	-.08	-.60**	-	.51**
4. DERS	-.33**	-.36**	.51**	-

Note. BAARS = Barkley Adult ADHD Rating Scale. DERS = Difficulties in Emotion Regulation Scale. ACEs = Adverse Childhood Experiences construct. RSA = Resilience Scale for Adults. *n* ranges from 270 to 298. **$p < .01$

Table 4.

Moderation Analysis: Resilience as a Moderator of the Relationship Between ACEs and ADHD symptoms.

Predictor	B	SE	*p*
Fixed Effects			
ACEs	.09	08	.23
RSA	.01	.08	.93
Interaction Effects			
Resilience × ACEs	-.09	.06	.14

Note. ACEs = Adverse Childhood Experiences construct. RSA = Resilience Scale for Adults. B = unstandardized beta, SE = standard error.

Table 5.

Moderation Analysis: Resilience as a Moderator of the Relationship Between ACEs and DERS.

Predictor	B	SE	*p*
Fixed Effects			
ACEs	-.08	.07	.23
RSA	.48	.07	<.001
Interaction Effects			
Resilience × ACEs	.02	.05	.65

Note. ACEs = Adverse Childhood Experiences construct. RSA = Resilience Scale for Adults. B = unstandardized beta, SE = standard error.

Table 6.

Correlations Between ADHD Presentations and Variables

Variable	1.	2.	3.	4.	5.	6.
1. ACEs	—					
2. RSA	−.602**	—				
3. DERS	−.355**	.510**	—			
4. BAARS Inattention	.18**	−.28**	−.35**	—		
5. BAARS Hyperactive/Impulsive	.001	.09	−.19**	.21**	—	
6. BAARS	.10	−.08	−.331**	.72**	.83**	—

Note. BAARS = Barkley Adult ADHD Rating Scale. DERS = Difficulties in Emotion Regulation Scale. ACEs = Adverse Childhood Experiences. RSA = Resilience Scale for Adults. *n* ranges from 270 to 302. ***p* < .01

Table 7.

Correlations Between ACEs Subscales and Variables

Variable	1.	2.	3.	4.	5.
1. CTQ-sf	-	.84**	.11	-.31**	-.57**
2. ELES	.84**	-	.11	-.37**	-5.86**
3. BAARS	.11	.11	-	-.33**	-.08
4. DERS	-.31**	-.37**	-.33**	-	.51**
5. RSA	-.57**	-.59**	-.08	.51**	-

Note. BAARS = Barkley Adult ADHD Rating Scale. DERS = Difficulties in Emotion Regulation Scale. RSA = Resilience Scale for Adults. CTQ-sf = Childhood Trauma Questionnaire – short form. ELES = Early Life Experiences Scale. *n* ranges from 274 to 298. **$p < .01$.

Table 8.

Correlations Between Resilience Subscales and Variables

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. PoS	-	.57*	.29*	.35*	.28*	.33*	-.13*	.60*	-.34*
2. PoF	.57*	-	.38*	.33*	.33*	.45*	.003	.43*	-.28*
3. SS	.29*	.38*	-	.06	.23*	.22*	-.23*	.19*	-.24*
4. SC	.35*	.33*	.06	-	.26*	.42*	.11	.26*	-.21*
5. FC	.28*	.33*	.23*	.26*	-	.65*	-.12*	.28*	-.72*
6. SR	.33*	.44*	.22*	.42*	.65*	-	-.06	.32*	-.54*
7. BAARS	-.13*	.003	-.23*	.11	-.12*	-.06	-	-.33*	.10
8. DERS	.60*	.43*	.19*	.26*	.28*	.32*	-.33*	-	-.36*
9. ACEs	-.34*	-.28*	-.24*	-.21*	-.72*	-.54*	.10	-.34*	-

Note. BAARS = Barkley Adult ADHD Rating Scale. DERS = Difficulties in Emotion Regulation Scale. ACEs = Adverse Childhood Experiences construct. RSA = Resilience Scale for Adults. PoS = Perception of Self. PoF = Perception of Future. SS = Structured Style. SC = Social Competence. FC = Family Cohesion. SR = Social Resources. *n* ranges from 274 to 298. *$p < .01$

Table 9

Moderation Analysis: Resilience Subscales Buffering the Relationship Between ACEs and ADHD Symptoms.

Predictor	B	SE	*p*
Fixed Effects			
Perception of Self	-.12	.06	.07
Perception of Future	.04	.06	.50
Structured Style	-.20	.06	<.001
Social Competence	.15	.06	.01
Family Cohesion	-.06	.090	.49
Social Resources	.07	.08	.36
Interaction Effects			
Perception of Self × ACEs	-.03	.06	.58
Perception of Future × ACEs	-.07	.06	.27
Structured Style × ACEs	.07	.06	.27
Social Competence × ACEs	-.03	.06	.62
Family Cohesion × ACEs	-.12	.06	.04
Social Resources × ACEs	-.14	.06	.02

Note. ACEs: Adverse Childhood Experiences. B = unstandardized beta, SE = standard error.

Table 10

Moderation Analysis: Resilience Subscales Buffering the Relationship Between ACEs and DERS.

Predictor	B	SE	*p*
Fixed Effects			
Perception of Self	.56	.05	<.001
Perception of Future	.37	.06	<.001
Structured Style	.12	.06	.04
Social Competence	.21	.06	<.001
Family Cohesion	.08	.09	.36
Social Resources	.18	.07	.01
Interaction Effects			
Perception of Self × ACEs	.09	.05	.06
Perception of Future × ACEs	-.01	.05	.86
Structured Style × ACEs	.03	.06	.60
Social Competence × ACEs	-.02	.06	.79
Family Cohesion × ACEs	.08	.060	.20
Social Resources × ACEs	.04	.06	.51

Note. ACEs = Adverse Childhood Experiences. B = unstandardized beta, SE = standard error.

Table 11.

One-Way ANOVA Examining the Effect of Sex on ADHD Presentations

Dependent Variable	Source	SS	df	MS	F	*p*	η^2
Inattention Symptoms	Between Groups	160.23	2	80.11	4.06	.02	.03
	Within Groups	5886.79	298	19.75			
	Total	6047.01	300				
Hyperactive/ Impulsive Symptoms	Between Groups	100.66	2	50.33	1.59	.21	.01
	Within Groups	9406.41	298	31.57			
	Total	9507.06	300				
Total ADHD Symptoms	Between Groups	486.28	2	243.14	3.96	.02	.03
	Within Groups	18056.41	294	61.42			
	Total	18542.69	296				

Note. ADHD = Attention-Deficit/Hyperactivity Disorder.