

**EXPLORING THE CORRELATION BETWEEN PSYCHOLOGICAL DEVELOPMENT
IN MALTREATED CHILDREN AND CRIMINAL BEHAVIOUR IN ADULTHOOD**

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Land Acknowledgment

Mount Royal University is located in the traditional territories of the Niitsitapi (Blackfoot) and the people of the Treaty 7 region in southern Alberta, which includes the Siksika, the Piikani, the Kainai, the Tsuut'ina and the Iyârhe Nakoda. We are situated on land where the Bow River meets the Elbow River. The traditional Blackfoot name of this place is "Mohkînstsis," which we now call the city of Calgary. The city of Calgary is also home to the Métis Nation.

Abstract

Child maltreatment is a highly prevalent and impactful experience that can alter a child's development and potentially make them more susceptible to criminal activity in adulthood. This literature review highlights the factors, both socially and psychologically, such as how a child's brain develops, their cognition, and their social, environmental, and emotional milestones play a role in criminality later in their life. A strong factor in a child's overall development is the introduction of play, specifically play spent with parents or caregivers which builds resiliency in children. Resilience can better equip children who have experienced maltreatment to cope and recover from the trauma they have endured. Furthermore, this literature review will tie in these factors that are important to child development and evaluate how they correlate to criminal behaviour in adulthood.

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Abbreviations

CA & N	Childhood Abuse and Neglect
CSA	Child Sexual Abuse
PTSD	Post-Traumatic Stress Disorder

It is a well-known and well-established concept that adverse childhood experiences such as abuse and neglect have large impacts on the alteration of a child's development. These can manifest both physically and mentally and generally occur during the first 18 years of an individual's life (Basto-Pereira et al., 2022; Herzog & Schmahl, 2018). Additionally, there are extensive amounts of social and environmental factors that can play a role in the early prediction of criminal behaviour (Leschied et al., 2008). While the long-term implications of these childhood experiences have been of focus for the past few decades, early life stress, as well as childhood sexual, emotional, and physical abuse have more recently been shown to be associated with poor health outcomes during adulthood (McFarlane et al., 2005). Lovibond and Lovibond (1995) discuss that stressful life events are thought to lead to chronic arousal and impaired functioning as a result of a stress response. Further into the research on these adverse childhood experiences, there is evidence to support that encounters such as abuse, exposure to violence, neglect, and inadequate care influence neural development (McLaughlin et al., 2019).

This thesis will explore psychological development and the factors, both social and environmental, in childhood that correlate with criminal behaviour in adulthood. Factors such as brain development, social milestones, emotional milestones, social factors, and environmental factors all can affect a child's psychological development, causing them to miss crucial milestones and alter their brain structure. The investigation of these factors will be done through existing literature by means of a thematic analysis in the hope of furthering the knowledge in this field through a comprehensive synopsis of the literature.

Maltreatment is described as when a child is experiencing repeated exposure to incidents where they feel a betrayal of trust, often by a parent or caregiver (Teicher et al., 2013). When a child experiences maltreatment in the early years of their life, due to the sensitivity and plasticity

of their brain, they are more susceptible to long-term consequences (Hart & Rubia, 2012; McFarlane et al., 2005). Brain function and adaptations are severely altered during times of serious maltreatment due to how the inflicted trauma aids in behaviour, emotion, and self-regulation (Fox, 2019; Korgaonkar, et al., 2023; National Scientific Council on the Developing Child, 2015; Nolvi et al., 2023; Pancost et al., 2022; Yoon et al., 2021).

Behavioural difficulties related to altered brain development and brain structure can include Post-Traumatic Stress Disorder (PTSD), anxiety, depression, aggression, delays in milestones, limited tolerance to stress and stressful situations, poor impulse control, substance abuse, and conduct disorders (Cabrera et al., 2020; Dias de Castro Bins et al., 2022; DuMont et al, 2007; Hart & Rubia, 2012; Herzog & Schmahl, 2018; Korgaonkar et al., 2023; Nolvi et al., 2023; Pancost et al., 2022; Zhuo et al., 2022). Along with the behavioural aspects of maltreatment that can be long-term, some short-term risks of abuse and neglect can be associated with aggression with adults and peers, scoring lower intellectually and academically, and difficulty with motor functioning (Malinosky-Rummell & Hansen, 1993).

After a critical analysis of the aforementioned adverse experiences in childhood, the link between the children who faced these developmentally-altering experiences and their criminality in adulthood will be examined. Through this exploration, the goal of this thesis is to conceptualize the existing literature that has been done on these factors and break down in which way they are correlated to criminal behaviour in adulthood. By critically analyzing the data and information in this way, the highlighted factors will help those in this field further their knowledge and understanding of why criminal behaviour occurs while all being within one piece of research. Such research in this field is important not only to the justice system but also to the

study of child development as this thesis can be used as a tool to prevent or address such factors that may be correlated with criminal behaviour.

The value of this thesis is the concise knowledge that it will bring to those who want to learn more about this topic. By comprehensively connecting a multitude of existing literature, this thesis can be used as a great tool for psychologists, development specialists, criminal justice workers, youth workers, and even parents and caregivers as a way to understand the correlation between child development and the impact of adverse experiences. As the research conducted on maltreatment and the effects it has on development has grown exponentially, the more understanding we have to create preventative plans to help children cope and manage the aftermath of such adverse experiences.

Methodology

The development of a child is a continuous sequence of changes involving the emotional, biological, and psychological aspects that begin at birth and occur till the end of adolescence (Pancost et al., 2022). The aim of this thesis is to conduct a comprehensive summary of the existing literature on these factors to better understand the correlation between psychological development in children and criminal behaviour in adulthood. By conceptualizing the existing research into a concise synopsis, those interested in this area can acquire a vast amount of knowledge through a condensed thesis. The objectives of this literature review are to:

1. Investigate the correlation between the psychological development of children and criminal behaviour in adulthood.
2. Examine in detail, through existing literature, the psychological, environmental, and social factors that all contribute to a child's development and how they may play into criminal behaviour in their adult life.

3. Seek an understanding of how these factors affect specific developmental milestones and socialization.
4. Conduct an extensive search on this correlation and as a result, create a conceptualized and concise resource that is readily accessible and easy to understand.

Due to the nature of this literature review, the remaining part of this thesis will focus on brain development and milestones in children, social and environmental factors, and the correlation with criminal behaviour, limitations, and any implications for future research.

Brain Development and Milestones in Children

When a child experiences traumatic events, such as maltreatment, there is a crucial impact done to their development both socially and neuropsychologically (Cabrera et al., 2020; Dias de Castro Bins et al., 2020; Hart & Rubia, 2012). In order to understand how and why maltreatment affects a child's brain so tremendously, a simple understanding of the brain functions that aid in typical brain development is imperative (Cabrera et al., 2020). Neurological areas such as the hippocampus, corpus callosum, amygdala, and white and gray matter affect motor skills and executive functioning (Andrews et al., 2021; Cabrera et al., 2020). When such areas are impaired or affected by maltreatment, harmful consequences can arise during adulthood (Dias de Castro Bins et al., 2020). Additionally, developmental milestone delays in infancy and toddlerhood such as language and motor skills can be predictive of neurobehavioural outcomes and neurodevelopmental disorders (Zhuo et al., 2022). The maternal role in the child's life from as early as the fetal period can have effects on the development of the child (Nolvi et al., 2023). Associations such as atypical brain development and elevated risk for psychopathy are potential risks for the child (Nolvi et al., 2023).

Prenatal and Early Postnatal Brain Development

Typical Early Brain Growth

Due to the rapid brain growth that occurs after a child is born, prenatal care is critical during this time as it is an important stage for neural and functional growth (Cabrera et al., 2020). White matter undergoes quick growth changes during infancy and plays a role in the development of a child's behaviour (Cabrera et al., 2020). This process of the myelination of the white matter begins during the prenatal period of growth and continues to increasingly grow during infancy (Cabrera et al., 2020). Gray matter (involved in muscle control, sensory perception, and memory) and white matter are vulnerable to changes during development due to synaptic pruning (Cabrera et al., 2020). While white matter continues to grow during adolescence, gray matter tends to increase in infancy and decrease throughout childhood and adolescence (Cabrera et al., 2020).

Responsible for processing and assigning emotions to determine valence to a stimulus, the amygdala works with the hippocampus to put those emotional valences into memory (Cabrera et al., 2020). Peak growth for the amygdala is during the pre-adolescence stage (Cabrera et al., 2020). Working hand and hand with the amygdala, the hippocampus function is involved with learning, memory, and response to stress (Cabrera et al., 2020). Many agree that there is a continuous hippocampal volume increase as an individual ages (Cabrera et al., 2020). Lastly, the corpus callosum connects to both the left and right hemispheres of the brain, made up of over 190 axons, and has been hypothesized to play a vital role in cognition (Cabrera et al., 2020). There is evidence to show that the thickness of the corpus callosum is related to problem-solving skills, intelligence, and processing speed (Cabrera et al., 2020).

Parental Factors

With an increase in access to neuroimaging and technology that furthers the knowledge of child neurodevelopment, the difficult task of attributing certain structural and functional changes or delays to certain factors in the child's life comes into play. While social factors have a strong impact on neurodevelopment, parental factors covary in their ability to affect a child and their neurodevelopment long-term (Hyde et al., 2022; Zhang et al., 2020). An association with prenatal adversity and increased risk of psychopathy in children has been consistently linked due to the effect maternal stress, depression, and anxiety during pregnancy can have on a baby's brain development (Nolvi et al., 2023). Prenatal adversity, specifically maternal stress during pregnancy, has been linked to causing smaller brain volume, altered corticolimbic structure, altered cortical thinning, and changes in the functionality of the brain (Nolvi et al., 2023). Furthermore, the structure, function, and connectivity of areas in the corticolimbic system, responsible for the regulation of pain in the body, have been linked to types of parenting styles (Hyde et al., 2022).

At a young age, a child's brain plasticity is extremely malleable and can change with negative or adverse experiences (Nolvi et al., 2023). In this early postnatal period of a child's life, the rapid development of structural and functional networks of the brain enhances the neural plasticity in the brain (Nolvi et al., 2023). During that postnatal phase, environment and family structure can have a large developmental impact on children who experience early deprivation, specifically children in the foster system (Nolvi et al., 2023). While there is evidence to support that early deprivation can persist and continue to cause developmental issues in their lives, those moved into a supportive environment at a younger age are more likely to catch up developmentally (Nolvi et al., 2023).

Parental factors such as lack of maternal involvement and encouragement of a child's feelings can lead to the absence of adequate communication skills and ways to cope with feelings (Cabrera et al., 2020). Verbal input from a parent is crucial to a child's neurodevelopment, something that is often missing in children who have been maltreated (Cabrera et al., 2020). High-quality caregiving and parental sensitivity have been found to support the development of structural connectivity and functionality of a child's brain (Nolvi et al., 2023). The parental role in a child's cognitive development is sometimes overlooked, especially in homes where children are being mistreated (Cabrera et al., 2020). However, inadequate parental involvement or input when it comes to things such as verbal communication can be detrimental to that child's development (Cabrera et al., 2020).

Cognitive Milestones

Stimulation of the cognitive and linguistic systems in a child from an early age supports their own cognitive and social-emotional development (Nolvi et al., 2023). With the introduction of early linguistic practice, neural circuits responsible for language, attention, and self-regulation of young children and infants are significantly increased (Nolvi et al., 2023). Acts such as being able to roll over, sit unassisted, say their first words and walk are all salient markers to help parents and professionals examine the development of a child (Zhuo et al., 2022). While delays with these salient markers are all associated with poorer neurocognitive function, delays in speech were considered to be associated with both poorer neurocognitive function and behavioural problems (Cabrera et al., 2020; Zhuo et al., 2022). Zhuo et al., (2022) found that children with language and motor milestone delays had the worst neurocognitive function and behavioural outcomes.

Although varying in type and severity, maltreatment can impact cognitive milestones and leave the child with long-lasting consequences psychologically, neurologically, and environmentally (Cabrera et al., 2020). Through analyzing these major milestones, emphasized attention is brought to how maltreatment causes a disruption in the neural structures and impairs the development of a child (Cabrera et al., 2020). Even something as small as an infection during the critical stages of development can result in deficits or changes in behaviour (Blomström et al., 2020). Through the work of Blomström et al. (2020), it was found that infections during both fetal and childhood could result in adult deficits such as aggressive behaviour, lack of cognitive abilities, and neuropsychiatric disorders. Small disturbances to a child's life can have major impacts, even when it does not seem to be affecting the child on a large scale.

Emotional and Social Milestones

Across the lifespan, positive social interactions, support, and relationships are critical for more adaptive brain functioning (Nolvi et al., 2023). When children are put in supportive, caring homes that enable healthy social and neurological development they are able to attain certain milestones throughout the first few years of their life. Smith (2008) developed a list of milestones that children experience at different ages, beginning their connection to other humans and society. At as little as three months old a child can exhibit milestones such as responding to facial expressions, sounds, movements, and different emotions displayed to them (Smith, 2008). Recognizing familiar faces, smiling at themselves in the mirror, showing anger when restricted, imitating gestures, and reacting to others' strong emotions all occur at the sixth-month mark (Smith, 2008). When a child hits the one-year mark they should be able to smile at strangers, regulate behaviour in uncertain situations, see that individuals act as their own independent

agents, and may show empathy when a loved one is upset or loved ones are yelling at each other (Smith, 2008).

When a child has experienced or is experiencing maltreatment, their emotional discrimination and response inhibition are severely altered, causing them to miss some of the aforementioned milestones (Hart & Rubia, 2012). If a child has experienced emotional abuse in the past, this contributes to these social and emotional milestones as the child learns to deal with conflict, emotion, verbal violence, and failed emotional connections in a different way (Hart & Rubia, 2012). For example, if a child experiences a lack of attention to their needs, lack of emotional connection, or refusal of essential psychological care, that child will not learn how to effectively manage their feelings or ask for what they need emotionally (Hart & Rubia, 2012). Due to the presence of abuse and stressors early in their life, children may experience major behavioural consequences and the structure of their brain may never function like a typical child's would (Hart & Rubia, 2012).

Attachment and Social Bonding

Not only is understanding early brain development, parental factors, and cognitive milestones extremely important toward the study of maltreatment and its correlation with criminality but building attachments and social bonds is essential for overall development (Haslam & Taylor, 2022; Winston & Chicot, 2016). The brain development, growth, and neuron pruning done in the first two years of a child's life is significant to their overall development, socially and cognitively (Winston & Chicot, 2016). Therefore, when a child experiences neglect or any other form of maltreatment that causes them to receive a lack of mentalizing from their caregiver, this could have distinctive impacts on attachment (Haslam & Taylor, 2022). This lack of mentalizing deprives the child of learning about their own internal world and distress in a way

that is detached from the adverse experiences and maltreatment (Haslam & Taylor, 2022). Further, when a child has a complex trauma history, they may have problems developing attachments due to the problematic disruptions of emotional regulation, behavioural control, or self-concept (Cabrera et al., 2020). Taken together, there is evidence that shows not only can maltreatment affect a child's internal development, but it can also affect their ability to grow outside of themselves in social interactions and relationships (Cabrera et al., 2020; Haslam & Taylor, 2022).

While it may seem small and insignificant, the emotional development of children is highly powerful and pivotal for their development (Winston & Chicot, 2016). The experiences children, especially in infancy, have with their caregivers and parents are unbelievably important due to the millions of new neural connections a child is making during this time (Winston & Chicot, 2016). An important aspect of development to aid in the relationship with parents and caregivers is play and the bonds playing with a child can create. This will be further discussed later in the portion of this review on play. When positive and repeated interactions are present during this vulnerable stage, learning, logic, memories, and meaningful relationships begin to form (Winston & Chicot, 2016). When a child does not experience positive interactions or relationships, they will not gain the pathways responsible for typical human experiences (Winston & Chicot, 2016). From as young as six months old, children can express happiness and emotions to someone they love and have an attachment to more than someone less familiar to them (Smith, 2008). If a child is not experiencing love, attention, and language they are likely to be deprived of critical milestones and emotional attachments (Winston & Chicot, 2016).

Brain Imaging

A key discovery in the research of children who have experienced maltreatment and those who engage in psychopathological behaviour is the access to neuroimaging and how the brain reacts to adverse experiences (Teicher & Samson, 2016). Early life stress and traumatic experiences in childhood can impact the structure and function of a child's impressionable, developing brain (Cabrera et al., 2020; Dias de Castro Bins et al., 2022; DuMont et al, 2007; Hart & Rubia, 2012; Korgaonkar et al., 2023; Pancost et al., 2022). With the inclusion of neuroimaging, the structure of the brain can be examined in a much more in-depth way, showing the substantial development a brain goes through during different stages of life (Andrews et al., 2021). For example, the reduction in the volume of the prefrontal cortex of children who have been maltreated is evidence that there is a neurologically developmental to what maltreatment can do to the brain (Cabrera et al., 2020). Aspects such as impulse control, regulating thoughts and emotions, and social behaviour are at risk of being affected by the thinning of the prefrontal cortex (Cabrera et al., 2020; Hart & Rubia, 2012; Pancost et al., 2022). If a child's neurobiological stress system is negatively affected at a young age it could result in an alteration of the functioning of the brain (Cabrera et al., 2020). This alteration in the child's brain function and structure is a product of maltreatment due to many areas of the brain being prone to change after experiencing abuse and neglect (Cabrera et al., 2020).

Social and Environmental Factors

It is evident that experiencing trauma and maltreatment at a young age can significantly affect a child's developing brain and their social cognition, resulting in problems later in their lives (Cabrera et al., 2020; DuMont et al., 2007; Hart & Rubia, 2012; Herzog & Schmahl, 2018; Nolvi et al., 2023; Zhuo et al., 2022). In addition to knowing the effects of maltreatment and

trauma on the brain, it is imperative that each of these social and environmental factors are separately examined to get a full idea of how these factors play a role. Early life environmental risks can be categorized into two fractions: sociodemographic factors and parental capability in the upbringing of a child, and the processes or experiences that affect and alter brain development (Blomström et al., 2020). Two of the most robust predictors of antisocial behaviour and strong predictors of delinquency are psychopathy and childhood trauma (Moreira et al., 2022). Neglect, maternal neglect, parental involvement, abuse, play, and resilience all have significant roles in a child's life, possibly creating the difference between those who grow up to have criminal tendencies and those who do not.

Neglect

Estimated to affect almost one in five children, neglect is one of the highest forms of child maltreatment (Haslam & Taylor, 2022). Due to its associated early timing in a child's life and its chronicity, neglect has higher risks for an individual than other types of maltreatment, having long-term influences on development (Haslam & Taylor, 2022; Pancost et al., 2022). The long-term influences neglect has on a child's development are brought on due to the plasticity of the nervous system during important developmental periods in their life (Dias de Castro Bins et al., 2020; McFarlane et al., 2005; Pancost et al., 2022). It has been heavily examined that children who are exposed to neglect are prone to neurological abnormalities and deficits, maladaptive patterns of development, disturbances in emotional regulation and impulse control, and poor relationship skills (Cabrera et al., 2020; Harvard University, 2024a; Haslam & Taylor, 2022; Pancost et al., 2022). Additionally, there is evidence to suggest that the long-term impact of neglect can be attributed to where the child lived at the time of the neglect as well as the family and community characteristics (DuMont et al., 2007).

Even more so than active abuse, chronic neglect has a far wider range of damaging effects on a child's development and well-being (Harvard University, 2024a). As reported by Harvard University (2024a), in the United States neglect accounts for 78% of all child maltreatment incidents, greatly surpassing physical abuse, sexual abuse, and psychological abuse cases combined. The disruptions to a child's development due to the negative effects of neglect may vary between each maltreatment case but there are regularly many similarities in aspects such as the development of the brain, emotion regulation, stress responses, and behavioural issues.

Behaviour is a large aspect of development that can be negatively affected by neglect due to the way the brain is learning to process information and specific skills for adjusting their behaviour (Arseneault et al., 2000; Cabrera et al., 2020; Harvard University, 2024a). Exposure to neglect can, especially in the primitive early years, leave children with difficulty processing and merging information from their environment which can lead to emotional, cognitive, and behavioural disorders (Cabrera et al., 2020; Fox, 2019; Harvard University, 2024a). Furthermore, the brain goes through extensive growth, about 75%, throughout the first two years of a child's life (Pancost et al., 2022). With that in mind, children who are being neglected during those years are at high risk for experiencing laps in executive functioning and behavioural skills (Cabrera et al., 2020; DuMont et al, 2007; Hart & Rubia, 2012; Harvard University, 2024a).

In addition, neglected children's biological stress-response systems may be altered developmentally which can lead to anxiety, depression, and other chronic debilitations later in their life (Harvard University, 2024a). Children who experience maltreatment, especially early in their development, are more likely to suffer from psychiatric disorders (Teicher et al., 2013). Specifically, anxiety disorders, PTSD, substance abuse, major depression, and bipolar disorder

are common among those who have experienced maltreatment (McFarlane et al., 2005; Teicher et al., 2013). Subsequently, neglected children are more likely to suffer from internalized symptoms than children who have experienced other forms of abuse (Garon-Bissonnette et al., 2022; Zhang, 2023). Symptoms can include difficulty dealing with stress, making friends, doing well in school, and social events; lack of independence, confidence, and self-determination (Zhang, 2023).

Maternal Neglect

Not only does maternal neglect toward a child have an effect on their functioning, but maternal exposure to neglect and abuse has been shown to have long-lasting consequences for their child both mentally and physically (Garon-Bissonnette et al., 2022). Children whose mothers experienced childhood abuse and neglect (CA & N) were more likely to present biological, behavioural, and developmental problems in their early childhood years than those who had mothers who did not have a history with CA & N (Garon-Bissonnette et al., 2022). Even as young as three years old, a child who experiences a greater amount of maternal hostility is more likely to show stronger connectivity during emotional processing between the amygdala and the medial prefrontal cortex than a child who experiences less material hostility (Hyde et al., 2022).

Parental Involvement

While violent criminal behaviour is believed to be derived from genetic or environmental factors, or a combination of the two; early life environmental risks such as parental capability and involvement in the upbringing of a child become increasingly important in this conversation (Zhang et al., 2020). In order to manage parenting along with all other aspects of life, there is a set of core capabilities set out by psychology and neuroscience research that adults use in their

daily lives (Harvard University, 2024b). The core capabilities include actions such as flexibility, planning, focus, self-control, and awareness all work together to initiate a response toward a stimulus (Harvard University, 2024b). These core capabilities fall under self-regulation and executive functioning, including both intentional and automatic self-regulation (Harvard University, 2024b). Not only are these capabilities important for the adults' well-being and life, but they are also of great value to any child of these adults (Harvard University, 2024b).

Although humans are not born with these skills, through the right experiences and practice one can develop them (Harvard University, 2024b). Beginning in early childhood, typically by the age of three, executive function skills are present in a child's behaviour such as remembering and following simple rules (Harvard University, 2024b). A rapid improvement in these skills happens from ages three to five (Harvard University, 2024b). Although these core capabilities do not only grow in childhood and adolescence, it is important to form a strong foundation before adulthood as it is easier to develop in younger years of life (Harvard University, 2024b).

If an adult experienced their own form of childhood stress that altered their own brain development, these core capabilities would be at risk and impede their ability to use them effectively, if at all (Harvard University, 2024b). In adults, two main deficits as a result of experiencing stress are executive functioning and self-regulation (Harvard University, 2024b). Additionally, if an adult is experiencing stressful stimuli in their lives, this could also derail their core capabilities and leave them to rely solely on their automatic responses (Harvard University, 2024b). Just as children experience behaviour disorders when dealing with stress or trauma, adult brains react very similarly when exposed to high levels of stress (Harvard University, 2024b). Aspects such as unpredictable and threatening environments, poverty, and rewarding stimuli

such as food or drugs can all aid in significant stress (Harvard University, 2024b). Many adults who are experiencing their own trauma or acute stress have difficulty keeping track of the problems in their lives, analyzing them, exploring options for dealing with them, and setting priorities for how they will move beyond them (Harvard University, 2024b).

Abuse

Often seen as a continuation of neglect, abuse is broken down most commonly into three different types: physical, sexual, and psychological. Emerging evidence from Korgaonkar et al. (2023) states that pervasive alterations in functional connectivity are associated with childhood abuse. The age at which a child experiences abuse can be crucial to moderate the risk and type of psychopathy. This is largely for those during the preschool and preadolescent ages due to the increased risk of depression, suicidal ideations, and dissociative symptoms (Korgaonkar et al., 2023). As well as neglect, abuse has a multitude of neurological, social, and emotional consequences, especially when experienced at a young age. Moreover, when the abuse the child is enduring is extreme, it can leave lasting injuries and disabilities that can lead to more health problems in adulthood (Manuel, 2021).

Physical Abuse

According to the National Child Abuse and Neglect Data System (NCANDS), 18% of reported cases are about physical abuse (Peterson et al., 2014). Physical abuse is considered by Peterson et al., (2014) as a:

nonaccidental physical injury (ranging from minor bruises to severe fractures or death) as a result of punching, beating, kicking, biting, shaking, throwing, stabbing, choking, hitting (with a hand, stick, strap, or other object), burning, or otherwise harming a child, that is inflicted by a parent, caregiver, or other person who has responsibility for the

child. Such injury is considered abuse regardless of whether the caregiver intended to hurt the child. (p. 21)

Additionally, physical abuse such as spanking is not considered abuse if done appropriately and does not cause bodily injury to the child (Peterson et al., 2014). Strikingly enough, most physical and sexual abuse cases happen inflicted by someone who is not a family member (Peterson et al., 2014).

Physical abuse largely affects mental and physical health, leaving a child with both liberal and psychological impacts on their body and mind (Manuel, 2021). As discussed in the section on neglect, a child that experiences physical abuse in the first few years of their life is more at risk for delays in executive functioning and behavioural problems (Cabrera et al., 2020; DuMont et al, 2007; Hart & Rubia, 2012; Harvard University, 2024a). Through the research investigating children who have experienced abuse, a smaller right hippocampus was present specifically in children with a history of physical abuse (Cabrera et al., 2020). This is evidence to support why children who have been psychically abused have trouble with adapting to situations, self-regulation, and responding to stress (Cabrera et al., 2020; Herzog & Schmahl, 2018; Nolvi et al., 2023; Teicher & Samson, 2013).

Landford et al., (2007) noted that children who had been abused were about 1.5 times more likely to be absent from school and were less likely to attend college than non-abused children. Furthermore, children who experienced physical abuse were more likely to develop a conduct disorder later in their life (Peterson et al., 2014). The development of behavioural and personality disorders such as depression and PTSD are common among children who have been physically abused (Herzog & Schmahl, 2018; Moreira et al., 2022; Springer et al., 2007; Teicher & Samson, 2013).

Sexual Abuse

A continuation of physical abuse, sexual abuse holds some very similar consequences and risk factors for children who experience this type of maltreatment. Long-term psychological consequences such as PTSD, suicide, self-harm, conduct disorder, affective instability, substance abuse, depression, and anxiety are prevalent for children who have survived sexual abuse (Edwards, 2018; Hailes et al., 2019; Sanjeevi et al., 2018). Sexual assault can include specific activities by a parent or caregiver that involve a child's genital area (Peterson et al., 2014). Activities such as, but not limited to, penetration, incest, rape, fondling a child's genitals, indecent exposure, and sexual exploitation through prostitution are all considered to be forms of childhood sexual abuse (Peterson et al., 2014). Child Sexual Abuse (CSA) is estimated to affect 11.8% of the population worldwide with 7.6 to 8% of victims being male and 15% to 19.7% being female (Sanjeevi et al., 2018).

Due to the timing of CSA being during formative developmental years, CSA can produce numerous chemical, hormonal, and physiological changes due to the increase in synaptic pruning being done during this time (Edwards, 2018; Hailes et al., 2019; Sanjeevi et al., 2018). CSA can have huge impacts on the brain not only in childhood but also in adulthood where there is evidence of mental health disorders and other long-term negative outcomes (Edwards, 2018; Hailes et al., 2019). Individuals who are survivors of CSA are more likely to experience lower satisfaction in their relationships as well as unstable intimate relationships later in life (Edwards, 2018; Hailes et al., 2019; Sanjeevi et al., 2018). In particular, women who experienced CSA are more likely to disagree with their partners and have a lessened affectionate disposition toward their partners (Edwards, 2018; Hailes et al., 2019; Sanjeevi et al., 2018).

Along with a multitude of psychological and developmental risk factors associated with sexual abuse, gender is seen to be an additional risk for CSA (Sanjeevi et al., 2018). Females are more likely to experience sexual abuse in their life than males but the importance of researching how CSA abuse affects both males and females is crucial in the research field (Sanjeevi et al., 2018). Recurrent forms of abuse and neglect are more common among females who have experienced CSA, as well as female children raised in low-income households are at a greater risk (Sanjeevi et al., 2018). Later in life women who experienced CSA are at a greater risk for panic episodes, depression, anxiety, distress in social situations, and elevated feelings of shame (Sanjeevi et al., 2018). Conversely, behavioural problems occur more commonly in male CSA survivors than in female survivors (Sanjeevi et al., 2018). While both male and female CSA survivors are at a higher risk of suicide, male CSA survivors exhibit a higher rate of suicide ideation and suicide attempts (Sanjeevi et al., 2018).

Psychological Abuse

Also referred to as emotional abuse and neglect, psychological abuse is a pattern of behaviours toward a child that impairs their sense of self and their emotional development (Petersen et al., 2014; Brassard et al., 2020). Peterson et al., (2014) recognize behaviours such as “constant criticism, threats, or rejection, as well as withholding love, support, or guidance” (p. 22) to be included in psychological abuse. Psychological abuse is often the form of maltreatment that gets less attention and research done on it in comparison to neglect, sexual abuse, and physical abuse while its prevalence is considerably high (Brassard et al., 2020; Hibbard et al., 2012). Child Protective Services reported maltreatment cases show that psychological abuse often occurs with other forms of child maltreatment but can also occur on its own (Brassard et al., 2020).

Oftentimes psychological abuse communicates to a child that they are worthless, unlovable, unwanted, expendable, and damaged which can have major effects on a child's emotional well-being (Brassard et al., 2020). “Sticks and stones may hurt my bones, but words will never hurt me” may be a commonly used phrase but in the case of child maltreatment this is positively not the case. Psychological abuse plays a major role in a child’s emotional development (Brassard et al., 2020; Petersen et al., 2014). When a child is experiencing a lack of social bonds due to continuous psychological abuse and torment, they will have trouble forming social relationships with, for example, peers and teachers (Brassard et al., 2020; Hibbard et al., 2012; Petersen et al., 2014; Ozbay & Ozcan, 2008). This type of consistent, diminishing abuse during the first three years of a child’s life has been associated with attachment disorders, socialization problems, and disruptive behaviour (Hibbard et al., 2012). Psychological abuse can have major impacts on how a child identifies attachments and relationships to people around them, especially parents or caregivers (Hibbard et al., 2012). Due to the complex influence a parent and caregiver has on a child’s development, when a child receives abuse from these important people in their lives their beliefs about themselves and how to interact with the people around them change (Blomstrom et al., 2020; Cabrera et al., 2020; Garon-Bissonnette et al., 2022; Herzog & Schmahl, 201; Hibbard et al., 2012; Nolvi et al, 2023; Ozbay & Ozcan, 2008; Teicher & Samson, 2013).

Play

It is evident that adverse experiences of maltreatment have large effects on a child's neurological, social, cognitive, and emotional development. The time a parent or caregiver spends with a child building connections through play has a bigger impact than most think it does. Interactions with play in a child’s early years not only help with their brain development

and executive functioning but also the development of their personal resilience (Harvard University, 2021; Whitebread et al., 2017). Starting at infancy, play is a critical component in helping children with attention, problem-solving, memory, and self-control (Harvard University, 2021; Whitebread et al., 2017). Children benefit from all different types of play such as physical, symbolic, pretend, and play with objects (Whitebread et al., 2017). Failure to engage in play will result in significant consequences in childhood and continuing throughout adolescence (Almon, 2004).

Play gives children a sense of exercise, which aids in lifelong health, as well as engages their creative and social minds (Almon, 2004; Ozbay & Ozcan, 2008; Whitebread et al., 2017). Engaging children in play and games that are challenging but not too frustrating for them, works their self-regulation and physical skills that are rapidly developing during this time (Harvard University, 2021; Whitebread et al., 2017). Research has shown that specifically for young boys, physical play can improve their emotional awareness and social competence as well as have an effect on their academic progress (Whitebread et al., 2017).

Games that include conversation, imitation, and hiding teach young children to focus, self-control, attention skills, and use their working memory (Harvard University, 2021; Whitebread et al., 2017). A game such as peekaboo can help engage a child in basic self-control by letting them control when they open their parent's hands and reveal their face, as well as works their memory as they are trying to remember who is hiding (Harvard University, 2021; Whitebread et al., 2017). Making simple gestures to a child also aids in the development of their self-control and attention (Harvard University, 2021; Whitebread et al., 2017). These types of games are also a great way for a child to develop bonds with the people playing with them.

When a child develops strong social bonds with their parents, family, peers, and teachers, they are less likely to commit criminal or deviant acts (Ozbay & Ozcan, 2008). This is an idea from Travis Hirschi's bonding theory which is composed of four elements; involvement, belief, attachment, and commitment (Manuel, 2021; Ozbay & Ozcan, 2008). When children establish strong social ties to the significant people around them through things such as play, their ties to conventional society also grow, creating less likelihood of committing a crime in the future (Manuel, 2021; Ozbay & Ozcan, 2008). Victims of maltreatment are more likely to show insecure attachments as a result of their diminished emotional regulations, support systems, and view of self (Garon-Bissonnette et al., 2022; Haslam & Taylor, 2022; Manuel, 2021; Ozbay & Ozcan, 2008; Petersen et al., 2014; Teicher & Samson, 2013).

The COVID-19 pandemic is a good example to show how the removal of interactive play with others outside of the family had an impact on children and their development. During the pandemic, most children were closed off from social interactions with people other than their family, leaving little diversity within their interactions and the social bonds they were able to create (Kerker et al., 2023). As play and play-based interactions promote the growth of social and emotional development, a lack of these aspects in a child's life poses negative outcomes (Kerker et al., 2023). These negative outcomes can include many developmental delays such as the ones mentioned in the section on brain development and milestones in children of this paper, as well as trouble forming peer relationships (Kerker et al., 2023).

Resilience

While trauma can negatively affect someone's health and overall development, especially if experienced during critical developmental periods, how someone responds to trauma can be more indicative of the long-lasting effects than the trauma itself (Cabrera et al., 2020; Dias de

Castro Bins et al., 2020; Fox, 2019; Hart & Rubia, 2012; Manuel, 2021). Resilience is an adaptive, positive response that can help explain why some individuals who experience child maltreatment do not exhibit negative outcomes and can recover from the adversity they have faced (Fox, 2019; Manuel, 2021; National Scientific Council on the Developing Child, 2015; Yoon et al., 2019). Essentially, resilience turns toxic, unbearable stress into tolerable stress that can be managed through strong social bonds and protective factors (Fox, 2019; Manuel, 2021; National Scientific Council on the Developing Child, 2015; Yoon et al., 2019).

Recently there has been an increase in studies done on resilience and how it can help individuals who have experienced maltreatment to get past their trauma and cope effectively (Yoon et al., 2019). Researchers believe that resilience is not a dichotomous attribute but rather is developed through many different areas of someone's life, both interpersonal predispositions and external experiences (Fox, 2019; National Scientific Council on the Developing Child, 2015). There are many domains that can help with the development of resilience, bettering a child's overall well-being, and mental health when faced with adversity (Fox, 2019). While deep emotion and suffering may surface from different forms of maltreatment or trauma, children who are resilient are able to better cope and thrive notwithstanding all they have experienced (Fox, 2019).

Research has stated that an estimated two-thirds of resilient children have the tools to overcome the adversity that comes with all forms of maltreatment (Fox, 2019). This resilience in children can be strengthened through different individual, peer, family, school, and community domains (Fox, 2019). These domains help children grow their relationships with the people around them and use those interactions as a way to recover from the maltreatment. Referring back to Hirschi's bonding theory, these ties to conventional society through protective factors

help a child straighten not only their social bonds but also their view of themselves (Fox, 2019, National Scientific Council on the Developing Child, 2015; Ozbay & Ozcan, 2008).

Protective factors can be used to measure juvenile delinquency but they are also a great measure of resiliency, depending on the bonds created through the four domains. Protective factors are defined by the Positive Achievement Change Tool and are virtually an extension of the four domains listed above. The protective factors include criminal history, demographics, school, use of free time, employment, relationships, family, alcohol and drugs, mental health, attitude, aggression, and social skills (Baglivio et al., 2014). These protective factors will fluctuate throughout an individual's life, having different effects at different times of their life (Baglivio et al., 2014). In addition to having strong social ties, the presence of these protective factors can help aid in a child's level of resiliency to their trauma and maltreatment (Baglivio et al., 2014; Fox, 2019; Ozbay & Ozcan, 2008). These protective factors are essential for resilience as they help to promote positive outcomes and reduce negative outcomes that are a result of maltreatment.

Correlation with Criminal Behaviour

The discussion of critical factors of development discussed not only within this paper but within numerous studies further the understanding of the course of criminal behaviour from childhood to adolescence, through to adulthood. It is known that early adverse childhood experiences such as maltreatment can have effects on behaviour and development but additionally a link has been analyzed to criminal behaviour (Basto-Pereira et al., 2022; Fikiri & Mkhize, 2023; Leschied et al., 2008). The research area into how these factors can predict criminal behaviour in adulthood is known as developmental criminology (Leschied et al., 2008).

With developmental criminology, certain factors at specific ages can be identified for predicting criminal behaviour later in life.

Throughout the analysis of many factors that have the potential to contribute to criminal behaviour, the difficult task for researchers is identifying which factors have an impermanent effect and which have a direct relation to difficulty in adulthood (Basto-Pereira et al., 2022; Fikiri & Mkhize, 2023; Leschied et al., 2008). Expanding on Hirschi's bonding theory, individuals who have experienced maltreatment are more likely to be impacted due to the damage done to these social and attachment bonds (Ozbay & Ozcan, 2008). If an individual has a lack of social bonds and ideals of how relationships should operate, future relationships and attachments may be difficult for them. This can result in a lack of support systems and protective factors that were discussed earlier, potentially aiding in criminal behaviour (Ozbay & Ozcan, 2008).

Through the extensive literature that this thesis has covered, it is clear that neglect, abuse, play, and resilience all play a role in the development of a child and have the potential to predict criminality. The inclusion of a typical development of a child was found crucial for this literature review as it is important to note how a child's brain should be developing and the milestones they should be hitting. In the previous sections, the experiences of maltreatment have shown evidence that it affects aspects of brain structure, executive functioning, cognition, emotional regulation, behavioural control, and relationship skills (Dias de Castro Bins et al., 2020; Nolvi et al., 2023; Cabrera et al., 2020; Harvard University, 2024a; Haslam & Taylor, 2022; Pancost et al., 2022; Winston & Chicot, 2016). Adolescents who have experienced their own form of adverse experiences are up to 44 times more likely to be involved in fights, be a bully, and perpetrate partner violence (Evans-Chase, 2014). It is also indicated that the older a child is when

experiencing these risk factors, the more likely a criminogenic outcome will occur (Basto-Pereira et al., 2022; Fikiri & Mkhize, 2023; Leschied et al., 2008).

However, as seen with the research on resilience, maltreatment such as abuse and neglect is not 100% indicative of criminal behaviour in adulthood. When a child has a strong development of protective factors in their life they can better navigate through such adverse experiences and trauma. An individual's trauma does not always define who they are or who they will become. Many people who have experienced adverse experiences, maltreatment, or any form of trauma can gain the ability to persevere through their difficulties and have the same life as someone who had a typical childhood upbringing. By repairing the damage that has occurred due to maltreatment, the act of resilience and having protective factors present in an individual's life can help them stray away from criminal behaviour in the future.

Preventative Factors

Through properly allocated and timed interventions, the negative effects of maltreatment can be reversed or reduced (Harvard University, 2024a). However, it takes more effort and work than simply removing the child from the toxic environment to effectively create positive outcomes for the child and their development (Harvard University, 2024a). Often when a child has experienced trauma, maltreatment, or severe stress needs tremendous support and care to mitigate the negative effects and to enable recovery (Green et al., 2020; Harvard University, 2024a). It can not be expected that a child be responsible for preventing their own neglect and abuse, just as it is not their responsibility when the neglect and abuse happens to them. Therefore, parental and caregiver prevention factors aid in the great reduction of these adverse childhood experiences from occurring (Austin et al., 2020; Green et al., 2020; Younas & Gutman, 2023).

Parents and caregivers having positive support networks have been shown to have increased their overall well-being and reduced their stress (Austin et al., 2020; Younas & Gutman, 2023). As mentioned earlier in the portion on parental involvement, parental capabilities can have a potentially large effect on how a child is treated and the experiences they have (Harvard University, 2024b). When a parent or caregiver has their own strong ties to their parents, romantic partners, coworkers, and their community, they can be better equipped to not cause harm in the form of deprivation, neglect, or abuse to their children (Harvard University, 2024b; Ozbay & Ozcan, 2008; Younas & Gutman, 2023). In communities and neighbourhoods that have an increase in close ties to other families around them, social cohesion, and social control have lower rates of neglect, sexual abuse, and physical abuse reported to child protective services (Austin et al., 2020).

While a child experiencing maltreatment is not able to manage or control the abuse or neglect, social and emotional competence can help a child recover from such adverse experiences. Characteristics such as self-regulation, self-esteem, social competence, and the ability to adapt appropriately to situations have been shown to have a positive effect in relation to experiencing neglect or abuse (Austin et al., 2020). A child's ability to control their emotions and behavioural responses in the midst of stressful situations is associated with more positive outcomes after experiencing maltreatment (Austin et al., 2020). Protective factors and resilience mentioned above also play a huge role in how maltreatment can affect a child from their youth all the way into adulthood (Green et al., 2020; Haskett et al., 2006).

Regardless of the type of maltreatment present, all children could benefit from prevention and intervention programs that have a strong focus on their mission to help children of maltreatment. The National Scientific Council on the Developing Child (2015) provides that

“facilitating supportive adult-child relationships, building a sense of self-efficacy and perceived control, providing opportunities to strengthen adaptive skills and self-regulatory capacities, and mobilizing sources of faith, hope, and cultural traditions” are all positive factors that contribute to helping maltreated children (p. 10).

Limitations

Among the many complex factors of child development in relation to criminal behaviour in adulthood discussed, there are some limitations to this literature review. First and foremost, this literature review does not provide any specific focus on how drug and alcohol abuse or addiction can play a role in a child’s development or parental involvement. Additionally, economic and familial factors were not discussed in length in relation to why neglect and abuse may occur. The factors discussed throughout are also not an exhaustive list of factors that can have a correlation with criminal behaviour in adulthood nor are they a list of definitive factors.

Another limitation of this literature review is that most of the research included in this review stems from a Westernized way of life and it excludes other ways of life, cultures, and beliefs that could potentially affect the results and correlation being discussed. Different racial histories and upbringings are going to differ in different cultures and races and these factors are not universal for all individuals. This is not a cohesive comprehensive correlation of child development and adult criminality of cultures and races all around the world. In different countries levels and prevalence of neglect and abuse may differ but this was not specified in this paper. Although briefly discussed in relation to sexual abuse, there is not a separate discussion on how the factors affect different genders.

Implications for Future Research

This literature review was conducted as a way to further the spread of knowledge on factors that are involved in a child's development and how those factors may impact criminal behaviour later in their lives. Potential implications for future research into this prevalent issue are to bring more awareness and understanding of how exactly maltreatment affects a child's development. More specifically, how preventative and protective factors can be utilized efficiently to help children better cope and deal with their trauma. By establishing concrete programs to help parents and caregivers get the support they need and better themselves as individuals and caregivers, the children in their lives will benefit.

For future researchers a huge area of study would be the children who were at critical ages in their development during the pandemic years and what changes have been made to their development and behaviour throughout their life (Henke, 2023). There is still little knowledge out there on how a pandemic of that magnitude has affected children socially and psychologically, and the research is ignorant of how it will affect them later in their lives (Henke, 2023). It will be many years until the effects the pandemic had on young children's minds and social competence but it will be an important area to measure and gain an understanding of (Henke, 2023).

Lastly, a huge area that needs more definitive measurement and research is how risk factors such as neglect and abuse play a role in environments with poverty, parental mental illness, and differing parenting styles (Haslam & Taylor, 2022; McLaughlin et al, 2019). The varying cases of maltreatment are vastly different in their own ways and examining specifically how small daily interactions, such as having strict parents, could educate researchers further. Not

only would it expand the knowledge of the differing factors in the field, but it would also help preventative programs be better equipped to establish an effective plan of action.

Conclusion

This literature review demonstrated how brain development and milestones in children and social and environmental factors, play a role in the development of a child both mentally and physically and how it correlates with criminal behaviour in adulthood. Through the extensive review of literature on this area, it is concluded that maltreatment can cause severe developmental delays and behavioural difficulties (Cabrera et al., 2020; DuMont et al, 2007; Fox, 2019; Hart & Rubia, 2012; Harvard University, 2024a; Kerker et al., 2023; Zhuo et al., 2022). Due to the plasticity and how malleable a young child's brain is, maltreatment causes behavioural, psychological, physical, and social deficits that have long-lasting consequences (Fox, 2019; Korgaonkar, et al., 2023; National Scientific Council on the Developing Child, 2015; Nolvi et al., 2023; Pancost et al., 2022; Yoon et al., 2021).

In addition to those long-term risk consequences, play and resilience have been shown to have positive outcomes for children who have survived maltreatment (Baglivio et al., 2014; Fox, 2019; Harvard University, 2021; Ozbay & Ozcan, 2008; Whitebread et al., 2017).). With the inclusion of Hirschi's social bonding theory, resilience, and play, this literature review was able to encompass the way that a child can turn their intolerable toxic stress into tolerable stress from which they can recover (Almon, 2004; Harvard University, 2021; Ozbay & Ozcan, 2008; Whitebread et al., 2017). Interactions with parents or caregivers greatly increase a child's sense of self, emotional regulation, self-control, and social competence (Harvard University, 2021; Whitebread et al., 2017).

Not all children who experience maltreatment are going to exhibit criminal behaviour in adulthood, but the types of maltreatment mentioned in this literature review give an extensive look into potential risk factors. These risk factors are not universally concrete for each child who experiences maltreatment but they can be used as a tool to indicate potential future criminality. Although this review included some limitations including the involvement of alcohol and drug abuse, and race, culture, and gender differences, the overall themes of this research were highlighted and discussed in appropriate length for this review.

It is the hope that this research can further educate someone on the factors in childhood that affect brain development, social and romantic relationships, crucial milestones, and much more and how we can connect those factors back to those same children when they begin to partake in criminal behaviour. Through the exploration of psychological development in children through social and environmental factors and its correlation with criminal behaviour in adulthood, the literature is extensive. This literature review poses as a tool that can be used to further the understanding of psychologists, development specialists, criminal justice workers, youth workers, and even parents on this topic. Through this descriptive thematic analysis of the existing literature, the research question has been mined to the best ability in consideration of time and resources. While exploring this correlation in detail it can determine the effects of such social and environmental factors in childhood and how these experiences navigate criminal behaviour in later life. The investigation of neglect, abuse, resilience, play, parental involvement, and traumatic experiences through a comprehensive synopsis gives those in this field an informative summary of what is being found.

Not only is this information important to those in the academic fields, but this research aids in helping parents seek help and bring attention to how they can help those children

experiencing adverse experiences. By pursuing a literature review in this area of research, a greater understanding of the risk factors of maltreatment and how protective and preventative factors can help are established. Through this understanding, more knowledge on how to help children who are experiencing maltreatment can be implemented. This critical analysis of the existing literature exists now as an instrument that those in this field can use. This thesis takes away the time-consuming work and effort that it would take to analyze the literature discussed and creates a conceptualized summary of the information that is out there. The main consideration for doing a literature review on this area of research is that there are copious amounts of valuable information out there on this topic that is crucial for parents, caregivers, teachers, and any individual who is interacting with children daily. The value of this thesis is insurmountable due to the knowledge that is being covered in such a condensed way.

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