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The Impact of Early Childhood Exposure to Domestic Violence on Neurodevelopment and Educational Outcomes in the Early Years of Schooling

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Abstract

Exposure to domestic violence (DV) during early childhood is a significant concern due to its potential effects on neurodevelopment, learning and educational outcomes. This literature review critically examines the relationship between early childhood exposure to DV, neurodevelopmental changes and children's capacity to learn and succeed during the early years of schooling. Drawing on research concerning childhood trauma, toxic stress, brain development and educational achievement, the review explores how alterations in stress-response systems and brain regions involved in memory, attention and emotional regulation may influence children's classroom engagement and academic performance. Associations between childhood adversity and difficulties are identified in cognitive functioning, emotional and behavioural regulation, school engagement and academic achievement. The review highlights the need for further longitudinal research and recommends trauma-informed educational practices, early identification of learning and behavioural difficulties, and collaboration between educators and relevant support services. A clearer understanding of the relationship between early childhood exposure to DV, neurodevelopment and learning is essential to informing educational responses that support children's wellbeing and academic development.

Keywords

Domestic Violence, Early Childhood, Neurodevelopment, Educational Outcomes, Childhood Trauma, Toxic Stress

1. Introduction

This paper aims to critique and analyse the impact of exposure to DV on children

in the early years and how it impacts their neurodevelopment and educational outcomes within the early years of their schooling. Early childhood is an important period from birth to age 8, during which future learning, behaviour and wellbeing are established. During this time, children experience rapid cognitive, social, emotional and neurological growth, with each developmental stage interacting to support and influence the other. According to Allen & Kelly (2015), it has been suggested that children's learning begins at birth, as children actively construct knowledge through reciprocal relationships, experiences, and interactions within their environment. Therefore, these early years are well known to have lasting implications for later academic achievement and a child's overall wellbeing (Allen & Kelly, 2015).

The primary focus of this paper aims to critically present and justify to *what extent exposure to DV affects and influences early childhood neurodevelopment and educational outcomes in the early years of schooling. This review is guided by two research questions: What neurodevelopmental changes are associated with exposure to DV in early childhood, and how early childhood exposure to DV influences children's learning, academic achievement and overall success at school*? The author aims to critically examine the available evidence relating to these research questions, focusing on three key areas:

1) A critical analysis and justification of the relationship between early childhood exposure to DV and its effects on neurodevelopment and educational outcomes.

2) Caveats and limitations of the existing literature, research findings or lack thereof.

3) Recommendations and propositions in line with the guiding question and initial lines of inquiry.

Review Methodology

This literature review critically examines the relationship between early childhood exposure to DV, neurodevelopment and educational outcomes during the early years of schooling. The review draws on peer-reviewed research articles, academic publications, and relevant government and professional reports on childhood trauma, stress-response systems, brain development, learning, and educational achievement.

Various literature was considered for its relevance to the review's two guiding questions: the neurodevelopmental changes associated with early childhood exposure to DV and the relationship between such exposure and children's learning, academic achievement and school participation. Particular focus was concentrated on research involving children from birth to approximately eight years of age (early years), reflecting its emphasis on early childhood and the initial years of formal schooling.

The literature was examined thematically, with findings organised around childhood trauma and adverse childhood experiences, stress-response regulation,

neurodevelopment, cognitive and emotional functioning, and educational outcomes. Where the research examined more comprehensive childhood maltreatment or adverse childhood experiences rather than exposure to DV specifically, these findings were considered supporting evidence and interpreted cautiously. Research involving adult or clinical populations was not treated as direct evidence of outcomes among young children exposed to DV.

The available evidence was critically considered in relation to study populations, research methods, the nature of the reported associations and the extent to which findings could be applied to children exposed to DV. Limitations included differences in definitions and measures of childhood adversity, co-occurring adverse experiences, and the limited capacity of some studies to establish causal relationships. These considerations informed how the literature was interpreted and the recommendations for future research and educational practice.

2. The Impact of Early Childhood Exposure to Domestic Violence on Neurodevelopment

2.1. Childhood Trauma Resulting from Domestic Violence

According to the United Nations (2025), DV, also referred to as domestic abuse or intimate partner violence, is defined as a repeated pattern of behaviours used to establish or maintain power and control over an intimate partner. These behaviours can involve physical, sexual, emotional, financial, or psychological abuse, including threats or intimidation intended to manipulate, frighten, humiliate, or harm another person. DV can occur in any intimate relationship, including those married, living together, or dating. DV affects people of all ages, genders, cultural backgrounds, religions, education levels, and socioeconomic groups (United Nations, 2025).

Consequently, adverse childhood experiences (ACE) from exposure to DV can generate chronic stress and trauma that can influence children's developmental and behavioural outcomes within early childhood. In order to discuss trauma effectively, it is required to understand what trauma is, from a psychological perspective. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), trauma and stress-related disorders are followed by a traumatic or stressful event (American Psychiatric Association, 2022). Cases of trauma can vary from a phenotype of anxiety or fear, or characteristics of anhedonia and dysphoria, aggression and dissociation. Various diagnoses have been introduced to meet DSM-5 criteria, including comorbidities (American Psychiatric Association, 2022). By understanding DV as an ACE, it can provide a foundation for analysing how childhood trauma has been experienced throughout early childhood, which can influence a child's neurodevelopment, behaviour and educational outcomes. Exposure to DV is recognised as an ACE due to its capacity to compromise a child's sense of security and wellbeing during their critical developmental periods. According to Burke et al. (2022), ACEs are potentially traumatic events that occur throughout childhood and are associated with long-term

negative health, social and developmental outcomes. When children are exposed to DV or witness physical, emotional, psychological or coercive abuse between or by their caregivers, this can often result in fear, emotional distress and household instability. Furthermore, it is suggested that exposure to DV can activate prolonged stress responses, which therefore contributes to emotional and behavioural complications that can continue to the emotional and behavioural difficulties that continue beyond early childhood (Burke et al., 2022). DV can be considered a significant ACE, as it reflects ongoing challenges that can disrupt healthy development, including neurodevelopmental, psychological, and educational issues that can occur throughout a person's lifespan.

2.2. Toxic Stress and the Stress Response System

Stress is a term commonly used to define the response to occurrences an individual encounters throughout their lifetime, which can be related to either positive or negative experiences (Franke, 2014). The stress response, also known as the "*fight, flight or freeze*" response, encompasses the physiologic changes that occur in response to stress or perceived stress in individuals (refer to **Figure 1**). Toxic stress can include a prolonged or permanent irregular physiological response to stress with the risk of end-organ dysfunction[1], which can affect both children and adults (Franke, 2014; Johnson et al., 2013).

Childhood toxic stress is acute and can be sustained for prolonged periods[2]. Disruption of the neuroendocrine-immune system results in sustained cortisol activation and a persistent inflammatory state, reducing the body's ability to return to physiological homeostasis after the stressor has been removed (Franke, 2014; Johnson et al., 2013; Wolf et al., 2008). Children who have experienced toxic stress within early childhood can be at risk of long-term adverse health impacts that may not present until adulthood. These health presentations can be inclusive of "*maladaptive coping skills, poor stress management, unhealthy lifestyle, mental illness and physical diseases*"[3] (Felitti et al., 1998; Franke, 2014; Garner et al., 2011; Johnson et al., 2013; Shonkoff et al., 2009; Shonkoff & Garner, 2012; Varese et al., 2012; Yates, 2007).

The hypothalamic-pituitary-adrenal (HPA) axis is the body's primary neuroendocrine system responsible for coordinating physiological responses to stress while maintaining homeostasis (Herman et al., 2016). When a stressor is perceived, the hypothalamus activates a hormonal cascade by releasing corticotropin-releasing hormone (CRH), which stimulates the secretion of glucorticoids. These hormones mobilise energy resources and prepare the body to respond to perceived threats through the "*fight-flight response*" (Herman et al., 2016). Under normal circumstances, negative feedback mechanisms involving limbic brain areas, including the hippocampus, regulate HPA axis activity and restore physiological balance once the stressor has passed. However, repeated or prolonged ex-

[1](Harvard University, 2025).
[2](Harvard University, 2025).
[3](Harvard University, 2025).

posure to stress can disrupt this regulatory process, resulting in prolonged HPA axis activation and altered neurodevelopment (Herman et al., 2016; see **Figure 2**).

Research examining cortisol metabolism following childhood trauma has identified variability in hypothalamic-pituitary-adrenal axis functioning. According to Aas et al. (2020), childhood trauma victims can be associated with elevated cortisol levels along with HPA axis abnormalities, which can be associated with poorer cognitive function in psychotic disorders (Pruessner et al., 2017). However, research on cortisol metabolism has been conducted in Post-Traumatic Stress Disorder (PTSD) (Aas et al., 2020; Tseilikman et al., 2019; Yehuda & McEwen, 2004; Yehuda & Seckl, 2011). As discussed by Aas et al. (2020) and Yehuda & Seckl (2011), various stress-induced neuropsychiatric disorders, including PTSD and chronic fatigue, have demonstrated low levels of cortisol, particularly in individuals who have experienced trauma within early childhood (Klaassens et al., 2012). This demonstrates that cortisol responses can vary across individuals and trauma-related conditions, which can program and shape long-term biological development, increasing the risk of psychopathy.

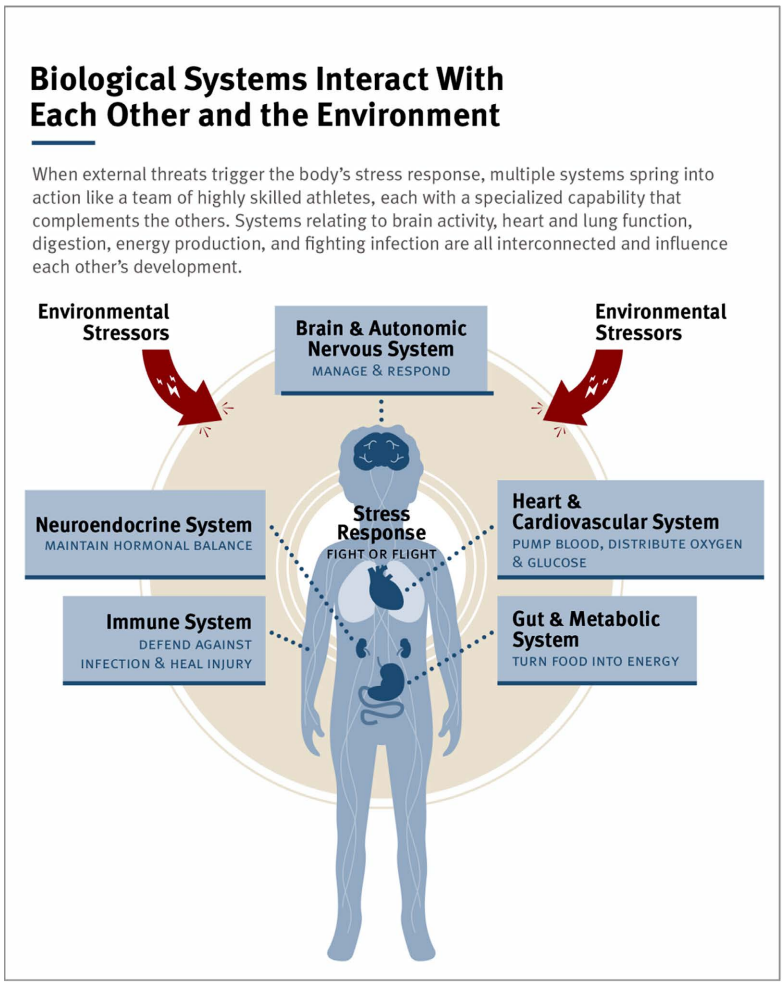


Figure 1. Fight or flight stress response (National Scientific Council on the Developing Child, 2020).

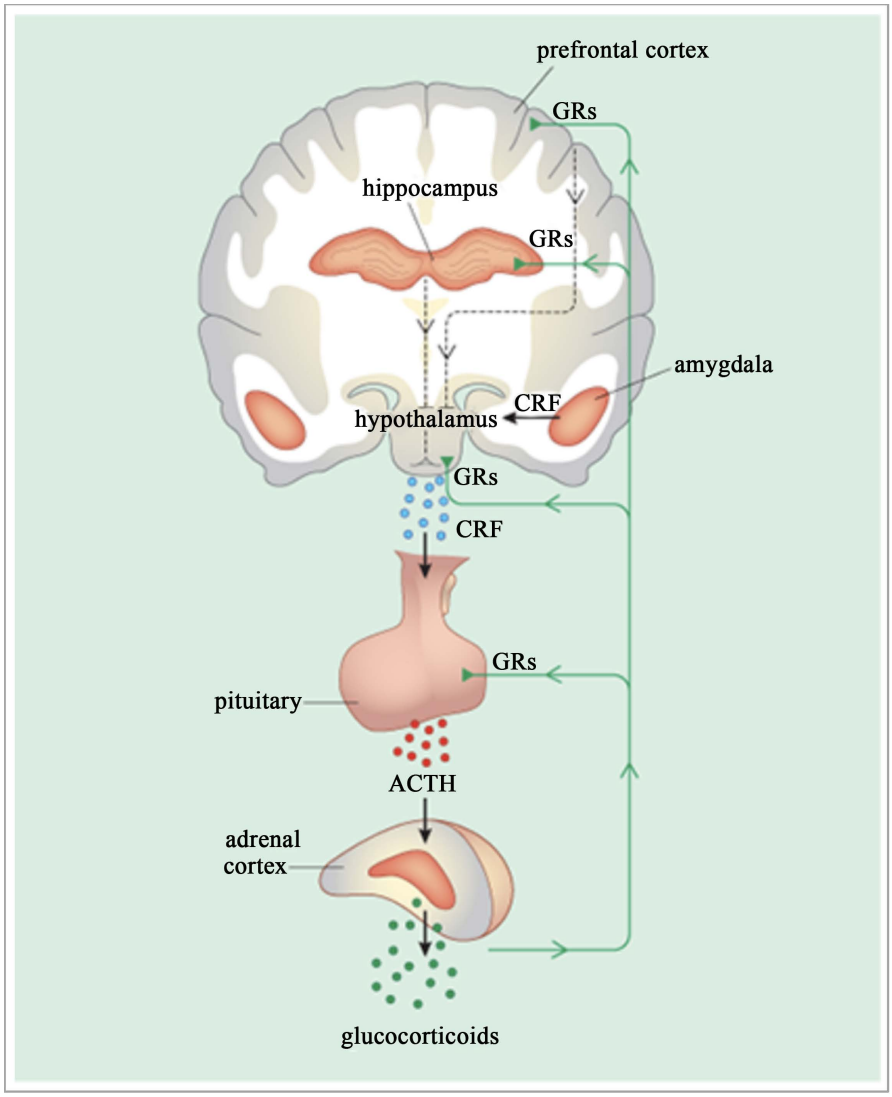


Figure 2. The HPA axis (The Open University, n.d.).

2.3. Early Childhood Vulnerability

Knudsen (2004) describes sensitive periods as developmental stages during which the brain exhibits heightened plasticity, making it particularly responsive to environmental experiences. During these periods, experiences play a crucial role in shaping the organisation of neural circuits that support cognitive, emotional, and behavioural development. As neural pathways become increasingly established, these transformations create stable patterns for connectivity that influence brain function throughout life. Consequently, understanding sensitive periods provides valuable insight into how early experiences, both positive and adverse, can shape neurodevelopment and subsequent behaviour.

Contrastingly, Peckham (2023) states that, rather than separating the effects of nature and nurture (genes and the environment), contemporary developmental perspectives acknowledge an intricate interplay connecting an individual's genotype and environmental experiences that together shape their pheno-

type, or observable characteristics. Researcher Teicher et al. (2016) accurately describe this interaction: "*brain development is directed by genes but sculpted by experiences*" (Peckham, 2023). Through this statement, Teicher explains that although genes provide the biological foundation for development, experiences such as child abuse and maltreatment play a significant role in shaping how the brain develops. Furthermore, Peckham (2023) explains that genes provide an evolutionary framework that equips individuals with the biological capacity needed to survive in their environment. In other words, humans possess a genetic inheritance that has been shaped through natural selection over thousands of years, while simultaneously retaining the developmental plasticity to adapt to the environmental conditions they experience throughout life (Peckham, 2023).

Early childhood signifies a sensitive period of neurodevelopment and growth, particularly when the brain experiences a period of rapid growth, organisation and refinement. In this critical period, neural circuits responsible for cognitive, emotional, behavioural and social functioning are highly plastic, allowing environmental influences to shape the architecture of a child's developing brain (Knudsen, 2004). Differing from later stages of development, any experiences that may be encountered throughout early childhood have an overwhelming influence on the formation and strengthening of neural pathways, forging the framework for future learning, behaviour and mental health (Nelson & Gabard-Durnam, 2020). However, exposure to trauma and adverse experiences during sensitive developmental periods can ultimately disrupt what is considered a typical neurodevelopmental trajectory and therefore increases the likelihood of permanent changes in brain structure and function (Nelson & Gabard-Durnam, 2020). This elevation in neuroplasticity explains why children who are exposed to DV during the early years are particularly vulnerable to long-term neurodevelopmental and educational consequences.

3. Neurodevelopmental Consequences of Domestic Violence Exposure

When interpreting the findings presented in this review, it is important to distinguish research examining exposure to DV specifically from studies investigating childhood maltreatment, adverse childhood experiences (ACEs) or trauma more broadly. Although these forms of adversity may share some developmental and physiological pathways, they are not interchangeable. Exposure to violence between caregivers may occur alongside direct maltreatment or other adverse experiences, making it challenging to isolate the specific effects of DV exposure. Accordingly, research examining broader childhood adversity is considered supporting evidence rather than definite evidence of DV-specific outcomes. Similarly, findings from adult clinical populations provide context for understanding potential biological mechanisms but cannot be generalized to young children who have been exposed to DV.

3.1. Alterations in Brain Structure and Function

The neurobiological systems in developing children are known to be specifically vulnerable to adverse consequences of childhood trauma with succeeding functional impact throughout an individual's lifetime (Cross et al., 2019). Exposure to various types of trauma, abuse or neglect can be impactful on brain development over time, which leads to changes in the brain's structure and function of multiple stress-sensitive areas, particularly the hippocampus, prefrontal cortex (PFC), and the amygdala (Cerqueira et al., 2007; Cross et al., 2019; Stevens et al., 2013; Tomoda et al., 2009; van Harmelen et al., 2014). Under typical neurodevelopmental conditions, the hippocampus plays a central role in processing and organising memories by combining information about events with the context in which they occur, including when and where they happened (Cross et al., 2019; Ranganath, 2010). The PFC supports higher-order processes by facilitating the recall and processing of these memories, while also regulating emotional responses through inhibitory control of the amygdala (Banks et al., 2007; Cross et al., 2019). Additionally, communication between the PFC and the hippocampus facilitates the integration of emotional and contextual memories (Kajiwara et al., 2003). However, chronic stress can disrupt the structure and function of these interconnected brain regions. Stevens et al. (2013) suggest that trauma may impair the brain's ability to accurately process and integrate emotional, contextual, and sensory information associated with traumatic experiences. As a result, children can experience persistent fear responses, intrusive memories, and difficulties regulating their emotions or consciously controlling recollections of traumatic events. These neurodevelopmental alterations are thought to arise largely through prolonged activation of the body's stress response system during childhood (Cross et al., 2019).

3.2. Attention and Classroom Engagement

Reciprocal relationships and wellbeing are the foundation for successful learning. However, the enduring impact of DV on children and families extends beyond emotional wellbeing, contributing to consistent long-term developmental consequences that can negatively impact children's capacity to learn and succeed at school (Lloyd, 2018).

Children whose fundamental needs, including adequate nutrition, safety and wellbeing, are consistently met are more likely to engage effectively in learning environments (Marafiote, 2025). In contrast, children whose basic needs remain unmet can experience reduced classroom engagement, impaired concentration, and difficulties participating in learning activities. When drawing upon Maslow's Hierarchy of Needs, Marafiote (2025) argues that safe and secure environments are characterized by reciprocal and supportive relationships, particularly student-teacher relationships within the school environment, which assist in fostering a sense of security and belonging, helping to enhance children's motivation and capacity to learn (Refer to **Figure 3**). For children exposed to DV,

persistent threats to their safety can compromise these foundational needs, which reduces their capacity to fully engage within learning and success within the school environment.



Figure 3. Maslow's hierarchy of needs (Marafiote, 2025).

3.3. Memory and Learning Processes

Throughout early childhood, children gain essential developmental skills including executive functioning, memory, emotional regulation, and social cognition to provide the foundation for learning and development (Fan & Kang, 2025). These skills are required to assist in the navigation of daily challenges and help develop healthy relationships with peers and the wider community (De Bellis & Zisk, 2014; Dye, 2018; Fan & Kang, 2025). However, ACEs within early childhood can disrupt a child's developmental trajectory, which then can lead to prolonged cognitive and emotional impairments (van der Kolk, 2003; Fan & Kang, 2025).

3.4. Academic Performance

Children exposed to DV are at greater risk of experiencing academic and other forms of childhood maltreatment and may experience difficulties with academic achievement and school engagement. Ryan et al. (2018) found that children involved in maltreatment situations were more likely to experience grade repetition and poorer performance on standardised reading in literacy and mathematics assessments by the third grade. Physical abuse has been closely linked to academically related issues. This is in comparison with children with no history of maltreatment compared to children who experienced physical abuse at some point during their life have been recorded to have less engagement in school, lower grades, lower academic results, an increase in suspensions, higher absenteeism, and had a greater increase to discontinue school (Johnson-Reid et al., 2004; Kendall-Tackett & Eckenrode, 1996; Kinard, 1999; Kurtz et al., 1993; Leiter, 2007; Leiter & Johnsen, 1997; Rowe & Eckenrode, 1999; Ryan et al., 2018; Shonk & Cicchetti, 2001). **Figure 4** summarises further findings.

Example behaviour	Contexual example
A child may struggle to concentrate at school because they are tired, having trouble sleeping, or hypervigilant.	The child appears exhausted at school every day, falls asleep during class and struggles to concentrate or focus on the task given. Teachers comment the child's academic results are slipping, and their attitude to learning is assessed as disengaged.
A child may change schools frequently due to moving to keep safe, or regularly miss school due to disruptions at home.	Following fleeing from the person using violence, the mother and child have moved to four different regional areas as they were unable to access long term housing in shelters. This has interrupted the child's learning and their willingness to engage in school fully (as they expect to move again).

Figure 4. DV impacts to children's learning (Queensland Government, 2025).

3.5. Behaviour and School Adjustment

Young children who have experienced DV can experience separation anxiety, while others could be seen as clingy, feigning illness, or disruptive and dysregulated within the school/education environment (Lloyd, 2018). When observing how DV has impacted a young child, Calder & Regan (2008) explain that effects can include symptoms such as injury, eating problems, and further stress-related conditions, including asthma and bronchitis. They also note that emotional effects manifest within a disruption to a child's schooling, including non-attendance, attention and concentration difficulties, sleep disturbance, withdrawal, insecurity, guilt, depression and low self-esteem. Commonly, children's behavioural outcomes include an increase of aggression, antisocial behaviour, poor emotional regulation, reduction in social competence, anxiety, depression, trauma-related symptoms, low-self-esteem, and pervasive fear (Bedi & Goddard, 2007; Clements et al., 2008; Edleson, 1999; Ernst et al., 2008; Fantuzzo & Fusco, 2007; Richards, 2017; Spilsbury et al., 2008). These behavioural and psychosocial difficulties can contribute to having an impaired cognitive functioning, peer conflict, school disengagement, and overall poor academic outcome. In some cases, childhood DV exposure has also associated children with a greater significant long-term consequence in adulthood, including substance abuse, delinquency, early school leaving, and an increase of self-harm (Herrenkohl et al., 2008; Richards, 2017). Observably, behaviour may change through conduct, unpredictability, aggression, anger, and hyperactivity. Many children of trauma in the home environment show hypervigilance and hyperarousal at school, constantly in a state of "*fight, flight, or freeze*" (Lloyd, 2018; Sterne & Poole, 2010). Furthermore, exposure to DV can negatively affect cognitive functioning, language development, and educational attainment (Lloyd, 2018). As DV commonly accompanies emotional neglect, affected children may also exhibit altered brain activity during

tasks requiring inhibitory control. Compared with their non-neglected peers, these children are often associated with a lack of ability to self-regulate and inhibit responses (McLean, 2016; McLaughlin et al., 2014; Mueller et al., 2010).

4. Caveats and Limitations

Several limitations should be considered when interpreting the literature reviewed. First, although an expanding body of research has linked childhood trauma and ACEs to alterations in brain structure and function, the underlying neurobiological mechanisms remain incompletely understood. Consequently, the relationships identified in the literature should be interpreted as associative rather than causal, as many studies cannot establish direct cause-and-effect relationships. Second, existing research has employed diverse study designs, sample characteristics, definitions of trauma, and neuroimaging methodologies, making direct comparisons across studies difficult and limiting the synthesis of findings into a unified developmental model (Fan & Kang, 2025). Furthermore, while numerous neuroimaging studies have reported associations between ACEs and alterations in brain volume, connectivity, and cerebral blood flow, much of the evidence is based on relatively small samples. As Keator et al. (2024) note, few large clinical studies have comprehensively examined these relationships to determine how neurobiological changes associated with ACEs contribute to the development of psychiatric disorders. Consequently, the generalisability of current findings remains limited, highlighting the need for larger, longitudinal neuroimaging studies to better understand the pathways linking early adversity with later neurodevelopmental and mental health outcomes. Finally, the findings should be interpreted with caution, as exposure to DV often coincides with other ACEs, including neglect, abuse, parental mental illness, and socioeconomic disadvantage. This makes it challenging to separate the targeted outcomes of DV on neurodevelopment. Furthermore, many studies are cross-sectional, relying on small or clinical samples, which limits the generalisability of findings and highlights the need for larger longitudinal studies to understand the prolonged impact of early trauma better.

5. Recommendations and Propositions

Future research should prioritise longitudinal studies that follow children exposed to DV across development to assist in establishing better causal relationships between early trauma, neurodevelopment, and educational outcomes. Larger, more diverse samples and standardised measures of trauma exposure would improve the reliability and generalisability of findings. Given that the evidence of early adversity can alter brain development during sensitive periods, a greater emphasis should be placed on early identification and trauma-informed interventions within educational settings. Strengthening collaboration between educators, healthcare professionals, and mental health services may help mitigate the adverse effects of DV by providing children with safe, supportive environments that promote re-

silience, learning, and healthy development.

6. Conclusion

What occurs within early childhood can have a profound effect on a child's life as they progress into adulthood. The widespread issue of DV in Australia, as discussed within this paper, is emphasised as requiring the need for resolving an ongoing issue through prevention, intervention measures and education. Early childhood represents a sensitive period of development during which exposure to DV can have profound and enduring effects on brain development, emotional wellbeing, and educational outcomes. While the current evidence demonstrates strong associations between early trauma and adverse neurodevelopmental outcomes, further longitudinal research is required to understand the fundamental mechanisms better and establish causal pathways. Given the prevalence of DV in Australia, adopting trauma-informed approaches across education and stakeholders is essential to support affected children and their families, promote understanding, and improve lifelong developmental and educational outcomes.

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This research has been shaped by a commitment to understanding domestic and family violence and its enduring impact on women, children and families. Behind the terminology, statistics and research findings are real people, real experiences and lives forever changed by violence. This work is dedicated to contributing to a greater understanding of those experiences, particularly the often-overlooked impact of domestic violence on children and their capacity to learn, develop and thrive. I would like to express my sincere gratitude to the University of New England and, in particular, Professor Sue Saltmarsh, for her guidance, encouragement and academic support throughout this research journey. Her willingness to challenge my thinking, encourage deeper inquiry and support my development as a researcher has been invaluable. I am deeply grateful for her guidance and for the opportunity to explore a subject that I believe deserves continued attention, understanding and meaningful action. I also acknowledge the researchers, advocates, practitioners and organisations whose work continues to bring attention to domestic and family violence, coercive control and the experiences of women and children. Their contributions remind us that violence cannot always be understood through what is immediately visible, and that the consequences often extend far beyond the person directly targeted. For children, the effects can follow them into the classroom, shaping their sense of safety, their relationships, their development and their opportunities to learn. To the women who have experienced domestic and family violence, and to the children who have lived with its consequences, this work is written with deep respect of your experiences. No research paper can fully capture what it means to live with fear, uncertainty or control, nor can it adequately represent the courage and resilience involved in navigating these circumstances. Children, in particular, must be rec-

ognised not simply as witnesses to violence, but as individuals whose safety, well-being, voices and futures matter in their own right. Finally, to my three sons, Oliver, Sebastian and Leonardo, you remain my greatest motivation. You remind me every day of the importance of creating a world in which children can grow up feeling safe, valued and supported. My hope is that through education, research and a willingness to have difficult conversations, we can contribute to a future in which fewer children have to carry the consequences of violence into their lives and learning.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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