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Biology of Emotion

The nervous system is not only the body's control unit, but also the center of the experience of emotion. In particular, the areas that are related to the recognition of emotion include the brain (limbic system) and the autonomic nervous system or ANS.

The Limbic System

The region of the brain that is related to the recognition and regulation of emotion is called the limbic system. The limbic system is composed of the amygdala, hippocampus, septum, anterior thalamic nuclei, septum, fornix and limbic cortex. The amygdala is the part of the limbic system that regulates emotions.

Brain Pathways

According to researchers, the sensory information that emerges from events that trigger emotions is transmitted to the thalamus, the relay center of the brain. From the thalamus, the information is transferred to two brain structures: the amygdala and the brain cortex. The role of amygdala [1] is to promptly process the sensory information and transmit signals to the hypothalamus afterwards. In turn, the hypothalamus releases hormones that activate the Autonomic Nervous System or ANS. The other pathway, the brain cortex, slowly processes the sensory information from the thalamus. Simply put, the amygdala is responsible for a person's instantaneous response to an emotion-evoking event, without even thinking about how to respond. On the other hand, researchers say that the brain cortex's gradual processing enable an individual to evaluate the emotion-evoking event.

Value of Amygdala

The amygdala is a very important brain structure because it affects how a person is able to recognize events in his environment and how he will respond to such emotion-evoking events. Studies particularly emphasize the effect of a damaged amygdala to the processing of fear. In humans, a person is unable to recognize fear in another person if his amygdala is damaged. However, some people with damaged amygdala still show the recognition of fear in themselves. In animals, conditioned fear responses cannot be developed, resulting to unusual ferocity despite the presence of a fear-evoking event.

The Autonomy Nervous System

The ANS controls all of the human body's automatic or involuntary functions. The ANS' sympathetic branch sends signals to the adrenal gland in order to prepare the body to act or react following an emotion-evoking event. Then, the adrenal gland secrets two important hormones: epinephrine and norepinephrine. The release of these hormones leads to the increase in heart rate, respiratory rate, blood pressure, and blood sugar levels. Slower digestive processes and pupil dilation can also be observed. On the other hand, the parasympathetic branch of ANS performs the opposite of what the sympathetic branch does; it keeps the body from expending energy.

The autonomic responses are frequently used by the researchers in measuring emotions. One of these responses is the galvanic skin response, which refers to the increase in the electrical conductivity rate of the skin. This response can be used as a person sweats upon facing an emotion-evoking event. Muscle tension, blood pressure, respiratory rate, heart rate and other body indicators are also used for measuring emotional states.

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