

## Learning Modules

### What is psychology?

The Greek word “psyche” translates into the “spirit” or “soul” while the suffix “ology,” (derived from the Greek word “logia” or “sayings”) relates to study. Psychology is the study of the complex human mind’s complexities and functions (especially those affecting development, behavior and impacts), and influences all aspects of the human experience. It can also extend to animal studies and overlaps with many areas of study, such as medicine, history, and sociology. Psychologists use human behavior as an indication of how the mind processes. They study thoughts, learning and understanding, emotions, memories, perceptions, and other ideas that are not physical.

### Some people of psychology

- **Pierre Cabanis** of France wrote “Relations between the physical and moral aspects of man,” in 1802, interpreting the mind within the constructs of his biology background and relating the soul to the nervous system.
- **Wilhelm Wundt** of Germany set up the first laboratory devoted exclusively psychological research in 1879. He is considered the father of psychology.
- William James, an American philosopher, published *Principles of Psychology* in 1890.
- **Hermann Abbingaus** (1850-1909) studied memory at the University of Berlin.
- **Ivan Pavlov** (1849-1936) became famous for his research in the learning process he called “classical conditioning” and is famous for the term “Pavlov’s dog.”
- **Sigmund Freud** (1856-1939) of Austria developed psychotherapy around the idea that the unconscious is responsible for thought and behavior.

### Some fields of psychology

- **Clinical psychology** is the study and application of psychology in order to understand, prevent, and alleviate psychologically-caused distress or disability and promote a patient’s well-being and personal development.
- **Medical psychology** observes how behavior, biology, and social context influence illness and health.
- **Cognitive psychology** investigates internal mental processes, such as problem solving, memory, learning, and language (how people think, perceive, communicate, remember and learn).
- **Developmental psychology** investigates the psychological changes a person experiences over the course of their lifespan.
- **Forensic psychology** employs psychology in criminal investigation and law.

### Sources

- American Psychological Association <http://www.apa.org/news/press/video/this-is-psychology/index.aspx>
- Medical News Today <http://www.medicalnewstoday.com/articles/154874.php>
- The Psychology Department at The University of Texas at Austin <http://www.psy.utexas.edu/>

## Learning Modules

### What is neurobiology?

Neurobiology studies the nervous system – the organization of its circuitry and how it processes information and mediates behavior. Neurons are diverse cells that are specialized to receive, propagate and transmit electrochemical impulses. The nervous system coordinates the actions of animals. The human brain has over a hundred billion neurons!

Neurobiology, Physiology and Behavior (NPB) emphasizes the understanding of vital functions common to all animals. All animals perform certain basic functions - they grow, reproduce, move, respond to stimuli and maintain homeostasis. The physiological mechanisms upon which these functions depend are precisely regulated and highly integrated through actions of the nervous and endocrine systems to determine behavior and the interaction between organisms and their physical and social environments.

### Sources and Resources

- <http://www.sciencedaily.com/articles/n/neurobiology.htm>
- <http://www.npb.ucdavis.edu/aboutnpb/>
- <http://www.biosci.utexas.edu/neuro/>

## Learning Modules

### What is memory?

The word “memory” comes from the Latin word *memor*, meaning mindful. In science, memory is described as the process of acquiring, storing, and recalling information. People use memory as a tool to respond to present and future thoughts, experiences, and purposes. Memory includes:

- Facts you know;
- Skills you learn;
- Habits or fears you have; and
- Events you experience.
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Memories, in these forms, can be shaped by emotions, imagination, perceptions, language and imagery.

### Sources

- Stanford Encyclopedia of Philosophy <http://plato.stanford.edu/entries/memory/>
- Exploratorium’s Memory Website <http://www.exploratorium.edu/memory/>

## Learning Modules

### What are the parts of the human brain and what do they do?

By processing electrical signals and chemical reactions, the brain directs communication within an organism's body, and between the organism and the outside world. The nervous system directs life support systems humans don't consciously control, such as breathing, digesting food, and circulating blood.

At birth, a human brain weighs less than a pound but grows to about 3 pounds at adulthood. During development, the number of brain cells (neurons and glial cells) remains about the same, but the size of the size increases, as well as the number of neural connections. The brain uses 20% of a human's oxygen and blood supply.

The brain is surrounded and protected by cerebrospinal fluid (CSF) in the skull and has three main parts (also listed are a few other parts and their functions):

1. Cerebrum
  - a. Frontal Lobe – behavior, problem-solving, sense of smell, muscle movements
  - b. Occipital Lobe – vision and reading
  - c. Parietal Lobe – sense of touch, sensory combination and comprehension
  - d. Temporal Lobe – auditory and visual memories, music, fear, sense of identity
  - e. Right Hemisphere – left side of the body, temporal and spatial relationships, nonverbal analysis, communicating emotion
  - f. Left Hemisphere – right side of the body, language
  - g. Corpus Callosum – communication between left and right hemispheres
2. Cerebellum – functions in posture and balance, cardiac, respiratory, and vasomotor centers
3. Medulla (Brain Stem) – motor and sensory pathway to body and face, vital centers
  - a. Hypothalamus (just above the brain stem) – moods, motivation, temperature regulation

For more on the brain, explore the Sheep Brain Dissection online activity from Exploratorium:  
<http://www.exploratorium.edu/memory/braindissection/index.html>.

### Sources

- Enchanted Learning <http://www.enchantedlearning.com/subjects/anatomy/brain/>
- Exploratorium, Memory, Sheep Brain Dissection  
<http://www.exploratorium.edu/memory/braindissection/index.html>.

## Learning Modules

### What are some diseases that affect the brain?

Many diseases affect the brain. This learning module will address two that also affect human memory.

#### Alzheimer's Disease

Alzheimer's is a progressive disease that accounts for 50-80% of dementia cases, where loss of memory and other intellectual abilities are observed that are serious enough to interfere with daily life. It is the sixth leading cause of death in the United States.

The first part of the brain affected involves learning, so early symptoms include a difficulty in remembering newly learned information. As the disease progresses, it can lead to difficulty with other brain processes, such as speaking, walking, and swallowing.

Scientists believe Alzheimer's disease prevents brain cells from functioning normally. Damage spreads from one group of cells to another, causing irreversible changes in the brain. It is suspected that abnormally high developments of plaques and tangles may be involved. These are deposits of proteins, beta-amyloid and tau, respectively, that build up between and inside cells, blocking communication between cells and normal functioning within cells.

#### Huntington's Disease

Huntington's disease is a progressive disease caused by a genetic mutation passed from parent to child, with each child having a 50/50 chance of inheriting the disease, and symptoms typically show up around middle age. The gene in question has been located by scientists, and now more research is being done as there is currently no way to halt or cure this disease that causes degeneration of nerve cells in the brain. Patients are encouraged to remain physically active, as those that do tend to do better. As the disease progresses, concentration on intellectual tasks becomes increasingly difficult and may have difficulty swallowing, talking, or expressing emotions.

#### Sources

- Alzheimer's Association [http://www.alz.org/alzheimers\\_disease\\_what\\_is\\_alzheimers.asp](http://www.alz.org/alzheimers_disease_what_is_alzheimers.asp)
- Huntington's Disease Society of America <http://www.hdsa.org/>
- National Institute of Neurological Disorders and Stroke <http://www.ninds.nih.gov/disorders/huntington/huntington.htm>