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| **AMYGDALA****A small almond-shaped structure inside the limbic system, which includes thalamus and hippocampus. All regulators of how we react. Hammond (2015) calls the amygdala the “guard dog” because it is on guard for anxiety. The amygdala can release cortisol that goes straight to the thalamus sending anxiety waves through the brain when we sense danger (like a microaggression). These interrupt cognitive waves and the ability to be fully attentive or process information.** |
| **THALAMUS****The thalamus (from Greek θάλαμος, "chamber") is a large mass of gray matter in the limbic system of the brain with several functions: relaying of sensory signals, including motor signals to the cerebral cortex, and the regulation of consciousness, sleep, and alertness. Hammond (2015) calls the thalamus the “brain’s communication dispatch hub” because all incoming sensory information has to pass through the thalamus. However, if the brain senses danger and the amygdala releases cortisol, that can interrupt the thalamus’ ability to take in information.****HIPPOCAMPUS****The hippocampus is a small, curved formation in the brain that plays an important role in the limbic system. It is involved in the formation of new memories and is also associated with learning and emotions. Because the brain is lateralized and symmetrical, you actually have two hippocampi. In short term memory, you can hold information 5-20 seconds. If you do not process it in some way, you lose it. In working memory, you can hold information for up to 20 minutes, allowing you to send signals to your brain schema to re-imagine how new information fits with old**. |
| **PREFRONTAL CORTEX****The prefrontal cortex (PFC) is the cerebral cortex covering the front part of the frontal lobe. This brain region has been implicated in planning complex cognitive behavior, personality expression, decision making, and moderating social behavior. Executive function exists in the neo or prefrontal cortex. Hammond (2015) says that “executive functioning controls planning, abstract thinking, organization and self-regulation”****RETICULAR ACTIVATING****SYSTEM (RAS)**The reticular activating system is in the reptilian part of the brain, just above the brain stem, responsible for alertness and attention. “The RAS scans our environment 24/7 for novelty that signals changes, any possible threats to one’s social status, physical survival or strong emotions (bodily harm, humiliation, microaggressions) or rewards (food, friendship). It sends reports to the amygdala”, which can then interrupt the thalamus (Hammond, pp. 38-39). |
| **REPTILIAN BRAIN**The oldest part of the brain, the reptilian brain has three parts. The brain stem **controls the body's vital functions such as heart rate, breathing, body temperature and balance. T**he cerebellum **receives information from the sensory systems, the spinal cord, and other parts of the brain and then regulates motor movements. The cerebellum coordinates voluntary movements such as posture, balance, coordination, and speech, resulting in smooth and balanced muscular activity. The RAS (reticular activating system)mediates overall level of consciousness.** |
| **WORKING MEMORY****Working memory is “where the brain works to connect new information to old knowledge in order to turn facts, figures, dates, concepts, or skills into something that has meaning and relevance to the learner” (Hammond, p. 40). This stores information currently in use for up to 20 minutes so that the learner can process and hopefully practice enough to get into long term memory by connecting to schema in which the brain stores information in an organized way to facilitate remembering at a later date.** |
| **SHORT TERM or** **SENSORY MEMORY**Information (stimuli) enters short term for a short time – 5-20 seconds, but it is not a processing center. Unless the learner interacts with the information, the learner “loses” the information. Learning (or quickly forgetting) a phone number is an example of how this works. Being able to attend depends on the limbic system and the ability of the thalamus to engage its ability to take in and use information. |
| **LONG TERM MEMORY****Two types of long-term memory include procedural memory, how to do things, and declarative memory, facts, general knowledge, and personal experiences.** **Information stored in long-term memory is first held in the hippocampus and then transferred to the areas of the cerebral cortex involved in language and perception for permanent storage.** |
| **THREE PARTS OF THE BRAIN****The brain parts developed in humans over time. The reptilian stem houses the brain stem, the cerebellum, and the RAS (reticular activating system). The limbic system is a layer of the brain or the emotional part of the brain is just above the reptilian stem and present only in mammals. Finally, the prefrontal or neocortex is a slower “processor” but houses the executive function of the brain.** |