

**ALPHABETICAL BRAIN™ VOCABULARY  
HUMANIST FAMILY BRAIN STUDY**

**DETAILS ABOUT POTENTIATION? #8  
[Also known as Long-Term Potentiation]  
September 9, 2019**

**WHAT IS THE POTENTIATION PROCESS?  
AND WHY IS IT SO IMPORTANT?**

The purpose of the *potentiation process (long-term potentiation)* is to make human cellular communication possible among all of the 100-200 billion neurons throughout your brain's physical system and your mind's mental functions and the rest of your body (nervous system).

The process of potentiation connects the neurons in your neuronal pathways. In addition, it makes possible your mind's mental force (brainpower) due to the process of transduction. The transduction process either stimulates (excites) or inhibits (blocks) the biochemical current of ionic signals and impulses traveling up and down your neuronal pathways. This signaling process travels in a single direction in each of your many neuronal pathways.

The potentiation process was first described by Hebb's Law in 1949 as "neurons that fire together, wire together." It has been updated to be more precisely descriptive of what actually happens by "the weight of connection between neurons is a function of the neuronal activity."

This phenomenal process strengthens the action potential spikes of biochemical current in particular neuronal pathways by adding more connections to more neurons through the repeated signaling of the ion impulses inside the reinforced neuronal pathways.

**Potentiation Image**

For example, the biochemical signaling process is what causes a habit to form through the repetition of a physical behavior, or a mental idea, until it is remembered in your long-term memory system.

This happens because of the deliberate association of strong emotions with the behavior or the repetition of a behavior due to your deliberate intention. Also, it can happen simply because of routine incidental unconscious behaviors of which you are not aware, if you let your mind wander. The actual biological process involves the inside of neuronal pathways when biochemical currents create "memory triggers" that are "wired" into your long-term memory system.

This fundamental biological process can produce new memories of all the sensations that your mind's mental force (brainpower) is aware of from both inside and outside your body.

For example, procedural memory (implicit muscle memory) is one of the two forms of your long-term memory. It deals specifically with physical skills and habits of movement, such as the learning of sports skills by repeatedly making specific bodily movements related to a particular skill or sport.

This learning ability is made possible by the potentiation process, which is the repeated signaling of thousands or hundreds of thousands of action potential spikes. They originate in the nucleus of neuron cell bodies of billions of neurons. The biochemical signals are forwarded from the working memory system of your prefrontal cortex to the long-term memory system of the hippocampus part of your limbic system.

**Note:** See in context: working memory #1, neurons #2, dendrites #3, axons #4, nucleus of a neuron #5, glial cells #6, synapses #7, connectome #9, plasticity #10, cerebrum #11, prefrontal cortex #12, limbic system #13, and long-term memory #15.

**RECOMMENDATION:** You may print this pdf version and read it and edit it by adding or deleting ideas. Then, you can read your edited version of these ideas according to a *reinforcement schedule*, such as a few hours later and a few days later and then several times in the next week or two. This strategy can help you take advantage of the power of the *spaced-repetition method of memorization*. Such deep introspection can change your adaptive self-identity and increase your self-esteem (positive emotions about yourself).

**Remember always:  
You are your adaptable memory!**