

The Impact of Trauma

Introduction

The argument so far has been that the development of our sense of ourselves begins as soon as we are born, if not before. This sense is based on our memories—memories of what has happened to us in our history. It is the very early memories that provide us with the emotional sense of our place in the world.

These first memories are stored only as emotions for the new-born baby. The cognitive processes begin to develop at about three years. Emotions and their association with an event begin at birth. In the child and the subsequent adult, other experiences with that incident or ones like it will trigger the same emotion.

For most babies, these memories are feelings of security and love. Their parents provide them with whatever they need, when they need it. However, for some children, the earliest memories are associated with experiences of abuse.

The Impact of Trauma on Sense of Self

Trauma is a medical-psychological word meaning “shock.” It can be defined as what happens when an event shatters stability based on expected outcomes—the expected link between actions and consequences.

For a baby, to move from the relative peace and security of the womb into another dimension is a traumatic event in itself. If the new world soon develops into another secure and peaceful environment, there is little impact on that child’s security. However, if the baby is born into an abusive environment—a world where he or she is abandoned, starved, hit, whatever—the child is subjected to on-going abuse and resulting trauma. These events fragment the child’s sense of security.

These children come face to face with their vulnerability and with the realization of the evil capacity of others—those in their outer zone—to destroy them. These children are at the start of their struggle to find security in the outer zone. They endeavour to develop a persona that will allow them to integrate.

The Mind and the Brain

The development of this persona takes place in the mind. The primary organ associated with the mind is the brain. The brain provides the hardware that allows us to think. It is what we think that constitutes our mind.

As humans, we are all driven by our human needs. These vary from individual to individual; however, we all have them, and they cannot be denied. This is our inner zone.

The outer zone is the world, our reality. It is in this zone that we look for opportunities to satisfy our inner drives. The world has no value until we see it as a place to get our needs met. It is the same for other people. You only have value to me if you provide the opportunity for my needs to be met.

It is the middle zone, our mind that links the two. It is here we experience the discomfort of the unsatisfied drive. We observe the world and its potential opportunity, and we make decisions and choose actions that will allow us to meet our needs in the world.

The brain is such a complex organ. It consists of billions of nerve cells that, through chemical and electrical interactions, give us access to a continual procession of thoughts. These thoughts are based on previously experienced events—experiences we have remembered.

In a broad sense, the brain consists of three parts. These parts are not complete at the time of birth but develop over time. Most of this development occurs in the first three years. An ordered, uninterrupted development is crucial to the maturation of a healthy mind and a healthy series of memories on which to base future decisions.

The Evolution of the Brain

The first region developed is the brain stem—the so-called reptilian part of the brain. This houses our most basic instinctive knowledge. The reflexes, the survival tools of thought, reside in this area. The brain stem is highly developed at the time of birth.

Development of the brain stem is quickly followed by development of the midbrain, which houses such things as motor regulation. The next part to develop is the limbic system. This is the storehouse of memories and emotions. It is a bagel-shaped part of the brain that sits above the brain stem and provides the mechanics that allow us to experience our sense of ourselves. Last to develop is the cerebral cortex. This is the most recent evolutionary development of the brain. This is where all the cognitive thought processes occur.

In the most basic sense, we act in the world by accepting incoming stimuli that are transferred from receptors through to the thalamus, located in the limbic system. The thalamus is the clearinghouse of the brain, which then sends the stimulus on to the appropriate parts where it is decoded and acted on. The brain handles these decisions by matching the presenting stimulus with records of previous experiences.

There's a myth first mentioned by William James at the beginning of the twentieth century, and popularized by Einstein, that we only use 10 per cent of our brain. Many trendy "positive thinkers" perpetuate this belief. They will claim they can teach you how to unleash all of your brain, allowing you to become rich and happy. Of course, these modern snake-oil salesmen will charge you for the privilege of maybe learning more effective use of the cerebral cortex. The fact is we do use all our brain all the time, although we do indeed have the capacity to use our thought processes more efficiently.

In 1978, a psychologist named McLean demonstrated a telling fact that shows the limits of changing behaviour through the power of positive thought. That is, in times of heightened stress, the brain shifts down from the cerebral cortex to the limbic system and potentially to the midbrain or brain stem. It is in the limbic system that powerful feelings and beliefs—the real power of the brain—reside. For children who have suffered early childhood abuse, this is a crucial factor. Abuse, particularly in the first three years, will have a lifelong impact on the child's middle zone.

The Impact of Trauma on the Developing Brain

It is only in the last two decades that we have come to an understanding of the full impact trauma has on the psychology and physiology of young children. Psychiatrists are at last unravelling the full extent of the damage. When fully comprehended, it presents a horrifying realization of the lifelong impact early childhood abuse can have.

Researchers in the field of trauma studies and brain development have only recently started to describe alterations to the very structure of the brain that occur in children who are subjected to abuse, particularly during the first three to four years. Bruce Perry of the Baylor College of Medicine and Bessel van der Kolk of Harvard Medical School are two at the forefront of research in this area. They, along with their colleagues, are becoming more and more certain that the majority of problem children have been victims of some form of abuse and would attract the diagnosis of post-traumatic stress disorder (PTSD).

PTSD is a psychiatric illness that results from people being exposed to events that have overwhelmed their psyche. The victims have problems incorporating these events into their lives. The first major push for research into this disease came after the Vietnam War. It is well documented that an extraordinary number of veterans suffered, and continue to suffer, from psychological disturbances that have wrecked their lives. Results of these studies provoked a movement to the study of children who suffered trauma in their early years. The results of this work are frightening. Perry and van der Kolk have demonstrated that the trauma not only leaves a child psychologically damaged, it causes long-term permanent damage to the child's brain.

The damage is caused by two factors. The first has its roots in the chemical activity associated with extreme levels of stress. The second occurs because of interruption to the orderly, hierarchical development of the brain's functions, particularly in the first three years. As stated earlier, the brain of an infant develops from the least complex system—the brain stem—up to the most complex area—the cerebral cortex, the thinking part of the brain. It is primarily the development of the limbic system, the area that deals with emotions and memories, that is impaired at this time.

Traditional wisdom dismisses the long-term damage early childhood abuse has on the subsequent adult behaviour of the individual. The belief is that children are resilient, and they won't remember or will get over these early experiences. The lack of early childhood cognitive memories is taken as a lack of all memory, and the belief is that there is no emotional memory for a human. But these abusive events experienced well before the child's capacity for cognitive recall nonetheless leave the child psychologically wounded, and the resulting scars are immense and long-lasting.

It is in the early years that the brain is most malleable. Neural connections are being created for the first time, and our earliest experiences create a template through which all subsequent information passes. If patterns of events related to experiences of trauma occur repeatedly, eventually a strong neural response—an overwhelming sense of fear and dread—is wired into the brain. When a similar stimulus is presented to the adult, he or she will experience a response that is associated with the level of fear and dread that was present at the time of the initial experience. This extreme response level will be triggered by events that an adult could reasonably expect to provoke minimal stress.

The Impact of Chemical Intrusion on the Developing Brain

It is difficult for others to understand the effects of the trauma suffered in the early stage of a child's life, particularly if the perpetrators are the primary caregivers. This direct abuse must subject the child to overwhelming levels of stress, with its potent mix of fear, confusion, anxiety, and pain. The resulting state of terror produces an automatic

physiological survival response from the brain stem. This is the brain's mechanism to prepare the body for defence.

The signals sent out are in the form of chemical and electrical change initiated in the brain. Chemically, this is an endogenous stress response of neuro-hormones—such as cortisol, epinephrine, norepinephrine, vasopressin, oxytocin, and endogenous opioids—that surge through the body, priming its defences. These chemicals flood the brain, including the cerebral cortex and such subcortical areas as the hippocampus, amygdala, hypothalamus, thalamus, and locus coeruleus. The most damaging change is the marked increase of cortisol.

The release of these naturally occurring chemicals is supposed to place the child in a state of preparedness to deal with perceived danger. When the danger has passed, the body returns to normal; the threat is over. However, when someone is exposed to too much stress or continual stress, the effectiveness of this normal stress response is inhibited. The persistent high levels of these chemicals, principally cortisol begins to damage brain development, particularly in the limbic system.

This situation also creates significant consequences for the hippocampus, the part of the limbic system considered to be the key structure of the emotional function of the brain. This damage, along with associated brain injury as described below, causes the person to suffer memory lapses, pervading anxiety, and an inability to control emotional outbursts.

The various components of the limbic system located in the central nervous system maintain the thinking process that controls the emotions and behaviours that are necessary for our sense of self. The amygdala, an almond-shaped knot of nerves located close to the brain stem, houses the emotional component associated with an external stimulus. Recent studies indicate that abnormalities in this limbic system, particularly to the amygdala, will occur if the child is subjected to high levels of stress. Damage and/or lack of appropriate and timely stimulation to this region of the brain interfere with its ability to make coherent sense of memories.

It is the hippocampus, another component of the limbic system that supplies the memory with meaning in a coherent assemblage of time and space. This will determine whether, and how, the incoming stimulus is associated with the brain's experience. That is, will this stimulus experience be associated with rewards, punishment, novelty, or non-reward? The hippocampus is also implicated in obsessional thinking or the inhibition of exploratory behaviour.

The failure of these components to fulfil their role in effectively dealing with incoming stimulation occurs because, as previously mentioned, the brain develops in a sequential and hierarchical fashion from least to most complex. The different functions become fully functional at different times during childhood. The amygdala matures before the hippocampus, which is not fully myelinated until the third or fourth year. Therefore, emotions identified by the amygdala have no meaning. They are lost in the infantile amnesia associated with the slow development of the hippocampus. The fear and terror remains associated with the stimulus, but there is no remembered reason for this emotion. It may well be that it is the interruption to regulated development of the brain at this time that impacts on the poor development of pro-social behaviours.

A striking example of the critical nature of interference to regulated development can be seen in rare cases where babies are born with cataracts on their eyes. If left untreated for as little as eight months, the baby becomes permanently and irreversibly blind. Yet a person who develops cataracts later in life can have sight restored with a simple surgical procedure. There is a time of development in the visual system that is critical to the development of the ability to interpret visual stimuli.

This same principle may apply to children who lack incoming signals associated with peace, love, and security. It may be that, if these children do not experience these emotions at the critical time, it becomes very difficult for these emotional capacities to develop fully at a later age. This has consequences for a child in the development of appropriate adult relationships. If a child misses positive experiences at the time the relevant section of the limbic system is maturing, he or she will most likely find it very difficult to form affectionate relationships in the future. This loss of ability to make appropriate attachments is critical for children to behave appropriately.

The horrifying effect of this lack of attachment is now being strikingly illustrated by children who were subjected to the horrors of the former Eastern Bloc countries' orphanages. These children, many of whom are now living with adoptive families in the West, are displaying the most extreme dysfunctional behaviours. They are almost incapable of experiencing any of the positive emotions associated with normal family life.

The problem created by the early development of the amygdala for abused children, associated with the late development of the hippocampus, means that they house a great deal of fear associated with particular stimuli that have no meaning for them. To compound the problem, recent studies of adults with a history of childhood abuse indicate high levels of brain alteration. A prominent researcher in this field, Bremner, found that the hippocampus of adults who had suffered sexual abuse as children had a 12 per cent reduction in size.

This abnormality occurs in other parts of the brain as well. The centre involved with attachment, the making of emotional bonds, actually looks different. The neurological wiring is not as dense or complex. It is like some sort of emotional delay in development, and the survivors of the abuse are literally lacking some brain organization that allows them to make strong connections with other people.

Perry demonstrated that the entire structure of the cortex in these people never developed properly. As a result, the cortical regions were around 20 to 30 per cent smaller than normal. Other workers in the field, Lewis and Pincus, found that excess and persistent cortisol actually produced layers of lesions on those parts of the cortex beneath the forehead known as the frontal lobes. It is this frontal lobe region that decides what is worth attending to, provides continuity and coherence of behaviour across time, and modulates affective and interpersonal behaviour so that drives are satisfied.

The cortex and frontal lobes are supposed to provide judgment, organize behaviour and decision-making, and help the individual adhere to the rules of everyday life. It is this impulsivity, observed in many dysfunctional children, that renders the cognitive approach to behaviour modification impotent in times of stress. The following specific impacts on behaviour are the manifestations of prefrontal damage:

- inability to use knowledge to regulate behaviour

- impaired ability to handle sequential behaviour
- impaired ability to establish or change mental set
- impaired ability to maintain a mental set
- impaired ability to monitor personal behaviour
- apathetic attitude

These children lack an appreciation for the impact their behaviour has on others. They are unable to appreciate damage or pain to anyone else but themselves. This lack of empathy is carried through to their adult life. They don't "grow out of it."

Yet another worker in this field, Teicher, measured the electro brain patterns of 115 children who had some history of abuse. He found that their EEG rates were twice as high as a control-group population with no reported history of abuse. However, the abnormality in every case was on the left-hand side of the brain. What he was describing is a neurological basis for the kind of polarization so often found in psychologically disturbed patients, identified through mood swings and contrasting temperaments. Instead of having two integrated hemispheres, the brain structure is in some sense bisected. Teicher found that the left hemisphere had fewer nerve cell connections between different areas and were less effective in logical responses to stressful situations.

The Impact of on PTSD on Behaviour

From the above information, it is apparent that subjecting children to high levels of repeated stress has a significant impact on the structural formation of the brain, particularly in the part of the brain that handles emotions—the limbic system. The neural paths established at this time become permanently associated with incoming stimuli. Because a particular stimulus evokes a paired response in the more primitive part of the brain, any pattern of incoming sensory information that resembles the original episode may be interpreted as, for example, threatening, and acted on before the cortex can make a more thorough evaluation.

As a result, victims of early and persistent abuse have exaggerated and more finely tuned biological responses to stimuli that are reminders of the traumatic event. These responses do not fade over time as should naturally occur. They are permanently housed in the emotional part of the brain.

As the brain matures, memory stages shift from the sensory-motor and perception representations of the early years to symbolic and linguistic modes of organization of sensory experience. For example, an incoming sensory message goes from the receptor to the thalamus. From there, it is transferred to the neo-cortex, the thinking brain, where a considered response can be made. Because of this, traumatized people—including children—can develop a fairly good psychosocial adjustment under normal circumstances. However, there is a second neural pathway from the thalamus to the amygdala. This link is more direct, and incoming information arrives at the amygdala well before the neo-cortex. It has been demonstrated that there is a half-second time difference between the message being delivered from the thalamus to the emotional part of the brain, the amygdala, and the thinking part of the brain, the neo-cortex.

The problem for people who have suffered early childhood abuse is that, when they are presented with stimulus associated with their early experience, the amygdala will instigate a

response developed for personal survival at the time of the abuse, well before any rational decision on the stimulus can be made by the neo-cortex. In effect, the responsive choices they make are not based on current conditions but on the selection available in their vulnerable early years. Because the response is based in the lower levels of the brain, these children bypass the lessons taught by counsellors and teachers—the lessons located in the neo-cortex.

The survival response available to very young children confronted with abuse is articulated from a small repertoire of behaviours. These behaviours fall into either a flight-or-flight or disassociation/surrender response. For a child, if making a noise—crying through to screaming—is ineffective, the only alternative is to completely surrender to the perpetrator and disassociate from the event. Adults have access to a variety of responses that range on a continuum between these extremes. Because the early responses are reduced to either fight-or-flight or disassociation/surrender, when an individual is confronted by a stimulus that evokes a response from the amygdala, the resulting behaviour will be limited to these alternatives. The adult repertoire is not considered.

In later life, the selection of either acting out or surrendering may go some distance towards explaining the differing number of boys and girls who are described as having severe behaviour problems in schools. Clearly, if you are an adult male, it is highly adaptive, in the face of a threat, to mobilize a total body response to fight or flight. Young children and females freeze to be defended by others or to become compliant. The latter is described as the defeated or the give-up response.

This sexual bias in the selection of responses may have its roots in the evolution of the brain, which over time found an adaptive advantage for survival. It has been postulated that over the last 250,000 years of evolution, humans had only two major predators: big cats and other humans. Combating clans or tribes would drive out or kill opposing adult males and capture the females and children. Therefore, it became the best adaptation for females and children to disassociate or surrender without a struggle, while the males had a better chance of survival through fighting or fleeing.

Not only may this explain the difference in the number of boys seen as having dysfunctional behaviours—acting out, fighting, etc.—it may also explain the dramatic increase in the identification of these boys from about the age of ten, the time they begin their journey through puberty. Girls, if they take up a surrender approach, will not present as a behavioural challenge to anyone but the most perceptive teacher.

Adaptations to Abuse

There appear to be three implications and major adaptations that traumatized people present in later life.

Intrusion

This is, in a sense, the reliving of the abusive episode. Intrusion may involve accurate memories and vivid flashbacks of the event or may present as associated, terrifying thoughts that are in some way similar to the original traumatic occasion. Nightmares are another form of intrusion. Terrifying dreams are common to these people and lead to poor

sleeping patterns. Once these individuals become dominated by intrusion, they begin to organize their lives around escaping these triggers.

Avoidance

People will consciously or subconsciously avoid situations likely to trigger the stress associated with the trauma. Young children who have been sexually abused by an adult male will fear contact with males just as an adult victim of rape will feel exaggerated fear if, say, a stranger follows them on a dark road.

Hyper-arousal

This is a persistent fear/response condition that pervades the consciousness of casualties of PTSD. Victims exhibit a profound sensitization of the neural response patterns associated with their traumatic experience. Any response to stimulus elicits the same level of fear and terror as the original episode.

To avoid this, traumatized children are constantly looking for clues from the environment that may signal a potential threat. A frown, a sign of rejection, an uncomfortable touch—all part of normal existence—take on highly significant meaning for these children. At school, they are so busy watching for potential danger that they are not listening to what the teacher is saying. Such behaviours make sense given the constant threat the child has historically experienced. The child's brain has become exquisitely tuned to emotional and physical cues from others.

Conclusion

The effects of this early exposure to trauma will be locked into the emotional memory of these children. They will feel the terror experienced at the time of the initial events of abuse whenever they're confronted with a similar situation. They carry a permanent sense of loss and sadness. They feel flawed and inadequate. They somehow sense that they will never be accepted, or be acceptable, to others in their world.

These feelings do not have any foundation in cognitive thought processes. They are feelings without consciously perceived cause. Therefore, attempts to deal with them must be outside any rehabilitating cognitive interventions, beyond the "power of positive thought."

These children feel cut off from others. There is a dislocation from a desirable, healthy link between their inner zone, their sense of humanity, and the outer zone, the rest of the world. This dislocation will dominate their future life. Their journey of self-discovery will be extremely disruptive. The fear associated with their past will force them to live constantly in a state of fear about the present.