

Psy/Soc Concepts



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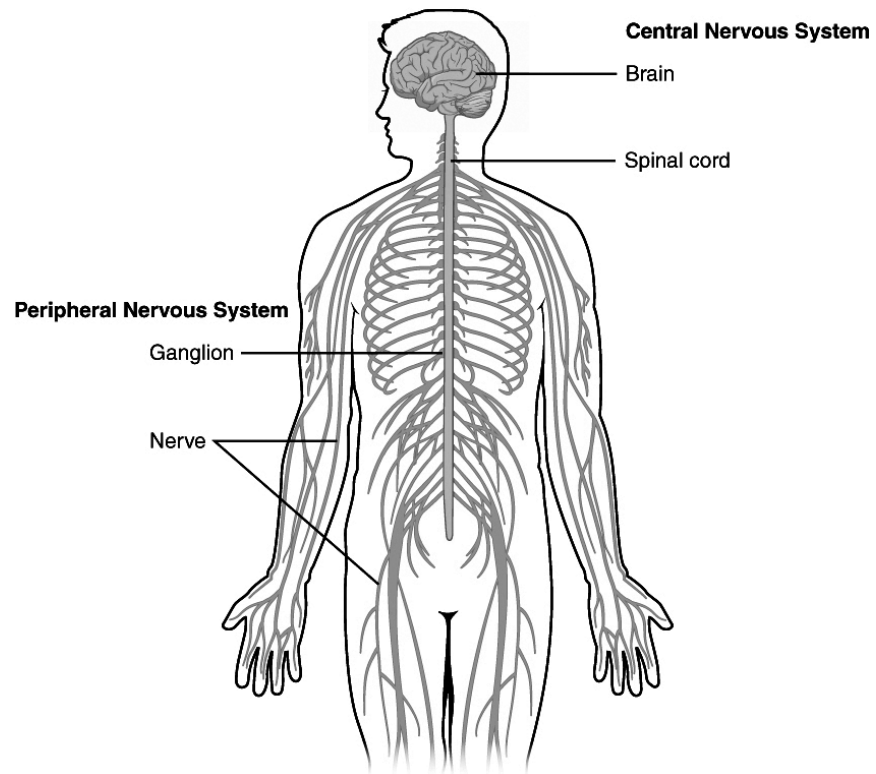
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The Human Nervous System

I. Nervous System Divisions and Structures

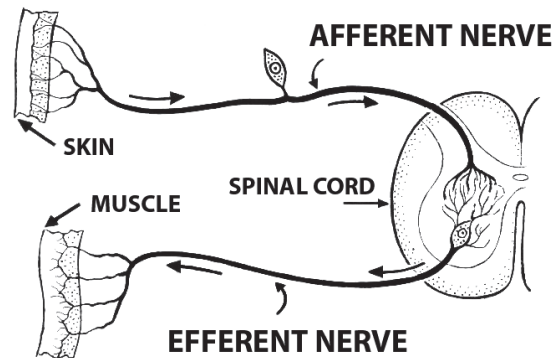
A. General Information

1. The **central nervous system** (CNS) is the part of the nervous system consisting of the brain and spinal cord.
2. The **peripheral nervous system** (PNS) is the part of the nervous system that consists of the nerves and ganglia outside of the brain and spinal cord.



- a. In the peripheral nervous system, an **afferent nerve fiber** is the axon of a sensory neuron, a long process carrying nerve impulses from sensory receptors or sense organs toward the central nervous system.

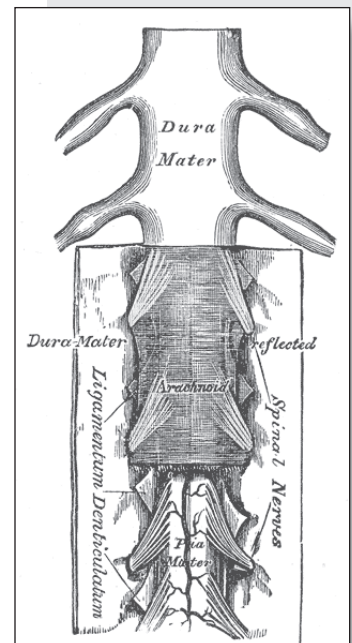
- b. A **motor neuron** is a nerve cell whose cell body is located in the spinal cord and whose fiber (axon) projects outside the spinal cord to directly or indirectly control effector organs, mainly muscles and glands.



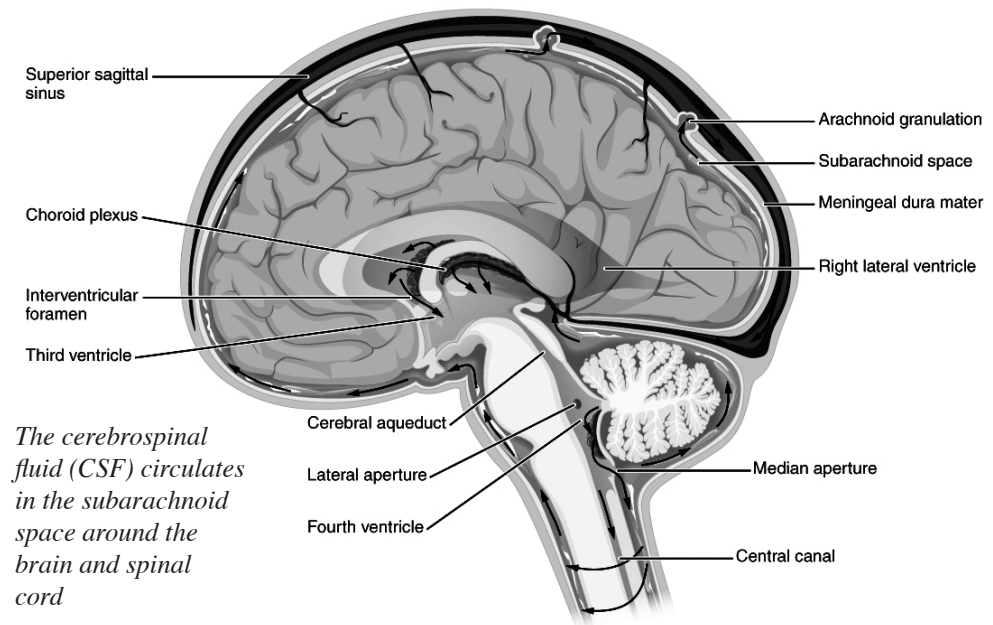
- c. In the peripheral nervous system, an **effluent nerve fiber** is the axon of a motor neuron, a long process extending far from the nerve cell body carrying nerve impulses away from the central nervous system toward the effector organs.

B. Meninges and Cerebrospinal Fluid

1. The **meninges** are the membranes that envelope the brain and spinal cord of the central nervous system.
 - a. **Dura mater** is a thick membrane that is the outermost of the three layers of the meninges that surround the brain and spinal cord.
 - b. One of three protective membranes covering the brain and spinal cord, the **arachnoid mater** is interposed between the more superficial and much thicker dura mater and the deeper pia mater.
 - c. **Pia mater** is the delicate innermost layer of the membranes surrounding the brain and spinal cord.



The meninges: dura mater, arachnoid mater and pia mater



2. **Cerebrospinal fluid** is a clear, colorless body fluid found in the brain and spine. It is produced in the choroid plexuses of the ventricles of the brain. The **ventricular system** is a set of four interconnected cavities in the brain, where the cerebrospinal fluid (CSF) is produced.

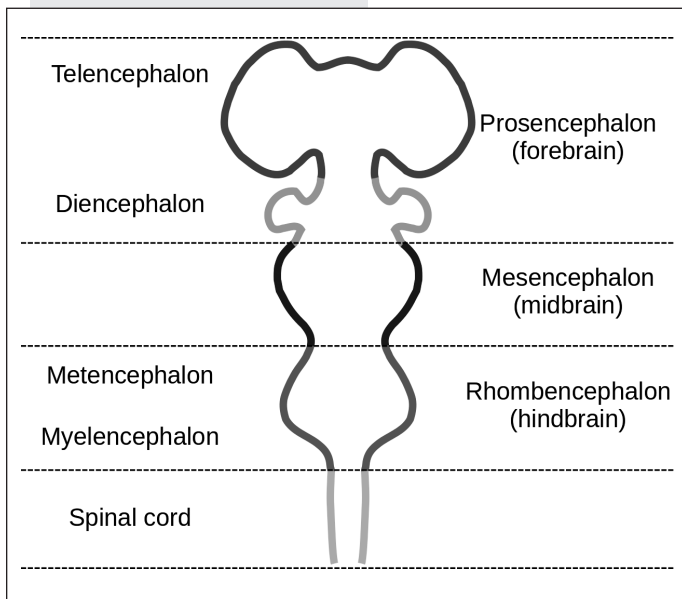


Diagram depicting the main subdivisions of the embryonic vertebrate brain. These regions will later differentiate into forebrain, midbrain and hindbrain structures.

C. The Forebrain

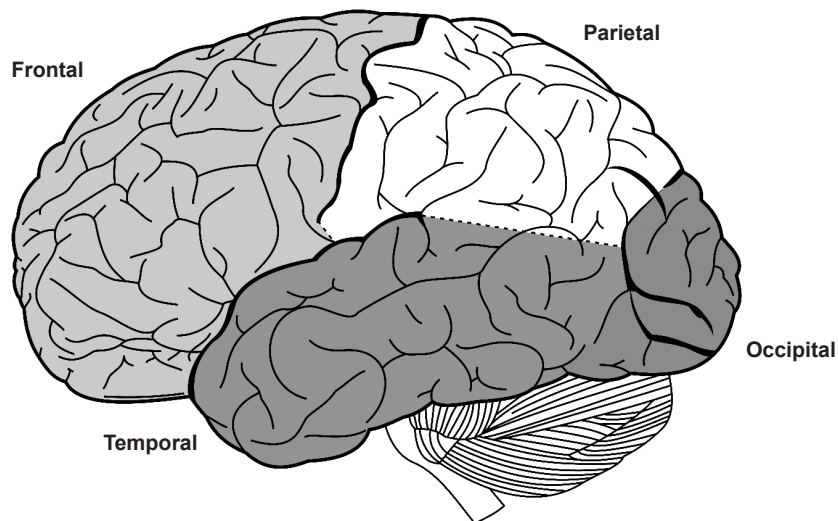
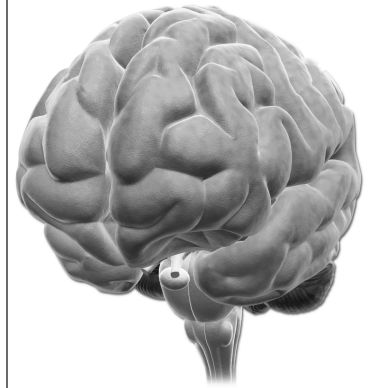
1. In the anatomy of the brain of vertebrates, the forebrain or **prosencephalon** is the rostral-most (forward-most) portion of the brain.

2. The **telencephalon** is the embryonic structure from which the cerebrum develops prenatally. The dorsal portion, or pallium, develops into the cerebral cortex, and the ventral portion, or subpallium, becomes the basal ganglia.

3. The **diencephalon** consists of several structures between the brainstem and the cerebrum, including the thalamus, hypothalamus, epithalamus, pituitary gland, and pineal gland.

3. The **cerebral cortex** is the cerebrum's outer layer of neural tissue in humans and other mammals.
4. The vertebrate cerebrum is formed by two **cerebral hemispheres** that are separated by a groove, the medial longitudinal fissure. The **lateralization of brain function** refers to how some functions, or cognitive processes tend to be more dominant in one hemisphere than the other.
5. The **corpus callosum** is a wide, flat bundle of neural fibers about 10 cm long beneath the cerebral cortex at the longitudinal fissure. It connects the left and right cerebral hemispheres and facilitates interhemispheric communication.
6. Organized as distributed networks throughout the frontal, parietal, temporal and occipital lobes, **association areas** function to produce a meaningful perceptual experience of the world, enable us to interact effectively, and support abstract thinking and language.

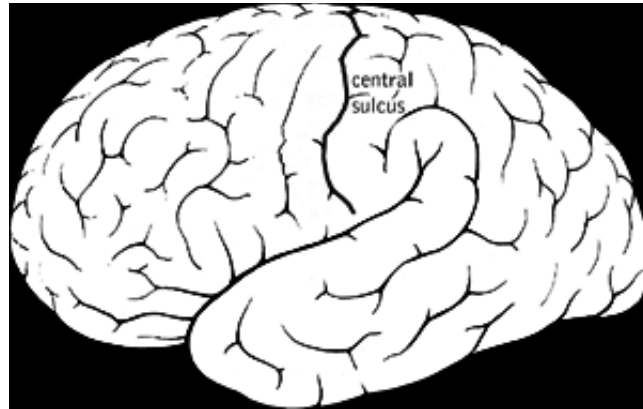
Cerebral Hemispheres



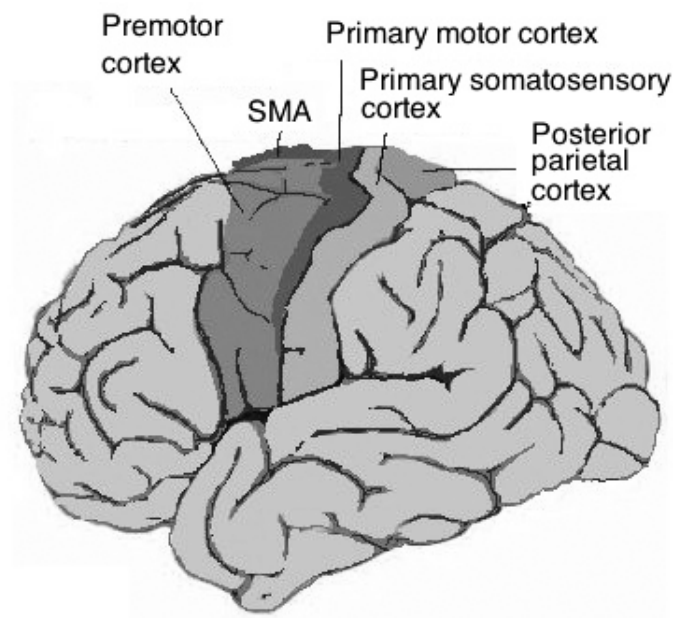
The lobes of the cerebral cortex include the frontal, temporal, occipital, and parietal lobes. The cerebellum (unlabeled) is not part of the telencephalon.

7. **Projection areas** are areas in the four lobes (frontal, parietal, temporal, occipital) of the brain where sensory processing occurs.
6. The **frontal lobe** is located at the front of each cerebral hemisphere and positioned in front of the parietal lobe and above and in front of the temporal lobe.
 - a. The **precentral gyrus** (a.k.a. motor strip) is a prominent structure on the surface of the posterior frontal lobe. It is the site of the primary motor cortex.

- b. Located in the front part of the frontal lobe of the cerebral cortex, the **prefrontal cortex** has been implicated in planning complex cognitive behavior, personality expression, decision making, and moderating social behavior.
- c. A fold in the cerebral cortex, the **central sulcus** separates the parietal lobe from the frontal lobe and the primary motor cortex from the primary somatosensory cortex.



- d. Located immediately anterior to the central sulcus, the **motor cortex** is the region of the cerebral cortex involved in the planning, control, and execution of voluntary movements.



e. **Broca's area** is a region in the frontal lobe of the dominant hemisphere with functions linked to speech production.

f. **Aphasia** is the name given to a collection of language disorders caused by damage to the brain. A requirement for this diagnosis is that, prior to the illness or injury, the person's language skills were normal.

7. One of the four major lobes of the cerebral cortex, the **parietal lobe** is positioned above the occipital lobe and behind the frontal lobe and central sulcus.

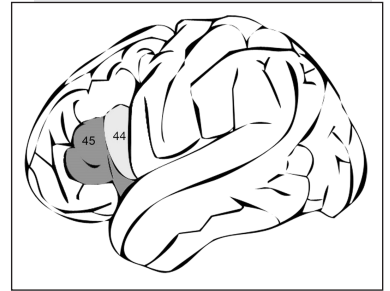
a. The lateral **postcentral gyrus** is a prominent structure in the parietal lobe of the human brain. It is the location of the primary somatosensory cortex.

b. Located in the parietal lobe, the **somatosensory cortex** is the main sensory receptive area for the sense of touch.

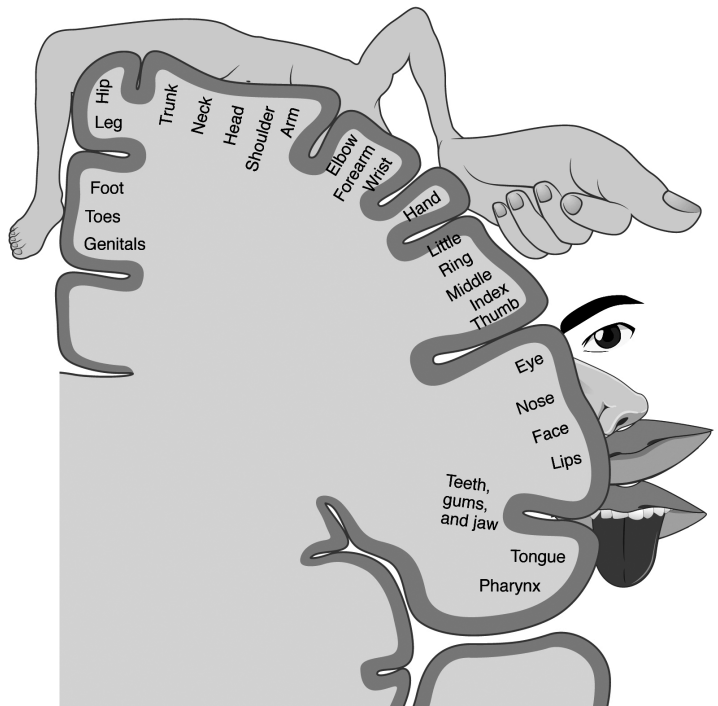
c. A **cortical homunculus** is a physical representation of the human body, located within the brain, a neurological map of the anatomical divisions of the body. There are two types: sensory and motor.

d. Usually the result of damage to the right parietal lobe, **contralateral neglect** is neglect of part of the body or space, which can impair many self-care skills such as dressing and washing.

8. The **temporal lobe** is located beneath the lateral fissure on both cerebral hemispheres. It is involved in processing sensory input into derived meanings for visual memory, language comprehension, and emotional association.



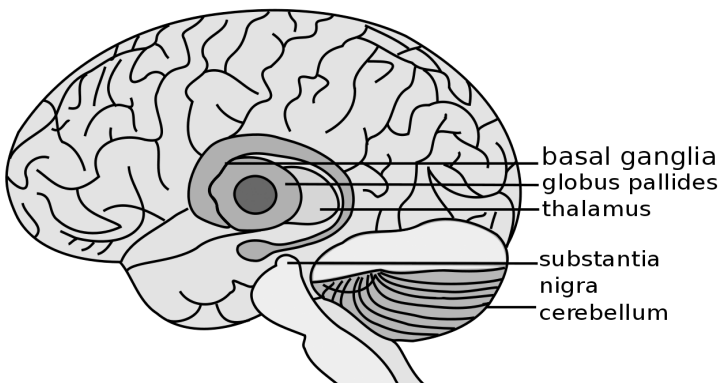
Schematic drawing of the lateral view of the left hemisphere and the position of the classic Broca's area.



A cortical sensory homunculus

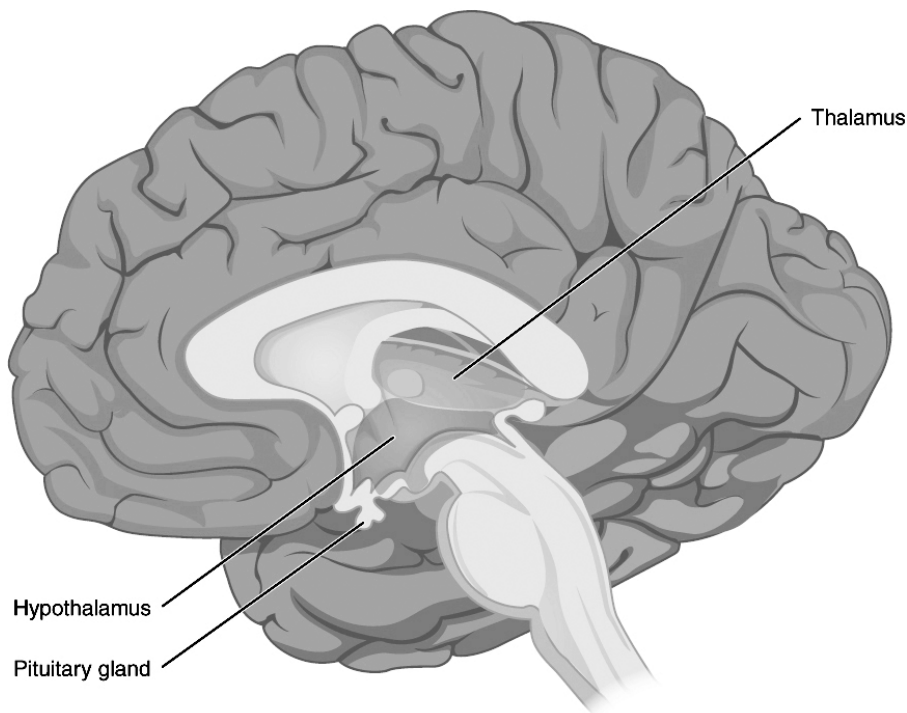
- a. The **lateral sulcus** divides both the frontal lobe and parietal lobe above from the temporal lobe below. It is in both hemispheres of the brain but is longer in the left hemisphere in most people.
 - b. The primary **auditory cortex** is the part of the temporal lobe that processes auditory information, performing basic and higher functions in hearing.
 - c. **Wernicke's area** is one of the two parts of the cerebral cortex linked to speech (the other is Broca's area). It is involved in the production of written and spoken language.
9. The **occipital lobe** is one of the four major lobes of the cerebral cortex. It is the visual processing center of the brain containing most of the anatomical region of the visual cortex.
- a. The part of the cerebral cortex responsible for processing visual information, the **visual cortex** is located in the occipital lobe.
 - b. The **striate cortex** is the primary visual cortex, receiving visual input from the thalamus. It is also known as Visual Area One.
10. **Sensory cortex** refers to the primary and secondary cortices of the different senses: the visual cortex on the occipital lobes, the auditory and olfactory cortices on the temporal lobes, and the primary somatosensory cortex on the anterior parietal lobes.

Basal Ganglia and Related Structures of the Brain



11. At the base of the forebrain, comprising multiple subcortical nuclei interconnected with the cerebral cortex, thalamus, and brainstem, the **basal ganglia** are associated with control of voluntary motor movements, procedural learning, routine behaviors, cognition, and emotion.

12. The **basal forebrain** is a collection of structures located in the subcortical part of the forebrain which are important in the production of acetylcholine, which is then distributed widely throughout the brain.

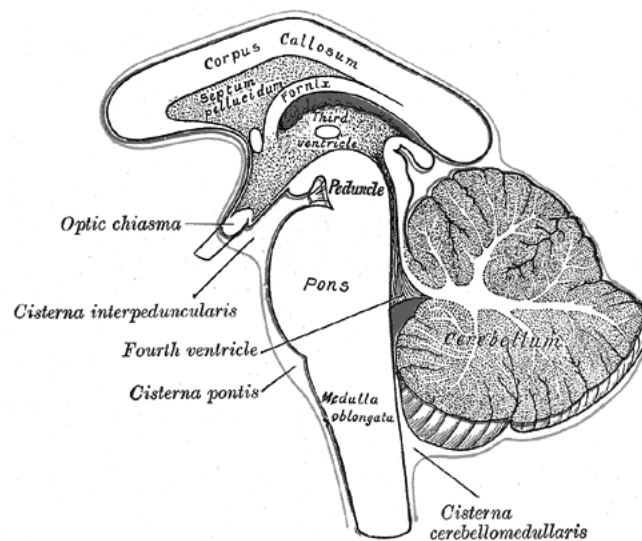


13. The **thalamus** is a midline symmetrical structure situated between the cerebral cortex and the midbrain. Some of its functions are the relaying of sensory and motor signals to the cerebral cortex and the regulation of consciousness, sleep, and alertness.

D. Midbrain and Hindbrain

1. The **brainstem** is the posterior part of the brain, adjoining and structurally continuous with the spinal cord. It includes the medulla oblongata, pons, and midbrain.
2. The midbrain or **mesencephalon** is associated with vision, hearing, motor control, sleep/wake, arousal (alertness), and temperature regulation.
 - a. The **substantia nigra** is a brain structure located in the mesencephalon that plays an important role in reward, addiction, and movement.
 - b. The **superior colliculus** is a structure of the midbrain which directs behavioral responses toward specific points in body-centered space.
 - b. The **inferior colliculus** is the principal midbrain nucleus of the auditory pathway and receives input from several peripheral brainstem nuclei in the auditory pathway, as well as inputs from the auditory cortex.

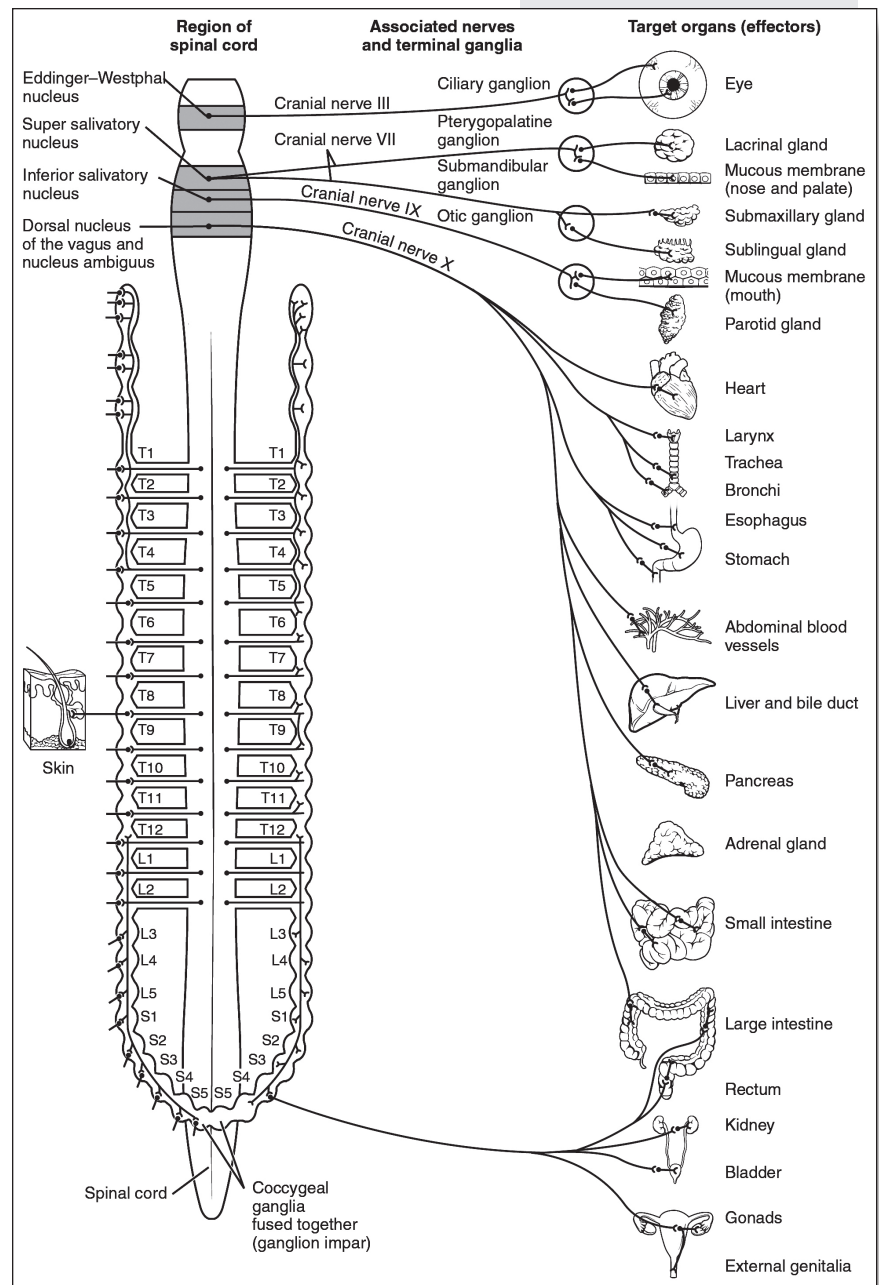
- c. Composed of several neuronal circuits connecting the brainstem to the cortex, the **reticular activating system** is responsible for regulating wakefulness and sleep-wake transitions
3. The hindbrain or **rhombencephalon** includes the medulla, pons, and cerebellum. Together they support vital bodily processes.
- a. The **myelencephalon** is the most posterior region of the embryonic hindbrain, from which the medulla oblongata develops.



- b. The **cerebellum** is a region of the hindbrain that plays an important role in motor control. It may also be involved in some cognitive functions such as attention and language, and in regulating fear and pleasure responses.
- c. The **pons** relays signals from the forebrain to the cerebellum. It also plays a role in regulating sleep, respiration, swallowing, bladder control, hearing, equilibrium, taste, eye movement, facial expressions, facial sensation, and posture.
- d. Anterior to the cerebellum, the **medulla oblongata** is responsible for multiple autonomic functions ranging from vomiting to sneezing. It also contains the cardiac, respiratory, vomiting and vasomotor centers.

E. The Peripheral Nervous System

1. **Interneurons** create neural circuits, enabling communication between sensory or motor neurons in the peripheral nervous system and the creation of extensive networks within the central nervous system.
2. A **reflex arc** is a neural pathway that controls a reflex action.
3. The **somatic nervous system** (voluntary nervous system) is the part of the peripheral nervous system consisting of the afferent and efferent nerves associated with voluntary control of body movements.
4. The **autonomic nervous system** is the division of the peripheral nervous system influencing the function of internal organs, a control system acting largely unconsciously to regulate bodily functions such as the heart rate, digestion, and respiratory rate.

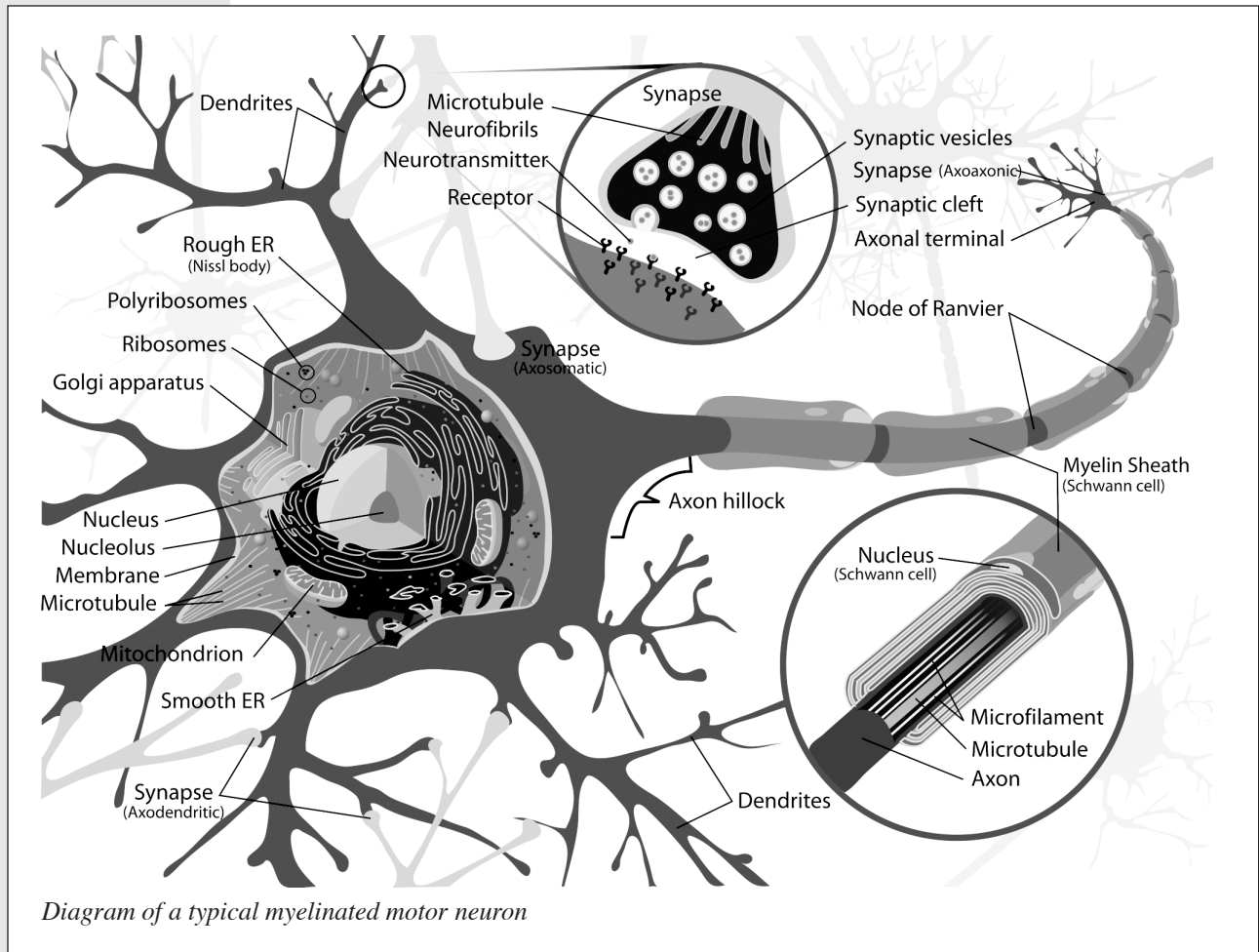


The autonomic nervous system is unique in that it requires a sequential two-neuron efferent pathway; the pre-ganglionic neuron must first synapse onto a postganglionic neuron before innervating the target organ. In the sympathetic system, the ganglia are arranged in two chains adjacent to the spinal column. In the parasympathetic system, the ganglia are located adjacent to or within the organs they supply.

II. Neural Tissue

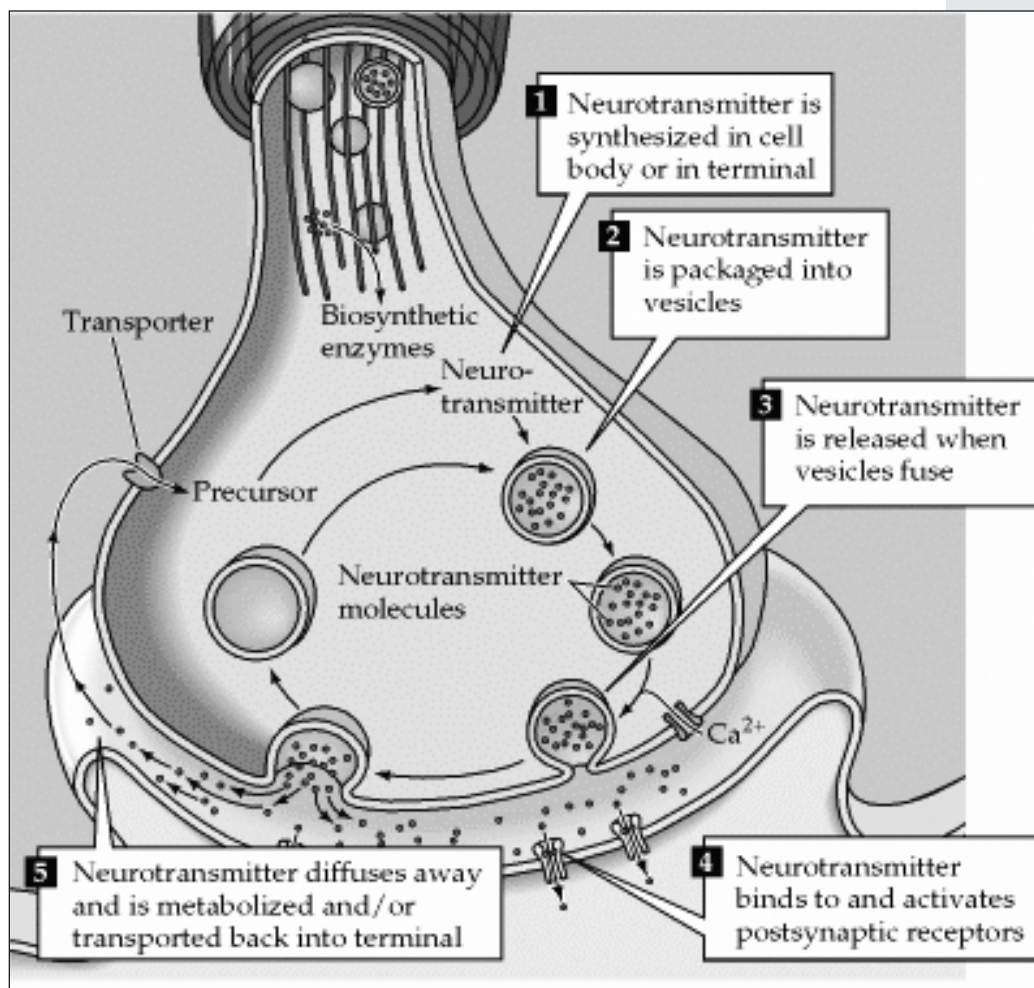
A. Neurons

1. A **neuron** is an electrically excitable cell that processes and transmits information through electrical and chemical signals.



2. The **cell body** is the bulbous end of a neuron, containing the cell nucleus.
3. **Dendrites** are the branched projections of a neuron that act to propagate the electrochemical stimulation received from other neural cells to the cell body of the neuron from which the **dendrites** project.
4. A **synapse** is a structure that permits a neuron (or nerve cell) to pass an electrical or chemical signal to another neuron. Some authors generalize this concept to include the communication from a neuron to any other cell type.

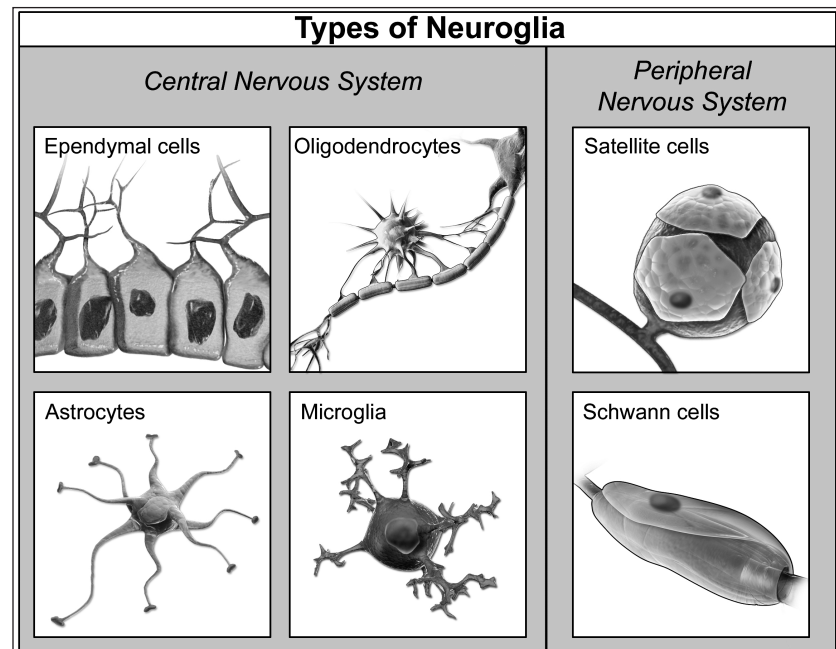
5. An **axon**, also known as a nerve fiber, is a long, slender projection of a nerve cell, or neuron, that typically conducts electrical impulses away from the neuron's cell body.
6. **Axon terminals** (also called synaptic boutons) are distal terminations of the branches of an axon.
7. In a neuron, **synaptic vesicles** store various neurotransmitters that are released at the synapse.
8. **Neurotransmitters** are endogenous chemicals that transmit signals across a chemical synapse, such as in a neuromuscular junction, from one neuron to another target neuron, muscle cell, or gland cell.



Life-cycle of a neurotransmitter.

B. Glial Cells

1. **Glial cells**, sometimes called neuroglia, are non-neuronal cells that maintain homeostasis, form myelin, and provide support and protection for neurons in the central nervous system and peripheral nervous system.

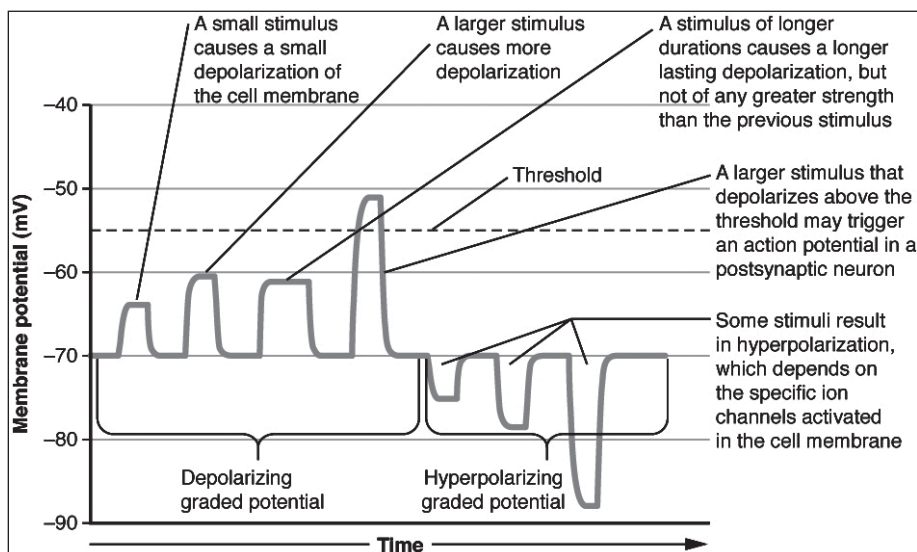


2. **Microglia** are specialized macrophages capable of phagocytosis that protect neurons of the central nervous system.
3. The most abundant type of macroglial cell in the CNS, **astrocytes** anchor neurons to their blood supply. They regulate the external chemical environment of neurons by removing excess ions and recycling neurotransmitters released during synaptic transmission.
4. **Oligodendrocytes** are a type of neuroglia that provides support and insulation to axons in the central nervous system by creating the myelin sheath, equivalent to the function performed by Schwann cells in the peripheral nervous system.
5. **Ependymal cells** line the spinal cord and the ventricular system of the brain. These cells are involved in the creation and secretion of cerebrospinal fluid (CSF) and beat their cilia to help circulate the CSF and make up the blood-CSF barrier.

- 7 Similar in function to oligodendrocytes, **Schwann cells** provide myelination to axons in the peripheral nervous system (PNS). They also have phagocytotic activity and clear cellular debris that allows for regrowth of PNS neurons.
8. **Satellite glial cells** are small cells that surround neurons in sensory, sympathetic, and parasympathetic ganglia which help regulate the external chemical environment.

C. Impulse Transmission within Nerve Fibers

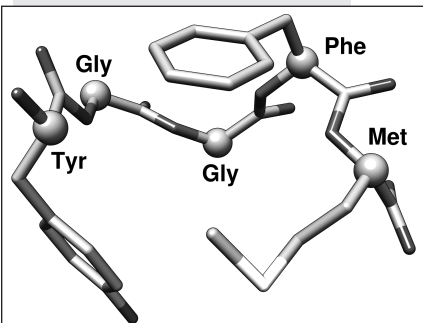
1. The relatively static membrane potential of quiescent cells is called the **resting membrane potential**, as opposed to the specific dynamic electrochemical phenomena called action potential and graded membrane potential.
2. **Graded potentials** are changes in membrane potential that vary in size, as opposed to being all-or-none.
3. The **threshold potential** is the critical level to which the membrane potential must be depolarized in order to initiate an action potential.
4. An **action potential** is a short-lasting event in which the electrical membrane potential of a cell rapidly rises and falls, following a consistent trajectory.
5. The **refractory period** is the amount of time it takes for an excitable membrane to be ready for a second stimulus once it returns to its resting state following an excitation.



Examples of graded potentials

D. Neurotransmitters, Neuropeptides, and Endorphins

1. The amino acid **glutamate** is an important excitatory neurotransmitter. It plays the principal role in neural activation.
2. **Gamma-aminobutyric acid** is the chief inhibitory neurotransmitter in the mammalian central nervous system.
3. An important neurotransmitter in the PNS, **acetylcholine** functions as a neuromodulator inside the brain, altering the way other brain structures process information.
4. The neurotransmitter **norepinephrine** is synthesized and released by the central nervous system and also by the sympathetic nervous system. Its basic function is to mobilize the brain and body for action.
5. The brain includes several distinct systems utilizing the neurotransmitter **dopamine** such as reward-motivated behavior, motor control and also control of the release of various hormones.
6. The functions of the monoamine neurotransmitter **serotonin** include the regulation of mood, appetite, and sleep. It also has cognitive functions, including memory and learning.
7. **Anandamide** is an essential fatty acid playing a role in the regulation of feeding behavior, and the neural generation of motivation and pleasure.
8. **Neuromodulation** is the process by which a given neuron uses one or more neurotransmitters, such as dopamine, serotonin, acetylcholine, histamine, and norepinephrine, diffused through a large area of the nervous system, to regulate diverse populations of neurons.
9. **Neuropeptides** are small protein-like molecules used by neurons to communicate with each other. They are involved in a wide range of brain functions, including analgesia, reward, food intake, metabolism, reproduction, social behaviors, learning and memory.
10. **Endorphins** are endogenous opioid neuropeptides, which bind to mu opioid receptors. They are produced by the central nervous system and pituitary gland.
11. **Enkephalins** are pentapeptides involved in regulating nociception in the body. They bind to delta opioid receptors.



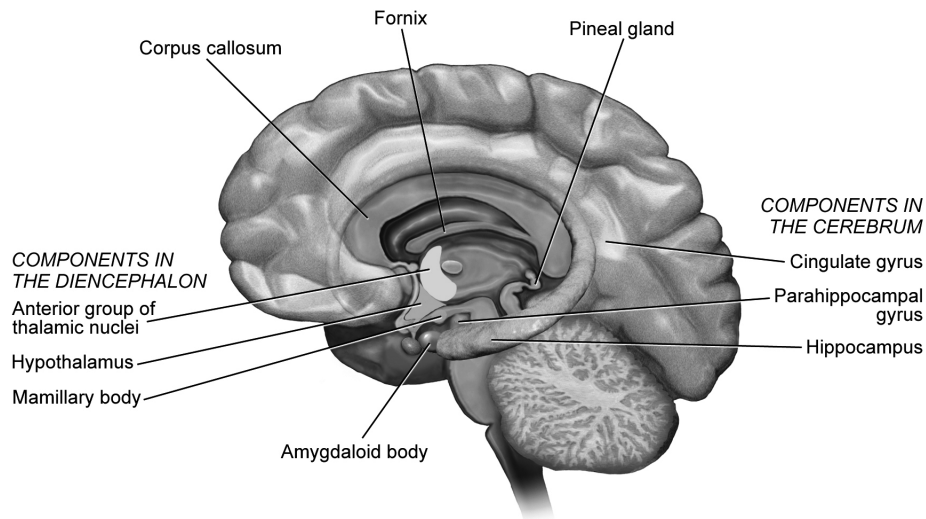
Structure of Met-enkephalin

III. Biological Approaches to Behavior

A. The Limbic System

1. The **limbic system** is a collection of structures on both sides of the thalamus that supports a variety of functions including epinephrine flow, emotion, behavior, motivation, long-term memory, and olfaction.

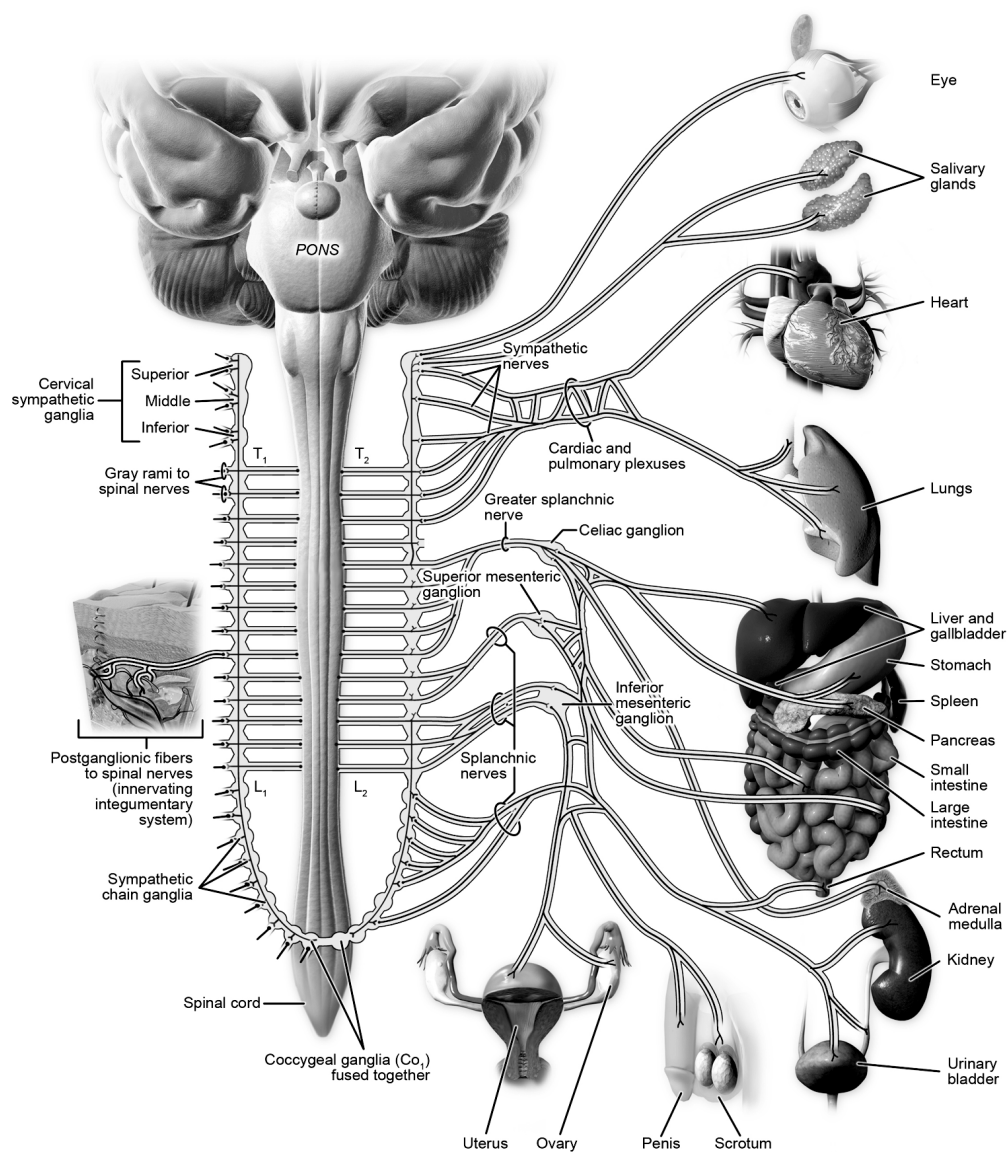
The Limbic System



2. Among other functions, the **hypothalamus** links the nervous system to the endocrine system via the pituitary gland.
3. In neuroanatomy, a **nucleus** is a cluster of densely packed cell bodies of neurons in the central nervous system, located deep within the cerebral hemispheres and brain-stem. The **amygdalae** are two almond-shaped groups of nuclei located within the temporal lobes which perform a primary role in the processing of memory, decision-making, and emotional reactions.
4. The **cingulate cortex**, also called the limbic cortex, is involved with emotion formation and processing, learning, and memory. It plays an important role in linking behavioral outcomes to motivation.
5. The **hippocampus** belongs to the limbic system and plays important roles in the consolidation of information from short-term memory to long-term memory and spatial navigation.

B. The Autonomic Nervous System

1. One of the two main divisions of the autonomic nervous system, the **sympathetic nervous system's** primary process is to stimulate the body's fight-or-flight response.

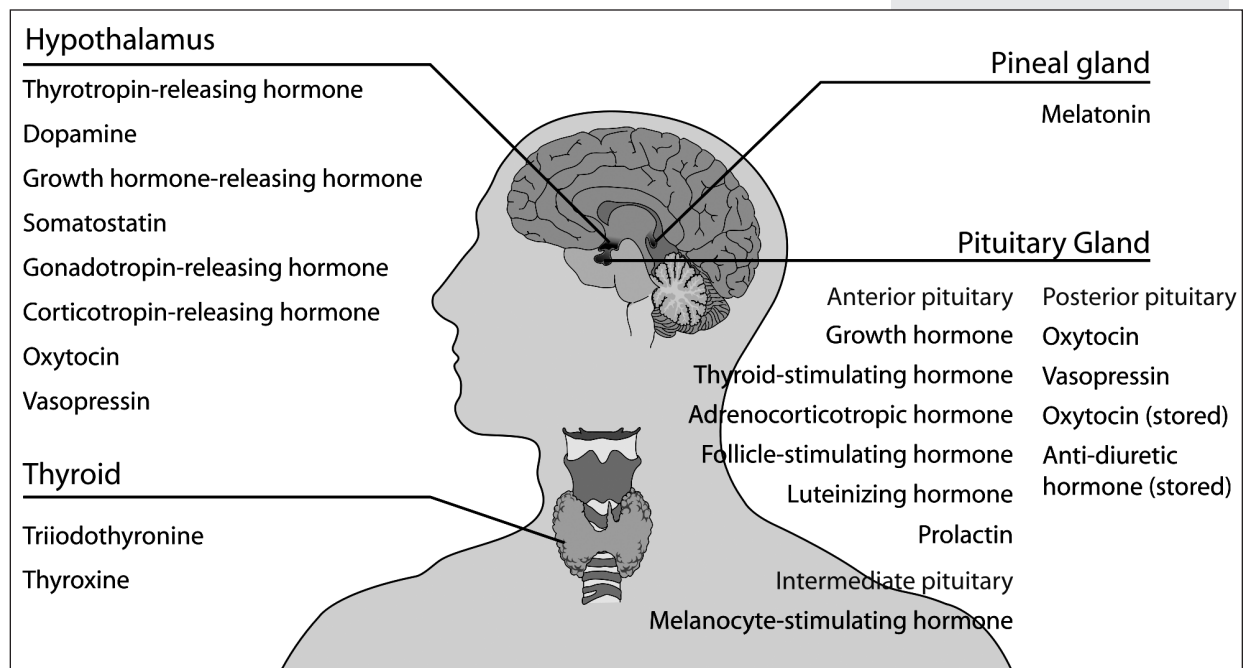
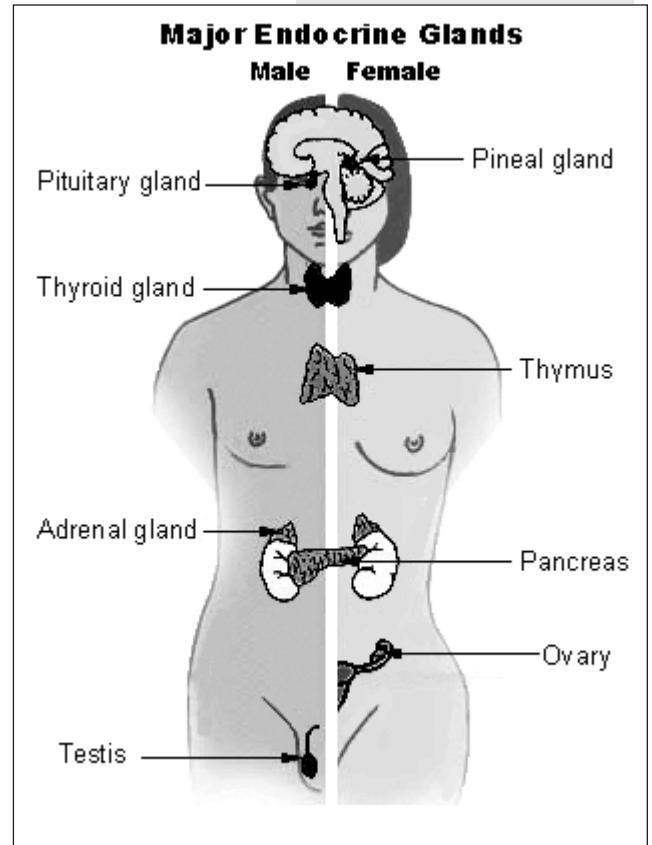


Schema of the sympathetic nervous system, showing the sympathetic ganglia and the parts of the body they connect to.

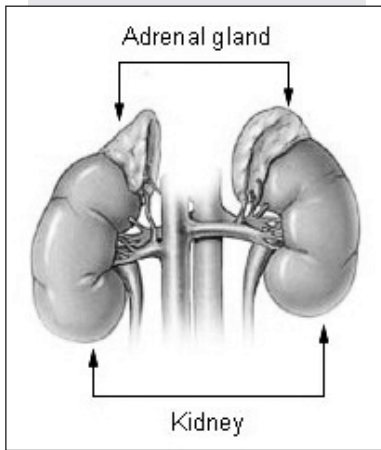
2. The other main division of the autonomic nervous system, the **parasympathetic nervous system's** primary process is responsible for stimulation of 'rest-and-digest' or 'feed and breed' activities that occur when the body is at rest.

C. The Endocrine System

1. The **endocrine system** refers to the collection of glands of an organism that secrete hormones directly into the circulatory system to be carried towards distant target organs.
2. A **hormone** is any member of a class of signaling molecules produced by glands in multicellular organisms that are transported by the circulatory system to target distant organs to regulate physiology and behaviour.
3. The **hypophyseal portal system** is a system of blood vessels in the brain that connects the hypothalamus with the anterior pituitary.
4. A protrusion off the bottom of the hypothalamus, the **pituitary gland** secretes hormones that help control: growth, blood pressure, sex organ functions, metabolism, some aspects of pregnancy, childbirth, nursing, water/salt concentration, temperature regulation and pain relief.



Endocrine glands in the human head and neck and their hormones



5. The **adrenal glands** are endocrine glands that produce a variety of hormones including epinephrine and the steroids aldosterone and cortisol.

a. The **adrenal medulla** is the innermost part of the adrenal gland, consisting of cells that secrete epinephrine, norepinephrine, and a small amount of dopamine in response to stimulation by sympathetic preganglionic neurons.

b. Situated along the perimeter of the adrenal gland, the **adrenal cortex** mediates the stress response through the production of mineralocorticoids and glucocorticoids, such as aldosterone and cortisol, respectively. It is also a secondary site of androgen synthesis.

c. Steroid hormones produced in the adrenal cortex, **corticosteroids** are involved in a wide range of physiological processes, including stress response, immune response, and regulation of inflammation, carbohydrate metabolism, protein catabolism, blood electrolyte levels, and behavior.

d. **Cortisol** is a steroid hormone produced in the adrenal cortex released in response to stress and low blood-glucose concentration.

e. **Epinephrine** is produced by both the adrenal glands and certain neurons. It plays an important role in the fight-or-flight response by increasing blood flow to muscles, output of the heart, pupil dilation, and blood sugar.

6. The principle male sex hormone, **testosterone** is a steroid hormone secreted primarily by the testicles of males and, to a lesser extent, the ovaries of females. Small amounts are also secreted by the adrenal glands. **Estrogen** is the primary female sex hormone and is responsible for development and regulation of the female reproductive system and secondary sex characteristics.

7. A **gonad** is an endocrine gland that produces the gametes (germ cells) of an organism. **Libido**, colloquially known as sex drive, is a person's overall sexual drive or desire for sexual activity. Sex drive is determined by biological, psychological and social factors.

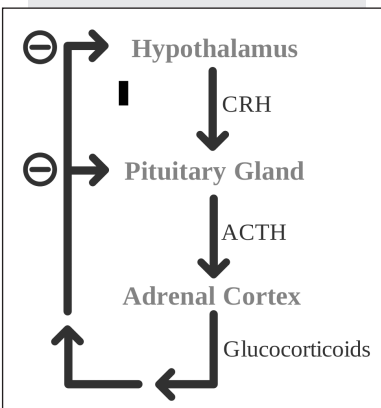
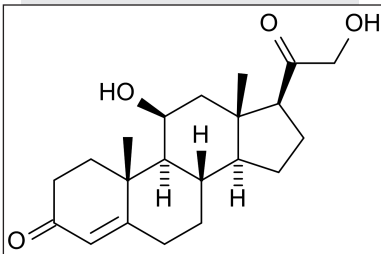


Diagram of physiologic negative feedback loop for glucocorticoids

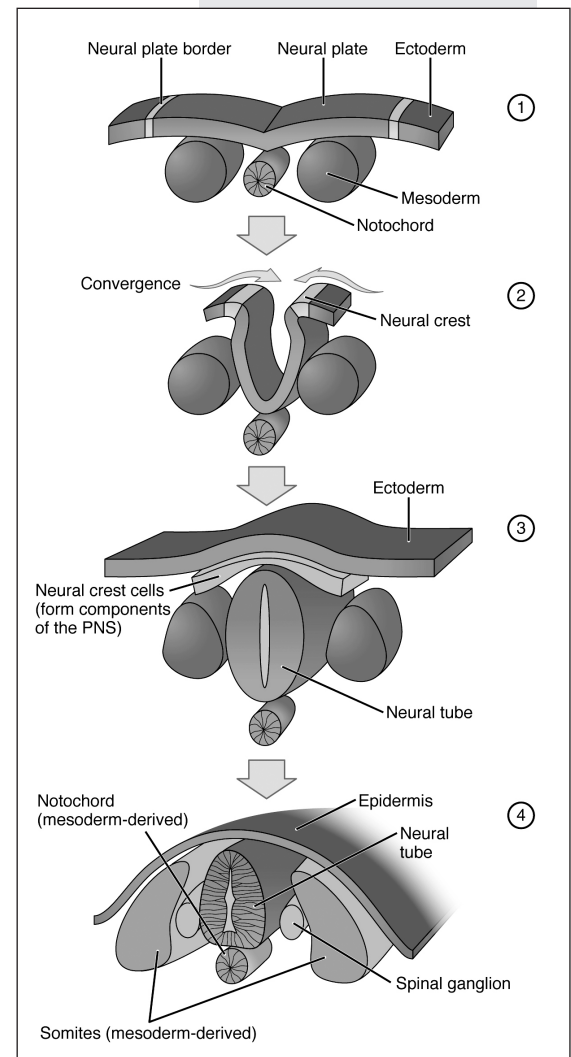


Chemical structure of corticosterone

IV. Neural Development and Plasticity

A. Neurulation refers to the folding process in vertebrate embryos, which includes the transformation of the neural plate into the neural tube.

1. A key developmental structure that serves as the basis for the nervous system, the **neural plate** forms through the thickening and flattening of ectodermal tissue opposite the primitive streak in the embryo.
2. The **neural groove** is a shallow median groove of the neural plate between the neural folds of an embryo.
3. **Neural folds** are derived from the neural plate, a preliminary structure consisting of elongated ectoderm cells. They give rise to neural crest cells, as well as bring about the formation of the neural tube.
4. **Neural crest** cells are a transient, multipotent, migratory cell population unique to vertebrates that gives rise to a diverse cell lineage including melanocytes, craniofacial cartilage and bone, smooth muscle, peripheral and enteric neurons and glia.
5. The embryonic precursor to the central nervous system, the **neural tube** forms by the neural groove gradually deepening as the neural folds become elevated and coalesce in the middle line.
6. The **alar plate** is a neural structure in the embryonic nervous system, part of the dorsal side of the neural tube. The caudal part later becomes sensory axon part of the spinal cord.
7. The **basal plate** is the region of the neural tube extending from the rostral mesencephalon to the end of the spinal cord and contains primarily motor neurons, whereas neurons found in the alar plate are primarily associated with sensory functions.





Rooting reflex



Moro reflex



Babinski's Sign in a healthy newborn

B. Motor Development

1. A **reflex** is an involuntary and nearly instantaneous movement in response to a stimulus.
2. **Primitive** reflexes are reflex actions originating in the central nervous system that are exhibited by normal infants, but not neurologically intact adults, in response to particular stimuli.
 - a. A reflex action by which an infant turns its head toward anything that strokes its cheek or mouth, the **rooting reflex** is present at birth and disappears around four months of age.
 - b. The **Moro reflex** is an infantile reflex normally present in all infants/newborns up to 4 or 5 months of age as a response to a sudden loss of support. It involves three distinct components: spreading out the arms, unspreading the arms, and crying.
 - c. An upward response (extension) of the big toe when the sole of the foot is stimulated with a blunt instrument is known as the **Babinski sign**, which can identify disease of the spinal cord and brain in adults, and also exists as a primitive reflex in infants.
3. **Gross motor skills** are the abilities usually acquired during infancy and early childhood as part of a child's motor development. By the time they reach two years of age, almost all children are able to stand up, walk and run, walk up stairs, etc.
4. **Fine motor skill** (or dexterity) is the coordination of small muscle movements - usually involving the synchronization of hands and fingers - with the eyes.

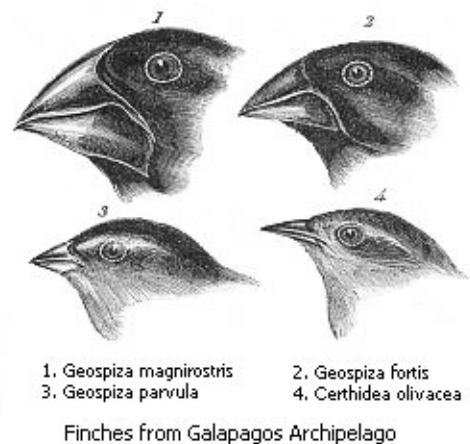
C. Neurogenesis and Synaptogenesis

1. **Neurogenesis** is the process by which neurons are generated from the neural stem cells and progenitor cells.
2. **Synaptogenesis** is the formation of synapses between neurons in the nervous system. Although it occurs throughout a healthy person's lifespan, an explosion of synapse formation occurs during early brain development.

3. **Synaptic pruning** is the process of synapse elimination that occurs between early childhood and the onset of puberty in many mammals.

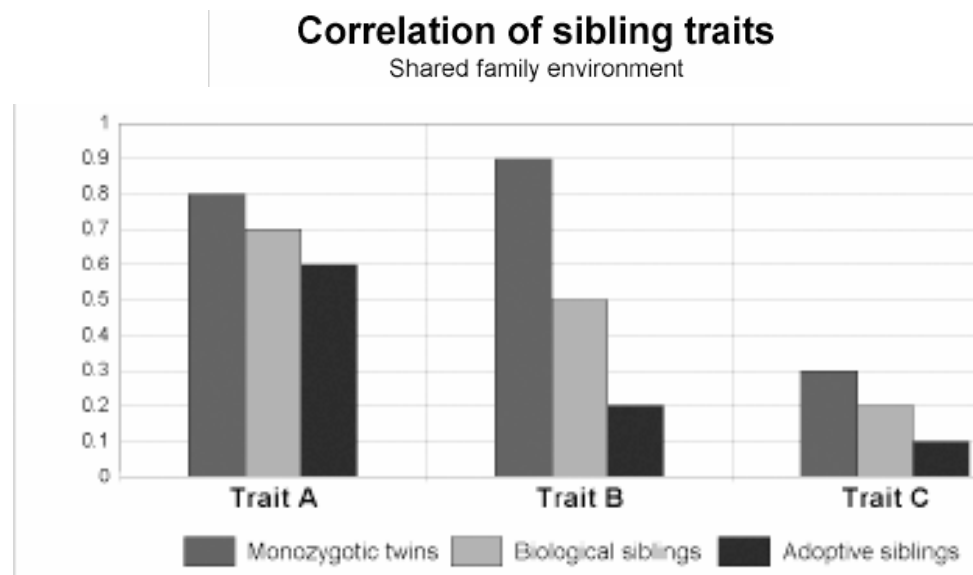
V. Genetics and Behavior

1. **Instinct** or innate behavior is the inherent inclination of a living organism towards a particular complex behavior.
2. A **learned behavior** is a change in the range of organism's actions or mannerisms as a result of experience.
3. The **adaptive value** represents the combined influence of all characters which affect the fitness of an individual or population.
4. An **adaptation** is a trait with a current functional role in the life history of an organism that is maintained and evolved by means of natural selection.
5. **Natural selection** is the differential survival and reproduction of individuals due to differences in phenotype.



6. The phrase **nature vs. nurture** relates to the relative importance of an individual's innate qualities as compared to an individual's personal experiences in causing individual differences, especially in behavioral traits.
7. **Concordance** is the probability that a pair of individuals will both have a certain characteristic, given that one of the pair has the characteristic.

8. Considered a key tool in behavioral genetics and in content fields, from biology to psychology, **twin studies** reveal the absolute and relative importance of environmental and genetic influences on individuals in a sample.
 - a. **Monozygotic twins** (identical twins) occur when a single egg is fertilized to form one zygote which then divides into two separate embryos.
 - b. **Dizygotic twins** (fraternal twins) usually occur when two fertilized eggs are implanted in the uterus wall at the same time.
9. The **adoption study** is a classic tool of behavioral genetics. The adoptees method investigates similarities between the adoptees and their biological and adoptive parents. The familial method compares non-biological siblings who are reared in the same household.



This chart illustrates three patterns one might see when studying the influence of genes and environment on traits in individuals. Trait A shows a high sibling correlation, but little heritability (i.e. high shared environmental variance c^2 ; low heritability h^2). Trait B shows a high heritability since correlation of trait rises sharply with degree of genetic similarity. Trait C shows low heritability, but also low correlations generally; this means Trait C has a high nonshared environmental variance e^2 . In other words, the degree to which individuals display Trait C has little to do with either genes or broadly predictable environmental factors—roughly, the outcome approaches random for an individual. Notice also that even identical twins raised in a common family rarely show 100% trait correlation.

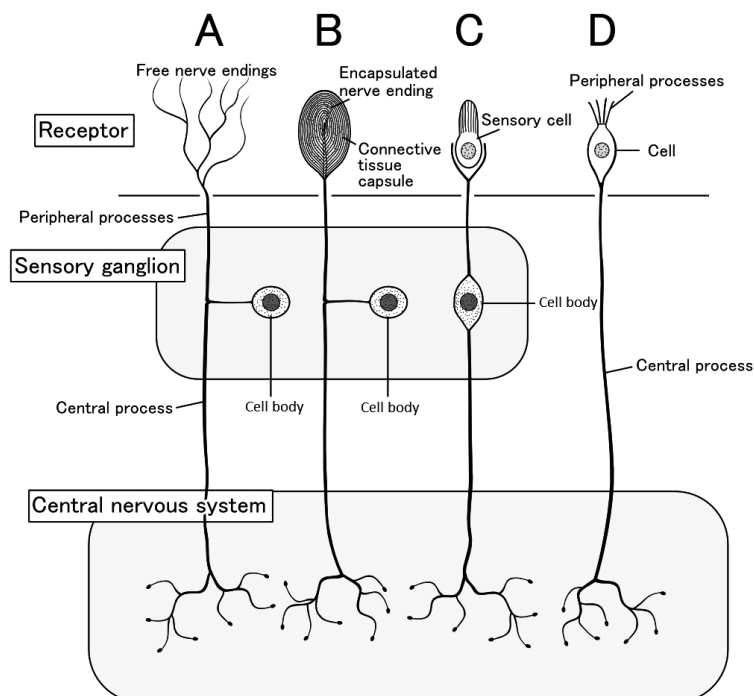
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Sensation and Perception

I. Sensation

Sensation refers to the biochemical and neurological events that begin with the impinging of a stimulus upon the receptor cells of a sensory organ.

1. **Transduction** refers to stimulus alerting events wherein a physical stimulus is converted into an action potential, which is transmitted along axons towards the central nervous system where it is integrated.
2. A **sensory receptor** is a sensory nerve ending that responds to a stimulus in the internal or external environment of an organism through initiation of sensory transduction by creating graded potentials or action potentials in the same cell or in an adjacent one.
3. A **ganglion** is a nerve cell cluster or a group of nerve cell bodies located in the peripheral nervous system.



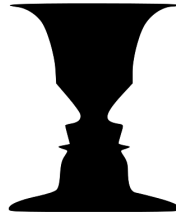
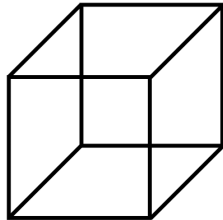
General structure of human sensory systems.

4. **Projection areas** are areas in the four lobes (frontal, parietal, temporal, occipital) of the brain where sensory processing occurs.
5. **Gustav Fechner** is credited with demonstrating the non-linear relationship between psychological sensation and the physical intensity of a stimulus.
 - a. **Absolute threshold** is the weakest stimulus that an organism can detect. Unless otherwise indicated, it is usually defined as the weakest stimulus that can be detected half the time.
 - b. A **liminal point** is a threshold of a physiological or psychological response.
 - c. **Subliminal stimuli** are any sensory stimuli below an individual's threshold for conscious perception.
 - d. In the branch of experimental psychology focused on sensation and perception, a **just-noticeable difference** is the amount something must be changed in order for a difference to be noticeable, detectable at least half the time. **Weber's law** states that the change in a stimulus that will be just noticeable is a constant ratio of the original stimulus.
 - e. **Cross-modal plasticity** is the adaptive reorganization of neurons to integrate the function of two or more sensory systems, often occurring after sensory deprivation due to disease or brain damage.
 - f. **Signal detection theory** is a means to quantify the ability to discern between information-bearing patterns of stimuli and random patterns that distract from the information (called noise, consisting of background stimuli and random activity of the nervous system).
6. To apply signal detection theory to a data set where stimuli were either present or absent, and the observer categorized each trial as having the stimulus present or absent, the trials are sorted into hits, misses, false alarms, and **correct rejections**. When the interval does not contain a stimulus, it is called a **catch trial**.

II. Perception

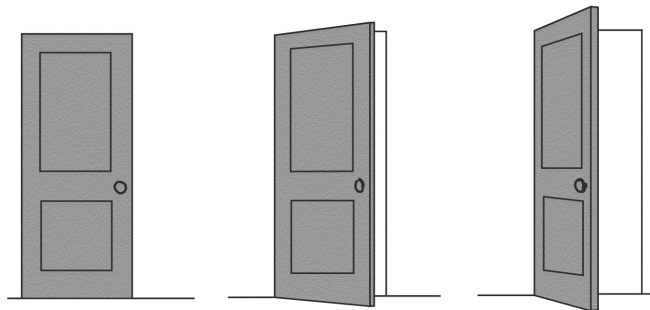
Perception is the organization, identification, and interpretation of sensory information in order to represent and understand the environment.

1. A perceptual **set** is a predisposition to perceive things in a certain way.



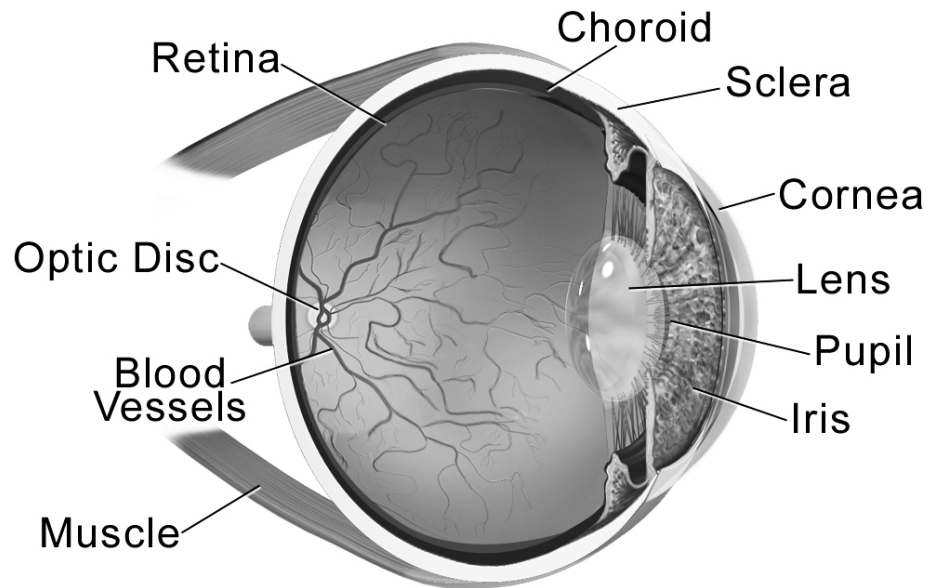
The Necker cube and Rubin vase can be perceived in more than one way.

2. **Perceptual constancy** is the perception of an object or quality with consistency even though our sensation of the object changes.



An example of shape constancy.

3. The **binding problem** refers to the problem of how our brains segregate elements in complex patterns of sensory input so that they are allocated to discrete objects.
4. **Selective attention** is the process of selecting one sensory channel while ignoring or minimizing others. The **cocktail party effect** is the phenomenon of being able to focus one's auditory attention on a particular stimulus while filtering out a range of other stimuli.
5. Donald Broadbent's **filter model of attention** proposed that the physical characteristics (e.g., pitch, loudness) of an auditory message were used to focus attention to only a single message.



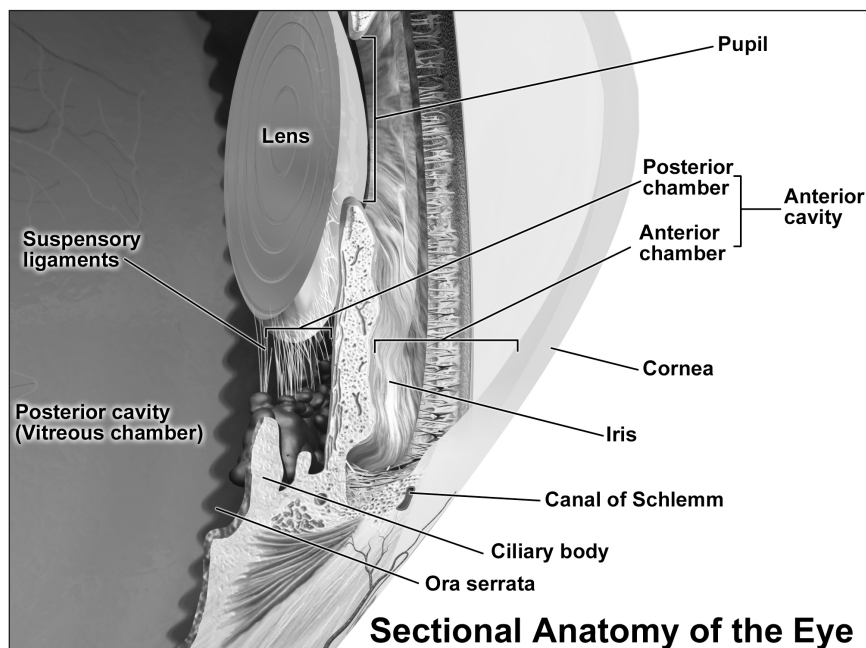
Anatomy of the Eye

III. Vision

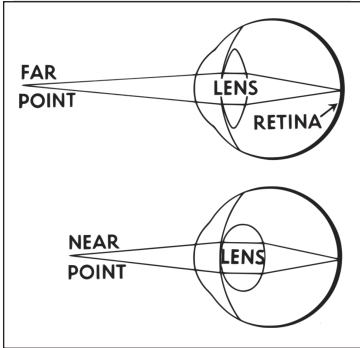
A. Structures of the Eye

1. The **cornea** is the transparent front part of the eye that covers the iris, pupil, and anterior chamber.
2. The **sclera**, also known as the white of the eye, is the opaque, fibrous, protective, outer layer of the eye containing collagen and elastic fiber.
3. The **choroid** is the vascular layer of the eye, containing connective tissue, and lying between the retina and the sclera.
3. The **anterior chamber** is the fluid-filled space inside the eye between the iris and the cornea's innermost surface.
4. The **posterior chamber** is a narrow space behind the peripheral part of the iris, and in front of the suspensory ligament of the lens and the ciliary processes.
5. The **iris** is a thin, circular structure in the eye, responsible for controlling the diameter and size of the pupil and thus the amount of light reaching the retina.
 - a. The **iris dilator muscle** is a smooth muscle of the eye, running radially in the iris and therefore fit as a dilator.

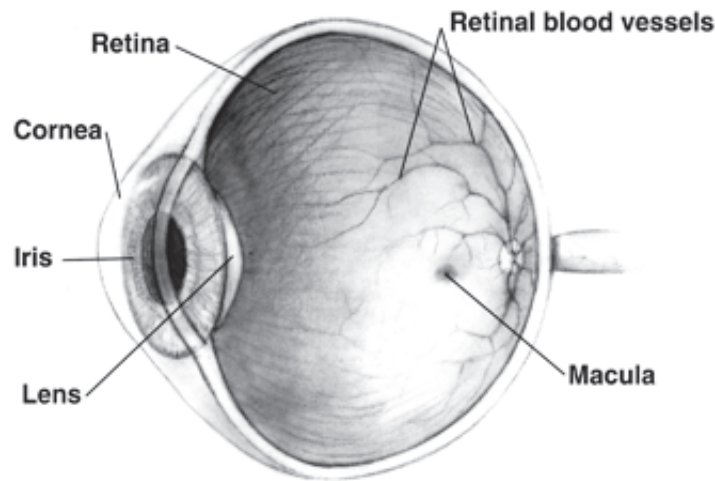
- b. The **iris sphincter muscle** encircles the pupil of the iris, appropriate to its function as a constrictor of the pupil.
6. The **ciliary body** is a part of the eye that includes the ciliary muscle, which controls the shape of the lens, and the ciliary epithelium, which produces the aqueous humor.
 7. The **aqueous humour** is a transparent, gelatinous fluid similar to plasma located in the anterior and posterior chambers of the eye.
 8. The **canal of Schlemm** is a circular lymphatic-like vessel in the eye that collects aqueous humor from the anterior chamber and delivers it into the episcleral blood vessels via aqueous veins.
 9. The **crystalline lens** is a transparent, biconvex structure in the eye that, along with the cornea, helps to refract light to be focused on the retina.
 10. The **ciliary muscle** in the eye's middle layer (vascular layer) that controls accommodation for viewing objects at varying distances and regulates the flow of aqueous humour into Schlemm's canal.
 11. The **vitreous humour** is the clear gel that fills the space between the lens and the retina of the eyeball of humans and other vertebrates.



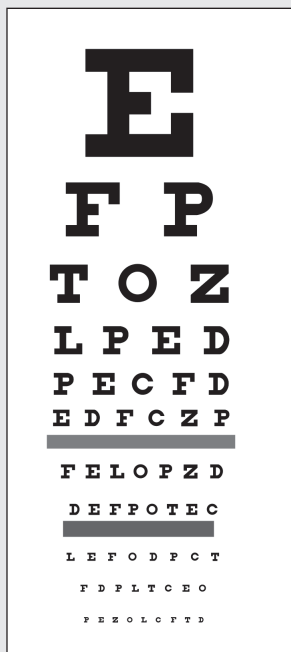
B. Image Formation



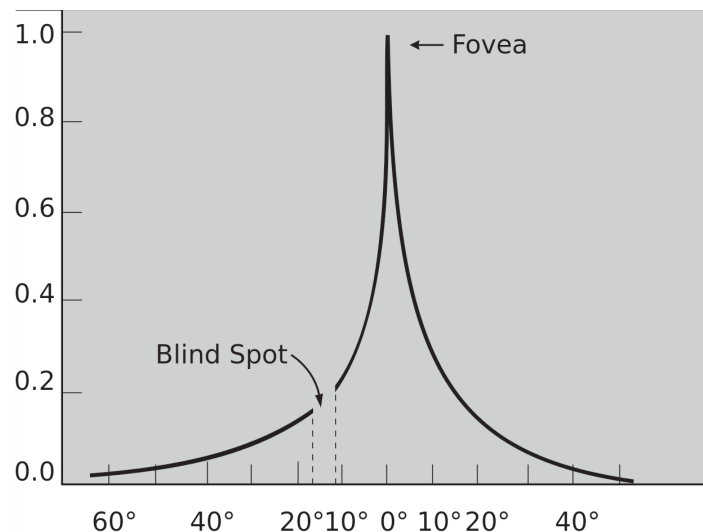
1. **Accommodation** is the process by which the vertebrate eye changes optical power by adjusting the thickness of the lens to maintain a clear image or focus on an object as its distance varies. Most refraction occurs at the air-cornea boundary. Accommodation produces fine adjustments.
2. The **retina** is the third and inner coat of the eye which is a light-sensitive layer of tissue.



3. The **fovea centralis** is a small, central pit composed of closely packed cones in the eye. It is located in the center of the macula lutea of the retina.
4. **Visual acuity** commonly refers to the clarity of vision. It is dependent on optical and neural factors.



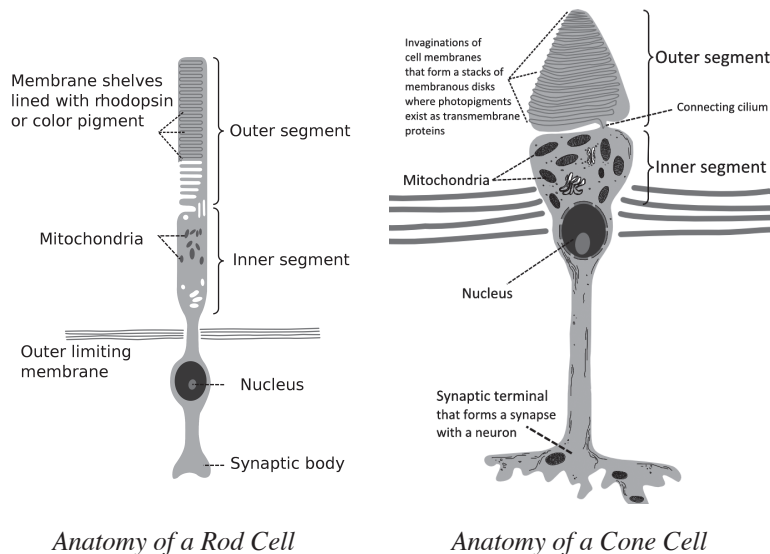
A typical Snellen chart. Originally developed by Dutch ophthalmologist Herman Snellen in 1862, to estimate visual acuity.



The diagram shows the relative acuity of the left human eye (horizontal section) in degrees from the fovea.

C. Visual Pathways

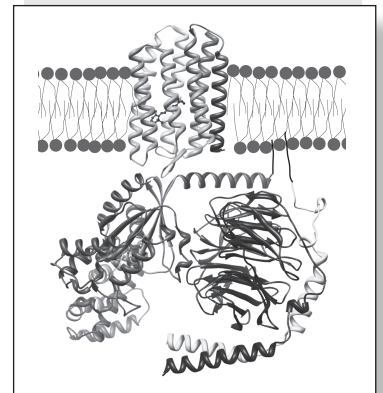
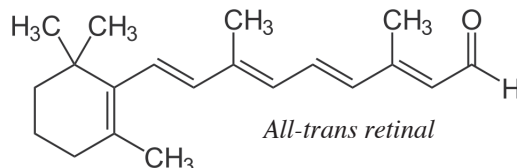
1. Concentrated at the outer edges of the retina and used in peripheral vision, **rods** are photoreceptor cells in the retina of the eye that can function in less intense light than the other type of visual photoreceptor, cone cells.
2. **Cones** are the other type of photoreceptor cell in the retina of the eye. They are responsible for color vision and function best in relatively bright light, as opposed to rod cells, which work better in dim light.



Anatomy of a Rod Cell

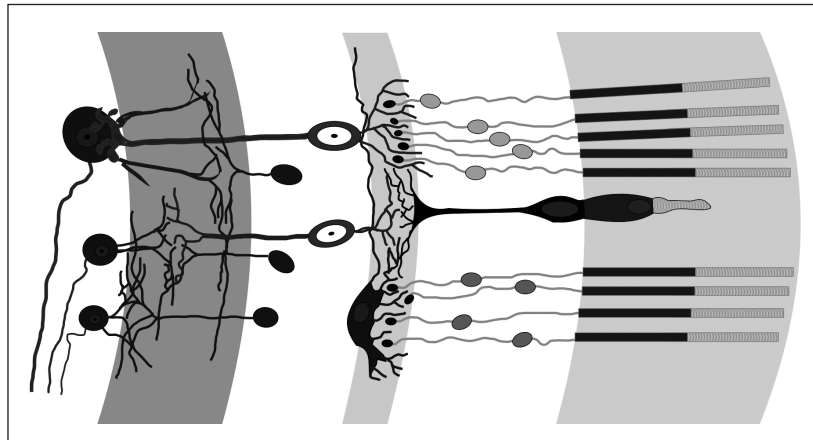
Anatomy of a Cone Cell

3. **Rhodopsin**, also known as visual purple, is a light-sensitive receptor protein. It is a biological pigment in photoreceptor cells of the retina, the primary pigment found in rod photoreceptors.
 - a. **Opsins** are a group of light-sensitive proteins found in photoreceptor cells of the retina. Five classical groups of **opsins** are involved in vision, mediating the conversion of a photon of light into an electrochemical signal, the first step in the visual transduction cascade.
 - b. **Retinal** is a polyene chromophore, bound to proteins called scotopsins and photopsins. It is the chemical basis of animal vision. When it absorbs a photon it undergoes cis-trans isomerization.



Rhodopsin

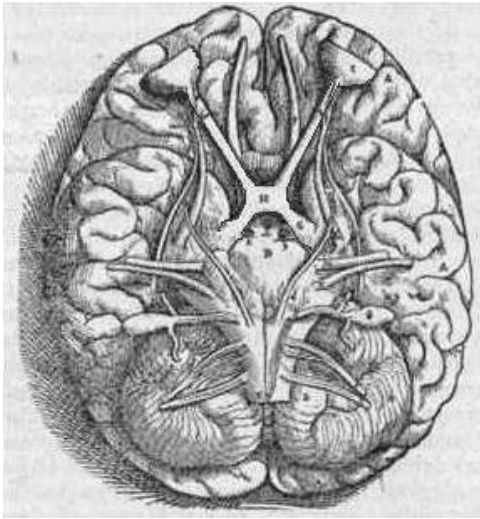
4. A type of neuron which has two extensions, **bipolar cells** are specialized sensory neurons for the transmission of special senses. As such, they are part of the sensory pathways for smell, sight, taste, hearing and vestibular functions.
5. **Amacrine cells** are inhibitory interneurons in the retina. They interact with retinal ganglion cells and/or bipolar cells.
6. **Horizontal cells** are the laterally interconnecting neurons having cell bodies in the inner nuclear layer of the retina of vertebrate eyes. They help integrate and regulate the input from multiple photoreceptor cells.



Rods, cones and nerve layers in the retina. The front (anterior) of the eye is on the left. Light (from the left) passes through several transparent nerve layers to reach the rods and cones (far right). A chemical change in the rods and cones send a signal back to the nerves. The signal goes first to the bipolar and horizontal cells, then to the amacrine cells and ganglion cells, then to the optic nerve fibres. The signals are processed in these layers. First, the signals start as raw outputs of points in the rod and cone cells. Then the nerve layers identify simple shapes, such as bright points surrounded by dark points, edges, and movement.

5. The **optic disc** is the point of exit for ganglion cell axons leaving the eye. Because there are no rods or cones overlying this area, it corresponds to a small physiological blind spot in each eye.
6. The **optic nerve** is a paired nerve that transmits visual information from the retina to the brain.

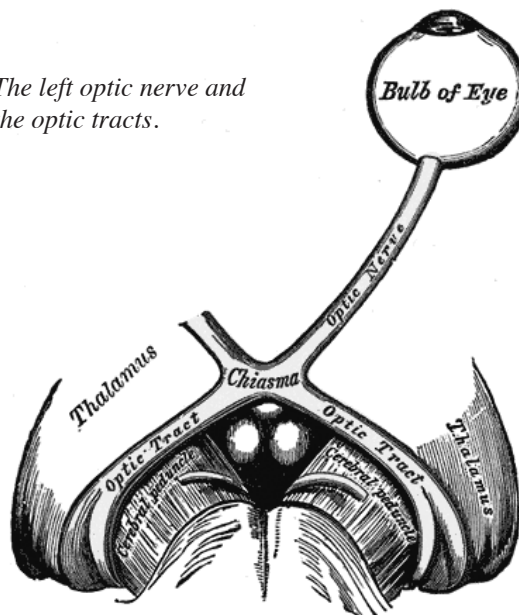
7. The **optic chiasm** is the part of the brain where the optic nerves partially cross. It is located at the bottom of the brain immediately below the hypothalamus.



Brain viewed from below showing the visual pathway with optic chiasm.

8. The **optic tract** is a part of the visual system in the brain. It is a continuation of the optic nerve that relays information from the optic chiasm to the ipsilateral lateral geniculate nucleus, pretectal nuclei, and superior colliculus.

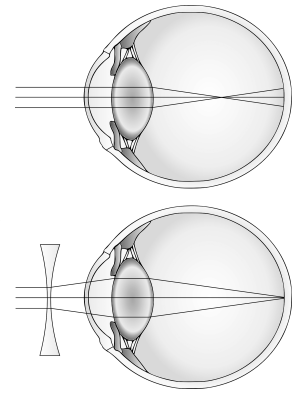
The left optic nerve and the optic tracts.



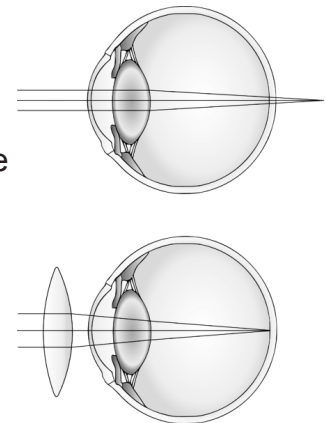
9. The main central connection for the optic nerve to the occipital lobe, the **lateral geniculate nucleus** is a relay center in the thalamus for the visual pathway. It receives a major sensory input from the retina.

D. Vision Problems

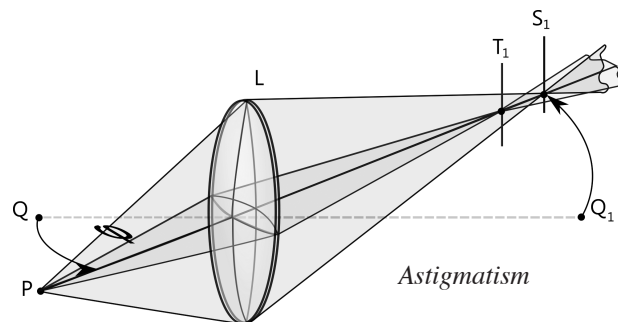
1. **Myopia**, also known as near-sightedness, is a condition of the eye where the light that comes in does not directly focus on the retina but in front of it, causing the image that one sees when looking at a distant object to be out of focus.



2. **Hyperopia**, commonly known as far-sightedness, is a defect of vision caused by an imperfection in the eye (often when the eyeball is too short or the lens cannot become round enough), causing difficulty focusing on near objects.



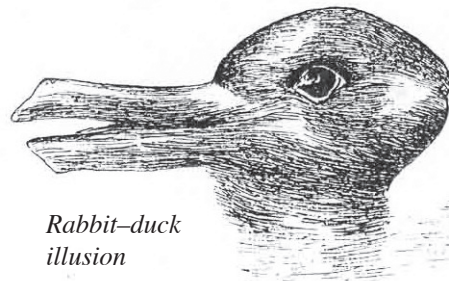
3. An optical system with **astigmatism** is one where rays that propagate in two perpendicular planes have different focus.



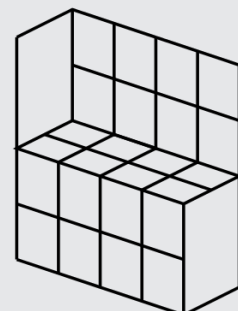
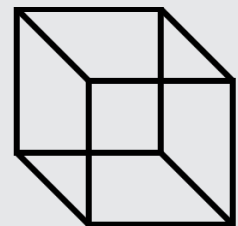
4. **Presbyopia** is a condition associated with aging in which the eye exhibits a progressively diminished ability to focus on near objects. Evidence most strongly supports a loss of elasticity of the crystalline lens as its cause.
5. A **cataract** is a clouding of the lens in the eye leading to a decrease in vision.
6. **Glaucoma** is a spectrum of diseases causing a chronic progressive optic neuropathy which is characterised by optic nerve damage and visual field loss.

E. Visual Perception and Object Recognition

1. **Trichromacy** is the condition of possessing three independent channels for conveying color information, derived from the three different cone types. **Opponent process theory** states that the human visual system interprets information about color by processing differences between the responses of cones, rather than each type of cone's individual response.
2. **Depth perception** is the visual ability to perceive the world in three dimensions.
 - a. **Monocular cues** for depth perception include size: distant objects subtend smaller visual angles than near objects, grain, size, and motion parallax.
 - b. **Binocular cues** for depth perception include stereopsis, eye convergence, disparity, and yielding depth from binocular vision through exploitation of parallax.
3. In visual perception with **bottom-up** processing, the stimuli are recognized by fixation points, proximity and focal areas to build objects.
4. In visual perception **top-down** processing is conceptually driven, context-sensitive, and influenced by our beliefs and expectations.
5. **Perceptual organization** refers to the process of organizing incoming sensations into information which is meaningful.
6. **Feature detection** is a process by which the nervous system sorts or filters natural stimuli in order to extract behaviorally relevant cues that have a high probability of being associated with important objects in their environment.
7. **Multistable perceptual phenomena** are a form of perceptual phenomena in which there are unpredictable sequences of spontaneous subjective changes.



Rabbit-duck illusion

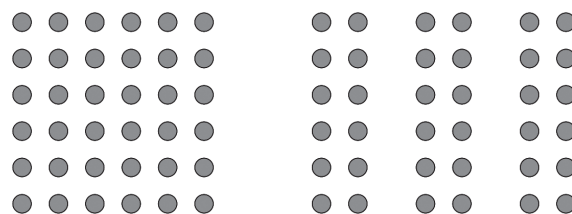


Multistable images

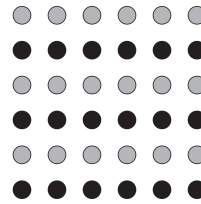
8. **Face recognition** refers to an individual's understanding and interpretation of the face, particularly the human face, especially in relation to the associated information processing in the brain.
9. The **phi phenomenon** is the optical illusion of perceiving a series of still images, when viewed in rapid succession, as continuous motion.
10. **Change blindness** is a perceptual phenomenon that occurs when a change in a visual stimulus is introduced and the observer does not notice it.



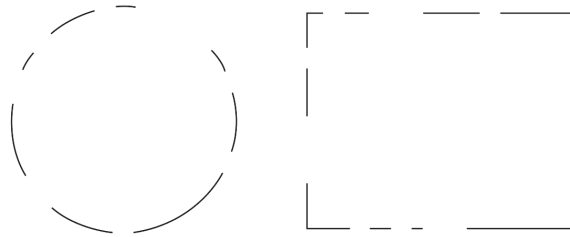
11. **Synesthesia** is a neurological phenomenon in which stimulation of one sensory or cognitive pathway leads to automatic, involuntary experiences in a second sensory or cognitive pathway.
12. The central principle of **gestalt psychology** is that the mind forms a global whole with self-organizing tendencies. This principle maintains that when the human mind forms a percept, the whole has a reality of its own, independent of the parts.
 - a. The gestalt **principle of proximity** states that when an individual perceives an assortment of objects, they perceive objects that are close to each other as forming a group.



- b. The gestalt **principle of similarity** states that elements within an assortment of objects are perceptually grouped together if they are similar to each other.



- c. The gestalt **principle of closure** states that individuals perceive objects such as shapes, letters, pictures, etc., as being whole when they are not complete.

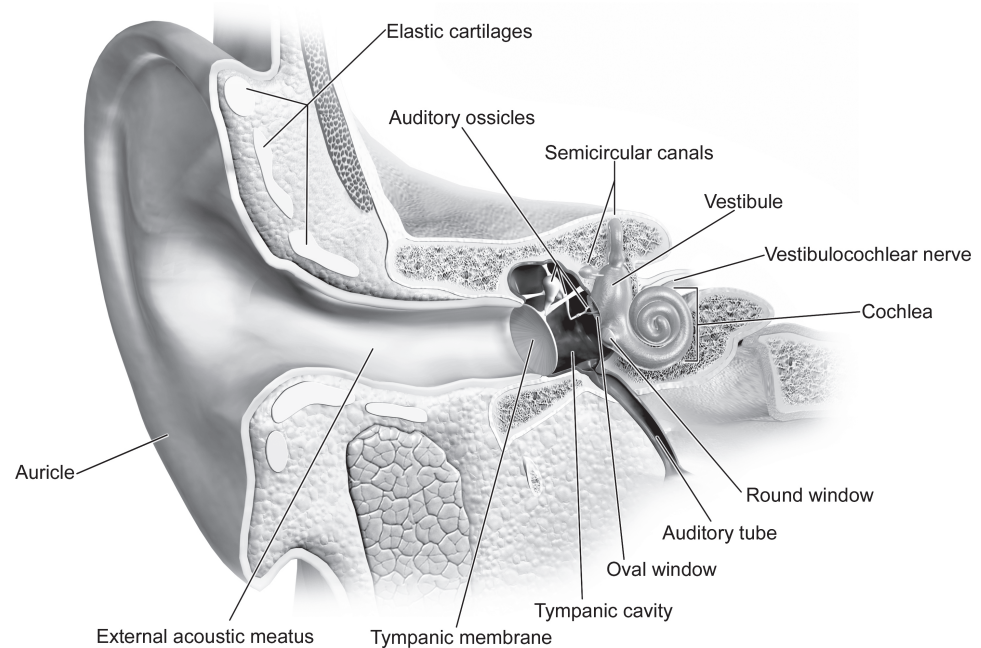


- d. The gestalt **principle of symmetry** states that the mind perceives objects as being symmetrical and forming around a center point.



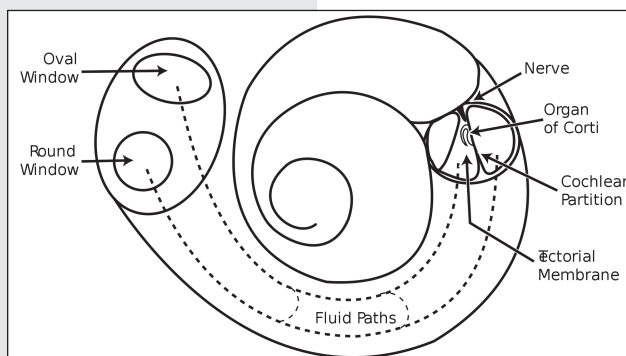
- e. The gestalt **principle of common fate** states that objects are perceived as lines that move along the smoothest path.
- f. The gestalt **principle of good continuation** states that objects are perceived as wholes even if other objects block part of them.
- g. The gestalt **principle of figure-ground** states that objects are perceived with attention focused on the central figure while the background is largely ignored.
- h. The gestalt **principle of Prägnanz** explains that elements of objects tend to be perceptually grouped together if they form a pattern that is regular, simple, and orderly. As individuals perceive the world, they eliminate complexity and unfamiliarity.

IV. Hearing



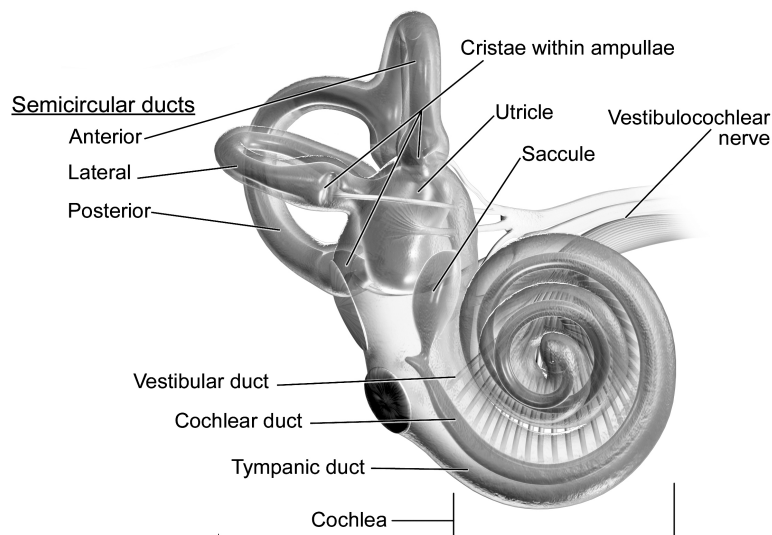
A. Structure of the Ear

1. The **auricle** is the visible part of the ear that resides on the outside of the head. It is also called the pinna.
2. The eardrum, or **tympanic membrane**, is a thin, cone-shaped membrane that separates the external ear from the middle ear.
3. The **ossicles** are three bones in either middle ear that are among the smallest bones in the human body. They serve to transmit sounds from the air to the fluid-filled labyrinth (cochlea).

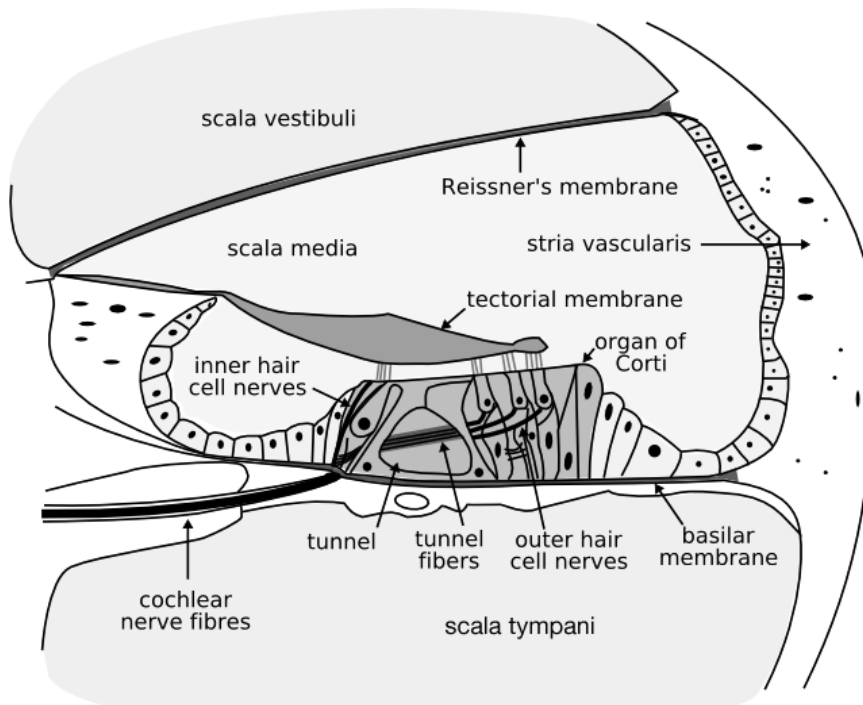


4. The **oval window** is a membrane-covered opening which leads from the middle ear to the vestibule of the inner ear. It serves as the intersection of the middle ear with the inner ear, and is directly contacted by the stapes.

5. The **round window** is one of the two openings from the middle ear into the inner ear. It vibrates with opposite phase to vibrations entering the inner ear through the oval window allowing fluid in the cochlea to move.

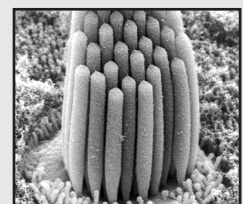


6. The **cochlea** is the auditory portion of the inner ear. It is a spiral-shaped cavity in the bony labyrinth.
7. The organ of **Corti**, or spiral organ, is the receptor organ for hearing and is located in the mammalian cochlea.
8. The **basilar membrane** within the cochlea of the inner ear is a stiff structural element that separates two liquid-filled tubes that run along the coil of the cochlea.



*Cross-section of cochlea.
(Endolymph is located in
the scala media)*

9. **Hair cells** are the sensory receptors of both the auditory system and the vestibular system in all vertebrates, which through mechanotransduction, detect movement in their environment.

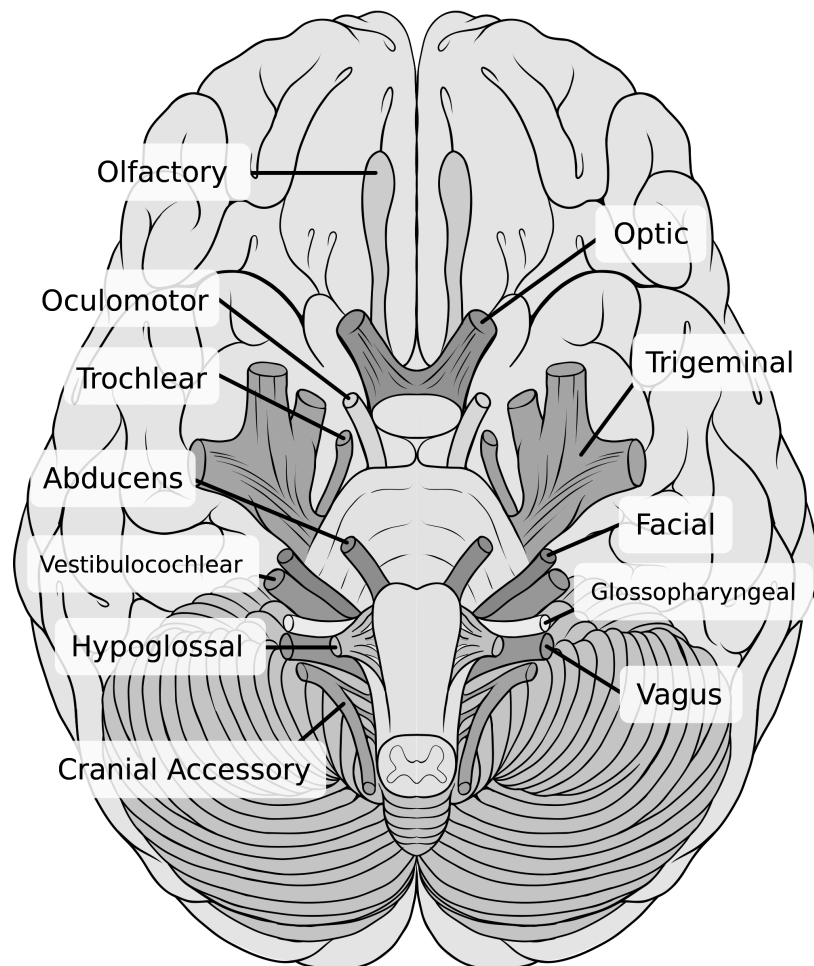


Hair cells

10. **Stereocilia** are the mechanosensing organelles of hair cells, which respond to fluid motion in numerous types of animals for various functions, including hearing and balance.
11. **Endolymph** is the fluid contained in the membranous labyrinth of the inner ear.
12. The **tectorial membrane** is one of two acellular gels in the cochlea of the inner ear, the other being the basilar membrane.
13. **Perilymph** is an extracellular fluid located within the cochlea in two of its three compartments.

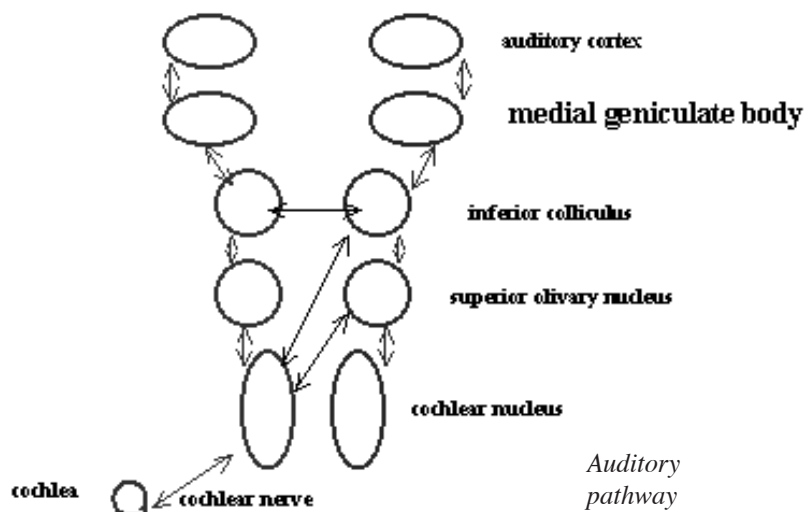
B. Auditory Pathways

1. The **vestibulocochlear nerve**, the eighth cranial nerve, transmits sound and equilibrium information from the inner ear to the brain.

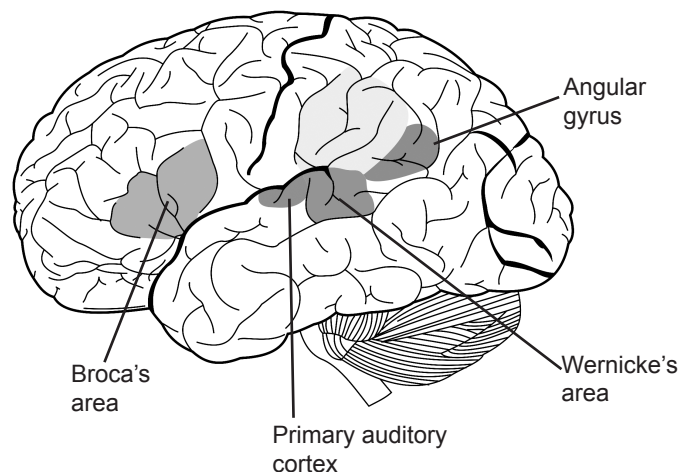


Inferior view of the human brain, with the cranial nerves labelled.

2. The **superior olivary complex** is a collection of brainstem nuclei that functions in multiple aspects of hearing and is an important component of the ascending and descending auditory pathways of the auditory system.
3. The **inferior colliculus** is the principal midbrain nucleus of the auditory pathway and receives input from several peripheral brainstem nuclei in the auditory pathway, as well as inputs from the auditory cortex.
4. The **medial geniculate nucleus** is part of the auditory thalamus and represents the thalamic relay between the inferior colliculus and the auditory cortex.

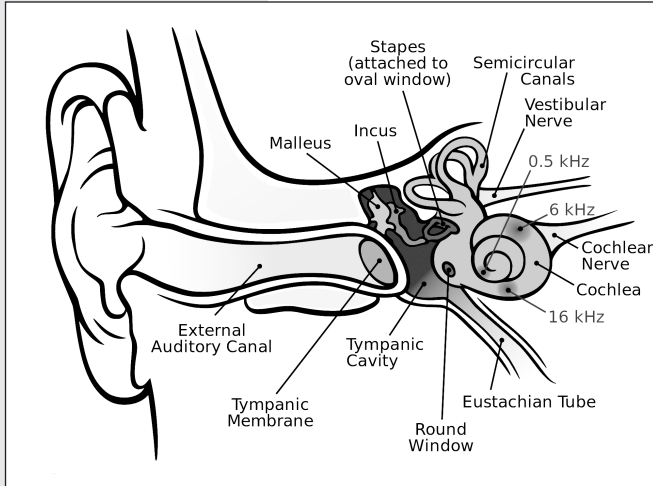


5. The primary **auditory cortex** is the part of the temporal lobe that processes auditory information in humans and other vertebrates.



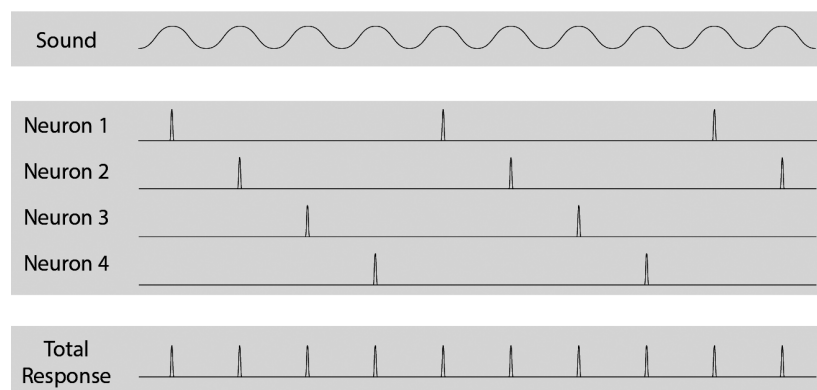
C. Auditory Perception

1. **Place theory** is a theory of hearing which states that our perception of sound depends on where each component frequency produces vibrations along the basilar membrane.



The human ear and frequency mapping in the cochlea. The three ossicles incus, malleus, and stapes transmit airborne vibration from the tympanic membrane to the oval window at the base of the cochlea. Because of the mechanical properties of the basilar membrane within the snail-shaped cochlea, high frequencies will produce a vibration peak near the oval window, whereas low frequencies will stimulate receptors near the apex of the cochlea (locations for three frequencies indicated schematically). Information from the cochlear receptor cells is transmitted to the cochlear nuclei via the 8th cranial nerve, and on through the midbrain to the cortex.

2. **Tonotopy** concerns the spatial arrangement of where sounds of different frequency are processed in the brain.
3. The **temporal theory** of hearing states that our perception of sound depends on the temporal patterns with which neurons respond to sound in the cochlea.
4. **Volley theory** states that groups of neurons of the auditory system respond to a sound by firing action potentials slightly out of phase with one another so that when combined, a greater frequency of sound can be encoded and sent to the brain to be analyzed.



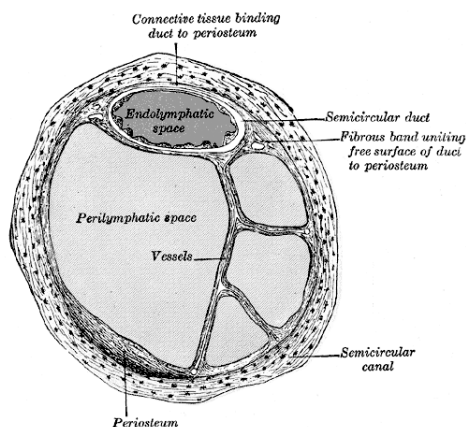
Volley Theory of Hearing demonstrated by four neurons firing at a phase-locked frequency to the sound stimulus. The total response corresponds with the stimulus.

5. **Binaural** hearing, along with frequency cues, lets humans and other animals determine the direction and origin of sounds.
6. A **sound shadow** is an area through which sound waves fail to propagate, due to topographical obstructions or disruption of the waves via phenomena such as wind currents, buildings, or sound barriers.

V. Equilibrium

The **vestibular system** is the sensory system that provides the leading contribution about the sense of balance and spatial orientation for the purpose of coordinating movement with balance.

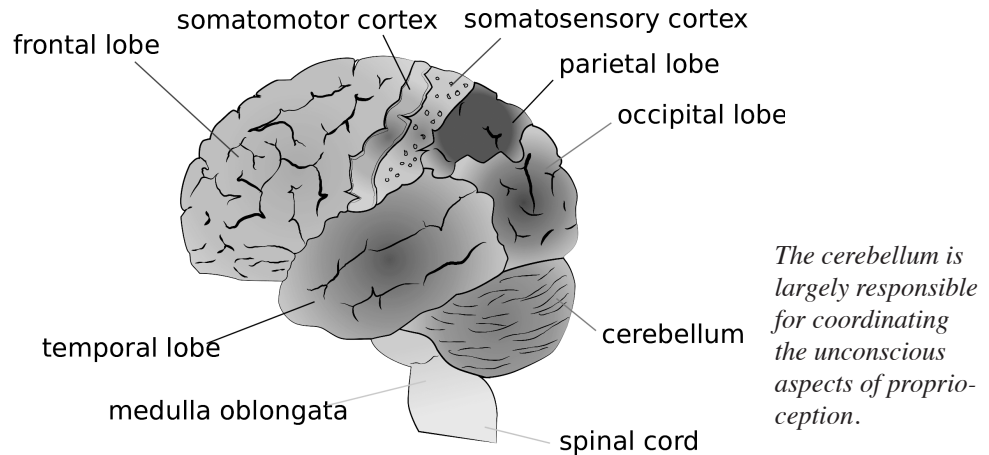
1. The **vestibule** is the central part of the osseous labyrinth, and is situated medial to the tympanic cavity, behind the cochlea, and in front of the semicircular canals.
2. An **otolith** is a structure in the saccule or utricle of the inner ear, specifically in the vestibular labyrinth of vertebrates, that allow sensitivity to changes in horizontal movement and vertical acceleration.
3. The **utricle**, along with the saccule, is one of the two otolith organs located in the vertebrate inner ear.
3. The **saccule** is a bed of sensory cells situated in the inner ear which translates head movements into neural impulses which the brain can interpret, detecting linear accelerations and head tilts in the vertical plane.
4. A **semicircular canal** is one of three interconnected tubes located inside each ear. Oriented along the pitch, roll, and yaw axes, they provide sensory input for experiences of rotary movements.



Cross-section of semicircular canal and duct showing perilymphatic space

VI. Kinesthetic sense

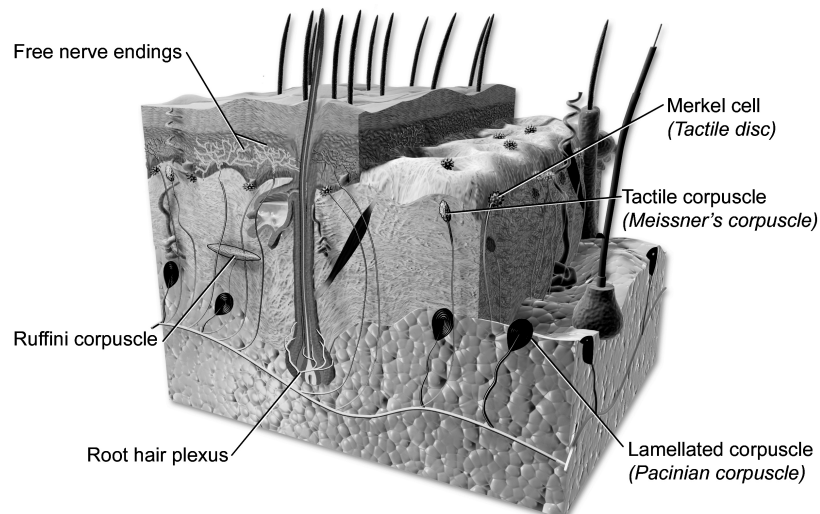
Proprioception is the sense of the relative position of neighbouring parts of the body and strength of effort being employed in movement.



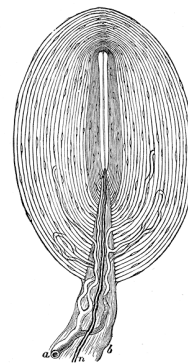
VII. Somatosensation

The **somatosensory system** is made up of thermoreceptors, photoreceptors, mechanoreceptors and chemoreceptors comprising various sensory modalities including proprioception, mechanoreception (touch), thermoception (temperature), and nociception (pain).

1. A **mechanoreceptor** is a sensory receptor that responds to mechanical pressure or distortion. Normally there are four main types in glabrous skin: Pacinian corpuscles, Meissner's corpuscles, Merkel's discs, and Ruffini endings.

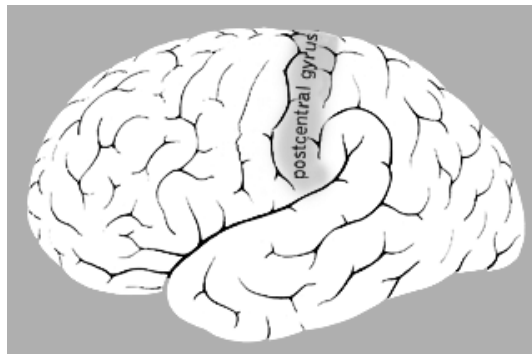


- a. **Meissner's** corpuscles are the type of mechanoreceptor responsible for sensitivity to light touch.
- b. A **Ruffini corpuscle** is a slowly adapting mechanoreceptor found in the subcutaneous tissue of humans. It is one of the receptors responsible for mechanoreception.
- c. **Merkel's discs** are mechanoreceptors found in the basal epidermis and hair follicles. They are large, myelinated nerve endings, providing information on pressure, position, and deep static touch features such as shapes and edges.
- d. **Pacinian corpuscles**, are one of the four major types of mechanoreceptor. They are nerve endings in the skin responsible for sensitivity to vibration and pressure. They respond only to sudden disturbances and are especially sensitive to vibration.



Pacinian corpuscle

2. A **nociceptor** is a sensory neuron (nerve cell) that responds to potentially damaging stimuli by sending signals to the spinal cord and brain. This process usually causes the perception of pain.
3. A **free nerve ending** is an unspecialized, afferent nerve ending, meaning it brings information from the body's periphery toward the brain. They function as cutaneous receptors and are essentially used by vertebrates to detect pain.
4. The **lateral postcentral gyrus** is a prominent structure in the parietal lobe of the human brain. It is the location of the primary **somatosensory cortex**, the main sensory receptive area for the sense of touch.

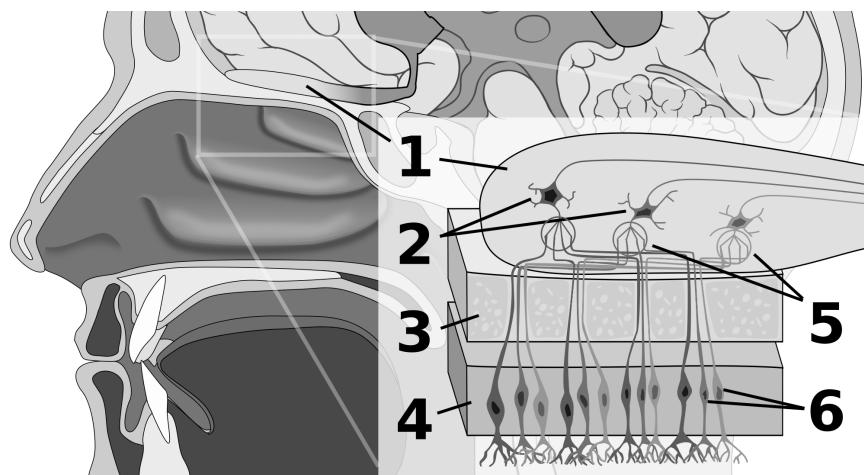


Postcentral gyrus of the human brain.

5. **Two-point discrimination** is the ability to discern that two nearby objects touching the skin are truly two distinct points, not one. It is often tested with two sharp points during a neurological examination and reflects how finely innervated an area of skin is.
6. The **gate control theory** of pain asserts that non-painful input closes the gates to painful input, which prevents pain sensation from traveling to the central nervous system. Therefore, stimulation by non-noxious input is able to suppress pain.
7. The **withdrawal reflex** is a spinal reflex intended to protect the body from damaging stimuli. It is polysynaptic, causing stimulation of sensory, association, and motor neurons.
8. **Phantom pain** sensations are described as perceptions that an individual experiences relating to a limb or an organ that is not physically part of the body.

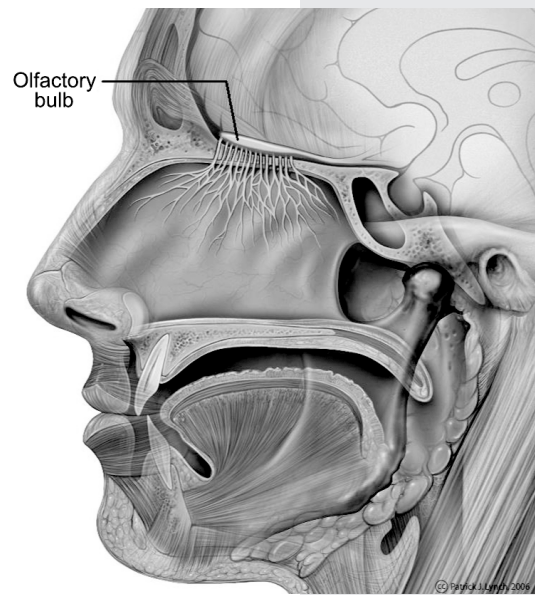
VIII. Smell

1. **Olfactory** neuron receptor molecules are responsible for the detection of odor molecules. Activation of these receptors is the initial player in a signal transduction cascade which ultimately produces a nerve impulse which is transmitted to the brain.



Human olfactory system. 1: Olfactory bulb 2: Mitral cells 3: Bone 4: Nasal epithelium 5: Glomerulus 6: Olfactory receptor neurons

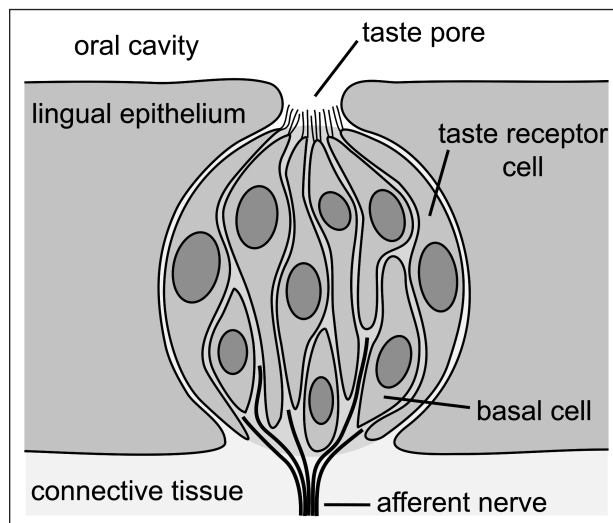
2. Located on the inferior side of the brain, the **olfactory bulb** is the primary neural structure of the vertebrate forebrain involved in olfaction, or the sense of smell.
3. The **olfactory tract** is a bundle of axons connecting the mitral and tufted cells of the olfactory bulb to several target regions in the brain.



Head anatomy showing olfactory nerve and olfactory bulb.

IX. Taste

1. **Gustation**, or taste, is the sensory impression of food or other substances on the tongue and is one of the five traditional senses.
2. **Taste buds** contain the receptors for taste. They are located around small structures (papillae) on the upper surface of the tongue, soft palate, upper esophagus, the cheek, and epiglottis.
3. **Lingual papillae** are the small, nipple or hairlike structures on the upper surface of the tongue that give the tongue its characteristic rough texture.

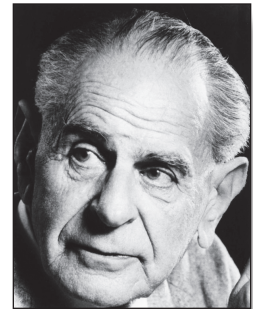


Taste bud

Research Methods in Psychology and Sociology

I. The Critical Scientific Approach

1. **Empirical research** is research using evidence gained through observation and experimentation. It is a way of gaining knowledge by means of direct and indirect observation or experience.
2. **Scientific skepticism** is the practice of questioning whether claims are supported by empirical research and have reproducibility, as part of a methodological norm pursuing 'the extension of certified knowledge'.
3. **Pseudoskepticism** is a term referring to a philosophical or scientific position which appears to be that of skepticism or scientific skepticism but which in reality fails to be so.
4. **Critical thinking** is clear, rational thinking involving critique and clear, reasoned judgments.
5. Generally regarded as one of the greatest philosophers of science of the 20th century, **Karl Popper** is known for his rejection of the classical inductivist views on the scientific method, in favour of empirical falsification.
6. A statement is called **falsifiable** if it is possible to conceive an observation or an argument which proves the statement in question to be false.



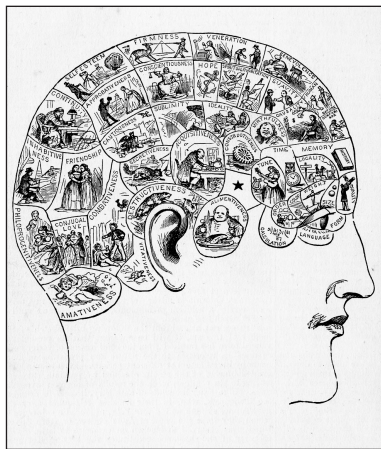
Karl Popper



Are all swans white?

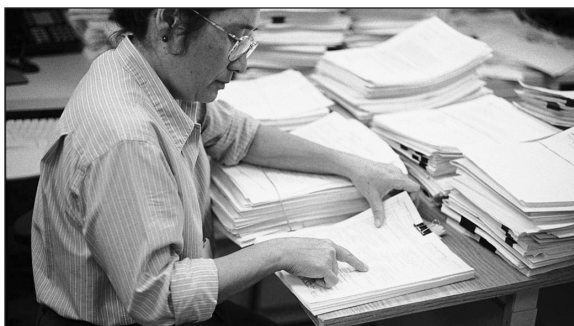
7. According to Karl Popper, confirmations of a scientific theory should count only if they are the result of **risky predictions**; that is to say, if, unenlightened by the theory in question, we should have expected an event which was incompatible with the theory.
8. **Occam's razor** is a problem-solving principle asserting that among competing hypotheses, the one with the fewest assumptions should be selected.

9. **Reproducibility** is the ability of an entire experiment or study to be duplicated, either by the same researcher or by someone else working independently.
10. While an attribute is often intuitive in research, the **variable** is the operationalized way in which an attribute is represented for further data processing.
11. In statistics, a **spurious relationship** is a mathematical relationship in which two events or variables have no direct causal connection, yet it may be wrongly inferred that they do, due to either coincidence or the presence of a certain third, unseen factor.
12. **Pseudoscience** is a claim, belief or practice which is incorrectly presented as scientific, but does not adhere to a valid scientific method, cannot be reliably tested, or otherwise lacks scientific status.



A typical 19th century phrenology chart: In the 1820s, phrenologists claimed the mind was located in areas of the brain, and were attacked for doubting that mind came from the nonmaterial soul. Their idea of reading “bumps” in the skull to predict personality traits was later discredited. Phrenology was first called a pseudoscience in 1843 and continues to be considered so.

13. An **ad hoc immunizing hypothesis** is an unscientific strategy applied when falsifiable predictions are strongly falsified. The theory is protected by the appendage of ad hoc clauses or shielded by speculative hypothesis.
13. **Peer review** is the evaluation of work by one or more people of similar competence to the producers of the work.



A reviewer at the National Institutes of Health evaluates a grant proposal.

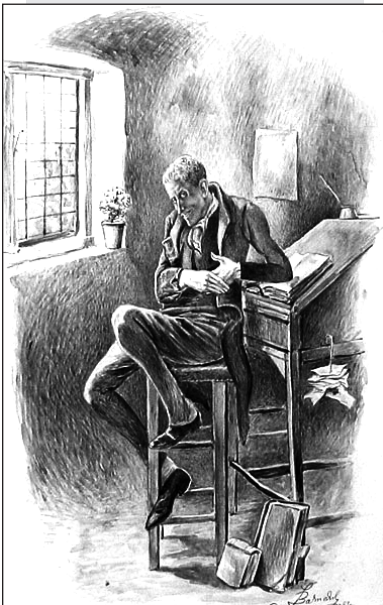
II. Fallacies and Biases

A. Fallacies

1. A **fallacy** is the use of poor, or invalid, reasoning for the construction of an argument.
2. The **correlation-causation fallacy** is taking a statistical dependence as sufficient to demonstrate the presence of a causal relationship.
3. The **post hoc fallacy** is a logical fallacy of the questionable cause variety that states 'Since event Y followed event X, event Y must have been caused by event X.'
4. The **bandwagon fallacy** is a fallacious argument that concludes that a proposition is true because many or most people believe it.
5. The **either-or fallacy** involves a situation in which only limited alternatives are considered, when in fact there is at least one additional option.

B. Biases

1. A **cognitive bias** refers to a systematic pattern of deviation from norm or rationality in judgment, whereby inferences about other people and situations may be drawn in an illogical fashion.
2. **Confirmation bias** is the tendency to search for, interpret, prefer, and recall information in a way that confirms one's beliefs or hypotheses while giving disproportionately less attention to information that contradicts it.



Confirmation bias has been described as an internal “yes man”, echoing back a person’s beliefs like Charles Dickens’ character Uriah Heep.



Mock trials allow researchers to examine confirmation biases in a realistic setting.

3. **Hindsight bias** is the inclination, after an event has occurred, to see the event as having been predictable,

despite there having been little or no objective basis for predicting it.

4. The **bias blind spot** is the cognitive bias of recognizing the impact of biases on the judgement of others, while failing to see the impact of biases on one's own judgement.
5. The **opportunity cost** of a choice is the value of the best alternative foregone, where a choice needs to be made between several mutually exclusive alternatives given limited resources.
6. **Malingering** is fabricating or exaggerating the symptoms of mental or physical disorders for a variety of secondary gain motives.
7. **Experiential thinking** regards an explanation as valid if it is personally functional and satisfying, offering a description of the world that may be more personal than can be provided by science and reducing the amount of work involved in understanding complex events.
8. The **transcendental temptation** is a tendency for people to seek paranormal or metaphysical explanations for events with a scientific basis.
9. **Terror management theory** proposes a basic psychological conflict that results from having a desire to live but realizing that death is inevitable.
10. **Pareidolia** is a psychological phenomenon involving a stimulus (an image or a sound) wherein the mind perceives a familiar pattern where none actually exists.



A satellite photo of a mesa in Cydonia, often called the Face on Mars. Later imagery from other angles did not show the illusion.

11. **Apophenia** is the human tendency to perceive meaningful patterns within random data.

III. Considerations in Experimental Design

1. **Naturalistic observation** is a research tool in which a subject is observed in its natural habitat without any manipulation by the observer.
 - a. **Participant observation** is one type of data collection method. The aim is to gain a close and intimate familiarity with a given group of individuals through an intensive involvement in their cultural environment, usually over an extended period of time.
 - b. A **case study** involves an up-close, in-depth, and detailed examination of a subject, as well as its related contextual conditions.
 - c. An **existence proof** is a demonstration that a given psychological phenomenon can occur.
2. In the design of experiments, the **experimental group** is the group of participants that receives the manipulation.
 - a. In an experiment, the **control group** is the group of participants who receive either no manipulation or a standard manipulation.
 - b. **Random assignment** is an experimental technique for assigning human participants or animal subjects to different groups in an experiment by a chance procedure.
 - c. A **blind** is an experiment in which information about the test is kept from the participant until after the test.
 - d. **Double-blind** describes an especially stringent way of conducting an experiment which attempts to eliminate subjective, unrecognized biases carried by both an experiment's subjects (usually human) and its conductors.
 - e. In the design of an experiment, the **independent variable** represents the input or cause. This is the variable that the experimenter manipulates.
 - f. The **dependent variable** represents the output or effect. It is the variable that an experimenter measures to see whether the manipulation has an effect.

- g. A **confound** is an extraneous variable in a statistical model that correlates with both the dependent variable and the independent variable. In experimental design, it is any difference between the experimental and control groups other than the independent variable.

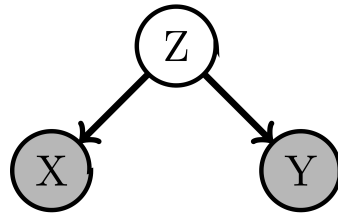
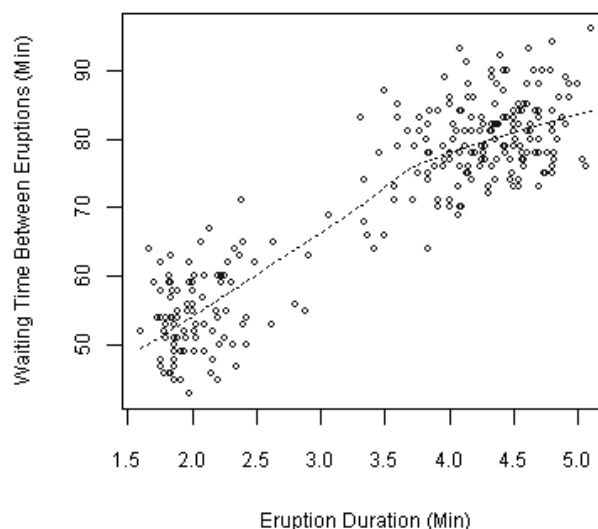


Illustration of a simple confounding case: in this graphical model, given Z, there is no association between X and Y. However, not observing Z will create spurious association between X and Y.

- h. With **positive correlation**, the greater value of one variable mainly corresponds with a greater value of the other variable.
- i. With **negative correlation**, a greater value of one variable mainly corresponds with a lower value of the other variable.
- j. A **scatter plot** is a type of mathematical diagram using Cartesian coordinates to display values as a set of points for typically two variables for a set of data.

Old Faithful Eruptions



Waiting time between eruptions and the duration of the eruption for the Old Faithful Geyser in Yellowstone National Park, Wyoming, USA. This chart suggests there are generally two “types” of eruptions: short-wait-short-duration, and long-wait-long-duration.



The placebo effect can be produced by inert tablets, by sham surgery, and by false information, such as when electrical stimulation is turned “off” in those with Parkinson’s disease implanted brain electrodes.

k. **Illusory correlation** is the phenomenon of perceiving a relationship between variables (typically people, events, or behaviors) even when no such relationship exists.

3. Sometimes patients given a simulated or otherwise medically ineffectual treatment will have a perceived or actual improvement in a medical condition, a phenomenon commonly called the **placebo effect**.

a. In a **balanced placebo design**, half of the participants are told they are receiving the active drug and half are told they are receiving the placebo - but only half of the participants in each group actually receive the drug or placebo as told, permitting independent and combined assessment of drug and placebo effects.

b. A **nocebo** is an inert substance or form of therapy that creates harmful effects in a patient.

4. Validity and Reliability

a. **External validity** is the validity of generalized (causal) inferences in scientific research, usually based on experiments. It is the extent to which the results of a study can be generalized to other situations and to other people.

b. **Internal validity** is a property of scientific studies which reflects the extent to which a causal conclusion based on a study is warranted. Such warrant is constituted by the extent to which a study minimizes systematic error or bias.

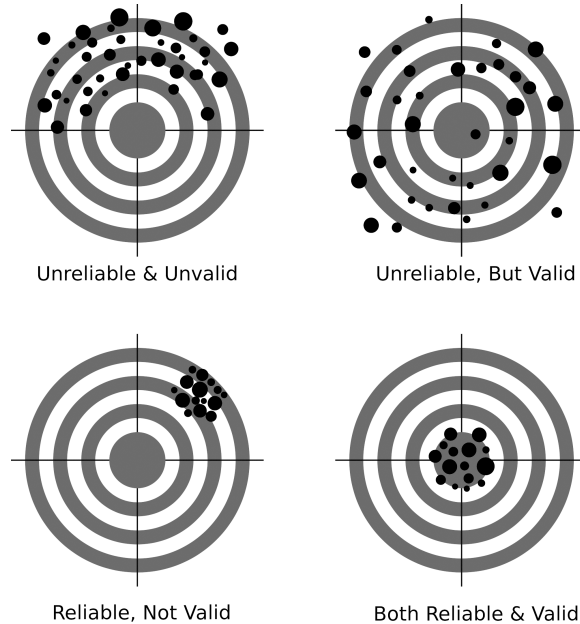
c. **Face validity** is the extent to which a test is subjectively viewed as covering the concept it purports to measure. It refers to the transparency or relevance of a test as it appears to test participants.

d. **Content validity** refers to the extent to which a measure represents all facets of a given social construct.

e. **Construct validity** is the degree to which a test measures what it claims, or purports, to be measuring.

f. **Criterion validity** is the extent to which a measure is related to an outcome.

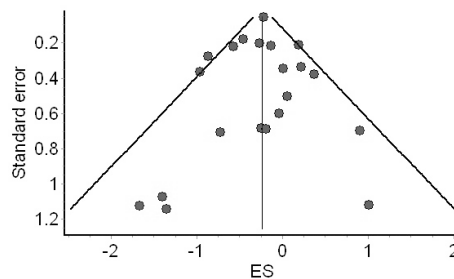
- g. **Incremental validity** describes how much a new psychometric assessment increases the predictive ability beyond that provided by an existing method of assessment, whether the new test adds much information that might be obtained with simpler, already existing methods.



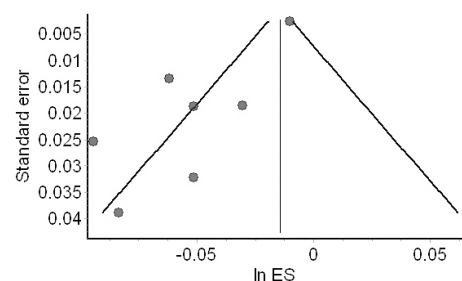
- h. In the psychometrics, **reliability** is the overall consistency of a measure, whether the measure produces similar results under consistent conditions.
- i. **Test-retest reliability** is the variation in measurements taken by a single person or instrument on the same item, under the same conditions, and in a short period of time.
- j. **Inter-rater reliability** is the degree of agreement among raters. It gives a score of how much homogeneity, or consensus, there is in the ratings given by judges.
5. The **fallacy of positive instances** is the act of pointing to individual cases or data that seem to confirm a particular position, while ignoring a significant portion of related cases or data that may contradict that position.

6. The idea behind the practice of **meta-analysis** is that there is a common truth behind all conceptually similar studies. The aim is to use approaches from statistics to derive a pooled estimate.

7. **Publication bias** is a type of bias with regard to what academic research is likely to be published among what is available to be published. This type of bias can affect the outcome of literature reviews of claims about support for a hypothesis.



A funnel plot expected without the file drawer problem. The largest studies converge at the tip while smaller studies show more or less symmetrical scatter at the base.



A funnel plot expected with the file drawer problem. The largest studies still cluster around the tip, but the bias against publishing negative studies has caused the smaller studies as a whole to have an unjustifiably favorable result to the hypothesis

8. The **Pygmalion** effect, or Rosenthal effect, is the phenomenon whereby higher expectations lead to an increase in performance.

9. The **experimenter expectancy effect** occurs when researchers' hypotheses causes them to unintentionally bias the outcome of a study.

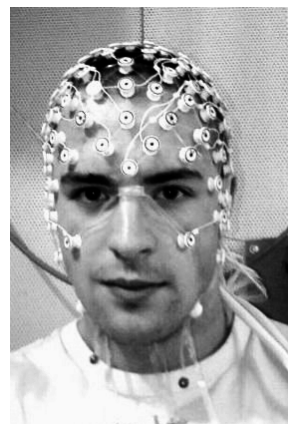
10. The **Hawthorne effect** (also referred to as the observer effect) is a type of reactivity in which individuals modify or improve an aspect of their behavior in response to their awareness of being observed.

11. **Demand characteristics** refers to an experimental artifact where participants form an interpretation of the purpose of an experiment and subconsciously change their behavior to fit that interpretation.

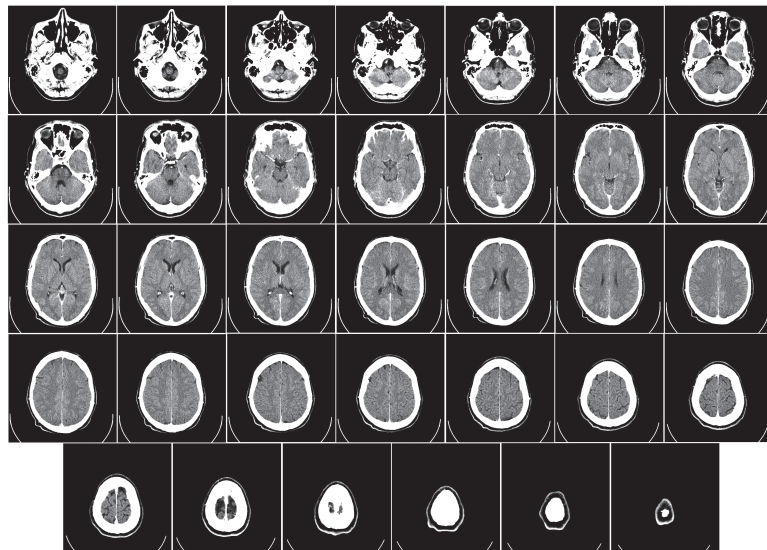
12. **Reactivity** is a phenomenon that occurs when individuals alter their performance or behavior due to the awareness that they are being observed. It is a significant threat to a research study's internal validity.
13. A type of study with validity problems, a **self-report study** is a type of survey, questionnaire, or poll in which respondents read the question and select a response by themselves without researcher interference.
14. A field of applied statistics, **survey methodology** studies the sampling of individual units from a population and the associated data collection techniques, such as questionnaire construction and methods for improving the accuracy of responses.
15. **Halo effect** is a cognitive bias in which an observer's overall impression of a person, company, brand, or product influences the observer's feelings and thoughts about that entity's character or properties.
16. The **leniency effect** is the tendency of raters to provide ratings that are overly generous.
17. The **error of central tendency** is the unwillingness of raters to provide extreme (very high or very low) ratings.

IV. Brain-Mapping Methods

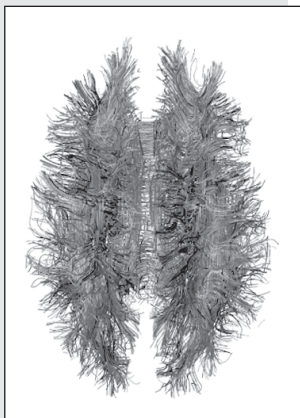
1. A **lesion** is any abnormality or damage in the tissue of an organism usually caused by disease or trauma. Lesions to the brain have played an important role in the history of brain-mapping. For example, association of damage to the left frontal lobe with aphasia allowed identification of Broca's area.
2. **Electroencephalography (EEG)** is an electrophysiological monitoring method to record electrical activity of the brain. It is typically noninvasive, with the electrodes placed along the scalp, although invasive electrodes are sometimes used in specific applications.



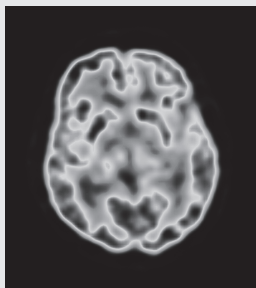
3. A **computed tomography (CT) scan** makes use of computer-processed combinations of many X-ray images taken from different angles to produce cross-sectional images of specific areas of a scanned object.



Computed tomography of human brain, from base of the skull to top.

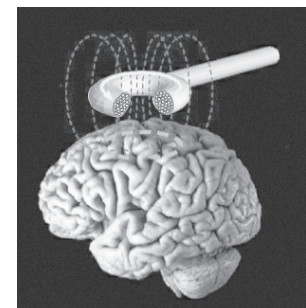


MRI image of white matter tracts.



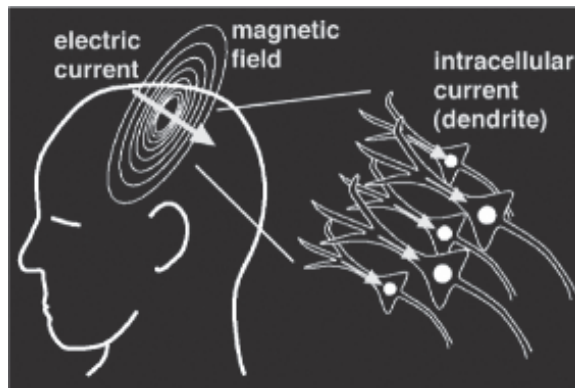
PET scan of the human brain.

4. **Magnetic resonance imaging (MRI)** is a medical imaging technique using magnetic fields and radio waves to form images of the body.
5. **Positron emission tomography (PET)** produces a three-dimensional image of functional processes in the body. The system detects pairs of gamma rays emitted indirectly by a positron-emitting radionuclide (tracer) introduced into the body on a biologically active molecule.
6. **Functional MRI (fMRI)** is a neuroimaging procedure using MRI technology that measures brain activity by detecting changes associated with blood flow. This technique relies on the fact that cerebral blood flow and neuronal activation are coupled.
7. **Transcranial magnetic stimulation (TMS)** is used to stimulate small regions of the brain. A magnetic field generator is placed near the head of the person receiving the treatment which produces small electric currents in the region of the brain just under the coil.



Transcranial magnetic stimulation (schematic diagram)

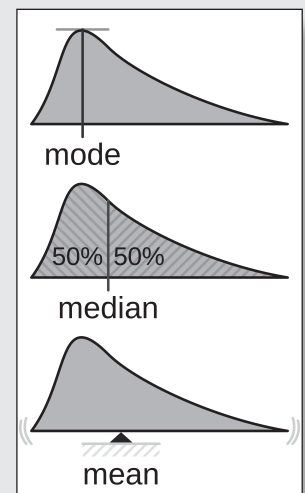
8. **Magnetoencephalography (MEG)** is a functional neuroimaging technique for mapping brain activity by recording magnetic fields produced by electrical currents occurring naturally in the brain, using very sensitive magnetometers.



Origin of the brain's magnetic field. The electric current also produces the EEG signal.

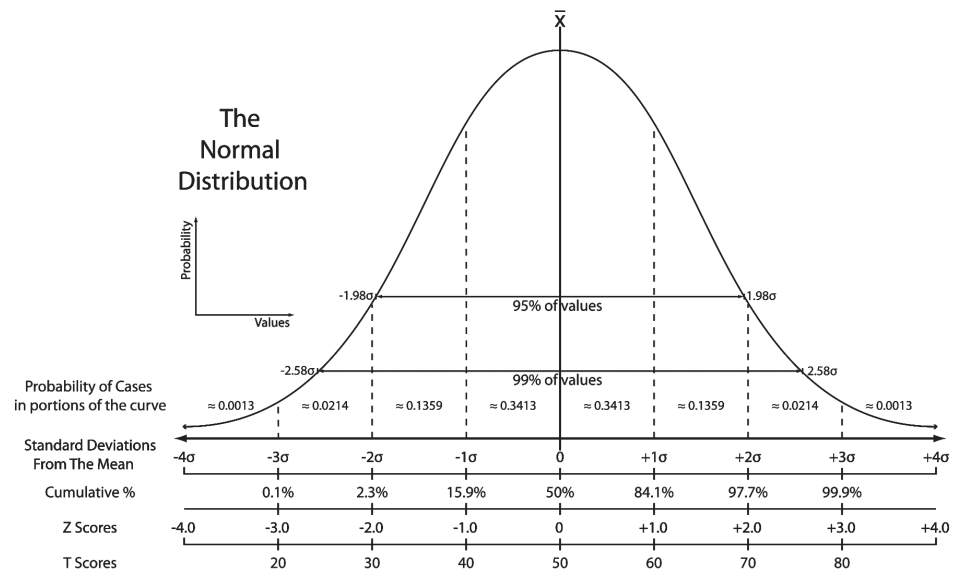
V. Statistics in Psychological Research

1. **Statistics** is the study of the collection, analysis, interpretation, presentation, and organization of data.
 - a. **Descriptive statistics** is the discipline of quantitatively describing the main features of a collection of information, or the quantitative description itself.
 - b. **Statistical inference** is the process of deducing properties of an underlying distribution by analysis of data to infer properties about a population.
2. In statistics, a **central tendency** is a central or typical value for a probability distribution.
 - a. The arithmetic **mean** is the sum of a collection of numbers divided by the number of numbers in the collection.
 - b. A **median** is the number separating the higher half of a data sample, a population, or a probability distribution, from the lower half.
 - c. The **mode** is the value that appears most often in a set of data.

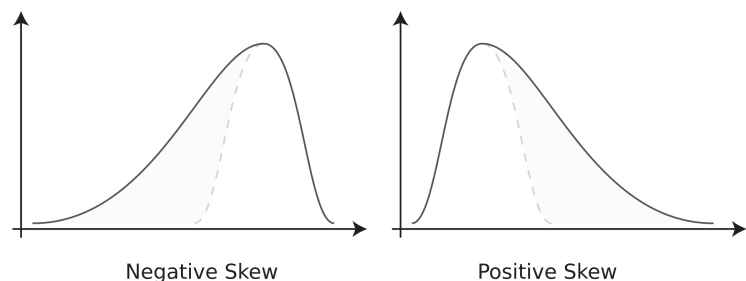


3. In the **normal distribution** (or Gaussian distribution, sometimes informally called the bell curve) averages of random variables independently drawn from independent distributions converge in distribution to the normal.

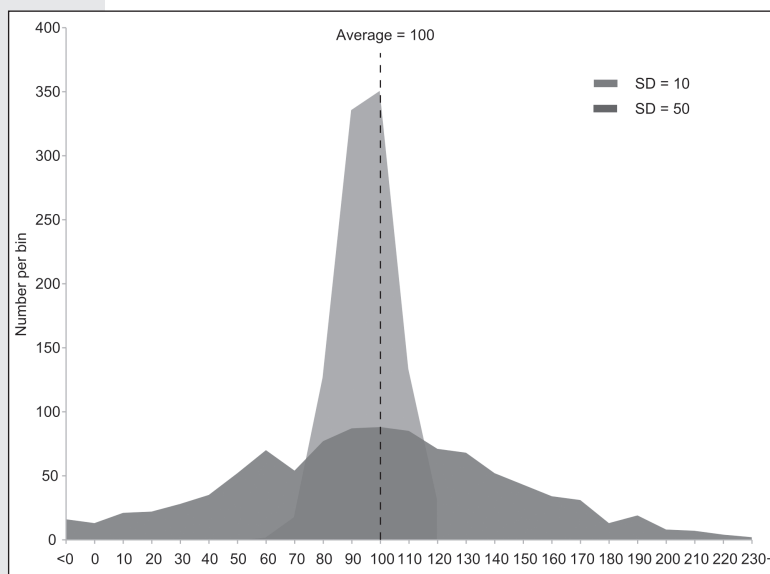
More probability density is found as one gets closer to the expected (mean) value in a normal distribution. Statistics used in standardized testing assessment are shown. The scales include standard deviations, cumulative percentages, Z-scores, T-scores, standard nines, and percentages in standard nines.



- a. **Skewness** is a measure of the asymmetry of the probability distribution of a real-valued random variable about its mean.

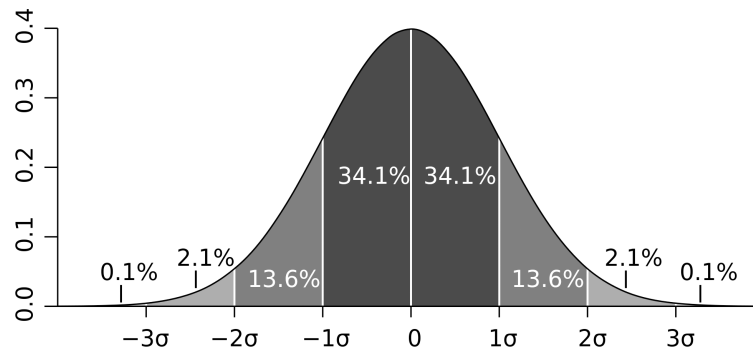


Example of two samples with the same mean and different standard deviations. Light grey sample has mean 100 and SD 10; dark grey sample has mean 100 and SD 50. Each sample has 1000 values drawn at random from a gaussian distribution with the specified parameters.



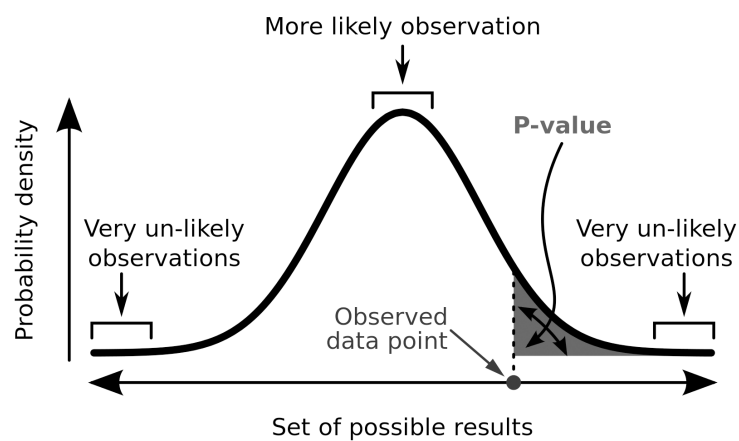
- b. **Dispersion** (also called variability, scatter, or spread) denotes how stretched or squeezed a distribution is. Common examples of measures of this property are the variance, standard deviation and interquartile range.

- c. The **standard deviation** is a measure that is used to quantify the amount of variation or dispersion of a set of data values.



Normal distribution curve that illustrates standard deviations. Each band has 1 standard deviation, and the labels indicate the approximate proportion of area.

4. **Statistical significance** is attained when a p-value is less than the significance level. The p-value is the probability of obtaining at least as extreme results given that the null hypothesis is true. Significance level is chosen before data collection and is usually set to 0.05 (5%).



A **p-value** (shaded area) is the probability of an observed (or more extreme) result assuming that the null hypothesis is true.

Remember that the probability of observing a result given that some hypothesis is true is not equivalent to the probability that a hypothesis is true given that some result has been observed. Using the p-value as a “score” is committing the transposed conditional fallacy.

VI. Research Ethics

1. **Informed consent** is a process for getting permission before conducting a healthcare intervention on a person. A health care provider may ask a patient to consent to receive therapy before providing it, or a clinical researcher may ask a research participant before enrolling that person into a clinical trial.
2. An **institutional review board (IRB)** is a committee that has been formally designated to approve, monitor, and review biomedical and behavioral research involving humans. They often conduct some form of risk-benefit analysis in an attempt to determine whether or not research should be done.

4

Learning

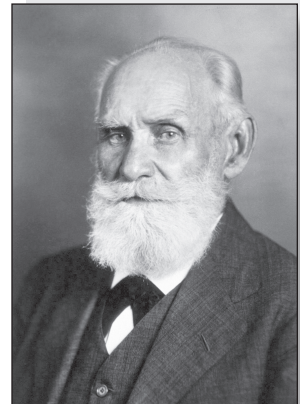
I. Learning Theory and Behaviorism

Learning is the act of acquiring new, or modifying and reinforcing, existing knowledge, behaviors, skills, values, or preferences and may involve synthesizing different types of information.

1. **Habituation** is a form of learning in which an organism decreases or ceases to respond to a stimulus after repeated presentations. Essentially, the organism learns to stop responding to a stimulus which is no longer biologically relevant.
2. **Dishabituation** is the brief recovery of the response to the eliciting stimulus when another stimulus is added.
3. **Associative learning** is the process by which an association between two stimuli or a behavior and a stimulus is learned. The two forms of associative learning are classical and operant conditioning.

II. Classical Conditioning

1. **Ivan Pavlov** was a Russian physiologist known primarily for his work in classical conditioning. His initial interest in classical conditioning occurred almost by accident during one of his experiments on digestion in dogs.
2. **Classical conditioning** is a learning process in which an innate response to a potent stimulus comes to be elicited in response to a previously neutral stimulus; this is achieved by repeated pairings of the neutral stimulus with the potent stimulus.
 - a. In classical conditioning, the **conditioned stimulus** is the neutral stimulus (e.g., the sound of a tuning fork).
 - b. The **unconditioned stimulus** is biologically potent (e.g., the taste of food).



Ivan Pavlov

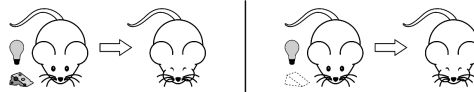
- c. The **unconditioned response** to the unconditioned stimulus is an unlearned reflex (e.g., salivation).
- d. After repeated pairing of conditioned stimulus with an unconditioned stimulus the organism exhibits a **conditioned response** to the conditioned stimulus when the conditioned stimulus is presented alone.

FORWARD CONDITIONING

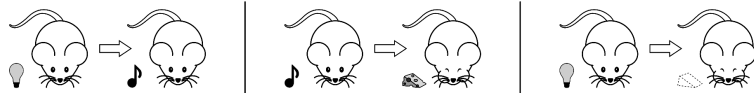


Classical conditioning procedures and effects.

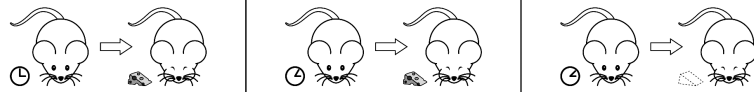
SIMULTANEOUS CONDITIONING



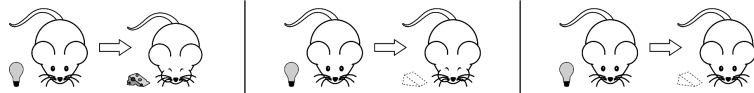
SECOND ORDER CONDITIONING



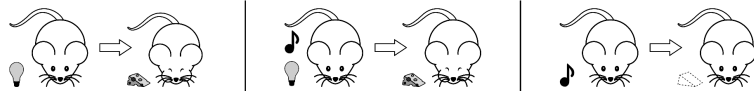
TEMPORAL CONDITIONING



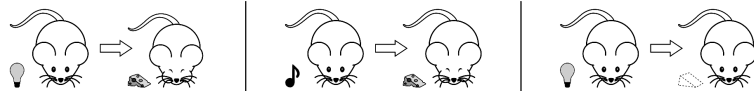
EXTINCTION



BLOCKING



INHIBITION



3. **Aversive conditioning** is classical conditioning to an unpleasant unconditioned stimulus.
4. During **acquisition**, the learning phase during which a conditioned response is established, the conditioned stimulus and the unconditioned stimulus are paired.

5. **Extinction** is the process of making a learned behavior disappear, the experimenter presents a CS alone, without the presence of the US. Once this process is repeated continuously, eventually, the CS will stop eliciting a CR.
 - a. **Spontaneous recovery** is a phenomenon of learning and memory which was first seen in classical (Pavlovian) conditioning and refers to the re-emergence of a previously extinguished conditioned response after a delay.
 - b. **Renewal** is a reemergence of a conditioned response following extinction when an animal is returned to the environment in which the conditioned response was acquired.
6. **Stimulus generalization** is said to occur if, after a particular CS has come to elicit a CR, another similar stimulus will elicit the same CR. Usually the more similar are the CS and the test stimulus the stronger is the CR to the test stimulus.
7. One observes **stimulus discrimination** when one stimulus (CS1) elicits one CR and another stimulus (CS2) elicits either another CR or no CR at all. This can be brought about by, for example, pairing CS1 with an effective US and presenting CS2 with no US.
8. **Higher-order conditioning** is a form of learning in which a stimulus is first made meaningful or consequential for an organism through an initial step of learning, and then that stimulus is used as a basis for learning about some new stimulus.
9. **Latent inhibition** refers to the observation that a familiar stimulus takes longer to acquire meaning (as a signal or conditioned stimulus) than a new stimulus. This process inhibits the formation of memory by preventing learning of the observed stimuli.
10. A **phobia** is a type of anxiety disorder, usually defined as a persistent fear of an object or situation in which the sufferer commits to great lengths in avoiding, typically disproportional to the actual danger posed, often being recognized as irrational.
11. **Fetishism** is a sexual focus on a nonliving object or non-genital body part.

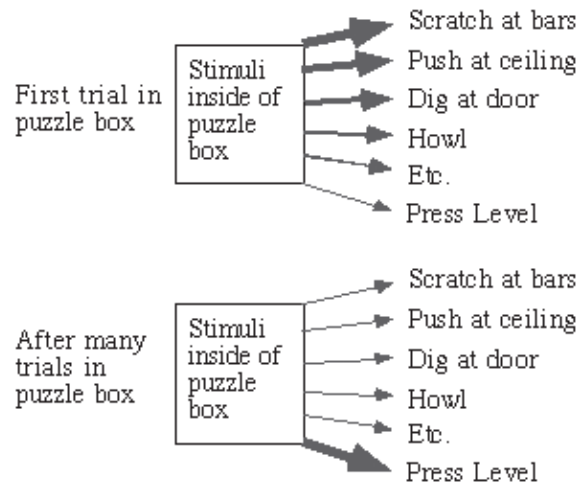
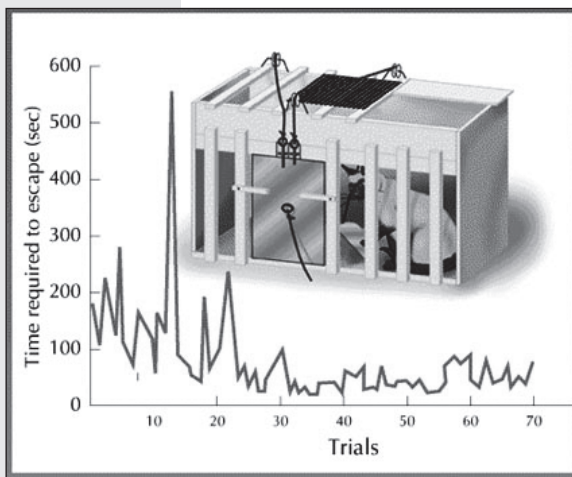
III. Operant Conditioning

A. The Law of Effect



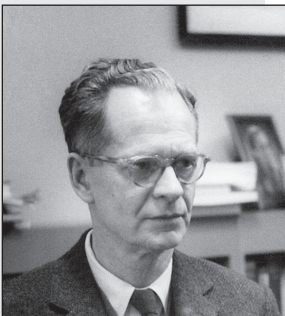
E. L. Thorndike

1. The **law of effect** basically states that responses that produce a satisfying effect in a particular situation become more likely to occur again in that situation, and responses that produce a discomforting effect become less likely to occur again in that situation.
2. The work of **E. L. Thorndike** on comparative psychology and the learning process led to the theory of connectionism and helped lay the scientific foundation for modern educational psychology.
3. Thorndike meant to distinguish clearly whether or not cats escaping from puzzle boxes were using **insight**. Animals using a more ordinary method of trial and error in his experiments would show gradual curves. His finding was that cats consistently showed gradual learning.



Initially, the cat's responses were largely instinctual, but over time, the pressing lever response was strengthened while the others were weakened

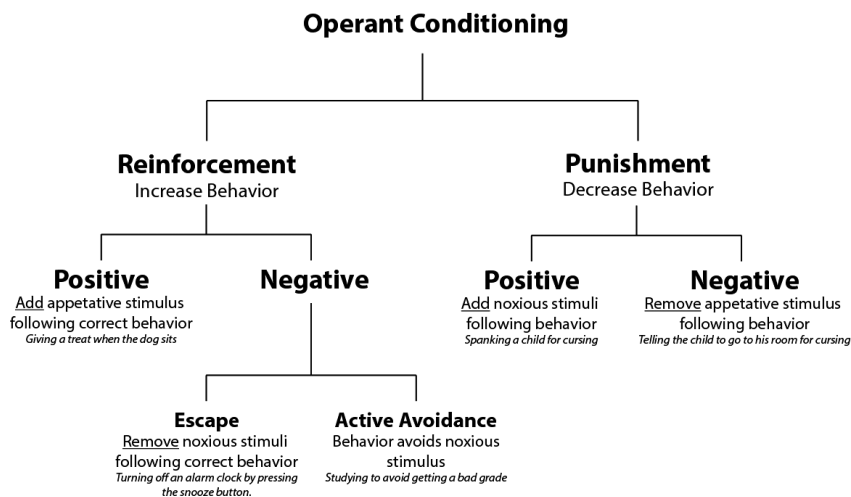
B. B. F. Skinner and Reinforcement



B. F. Skinner

1. **B. F. Skinner** was an American psychologist who considered free will an illusion and human action dependent on consequences of previous actions.
2. **Behaviorism** is an approach to psychology that emerged in the early twentieth century with the primary tenet that psychology should have only concern itself with observable events.

3. The **Skinner box** is a laboratory apparatus used to study animal behavior which permits experimenters to study behavior conditioning by teaching a subject animal to perform certain actions (like pressing a lever) in response to specific stimuli, such as a light or sound signal.
4. **Operant conditioning** is a learning process in which behavior is sensitive to, or controlled by its consequences.



Positive presence of a stimulus

Negative absence of a stimulus

Reinforcement increases behavior

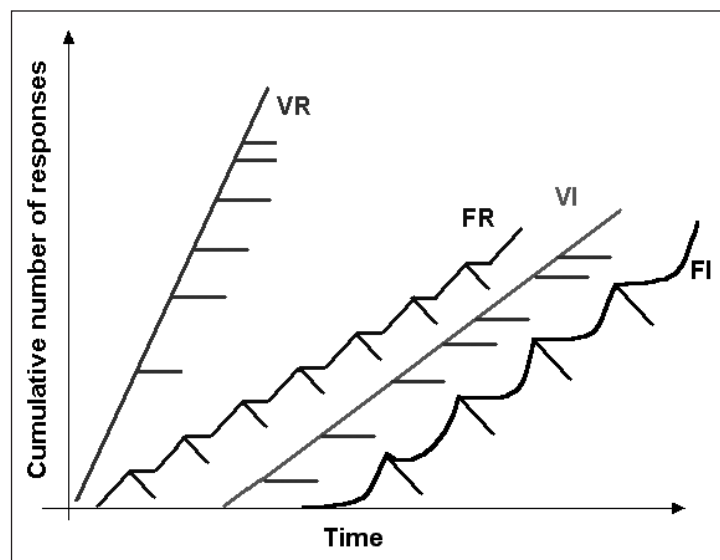
Punishment decreases behavior

Escape removes a stimulus

Avoidance prevents a stimulus

- a. **Reinforcement** is a consequence that will strengthen an organism's future behavior whenever that behavior is preceded by a specific antecedent stimulus. This strengthening effect may be measured as a higher frequency of behavior or shorter latency.
- b. **Positive reinforcement** occurs when a desirable event or stimulus is presented as a consequence of a behavior and the behavior increases.
- c. **Negative reinforcement** occurs when the rate of a behavior increases because an aversive event or stimulus is removed or prevented from happening.
- d. **Positive punishment** occurs when a response produces a stimulus and that response decreases in probability in the future in similar circumstances.

- e. **Negative punishment** occurs when a response produces the removal of a stimulus and that response decreases in probability in the future in similar circumstances.
5. A **discriminant stimulus** is a stimulus that serves as a signal for the presence of reinforcement.
6. A **schedule of reinforcement** specifies the rules that determine how and when a response will be followed by a reinforcer.
- With a **fixed ratio schedule**, reinforcement is delivered after every n th response.
 - With a **variable ratio schedule**, reinforcement is delivered on average every n th response, but not always on the n th response.
 - With a **continuous reinforcement schedule** every occurrence of the instrumental response (desired response) is followed by the reinforcer.
 - With a **fixed interval schedule**, reinforcement is delivered after n amount of time.
 - With a **variable interval schedule**, reinforcement is delivered on average after n amount of time, but not always exactly n amount of time.



A chart demonstrating the different response rate of the four simple schedules of reinforcement, each hatch mark designates a reinforcer being given.

7. Escape and avoidance

- a. In **escape learning**, a behavior terminates an (aversive) stimulus.
- b. In **avoidance learning**, behavior is maintained that prevents a stimulus.
- c. **Two-process theory** seeks to explain discriminated avoidance learning, in which an organism learns to avoid an aversive stimulus by escaping from a signal for that stimulus. Two processes are involved: classical conditioning of the signal followed by operant conditioning of the escape response.

C. Applications of Operant Conditioning

1. A **token economy** is a system of behavior modification based on the systematic reinforcement of target behavior. The reinforcers are symbols that can be exchanged for other reinforcers. In token economies, **secondary reinforcers** are neutral objects that can be traded for primary reinforcers, which are naturally pleasurable.
2. **Shaping** is a conditioning paradigm used primarily in the experimental analysis of behavior. The method used is differential reinforcement of successive approximations.
3. **Chaining** involves reinforcing individual responses occurring in a sequence to form a complex behavior.
4. **Premack's principle**, or the relativity theory of reinforcement, states that more probable behaviors will reinforce less probable behaviors.
5. Observing pigeons behaving ritualistically in an attempt to receive food from a dispenser, Skinner believed that the pigeons were trying to influence their feeding schedule by performing these actions, exhibiting **superstitious behavior**.
6. **Applied behavior analysis** is defined as the process of systematically applying interventions based upon the principles of learning theory to improve socially significant behaviors, and to demonstrate that the interventions are effective.

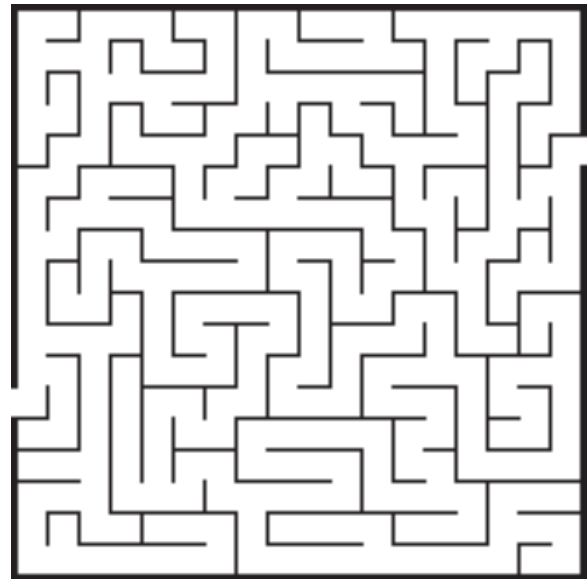
IV. Cognitive Models of Learning



Robert Woodworth

1. The primary tenet of **methodological behaviorism**, as expressed in the writings of John B. Watson and others, is that psychology should have only concerned itself with observable events. From Watson's perspective, thinking and emotion lay outside the domain of scientific psychology.
2. Robert Woodworth introduced and popularized the expression **Stimulus-Organism-Response** (S-O-R) to describe his functionalist approach to psychology and to stress its difference from the strictly Stimulus-Response (S-R) approach of the behaviorists.
3. **Cognitive conditioning** is the phenomenon whereby a subject's interpretation of the situation affects their conditioning.
4. **Latent learning** is a form of learning that is not immediately expressed in an overt response. It occurs without any obvious reinforcement of the behavior or associations that are learned. The phenomenon presents a challenge to the view that reinforcement is necessary for learning to occur.

In a classic study by Edward C. Tolman, three groups of rats were placed in mazes and their behavior observed each day for more than two weeks. The rats in Group 1 always found food at the end of the maze; the rats in Group 2 never found food; and the rats in Group 3 found no food for 10 days, but then received food on the eleventh. The Group 1 rats quickly learned to rush to the end of the maze; Group 2 rats wandered in the maze but did not preferentially go to the end. Group 3 acted the same as the Group 2 rats until food was introduced on Day 11; then they quickly learned to run to the end of the maze and did as well as the Group 1 rats by the next day. This showed that the Group 3 rats had learned about the organisation of the maze, but without the reinforcement of food.

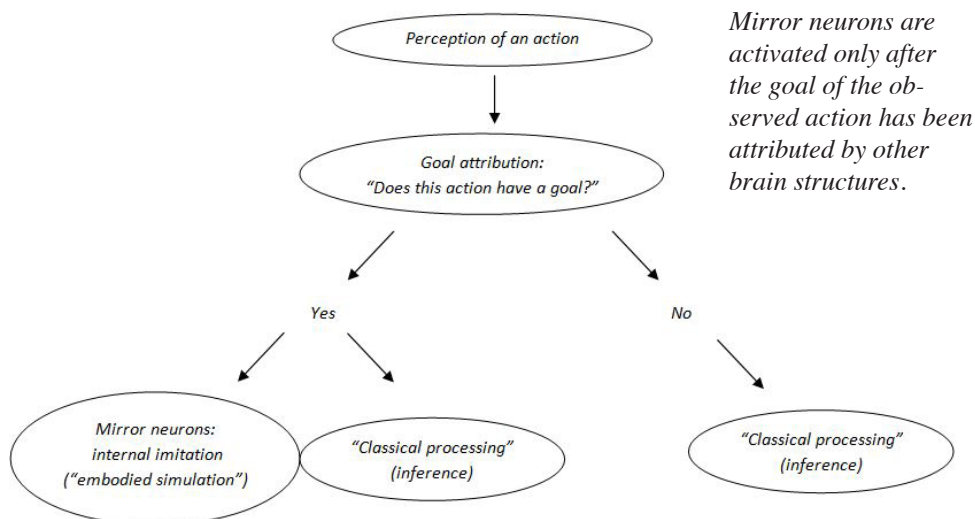


5. **Preparedness** is a concept developed to explain why certain associations are learned more readily than others. For example, phobias related to survival, such as snakes, spiders, and heights, are much more common and much easier to induce in the laboratory than other kinds of fears.
6. A **cognitive map** is a type of mental representation which serves an individual to acquire, code, store, recall, and decode information about the relative locations and attributes of phenomena in their everyday or metaphorical spatial environment.
7. **Observational learning** is learning that occurs through observing the behavior of others. It is a form of social learning which takes various forms, based on various processes.



Neonatal (newborn) macaque imitating facial expressions.

- a. **Albert Bandura** is known as the originator of social learning theory and the theoretical construct of self-efficacy.
- b. A **mirror neuron** is a neuron that fires both when an animal acts and when the animal observes the same action performed by another.



8. **Insight Learning.** In his book *The Mentality of Apes* (1917) Wolfgang Khler described observations of chimps using sticks to retrieve bananas outside of their cages. He concluded that their problem-solving method was not arrived at by trial-and-error but rather that the chimps had learned the method through **insight**.

V. Interplay of Instinct with Learning

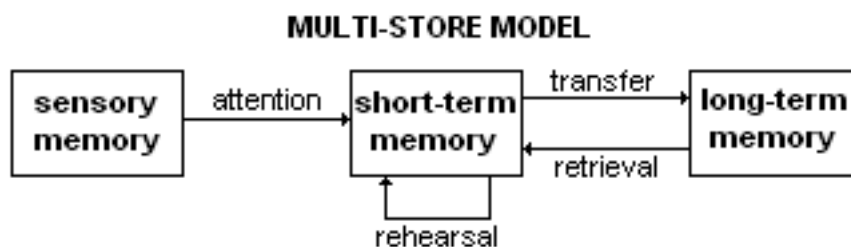
1. **Conditioned taste aversion** occurs when an animal associates the taste of a certain food with symptoms caused by a toxic, spoiled, or poisonous substance.
2. **Sauce-Bernaise syndrome** refers to a conditioned taste aversion that sometimes occurs when the associated sickness was merely coincidental and not related to the substance that caused the sickness.
3. **Instinctive drift** is the tendency of an animal to revert to instinctive behaviors that interfere with a conditioned response.

5

Memory

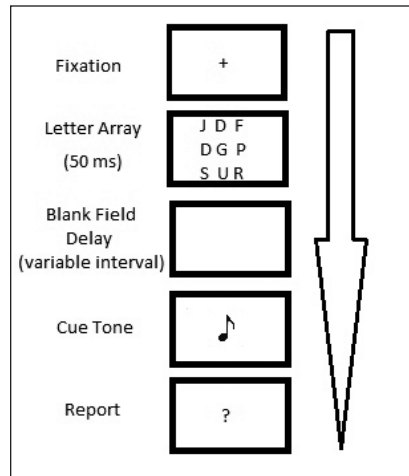
I. Memory

1. **Memory** is the process in which information is encoded, stored, and retrieved.
2. A **field memory** is a memory recollected in the original perspective, from a first-person point of view.
3. An **observer memory** is a memory recollected from a perspective outside ourselves, a third-person point of view.
4. **Span** describes how much information a memory system can retain.
5. **Decay** describes the fading of information from memory.
6. **Duration** refers to the length of time for which a memory system can retain information.



II. Types of Memory

1. Sensory information taken in by sensory receptors and processed by the nervous system is briefly stored in **sensory memory** before it is passed to short-term memory.
2. **Iconic memory** is the visual sensory memory register pertaining to the visual domain and a fast-decaying store of visual information.



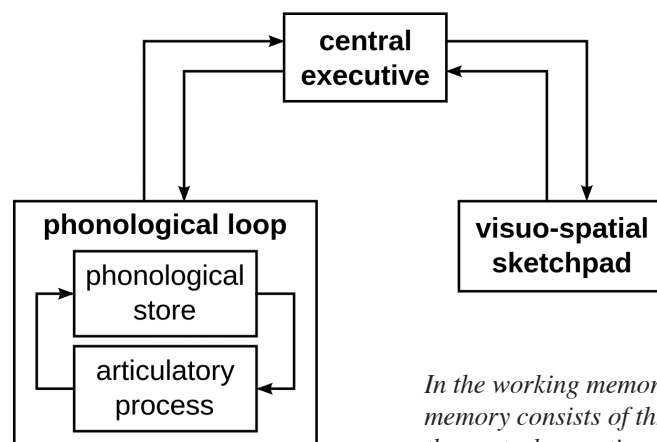
The partial report condition required participants to identify a subset of the characters from the visual display using cued recall. This type of sampling revealed that immediately after stimulus offset most letters of the entire visual display was accessible to memory through the iconic memory system.

3. George Sperling demonstrated iconic memory using the **method of partial report** which involved delivering a request to access and report on a section of an image impression 250 milliseconds after the image flash disappeared.

4. **Echoic memory** is one of the sensory memory registers; a component of sensory memory that is specific to retaining auditory information.

5. **Short-term memory** is the capacity for holding a small amount of information in mind in an active, readily available state for a short period of time believed to be in the order of seconds.

6. **Working memory** is responsible for the transient holding and processing of new and already-stored information, and is an important process for reasoning, comprehension, learning and memory updating. It is often used synonymously with short-term memory, but the two concepts are different. The 'Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information' one of the most highly cited papers in psychology, is often interpreted to argue that the number of objects an average human can hold in working memory is 7 ± 2 , frequently referred to as **Miller's Law**.



In the working memory model, working memory consists of three basic stores: the central executive, the phonological loop and the visuo-spatial sketchpad.

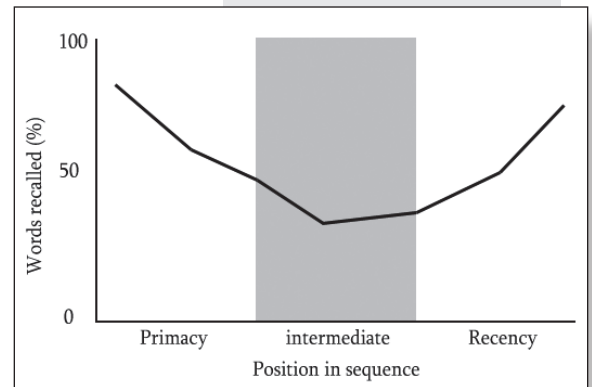
7. **Free recall** is a basic paradigm in the psychological study of memory in which participants study a list of items on each trial, and then are prompted to recall the items in any order. Items are usually presented one at a time for a short duration.

a. The **primacy effect** is a cognitive bias that results in a subject recalling primary information presented better than information presented later on. For example, a subject who reads a sufficiently long list of words is more likely to remember words toward the beginning than words in the middle.

b. The **recency effect** is a cognitive bias that results in a subject recalling information presented more recently better than information presented earlier.

c. **Serial position effect** is the tendency to recall the first and last items in a series best, and the middle items worst.

d. The **Von Restorff effect** predicts that an item that 'stands out like a sore thumb' (called distinctive encoding) is more likely to be remembered than other items. It is a bias in favor of remembering the unusual.



A graph demonstrating the serial position effect

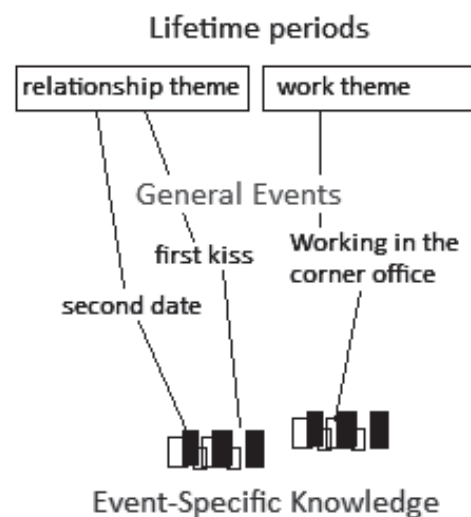
8. **Chunking** is a phenomenon whereby individuals group responses when performing a memory task, forming clusters of responses based on the items' semantic relatedness or perceptual features.

9. **Rehearsal** is a term for the role of repetition in the retention of memories. It involves repeating information over and over in order to get the information processed and stored as a memory. **Maintenance rehearsal** involves repeating information without thinking about its meaning or connecting it to other information. While useful in maintaining information in short term memory or working memory, it is not an effective way of transferring the information into long term memory.

10. The **levels-of-processing effect** describes memory recall of stimuli as a function of the depth of mental processing. Deeper levels of analysis produce more elaborate, longer lasting, and stronger memory traces than shallow levels of analysis.

11. **Long-term memory** is the final stage of the dual memory model proposed by Atkinson and Shiffrin, in which data can be stored for long periods of time. **Permastore** is a type of long-term memory that appears to be permanent.
12. **Explicit memory** is the conscious, intentional recollection of previous experiences and information.
 - a. **Episodic memory** is the memory of autobiographical events that can be explicitly stated. It is the type of explicit memory involving the collection of past personal experiences that occurred at a particular time and place.
 - b. **Semantic memory** is the type of explicit memory that refers to general world knowledge that we have accumulated throughout our lives. This general knowledge (facts, ideas, meaning and concepts) is intertwined in experience and dependent on culture.
 - c. **Autobiographical memory** is a memory system consisting of episodes recollected from an individual's life, based on a combination of episodic and semantic memory.

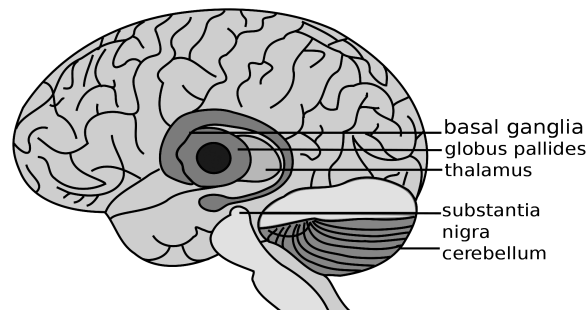
Autobiographical Memory Base



The autobiographical knowledge base contains knowledge of the self, used to provide information on what the self is, what the self was, and what the self can be. This information is categorized into three broad areas: lifetime periods, general events, and event-specific knowledge.

13. **Implicit memory** is a type of memory in which previous experiences aid the performance of a task without conscious awareness of these previous experiences.
- a. **Priming** is an implicit memory effect in which exposure to one stimulus influences the response to another stimulus.
 - b. The **word stem completion** task is a verbal test of perceptual implicit memory. In this task a participant is presented with the first few letters of a word and asked to complete the word with the first word that they can think of.
 - c. **Procedural memory** is a type of implicit memory. It is the memory for the performance of particular types of action.

Basal Ganglia and Related Structures of the Brain



Structure of the basal ganglia, including thalamus, globus pallidus, substantia nigra, and cerebellum. The dorsolateral striatum is associated with the acquisition of habits and is the main neuronal cell nucleus linked to procedural memory.

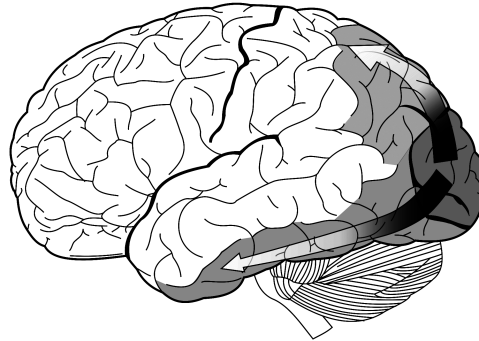
III. The Stages of Memory

1. **Controlled processing** describes cognitive processing requiring us to pay attention and deliberately put in effort.
2. **Automatic processing** is cognitive processing that occurs without conscious awareness or expenditure of effort.

A. Encoding

The first stage of memory is **encoding**, which allows the perceived item of use or interest to be converted into a construct that can be stored within the brain. It is the process of getting information into our memory banks.

1. **Visual encoding** is the process of encoding images and visual sensory information. Visual sensory information is temporarily stored within our iconic memory and working memory before being encoded into permanent long-term storage.



Dorsal and ventral streams in the human brain visual system.

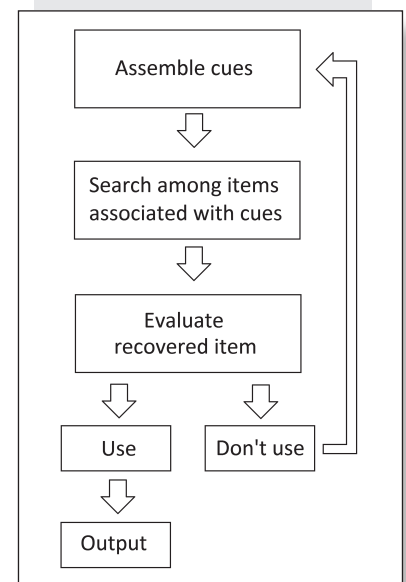
2. **Acoustic encoding** is the encoding of auditory impulses.
3. **Semantic encoding** is the processing and encoding of sensory input that has particular meaning or can be applied to a context. Various strategies can be applied such as chunking and mnemonics to aid in encoding, and in some cases, allow deep processing, and optimizing retrieval.
4. The **self-reference effect** is a tendency for people to encode information differently depending on the level on which the self is implicated in the information.
5. **State-dependent memory** is the phenomenon through which memory retrieval is most efficient when an individual is in the same state of consciousness as they were when the memory was formed.
6. **Memory strategies**
 - a. **Distributed practice** is a learning strategy, where practice is broken up into a number of short sessions - over a longer period of time. Humans and animals learn items in a list more effectively when they are studied in several sessions spread out over a long period of time.
 - b. **Massed practice** consists of a few, long training sessions. It is generally a less effective method of learning than distributed practice.

- c. **Elaborative rehearsal** is a type of memory rehearsal that is useful in transferring information into long term memory. This type of rehearsal is effective because it involves thinking about the meaning of the information and connecting it to other information already stored in memory.
- d. **Paired-associate tasks** are employed in systems of learning in which items (such as words, letters, numbers, symbols etc.) are matched so that presentation of one member of the pair will cue the recall of the other member.
- e. A **mnemonic** is any learning technique that aids information retention in the human memory.
- f. The **method of loci**, also called the memory palace or mind palace technique, is a mnemonic device which uses visualization, often of an architectural or geographical nature, to organize and recall information.

B. Storage is the process of keeping information in memory.

C. Retrieval refers to the reactivation or reconstruction of events or information from our memory stores.

1. In the process of memory retrieval, **recall** refers to the generation of previously remembered events or information.
2. **Recognition** involves selecting previously remembered information from a set of objects.
3. The **Austin Simonson theory** states that the process of recall begins with a search and retrieval process, and then a decision or recognition process where the correct information is chosen from what has been retrieved.
4. The **theory of encoding specificity** describes how the memory utilizes information from the memory trace, or the situation in which it was learned, and from the environment in which it is retrieved. Memory is improved when information available at encoding is also available at retrieval.
5. **Context-dependent memory** refers to improved recall of specific episodes or information when the context present at encoding and retrieval are the same.

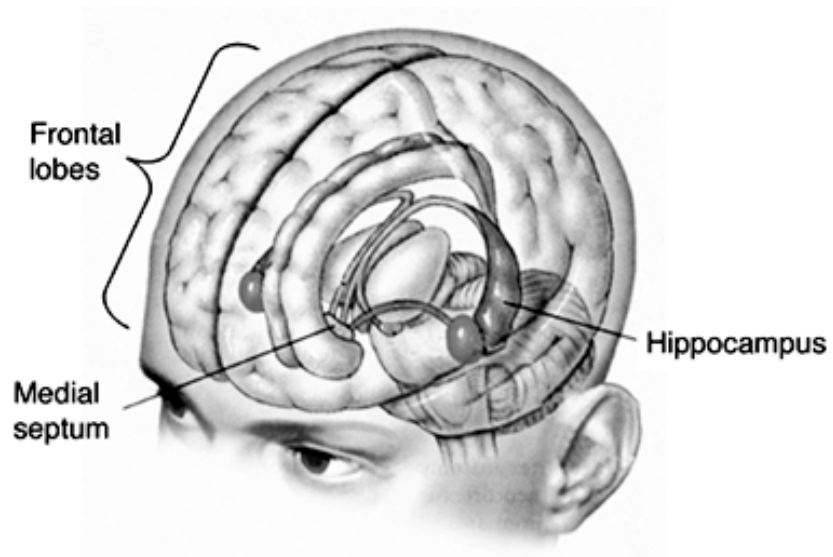


Austin Simonson theory of memory recall.

6. **Relearning** refers to the reacquisition of knowledge that had been previously learned but largely forgotten over time. Learning occurs much more rapidly the second time.
7. **Spreading activation** is a method for searching associative networks, neural networks, or semantic networks. The search process is initiated by labeling a set of source nodes and then iteratively propagating that activation out to other nodes linked to the source nodes.
8. The **tip-of-the-tongue phenomenon** is the failure to retrieve a word from memory, combined with partial recall and the feeling that retrieval is imminent.

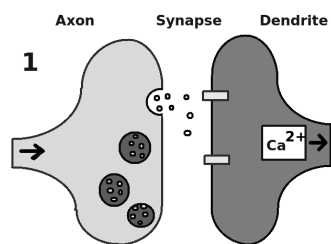
IV. Neurobiology of Memory

1. The **hippocampus** belongs to the limbic system and plays important roles in the consolidation of information from short-term memory to long-term memory and spatial navigation.

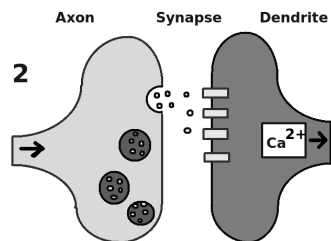


The hippocampus has long been considered the central hub of all memory, and therefore responsible for a large majority of learning. Located in the ventral-medial temporal area of the brain, its importance regarding the consolidation of new memories, and thus the learning of new things, was demonstrated by the infamous case of HM (patient), a man who had both medial temporal regions of his brain removed. This resulted in his inability to form new long-term memories.

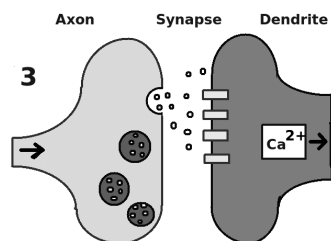
2. **Engrams** are means by which memory traces are stored in the brain in response to external stimuli. They are sometimes thought of as neural networks and sometimes conceptualized using a hologram analogy in light of results showing that specific memories appear not to be localized.
3. **Long-term potentiation** is a persistent strengthening of synapses based on recent patterns of activity. These are patterns of synaptic activity that produce a long-lasting increase in signal transmission between two neurons.



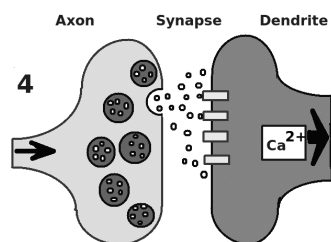
Long term potentiation: first stage. A synapse is repeatedly stimulated, sending neurotransmitters from the axon terminal (left) across the synapse to the dendrites of a second neuron (right).



Second stage. More receptors are found on the dendrite.



Third stage. More neurotransmitters are produced.



A stronger link between neurons.

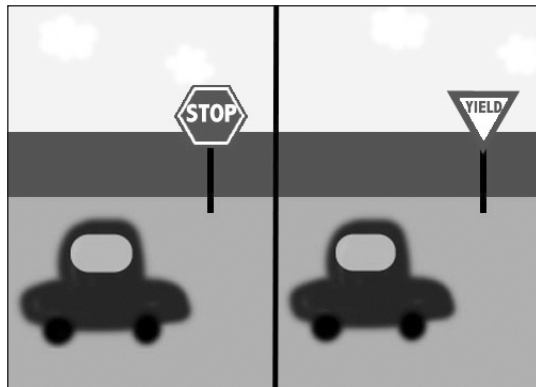
4. **Memory consolidation** is the category of processes that stabilize a memory trace after its initial acquisition.
 - a. The initial process of memory consolidation, **synaptic consolidation**, occurs within the first few hours after learning. This involves the strengthening of synapses based on recent patterns of activity and is a form of long-term potentiation.
 - b. **Systems consolidation** is the process of memory consolidation through which hippocampus-dependent memories become independent of the hippocampus over a period of weeks to years.
5. A type of memory process which is amenable to detailed cellular analysis with certain animal models, **sensitization** is a non-associative learning process in which repeated administrations of a stimulus results in the progressive amplification of a response.

V. Memory Problems and Disorders

1. **Interference** refers to the loss of information from memory because of competition from additional incoming information.
2. **Retroactive inhibition** refers to interference with retention of old information due to acquisition of new information.
3. **Proactive inhibition** refers to interference with retention of new information due to retention of previous information.
4. **Amnesia** is a deficit in memory caused by brain damage, disease, or psychological trauma.
 - a. **Retrograde amnesia** is a loss of memory-access to events that occurred, or information that was learned, before an injury or the onset of a disease.
 - b. **Anterograde amnesia** is a loss of the ability to create new memories after the event that caused the amnesia, leading to a partial or complete inability to recall the recent past, while long-term memories from before the event remain intact.
5. **Agnosia** is the inability to process sensory information. Often there is a loss of ability to recognize objects, persons,

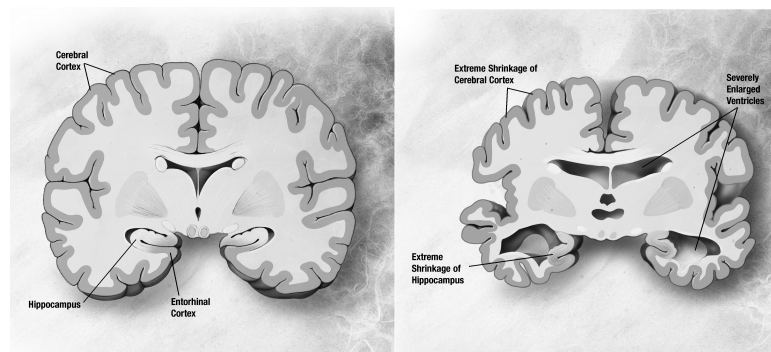
sounds, shapes, or smells while the specific sense is not defective nor is there any significant memory loss.

6. **Source amnesia** is the inability to remember where, when or how previously learned information has been acquired, while retaining the factual knowledge.
7. A **source-monitoring error** is a type of memory error where a specific recollected experience is incorrectly determined to be the source of a memory.
8. **False memory syndrome** describes a condition in which a person's identity and relationships are affected by memories that are factually incorrect but that they strongly believe.
9. A **flashbulb memory** is a highly detailed, exceptionally vivid snapshot of the moment and circumstances in which a piece of surprising and consequential (or emotionally arousing) news was heard.
10. **Cryptomnesia** occurs when a forgotten memory returns without it being recognized as such by the subject, who believes it is something new and original.
11. The **misinformation effect** happens when a person's recall of episodic memories becomes less accurate because of post-event information.



Loftus, Miller, and Burns (1978) conducted the original misinformation effect study. Participants were shown a series of slides, one of which featured a car stopping in front of a stop sign. After viewing the slides, participants read a description of what they saw. Some of the participants were given descriptions that contained misinformation, which stated that the car stopped at a yield sign. Following the slides and the reading of the description, participants were tested on what they saw. The results revealed that participants who were exposed to such misinformation were more likely to report seeing a yield sign than participants who were not misinformed.

12. **Confabulation** is a memory disturbance, defined as the production of fabricated, distorted or misinterpreted memories about oneself or the world, without the conscious intention to deceive.
13. **Suggestibility** is the quality of being inclined to accept and act on the suggestions of others. A person experiencing intense emotions tends to be more receptive to ideas and therefore more suggestible.
14. **Absent-mindedness** is where a person shows inattentive or forgetful behaviour. It can have various causes including a low level of attention, intense attention to a single object of focus (hyperfocus), or unwarranted distraction of attention.
15. **Dementia**, also known as senility, is a broad category of brain diseases that cause a long term and often gradual decrease in the ability to think and remember that is great enough to affect a person's daily functioning.
16. **Alzheimer's disease** accounts for 60% to 70% of cases of dementia. It is a chronic neurodegenerative disease that usually starts slowly and gets worse over time.



Comparison of a normal aged brain (left) and the brain of a person with Alzheimer's (right).

- a. **Neurofibrillary tangles** are aggregates of hyperphosphorylated tau protein that are most commonly known as a primary marker of Alzheimer's Disease.
- b. **Amyloid beta** denotes peptides of 36–43 amino acids that are crucially involved in Alzheimer's disease as the main component of the amyloid plaques found in the brains of Alzheimer patients.
- c. **Sundowning** is a psychological phenomenon associated with increased confusion and restlessness in patients with some form of dementia.

17. **Parkinson's disease** is a degenerative disorder of the central nervous system mainly affecting the motor system. Dementia commonly occurs in the advanced stages of the disease.



*Front and side views of a man portrayed to be suffering from Parkinson's disease. These are woodcut reproductions (of two collotypes from Paul de Saint-Leger's 1879 doctoral thesis, *Paralysie agitante*.. etc.)*

18. **Korsakoff's syndrome** is a neurological disorder caused by a lack of thiamine (vitamin B1) in the brain. It is also often exacerbated by the neurotoxic effects of alcohol.

6

Cognition

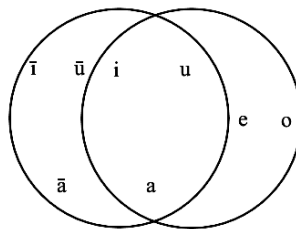
Cognition is the set of all mental abilities and processes related to knowledge, attention, memory and working memory, judgment and evaluation, reasoning and computation, problem solving and decision making, comprehension and production of language, etc.

The **information processing theory** approach to the study of cognitive development evolved out of the American experimental tradition in psychology. The theory is based on the idea that humans process the information they receive, rather than merely responding to stimuli.

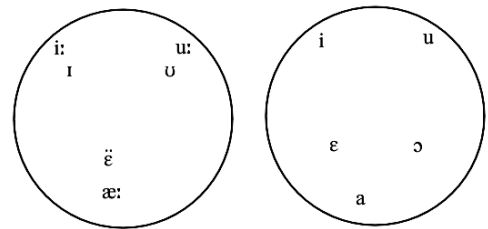
I. Language

A. Features of Language

1. **Phonology** is a branch of linguistics concerned with the systematic organization of sounds in languages.



*The vowels of modern (Standard) Arabic and (Israeli) Hebrew from the **phonemic** point of view. Note the intersection of the two circles—the distinction between short *a*, *i* and *u* is made by both speakers, but Arabic lacks the mid articulation of short vowels, while Hebrew lacks the distinction of vowel length.*



*The vowels of modern (Standard) Arabic and (Israeli) Hebrew from the **phonetic** point of view. Note that the two circles are totally separate—none of the vowel-sounds made by speakers of one language is made by speakers of the other.*

2. A **phoneme** includes all the speech sounds or gestures that share the same signifier for the phonology of a particular language.

3. **Categorical perception** is the experience of percept invariances in sensory phenomena. Multiple views of a face, for example, are mapped onto a common identity and distinct speech tokens are identified as belonging to the same phonetically distinct and separate percept.
4. A **morpheme** is the smallest grammatical unit in a language. In other words, it is the smallest meaningful unit of a language.
5. **Morphology** is the identification, analysis and description of the structure of the morphemes of a given language and other linguistic units, such as root words, affixes, parts of speech, intonations and stresses, or implied context.
6. **Semantics** is the study of meaning. It focuses on the relation between signifiers, like words, phrases, signs, and symbols, and what they stand for; their denotation.
7. **Syntax** is the set of rules, principles, and processes that govern the structure of sentences in a given language.
8. **Pragmatics** is a subfield of linguistics and semiotics that studies the ways in which context contributes to meaning.
9. **Prosody** is concerned with those elements of speech that are not individual vowels and consonants but are properties of syllables and larger units of speech. These contribute to such linguistic functions as intonation, tone, stress, and rhythm.
10. A **dialect** is a variety of a language that is a characteristic of a particular group of the language's speakers.
11. An **onomatopoeia** is a word that phonetically imitates, resembles or suggests the source of the sound that it describes.
12. **Phonesthemes** are similar sounding words that have related meanings.

B. Language Acquisition

1. **Babbling** is a stage in child development and a state in language acquisition, during which an infant appears to be experimenting with uttering articulate sounds, but not yet producing any recognizable words.



Babies begin babbling around 5-7 months of age

2. **Holophrasis** is the prelinguistic use of a single word to express a complex idea.
3. **Cryptophasia** is a phenomenon of a language developed by twins (identical or fraternal) that only the two children can understand.
4. The **generative principle** reflects the human capacity to generate an infinite number of phrases and sentences from a finite grammatical or linguistic competence.
5. The **nativist account** of language acquisition theorizes that children are born knowing how language works. The **Language Acquisition Device** is a hypothetical module of the human mind posited to account for children's innate predisposition for language acquisition. It was first proposed by Noam Chomsky in the 1960s.
6. The **social-pragmatics account** of language acquisition theorizes that children acquire linguistic capabilities through context and social interaction.
7. **Emergentism** posits that language acquisition is a cognitive process that emerges from the interaction of biological pressures and the environment. According to these theories, neither nature nor nurture alone is sufficient to trigger language learning.
8. **Metalinguistic awareness** refers to the ability to objectify language as a process as well as an artifact.

C. Language and Thought

1. **Covert speech** is thinking in the form of sound - 'hearing' one's own voice silently to oneself, without the intentional movement of any extremities such as the lips, tongue, or hands.
2. **Linguistic determinism** is the idea that language and its structures limit and determine human knowledge or thought, as well as thought processes such as categorization, memory, and perception.
3. The principle of **linguistic relativity** holds that the structure of a language affects the ways in which its respective speakers conceptualize their world, i.e. their world view, or

otherwise influences their cognitive processes. The strong version of this principle is similar to linguistic determinism.

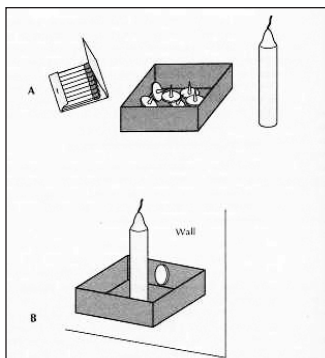
D. Reading

1. **Whole word recognition** is a literacy strategy that involves identifying words without having to sound them out.
2. **Phonetic decomposition** is a literacy strategy that involves sounding out words by drawing correspondences between printed letters and phonemes.

II. Thinking and Problem Solving

A. Problem solving refers to a state of desire for reaching a definite goal from a present condition that either is not directly moving toward the goal, is far from it, or needs more complex logic for finding a missing description of conditions or steps toward the goal.

1. A **mental set** refers to the phenomenon of becoming stuck on a specific problem-solving strategy, a type of rigidity that inhibits the ability to generate alternatives.
2. Rigidity refers to inability to modify concepts and attitudes once developed. A specific example of rigidity is **functional fixedness**, which is a difficulty conceiving new uses for familiar objects.
3. **Duncker's candle problem** is a classic cognitive performance test, measuring the influence of functional fixedness on a participant's problem solving capabilities.



Duncker's candle problem is a classic test for functional fixedness. The solution is to empty the box of thumbtacks, put the candle into the box, use the thumbtacks to nail the box (with the candle in it) to the wall, and light the candle with the match. The concept of functional fixedness predicts that the participant will only see the box as a device to hold the thumbtacks and not immediately perceive it as a separate and functional component available to be used in solving the task.

4. **Trial-and-error** is a fundamental method of solving problems. It is characterized by repeated, varied attempts which are continued until success, or until the agent stops trying.
5. **Deductive reasoning** is the process of reasoning from one or more statements (premises) to reach a logically certain conclusion.
6. **Inductive reasoning** is reasoning that derives general principles from specific observations.

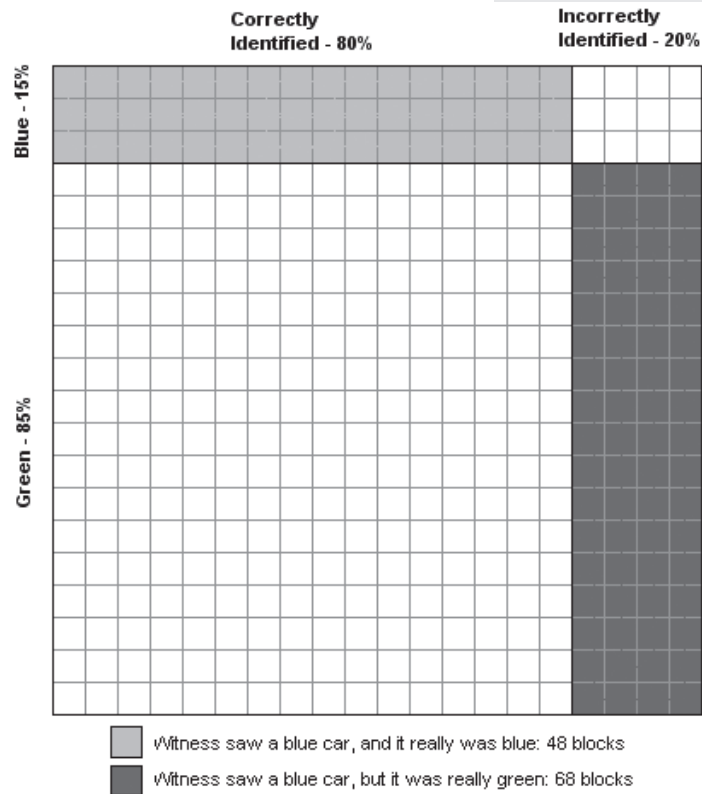
B. Cognitive Economy

1. **Cognitive miser** is an umbrella theory of social cognition that brings together previous research on heuristics and attributional biases. The theory suggests that humans find different ways to save time and effort when negotiating the social world.
2. A **heuristic** is any approach to problem solving, learning, or discovery that employs a practical method not guaranteed to be optimal or perfect, but sufficient for the immediate goals.
 - a. A **rule of thumb** is an easily learned and easily applied procedure for approximately calculating or recalling some value, or for making some determination.
 - b. The **representativeness heuristic** is used when making judgments about the probability of an event under uncertainty. It involves assessing similarity of objects and organizing them based around the category prototype.
 - c. **Base rate fallacy** refers to how the mind tends to focus on information pertaining to a certain case while ignoring how common a characteristic or behavior actually is in the general population.
 - d. The **availability heuristic** is a mental shortcut that relies on immediate examples that come to a given person's mind when evaluating a specific topic, concept, method or decision.

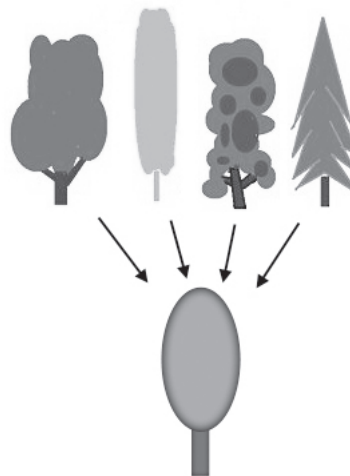
A classic demonstration of the problems that can occur through neglect of relevant base rates is the taxi-cab problem. A cab was involved in a hit and run accident at night. Two cab companies, the Green and the Blue, operate in the city. 85% of the cabs in the city are Green and 15% are Blue.

A witness identified the cab as Blue. The court tested the reliability of the witness under the same circumstances that existed on the night of the accident and concluded that the witness correctly identified each one of the two colors 80% of the time and failed 20% of the time.

What is the probability that the cab involved in the accident was Blue rather than Green knowing that this witness identified it as Blue?



3. **Categorization**, the act of grouping objects, actions, and characteristics, based on shared properties, is the process by which ideas and objects are recognized, differentiated, and understood.



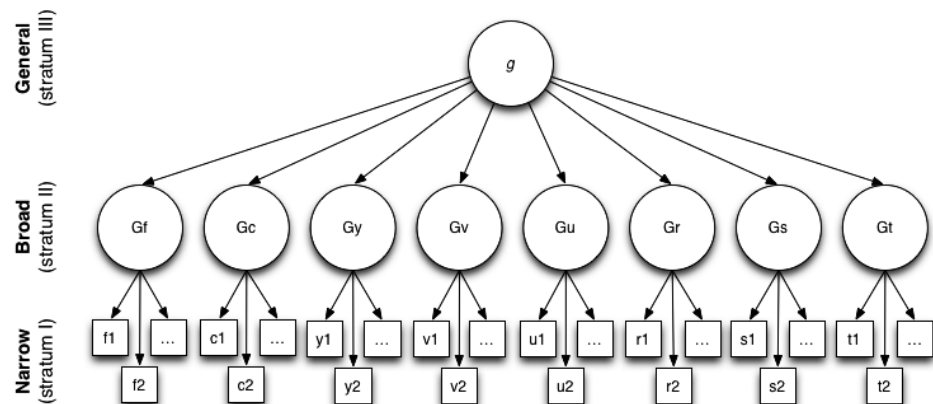
When the mind makes a generalization such as the concept of tree, it extracts similarities from numerous examples; the simplification enables higher-level thinking.

3. A **schema** describes an organized pattern of thought or behavior that organizes categories of information and the relationships among them. It can also be described as a framework representing some aspect of the world or a system of organizing and perceiving new information.
4. The **recognition-primed decision model** seeks to describe how people make quick, effective decisions. In this model, the decision maker generates a possible course of action, compares to constraints, and selects the first course of action that is not rejected.

III. Intelligence

A. Defining Intelligence

1. **Abstract thinking** is the ability to understand hypothetical concepts or derive general rules from subordinate concepts.
2. The **g factor** is a construct developed in psychometric investigations of cognitive abilities. It is a variable summarizing positive correlations among different cognitive tasks. The terms IQ or general intelligence are often used interchangeably to refer to this common core.



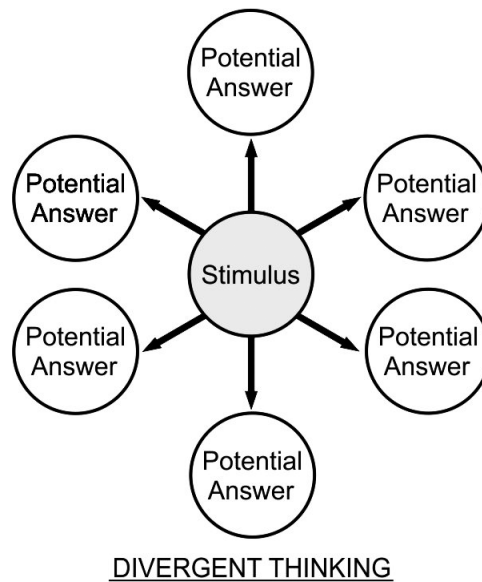
An illustration of John B. Carroll's three stratum theory, an influential contemporary model of cognitive abilities. The broad abilities recognized by the model are fluid intelligence (Gf), crystallized intelligence (Gc), general memory and learning (Gy), broad visual perception (Gv), broad auditory perception (Gu), broad retrieval ability (Gr), broad cognitive speediness (Gs), and processing speed (Gt). Carroll regarded the broad abilities as different "flavors" of g.

3. **Fluid intelligence** is the capacity to think logically and solve problems in novel situations, independent of acquired knowledge.
4. **Crystallized intelligence** is the ability to use skills, knowledge, and experience. It does not equate to memory, but it does rely on accessing information from long-term memory.
5. The **Theory of Multiple Intelligences** is a theory of intelligence that differentiates it into specific (primarily sensory) modalities, rather than seeing intelligence as dominated by a single general ability.

6. The **triarchic model of intelligence** proposed by Robert Sternberg categorizes intelligence into three parts: analytical, creative and practical.

7. **Divergent thinking** is a thought process or method used to generate creative ideas by exploring many possible solutions.

8. **Convergent thinking** generally means following a particular set of logical steps to arrive at one solution, reflecting the ability to give the correct answer to standard questions that do not require significant creativity.

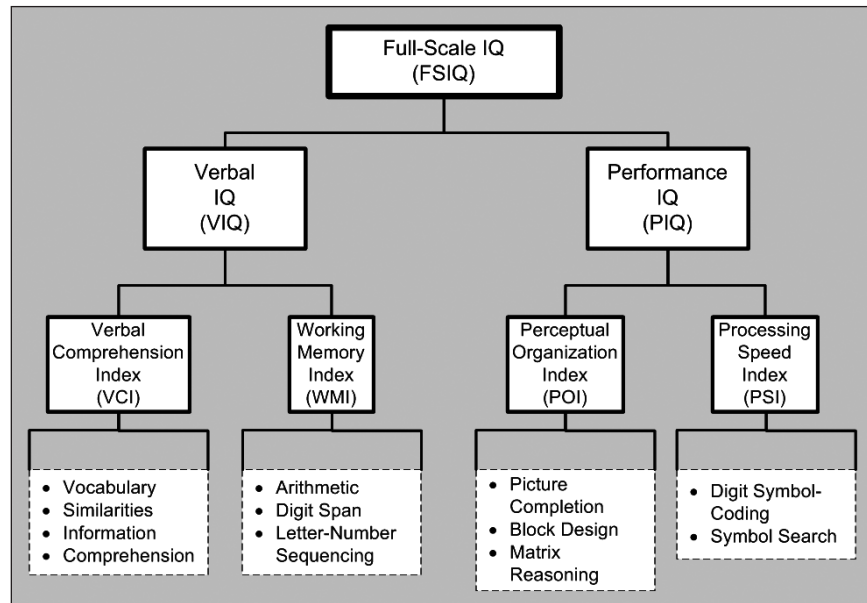


9. **Emotional intelligence** is a term used to describe the ability of an individual to recognize their own and other people's emotions, to discriminate between different feelings and label them appropriately, and to use emotional information to guide thinking and behavior.
10. **Wisdom** is the ability to think and act using knowledge, experience, understanding, common sense, and insight.

B. Intelligence Testing

1. **Mental age** is a concept related to intelligence. It looks at how a specific child, at a specific age--usually today, now--performs intellectually, compared to average intellectual performance for that physical age, measured in years.
2. The current scoring method for all IQ tests is the **deviation IQ**. In this method, an IQ score of 100 means that the test-taker's performance on the test is at the median level of performance. An IQ score of 115 means performance one standard deviation above the median.

3. The **Wechsler Adult Intelligence Scale (WAIS)** is a test designed to measure intelligence in adults and older adolescents.



Wechsler Adult Intelligence Scale subscores and subtests.

4. The **Stanford-Binet Intelligence Scale** is a cognitive ability and intelligence test that is used to diagnose developmental or intellectual deficiencies in young children. The test measures knowledge, quantitative reasoning, visual-spatial processing, working memory, and fluid reasoning.
5. The **Culture Fair Intelligence Test (CFIT)** is an attempt to produce a measure of cognitive abilities that accurately estimated intelligence devoid of sociocultural and environmental influences.
6. **Eugenics** is a set of beliefs and practices which aims at improving the genetic quality of the human population. Some of these practices are considered by many to be a violation of basic human rights, which include the right to reproduction.

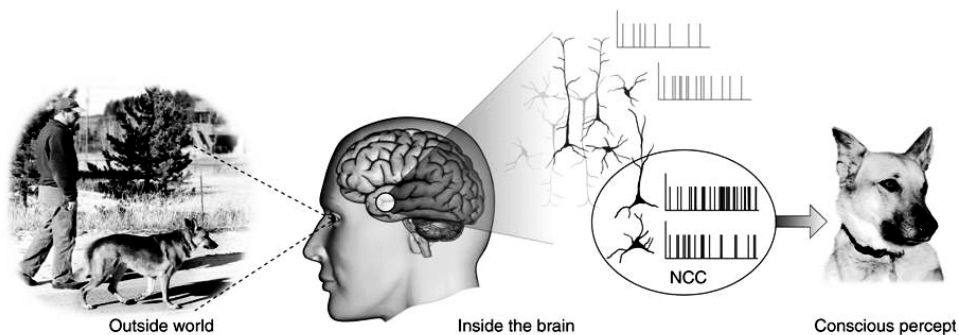
C. Influences on IQ

1. **Cumulative deficit** is an hypothesis concerning the cause of lower mental test scores of groups considered environmentally deprived, which seeks to quantify the adverse effects of economic and social deprivation on IQ.

2. The **Flynn effect** is the substantial and long-sustained increase in both fluid and crystallized intelligence test scores measured in many parts of the world from roughly 1930 to the present day.
3. **Test bias** is a form of systematic (i.e., non-random) error which leads to examinees from one demographic group having an unwarranted advantage over examinees from another demographic group.

IV. Consciousness

Consciousness is the state of awareness, or, of being aware of an external object or something within oneself. It has been defined as: sentience, awareness, subjectivity, the ability to experience or to feel, wakefulness, having a sense of selfhood, and the executive control system of the mind.



A major part of the scientific literature on consciousness consists of studies that examine the relationship between the experiences reported by subjects and the activity that simultaneously takes place in their brains—that is, studies of the neural correlates of consciousness.

A. Alertness and Attention

1. **Alertness** is the state of active attention by high sensory awareness such as being watchful and prompt to meet danger or emergency, or being quick to perceive and act.
2. The **reticular formation** is a set of interconnected nuclei located throughout the brainstem. It is not anatomically well defined. Its neurons play a crucial role in maintaining behavioral arousal and consciousness through modulatory and premotor functions.

3. A **sensorium** is the sum of an organism's perception, the 'seat of sensation' where it experiences and interprets the environments within which it lives.
4. **Attention** is the behavioral and cognitive process of selectively concentrating on a discrete aspect of information, whether deemed subjective or objective, while ignoring other perceivable information.
5. **Attentional control** refers to an individual's capacity to choose what they pay attention to and what they ignore. It is also known as endogenous attention or executive attention.

V. Sleep

1. A **circadian rhythm** is any biological process that displays an endogenous, entrainable oscillation of about 24 hours.

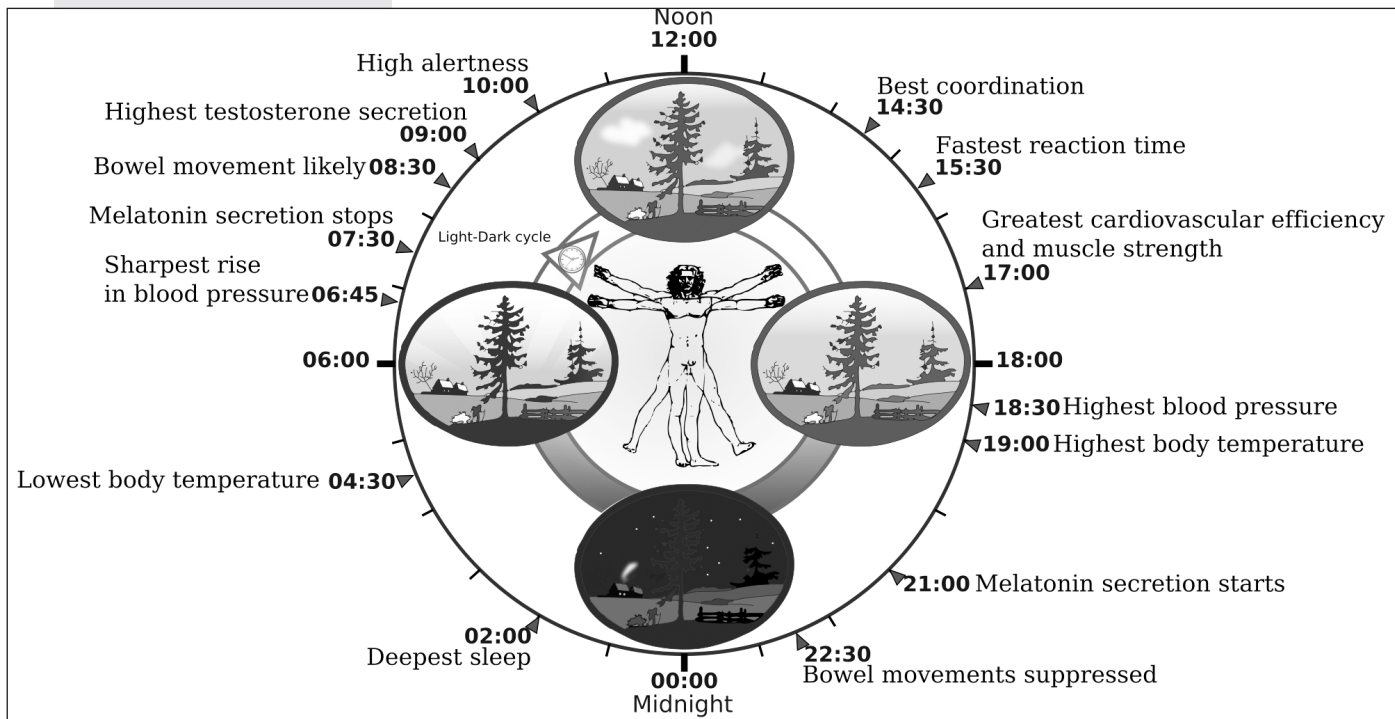
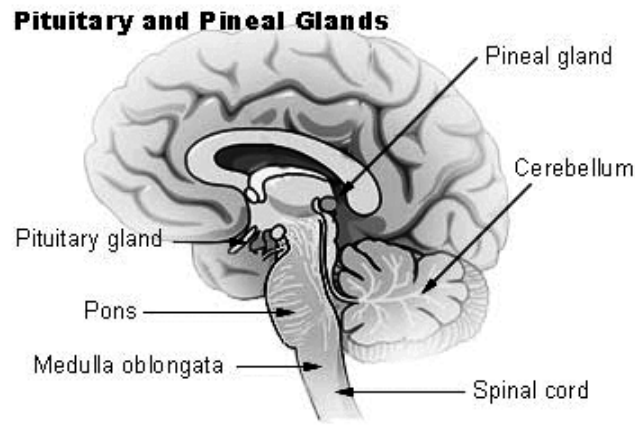


Diagram illustrating the influence of dark-light rhythms on circadian rhythms and related physiology and behavior.

2. The **suprachiasmatic nucleus** is a tiny region located in the hypothalamus, situated directly above the optic chiasm. It is responsible for controlling circadian rhythms.

3. The **pineal gland** is a small endocrine gland in the vertebrate brain. It produces melatonin, a serotonin derived hormone, which affects the modulation of sleep patterns in both seasonal and circadian rhythms.



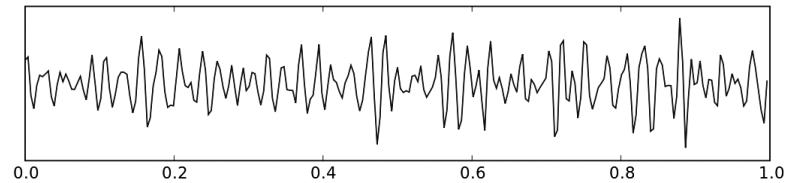
4. The hormone, **melatonin**, is involved in the entrainment (synchronization) of the circadian rhythms of physiological functions including sleep timing, blood pressure regulation, seasonal reproduction and many others.
5. In addition to melatonin, the amount of **cortisol** present in the blood undergoes diurnal variation; the level peaks in the early morning (approximately 8 a.m.) and reaches its lowest level at about midnight-4 a.m., or three to five hours after the onset of sleep.

A. Stages of Sleep

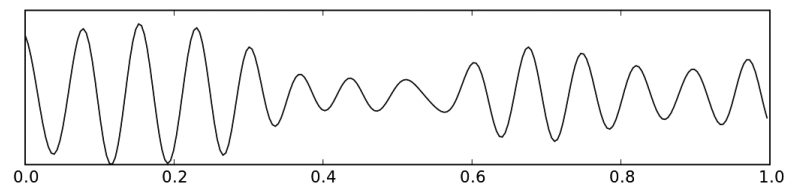
1. **Electroencephalography** is an electrophysiological monitoring method to record electrical activity of the brain, measuring voltage fluctuations resulting from ionic current within the neurons of the brain. It is typically noninvasive.
2. **Electrooculography** is a technique for measuring the corneo-retinal standing potential that exists between the front and the back of the human eye. Primary applications are in ophthalmological diagnosis and in recording eye movements.
3. **Electromyography** is an electrodiagnostic medicine technique for evaluating and recording the electrical activity produced by skeletal muscles.

4. **Neural oscillation** is rhythmic or repetitive neural activity in the central nervous system.

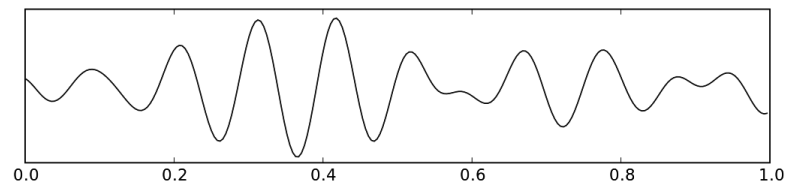
- a. A **gamma wave** (30-100 Hz) is a pattern of neural oscillation. These types of brain waves seem to be implicated in creating the unity of conscious perception (the binding problem) during conscious awake states and dreaming.



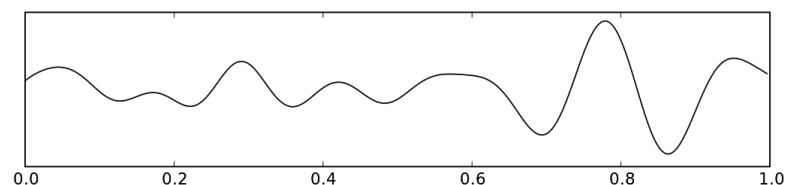
- b. Low amplitude **beta waves** (13-30 Hz) with multiple and varying frequencies are often associated with active, busy, or anxious thinking and active concentration.



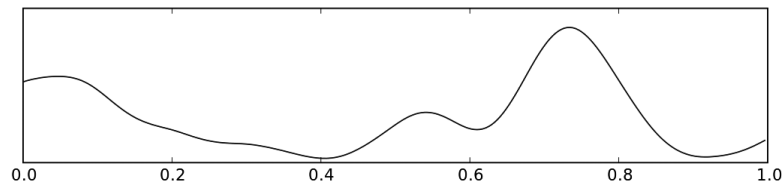
- c. **Alpha waves** (8-13 Hz) are a type of brain waves which predominantly originate from the occipital lobe during wakeful relaxation with closed eyes. These brain waves are reduced with open eyes, drowsiness and sleep.



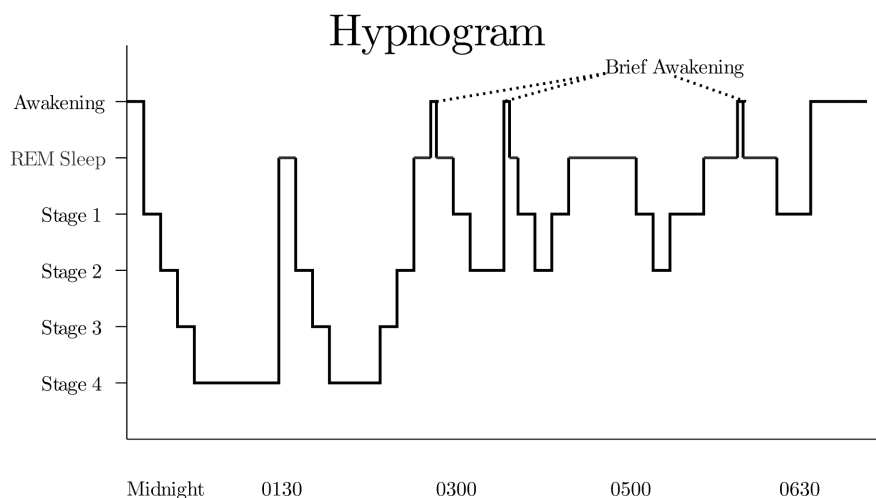
- d. Cortical **theta waves** (4-8 Hz) are observed frequently in young children. In older children and adults, they tend to appear during meditative, drowsy, or sleeping states, but not during the deepest stages of sleep.



- e. A **delta wave** (1-4 Hz) is a high amplitude, low frequency brain wave. These types of brain waves are usually associated with the deep stage 3 of non-REM sleep, also known as slow-wave sleep.



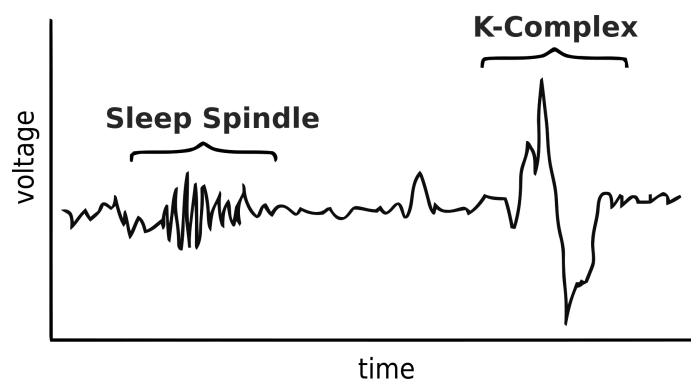
5. **Hypnagogia** is the experience of the transitional state from wakefulness to sleep.
6. **Non-REM sleep** is collectively sleep stages 1-3. There are distinct electroencephalographic wave patterns and other characteristics seen in each stage. There is usually little or no eye movement during these stages. Dreaming is rare and muscles are not paralyzed.



Hypnogram of sleep between midnight and 6.30 am

- a. **Stage 1 sleep** usually occurs between sleep and wakefulness, and sometimes between periods of deeper sleep and periods of REM. The brain transitions from alpha waves to theta waves. Sudden twitches and hypnic jerks may be associated sleep onset. Some people may also experience hypnagogic hallucinations during this stage.

- b. In **stage 2 sleep**, theta activity is observed and sleepers become gradually harder to awaken. The alpha waves of the previous stage are interrupted by abrupt activity called sleep spindles and K-complexes.
- c. A **sleep spindle** is a burst of oscillatory brain activity visible on an EEG that occurs during stage 2 sleep. It consists of 12-14 Hz waves generated in the reticular nucleus of the thalamus that occur for at least 0.5 seconds.
- d. **K-complexes** are EEG waveforms that occur during stage 2 of NREM sleep, the largest events in healthy human EEG. More frequent in the first sleep cycles, they are thought to suppress cortical arousal in response to stimuli evaluated not to signal danger and also to aid sleep-based memory consolidation.



Stylization of an EEG showing a sleep spindle and K-complex in stage 2 sleep.

- e. **Stage 3 sleep** is slow-wave, deep sleep. Consisting of delta activity, it is thought to be the most restful form of sleep in which the sleeper is less responsive to the environment. This is the stage in which night terrors, nocturnal enuresis, sleepwalking, and somniloquy occur.
7. During **REM sleep**, most muscles are paralyzed, and heart rate, breathing and body temperature become unregulated, and the sleeper may experience vivid dreams. Although exhibiting high-frequency EEG waves similar to a waking state, the sleeper is harder to arouse than at any other sleep stage.

- a. **REM rebound** is the lengthening and increasing frequency and depth of rapid eye movement (REM) sleep which occurs after periods of sleep deprivation.
- b. **REM behavior disorder** is a sleep disorder that involves abnormal behavior during the sleep phase with REM sleep. The major abnormal feature of this disorder is loss of muscle atonia during otherwise intact REM sleep.

B. Dream Theories

1. Sigmund Freud coined the term, **wish fulfillment**, in *The Interpretation of Dreams* (1900) to refer the satisfaction of a desire through an involuntary thought process in order to resolve a repressed conflict.
 - a. **Dreamwork** refers to Sigmund Freud's idea that a person's forbidden and repressed desires are distorted in dreams, so they appear in disguised forms.
 - b. In Freudian dream analysis, the **manifest content** is the information that the conscious individual remembers experiencing from a dream. It consists of the actual images, thoughts, and content within the dream that the individual is cognitively aware of upon awakening.
 - c. In Freudian dream analysis, the **latent content** of the dream illustrates the hidden meaning of one's unconscious thoughts, drives, and desires.
2. The **activation-synthesis theory** proposes that dreams result from brain activation during REM sleep. Dreaming is a state of the brain that is similar to yet different from waking consciousness. Interaction and correlation between the two is necessary for optimal performance from both.
3. **Problem-solving dream theory** of Deirdre Barrett describes dreaming as simply 'thinking in different biochemical state'. According to this theory we continue to work on all the same problems - personal and objective - in that state.
4. The **cognitive process dream theory** states that dreams are simply thoughts or sequences of thoughts that occur during sleep-states. Dreams express conceptions of self, family members, friends, and social environment.

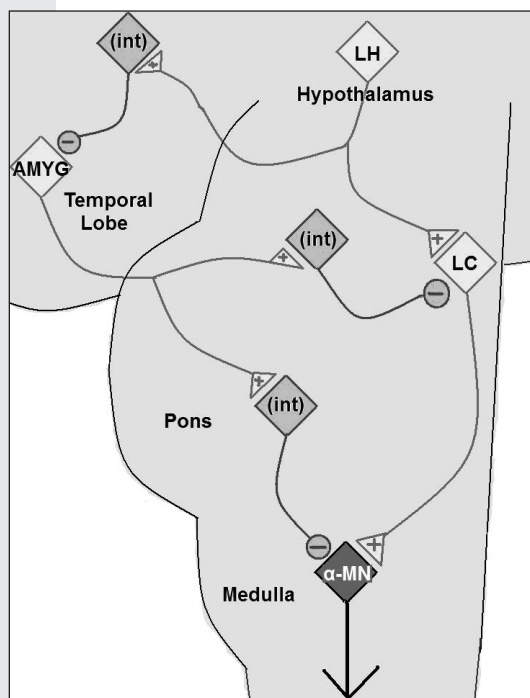


Deirdre Barrett

C. Sleep Disorders

1. **Dyssomnias** are a broad classification of sleeping disorders that make it difficult to get to sleep, or to remain sleeping.
2. **Parasomnias** are a category of sleep disorders that involve abnormal movements, behaviors, emotions, perceptions, and dreams that occur while falling asleep, sleeping, between sleep stages, or during arousal from sleep.
3. **Insomnia**, also known as trouble sleeping, is a sleep disorder in which there is an inability to fall asleep or to stay asleep as long as desired.
4. **Rebound insomnia** is the emergence or re-emergence of insomnia symptoms that were either absent or controlled while taking a medication, but appear when that same medication is discontinued, or reduced in dosage (at often a worse level of severity than pretreatment levels).
5. **Restless legs syndrome** is a neurological disorder characterized by an irresistible urge to move one's body to stop uncomfortable or odd sensations.
6. **Narcolepsy** is a chronic neurological disorder involving the loss of the brain's ability to regulate sleep-wake cycles normally. People with this condition experience frequent excessive daytime sleepiness.

In this simplified brain circuit, damage to orexin-secreting neurons in the hypothalamus can lead to inhibition of motor neurons, thus lowering muscle tone.



7. **Cataplexy** is a sudden and transient episode of muscle weakness accompanied by full conscious awareness, typically triggered by emotions such as laughing, crying, terror, etc. It is the cardinal symptom of narcolepsy.

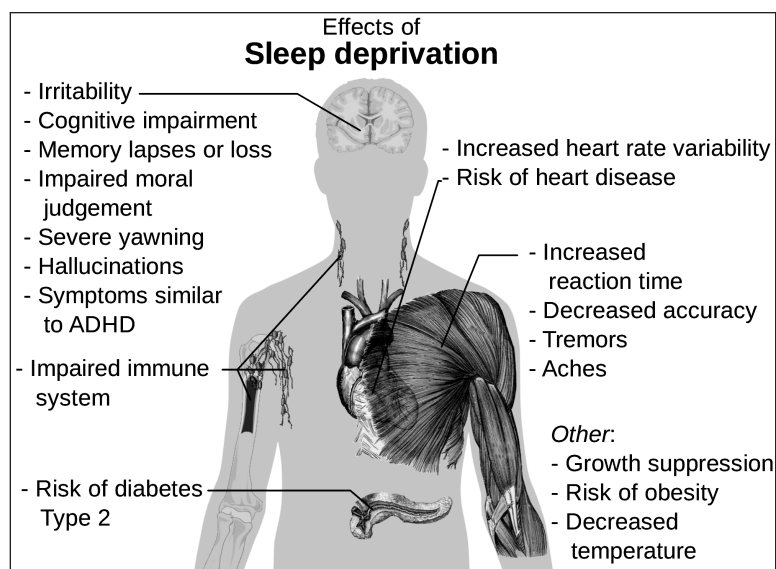
8. **Orexin**, also called hypocretin, is a neuropeptide that regulates arousal, wakefulness, and appetite. The most common form of narcolepsy is caused by a lack of this substance in the brain due to destruction of the cells that produce it.

9. **Sleep paralysis** is a phenomenon in which a person either during falling asleep or awakening, temporarily experiences an inability to move, speak, or react. One hypothesis is that it results from disrupted REM sleep, which normally induces complete muscle atonia.



Depiction of sleep paralysis perceived as a demonic visitation.

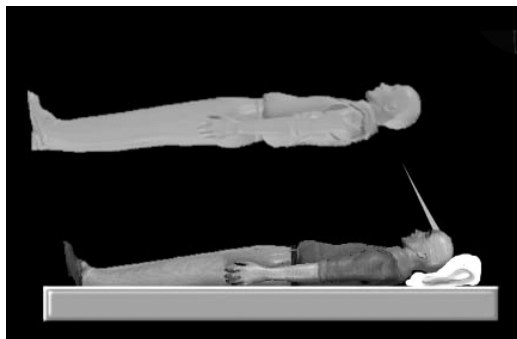
10. **Sleep apnea** is characterized by pauses in breathing or instances of shallow or infrequent breathing during sleep.
11. A **night terror** is a sleep disorder, causing feelings of terror or dread, and typically occurs during the first hours of stage 3 non-REM sleep. They tend to happen during periods of arousal from delta (slow-wave) sleep.
12. **Somnambulism** is a sleep disorder belonging to the parasomnia family. Sufferers arise from the slow wave sleep stage in a state of low consciousness and perform activities that are usually performed during a state of full consciousness.
13. **Sleep deprivation** is the condition of not having enough sleep. It can be either chronic or acute.



VI. Alterations of Consciousness

A. Hallucinations and Unusual Experiences

1. A **hallucination** is a perception in the absence of external stimulus that has qualities of real perception.
2. An **illusion** is a distortion of the senses, revealing how the brain normally organizes and interprets sensory stimulation.
3. A **pseudohallucination** is an involuntary sensory experience vivid enough to be regarded as a hallucination, but recognised by the patient not to be the result of external stimuli.
4. A type of dissociative experience arising from psychological and neurological factors, an **out-of-body** experience typically involves floating outside one's body and, in some cases, perceiving one's physical body from a place outside one's body.

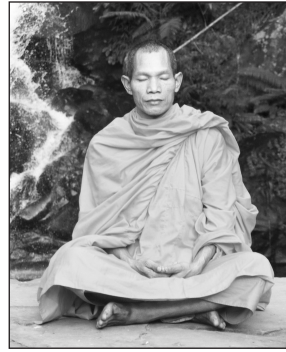


Artist's depiction of the separation stage of an out-of-body experience, which often precedes free movement.

5. A **near-death experience** is a personal experience associated with impending death, encompassing multiple possible sensations including detachment from the body and the presence of a light. Research from neuroscience considers the experience to be a hallucinatory state.
6. **Déjà vu** is the phenomenon of having the strong sensation that an event or experience currently being experienced, has already been experienced in the past, whether it has actually happened or not. Scientific approaches explain it as an anomaly of memory.

B. Meditation

Meditation is a practice in which an individual trains the mind or induces a mode of consciousness, either to realize some benefit or for the mind to simply acknowledge its content without becoming identified with that content, or as an end in itself.



*Buddhist monk
meditating*

1. In **concentrative meditation** a practitioner focuses intensively on one particular object.
2. In **mindfulness meditation**, the practitioner focuses on all mental events that enter the field of awareness.

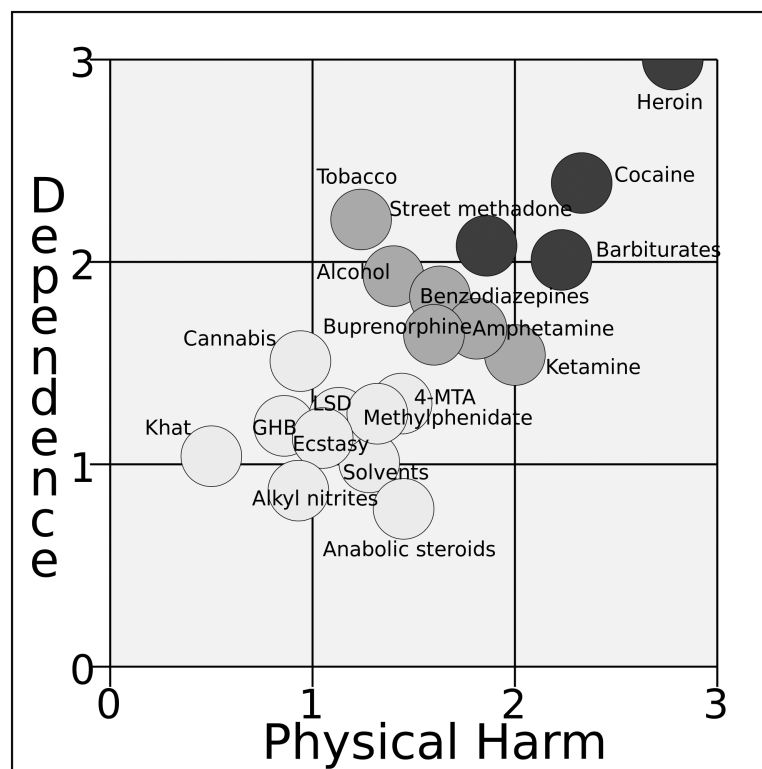
C. Hypnosis

Hypnosis is a state of human consciousness involving focused attention and reduced peripheral awareness and an enhanced capacity for response to suggestion.

1. **Hypnotic induction** is the process undertaken by a hypnotist to establish the state or conditions required for hypnosis to occur.
2. The **role theory of hypnosis** states that a hypnotized person is not actually in an alternate state of consciousness but is playing the role of being hypnotized, which includes complying with the instructions of the hypnotist.
3. The **state theory of hypnosis** describes hypnosis as an altered state of consciousness. According to this theory, real, significant changes in basic mental processes take place during hypnosis.
4. The **dissociation theory of hypnosis** contends that hypnosis is a splitting of the central control of thought processes and behavior with the hypnotized person agreeing to give some of the control to the hypnotist.
5. The American psychologist, Ernest Hilgard, was known for his theory that a so-called **hidden observer** is created in the mind while hypnosis is being induced, an idea in support of his neodissociationist theory of hypnotism.

D. Drugs and Consciousness

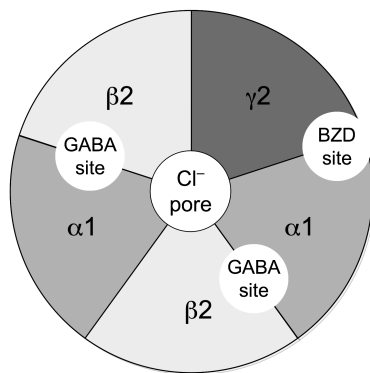
1. A **psychoactive drug** is a chemical substance that changes brain function and results in alterations in perception, mood, or consciousness.
2. **Drug tolerance** is a pharmacology concept where a subject's reaction to a specific drug and concentration of the drug is reduced followed repeated use, requiring an increase in concentration to achieve the desired effect.
3. **Drug withdrawal** is the group of symptoms that occur upon the abrupt discontinuation or decrease in intake of medications or recreational drugs.



A rational scale to assess the harm of drugs. Data source is the March 24, 2007 article: Nutt, David, Leslie A King, William Saulsbury, Colin Blakemore. "Development of a rational scale to assess the harm of drugs of potential misuse" The Lancet 2007; 369:1047-1053. (PMID 17382831; doi:10.1016/S0140-6736(07)60464-4) The data in the paper were obtained solely from questionnaire results obtained from two groups of people: the first comprised of people from the UK national group of consultant psychiatrists who were on the Royal College of Psychiatrists' register as specialists in addiction, while the second comprised of people with experience in one of the many areas of addiction, ranging from chemistry, pharmacology, and forensic science, through psychiatry and other medical specialties, including epidemiology, as well as the legal and police services.

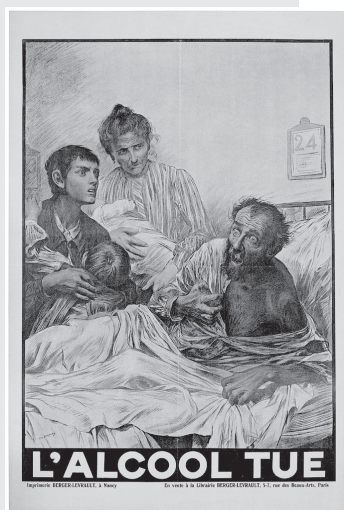
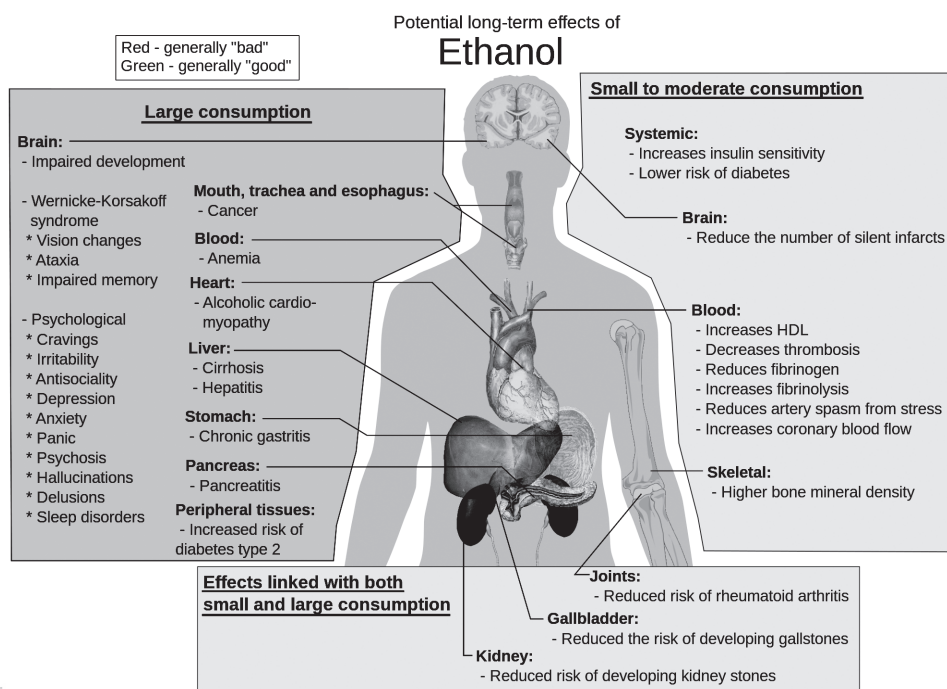
E. Depressant Drugs: Alcohol and Sedative-Hypnotics

1. A **sedative** or tranquilizer is a substance that induces a state of calm or sleep by reducing irritability or excitement.
2. A **hypnotic** is a type of psychoactive drugs whose primary function is to induce sleep. They are used in the treatment of insomnia (sleeplessness) or surgical anesthesia.
3. A **GABA receptor agonist** is a drug that binds one or more of the GABA receptors, producing typically sedative effects. A **GABA receptor positive allosteric modulator** is a type of drug that affects a subtype of GABA receptor by binding at a different site than the active site. Examples include ethanol, benzodiazepines, and the barbiturate drugs.



Schematic diagram of a GABA_A receptor protein (($\alpha 1$)₂($\beta 2$)₂($\gamma 2$)) which illustrates the five combined subunits that form the protein, the chloride (Cl⁻) ion channel pore, the two GABA active binding sites at the $\alpha 1$ and $\beta 2$ interfaces, and the benzodiazepine (BZD) allosteric binding site at the $\alpha 1$ and $\gamma 2$ interface.

4. An alcoholic beverage is a drink which contains a substantial amount of the psychoactive drug **ethanol**.
 - a. **Alcoholism**, also known as alcohol use disorder and alcohol dependence syndrome, is a broad term for any drinking of alcohol that results in problems.
 - b. **Alcohol myopia** is a cognitive-physiological theory on alcohol abuse in which many of alcohol's social and stress-reducing effects are explained as a consequence of alcohol's narrowing of perceptual and cognitive functioning.
 - c. **Wernicke-Korsakoff Syndrome** is a manifestation (separate or concurrent) of thiamine deficiency, encephalopathy, and psychosis. Usually secondary to alcohol abuse, it mainly causes vision changes, ataxia and impaired memory.

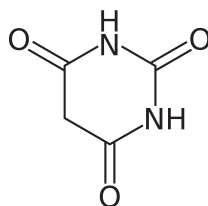


An alcoholic man with delirium tremens on his deathbed, surrounded by his terrified family.

d. **Delirium tremens** is a state of confusion of rapid onset usually caused by withdrawal from alcohol. Physical effects may include shakings, shivering, an irregular heart rate, and sweating. Occasionally a very high body temperature or seizures may result in death.

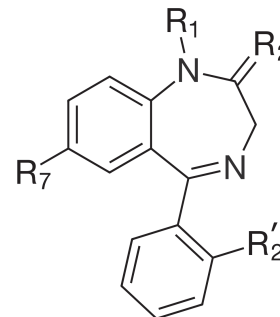
e. **Alcoholic hallucinosis** (or alcohol-related psychosis or alcohol-induced psychotic disorder) is a complication of alcohol withdrawal in alcoholics.

5. Derivatives of barbituric acid, **barbiturates** are drugs that act as central nervous system depressants, and can therefore produce a wide spectrum of effects, from mild sedation to total anesthesia.



Barbituric acid, the basic structure of all barbiturates.

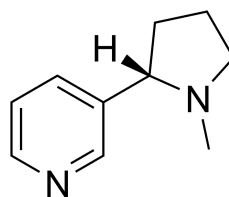
6. **Benzodiazepines** are the class of drugs that include valium and clonazepam, which enhance the effect of the neurotransmitter gamma-aminobutyric acid (GABA), resulting in sedative, hypnotic, anxiolytic, anticonvulsant, and muscle relaxant effects.



The core structure of benzodiazepines.

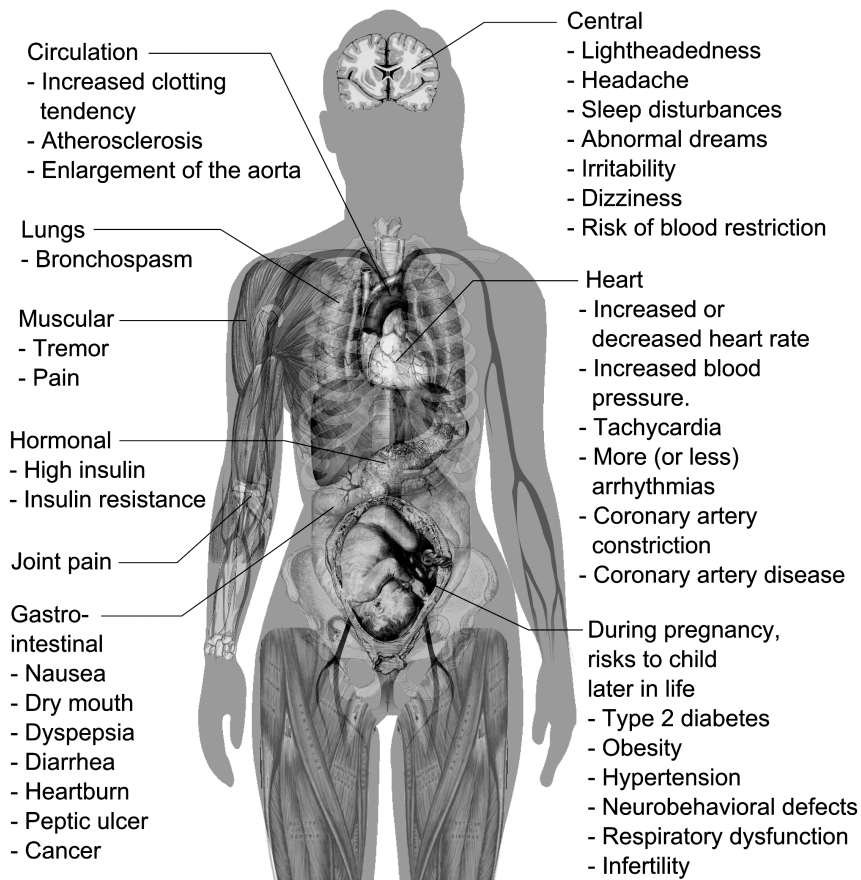
F. Stimulant Drugs: Tobacco, Cocaine, and Amphetamine

1. **Stimulants** are psychoactive drugs that induce temporary improvements in either mental or physical functions or both.
2. The plant **tobacco** contains the alkaloid nicotine, a stimulant. The use of this plant, particularly in smoking, is a risk factor for many diseases, especially those affecting the heart, liver, and lungs, and several cancers.
3. **Nicotine** is a potent parasympathomimetic alkaloid found in the nightshade family of plants and is a stimulant drug.

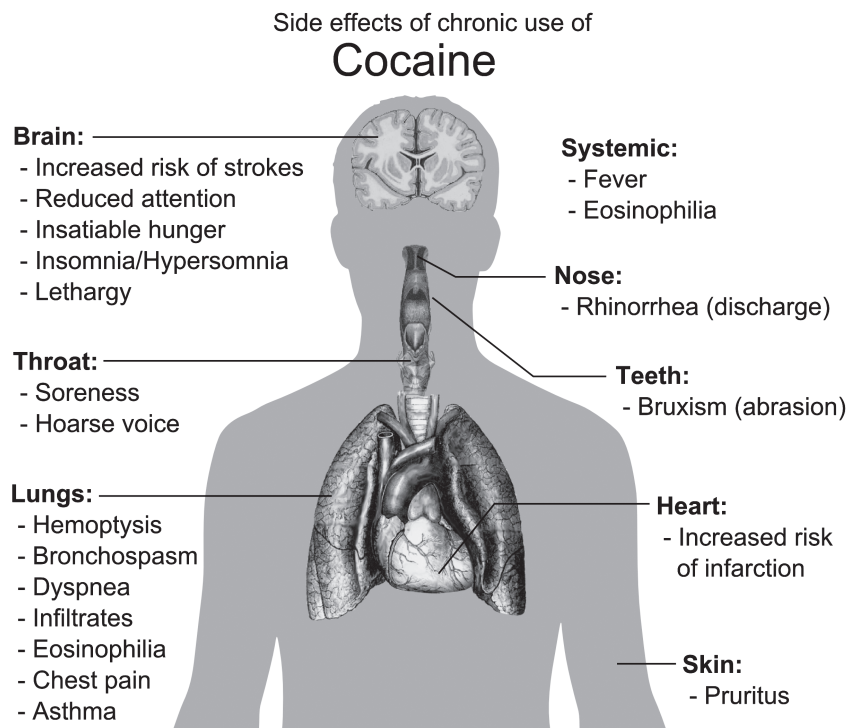


Nicotine

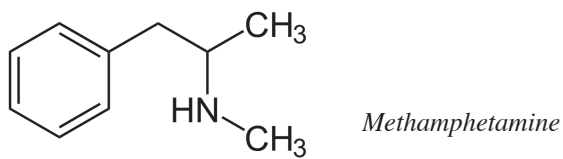
Side effects of nicotine



4. **Cocaine**, also known as benzoylecgonine, is a strong stimulant. It is commonly snorted, inhaled, or injected into the veins. Mental effects may include loss of contact with reality, an intense feeling of happiness, or agitation.

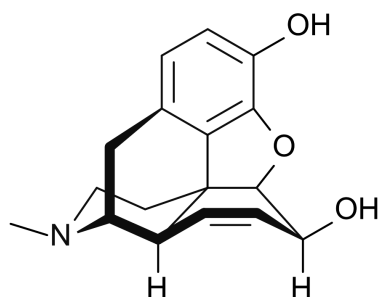


4. The class of substituted **methamphetamines** span a variety of pharmacological subclasses, including stimulants, entactogens, hallucinogens, among others. Examples from this class of drugs include ephedrine, cathinone, MDMA (ecstasy), and DOM (STP).
5. **Methamphetamine** is a strong central nervous system (CNS) stimulant that is mainly used as a recreational drug. Chronic high dose use can precipitate unpredictable and rapid mood swings, prominent delusions and violent behavior.



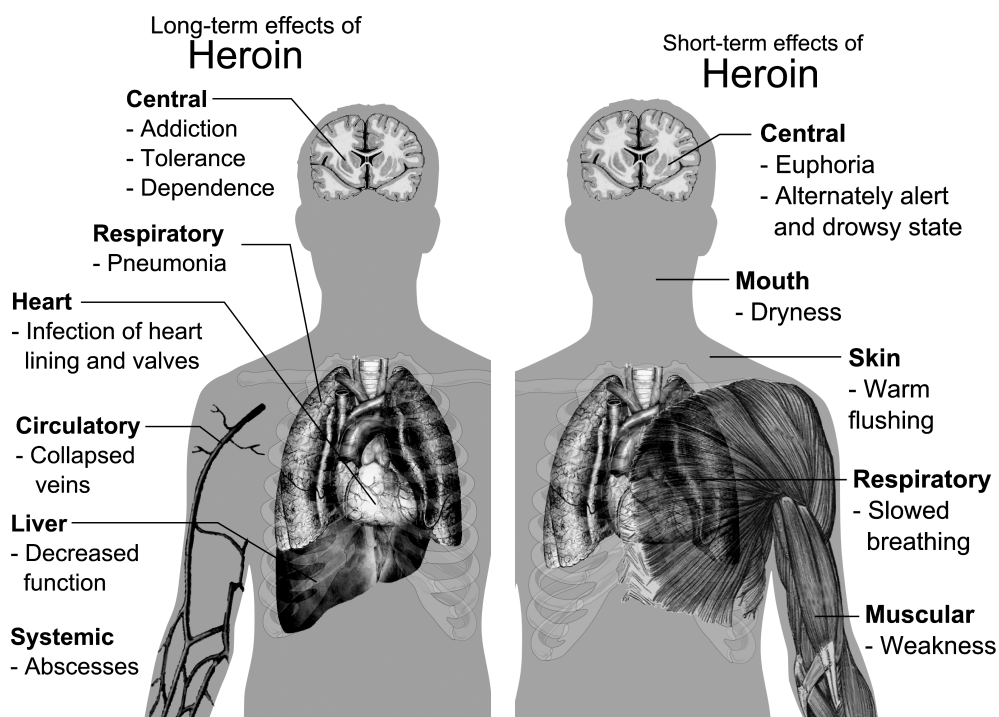
G. Narcotic Drugs

1. The term **narcotic** is used to refer to opiates and opioids, commonly morphine and heroin and their derivatives, such as hydrocodone.
2. **Morphine**, sold under many trade names, is a pain medication of the opiate type. It acts directly on the central nervous system to decrease the feeling of pain. It can be used for both acute pain and chronic pain.



Chemical structure of morphine.

3. **Heroin** is an opioid analgesic synthesized by adding two acetyl groups to the molecule morphine.

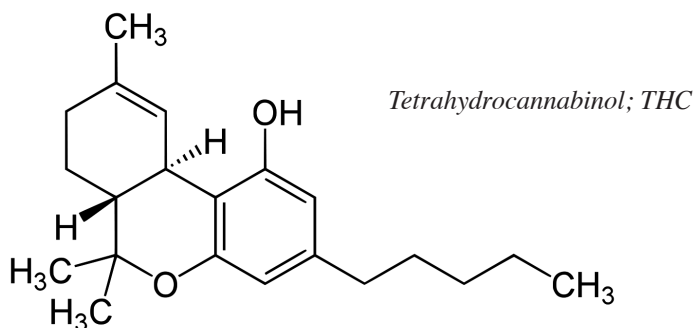


H. Hallucinogens

1. A **hallucinogen** is a psychoactive agent which can cause hallucinations, perception anomalies, and other substantial subjective changes in thoughts, emotion, and consciousness. Common types are psychedelics, dissociatives, or delirants.
2. A **psychedelic** substance is a psychoactive drug whose primary action is to alter cognition and perception, typically by agonising serotonin receptors.
3. **Cannabis**, also known as marijuana, is often consumed for its mental and physical effects, such as heightened mood, relaxation, and an increase in appetite. **Tetrahydrocannabinol** is the principal psychoactive constituent of cannabis.



Cannabis



Physical effects of
Lysergic acid diethylamide (LSD)

 A diagram of a human male torso with anatomical structures labeled to show the physical effects of LSD. The labels and their corresponding effects are:

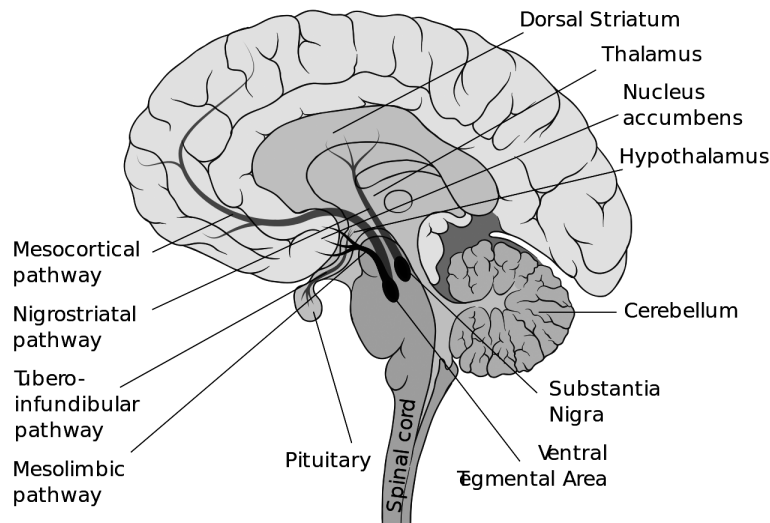
- Systemic:** - Increased temperature
- Mouth:** - Dryness
- Blood:** - High blood pressure
- Muscles:** - Numbness, - Weakness, - Tremors
- Pupils:** - Dilation
- Skin:** - Profuse sweating
- Heart:** - Increased heart rate
- Gastric:** - Nausea

4. **LSD** is a psychedelic drug of the ergoline family, well known for its psychological effects - which can include altered thinking processes, closed- and open-eye visuals, synesthesia, an altered sense of time, and spiritual experiences.

5. **Ecstasy** [MDMA) is a psychoactive drug consumed primarily for its euphoric and empathogenic effects. Pharmacologically, it acts as a serotonin-norepinephrine-dopamine releasing agent and reuptake inhibitor.

I. Drug Addiction

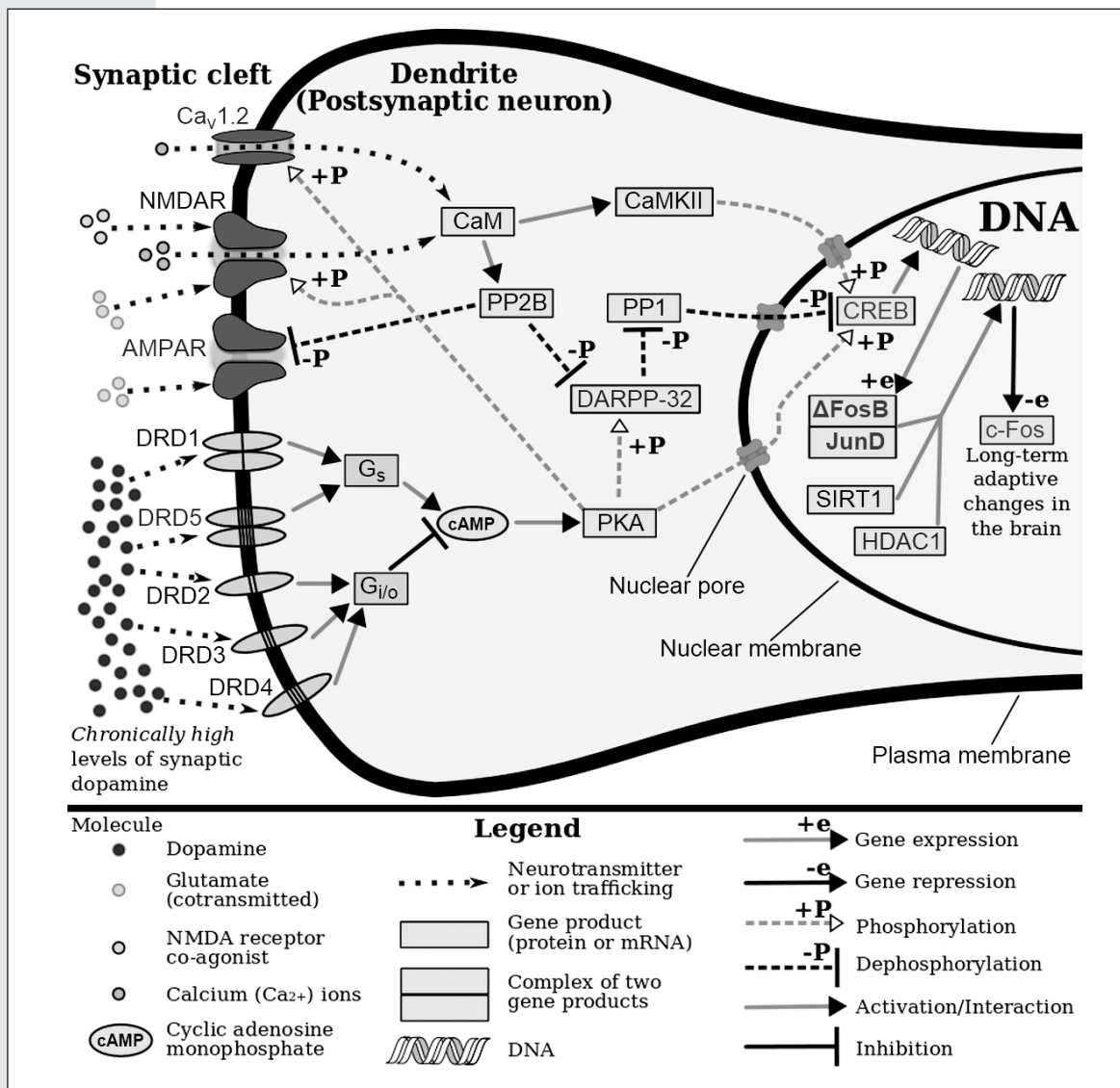
1. **Addiction** is a state characterized by compulsive engagement in rewarding stimuli, despite adverse consequences. It can be thought of as a disease or biological process leading to such behaviors.
2. **Dopaminergic pathways** are neural pathways in the brain that transmit the neurotransmitter dopamine from one region of the brain to another.



The dopaminergic mesolimbic pathway in the brain, running from the Ventral Tegmental Area to the Nucleus Accumbens.

- a. The **mesolimbic** pathway (reward pathway) is a dopaminergic pathway in the brain. The pathway begins in the ventral tegmental area of the midbrain and connects to the nucleus accumbens. It is the most significant neural pathway in the brain for addiction.
- b. The **nucleus accumbens** is a region in the basal forebrain rostral to the preoptic area of the hypothalamus with significant role in the cognitive processing of aversion, motivation, pleasure, reward and reinforcement learning. It has a significant role in addiction.
- c. The **ventral tegmental area** is a group of neurons located close to the midline on the floor of the midbrain. It is the origin of the dopaminergic cell bodies of the mesocorticolimbic dopamine system and is widely implicated in the drug and natural reward circuitry of the brain.

- d. The **Δ FosB** splice variant of the FosB protein has been identified as playing a central, crucial (necessary and sufficient) role in the development and maintenance of pathological behavior and neural plasticity involved in both behavioral addictions (associated with natural rewards) and drug addictions.



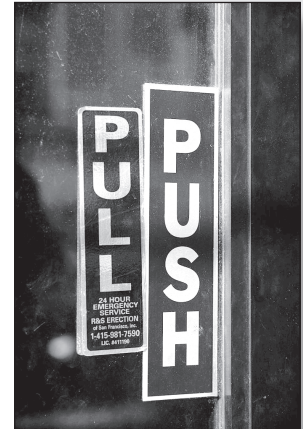
This diagram depicts the signaling events in the brain's reward center that are induced by chronic high-dose exposure to psychostimulants that increase the concentration of synaptic dopamine, like amphetamine, methamphetamine, and phenethylamine. Following presynaptic dopamine and glutamate co-release by such psychostimulants, postsynaptic receptors for these neurotransmitters trigger internal signaling events through a cAMP pathway and calcium-dependent pathway that ultimately result in increased CREB phosphorylation. Phosphorylated CREB increases levels of Δ FosB, which in turn represses the c-fos gene with the help of corepressors; c-fos repression acts as a molecular switch that enables the accumulation of Δ FosB in the neuron. A highly stable (phosphorylated) form of Δ FosB, one that persists in neurons for one or two months, slowly accumulates following repeated exposure to stimulants through this process. Δ FosB functions as "one of the master control proteins" that produces addiction-related structural changes in the brain, and upon sufficient accumulation, with the help of its downstream targets (e.g., nuclear factor kappa B), it induces an addictive state.

7

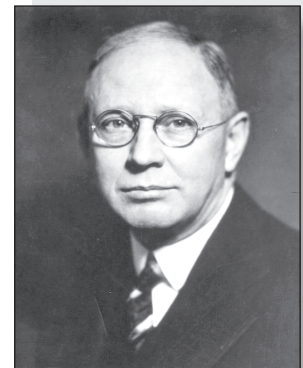
Motivation and Emotion

I. Theories of Motivation

1. **Motivation** is a theoretical construct used to explain the psychological drives that prompt a person to act in a certain way.
 - a. **Intrinsic motivation** is driven by an interest or enjoyment in the task itself, and exists within the individual rather than relying on external pressures or a desire for reward.
 - b. **Extrinsic motivation** refers to the performance of an activity in order to attain a desired outcome and it is the opposite of intrinsic motivation. This type of motivation comes from influences outside of the individual.
2. **Bounded rationality** is the idea that when individuals make decisions, their rationality is limited by the information they have, the cognitive limitations of their minds, and the time available to make the decision.
3. **Homeostasis** is the property of a system in which variables are regulated so that internal conditions remain stable and relatively constant.
4. **Drive theory** is based on the principle that organisms are born with certain psychological needs and that a negative state of tension is created when these needs are not satisfied. **Drive reduction theory** is a motivational theory popular in the mid-twentieth century which held that certain primary drives like hunger, thirst and sexuality motivate us to act in ways that minimize aversive states.
 - a. In drive reduction theory, **primary drives** are innate drives (e.g. thirst, hunger, and sex).
 - b. **Secondary drives** are learned by conditioning (e.g. money).



Motivation is the answer to the question of why we do what we do.



Clark Hull was the behaviorist who developed the drive-reduction theory of motivation.

5. Hunger

- a. The **set-point theories of hunger and eating** are a group of theories developed in the 1940s and 1950s that operate under the assumption that hunger is the result of an energy deficit and that eating is a means by which energy resources are returned to their optimal level.
- b. The **positive-incentive perspective of hunger** maintains that humans and other animals are not normally motivated to eat by energy deficits, but are instead motivated to eat by the anticipated pleasure of eating

6. The Human Sexual Response

- a. The **desire phase** of the human sexual response involves sexual interest and a longing for physical intimacy.
- b. The **excitement phase** of the human sexual response involves the physical reaction to sexual desire and the experience of sexual pleasure.
- c. The **orgasm phase** of the human sexual response is characterized by the release of sexual tension and involuntary, rhythmic muscle contractions in the genitals of both men and women.
- d. The **resolution phase** is the final stage of the human sexual response. During this phase, the body returns to normal. Heart rate and breathing slow, and muscles relax.

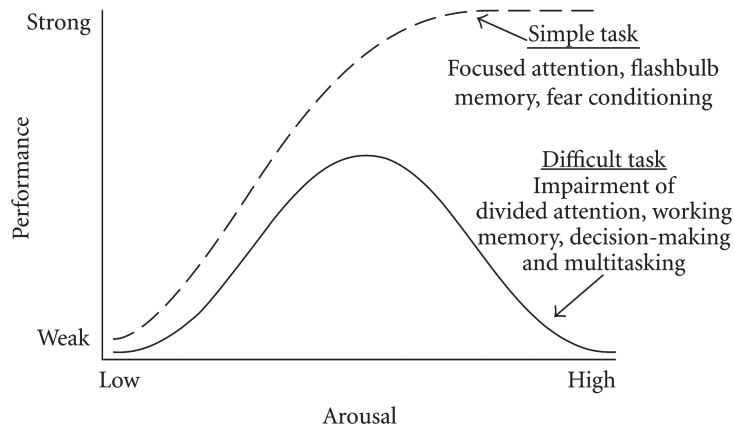
7. **Incentive theories** explain motivation as the association of a positive goal with a behavior or action.

8. **Expectancy-value theory** proposes that motivation is a function of the expectancies one has and the value of the goal. When more than one behavior is possible, the behavior chosen will be the one with the largest combination of expected success and value.

9. **Approach-avoidance conflicts** occur when there is one goal or event that has both positive and negative effects or characteristics that make the goal appealing and unappealing simultaneously.

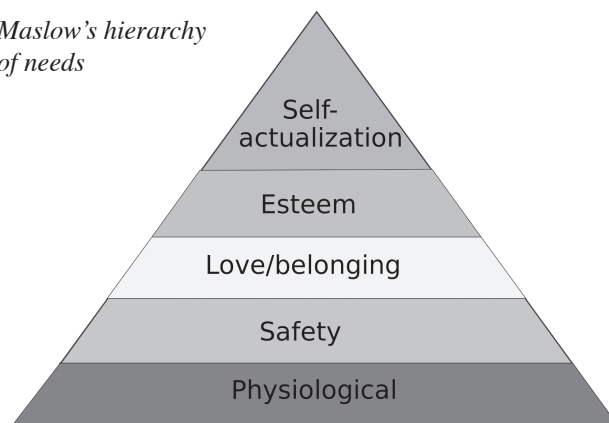
10. The **Yerkes-Dodson law** is an empirical relationship between arousal and performance which states that performance increases with physiological or mental arousal, but only up to a point. When levels of arousal become too high, performance decreases.

Yerkes-Dodson law



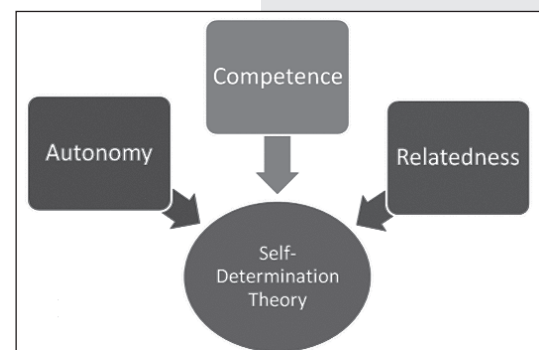
11. **Maslow's hierarchy of needs** is a theory of psychological health predicated on fulfilling innate human needs in priority, culminating in self-actualization.

Maslow's hierarchy of needs



12. **Self-determination theory** focuses on the degree to which an individual's behavior is self-motivated and self-determined.

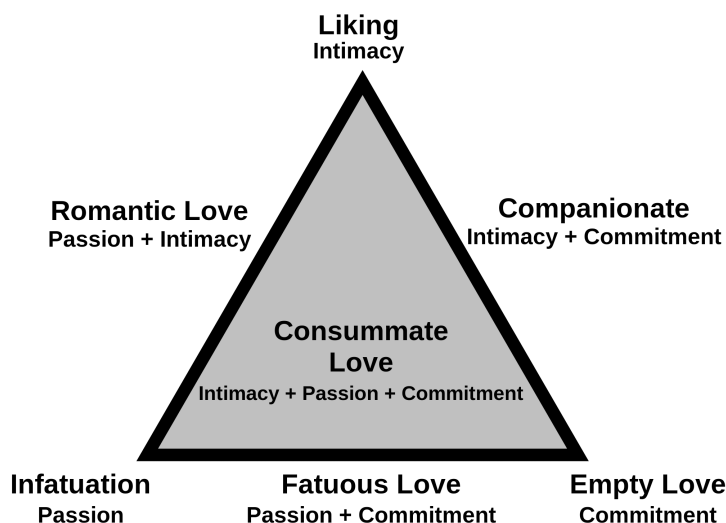
SDT identifies three innate needs that, if satisfied, allow optimal function and growth.



II. Interpersonal Attraction

1. The **propinquity** effect is a factor in creating interpersonal attraction. The more we see and interact with a person, the more likely he or she is to become our friend or sexual partner.
2. The **mere-exposure** effect is a psychological phenomenon by which people tend to develop a preference for things merely because they are familiar with them.
3. **Intimacy** generally refers to the feeling of being in a close personal association and belonging together. It is a familiar and very close affective connection with another as a result of a bond that is formed through knowledge and experience of the other.
4. **Self-disclosure** is a process of communication by which one person reveals information about himself or herself to another.
5. **Reciprocity** refers to responding to a positive action with another positive action, rewarding kind actions.
6. **Role theory** is a perspective that considers most of everyday activity to be the acting out of socially defined categories (e.g., mother, manager, teacher).
7. The three components of love, according to the **triangular theory of love**, are an intimacy component, a passion component, and a decision/commitment component.

The 3 properties of love and how they create 7 different loves according to the triangular theory of love.

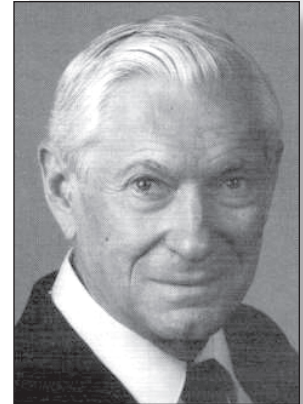


III. Emotion

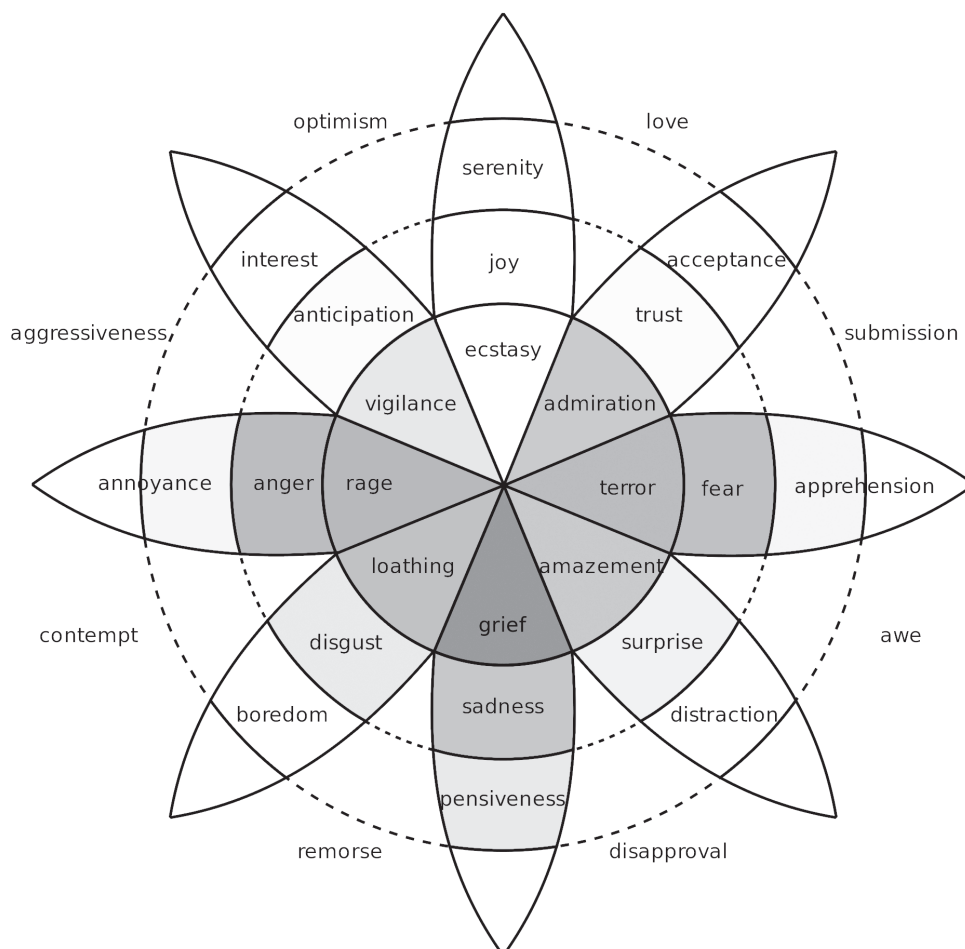
An **emotion** is a complex state of feeling that corresponds to physical and psychological changes that influence behavior. **Affect** is the experience of feeling or emotion.

A. Discrete Emotions

1. **Discrete emotion theory** is the claim that there are a small number of core emotions, typically six to ten or so.
 - a. The **primary emotions** are a small number of biologically primitive emotions believed to be cross-culturally universal.
 - b. **Secondary emotions** are mixed or derivative states; that is, they occur as combinations, mixtures, or compounds of the primary emotions.

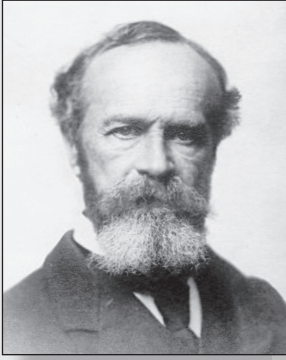


Robert Plutchik's psychoevolutionary theory of emotion is one of the most influential classifications for general emotional responses. He considered there to be eight primary emotions—anger, fear, sadness, disgust, surprise, anticipation, trust, and joy.



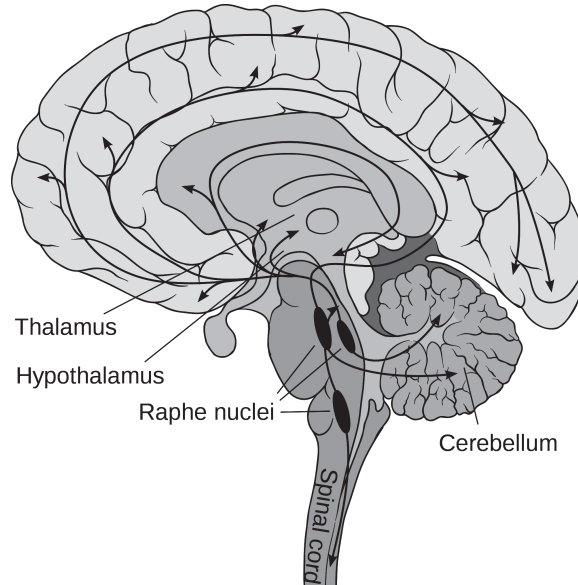
Robert Plutchik's Wheel of Emotions

B. Theories of Emotion



William James

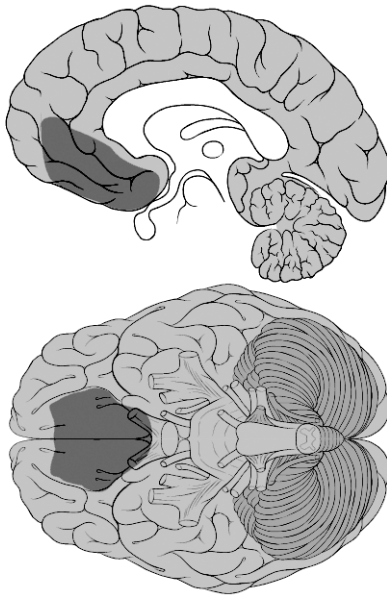
1. The **James-Lange theory** (19th century) is that physiological arousal instigates the experience of emotion. The physiological change is primary, and emotion is then experienced when the brain reacts to the information received via the nervous system.
2. The **facial feedback hypothesis** states that facial movement can influence emotional experience. For example, an individual who is forced to smile during a social event will actually come to find the event more of an enjoyable experience.
3. **Display** is a form of animal behaviour, linked to sexual selection and survival in which animals use certain behaviors and markings as signals to other animals.
4. In **Cannon-Bard theory**, emotional expression results from the function of hypothalamic structures, and emotional feeling results from stimulations of the dorsal thalamus. The physiological changes and subjective feeling of an emotion are separate and independent.



The thalamic region of the brain.

5. The **Schachter-Singer, or two-factor, theory** of emotion states that emotion is based on physiological arousal and cognitive label. When an emotion is felt, the person uses the immediate environment to search for emotional cues to label the physiological arousal.

6. **Somatic marker theory** posits the existence of associations stored in the ventromedial prefrontal cortex between reinforcing stimuli and physiological affective states.



Somatic markers are probably stored in the ventromedial prefrontal cortex.

7. **Cognitive theories of emotion** maintain that judgments, evaluations, or thoughts are entirely necessary for an emotion to occur. The activity involved may be conscious or unconscious and may or may not take the form of conceptual processing.
8. **Self-discrepancy theory** states that people compare themselves to internalized standards called 'self-guides'. These different representations of the self can be contradictory and result in emotional discomfort.
- a. In self-discrepancy theory, **actual self** is your representation of the attributes that you believe you actually possess, or that you believe others believe you possess.
 - b. The **ideal self** is a person's representation to themselves of the attributes that they would like, ideally, to possess. This self-regulatory system focuses on the presence or absence of positive outcomes (e.g., love provided or withdrawn).
 - c. **Ought self** is another form of a person's representation of the attributes that they or another believes they should possess. This self-regulatory system focuses on the presence or absence of negative outcomes (e.g., criticism administered or suspended).

- d. **Self-esteem** reflects a person's overall subjective emotional evaluation of his or her own worth.
 - e. **Self-efficacy** is the extent or strength of one's belief in one's own ability to complete tasks and reach goals.
 - f. **Locus of control** refers to the extent to which individuals believe they can control events affecting them.
9. **Neuroticism** is a fundamental personality trait in the study of psychology characterized by anxiety, fear, moodiness, worry, envy, frustration, jealousy, and loneliness.
 10. **Learned helplessness** is behavior typical of an organism that has endured repeated aversive stimuli which it was unable to escape or avoid. After such experience, the organism often fails to learn escape or avoidance in new situations where such behavior would be effective.

C. Positive Psychology

Positive psychology is the branch of psychology that uses scientific understanding and effective intervention to aid in the achievement of a satisfactory life, rather than treating mental illness.

1. The **broaden-and-build theory** of positive emotions suggests that positive emotions broaden one's awareness and encourage novel, varied, and exploratory thoughts and actions. Over time, this broadened behavioral repertoire builds skills and resources.
2. The **positivity effect** pertains to the tendency of people, when evaluating the behaviors of a person they like, to attribute the person's disposition as the cause of their positive behaviors and the situations surrounding them as the cause of their negative behaviors.
3. **Affective forecasting** (also known as hedonic forecasting) is the prediction of one's emotional state in the future. It is a process that influences preferences, decisions, and behavior,
4. **Durability** bias in affective forecasting is the tendency for people to overestimate the length or the intensity of future feeling states.

5. The **hedonic treadmill** is the observed tendency of humans to return to a relatively stable level of happiness despite major positive or negative events. For example, as a person makes more money, expectations rise in tandem, which results in no permanent gain in happiness.
6. **Positive illusions** are unrealistically favorable attitudes that people have, a form of self-deception or self-enhancement that feels good, maintains self-esteem or staves off discomfort at least in the short term.
7. **Defensive pessimism** is a cognitive strategy to prepare for anxiety provoking events or performances. Individuals set low expectations for their performance, regardless of how well they have done in the past.

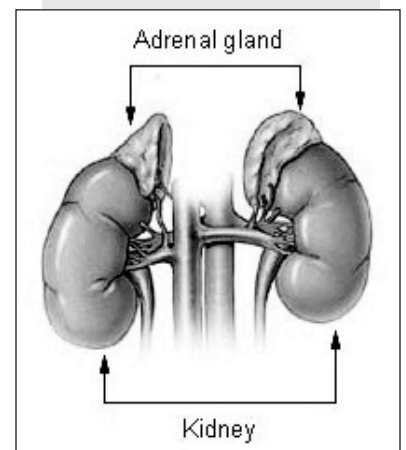
IV. Stress

A. The Stress Response

1. **Stress** is a feeling of strain and pressure.
2. A **stressor** is a chemical or biological agent, environmental condition, external stimulus or an event that causes stress to an organism.
3. A **traumatic event** is an event that is severely distressing.
4. In appraisal theory, **primary appraisal** is evaluation directed at the establishment of the significance or meaning of an event. **Secondary appraisal** is evaluation directed at the assessment of the ability of the organism to cope with the consequences of the event.
5. **Problem-focused coping** refers to one's ability to take action and to change a situation to make it more congruent with one's goals. **Emotion-focused coping** refers to one's ability to handle or adjust to the situation should the circumstances remain inconsistent with one's goals.
6. **Corticosteroids** are a class of hormones produced in the adrenal cortex involved in a wide range of physiological processes including stress response.

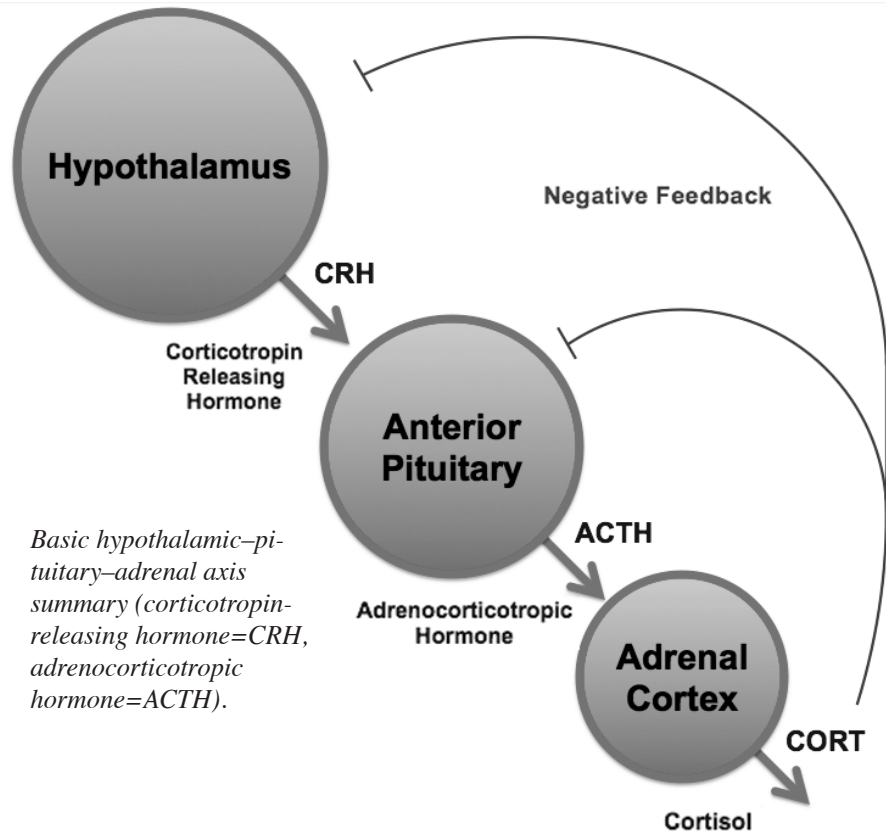


A frustrated man sitting at a desk

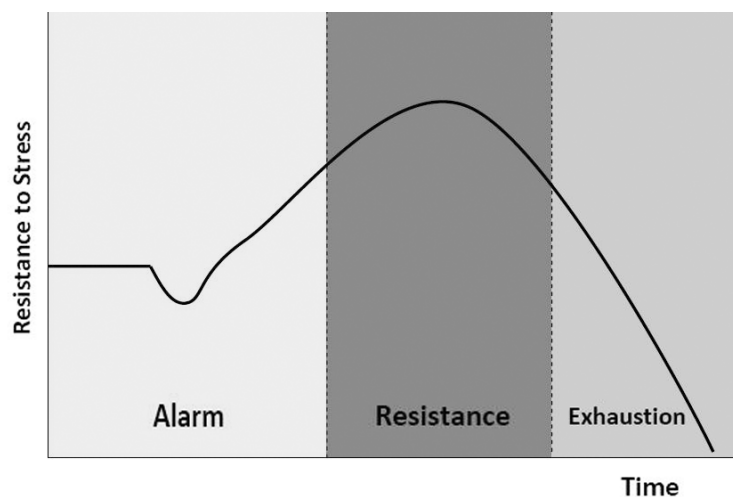


Adrenal gland

7. Interactions of the hypothalamus, pituitary gland, and the adrenal glands constitute the **HPA axis**, which controls reactions to stress as well as many other processes. It is the mechanism for interactions between the endocrine system and the midbrain in the general adaptation syndrome.

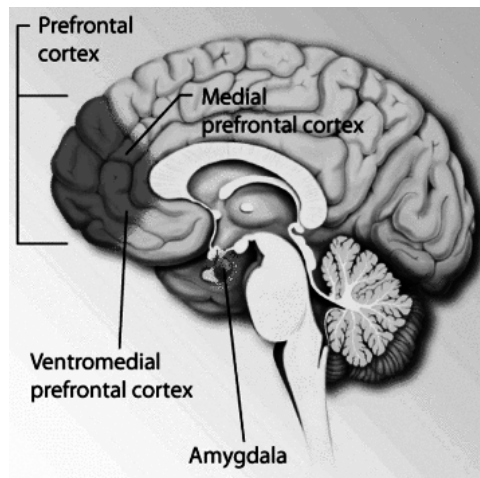


8. **General Adaptation Syndrome** is a profile which characterizes the stress response as composed of three phases: a nonspecific mobilization phase, a resistance phase, and an exhaustion phase.



A diagram of the General Adaptation Syndrome model.

9. The **fight-or-flight response** is a physiological reaction that occurs in response to a perceived harmful event or threat. The adrenal medulla secretes catecholamines, especially norepinephrine and epinephrine. Estrogen, testosterone and cortisol also affect how organisms react to stress.
10. The **tend-and-befriend response** is a behavior exhibited by some animals, including humans, in response to threat. It refers to protection of offspring and seeking out the social group for mutual defense. It is theorized as having evolved as the typical female response to stress.



Regions of the brain associated with stress and posttraumatic stress disorder

B. Stress and Health

1. **Psychoneuroimmunology** is the study of the interaction between psychological processes and the nervous and immune systems of the human body.
2. **Psychophysiology** is the branch of psychology that is concerned with the physiological bases of psychological processes.
3. The **biopsychosocial model** posits that health is best understood in terms of a combination of biological, psychological, and social factors rather than purely in biological terms.
4. **Cardiovascular disease** is a class of diseases that involve the heart or blood vessels. Such diseases include coronary artery diseases, stroke, hypertensive heart disease, endocarditis, aortic aneurysms, peripheral artery disease and venous thrombosis.



A U.S. Long-Range Patrol team leader in Vietnam, 1968. The long-term medical consequence of PTSD among male veterans who served in the Vietnam War were almost twice as likely to die in the quarter of a century between the two key studies than those who did not have PTSD.

5. **Asthma** is a common chronic inflammatory disease of the airways characterized by variable and recurring symptoms, reversible airflow obstruction and bronchospasm. Common symptoms include wheezing, coughing, chest tightness, and shortness of breath.
6. **Posttraumatic stress disorder** is an anxiety disorder that can develop after a person is exposed to one or more traumatic events, such as major stress, sexual assault, warfare, or other threats on a person's life.

C. Coping with Stress

1. **Coping** is expending conscious effort to solve personal and interpersonal problems, and seeking to master, minimize or tolerate stress or conflict. In **proactive coping**, the coping response aims to head off a future stressor.
2. **Social support** is the perception and actuality that one is cared for, has assistance available from other people, and that one is part of a supportive social network.
3. **Hardiness** is a personality style described as a pattern of personality characteristics that help individuals remain healthy under life stress, as compared to those who developed health problems.
4. **Behavioral medicine** is an interdisciplinary field combining both medicine and psychology and is concerned with the integration of knowledge in the biological, behavioral, psychological, and social sciences relevant to health and illness.
4. **Biofeedback** is the process of gaining greater awareness of physiological functions with a goal of being able to manipulate them at will. Some of the processes that can be controlled include brainwaves, heart rate and pain perception.

8

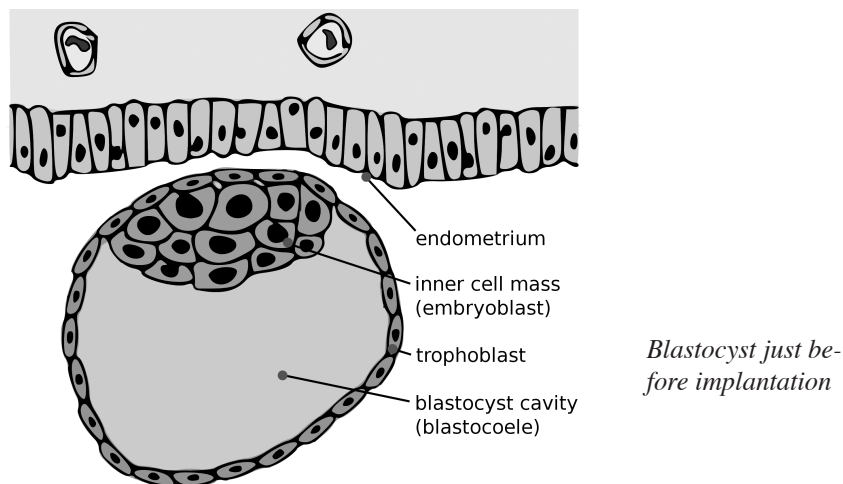
Identity and Personality

I. Development

Developmental psychology is the scientific study of how and why human beings change over the course of their life.

A. Prenatal Development

1. **Prenatal development** is the process in which a human embryo or fetus gestates during pregnancy, from fertilization until birth.
2. The **blastocyst** is a structure formed in the early development. It possesses an inner cell mass which subsequently forms the embryo. The outer layer consists of cells collectively called the trophoblast which becomes the placenta.

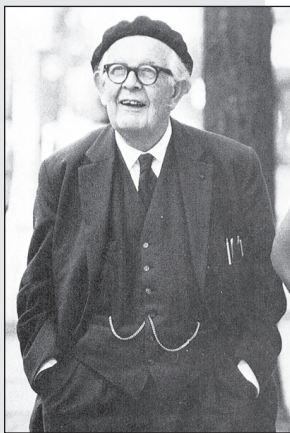


3. In humans, an **embryo** is a prenatal human generally considered to be between the first and the eighth week of development after fertilization and from then it is instead called a fetus.
4. A **fetus** is a prenatal human between its embryonic state and its birth.
5. **Teratology** is the study of abnormalities of physiological development.

B. Cognitive Development

1. **Cognitive development** is a field of study in neuroscience and psychology focusing on a child's development in terms of information processing, conceptual resources, perceptual skill, language learning, and other aspects of brain development.
2. **Modularity of mind** is the notion that a mind may, at least in part, be composed of innate neural structures or modules which have distinct established evolutionarily developed functions.
3. **Domain-specific cognitive accounts** hold the position (especially in modern cognitive development) that many aspects of cognition are supported by specialized, presumably evolutionarily specified, learning devices.
4. **Domain-general cognitive accounts**, such as Jean Piaget's theory, believed all learning is driven by the operation of a few general learning devices. Proponents of domain specificity argue that these theories are unable to overcome the problems of many learning domains, especially language.
5. The **sociocultural perspective** is a theory used in psychology to describe awareness of circumstances surrounding individuals and how their behaviors are affected specifically by their surrounding, social and cultural factors.

C. Jean Piaget



Jean Piaget

1. **Jean Piaget** proposed a comprehensive theory of cognitive development known as developmental stage theory which divides cognitive development during childhood into distinct stages characterized by qualitative differences in behavior.
2. **Assimilation** is the process of fitting new information into pre-existing cognitive schemas. It occurs when humans are faced with new or unfamiliar information and refer to previously learned information in order to make sense of it.

3. **Accommodation** is the process of taking new information in one's environment and altering pre-existing schemas in order to fit in the new information.
4. In Piaget's theory, the **sensorimotor** stage is the first of the four stages in cognitive development. It extends from birth to language acquisition. In this stage, infants progressively construct knowledge and understanding of the world by coordinating experiences with physical interactions.
 - a. **Object permanence** is a child's understanding that objects continue to exist even though he or she cannot be seen or heard.



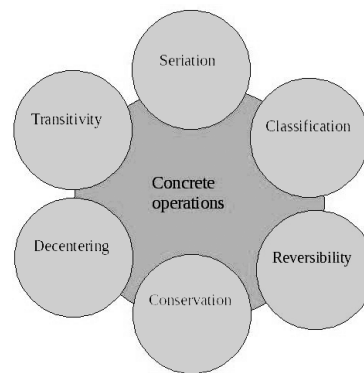
Peek-a-boo is a good test for object permanence. By the end of the sensorimotor period, children develop a permanent sense of self and object.

- b. During the sensorimotor stage **primary circular reactions** involve reproduction of an event that initially occurred by chance.
 - c. **Secondary circular reactions** involve the reproduction of an action involving an object. The differentiation between means and ends occurs. This is one of the most important stages of a child's growth as it signifies the dawn of logic.
 - d. In the **deferred imitation technique**, an experimenter shows infants a unique sequence of actions (such as using a stick to push a button on a box) and then, after a delay, asks the infants to imitate the actions.
5. Piaget's second stage, the **pre-operational stage**, starts when the child begins to learn to speak at age two and lasts up until the age of seven.
 - a. **Egocentrism** is the inability to differentiate between self and other. More specifically, it is the inability to untangle subjective schemas from objective reality; an inability to understand or assume any perspective other than their own.

b. **Animism** is the belief that inanimate objects are capable of actions and have lifelike qualities.

c. A behavior often demonstrated in the pre-operational stage, **centration** is the tendency to focus on one salient aspect of a situation and neglect other, possibly relevant aspects.

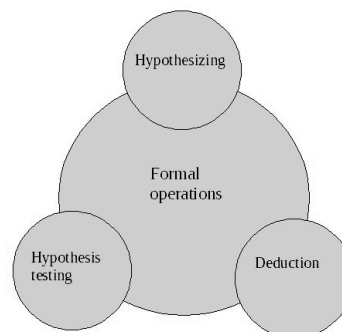
6. The **concrete operational stage** is the third stage of Piaget's theory of cognitive development in which a child's thought processes become more mature and they start solving problems in a more logical fashion. However, abstract, hypothetical thinking is not yet fully developed.



Mental operations of the concrete operational stage according to Jean Piaget.

a. A Piagetian test for the concrete operational stage, **conservation** refers to the ability to determine that a certain quantity will remain the same despite adjustment of the container, shape, or apparent size.

7. The **formal operational stage** in Piaget's theory of cognitive development occurs from adolescence and into adulthood. At this point, the person is capable of hypothetical and deductive reasoning.



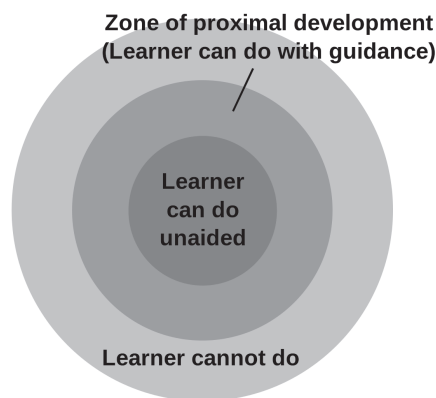
Mental operations of the formal operational stage.

D. Lev Vygotsky

1. **Lev Vygotsky** proposed a theory of the development of higher cognitive functions in children that saw reasoning as emerging through practical activity in a social environment.
2. The **zone of proximal development** is the difference between what a learner can do without help and what he or she can do with help.

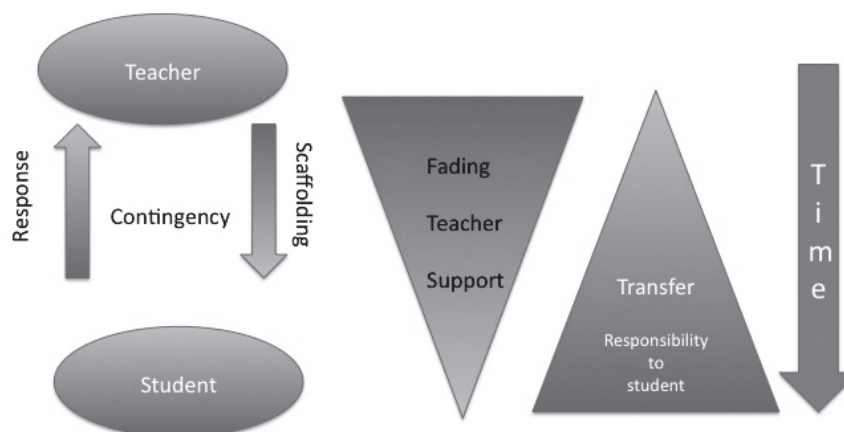


Lev Vygotsky



In the middle circle, representing the zone of proximal development, students cannot complete tasks unaided, but can complete them with guidance.

3. The **more knowledgeable other** refers to someone who has a better understanding or a higher ability level than the learner, with respect to a particular task, process, or concept.
4. **Instructional scaffolding** is a learning process designed to promote a deeper level of learning. Scaffolding is the support given during the learning process which is tailored to the needs of the student with the intention of helping the student achieve his/her learning goals.



Cycle of Scaffolding

D. Attachment

1. **Attachment theory** is a psychological model that attempts to describe the dynamics of long-term interpersonal relationships between humans.
2. **Imprinting** is any kind of learning occurring at a particular age or a particular life stage that is rapid and apparently independent of the consequences of behavior.
 - a. A **critical period** is a maturational stage in the lifespan of an organism during which the nervous system is especially sensitive to certain environmental stimuli.
 - b. Some researchers differentiate between a critical and a **sensitive period**, defining the latter type of period as one which is more extended and after which learning is still possible.
3. **Contact comfort** is the comfort that is derived from physical closeness with a caregiver.
4. **Attachment styles** are different patterns of attachment that children have toward their parents which shape - but do not determine - their expectations in later relationships.
 - a. **Secure attachment** is when children feel they can rely on their caregivers to attend to their needs of proximity, emotional support and protection. Separation anxiety is what infants feel when they are separated from their caregivers.
 - b. **Anxious-ambivalent attachment** is when the infant feels separation anxiety when separated from his caregiver and does not feel reassured when the caregiver returns to the infant.
 - c. **Anxious-avoidant attachment** is when the infant avoids their parents.
 - d. **Disorganized attachment** is when there is a lack of attachment behavior.
5. **Stranger anxiety** is a form of distress that children experience when exposed to people unfamiliar to them.

E. Moral Development

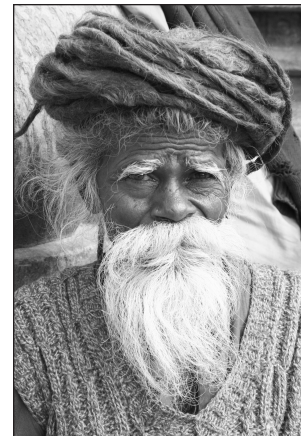
1. **Temperament** refers to those aspects of an individual's personality, such as introversion or extroversion, that are often regarded as innate rather than learned.
2. **Socialization** refers to the lifelong process of inheriting and disseminating norms, customs, and ideologies, providing an individual with the skills and habits necessary for participating within their own society.
3. **Self-control** is the ability to control one's emotions, behavior, and desires in the face of external demands, to function in society.
4. **Lawrence Kohlberg** was an American psychologist best known for his theory of stages of moral development.
 - a. In Kohlberg's theory of moral development, **pre-conventional morality** represents a phase of development in which the morality of an action is judged by its direct consequences. Morality is punishment driven or self-interest driven.
 - b. The **instrumental relativist orientation** follows the punishment and obedience orientation of pre-conventional morality. Right action consists of what satisfies your own needs, and reciprocity, though present, is interpreted pragmatically.
 - c. In Kohlberg's theory, **conventional morality** is characterized by an acceptance of society's conventions concerning right and wrong. At this level an individual obeys rules and follows society's norms even when there are no consequences for obedience or disobedience.
 - d. **Post-conventional morality**, in Kohlberg's theory, is marked by a growing realization that individuals are separate entities from society, and that the individual's own perspective may take precedence. The person lives by principles typically including such basic human rights as liberty and justice.
5. A **universal** code of ethics is a system of ethics that can apply to every sentient being.



Lawrence Kohlberg

F. Adolescence and Adulthood

1. **Adolescence** is a transitional stage of physical and psychological human development that generally occurs during the period from puberty to legal adulthood (age of majority).
2. A **primary sex characteristic** is any anatomical part of the body involved in sexual reproduction and constituting the reproductive system in a complex organism, especially the external sex organs.
3. A **secondary sex characteristic** is a feature that appears during puberty, a phenotypic trait that distinguishes the two sexes, but unlike the sex organs, is not directly part of the reproductive system.
4. **Menarche** is the first menstrual cycle, or first menstrual bleeding, in female humans.
5. **Spermarche** refers to the beginning of development of sperm in boys' testicles at puberty.
6. **Identity formation** is the development of the distinct personality of an individual.
7. **Erik Erikson** was a twentieth century developmental psychologist known for his theory on psychosocial development of human beings. He may be most famous for coining the phrase identity crisis.
 - a. In psychology, the term **identity crisis**, as coined by Erik Erikson, means the failure to achieve ego identity during adolescence.
 - b. **Erikson's stages of psychosocial development** is a psychoanalytic theory which identifies eight stages of development through which a healthily developing human should pass from infancy to late adulthood.
8. **Menopause** is the time in most women's lives when menstrual periods stop permanently, and the woman is no longer able to have children.



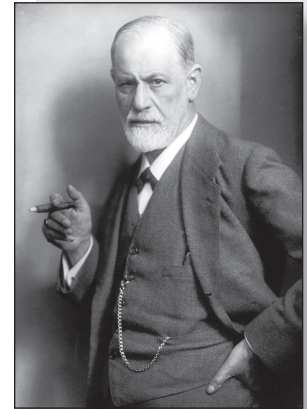
A beard is a human male secondary sexual characteristic.

II. Freud's Psychoanalytic Theory

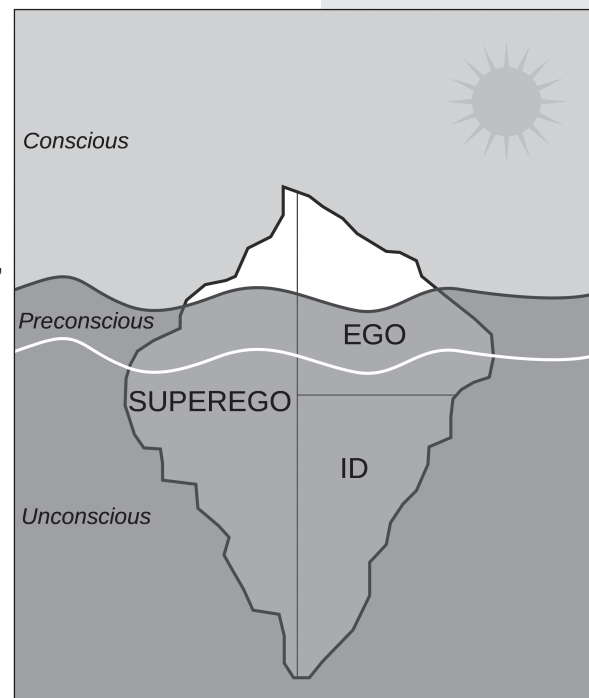
Sigmund Freud was an Austrian neurologist, now known as the father of psychoanalysis.

A. The Psyche

1. The **psyche** is the totality of the human mind, conscious and unconscious.
2. **Psychic determinism** theorizes that all mental processes are not spontaneous but are determined by the unconscious or preexisting mental complexes.
3. A **symbol** is an object or a concept that represents, stands for or suggests another idea, visual image, belief, action or material entity.
4. **Psychodynamics** emphasizes systematic study of the psychological forces that underlie human behavior, feelings, and emotions and how they might relate to early experience. It is especially interested in the dynamic relations between conscious motivation and unconscious motivation.
5. The **unconscious mind** consists of the processes in the mind that occur automatically and are not available to introspection, and include thought processes, memory, affect, and motivation.
6. In Freud's structural model of the psyche, the **id** is the unorganized part of the personality structure that contains a human's basic, instinctual drives. It is the only component of personality that is present from birth.
7. The **pleasure principle** is the instinctual seeking of pleasure and avoiding of pain in order to satisfy biological and psychological needs. Specifically, it is the driving force guiding the id.
8. In Freud's structural model of the psyche, the **ego** seeks to please the id's drive in realistic ways that will benefit in the long term rather than bring grief.



Sigmund Freud

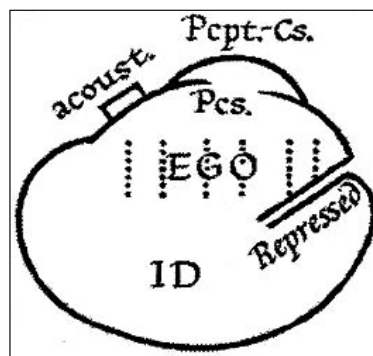


An iceberg is often used to provide a visual representation of Freud's theory that most of the human mind operates unconsciously.

9. In Freudian psychology and psychoanalysis, the **reality principle** is the ability of the mind to assess the reality of the external world, and to act upon it accordingly, as opposed to acting on the pleasure principle.
10. In Freud's structural model of the psyche, The **superego** reflects the internalization of cultural rules, mainly taught by parents applying their guidance and influence.

B. Defense Mechanisms

1. A **defense mechanism** is a coping technique that reduces anxiety arising from unacceptable or potentially harmful impulses. They are unconscious and are not to be confused with conscious coping strategies.
2. **Neurosis** is a class of functional mental disorders involving distress but neither delusions nor hallucinations.
3. **Repression** is the psychological attempt made by an individual to repel one's own desires and impulses toward pleasurable instincts by excluding the desire from one's consciousness and holding or subduing it in the unconscious.



"The ego is not sharply separated from the id; its lower portion merges into it.... But the repressed merges into the id as well, and is merely a part of it. The repressed is only cut off sharply from the ego by the resistances of repression; it can communicate with the ego through the id." (Sigmund Freud, 1923)

4. **Denial** is used for a psychological defense mechanism in which a person is faced with a fact that is too uncomfortable to accept and rejects it instead, insisting that it is not true despite what may be overwhelming evidence.
5. **Regression** is a defense mechanism leading to the temporary or long-term reversion of the ego to an earlier stage of development rather than handling unacceptable impulses in a more adult way.

6. **Reaction-formation** is a defense mechanism in which emotions and impulses which are anxiety-producing or perceived to be unacceptable are mastered by exaggeration of the directly opposing tendency.
7. **Projection**, also known as blame shifting, is a defense mechanism in which humans defend themselves against unpleasant impulses by denying their existence in themselves, while attributing them to others.
8. **Displacement** is an unconscious defense mechanism whereby the mind substitutes either a new aim or a new object for goals felt in their original form to be dangerous or unacceptable.
9. **Rationalization** is a defense mechanism in which controversial behaviors or feelings are justified and explained in a seemingly rational or logical manner to avoid the true explanation.
10. **Intellectualization** is a defense mechanism where reasoning is used to block confrontation with an unconscious conflict and its associated emotional stress where thinking is used to avoid feeling.
11. **Sublimation** is a mature type of defense mechanism where socially unacceptable impulses or idealizations are unconsciously transformed into socially acceptable actions or behavior, possibly resulting in a long-term conversion of the initial impulse.
12. **Stockholm syndrome** is a psychological phenomenon in which hostages express empathy and sympathy and have positive feelings toward their captors, sometimes to the point of defending and identifying with the captors.

C. Freud's Theory of Personality Development

1. An **erogenous zone** is an area of the human body that has heightened sensitivity, the stimulation of which may generate a sexual response.
2. In Freudian psychoanalysis, the term **oral stage** denotes the first psychosexual development stage where in the mouth of the infant is his or her primary erogenous zone.



A baby breastfeeding.

3. The **anal stage** is the second stage in Freud's theory of psychosexual development, lasting from age 18 months to three years. According to Freud, the anus is the primary erogenous zone and pleasure is derived from controlling bladder and bowel movement.
4. The **phallic stage** is the third stage of psychosexual development in Freud's theory, spanning the ages of three to six years, wherein the infant's libido (desire) centers upon his or her genitalia as the erogenous zone.
5. The term **Oedipus complex**, coined by Sigmund Freud, explains the emotions and ideas that the mind keeps in the unconscious, via dynamic repression, that concentrates upon a child's desire to have sexual relations with the parent of the opposite sex.
6. In Neo-Freudian psychology, the **Electra complex** is a girl's psychosexual competition with her mother for possession of her father.
7. **Penis envy** is a stage theorized by Sigmund Freud regarding female psychosexual development, in which female adolescents experience anxiety upon realization that they do not have a penis.
8. In the Freudian model of psychosexual development, the **latency stage** is a period of relative calm between the phallic and genital phases.
9. The **genital stage** is the term used by Sigmund Freud to describe the final stage of human psychosexual development. The individual develops a strong sexual interest in people outside of the family.



Oedipus and the Sphinx, by Gustave Moreau, 1864.

III. Neo-Freudian Theories

1. The **Neo-Freudian** psychologists were a group of loosely linked theorists of the mid-twentieth century, who were all influenced by Sigmund Freud, and who extended his theories, often in social or cultural directions.
2. **Alfred Adler** was the founder of the school of individual psychology. His emphasis on the importance of feelings of inferiority - the inferiority complex - is recognized as isolating an element which plays a key role in personality development.
 - a. An **inferiority complex** is a lack of self-worth and feelings of not measuring up to standards. It is often subconscious, and is thought to drive afflicted individuals to overcompensate, resulting either in spectacular achievement or extreme asocial behavior.
 - b. **Holism** is the idea that systems and their properties should be viewed as wholes, not as collections of parts.
 - c. **Lifestyle** denotes the interests, opinions, behaviors, and orientations of an individual, group, or culture.
 - d. **Fictional final goal** is a central personality dynamic of classical Adlerian psychology which assumes a future-oriented striving toward an ideal goal of significance, superiority, success or completion.
3. **Karen Horney** is credited with founding feminist psychology in response to Freud's theory of penis envy. She disagreed with Freud about inherent differences in the psychology of men and women, and she traced such differences to society and culture rather than biology.
 - a. The ten **neurotic needs**, as set out by Horney, are
 - 1) affection & approval
 - 2) a partner
 - 3) power
 - 4) the need to exploit others
 - 5) social recognition
 - 6) personal admiration
 - 7) personal achievement
 - 8) self sufficiency
 - 9) perfection
 - 10) the need to restrict life practices.
 - b. **Basic anxiety** is a term used by Karen Horney, who believed that neurosis resulted from it. Her theory proposes that coping strategies can be overused, causing them to take on the appearance of needs.



Alfred Adler



Karen Horney

c. **Basic hostility** was described by Horney as a bad attitude a child develops as a result of inappropriate parental behavior - from lack of affection to abuse.

4. **Object relations theory** is a neo-Freudian framework which describes the process of developing a psyche. The theory suggests that the way people relate to others and situations in their adult lives is shaped by family experiences during infancy.
5. **Erich Fromm** was a neo-Freudian theorist who believed that freedom was an aspect of human nature that we either embrace or escape. Embracing our freedom of will is healthy, whereas escaping freedom through the use of escape mechanisms is the root of psychological conflicts.

IV. The Jungian Psyche

1. **Carl Jung** was a Swiss psychiatrist and psychotherapist who founded analytical psychology. His work has been influential not only in psychiatry but also in philosophy, anthropology, archaeology, literature, and religious studies.
2. According to Jungian psychology, **individuation** is a process of psychological integration whereby the personal and collective unconscious are brought into consciousness, active imagination, or free association to be assimilated into the whole personality.
3. **Collective unconscious** refers to structures of the unconscious mind which are shared among human beings.
4. **Jungian archetypes** are highly developed elements of the collective unconscious, universal, archaic patterns and images which are the psychic counterpart of instinct.



Carl Jung

*The Norse trickster god
Loki as depicted on an
18th-century Icelandic
manuscript*



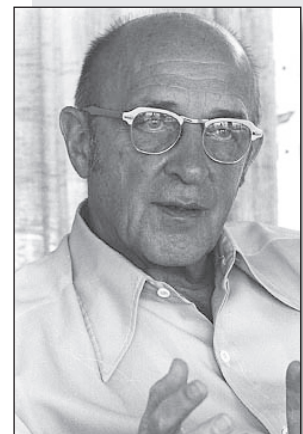
5. A **complex** is a core pattern of emotions, memories, perceptions, and wishes in the personal unconscious organized around a common theme, such as power or status.
6. The **persona**, for Swiss psychiatrist Carl Jung, was the social face the individual presented to the world.
7. An archetype of the collective unconscious, the **anima** and **animus** are the totality of the unconscious feminine psychological qualities that a man possesses or the masculine ones possessed by a woman, respectively.

V. Humanistic Psychology

1. **Humanistic psychology** rose to prominence in the mid-20th century in response to Sigmund Freud's psychoanalytic theory and B. F. Skinner's behaviorism. This approach emphasizes individuals' inherent drive towards self-actualization.
2. **Self-actualization** is the process of realizing and expressing one's own capabilities and creativity.
3. **Phenomenology** is the study of subjective experience.
4. Developed by Kurt Lewin, **force field analysis** provides a framework for looking at the factors that influence a situation, originally social situations, forces that are either driving movement toward a goal or blocking movement toward a goal. The Lewin's equation, $B = f(P, E)$, is an equation of behavior stating that behavior is a function of the person in their environment. It gives importance to a person's momentary situation in understanding his or her behavior, rather than relying entirely on the past.
5. **Client-centered therapy** is a form of talk-psychotherapy developed by Carl Rogers in the 1940s and 1950s. The goal is to provide clients with an opportunity to develop a sense of self where they can realize how their attitudes, feelings and behavior are being negatively affected.
 - a. **Unconditional positive regard**, a concept developed by the humanistic psychologist Carl Rogers, is the basic acceptance and support of a person regardless of what the person says or does, especially in the context of client-centered therapy.



Kurt Lewin



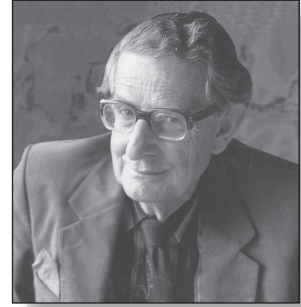
Carl Rogers

- b. According to Carl Rogers, **conditions of worth** are standards laid down by others (within an environment of conditional positive regard) which inhibit a person's self-actualization.
 - c. In the psychology of Carl Rogers, **incongruity** is the gap between the real self and the ideal self. In pursuit of positive regard, this causes people to live lives that include falseness and to not realize their potential.
6. **Maslow's hierarchy of needs** is a theory of psychological health predicated on fulfilling innate human needs in priority, culminating in self-actualization. A **peak experience** is a moment accompanied by a euphoric mental state often achieved by self-actualizing individuals. The concept was originally developed by Abraham Maslow in 1964.

VI. Models of Personality

- 1. **Personality** has to do with individual differences among people in behavior patterns, cognition and emotion. Different theorists present their own definitions of the word based on their theoretical positions.
- 2. A **personality trait** is a habitual pattern of behavior, thought, and emotion.
- 3. The **nomothetic approach** involves measures of a relatively large sample.
- 4. The **idiographic approach** describes studies involving a singular case, or, in other words, case studies.
- 5. **Personality type** refers to the psychological classification of different types of individuals involving qualitative differences between people.
 - a. According to one type theory, a **type A personality** is more competitive, outgoing, ambitious, impatient and/or aggressive.
 - b. A **type B personality** is more relaxed. They are noted to live at lower stress levels. When faced with competition, they may focus less on winning or losing.

6. In his 1967 book *Dimensions of Personality*, **Hans Eysenck** provided a two-dimensional space to describe differences in behavior with two personality dimensions, extraversion and neuroticism.
7. Jeffrey Gray, a former student of Eysenck, developed the **five-factor model** of personality traits, the most widely used model of personality. The traits are openness, conscientiousness, extraversion, agreeableness, and neuroticism.



Hans Eysenck



Personality research conducted on twin subjects suggest that both heritability and environmental factors contribute to the Big Five personality traits.

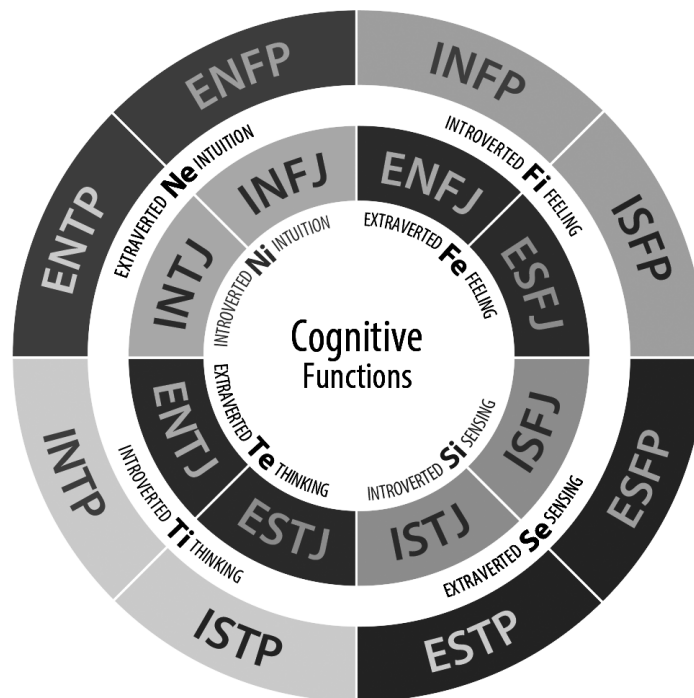
- a. **Openness to experience** is one of the domains describing personality in the Five-Factor Model. It involves six dimensions, including active imagination, aesthetic sensitivity, attentiveness to inner feelings, preference for variety, and intellectual curiosity.
 - b. **Conscientiousness** is the personality trait of being thorough, careful, or vigilant, implying a desire to do a task well, to act in an efficient and organized manner as opposed to being easy-going and disorderly.
 - c. **Extraversion** is the personality trait of tending to be outgoing, talkative, and energetic.
 - d. **Agreeableness** is a personality trait manifesting itself in individual behavioral characteristics that are perceived as kind, sympathetic, cooperative, warm and considerate.
 - e. **Neuroticism** is a fundamental personality trait in the study of psychology characterized by anxiety, fear, moodiness, worry, envy, frustration, jealousy, and loneliness.
8. In the personality trait theory of Gordon Allport, a **cardinal trait** is the trait that dominates and shapes a person's behavior. These are the ruling passions/obsessions, such as a need for money, fame etc.

- a. In the theory of Gordon Allport, a **central trait** is a general characteristic found in some degree in every person. These are the basic building blocks that shape most of our behavior although they are not as overwhelming as cardinal traits. An example would be honesty.
 - b. A **secondary trait** is a characteristic seen only in certain circumstances (such as particular likes or dislikes that a very close friend may know). They must be included to provide a complete picture of human complexity.
9. **Functional autonomy** is the idea that drives can become independent of the original motives for a given behavior.
 10. In the three level model of personality of Dan McAdams, traits are a person's general tendencies while **characteristic adaptations** are a person's desires, beliefs, concerns, and coping mechanisms.
 11. The theory of **narrative identity** postulates that individuals form an identity by integrating their life experiences into an internalized, evolving story of the self, which provides the individual with a sense of unity and purpose in life.



12. **Need theory**, proposed by psychologist David McClelland, is a motivational model that attempts to explain how the needs for achievement, power, and affiliation affect the actions of people.
13. The **Minnesota Multiphasic Personality Inventory** (MMPI) is the most widely used and researched standardized psychometric test of adult personality and psychopathology.

14. The **Myers-Briggs Type Indicator** (MBTI) is an introspective self-report questionnaire designed to indicate psychological preferences in how people perceive the world and make decisions.



A diagram depicting the cognitive functions of each Myers-Briggs personality type.

15. A **projective test** is a personality test designed to let a person respond to ambiguous stimuli, presumably revealing hidden emotions and internal conflicts projected by the person into the test. The **Rorschach test** is a projective, psychological test in which subjects' perceptions of inkblots are recorded and then analyzed using psychological interpretation, complex algorithms, or both.



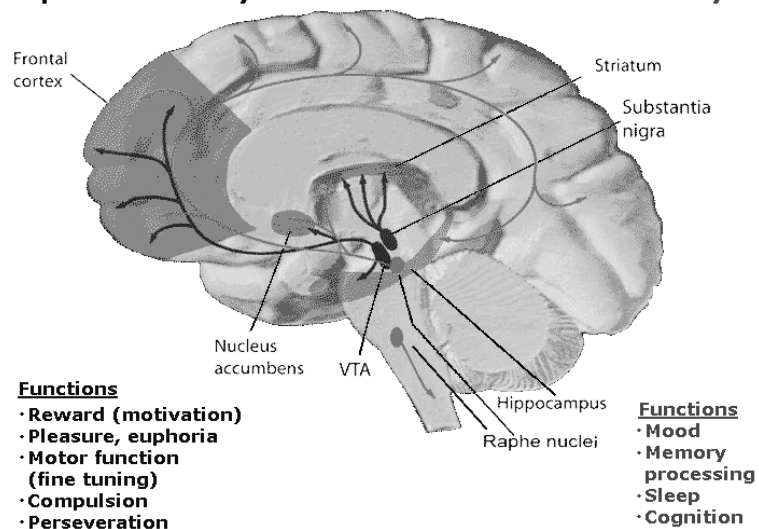
The fourth blot of the Rorschach inkblot test

VII. Biological Basis of Personality

1. Three-Factor Model of Personality developed by **Hans Eysenck** is a causal theory of personality based on activation of reticular formation and limbic system.
 - a. In Eysenck's Three-Factor Model of Personality, extraversion is mediated by the activation of the **reticular formation**.
 - b. In the Three-Factor Model of Personality, neuroticism is associated with the **limbic system**.
2. **Gray's Reinforcement Sensitivity Theory** is based on the idea that there are three brain systems that respond to rewarding and punishing stimuli, the Fight-Flight-Freeze System, Behavioral Inhibition System, and the Behavioral Approach System.
3. The **Cloninger Model of Personality** is based on the idea that different responses stimuli are caused by an interaction of three dimensions: Novelty Seeking (correlated with low dopamine activity), Harm Avoidance (high serotonin activity) and Reward Dependence (low norepinephrine activity).

Dopamine Pathways

Serotonin Pathways



9

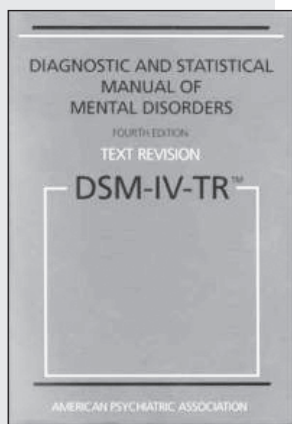
Abnormal Psychology

I. Approaches to Psychological Disorders

1. A **mental disorder** is a mental or behavioral pattern that causes either suffering or a poor ability to function in ordinary life.
2. **Psychopathology** is the scientific study of mental disorders, including efforts to understand their genetic, biological, psychological, and social causes; effective classification schemes; course across all stages of development; manifestations; and treatment.
3. **Biopsychiatry** is an approach to psychiatry that aims to understand mental disorder in terms of the biological function of the nervous system.
4. The **biopsychosocial approach** is a general model or approach to mental illness stating that biological, psychological, and social factors all play a significant role in mental illness.

II. Psychiatric Diagnosis

1. **Dimensional models** of personality disorders conceptualize personality disorders as quantitatively rather than qualitatively different from normal personality.
2. **Categorical models** of personality disorders are based on the boolean presence or absence of symptoms and do not take into account levels of expression of a characteristic or the presence of any underlying dimension.
3. **Prevalence** in epidemiology is the proportion of a population found to have a condition, arrived at by comparing the number of people found to have the condition with the total number of people.
4. The **Robins and Guze criteria for validity** of a diagnostic concept representing a mental disorder were clinical de-



DSM-IV-TR, the predecessor to the most current DSM edition, the DSM-5

scription, laboratory studies, delimitation from other disorders, follow-up studies and family studies.

5. The **Diagnostic and Statistical Manual of Mental Disorders** (DSM), published by the American Psychiatric Association, offers a common language and standard criteria for the classification of mental disorders.
6. **Comorbidity** is the presence of one or more additional disorders (or diseases) co-occurring with a primary disease or disorder.

III. Clinical Syndromes

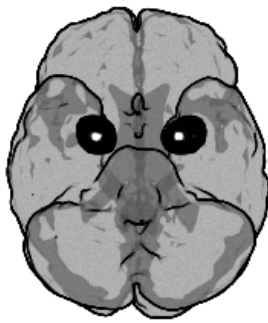
A. Anxiety Disorders

1. **Anxiety sensitivity** refers to the fear of behaviors or sensations associated with the experience of anxiety. Bodily sensations related to anxiety are misattributed as a harmful experience causing more intense anxiety or fear.
2. A **somatic symptom disorder** is a diagnosis requiring symptoms of physical illness or injury which cannot be explained fully by a general medical condition, the direct effect of a substance, and are not attributable to another mental disorder.
3. **Hypochondriasis** refers to worry about having a serious illness. This debilitating condition is the result of an inaccurate perception of the condition of body or mind despite the absence of an actual medical condition.
4. **Panic attacks** are periods of intense fear or apprehension of sudden onset accompanied by at least four or more bodily or cognitive symptoms such as heart palpitations, dizziness, shortness of breath, or feelings of unreality.



Someone who is experiencing a panic attack, being calmed down and reassured by another person.

5. **Panic disorder** is characterized by recurring panic attacks, causing a series of intense episodes of extreme anxiety during panic attacks.
6. **Generalized anxiety disorder** is an anxiety disorder characterized by excessive, uncontrollable and often irrational worry, that is, apprehensive expectation about events or activities.



Generalized anxiety disorder has been linked to disrupted functional connectivity of the amygdala and its processing of fear and anxiety.

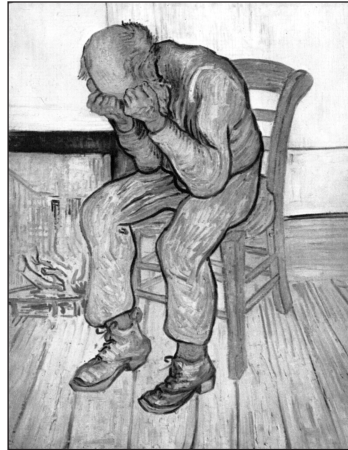
7. **Social anxiety disorder** is an anxiety disorder characterised by an intense fear in one or more social situations causing considerable distress and impaired ability to function in at least some parts of daily life.
8. A **phobia** is a type of anxiety disorder, usually defined as a persistent fear of an object or situation in which the sufferer commits to great lengths in avoiding, typically disproportionate to the actual danger posed.
9. A **specific phobia** is any kind of anxiety disorder that amounts to an unreasonable or irrational fear related to exposure to specific objects or situations.
10. **Obsessive-compulsive disorder** is a mental disorder where people feel the need to check things repeatedly, have certain thoughts repeatedly, or feel they need to perform certain routines repeatedly.
 - a. **Obsessions** are thoughts that recur and persist despite efforts to ignore or confront them.
 - b. **Compulsions** are acts performed persistently and repetitively without necessarily leading to an actual reward or pleasure.



Dermatophagia - extreme nail biting / biting of skin occurs in some people with obsessive compulsive disorder (OCD).

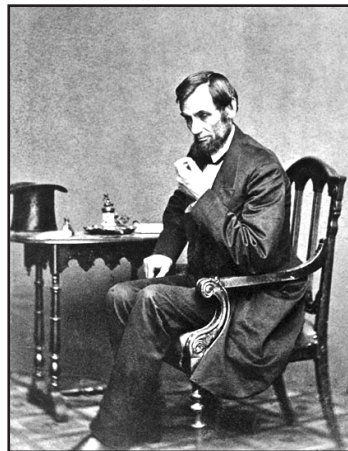
B. Mood Disorders

1. **Mood disorder** is a group of diagnoses in the Diagnostic and Statistical Manual of Mental Disorders classification system where a disturbance in the person's mood is hypothesized to be the main underlying feature.



Vincent van Gogh's 1890 painting, Sorrowing Old Man ('At Eternity's Gate').

2. **Major depressive disorder** is a mental disorder characterized by a pervasive and persistent low mood that is accompanied by low self-esteem and by a loss of interest or pleasure in normally enjoyable activities. A **major depressive episode** is a period characterized by the symptoms of major depressive disorder.



Abraham Lincoln suffered from "melancholy", a condition that now may be referred to as clinical depression.

3. **Anhedonia** is defined as the inability to experience pleasure from activities usually found enjoyable, e.g. exercise, hobbies, music, sexual activities or social interactions.
4. **Dysthymia** is a mood disorder consisting of the same cognitive and physical problems as in depression, with less severe but longer-lasting symptoms.

5. **Behavioral activation** is an idiographic and functional approach to depression. It argues that people with depression act in ways that maintain their depression and locates the origin of depressive episodes in the environment.
6. The **monoamine hypothesis of depression**, postulates that the deficit of certain neurotransmitters is responsible for the features of depression. **Monoamines** are neurotransmitters and neuromodulators that include serotonin, dopamine, norepinephrine, and epinephrine.

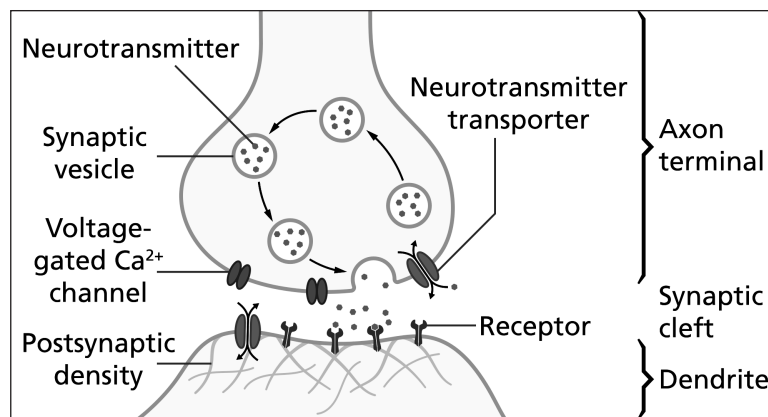


Diagram of a chemical synapse between two neurons. Most antidepressants influence the overall balance of three neurotransmitters: serotonin, norepinephrine, and dopamine. Some antidepressants act on neurotransmitter receptors.

7. **Beck's cognitive triad** represents three types of negative thoughts present in depression. These are thoughts about the self, the world, and the future.
8. A **negative schema** is a fundamental underlying way in which a person processes information reflecting a negative view of the self, the world, or the future.
9. **Cognitive distortions** are exaggerated or irrational thought patterns that are believed to perpetuate the effects of psychopathological states, especially depression and anxiety.
10. **Seasonal affective disorder** is a mood disorder subset in which people who have normal mental health throughout most of the year experience depressive symptoms in the winter or summer.



Bright light therapy is a common treatment for seasonal affective disorder and for circadian rhythm sleep disorders.

11. **Bipolar disorder** is a mental disorder characterized by periods of elevated mood and periods of depression. The elevated mood is significant and is known as mania or hypomania depending on the severity or whether there is psychosis.



Bipolar disorder is characterized by transitions between depression and mania

- a. **Bipolar I disorder** is a bipolar spectrum disorder characterized by the occurrence of at least one manic or mixed episode.
- b. **Bipolar II disorder** is a bipolar spectrum disorder characterized by at least one episode of hypomania and at least one episode of major depression. Diagnosis requires that the individual must never have experienced a full manic episode.
- c. **Mania** is the mood of an abnormally elevated arousal energy level, or a state of heightened overall activation with enhanced affective expression together with lability of affect.
- d. **Hypomania** is a mood state characterized by persistent disinhibition and pervasive elevated (euphoric) or irritable mood but generally less severe than full mania.
- e. **Cyclothymia** is a type of chronic mood disorder widely considered to be a more chronic but milder or sub-threshold form of bipolar disorder.

C. Dissociative Disorders

1. **Dissociative disorders** are conditions involving disruptions or breakdowns of memory, awareness, identity, or perception.
2. **Depersonalization disorder** (DPD) is a mental disorder in which the sufferer has persistent or recurrent feelings of being a detached observer of themselves and/or derealization.
3. **Dissociative amnesia** (dissociative fugue) is a dissociative disorder characterized by retrospectively reported memory gaps. These gaps involve an inability to recall personal information, usually of a traumatic or stressful nature.

4. **Dissociative identity disorder** is a mental disorder characterized by the appearance of at least two distinct, relatively enduring identities or dissociated personality states that alternately control a person's behavior, accompanied by memory impairment not explained by ordinary forgetfulness.

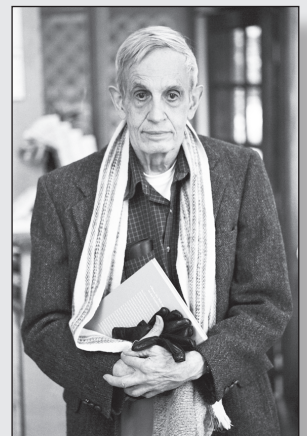


An artist's interpretation of one person with dissociative identity disorder

5. **Derealization** is an alteration in the perception or experience of the external world so that it seems unreal.
6. **Conversion disorder** causes patients to suffer from neurological symptoms, such as numbness, blindness, paralysis, or fits without a definable organic cause.

D. Schizophrenia

1. **Schizophrenia** is a mental disorder often characterized by abnormal social behavior and failure to recognize what is real. Common symptoms include false beliefs, unclear or confused thinking, auditory hallucinations, reduced social engagement, and lack of motivation.
- Schizophrenia, **paranoid type**, is the most common type of schizophrenia. The clinical picture is dominated by relatively stable, often persecutory, delusions, usually accompanied by hallucinations.
 - The prominent characteristics of schizophrenia, **disorganized type** are disorganized behavior and speech, including loosened associations and word salad, and flat or inappropriate affect. Delusions and hallucinations are not prominent features.
 - With schizophrenia, **catatonic type**, the subject may be almost immobile or exhibit agitated, purposeless



John Nash, an American mathematician and joint winner of the 1994 Nobel Prize for Economics, who had schizophrenia.

movement. Symptoms can include stupor and decreased response to stimuli and a tendency to remain in an immobile posture.

2. **Positive symptoms** are those that most individuals do not normally experience but are present in people with schizophrenia. They can include delusions, disordered thoughts and hallucinations, typically regarded as manifestations of psychosis.
3. **Negative symptoms** are deficits of normal emotional responses or of other thought processes, and are less responsive to medication. They commonly include flat expressions or little emotion, inability to experience pleasure, and lack of motivation.
4. A **prodrome** is an early symptom (or set of symptoms) that might indicate the start of a disease before specific symptoms occur.
5. **Psychosis** refers to an abnormal condition of the mind described as involving a 'loss of contact with reality', personality changes and thought disorder. Depending on its severity, this may be accompanied by unusual or bizarre behavior.
6. A **delusion** is a belief held with strong conviction despite superior evidence to the contrary. As a pathology, it is distinct from a belief based on false or incomplete information, confabulation, dogma, illusion, or other effects of perception.
 - a. **Delusions of reference** describe the phenomenon of an individual's experiencing innocuous events or mere coincidences and believing they have strong personal significance.
 - b. With **delusions of persecution** the affected person believes that harm is occurring, or is going to occur. They have a delusion that an individual or individuals have the intention to cause them harm.
 - c. **Delusions of grandeur** are characterized by fantastical beliefs that one is famous, omnipotent, wealthy, or otherwise very powerful. The delusions are generally fantastic and typically have a supernatural, science-fictional, or religious theme.

E. Personality Disorders

1. **Personality disorders** are characterized by enduring maladaptive patterns of behavior, cognition, and inner experience, exhibited across many contexts and deviating markedly from those accepted by the individual's culture.
2. **Paranoid personality disorder** is a mental disorder characterized by pervasive, long-standing suspiciousness and generalized mistrust of others.
3. **Schizotypal personality disorder** is a personality disorder characterized by a need for social isolation, anxiety in social situations, odd behavior and thinking, and often unconventional beliefs.
4. **Magical thinking** is the attribution of causal relationships between actions and events which seemingly cannot be justified by reason and observation.
5. **Histrionic personality disorder** is characterized by a pattern of excessive attention-seeking emotions, usually beginning in early adulthood, including inappropriately seductive behavior and an excessive need for approval.
6. **Narcissistic personality disorder** is a personality disorder in which a person is excessively preoccupied with personal adequacy, power, prestige and vanity, mentally unable to see the destructive damage they are causing to themselves and others.
7. **Avoidant personality disorder** corresponds to a pervasive pattern of social inhibition, feelings of inadequacy and inferiority, extreme sensitivity to negative evaluation, and avoidance of social interaction despite a strong desire to be close to others.
8. **Dependent personality disorder** is a personality disorder that is characterized by a pervasive psychological dependence on other people.
9. **Obsessive-compulsive personality disorder** is characterized by a general pattern of concern with orderliness, perfectionism, and excessive attention to details. This is a distinct disorder from obsessive-compulsive disorder, which is an anxiety, rather than a personality, disorder.



*Narcissus by Caravaggio,
gazing at his own reflection.*

10. **Borderline personality disorder** includes a pattern of impulsivity and instability of behaviors, interpersonal relationships, and self-image. The pattern is present by early adulthood and occurs across a variety of situations and contexts.
11. **Antisocial personality disorder** is characterized by a pervasive pattern of disregard for, or violation of, the rights of others. There may be an impoverished moral sense or conscience and a history of crime, legal problems, and impulsive and aggressive behavior.
12. **Conduct disorder** is diagnosed in childhood or adolescence. It presents itself through a repetitive and persistent pattern of behavior in which the basic rights of others or major age-appropriate norms are violated. It is often seen as the precursor to antisocial personality disorder.
13. **Psychopathy** is traditionally defined as a personality disorder characterized by enduring antisocial behavior, diminished empathy and remorse, and disinhibited or bold behavior.

F. Substance Abuse and Dependence

1. **Substance abuse**, also known as drug abuse, is a patterned use of a drug in which the user consumes the substance in amounts or with methods which are harmful to themselves or others.
2. **Drug dependence** is an adaptive state that develops from repeated drug administration, and which results in withdrawal upon cessation of drug use.
3. **Drug addiction**, a distinct concept from substance dependence, is defined as compulsive, out-of-control drug use, despite negative consequences.

10

Treatment of Mental Disorders

I. Psychotherapy

Psychotherapy is the use of psychological methods, particularly when based on regular personal interaction, to help a person change and overcome problems in desired ways.

A. Psychoanalysis

1. **Insight-oriented psychotherapy** relies on conversation between the therapist and the client. It helps people through understanding and expressing feelings, motivations, beliefs, fears and desires.
2. In **free association**, psychoanalytic patients are invited to relate whatever comes into their minds during the analytic session, and not to censor their thoughts.
3. In psychodynamic psychotherapy, **working through** is seen as the process of repeating, elaborating, and amplifying interpretations. It is believed that such a process is critical to the success of therapy.
4. **Interpersonal psychotherapy** is a time-limited treatment that encourages the patient to regain control of mood and functioning. It is based on the principle that there is a relationship between the way people communicate and interact with others and their mental health.

B. Humanistic Therapy

1. **Existential psychotherapy** is a philosophical method of therapy that operates on the belief that inner conflict within a person is due to that individual's confrontation with the givens of existence.
2. **Logotherapy** is founded upon the belief that the striving to find a meaning in one's life that is the primary, most powerful motivating and driving force in humans.

3. **Gestalt therapy** is an existential-experiential form of psychotherapy that emphasizes personal responsibility, focusing on the individual's experience in the present moment and the self-regulating adjustments people make as a result of their overall situation.
4. **Client-centered therapy** is a form of talk-psychotherapy developed by Carl Rogers in the 1940s and 1950s. The goal is to provide clients with an opportunity to develop a sense of self where they can realize how their attitudes, feelings and behavior are being negatively affected.
5. **Motivational interviewing** is a goal-oriented, client-centered counseling style for eliciting behavior change by helping clients to explore and resolve ambivalence.
6. **Emotionally focused therapy** proposes that human emotions have an innately adaptive potential that, if activated, can help clients change problematic emotional states or unwanted self-experiences.
7. **Systemic therapy** seeks to address people not only on the individual level, as had been the focus of earlier forms of therapy, but also as people in relationships, dealing with the interactions of groups and their interactional patterns and dynamics.

C. Behavioral Therapy

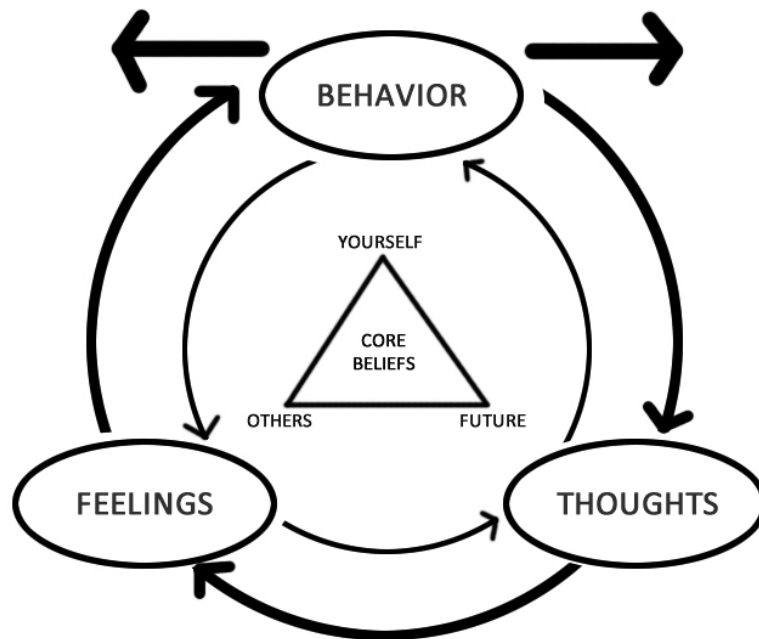
1. **Behavior therapy** is a broad term referring to psychotherapy in which the methods focus on either just behaviors or in combination with thoughts and feelings that might be causing them.
2. **Systematic desensitization** is a type of behavior therapy used to help effectively overcome phobias and other anxiety disorders. More specifically, it is a form of counter conditioning, a type of Pavlovian therapy.
3. **Exposure therapy** is a technique in behavior therapy used to treat anxiety disorders. It involves the exposure of the patient to the feared object or context without any danger, in order to overcome their anxiety.
4. In **response prevention** treatment the escape response is maintained at all times and not just during specific practice sessions. Not only does the subject experience ha-

bituation to the feared stimulus, they also practice a fear-incompatible behavioral response.

5. **Reciprocal inhibition** is a technique in behavior theory in which training occurs to inhibit anxiety with a feeling or response that is not compatible with the feeling of anxiety.
6. **Counterconditioning** is the conditioning of an unwanted behavior or response to a stimulus into a wanted behavior or response by the association of positive actions with the stimulus.
7. **Participant modeling** is a behavior therapy technique in which the therapist models a problematic situation and then guides the patient through steps to cope with it unassisted.
8. **Assertiveness training** is a form of therapy based on the idea that a person could not be both assertive and anxious at the same time, and thus being assertive would inhibit anxiety.
9. In **aversion therapy**, the patient is exposed to a stimulus while simultaneously being subjected to some form of discomfort. This conditioning is intended to cause the patient to associate the stimulus with unpleasant sensations in order to stop the specific behavior.

D. Cognitive Behavioral Therapy

1. **Cognitive-behavioral therapy** works to solve current problems and change unhelpful thinking and behavior using a combination of basic behavioral and cognitive principles. It was originally designed to treat depression, but is now used for a number of mental disorders.
2. A **cognitive distortion** is an exaggerated or irrational thought patterns that is believed to perpetuate the effects of psychopathological states, especially depression and anxiety.
3. **Dialectical behavior therapy** is designed to help people change patterns of behavior that are not helpful, such as self-harm and substance abuse. It works towards helping people learn about the triggers that lead to reactive states and which coping skills to apply to help avoid undesired reactions.



The diagram depicts how emotions, thoughts, and behaviors all influence each other. The triangle in the middle represents cognitive behavior therapy's tenet that all humans' core beliefs can be summed up in three categories: self, others, future.

4. **Rational Emotive Behavior Therapy** is a long-standing form of cognitive-behavior therapy. A fundamental premise is that humans do not get emotionally disturbed by unfortunate circumstances, but by how they construct their views of these circumstances.

E. Group Therapy

1. **Group therapy** is a form of psychodynamic therapy where the system of behaviors and psychological processes occurring within a social group are utilized as a mechanism of change.
2. **Family therapy** is a branch of psychotherapy that works with families and couples in intimate relationships to nurture change and development. It emphasizes family relationships as an important factor in psychological health.
3. A **twelve-step program** is a set of guiding principles outlining a course of action for tackling problems including alcoholism, drug addiction and compulsion. It was originally proposed by Alcoholics Anonymous as a method of recovery from alcoholism.



Group psychotherapy

II. Biological Treatments

1. **Pharmacotherapy** is therapy using pharmaceutical drugs.

- a. An **anxiolytic** is a medication or other intervention that inhibits anxiety.
- b. An **antidepressant** is a drug used for the treatment of major depressive disorder and other conditions.



Blister pack of Prozac (fluoxetine), a selective serotonin reuptake inhibitor

- c. A **mood stabilizer** is a psychiatric medication used to treat mood disorders characterized by intense and sustained mood shifts, typically bipolar disorder.
- d. **Antipsychotics** are a class of psychiatric medication primarily used to manage psychosis, in particular in schizophrenia and bipolar disorder, and are increasingly being used in the management of non-psychotic disorders.



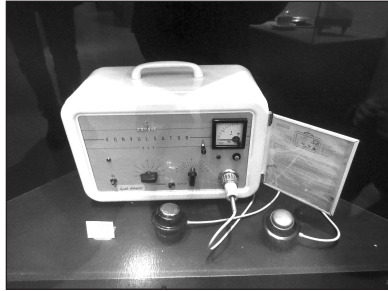
Olanzapine, an example of a second-generation antipsychotic.

- e. **Psychostimulants** are psychoactive drugs that induce temporary improvements in either mental or physical functions or both.

Ritalin sustained-release (SR) 20 mg tablets



2. **Electroconvulsive therapy** is a psychiatric treatment in which seizures are electrically induced in patients to provide relief from psychiatric illnesses.



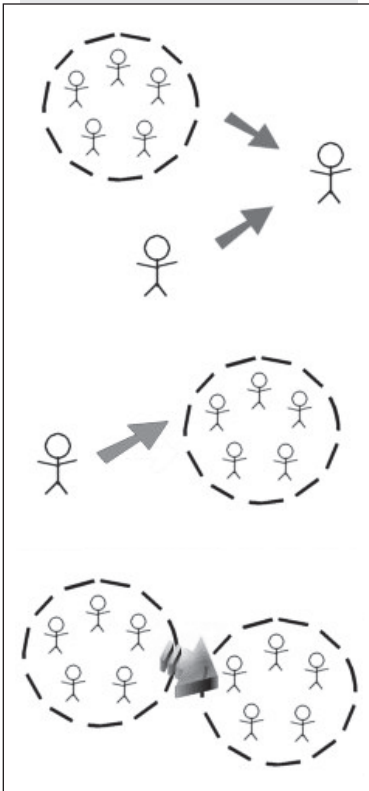
ECT device produced by Siemens AG, and used at the Eg Asyl mental hospital in Kristiansand, Norway, from the 1960s to the 1980s.

3. **Psychosurgery** is the neurosurgical treatment of mental disorder, a controversial medical field.

Interaction and Social Behavior

I. Social Influence

1. **Social psychology** is the scientific study of how people's thoughts, feelings, and behaviors are influenced by the actual, imagined, or implied presence of others.
2. **Social constructionism** is a theory of knowledge that examines the development of jointly constructed understandings of the world. A major focus is to uncover the ways in which individuals and groups participate in the construction of their perceived social reality.
3. **Game theory** is the study of mathematical models of conflict and cooperation between intelligent rational decision-makers, an umbrella term for the science of logical decision making.
4. **Social action** refers to an act which takes into account the actions and reactions of individuals. According to Max Weber, an action is social if the acting individual takes account of the behavior of others and is thereby oriented in its course.
5. **Reciprocal determinism** refers to Bandura's triad of causation involving personal factors, the environment, and behavior. Behavior is determined by the individual through cognitive processes in feedback with the environment through external social stimulus events.
6. The **need-to-belong theory** seeks to show that humans have a natural need to push to form relationships. This push is what helps to distinguish it as a need instead of a desire.
7. **Social facilitation** is the tendency for people to do better on simple tasks when in the presence of other people.
8. **Social comparison theory** explains how individuals evaluate their own opinions and abilities by comparing themselves to others in order to reduce uncertainty in these



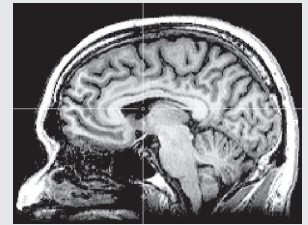
Social psychologists study interactions within groups, and between both groups and individuals.

domains, and learn how to define the self.

9. The **Michelangelo phenomenon** is a phenomenon observed by psychologists in which interdependent individuals influence each other to develop toward what they themselves consider as their 'ideal selves.'
10. A **peer group** is both a social group and a primary group of people who have similar interests, age, background, or social status.
11. **Peer pressure** is influence a peer group, observers or individual exerts that encourages others to change their attitudes, values, or behaviors to conform to groups.
12. **Cognitive dissonance** is the mental stress or discomfort experienced by an individual who holds two or more contradictory beliefs, ideas, or values at the same time



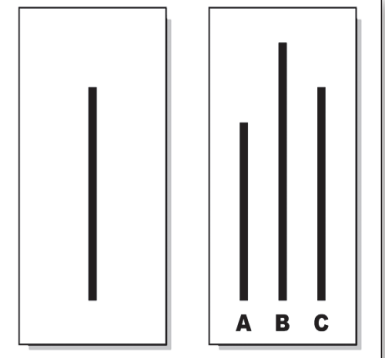
*"The Fox and the Grapes" by Aesop.
When the fox fails to reach the grapes, he decides he does not want them after all.
Rationalization (making excuses) is often involved in reducing anxiety about conflicting cognitions, according to cognitive dissonance theory.*



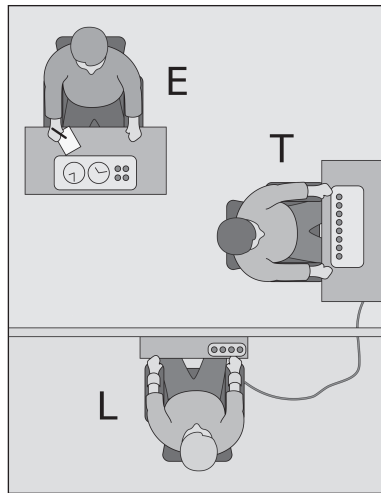
Evidence suggests that the more the anterior cingulate cortex signals conflict, the more dissonance a person experiences and the more their attitudes may change.

13. The **identity shift effect** seeks to explain how responding to peer pressure may lead to altered attitudes. Social comparison first compels conformity. Subsequent cognitive dissonance leads to adoption of group attitudes to resolve inner conflict.
14. The **Asch paradigm** refers to a series of studies on how individuals yield to or defy a majority group and the effect of such influences on beliefs and opinions. The studies revealed that while many subjects would 'just go along', there were considerable individual differences.

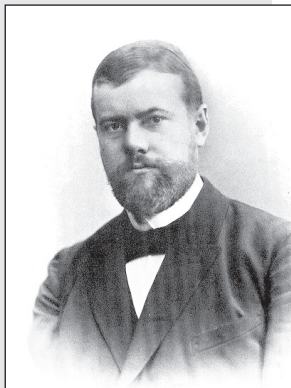
Which line matches the first line, A, B, or C? In the Asch conformity experiments, people frequently followed the majority judgment, even when the majority was (objectively) wrong.



15. **Obedience** in human behavior is a form of social influence in which a person yields to explicit instructions or orders from an authority figure.
16. The **Milgram experiment** on obedience was a series of social psychology experiments conducted that measured the willingness of study participants to obey an authority figure who instructed them to perform acts conflicting with their personal conscience.



The Milgram experiment: The experimenter (E) persuades the participant (T) to give what the participant believes are painful electric shocks to another participant (L), who is actually an actor. Many participants continued to give shocks despite pleas for mercy from the actor.



Max Weber (1864–1920), one of the first scholars to study cults.

17. **Deindividuation** is a concept in social psychology that is generally thought of as the loss of self-awareness in groups.
18. A **cult** is a religious or social group with socially deviant or novel beliefs and practices. However, whether any particular group's beliefs and practices are sufficiently deviant or novel is often unclear, thus making a precise definition problematic.
19. **Risky shift** refers to the phenomenon that after participating in a discussion group, members tend to advocate more extreme positions and call for riskier courses of action than individuals who did not participate in any such discussion.
20. An **illusion of invulnerability** is an inflated certainty that the right decision has been made by a group while significantly overrating its own abilities in decision-making.
21. **Group polarization** refers to the tendency for groups to make decisions that are more extreme than the initial inclination of its members.

22. **Groupthink** is a psychological phenomenon that occurs within a group of people, in which the desire for harmony or conformity in the group results in an irrational or dysfunctional decision-making outcome.

Groupthink

by William H. Whyte Jr.



thing has been taking
ry—and almost without
a country where “in-
pendence and self-reli-
tchword for three cen-
; now coming to be ac-

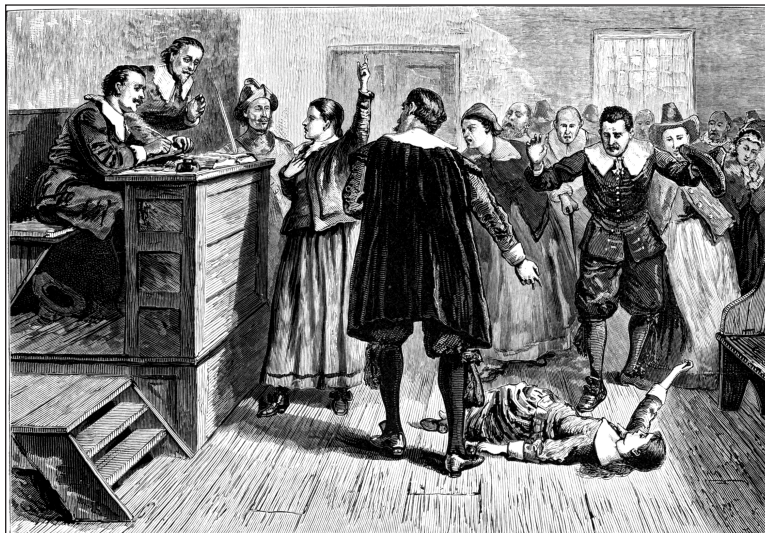
phenomena; recent public-opinion polls,
slick-magazine fiction, current best-sellers,
all document the same trend. Groupthink
is becoming a national philosophy.

Groupthink being a coinage—and, ad-
mittedly, a loaded one—a working defini-

Huxley's *Brave New W*
well's *Nineteen Eighty*-
danger, however, is some
It is not that the layma
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William H. Whyte, Jr. coined the term “Groupthink” in 1952 in Fortune magazine.

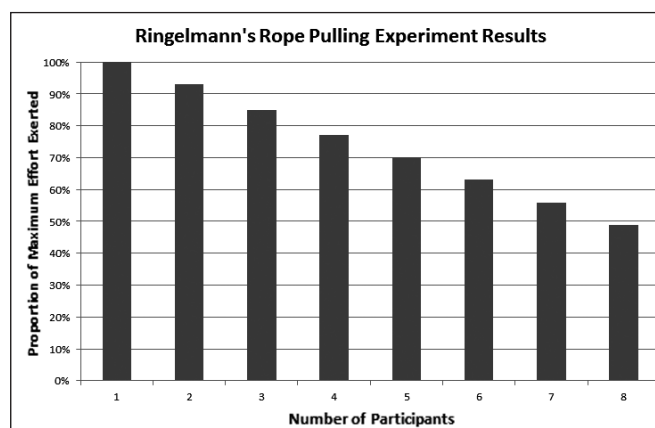
23. **Social disruption** is a term used in sociology to describe the alteration or breakdown of social life, often in a community setting.
24. **Mass hysteria** refers to collective delusions of threats to society that spread rapidly through rumors and fear.



Adolescent girls Abigail Williams, Betty Parris, Ann Putnam, Jr., and Elizabeth Hubbard began to have fits that were described by a minister as “beyond the power of Epileptic Fits or natural disease to effect.” The events resulted in the Salem witch trials, an example of mass hysteria, which resulted in the deaths of 25 citizens of Salem and nearby towns.

II. Social Behavior

1. **Prosocial behavior** is a social behavior that benefits other people or society as a whole, such as helping, sharing, donating, co-operating, and volunteering.
2. A social relation or **social interaction** is any relationship between two or more individuals. Such relationships derived from individual agency form the basis of social structure and the basic object for analysis by social scientists
3. **Self-monitoring** is defined as a personality trait that refers to an ability to regulate behavior to accommodate social situations.
4. **Display rules** are a social group's informal norms about when, where, and how one should express emotions.
5. **Pluralistic ignorance** is a situation in which a majority of group members privately reject a norm, but incorrectly assume that most others accept it, and therefore go along with it.
6. **Diffusion of responsibility** is a phenomenon whereby a person is less likely to take responsibility for action or inaction when others are present. The individual assumes that others either are responsible for taking action or have already done so.
7. The **bystander effect** is a social psychological phenomenon that refers to cases in which individuals do not offer any means of help to a victim when other people are present.
8. **Social loafing** is the phenomenon of people exerting less effort to achieve a goal when they work in a group than when they work alone.



The first known research on the social loafing effect began in 1913 with Max Ringelmann's study. He found that when he asked a group of men to pull on a rope, that they did not pull as hard collectively as they did when each was pulling alone.

9. **Altruism** or selflessness is the principle or practice of concern for the welfare of others. It is a traditional virtue in many cultures and a core aspect of various religious traditions and secular worldviews.

a. **Empathy-altruism** is a form of altruism based on feelings for others.



Volunteers assist Hurricane victims at the Houston Astrodome, following Hurricane Katrina.

b. **Cooperation** is the process of groups of organisms working or acting together for their common/mutual benefit, as opposed to working in competition for self-ish benefit.

c. **Inclusive fitness** is a model for the evolution of social behaviors through the indirect reproduction of copies of a trait in other individuals. Alongside reciprocal altruism, inclusive fitness is considered one of the two primary mechanisms of the evolution of social behaviors in natural species.

10. **Aggression** is overt, often harmful, social interaction with the intention of inflicting damage or other unpleasantness upon another individual.

11. **Relational aggression**, also known as covert aggression, or covert bullying is a type of aggression in which harm is caused by damaging someone's relationships or social status.

III. Socialization

1. **Socialization** refers to the lifelong process of inheriting and disseminating norms, customs, and ideologies, providing an individual with the skills and habits necessary for participating within their own society.
 - a. **Primary socialization** occurs during childhood and is when a child learns the attitudes, values and actions appropriate to individuals as members of a particular culture.
 - b. **Secondary socialization** refers to the process of learning what is the appropriate behavior as a member of a smaller group within the larger society.
 - c. **Anticipatory socialization** refers to the processes of socialization in which a person rehearses for future positions, occupations, and social relationships.
 - d. **Resocialization** refers to the process of discarding former behavior patterns and reflexes, accepting new ones as part of a transition in one's life.
2. **Norms** are collective representations of acceptable group conduct as well as individual perceptions of particular group conduct.



Shaking hands after a sports match is an example of a social norm.

3. **Mores** refer to social norms that are widely observed and are considered to have greater moral significance than others.
4. A **taboo** is a vehement prohibition of an action based on the belief that such behavior is either too sacred or too accursed for ordinary individuals to undertake, under threat of supernatural punishment.

5. **Deviance** describes an action or behavior that violates social norms, including a formally enacted rule (e.g., crime), as well as informal violations of social norms (e.g., rejecting folkways and mores).
6. **Social stigma** is the extreme disapproval of (or discontent with) a person or group on socially characteristic grounds that are perceived, and serve to distinguish them, from other members of a society.
7. **Social control measures** are measures intended to prevent, limit, punish or stigmatize behavior considered undesirable by those imposing the measures.
8. **Conformity** is the act of matching attitudes, beliefs, and behaviors to group norms. Norms are implicit, unsaid rules, shared by a group of individuals, that guide their interactions with others.
9. **Compliance** is public conformity, while possibly keeping one's own original beliefs for yourself. It is motivated by the need for approval and the fear of being rejected.
10. **Identification** is conforming to someone who is liked and respected, such as a celebrity or a favorite uncle. This can be motivated by the attractiveness of the source. It is a deeper type of conformism than compliance.
11. **Internalization** is accepting the belief or behavior and conforming both publicly and privately, if the source is credible. It is the deepest influence on people and has long-lasting effects.
12. **Labeling theory** is the theory of how the self-identity and behavior of individuals may be determined or influenced by the terms used to describe or classify them. It is associated with the concepts of self-fulfilling prophecy and stereotyping.
13. In criminology, **differential association** is a theory proposing that through interaction with others, individuals learn the values, attitudes, techniques, and motives for criminal behavior.



Prohibited activities are an example of social control

IV. Attitudes and Persuasion

1. **Social cognitive theory** holds that portions of an individual's knowledge acquisition can be directly related to observing others within the context of social interactions, experiences, and outside media influences.
2. **Belief** is the state of mind in which a person thinks something to be the case, with or without there being empirical evidence to prove that something is the case with factual certainty.
3. An **attitude** is an expression of favor or disfavor toward a person, place, thing, or event. It is a belief that includes an emotional component.
 - a. The **cognitive component** of attitudes refer to the beliefs, thoughts, and attributes that we would associate with an object. Many times a person's attitude might be based on the negative and positive attributes they associate with an object.
 - b. The **affective component** of attitudes refer to your feelings or emotions linked to an attitude object.
 - c. The **behavioral component** of attitudes refer to past behaviors or experiences regarding an attitude object. The idea that people might infer their attitudes from their previous actions.
4. **Persuasion** is a social influence or process aimed at changing a person's beliefs, attitudes, intentions, motivations, or behaviors.
5. The **functional** view of attitudes suggests that in order for attitudes to change (e.g., via persuasion), appeals must be made to the function(s) that a particular attitude serves for the individual.
 - a. An attitude serving a **utilitarian function** is perceived to be helpful to a person in facilitating rewards or in helping them avoid punishment.
 - b. An attitude serving a **knowledge function** help people maintain an organized, meaningful, and stable view of the world.

- c. An attitude serving an **ego-defensive function** involves the protection from psychological harm through defense mechanisms including denial, repression, projection, and rationalization.
 - d. An attitude serving a **value-expressive function** serves to express one's central values and self-concept, tending to establish our identity and gain us social approval.
6. The **Elaboration Likelihood Model** (ELM) of persuasion is a dual process theory describing how attitudes form and change. The model aims to explain different ways of processing stimuli, why they are used, and their outcomes on attitude change. **Dual process theory** provides an account of how a phenomenon can occur in two different ways, or as a result of two different processes. Often, the two processes consist of an implicit, unconscious process and an explicit, conscious process.
- a. With **central route processing**, persuasion results from thoughtful consideration of the true merits of the information presented in support of an advocacy. The resulting attitude change will be relatively enduring, resistant, and predictive of behavior.
 - b. With **peripheral route processing**, persuasion results from association with positive or negative cues in the stimulus or making a simple inference about the merits of the advocated position.
7. The **name-letter effect** refers to a person's tendency to favor the letters in their name over the other letters of the alphabet and it is one of the widest used measures of implicit self-esteem.
8. **Self-perception theory** is an account of attitude formation which asserts that people develop their attitudes (when there is no previous attitude) by observing their own behavior and concluding what attitudes must have caused it.
9. The **foot-in-the-door technique** is a compliance tactic that involves getting a person to agree to a large request by first setting them up by having that person agree and consummate a modest request.

10. The **door-in-the-face technique** is a compliance method in which the persuader attempts to convince the respondent by making a large request that the respondent will most likely turn down. The respondent is then more likely to agree to a second, more reasonable request.
11. The **low-ball** is a persuasion technique in which an item or service is offered at a lower price than is actually intended to be charged, after which the price is raised. If a person is already enjoying the prospect of the item or idea, then backing out would create cognitive dissonance.

V. Social Perception

1. **Social perception** is the study of how people form impressions of and make inferences about other people.
2. **Emotional expressions** in psychology are observable verbal and nonverbal behaviors that communicate an internal emotional or affective state.
3. **Implicit personality theory** describes the specific patterns and biases an individual uses when forming impressions based on a limited amount of initial information about an unfamiliar person.
4. **Attribute theory** describes how people view trait stability in another person.
5. The **self-based heuristic** describes the strategy that observers use when provided limited trait information about another person, in which case they fill in the gaps with trait information that reflects their own personality.
6. **Impression management** is a goal-directed conscious or subconscious process in which people attempt to influence the perceptions of other people by regulating and controlling information in social interaction.
7. The **halo effect** describes the tendency of an observer to form a generally favorable, unfavorable, or average impression of a specific person, and to allow that general impression to have an exaggerated effect on their judgments of that person along other trait dimensions.
8. A **self-serving bias** is any cognitive or perceptual process that is distorted by the need to maintain and enhance self-

esteem, or the tendency to perceive oneself in an overly favorable manner.

9. **Attribution** is the process by which individuals explain the causes of behavior and events.
 - a. **Situational attribution**, also called external attribution, refers to interpreting someone's behavior as being caused by the situation that the individual is in.
 - b. **Dispositional attribution** is the explanation of individual behavior as a result caused by internal characteristics that reside within the individual, as opposed to external influences that stem from the environment or culture in which that individual is found.
 - c. **Attribute substitution** is thought to underlie a number of cognitive biases and perceptual illusions. It occurs when an individual has to make a judgment that is computationally complex, and instead substitutes a more easily calculated heuristic attribute.
 - d. The **fundamental attribution error** is the tendency for people to place an undue emphasis on internal characteristics (personality) to explain someone else's behavior in a given situation rather than considering the situation's external factors.
 - e. **Self-serving attribution bias** leads a person to attribute positive outcomes to one's internal disposition but negative outcomes to factors beyond one's control e.g. others, chance or circumstance.
 - f. In attributing an individual's behavior as either dispositional or situational, **consensus information** is information on how other people in the same situation and with the same stimulus behave. **Distinctiveness information** is information on how the individual responds to different stimuli. **Consistency information** is information on the individual's behavior with similar stimulus but varied situations.
 - g. According to **correspondent inference theory**, a perceiver compares actions with alternative actions to evaluate the choices available to the actor. The more distinctive the consequences of a choice, the more confidently the perceiver infers intention and disposition.

10. **Social status** is the position or rank of a person or group, within the society.

- a. **Ascribed status** is the social status a person is assigned at birth or assumed involuntarily later in life. It is a position that is neither earned nor chosen but assigned.
- b. **Achieved status** is a social position that a person can acquire on the basis of merit. It is a position that is earned or chosen.
- c. **Master status** is the social position that is the primary identifying characteristic of an individual. It is defined as “a status that has exceptional importance for social identity, often shaping a person’s entire life.



Physician is an achieved status.

11. A **role** is a set of connected behaviours, rights, obligations, beliefs, and norms as conceptualised by people in a social situation.

- a. A **role set** is the complement of social relationships in which a person is involved because they occupy a particular social status.
- b. **Role conflict** takes place when one is forced to take on two different and incompatible roles at the same time.
- c. **Role strain** may arise when there is a conflict in the demands of roles, when an individual does not agree with the assessment of others concerning his or her performance in his or her role, or from accepting roles that are beyond an individual’s capacity.

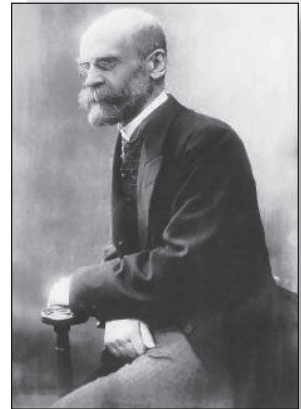
12

Social Structure and Inequity

Social structure is the patterned social arrangements in society that are both emergent from and determinant of the actions of the individuals.

I. Theory of Social Structure

1. **Macrosociology** is an approach to sociology which emphasizes the analysis of social systems and populations on a large scale, at the level of social structure.
2. Based on interpretative analysis rather than statistical or empirical observation, **microsociology** is one of the main focuses of sociology. It is concerned with the nature of everyday human social interactions and agency on a small scale.
3. **Functionalism** is a theoretical framework that sees society as a complex system whose parts work together to promote solidarity and stability. It addresses society as a whole in terms of the function of its constituent elements; namely norms, customs, traditions, and institutions.
 - a. **Manifest functions** are the consequences that people observe or expect. They are explicitly stated and understood by the participants in the relevant action.
 - b. **Latent functions** are those that are neither recognized nor intended. A latent function of a behavior is not explicitly stated, recognized, or intended by the people involved.
 - c. **Dysfunctions** are disruptions of social life, which can be manifest or latent. They are unintended or unrecognized and have a negative effect on society.
4. **Conflict theories** are perspectives in sociology and social psychology that emphasize the social, political, or material inequality of a social group or that critique the broad socio-political system.

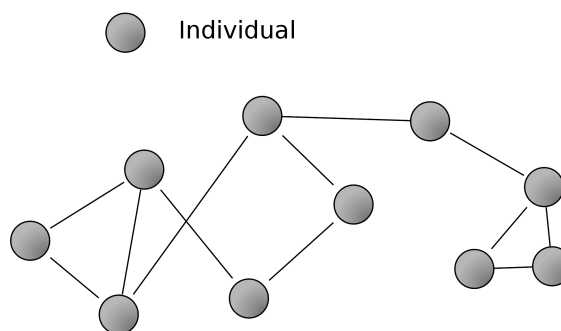


Émile Durkheim argued that complex societies are held together by organic solidarity, i.e. “social bonds, based on specialization and interdependence, that are strong among members of industrial societies.”

5. According to the perspectives of **symbolic interactionism**, humans do not respond to reality directly but rather to the social understanding of reality. People act toward things based on the meaning those things have for them, and these meanings are derived from social interaction and modified through interpretation.
6. **Institutions** are stable, valued, recurring patterns of behavior. As structures or mechanisms of social order, they govern the behavior of a set of individuals within a given community, transcending individuals and intentions by mediating the rules that govern living behavior.

II. Social Groups and Organization

1. A **social group** within social sciences has been defined as two or more people who interact with one another, share similar characteristics, and collectively have a sense of unity.



Individuals in groups are connected to each other by social relationships

Early childhood peers engaged in parallel play



- a. A **peer group** is both a social group and a primary group of people who have similar interests, age, background, or social status. The members of this group are likely to influence a person's beliefs and behavior.
- b. An **ingroup** is a social group to which a person psychologically identifies as being a member. An **outgroup** is a social group with which an individual does not identify.
- d. A **reference group** is a group to which an individual or another group is compared. It is what sociologists call any group that individuals use as a standard for evaluating themselves and their own behavior.

- e. A **primary group** is a small social group whose members share close, personal, enduring relationships. These groups are marked by members' concern for one another, in shared activities and culture. Examples include family and childhood friends.
 - f. People in a **secondary group** interact on a less personal level than in a primary group, and their relationships are temporary rather than long lasting. Since this type of group is established to perform functions, people's roles are more interchangeable.
2. The **Gemeinschaft-Gesellschaft** dichotomy was used by Max Weber to accentuate the key elements of a historic/ social change. Social ties can be categorized, on one hand, as belonging to personal social interactions or, on the other hand, as belonging to indirect interactions, impersonal roles, and formal values.
 3. A **social network** is a social structure made up of a set of social actors (such as individuals or organizations) and a set of the dyadic ties between these actors.
 4. An **organization** is an entity comprising multiple people, such as an institution or an association, that has a collective goal and is linked to an external environment
 5. A **bureaucracy** is the administrative system governing any large institution.

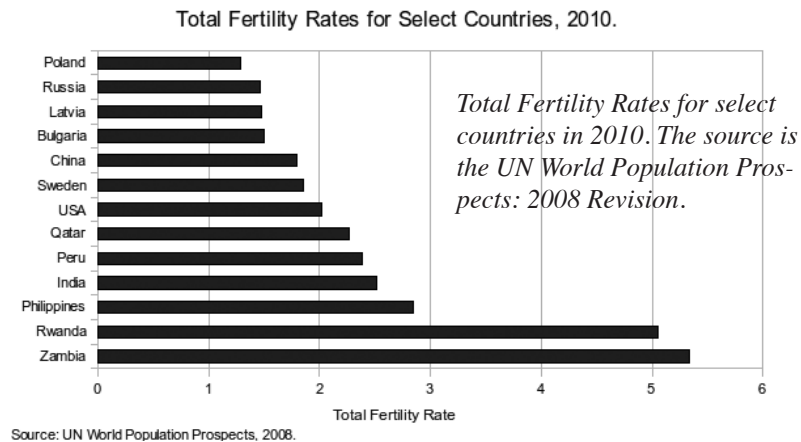


Students competed in imperial examinations to receive a position in the bureaucracy of ancient China.

6. The **iron law of oligarchy** is a political theory which claims that rule by an elite is inevitable as an iron law within any democratic organization as part of the tactical and technical necessities of organization.

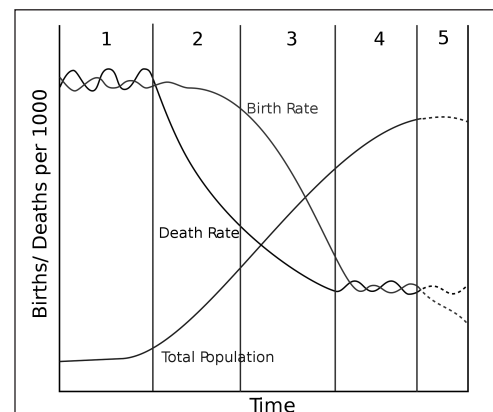
III. Demographics

1. **Demography** is the statistical study of populations, including of human beings.
2. The **fertility rate** of a population is the average number of children that would be born to a woman over her lifetime if she were to experience the exact current age-specific rates of fertility through her lifetime, and she were to survive from birth through the end of her reproductive life.



3. The **mortality** rate is a measure of the number of deaths (in general, or due to a specific cause) in a particular population, scaled to the size of that population, per unit of time.
4. **Immigration** is the movement of people into a destination country to which they are not native or do not possess its citizenship in order to settle or reside there.
5. **Emigration** is the act of leaving one's native country with the intent to settle elsewhere.

6. **Demographic transition** refers to the transition from high birth and death rates to low birth and death rates as a country develops from a pre-industrial to an industrialized economic system.



A plot of the demographic transition model, including stage 5

7. A **social movement** is a type of group action. It is a large, sometimes informal, groupings of individuals or organizations which focuses on specific political or social issues.



The Rev. Martin Luther King Jr. led the American Civil Rights Movement, one of the most famous social movements of the 20th century.

8. **Urbanization** is a population shift from rural to urban areas and the ways in which each society adapts to the change. It is predominantly the process by which towns and cities are formed and become larger as more people begin living and working in central areas.



Guangzhou, a city of 12.7 million people, is one of the 8 adjacent metropolises located in the largest single agglomeration on earth, ringing the Pearl River Delta of China.

9. **Globalization** is the process of international integration arising from the interchange of world views, products, ideas, and other aspects of culture.

The Headquarters of the United Nations' United Nations Secretariat Building in Manhattan, New York.





Religion and expressive art are important aspects of human culture.

IV. Culture

1. **Culture** is the way of life, especially the general customs and beliefs, of a particular group of people at a particular time.
2. A **cultural artifact** is a term used in the social sciences, particularly anthropology, ethnology, and sociology for anything created by humans which gives information about the culture of its creator and users.
3. **Material culture** is the physical evidence of a culture in the objects and architecture they make, or have made.
4. **Symbolic culture** is the ability to learn and transmit behavioural traditions from one generation to the next by the invention of things that exist entirely in the symbolic realm.
5. **Culture shock** is the personal disorientation a person may feel when experiencing an unfamiliar way of life due to immigration or a visit to a new country, a move between social environments, or simply travel to another type of life.
6. A **ritual** is a sequence of activities involving gestures, words, and objects, performed according to set sequence, characterized by formalism, traditionalism, invariance, rule-governance, sacral symbolism, and performance.



Celebrations, rituals, and patterns of consumption are important aspects of folk culture.



A priest elevates the Host during a Catholic Mass, one of the most widely performed rituals in the world.

7. **Assimilation** is the process whereby a minority group gradually adapts to the customs and attitudes of the prevailing culture and customs
8. An **ethnic enclave** is a geographic area with high ethnic concentration, characteristic cultural identity, and economic activity.



India Square in Jersey City, New Jersey, one of 24 Indian ethnic enclaves in the New York City Metropolitan Area.

9. **Multiculturalism** describes the existence, acceptance, or promotion of multiple cultural traditions within a single jurisdiction, usually considered in terms of the culture associated with an ethnic group.



Sikhs celebrating the Sikh new year in Toronto, Canada

10. A **subculture** is a cultural group within a larger culture, often having beliefs or interests at variance with those of the larger culture.
11. **Cultural relativism** is the principle that an individual human's beliefs and activities should be understood by others in terms of that individual's own culture.
12. A **culture-bound syndrome** or folk illness is a combination of psychiatric and somatic symptoms that are considered to be a recognizable disease only within a specific society or culture.

V. Stereotypes, Prejudice, and Discrimination

1. A **stereotype** is a thought reflecting expectations and beliefs about the characteristics of members of groups perceived as different from one's own.
 - a. An **implicit stereotype** is the unconscious attribution of particular qualities to a member of a certain social group.
 - b. An **explicit stereotype** is the result of intentional, conscious, and controllable thoughts and beliefs directed toward a group of people based on what is being perceived.
2. **Illusory correlation** is the phenomenon of perceiving a relationship between variables (typically people, events, or behaviors) even when no such relationship exists.
3. The **ultimate attribution error** is a group-level attribution error that offers an explanation for how one person views different causes of negative and positive behavior in in-group and outgroup members.
4. **Scapegoating** is the practice of singling out any party for unmerited negative treatment or blame.
5. The **just-world hypothesis** is the cognitive bias that a person's actions are inherently inclined to bring morally fair and fitting consequences to that person, to the end of all noble actions being eventually rewarded and all evil actions eventually punished.
6. The **stereotype content model** postulates that all social groups (e.g., older people, the homeless, drug addicts) fit within each of the four combinations of high and low levels of warmth and competence.
 - a. Groups perceived as low status and not competitive are viewed through the lens of a **paternalistic** stereotype.
 - b. Groups perceived as low status and competitive are viewed through the lens of a **contemptuous** stereotype.

- c. Groups perceived as high status and not competitive are viewed through the lens of an **admiration** stereotype.
- d. Groups perceived as high status and competitive are viewed through the lens of an **envious** stereotype.

		Competence	
		Low	High
Warmth	High	Paternalistic stereotype low status, not competitive (e.g., housewives, elderly people, disabled people)	Admiration high status, not competitive (e.g., ingroup, close allies)
	Low	Contemptuous stereotype low status, competitive (e.g., welfare recipients, poor people)	Envious stereotype high status, competitive (e.g., Asians, Jews, rich people, feminists)

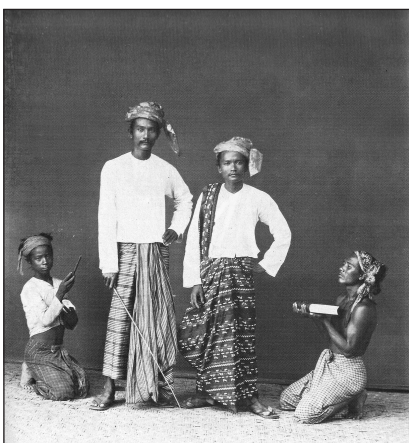
*Stereotype content model, adapted from Fiske et al. (2002):
Four types of stereotypes resulting from combinations of perceived warmth and competence.*

7. **Stereotype threat** is a situational predicament in which people are or feel themselves to be at risk of confirming negative stereotypes about their social group.
8. **Prejudice** refers to a positive or negative evaluation of another person based on their perceived group membership.
 - a. **In-group bias** refers to a pattern of favoring members of one's own social group over out-group members. This can be expressed in evaluation of others, in allocation of resources, and in many other ways.
 - b. The **out-group homogeneity effect** is one's perception of out-group members as more similar to one another than are in-group members, e.g. 'they are alike; we are diverse'.
9. **Discrimination** is treatment or consideration of, or making a distinction in favor of or against, a person or thing based on the group, class, or category to which that person or thing is perceived to belong to rather than on individual merit.

10. **Institutionalized discrimination** refers to the unjust and discriminatory mistreatment of an individual or group of individuals by society and its institutions as a whole, through unequal selection or bias, intentional or unintentional.
11. In the **jigsaw classroom** approach, pupils are divided into small groups, mixed by race and by ability, to work co-operatively on a task.

VI. Social Class

1. In social science and politics, **power** is the ability to influence or control the behavior of people.
2. **Privilege** is the sociological concept that some groups of people have advantages relative to other groups.



*Burmese nobles
and servants*

3. **Social class** is a set of concepts in the social sciences and political theory centered on models of social stratification in which people are grouped into a set of hierarchical social categories.
4. **Anomie** is the breakdown of social bonds between an individual and the community e.g. if under unruly scenarios resulting in fragmentation of social identity and rejection of self-regulatory values.
5. **Strain theory** states that social structures within society may pressure citizens to commit crime.
6. The term **cultural capital** refers to non-financial social assets that promote social mobility beyond economic means.

7. **Social capital** is the expected collective or economic benefits derived from the preferential treatment and cooperation between individuals and groups. Social networks have value.
8. **Interpersonal ties** are defined as information-carrying connections between people. They generally come in three varieties: strong, weak, or absent.
9. **Social mobility** is the movement of individuals, families, households, or other categories of people within or between social strata in a society. It is a change in social status relative to others' social location within a given society.

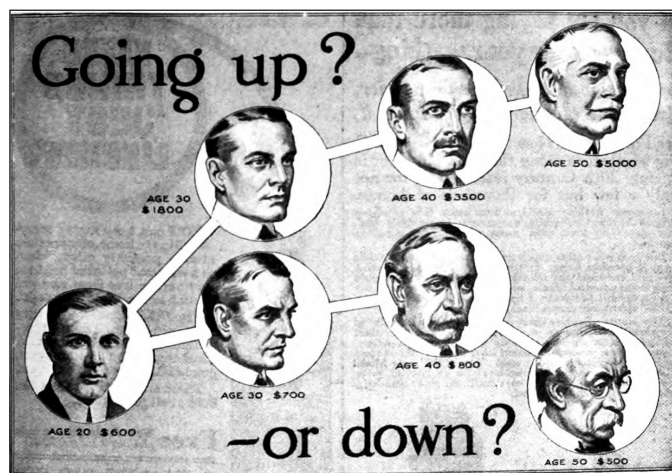


Illustration from a 1916 advertisement for a vocational school in the back of a US magazine. Education has been seen as a key to social mobility, and this advertisement appealed to Americans' belief in the possibility of self-betterment, as well as threatening the consequences of downward mobility in the great income inequality existing during the Industrial Revolution.

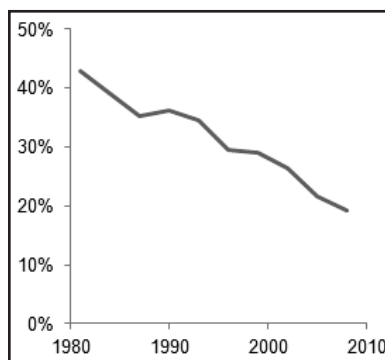
10. **Meritocracy** is a political philosophy which holds that power should be vested in individuals almost exclusively according to merit. Advancement in such a system is based on measured performance and/or demonstrated achievement in the field where it is implemented.
11. **Plutocracy** is a form of oligarchy. It defines a society ruled or controlled by the small minority of the wealthiest citizens.
12. **Social reproduction** is a concept originally proposed by Karl Marx which refers to the emphasis on the structures and activities that transmit social inequality from one generation to the next.

13. **Poverty** is general scarcity, dearth, or the state of one who lacks a certain amount of material possessions or money.

- a. **Absolute poverty** is characterized by severe deprivation of basic human needs including food, safe drinking water, sanitation facilities, health, shelter, education and information. It refers to earning below the international poverty line of \$1.25/day (in 2005 prices).



An example of urban poverty in this slum in Jakarta, Indonesia



This graph shows the proportion of world population in extreme poverty 1981–2008 according to the World Bank.

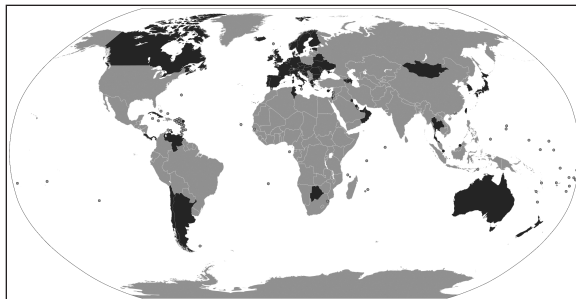
- b. The term **relative poverty** reflects a view of poverty as socially defined and dependent on social context, hence it is a measure of income inequality.
- c. The **poverty line** is the minimum level of income deemed adequate in a particular country.
14. **Social exclusion** (or marginalization) is social disadvantage and relegation to the fringe of society.
15. **Spatial inequality** is the unequal amounts of qualities or resources and services depending on the area or location, such as medical or welfare.

VII. Race and Gender Stratification

1. **Race**, as a social construct, is a group of people who share similar and distinct physical characteristics. Social conceptions and groupings vary over time, involving folk taxonomies that define essential types of individuals based on perceived traits.
2. An **ethnic group** is a socially defined category of people who identify with each other based on common ancestral, social, cultural or national experience.
3. **Sexual orientation** is an enduring pattern of romantic or sexual attraction (or a combination of these) to persons of the opposite sex or gender, the same sex or gender, or to both sexes or more than one gender.
4. **Ethnocentrism** is judging another culture solely by the values and standards of one's own culture.
5. **Ageism** is stereotyping and discriminating against individuals or groups on the basis of their age.

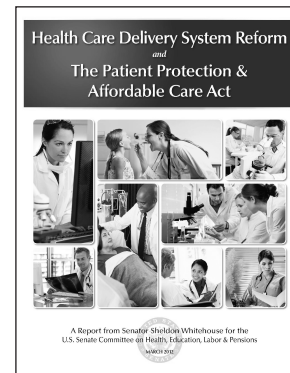
VIII. Health Equity

1. **Health equity** refers to the study of differences in the quality of health and healthcare across different populations.
 - a. **Horizontal equity** is the equal treatment of individuals or groups in the same circumstances.
 - b. The principle of **vertical equity** in health equity is the principle that individuals who are unequal should be treated differently according to their level of need.
2. **Universal health care** refers to a health care system which provides health care and financial protection to all citizens of a particular country.



58 countries with universal health care in 2009 defined as >90% health insurance coverage, and >90% skilled birth attendance.

3. **Health literacy** is the degree to which a patient can obtain, process and understand basic health information.
4. **Provider discrimination** occurs when health care providers either unconsciously or consciously treat certain racial and ethnic patients differently from other patients.
5. **Preventive healthcare** consists of measures taken for disease prevention, as opposed to disease treatment.
6. The **Affordable Care Act** is a United States federal statute signed into law by President Barack Obama in 2010 which represents the most significant regulatory overhaul of the U.S. healthcare system since the passage of Medicare and Medicaid in 1965.



7. **Medicare** is a national social insurance program, administered by the U.S. federal government since 1966, which provides health insurance for Americans aged 65 and older who have worked and paid into the system.



President Lyndon B. Johnson signing the Medicare Bill - 30 July 1965

8. The largest social health care program in the United States for families and individuals with low income, **Medicaid** is a means-tested program jointly funded by the state and federal governments and managed by the states.
9. The **Hippocratic Oath** is an oath historically taken by physicians. It is one of the most widely known of Greek medical texts. In its original form, it requires a new physician to swear, by a number of healing gods, to uphold specific ethical standards.

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