REFEREED ARTICLE

Effects of Nurture Versus Trauma on Infant and Early Childhood Psychological and Social Development

Margaret Nichols

Abstract

Child maltreatment is a significant problem in North America. Maltreatment comes in many forms, such as neglect, physical abuse, sexual abuse, abandonment, and traumatic world events. The maltreatment affects children's neurobiological development, and thus, potentially their future quality of social and psychological health. This article gives a basic description of how the brain works and discusses the impact of trauma, particularly from birth to three years of age, on different aspects of the brain. It also contrasts the effects of trauma with the impact of nurture on the brain. The author demonstrates that what happens from birth to age three sets up the person's neuro-wiring for how individuals will respond to perceived traumatic events for the rest of their lives, and determines whether or not they will be prone to psychological disorders by the age of three or later on in life.

The early years of human life, from birth to three years of age, are the most crucial years for a child's psychological and social development. The quality of a child's relationship with his or her mother or primary caregiver is of utmost importance. This early bonding, or lack thereof, sets the stage for an individual's ability to cope with future stresses in relationships and in life. The complex social-emotional neuron networking that is established in the brain during these early years of life becomes the foundation upon which each person interacts with his or her world. Early childhood neglect or abuse can cause chronic stress. The brain's stress response system then creates neuro-wiring that leaves the child with a distorted sense of attachment, thus disrupting a child's ability to relate to others in socially acceptable ways. Under these circumstances the child's ability to learn to emotionally self-regulate is also disrupted. These disruptions can result in a myriad of social dysfunctions throughout the traumatized child's life. On the other hand, if the mother or primary caregiver offers predominantly nurturing and protective care during early childhood, then the child's brain is networked with effective coping mechanisms to handle life's presenting stresses. Parental care, bonding, and attachment determine, in part, an individual's future in terms of coping mechanisms in stressful situations, and the potential for developing or not developing costly psychological and social disorders, such as post traumatic stress disorder (PTSD) and manic-depression.

In order to understand the effects of either nurture or trauma on the psychological development of a child, it is important to have at least a rudimentary understanding of how the human brain works. An infant is born with 100 billion brain cells, called neurons (Fletcher, 2007). These neurons begin to form connections, or synapses, as the infant processes life experiences. The more stimuli the child experiences, the more synaptic connections occur in the brain. Conversely, a lack of stimuli from a stagnant environment will create a poor synaptic network. There are critical windows of opportunity for developing each area of the brain; many of those windows occur in early childhood (Fletcher, 2007). For example, the critical time for the development of language is between one and three years of age. The more meaningful listening and speaking experiences a child has during this time, the more the neuron connections are made in that area of the brain. Both maltreatment and lack of sensory experience can impede the creation of important neuron structures in the brain during sensitive periods of development, reducing the affected areas functioning capacity for life (Perry et al., 1995).

At an unconscious level, the human brain also has a hard-wired system that ensures survival of the species. Fear is produced in response to a dangerous stimulus, which in turn

leads to a “fight,” “flight,” or “freeze” response (Cozolino, 2002, p. 235). There are two major stress response systems in a human: the Autonomic Nervous System (ANS) and the Hypothalamic-Pituitary-Adrenal (APA) axis (Lazinski et al., 2008). These two systems work together to some degree, but they also have their own specific functions. The ANS is made up of the Sympathetic Nervous System (SNS) and the Parasympathetic Nervous System (PNS) (Nichols, 2009). The PNS prepares the body for rest. It slows a person down so that he or she can relax under normal circumstances. If the hormone cortisol is released into the system due to stress, then respiration and heart rate decrease further, and the body becomes weak, trembles, and may collapse, entering a survival freeze response (Ambrose, 2009). The system is in the hypoarousal state at this extreme. The function of the SNS is opposite; it prepares one for action. An activated SNS releases the hormone adrenaline into the system, which causes an increase in blood pressure and heart rate, dilated pupils, and slowing of the digestive system. This system takes control during times of stress, and makes the brain alert to danger. Depending on circumstances, the brain initiates a flight or fight response, and the system is in a hyperaroused state. The unconscious level of the brain is in control at both the hyperaroused and hypoaroused states, and ensures that the person fights, takes flight, or freezes action, for survival.

The limbic area of the brain is also important in terms of stress responses. This is where the HPA axis is controlled. The limbic area contains the amygdla, orbitofrontal, hypothalamus, hippocampus, and the pituitary gland (Nichols, 2009). The amygdla contains the only form of memory from birth to 18 months. It also alerts a person to danger. The orbitofrontal part of the prefrontal cortex is an important area for recovery from trauma and attachment difficulties. The hippocampus is involved in retrieving past memory. The hypothalamus controls the neuroendocrine system, along with the pituitary and adrenal glands. This is known as the HPA axis. When a stressful event occurs, the amygdla sends neuro-chemical messages to the hypothalamus, which in turn alerts the pituitary via more neuro-chemical messages. The pituitary signals the adrenal glands to release cortisol, a stress hormone, that has a stimulating effect on the PNS. In the short term, cortisol is useful in making the body respond to a stressful stimulus. However, problems result when high levels of this hormone remain in the system for a long period of time due to prolonged stress.

When an infant or child experiences chronic stress, the normal system of stress release and self-regulation do not happen. Some neurotransmitters that are released during times of stress are dopamine, norepinephrin (NE), endogenous opioids, and glucocorticoids (GC). These hormones that have been released by the ANS and the HPA axis remain in the child’s system with damaging results. An increase in NE “reinforces the biological encoding of traumatic memory” (Cozolino, 2002, p. 261). It also increases anxiety, hyperarousal, and irritability. An abundance of dopamine in the system produces hypervigilance, paranoia, and perceptual distortions. In this case, the chronically stressed child views the world as a dangerous and scary place. Social withdrawal and avoidance of new stimuli (which are perceived as dangerous) can result. A prolonged high level of GC in the system can decrease the volume of the hippocampus, thus impacting on memory (Cozolino, 2006). It also has a negative impact on the immune system, resulting in higher rates of physical illness. Another hormone called endogenous opioids, which relieve pain under flight or fight responses, can dull the emotions and lead to dissociative reactions, and even depersonalization, if it remains in the system for too long. Biological well-being is sacrificed for immediate survival. Along with the increase in stress hormones in the system, there is a decrease in the pleasure hormone serotonin. Low levels of serotonin in the body have been linked to aggression, irritability, depression, hyperarousal, and violence. These various neurotransmitters, which under conditions of stress help the individual to survive, can have devastating lifelong, psychological impacts if they are allowed to flood the system for an extended period of time.

The experience of trauma is processed in the brain (Perry et al., 1995). The longer the duration of the traumatic experience, the denser the neuron networking associated with it. Also,

the system becomes more sensitized to the traumatic stimulus, and eventually requires less of the stimulus to produce full-blown hyperarousal or hypoarousal reaction patterns. Later in life, the child's reaction pattern becomes an unconscious trait of automatic over-reacting to "minor" stressors. A child who has developed either of these reaction patterns can move easily from a state of feeling anxious to feeling threatened to feeling terrorized, resulting in maladaptive emotional behaviour (Perry et al., 1995). The brain becomes imprinted with the resulting trauma responses, and the brain can remain that way for life.

Attachment is another evolutionary process designed to promote the survival of species; however, attachment is also important to healthy relationships in humans (Shepiris et al., 2003). Initially, in an infant-primary caregiver situation, attachment is established through physical contact on the part of the caregiver, such as caressing and kissing, and behaviours such as reaching and grasping by the infant. Other cues, such as eye contact and vocal nuances, help in the bonding between infant and primary caregiver. As the child grows, attachment expands to encompass the toddler's anticipation of caregiver actions, and the child adjusts his or her behaviour accordingly. For healthy attachment to occur, it is imperative that the primary caregiver is consistent in displaying love and positive attention to the child. The child, through experiencing nurturing behaviour, develops a sense of security and comfort, as well as a trust that the world is a safe place to be. This positive nurturing allows the young child to explore his or her environment (Webster et al., 2009). As a result, the child develops a normal neural network and is "less vulnerable to long-term, negative effects on his/her neurodevelopment" (Lawson, 2009). Children growing up in violent communities have been shown to be protected from developing aggressive and antisocial behaviour through "good family relations and optimal parenting practices" (Quota et al., 2008, p. 232). Therefore, if a child develops strong attachments to his or her primary caregiver, then he or she will be well wired to develop healthy relationships with other people throughout life.

Along with the need for attachment is the theory of self-regulation and its importance in the human experience with regards to the ability to process traumatic experiences and, hence, to affect emotional development. Self-regulation is related to the hormonal balance within the ANS. Hyperarousal happens when the SNS is over-activated, and hypoarousal results from an over-activated PNS. Self-regulation is described as the ability to keep one's emotional state within a window of tolerance, otherwise known as the optimal arousal zone (Ogden et al., 2006). Within this optimal zone, one's brain is able to process and integrate sensory information, including traumatic memories. When one's emotional state enters hyperarousal in response to trauma-related stimuli, he or she is out of the optimal arousal zone. Hyperarousal results in "too much arousal to process information effectively" (Ogden et al., 2006, p. 26). The hypoaroused individual experiences "intrusive images, affects, and body sensations" (Ogden et al., 2006, p. 26). The hypoaroused state also causes one to depart from the window of tolerance at the opposite end of the continuum. A hypoaroused individual distances him or herself from the experience in an unconscious way and is unable to process the incoming information effectively. He or she feels "a numbing, a sense of deadness or emptiness, passivity, and possibly paralysis" (Ogden et al., 2006, p. 26). The ability to self-regulate, and keep one's emotional state within the optimal zone at least most of the time, will help that individual to deal emotionally with traumatic events, processing and integrating them into his or her system.

An infant does not have the ability to self-regulate. The baby needs a caregiver who will identify with his or her needs as if they were the caregiver's own (Gerhardt, 2004). In other words, the caregiver feels the desire to fulfill the baby's needs immediately. When the caregiver relieves the baby's stress or discomfort, the baby can calm down to a regulated state. If this stress relief is consistently given to the infant as he or she grows, the brain of the developing child gradually produces the neuron network needed to be able to self-regulate. Then, as an adult, that individual will be able to cope with stress in a manageable fashion. However, if the caregiver does not respond to the baby's needs on a consistent basis, the baby does not learn how to monitor and regulate his or her emotional states (Gerhardt, 2004). Instead, the infant

receives the implicit message that no one is interested in his or her feelings or needs, which changes the way that the baby responds to the caregiver. These behaviours develop unconsciously, and pave the way for how that individual relates to people throughout life. An infant learns to self-regulate or not self-regulate through the relationship with his or her primary caregiver.

World conditions such as war can indirectly impact on a young child's emotional health through the child's mother's state of emotional health. The child does not have to have directly experienced the trauma due to war, in order to be affected. From birth, an infant shows interest in stimuli such as faces and voices (Kaitz et al., 2009). Gradually, he or she attains competency in understanding the messages portrayed through social interactions. When these messages are positive, the infant develops a sense of self-trust and a trust in others (Kaitz et al., 2009). In situations wherein the mother has been previously traumatized by war, and is herself emotionally dysfunctional, her capacity to interact with her child is negatively affected. The child is then unable to attain a regulated state from his or her unregulated mother, and may stay in a stressed state for a prolonged period of time. A child who has not personally endured the trauma of war can be negatively emotionally affected by it through his or her mother.

Traumatic events in infancy and early childhood can result in self-regulation dysfunction to varying degrees. The effect of trauma depends on an individual's perception and internalization of the traumatic event, as well as his or her ability to self-regulate. Trauma is defined as "anything that overwhelms the organism, physically, emotionally, and mentally" (Ambrose, 2009, slide 132). It is an individual's reaction to the event that determines whether it was traumatic or not. An individual is traumatized if he or she feels overwhelmed by a situation perceived as threatening, feels completely helpless, and is unable to process psychological and physical reactions (Nichols, 2009). The trauma is experienced by the entire human organism and is entrenched in the nervous system. The intensity of the impact of the trauma on an individual depends on the "length and intensity of the trauma, past traumas, and genetic programming" (Nichols, 2009, slide 36). Trauma produces a dysregulation in the nervous and affective systems of the body, hindering the brain from processing the body's reaction to the stimulus. If a person is not able to self-regulate, then the psychosomatic effects of a trauma can remain in the mind, brain, and body for the rest of that person's life, continuing to produce dysregulation in the system (Ambrose, 2009). However, if a person has learned to self-regulate in early childhood, then he or she will be better able to process and integrate the effects of each trauma. The inability of a child to self-regulate has a negative effect on his or her entire system.

A small child's lack of secure attachment to his or her mother or primary caregiver is equally as damaging as the inability to self-regulate, and can lead to future emotional and social problems for the child. To an infant or small child, trauma can include experiencing neglect or abuse from his or her primary caregiver. A child who is neglected or physically abused is not as likely to develop a secure attachment with his or her caregiver (Ambrose, 2009). A secure attachment means that a child has a clear preference for his or her caregiver, and seeks and is comforted by the caregiver. In response to the child, the caregiver acts in a caring and consistent way to meet the child's needs. There are three types of attachment disorders: avoidant, ambivalent/resistant, and disorganized. Around 35% of children are divided between these insecure classifications ("Attachment Theory," 2009, para. 22). In avoidant attachment, the young child typically shows little emotion towards his or her caregiver. This behaviour is in response to the caregiver seldom meeting the needs of the child when under distress. Also, the caregiver tends to discourage crying, and expects the child to soothe him or herself ("Attachment Theory," 2009). When a caregiver inconsistently demonstrates both neglectful and appropriate responses toward the child, the child develops ambivalent/resistant attachment. The child will seek contact with his or her caregiver, then "resist angrily when it is received" ("Attachment Theory," 2009, Table). The pattern of a disorganized attached child is one of contradictory behaviour. The child looks toward the caregiver to meet his or her needs, but at the same time is apprehensive and fearful. In this case, the caregiver is the source of trauma for

the child (Nichols, 2009). All future neuron networking is set against this early life brain structuring (Cozolino, 2002). The disorganized attached child is usually unable to use his or her caregiver as a secure base (Cornell & Hamrin, 2008). Dysfunctional emotional and social behaviours result from disorganized attachment. If no intervention is given, these patterns of behaviour, and relating to others, stay with that individual into later childhood and adulthood (Lawson, 2009). Poor attachment of a small child to his or her primary caregiver may be at the root of that child's behaviour problems throughout life. Knowledge of how the brain works, and the impact of early childhood trauma on the brain, would be beneficial to school psychologists and school counsellors, in order to assess the extent that early childhood trauma has affected children's presenting behaviours. This information could then be helpful in developing effective treatment programs for individual children.

Manic-depression has its roots of insecure attachment in toddlerhood (Gerhardt, 2004). For example, Ron (a pseudonym) was both neglected and abused as a young child and developed manic-depression in adulthood. Initially, when Ron was an infant and young child, his mother was emotionally distant. She suffered from depression and had emotional instability most of her life. When Ron was six years old, his mother married. His stepfather was both verbally and physically abusive to him. Ron was forced to live and eat in the basement, not with the rest of the family, and he was continually given beatings. From about the age of eight on, his stepfather would literally kick Ron out of the house to fend for himself. He often slept at a nearby community center. Somehow, he managed to function in a socially acceptable manner, in terms of relationships with peers, throughout his teens and early adult life. Problems began to surface for Ron during the summer following the birth of his first child. He had a moderate manic episode during that summer. This manic state, which quickly turned to a moderate depression in the fall, continued through the winter. The next spring, his second child was born. This event brought on a severe manic state for about five months, followed by an equally severe depression that lasted for months as well. It was during this last depression that Ron was diagnosed with manic-depression. Ron has been plagued with manic-depression for the past 35 years. His wife was unwilling to cope with the countless social, emotional, and financial difficulties that resulted from Ron's manic episodes, and she left with their children. Ron was also unable to function as a parent most of the time. Since he usually chose not to take the necessary medication to control the illness, Ron's resulting manic behaviours landed him either in jail or on a psychiatric ward on many occasions. Ron certainly had a difficult and traumatic childhood, with devastating emotional and social consequences throughout his adult life.

Another psychological disorder that has a link to early childhood trauma is post traumatic stress disorder (PTSD) (Cozolino, 2002). Core neuron networks are under construction in early life, and traumatic events compromise these connections. PTSD is most common in children who have been abused or neglected (Becker-Weidman & Hughes, 2008). The effects are most devastating if the perpetrator of the trauma is the primary caregiver (Cozolino, 2002). The child is deprived of the nurturing, self-regulating, interactions at the same time as he or she is traumatized by the caretaker. PTSD is a result of unresolved and un-integrated, prolonged traumatic experiences in early childhood. Someone suffering from PTSD is continually re-traumatized by the memory of specific traumatic events. This continual loop of self-traumatization "can devastate every aspect of the victim's life" (Cozolino, 2002, p. 265). There is also a link between the prolonged release of the glucocorticoids (GC) hormone due to stress, and a smaller hippocampus. One study showed that adults who developed PTSD after combat, and who also had a history of childhood abuse, were found to have had a smaller than normal hippocampus (Cozolino, 2002). As noted earlier, increased levels of GC in a young child's system can damage the hippocampus. Effects of prolonged trauma during childhood can lead to PTSD in later life.

The costs incurred by society as a result of infant and childhood trauma are both human and monetary. The traumatized child pays the price throughout his or her life in terms of quality of emotional and relational health, as well as quality of life in general. Ron, for instance, has been

unable to function as a normal, productive member of society throughout most of his adult life, requiring societal care on many occasions. Children who suffer from abuse or neglect may need long-term care. Problems such as shaken baby syndrome, impaired brain development, poor physical health, poor mental and emotional health, cognitive difficulties, juvenile delinquency, other difficulties during adolescence, and adult criminality require that the child receives help from society ("Long-Term Consequences," 2008). To care for special needs children with severe attachment problems, residential treatment programs can exceed $100,000 annually per child (Shepiris et al., 2003). It has been conservatively estimated that in excess of 4,000,000 children in the United States are exposed to a traumatic event in any recent year (Perry et al., 1995). At least half of those children are at risk of developing serious emotional, behavioural, and social problems that will require an intervention. The costs to the traumatized children, and to society in general, are varied and huge.

Many factors in a child's early life affect his or her ability to develop healthily, both psychologically and socially. An understanding of how the brain develops in early childhood and of the impact of prolonged stress and trauma on that development is vital knowledge for every caregiver. With this information, school psychologists and school counsellors would more fully understand the children that they work with and would be better rpepared to meet the children's needs. The mother or primary caregiver's ability to nurture and bond with the infant is the most critical factor. A securely attached child will learn to self-regulate from the caregiver, and will have developed the neuron networking necessary to cope with most stressors that he or she will have to deal with throughout life. Both a secure attachment and the ability to self-regulate protect the child from the various stress hormones that cause damage to the brain. This protection also reduces the risk of the child's developing PTSD later in life. On the other hand, when the caregiver is ill-equipped, or unable to attach to the infant, the baby will develop attachment problems due to stress or trauma. Depending on the nature of the neglect or abuse caused by the caregiver, and the duration of the maltreatment, a variety of difficulties will challenge the child throughout life. Many of these neglected or abused children will likely experience some form of emotional and/or social dysfunction, and may need ongoing care and treatment. The costs attributed to maltreatment of young children, in terms of human suffering and in terms of costs to society, are too high. The quality of a person's life depends on his or her emotional and social well-being. Adequate nurturing and bonding from the primary caregiver toward the infant is paramount to the child's future health and happiness.

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