

# neural and synaptic transmission



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The nervous system is made up of neurons and glial cells. Neurons are the basic communication links in the nervous system. Glial cells provide support for neurons and contribute to communication. Neurons normally transmit a neural impulse (an electric current) along an axon to a synapse with another neuron. The neural impulse is a brief change in neuron's electrical charge that moves along an axon. It is an all-or-none event. Action potential triggers the release of chemicals called neurotransmitters that diffuse across the synapse to communicate with other neurons. Transmitters bind with receptors in the postsynaptic cell membrane, causing excitatory or inhibitory PSPs.

Most neurons are linked in neural pathways, circuits, and networks. In the nervous system, the neural impulse functions as a signal. For that signal to have any meaning for the system as a whole, it must be transmitted from the neuron to other cells. As noted above, this transmission takes place at a special junction called synapses, which depend on chemical messengers. To explain in another way, neural impulses are electrochemical events. When neurons are stimulated beyond a threshold level, there is a rapid shift in its polarity from negative to positive charge. This reversal of charge, called an action potential or neural impulse, is generated along the length of the axon to the terminal buttons.

When a neural impulse reaches the terminal button, it triggers the release of neurotransmitters, the chemical messengers that carry the message across the synapse to neighboring neurons. Neurotransmitters can have either excitatory or inhibitory effects on the neurons at which they dock. Example: The educational and childcare reformers who have used brain science as the

base for their campaigns have primarily cited to key findings: the discovery of critical period in neural development and the demonstration that rats raised in “ enriched environments” have more synapses than rates raised in “ impoverished environments.” A critical period is a limited time p in the development of an organism when it is optimal for certain capacities to emerge because the organism is especially responsive to certain experiences.

### Classical conditioning

Classical conditioning explains how neutral stimulus can acquire the capacity to elicit a response originally evoked by another stimulus. This kind of conditioning was originally described by Ivan Pavlov. Many kind of everyday responses are regulated through classical conditioning, including phobias, fears, and pleasant emotional responses. Even psychological responses such as immune and sexual functioning and drug tolerance can be influenced by classical conditioning. A conditioned response may be weakened and extinguished entirely when the CS is no longer paired with the US. In some case, spontaneous recovery occurs, and an extinguished response reappears after a period of non-exposure to CS.

Conditioning may generalized to additional stimuli that are similar to the original CS. The opposite of generalization is discrimination, which involve not responding to stimuli that resemble the original CS. Higher order conditioning occurs when a CS function as if it were US, to establish new conditioning. Example: The art of manipulating people’s association has been perfected by the advertising industry. Advertisers consistently endeavor to pair the product they are pendling with stimuli that seem likely

to elicit positive emotional response. Like advertisers, candidates running for election need to influence the attitude of many people quickly, subtly, and effectively- and they depend on evaluation conditioning to help them do so. For example , politician show-up at an endless variety of pleasant public events( such as opening of a new mall) that often have nothing to do with their public service.

## Stress

Stress is common every day event, even seemingly minor stressors or hassles can be problematic. To a large degree, stress lies in the eye of the beholder, as appraisals of stress are highly subjective. Major type of stress includes frustration, conflict, change, and pressure. Frustration occurs when an obstacle prevent one from attaining some goal. The three principal type of conflict are approach-approach, avoidance-avoidance, and approach-avoidance. A large number of studies with the SRRS suggest that change is stressful. Although this may be true, it is now clear that the SRRS is a measure of general stress rather than just change related stress.

Two kind of pressure ( to perform and conform) also appears to be stressful. Emotional reaction to stress typically include anger, fear, and sadness, although positive emotions may also occur may promote resilience. Emotional arousal may interfere with coping. The optimal level of arousal on a task depends on the complexity of the task. The psychological arousal in response to stress was originally called the fight-or-flight response by Cannon. The fight-or-flight response may be less applicable to women than men. Selye's general adaptation syndrome describes three stages in physiological reaction to stress: alarm, resistance, and exhaustion.

There are two major pathways along which the brain send signal to the endocrine system in response to stress. Action along these pathways release two set of hormone, catecholamines and corticosteroids, into the bloodstream. Stress may support the process of neurogenesis. Some coping responses are less than optimal. They include giving up, blaming oneself, and striking out at others with act of aggression. Indulging oneself is another coping pattern that tends to be of limited value. Defense mechanism protect against emotional distress through self-deception. Small positive illusion about oneself may sometimes be adaptive.

### Piaget

According to Piaget's theory of cognitive development, the key advance during sensorimotor period is the child's gradual recognition of the permanence of objects. The preoperational period is marked by certain deficiencies in thinking- notably, centration, irreversibility, and ego centrism. Jean Piaget (1929, 1952, 1983) was an interdisciplinary scholar whose own cognitive development was exceptionally rapid. In his early 20s, after he had earned a doctorate in natural science and published a novel, piaget turned his focus on psychology.

He soon found himself administering intelligent test to children to develop better test norms. In doing this testing, piaget became intrigued the reasoning underlying the children's wrong answers. He decided that measuring children intelligent was less interesting than studying how children use their intelligence. He spent the rest of his life studying cognitive development. Many of his ideas were based on insights gleaned from careful observation of his own three children during their infancy.

Like Erikson's theory, Piaget model is a stage theory of development. Piaget proposed that the youngsters progress through four major stages of cognitive development, which are characterized by fundamentally different thought process: (1) Sensorimotor period (birth to age 2), (2) the preoperational period (age 2 to 7), (3) the concret operational period (age 7 to 10), and (4) the formal operational period (age 11 onwards). Example; fathers are essential for healthy development. Over the last 40 years proportion of children growing up without a father in home has more than doubled. During the same time, we have seen dramatic increase in teenager pregnancy, juvenile delinquency, violent crime, drug abuse, eating disorder, teensuicideandfamilydysfunction.

## Erikson

Erikson theory of personality development propose that individual evolve through eight stages over the life p. In each stage the person wresles with changes (crises) in social relationship. According to Erikson Personality is shaped by how individual deal with these psychological crises. Each crisis involves a struggle between two opposing tendencies, such as trust versus mistrust or initiative vesus guilt, both of which are experienced by the person. Erikson describes the stages interms of these antagonistic tendencies, which represent personality treatesthat people display in varying degrees over the reminder of their lives. Although the names for Erikson's stage suggest either-or-outcomes, he viewed each stage as a tug of war that determind the subsequent balance between opposing polarities in personalities.

The eight stages in Erikson's theory are: stage 1- Trust versus mistrust (Is my world predictable and supportive?, first year of life), stage 2-Autonomy versus shame and doubt (Can I do things myself or must I always rely on others?, second and third years), stage 3-Initiative versus guilt (Am I good or am I bad?, fourth through six years), stage 4- Industry versus inferiority (Am I competent or am I worthless? Age six through puberty), stage 5-Identity versus confusion (Who am I and where am I going?, adolescent), stage 6-Intimacy versus isolation (Shall I share my life with another or live alone?, early adulthood), stage 7-Generativity versus self-absorption (Will I produce something of real value?, middle adulthood), stage 8-integrity versus despair (Have I lived a full life?, late adulthood)

Psychoanalytic

(Freud/Jung)

Freud's psychoanalytic theory emphasizes the importance of the unconscious. Freud described personality structure in terms of three components- the id, ego, and superego- which are routinely involved in ongoing series of internal conflict. Freud theorized that conflict centering on sex and aggression are especially likely to lead to anxiety. According to Freud, anxiety and other unpleasant emotions such as guilt are often warded off with defense mechanisms. Freud described a series of five stages of development: Oral, anal, phallic, latency, and genital.

Certain experiences during these stages can have lasting effects on adult personality. Jung's most innovative and controversial concept was the collective unconscious. Adler's individual psychology emphasizes how people strive for superiority to compensate for their feeling of inferiority. Overall, psychodynamic theories have produced many groundbreaking insights

about the unconscious, the role of internal conflict and the importance of early childhood experiences in personality development. However, psychodynamic theories have been criticized for their poor testability, inadequate base of empirical evidence, and their male centered view.