

## **Childhood Trauma: Scars That Won't Heal**

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According to the National Institute of Mental Health, childhood trauma is defined as: “The experience of an event by a child that is emotionally painful or distressful, which often results in lasting mental and physical effects.”

Trauma that results in lasting emotional damage is categorised as Post-Traumatic Stress Disorder (PTSD). The Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-4) defines PTSD as the development of characteristic symptoms following a traumatic event. These responses must involve intense fear, helplessness, or horror, and in children, the response must involve agitated or disorganized behaviour.

### **Some Leading Causes:**

Trauma is defined by the way a person reacts to events. So, a trauma to one person may not be a trauma to another. Any time a child does not feel safe and protected, the event could be seen as a trauma.

The most common causes of Childhood Trauma listed by Illinois Department of Human Services are:

- Accidents
- Bullying/Cyberbullying
- Chaos or dysfunction in the house
- Death of a loved one
- Emotional abuse or neglect
- Physical abuse or neglect
- Separation from a parent or caregiver
- Sexual abuse
- Stress caused by poverty
- Sudden and/or serious medical condition
- Violence (at home, at school or in the surrounding community)
- War/terrorism

### **How Childhood Trauma Affects the Brain**

According to data provided by the Children's Bureau of the United States Department of Health and Human Services, there was a 3.8 percent increase in reported child abuse cases in the country between 2011 and 2015. This amounts to 683,000 cases of child abuse in 2015 alone in the U.S.

Research suggests that this type of trauma in childhood leaves deep marks, giving rise to issues including post-traumatic stress disorder, depression, anxiety, and substance abuse.

Dr. Pierre-Eric Lutz and colleagues noted that in adults who went through severe abuse as children, the neural connections in an area of the brain associated with the regulation of emotion, attention, and various other cognitive processes are critically impaired. The researchers' findings were published recently in *The American Journal of Psychiatry*.

### **White matter affected after childhood abuse**

Previous research has pointed out those individuals who experienced neglect and abuse as children have decreased volumes of white matter in various areas of the brain. White matter consists in myelinated axons, which are the projections of nerve cells allowing electric impulses to "travel" around and carry information, while myelin is the isolating "coating" in which these tracts are sheathed. Myelin helps these electrical impulses to travel faster, allowing information the volume and structure of white matter correlate with an individual's capacity for learning, and

this component of the brain keeps on developing throughout early adulthood - unlike gray matter. Although these changes - regarding the volume of white matter in people who have undergone abuse as children - have been noted before, other studies used MRI to scan the brains of the participants. Dr. Lutz and team instead decided to study brain samples collected post-mortem, in order to better understand what happens at a molecular level.

### **Myelination of axons was disrupted**

The researchers analysed samples collected from the brains of 78 individuals who had died due to suicide. All the brain samples were obtained using the Douglas Bell Canada Brain Bank. Of these people, 27 had been diagnosed with depression and had undergone severe abuse in their childhood, 25 had been diagnosed with depression but had no history of childhood abuse, and 26 had not been diagnosed with any mental disorder and had no history of child abuse. The brain tissue from the three groups of people were studied and compared. Alongside these, the researchers also looked at brain samples from 24 mouse models illustrating the impact of environment on the early developmental stages of the nervous system. People who had undergone abuse as children exhibited thinner myelin coating in a large percentage of nerve fibres. This was not true for the other two brain sample types studied. Also, the researchers noted that abnormal development at a molecular level specifically impacted the cells involved in the production and maintenance of myelin, which are called oligodendrocytes.

### **Connectivity of key brain areas impacted**

The team also found that some of the largest axons affected were unusually thickened. They say that these peculiar alterations may all act together to negatively impact the connectivity between the anterior cingulate cortex, which is a region of the brain implicated in processing emotions and cognitive functioning, and associated areas of the brain. These affiliated areas include the amygdala, which plays a key role in regulating emotions, and the nucleus accumbens, which is involved in the brain's reward system, "telling" us when to anticipate pleasure. This could explain why people who underwent abuse in childhood process emotions differently and are more exposed to negative mental health outcomes, as well as substance abuse. The researchers' conclusion is that experiencing abuse in early life "may lastingly disrupt" the connectivity between the areas of the brain that are key in cognitive and emotional processes. However, they admit that the full mechanism involved is not yet clear, and they hope that further research could shed additional light on the impact of childhood trauma on the brain.

### **Learning and Memory:**

Traumatized children tend to become hypervigilant. They become preoccupied with impending danger and tend to lash out in the face of ambiguous stimuli. This affects how they organise their perceptions of the world and often is associated with the development of generalized problems in learning and academic achievement. Many traumatized children narrow their attention to sources of threat and feeling uninterested or numb in response to things other children may find challenging.

### **Dealing with the Damage**

I hope that new understanding of childhood abuse's impact on the brain will lead to new ideas for treatment. The most immediate conclusion from work of DANA Foundation, however, is the crucial need for prevention. If childhood maltreatment exerts enduring negative effects on the developing brain, fundamentally altering one's mental capacity and personality, it may be possible to compensate for these abnormalities—to succeed in spite of them— but it is doubtful that they can actually be reversed in adulthood. The costs to society are enormous. Psychiatric

patients who have suffered from childhood abuse or neglect are far more difficult and costly to treat than patients with a healthy childhood. Furthermore, childhood maltreatment can be an essential ingredient in the makeup of violent individuals, predisposing them to bouts of irritable aggression.

### **Their Choice or Ours?**

Society reaps what it sows in nurturing its children. Whether abuse of a child is physical, psychological, or sexual, it sets off a ripple of hormonal changes that wire the child's brain to cope with a malevolent world. It predisposes the child to have a biological basis for fear, though he may act and pretend otherwise. Early abuse moulds the brain to be more irritable, impulsive, suspicious, and prone to be swamped by fight-or-flight reactions that the rational mind may be unable to control. The brain is programmed to a state of defensive adaptation, enhancing survival in a world of constant danger, but at a terrible price.

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