**The Brain, Memory and Trauma**

Memory: Encoding

Right brain develops first

-Implicit, nondeclarative or procedural memory

-online at birth

-the earliest form of memory is unconscious, implicit, emotional and inaccessible

-stores emotional memory which derives from emotional responses to stimuli and is processed by the **amygdale**

**-NOTE:** patterns of expectation of how relationships will go begin to accumulate in the young child’s brain; these patterns are stored in implicit or emotional memory and have a lasting effect on the way a young person begins to expect interactions to be with another – all others.

Left brain develops later (online around age 3)

-Explicit or declarative memory which can be accessed and spoken about

-semantic memory; the “what” of memory

-explicit memory is processed by the hippocampus – which tags time and place to memory (the “when” and”where”) guaranteeing the ability to retrieve the memory in an identifiable form.

-when the **hippocampus** has consolidated the memory in the cortex, each individual element that comprises the memory is stored at the cortical site where it was originally received.

Memory: Retrieval

-Different elements of a particular memory are distribute widely across different parts of the brain – no single location contains the entire memory trace of a specific experience

-Thus – memory retrieval requires a complex assembling of all the memory elements that have been stored in various cortical sites. When memory is recall is over – the memory is disassembled

-Elements remain ready to be reassembled –BUT with the overlay of the most recent remembering

-synaptic plasticity plays a significant role in the “organizational basis of long term memory implicit or explicit”. Thus the actual re-experiencing of the memory and the context in which it takes place will affect the process.

-Clinical Significance: working through of fearful memories……may be necessary to regulate the process of the return of the memory –slowing it down and helping the person toward regulation of affect so that the trauma is processed in small manageable amounts.

**The Effects of Trauma**

**-**mounds of empirical evidence support the notion that early stress and maltreatment have the potential to literally alter the brain and its development (i.e., reduced size of the corpus collosum; HPA axis and neurohormonal functioning )

-“In essesnce – stress response systems are programmed by experience to respond more drastically to events later in life” (Teicher et al., 2006, p.191). Alternations occur in the amygdale and other limber regions as a part of readying for the flight or fight response in the face of further threat.

-Shin et al. (2006) argues that the amygdale responsivity is heightened and positively associated with sx severity in PTSD.

Trauma and processing –

In non-traumatic situations – the explicit or declarative memory store of the hippocampus is easily accessible. But if information has not been adequately processed by the hippocampus (which becomes inactive in circumstances of severe trauma) the person cannot easily remember what happened.

-Distressing events – inactivate the memory store of the left hemisphere and leave the strong emotion to be stored primarily in the emotional storehouse of the amygdala. Thus it remains unavailable to recall but – but yet can still govern ways of being and behaving in relating to others and the world around us.

-recall – cortisol affects memory formation and retrieval – it interferes with the function of the neurotransmitters – the brain cells that are used to communicate with each other. Excessive cortisol can make it difficult to think or retrieve information.

-why we lose our memory – stress hormones divert blood glucose to muscles – thus the amount of glucose or energy that reaches the brain’s hippocampus is diminished. This creates an energy crisis in the hippocampus which compromises its ability to create new memories.

-If an environmental stimulus triggers reactivation of an emotional memory – aspects of it become available to the conscious mind. – the patient becomes able to think and begin to process.