

**THE TRAUMA-INFORMED BRAIN  
HOW TRAUMATIC STRESS SHAPES NEUROBIOLOGY  
Highlights**

- Our brains are malleable. Neural pathways can reconnect or grow. This plasticity is primarily seen in a few brain areas including the hippocampus, which is important for learning and memory.
- Brain development is use-dependent. What we use gets stronger.
- The areas of the brain focused on survival act first and faster than our thinking brain. One important structure is the amygdala, which as the “first responder” initiates the reflexive stress response.
- A stress response, although involuntary and automatic, can be based on a learned emotional association, referred to as fear conditioning. The amygdala is a primary brain structure involved in forming and storing fear-conditioned memories.
- The amygdala (fight, flight, or freeze) in trauma survivors is hyper-vigilant – scanning for danger, seeing danger, sensing threat, reacting to perceived threat or danger. This is (among other things) exhausting.
- Trauma stress events, especially layers of trauma over time, strengthen our survival neural networks making them quicker to respond.
- Memories of trauma are both implicit (activate emotions and senses) and explicit (activate pictures and stories of what happened). Implicit trauma memories are stronger than explicit memories.
- Memory involves repackaging fragments of sensory information into a coherent whole. Because the brain areas that provide context are often not working well in traumatic situations, these detached sensory fragments can illicit a stress response even in the absence of threat.
- Feeling connected and safe using the right hemisphere precedes reflecting and problem-solving using the left hemisphere.
- When we feel threatened or scared, our brains move resources away from thinking and towards survival. Trauma informed or trauma specific work is about reducing the experience of threat (emotional regulation) and restoring the capacity of the prefrontal cortex (thinking, problem solving, planning, inhibiting).
- Every interaction the survivor has with a provider system (physical space, intake, case managers or clinicians, assessment procedures and questions, rules and policies, etc.) has the potential either to activate the trauma response or not. When we fail to re-activate the trauma response, we invite the frontal lobe back on line and enhance emotional regulation and rational thought/behavior. Positive interactions, which create safe context and connection are foundational to changing maladaptive brain patterns.