

## Trauma, Senses, and Recovery

When working with traumatized individuals, it is very important to consider the role senses play in traumatic memory, as well as healing. Science has demonstrated that smells can trigger traumatic memory to activate. If the brain can respond negatively to smell, can the opposite be true? Yes. This is true for all of our senses.

- ♥ Smell – Apple Pie like grandma made, laundry detergent from home, familiar soap, etc.
- ♥ Touch – Blanket, siblings' sweater, stuffed animal, parents' pillow, etc.
- ♥ Sound – A musical CD, humming child to sleep, audio nature sounds, etc.
- ♥ Sight – Pictures of loved ones and friends, warm and friendly art/paintings, plants, etc.
- ♥ Taste – Macaroni and cheese, soup, etc.

Sometimes the most beneficial thing a helping adult can do to reassure a child is not spoken with words at all, rather reminders of external cues the child can assign their own meaning of safety to.

## Fun Brain Factoids!

It is estimated that the human brain has 100 billion brain cells and each of these neurons connect to approximately 1000 other neurons. The total brains firing activity at any given moment is approximately 20 million billion calculations per second! If we were to lay out each neuron we would have approximately 2 million miles of neurons.

*The external environment has the very real capacity to form new biological neural connections. One way to understand this is to use an analogy of a path in a forest. If hikers (neurons) stay on the trail (network of neurons), the trail eventually becomes wider (stronger neuronetworks), easier to see, and distinguishable as a central path. If hikers (neurons) stray from the path to the surrounding forest, new paths begin to form. Eventually these new paths take on the size and shape of the original main path. With the main trail neglected, the forest eventually grows over the path and returns to looking like the rest of the forest (diminished neural connections or cell death).*

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## Biology of Trauma

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### *How Trauma Impacts the Developing Mind*

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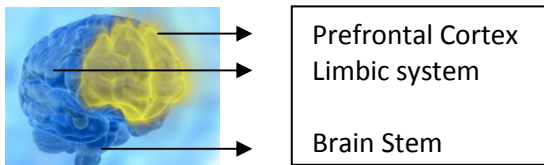
## Trauma and the Developing Mind

Life experiences influence brain maturation, as well as how the mind achieves mental health. Countless studies have been able to demonstrate that *nature* depends on *nurture*. Every interaction we have with others shapes the architecture of our brains. This is especially true for the developing brain, which doesn't fully develop until approximately age 29.

In order for helping adults to understand how to best reduce the affects of trauma on the developing mind, they must first understand what trauma is and how it affects the brain. This understanding can minimize assumptions that may be inaccurate, and can provide tools for interactions that promote healing.

## Basic Brain Functioning

How many times have we heard that humans use just 10% of their brain? In actuality we use all of our brain all of the time. We cannot "think" with the prefrontal cortex (logic) without input from the limbic system (emotions) or the brain stem (biology of entire body).



For example, the brain stem tells the limbic system that the heart rate has increased, the limbic system begins to feel emotional discomfort, and the prefrontal cortex attempts to discern what is causing the emotional discomfort and thinks about how to address that cause.

It is when these structures are impacted by trauma that people experience instability of thought ("It must be my fault"), emotion ("I don't know why I get so angry sometimes"), and instability of the body

("The doctor says I'm healthy, but the pain in my body is real"). Trauma's main impact on the brain is in triggering significant over-activity of neurons and the entire brain's response often results in cell toxicity and cell death to varying degrees.

## Trauma and the Brain

A survivor of trauma is physiologically not able to simply ignore emotions in order to increase logical thinking. A trauma survivor cannot be told how to think, behave, or feel when traumatic episodes take place any more than a person with a broken leg can just "shake it off" and walk without a limp. Cell recovery takes the right kind of intervention (cast for a broken leg with crutches) and time for cells to form strength (how long does it take for a broken bone to heal?).

Physiology takes precedence. We cannot determine what a traumatized child should think or feel any more than we can expect a person with a broken leg to simply walk like everyone else. It is crucial to keep this in mind when working with anyone suspected of experiencing past trauma because recovery takes time.

## Trauma and the Emotional Brain

When an individual experiences trauma, the limbic system sounds the alarm and lets the prefrontal cortex and body know that danger is impending. This brain structure tells us when to run and when to stay and fight, providing the necessary chemicals to ensure survival.

Because the limbic system is mostly unconscious, a traumatized person often does not know why they feel what they feel. Sometimes they are unable to identify what they are feeling. This is the main reason why some children respond to kindness from adult helpers with anger, fear, and aggression. They are literally fighting for their life, whether there is an actual threat or not.

## Trauma and Neuron Activity

When an individual experiences trauma, neuron (brain cell) activity increases to extremely high levels. Because the brain cannot function for very long in this state, eventually the neurons decrease activity in an equally extreme manner, eventually balancing out.

Traumatic events can cause the brain to perpetually fluctuate between extreme high and low activity states, with very little chemical balance. It is because of this that traumatized children sometimes perceive threats where there are none and respond accordingly.

Children who are experiencing fluctuations can exhibit behaviors that perplex adults. Sometimes children will express high levels of anger or sorrow after a caring adult expresses kindness. The psychological explanation of this typically involves the notion that children protect themselves from others by "pushing" them away. This keeps the child safe from abandonment, betrayal, and abuse. The physiological contribution to this explanation is that emotional regulation is nearly impossible for a child whose neurons fire too rapidly or too slowly, and the child responds with behavior that often "pushes" others away.

## Trauma and Stress Hormones

Two of the greatest triggers of stress hormones related to emotional trauma are fear of the *known*, and fear of the *unknown*. Helping adults can provide safety from known fears by removing the child from a dangerous environment and explaining what things to expect will happen in age appropriate ways to the child. The effects of trauma are greatest when a child cannot make sense of what is happening. The more information a child can obtain about their past, present, and future, the greater the odds are for resiliency and recovery to take place.