**Psychology Chapter 5 - Sensation / Perception Key Terms**

Sensation - the raw data of experience; sensory stimulation; example are eyes only register light energy and ears only register wave energy

difference threshold - Just Noticeable Difference (JND); the smallest change in stimulation that you can detect 50% of the time; differs from one person to the other (and from moment to moment); tells us the flexibility of sensory systems

perception - the mental process of sorting, identifying, and arranging raw sensory data into meaningful patterns; Ex. how we distinguish between music and crying, how we take light and form a tree

Weber's law - developed the 1930s by Ernst Weber; the principle that accounts for how one notices JND for any cents by noticing a fraction or proportion of a stimulus; change necessary for JND-hearing 0.3%, taste 20%, weight 2%

the **Stroop effect** - a demonstration of the **reaction time** of a task.

Cornea - transparent protective coating over the front of the eye

Pupil - small opening in the center of the iris; color part of the eye

Adaptation - process by which our senses adjust to different levels of stimulation; in addition there are two types-light and dark; the sensitivity of rods and cones change accord how much light is available

Iris - the color part of the eye; made of muscle that contracts/relaxes to control the size of the people allowing light to enter the eye

Lens - transparent part of the eye behind the iris; focuses light on the retina; change shape to focus on objects;-if object is closed, muscles attach to the land contract to make lens around,-if object is far away, the muscles pull to flatten the lens

Rods - visual receptor cell; located in retina; 120 million in each eye; respond to varying degrees of light and dark; chiefly responsible for night vision and perception of brightness

Retina - the light-sensitive inner lining of the back of the eyeball; contains receptor cells

Cones - visual receptor cells; located in retina; 8 million in each eye; works best in bright light; chiefly responsible for viewing color; greatest density in the fovea

Fovea - located on retina, directly behind lens; is a depressed spot; Center a visual field; images are sharpest here; contains mostly cones
bipolar cells - specialize neuron located in the eye; as one dendrite and one axon; connects rods/cones to ganglion cells

light - electromagnetic energy; eyes are sensitive to this energy

visual acuity - the ability to distinguish fine details; acuity-Greek word for sharp

wavelengths - physical energy

dark adaptation - process by which rods and cones become more sensitive to light in lower levels of light; maximum sensitivity is achieved in 30 minutes; in dark, there is not enough energy to see colors, therefore only see black, white, gray

light adaptation - process by which rods and cones become less sensitive to light in increased levels of light; takes approximately 1 minute to adjust

optic chiasm - located near the base of the brain; point where some the fibers in the optic nerve crossover to the other side of the brain

afterimage - sensory experience that occurs after a visual experience has been removed; when eyes adjust to stimulation (or lack of) but they do not completely adjust/adapt

hue - color, or aspects of colors; most people can name 150
ganglion cells - neurons that connect the bipolar cells to the optic nerve; an interneuron; one million in each eye; summarizes and organizes data from rods/cones and sends it to the brain

saturation - how rich or vivid a color is, deep/saturated

optic nerve - bundle of axons from ganglion cells that carries no messages from the eye to the brain

brightness - how bright or dark a color is; based on the strength of light entering your eyes

blind spot - place on the retina out where the ganglion cells axons leads the eye; no receptors (or rods/cones) are located here

additive color mixing - mixing light waves to create new hues (privacy colors)

subtractive color mixing - mixing of pigments to create hues; depending on the pigment, light may be absorbed or reflected

dichromats - people who only see two of the three primary colors; blind to read-green or blue-yellow; colorblind individuals
trichromatic theory - created by Hermann von Helmholtz; theory of color vision based on additive color mixing; suggest that the retina contains three types of color receptors, cones: red, green, blue

opponent-process theory - created by Edward Hering; alternative theory used to explain after images; suggest that the retina contains three pairs color receptors or cones-yellow-blue, red-green, black-white; pairs work in opposition

colorblindness - inability to see certain color combinations: red-green or blue-yellow; 10% are male and 1% are female

sound - brains interpretation to changes in air pressure purposely soundwaves) as it passes through the ear

trichromats - individuals with normal color vision

sound waves - changes in air pressure caused when the molecules of air or fluid collide with one another and move apart again

monochromats - individuals who see no color at all; respond only to shades of light and dark; very rare

ossicles - the middle ear; contains the hammer, anvil, and stirrup which are the smallest three bones the body; when the eardrum quivers it causes the hammer, anvil, and stirrup to hit each other in sequence, then carry the vibrations to the inner ear; stirrup catch the oval window

frequency - the number of cycles per second in a sound waves; the primary determinant of page; expressed in hertz (Hz) unit

Hertz (Hz) - unit that measures frequency a sound waves or cycles per second

Timbre - the quality or texture of sound; caused by overtones

Pitch - auditory experience corresponding to the frequency of sound vibrations, resulting in a higher or lower tone; humans respond to 20 Hz to 20,000 Hz

absolute threshold - minimal amount of energy required to produce any sensation; taste-1 g salt and 500 L of water, smell-one draw perfume in a three room apartment, touch-wing of the bee at 1 cm, hearing-pick of the watch 20 feet in a quiet room, vision-candle flame 30 miles on a clear night

Hammer, anvil, and stirrup - middle ear; free tiniest bones in the body; quivering of eardrum causes these bounds to hate in sequence and carry vibrations to the oval window
amplitude - the magnitude of the way; combined with frequency, it determines loudness; measured in decibels

oval window - membrane between the middle and inner ear; attach to stirrup of middle ear and cochlea of the inner ear; since vibrations to the cochlea

decibel (dB) - unit of measurement; measures loudness

round window - located just below the oval window; equalize pressure in the inner ear

overtones - tones that result from sound waves that are multiples of the basic tone; primary determinant of timbre; created by musical instruments

cochlea - snail-shaped structure in the inner ear; contains fluid that vibrate; attach the oval window and basilar membrane

basilar membrane - part of the inner ear; divides the cochlea lengthwise; stiff near the oval window but becomes flexible by the other end; as the fluid in the cochlea begins to move, the basilar membrane ripples in response

volley principle - a modified or refined frequency theory; suggest that the auditory neurons fire in the sequence increasing to a rapid series of impulses; the complete pattern corresponds to the frequency of a soundwave

organ of Corti - part of the inner ear; structure on service and basilar membrane that connects thousands of tiny hair cells (receptor cells) for hearing; each hair is taught by fibers that push and pull the vibrations of the basilar membrane and brain pools the information

olfactory epithelium - patch of tissue in nasal cavity that contains receptor cells

auditory nerve - bundle of axons from the organ of Corti to the brain

olfactory bulb - axons of olfactory epithelium connects to olfactory bulb, which is considered the smell center of the brain; olfactory bulb records messages and send them to the temporal lobe and brain core

Place theory - one unto basic views of pitch discrimination; brain determines pitch by the place on the basilar membrane with the messages strongest; the highest frequency sounds cause the greatest vibrations at the stiff base of the basilar membrane

pheromones - often considered a nonfunctional relic of human past; it animals, it provides information about another animals identity or status (i.e. stress); secreted by glands or in urine that has effects on other animals behavior; stimulates vomeronasal organ (VNO); colorless molecules
vomeronasal organ (VNO) - located in the root of the nasal cavity; stimulated by pheromones; sends messages to a second olfactory bulb (and animals) that is designed to enter their mobile communication; activates hypothalamus and amygdala; dismissed as nonfunctional in humans

taste buds - receptor cells on sides, depth, and back of tongue; pairs with smell to determine flavors; recognizes for basic taste qualities: sweet, sour, salty, and bitter; adults have 10,000 but they decrease with age; research looking at umami sensitivity to MSG and proteins

vestibular sense - sense of equilibrium-orientation and/or position in space; originates in inner ear - movement of fluid in the semicircular canals relays messages about speed and direction of body rotation
papillae - small bulbs on tongue that contain taste buds; the eye and replace every seven days

semicircular canals - three circular-like canals attached to the cochlea their relays messages about speed and direction of body rotation (vestibular sense)

kinesthetic senses - sense of muscle movement, posture, and strain on muscles/joints; provides information on speed and direction of movement; works with vestibular sense

vestibular sacs - two sacks in the inner ear by the semicircular canals that since gravitation forward, backward, and vertical movement

stretch receptors - works with kinesthetic senses; specialized nerve endings that are attached to muscle fibers that sense of muscle stretches and contractions

gate control theory - theory of pain sensitivity; suggest that there is a "neurological gate" in spinal cord that controls transmission of pain impulses to the brain; individual differences vary the control of the gate

golgi tendon organs - works with kinesthetic senses; specialized nerve endings attached to tendon (attaches muscles and bones) and sense movement

placebo effect - pain relief that occurs when a person believes that a pill or procedure will reduce pain; most likely caused by endorphin release

figure/ground - a gestalt-like illusion; an illusion where a figure of merges from the background (ground) using perceptual cues

shape constancy - tendency to see an object as the same shape no matter the angle it is viewed from; example - closed door collusion

brightness constancy - tendency to see an object
feature detectors - specialized brain cells that respond to particular elements such as movement or lines; discovered by David Hubel and Torsten Weisel

color constancy - tendency to perceive familiar objects as a color despite changes in sensory information; example-blue under fluorescent lights but not so blue and natural light--> it is still blue

perceptual constancy - tendency to see/perceive objects as stable and unchanging; example-a white house is still white no matter the elimination or angle

binocular cues - visual messages/cues that only require one eye

size constancy - the perception of an object as the same size regardless of the distance from which it is viewed; example someone height

binoculars cues - visual messages/cues that require the use of two eyes

superposition - an object appears closer because the images superimposed on the top of the other image; example-one card laying on top of another card

shadowing - illusion that gives depth to spherical objects to give it a three-dimensional quality

linear perspective - binocular cue; used to cue distance in depth by allowing two parallel lines to come together at a horizon

motion parallax - binocular distance cubed; objects close to you seem to move in the direction opposite from the way in which your head is moving; objects far away seem to move in the same direction; example-when you’re driving in the car

aerial perspective - binocular cue; just distance and death; distant objects appear hazy and blurred

stereoscopic vision - combination of two retinal images to give a 3-D perceptual experience
elevation - suggestion of depth because one object is appreciatively smaller; vestibular retinal disparity - binocular distance cue; based on the overlay of two retinal fields when both eyes focus on one object
texture gradient - binocular cue; judges distance and death in the objects in the foreground are large and clear but distant objects are smooth and less textured convergence - binoculars cue; visual depth cue; muscles controlling eye movement as the eyes turned inward to view a nearby stimulus
monaural cues - cues sound location that requires just one ear
binaural cues - cues sound location that requires both ears
autokinetic illusion - illusion of apparent movement; when a stationary object is perceived to move
stroboscopic motion - illusion of apparent movement; result from flashing a series of still pictures in rapid succession; example-motion picture
phi phenomenon - illusion of apparent movement; caused by flashing lights in the sequence; example-neon lights
physical illusion - optical phenomenon; illusion produced by reflection of light into hot air; example-mirage
perceptual illusion - illusion due to misleading cues in stimuli; inaccurate or impossible perceptions

sensation - process where we must detect physical energy from the environment and encode it as neural signals

perception - process where we must select, organize, and interpret our sensations

bottom-up processing - sensory analysis that starts at sensory receptors and works up to the brains sensory information

top-down processing - information processing guided by the upper-level mental processes, as we construct perceptions drawing on our experience and expectations

psychophysics - study of relationships between physical characteristics of stimuli

absolute threshold - minimum stimulation needed to detect a particular stimulus 50% of the time

difference threshold - the minimum difference between 2 stimuli, required for detection 50% of the time. we experience the difference threshold as a noticeable difference

signal detection theory - predicts when we will detect weak signals, measured as our ratio of "hits" to "false alarms"

subliminal stimulation - below ones absolute threshold for conscious awareness (stimuli detectable less than 50% of the time)

priming - the activation, often unconsciously, of certain associations, thus predisposing ones perception, memory, or response

Weber's law - principle that, to be perceived as different, 2 stimuli must differ by a constant minimum %

sensory adaptation - diminished sensitivity as a consequence of constant stimulation
sensory transduction - process where our sensory systems encode stimulus energy as neural messages

cornea - protects eye and bends light to provide focus

pupil - the small adjustable opening in the center of the eye
iris - colored muscle tissue surrounding the pupil, controls the size of pupil opening

lens - transparent structure behind the pupil, changes shape to help focus images on the retina

retina - the eyeball's light-sensitive inner surface where the rays focus is a multilayered tissue

rods - retinal receptors that detect black, white, and grey

cones - retinal receptor cells that function well in daylight and well lit situations

fovea - the central focal point in the retina, around which the eye's cones cluster

optic nerve - nerve that carries neural impulses from the eye to the brain

feature detectors - nerve cells in the brain that respond to specific features of the stimulus

trichromatic theory - the theory that the retina has 3 types of color receptors, each especially sensitive to one of three colors (red, green, and blue)

subtractive color mixing - subtracts wavelength from the reflected light (making black)

additive color mixing - process adds wavelength and increases light (makes white)

opponent-process theory - theory that opposing retinal processes enable color vision (red-green, yellow-blue, white-black)

blind spot - point at which the optic nerve leaves the eye creating a "blind spot" because no receptor cells are located there

parallel processing - processing several things at once

frequency - the number of complete wavelengths that pass a point in a given time

pitch - a tone's experienced highness/lowness, depends on frequency

decibels - a unit of measurement of loudness
middle ear - chamber between the eardrum and cochlea containing 3 tiny bones that concentrate the vibrations of the eardrum on the cochlea's oval window

inner ear - the innermost part of the ear

cochlea - a coiled, bony, fluid-filled tube in the inner ear through which sound waves trigger nerve impulses

place theory - the theory that links the pitch we hear with the place where the cochlea's membrane is stimulated

frequency theory - the theory that the rate of nerve impulses traveling up the auditory nerve matches the frequency of a tone (enabling us to sense its pitch)

conduction-hearing loss - hearing loss caused by damage to the mechanical system that conducts sound waves to the cochlea

sensorineuronal-hearing loss - hearing loss caused by damage to the cochlea's receptor cells or to the auditory nerves

cochlear implant - a device for converting sounds into electrical signals and stimulating the auditory nerve through electrodes threaded into the cochlea

phantom limb sensations - sensations that indicate that with pain the brain can misinterpret the spontaneous CNS activity

gate-control theory - the theory that the spinal cord contains a neurological "gate" that blocks pain signals and allows them to pass on to the brain

sensory interaction - principle that one sense may influence another

sweet, sour, salty, bitter - what are the four basic taste sensations??

transduction - conversion of one form of energy into another

bipolar/ganglion cells - cells that form an optic nerve

afterimages - if you stare at a color for a while, when you look at white paper you see its opponent color

color constancy - perceiving familiar objects as having consistent color

audition - the act/sense of hearing

oval window - the membrane of the cochlea (vibrates, which jostles fluid in the basilar membrane)
umami - flavor enhancer

olfactory receptor cells - receptor cells at top of nasal cavity (pick up smell)

kinesthesis - system for sense of position of body (when can see body)

gestalt - an organized whole that we perceive of many individual pieces

inattentional blindness - failing to see visible objects when our attention is directed elsewhere (also called change blindness) ie. the giving directions/door situation

figure-ground - organization of visual field into objects (figures) and their surroundings (ground)

selective attention - focusing of conscious awareness on a particular stimulus (can only attend one voice at a time)

depth perception - ability to see objects in three dimensions although the images that strike the retina are 2D

Ponzo illusion - if two bricks of equal size were on a railroad track, the brick further away from you would appear larger, although logically it should appear smaller (cross between relative size and linear perspective)

phi phenomenon - illusion of movement created when two or more lights blink on and off in quick succession (brain plays tricks)

binocular cues - depth cues that depend on the use of 2 eyes

monocular cues - depth cues that depend on the use of 1 eye

visual cliff - laboratory device for testing depth perception of infants (glass table that appears to dip down)

convergence - why your eyes converge inward when looking at an object (cross-eyedness)

retinal disparity - why your eyes create a "floating finger sausage" as you look further away from your fingers

perceptual set - mental predisposition (illusions of man/saxophone, old/young woman, etc.)

perceptual adaptation - ability to adjust to artificially displaced visual field (when blinded, the football player in the movie learned to throw differently)
relative size - when see 2 similar objects, the smaller one seems farther away

interposition - when blocked by another object, an object seems farther away (horse photo)

relative clarity - hazy objects seem further away

texture gradient - gradual change from coarse to fine

relative height - higher object in field of vision = further away (airplane seems further away than a stop sign, even if they're both a mile away)

relative motion - as we move, stable objects appear to move too (when in car)

linear perspective - parallel lines converge with distance (think railroad tracks)

light & shadow - nearby objects reflect more light to eyes

proximity - nearby figures grouped together

similarity - similar figures grouped together

visual capture - tendency for vision to dominate other senses

continuity - perceive smooth, continuous patterns instead of separate parts connected

connectedness - when something is linked, perceive it as a single unit or whole

closure - our brain fills in gaps to create a whole object (invisible triangle)

accommodation - process by which eye's lens changes shape to focus near or far objects on retina

prosopagnosia - can see faces but can't recognize them (no top-down processing)

ESP - controversial claim that perception can occur apart from sensory input

parapsychology - study of paranormal phenomena, including ESP and psychokinesis

telepathy - mind-to-mind communication

clairvoyance - perceiving remote events

precognition - perceiving future events
psychokinesis - "mind over matter" (control with mind)