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| Synesthesia | Disorder in which the signals from the various sensory organs are processed in the wrong cortical areas, resulting in the sense information being interpreted as more than one sensation. |
| Sensation | The process that occurs when special receptors in the sense organs are activated, allowing various forms of outside stimuli to become neural signals in the brain. |
| Transduction | The process of converting outside stimuli, such as light, into neural activity. |
| Just noticeable difference | The smallest difference between two stimuli that is detectable 50 percent of the time. |
| Sense | A system that translates outside information into activity in the nervous system. |
| Perception | The method by which the sensations experienced at any given moment are interpreted and organized in some meaningful fashion. |
| Sensory receptors | Specialized forms of neurons stimulated by kinds of energy such as light or vibration instead of being stimulated by neurotransmitters |
| Absolute threshold | The lowest level of stimulation that a person can consciously detect 50 percent of the time the stimulation is present. |
| Wavelength | The distance between peaks in a wave of light or sound |
| Frequency | Number of complete waves, or cycles, that pass a given point per unit of time |
| Amplitude | The distance between the peak and the baseline of a wave |
| The first step in sensory systems | Modification of the incoming stimulus by accessory structures |
| The second step in sensory systems | Further modification of the incoming stimulus through transduction |
| Translating the physical properties of a stimulus into neural activity | Coding |
| Location in the brain to which sensory nerves (except olfaction) transfer coded activity | Thalamus |
| The location to which the thalamus sends sensory information. | Cerebral cortex |
| Area of the brain that is the site of perception and sensation. | Cerebral cortex |
| The “triage nurse” of the brain | Thalamus |
| Why is the thalamus called the “triage nurse” | It does some processing of sensory information before sending the information to the cerebral cortex |
| Came up with the law of just noticeable differences | Ernest Weber |
| Expanded on Ernest Weber’s work by studying absolute threshold | Gustav Fechner |
| Subliminal perception | Perception of stimuli that are below the level of conscious awareness |
| Subliminal perception and advertising | We do perceive sensory information subliminally but it does not influence our voluntary actions such as purchasing objects |
| What kind of stimuli is often perceived of subliminally | Stimuli that produces fear |
| Where in the brain is fear based stimuli perceived | Amygdala |
| What area of the brain is responsible for filtering out constant stimuli during habituation | Cerebellum |
| Habituation | The tendency of the brain to stop attending to constant, unchanging information |
| Sensory adaptation | Tendency of sensory receptor cells to become less responsive to a stimulus that is unchanging |
| Key point to remember about habituation | In habituation the sensory receptors are still responding to stimulation but the lower centers of the brain (cerebellum) are not sending the signals from those receptors to the cortex. |
| Saccadic movement | The small movements made by the eyes that are generally not consciously noticed by individuals but that keep us from becoming adapted to visual sensory input |
| Photons | Tiny particle packets of waves |
| Who first proposed that light is actually tiny packets of waves | Albert Einstein |
| Three psychological principles of light | Brightness; color; saturation |
| Brightness | Determined by amplitude of the wave |
| Color (hue) | Determined by length of wave |
| What color do you get when you combine blue, red, and green light | White light |
| What is the visible spectrum | The narrow band of light between 400nm and 700nm that is visible to the human eye |
| Saturation | The purity of the color people perceive with light. Light with only one wavelength would be highly saturated in that specific color. |
| The two sources of light are | 1. Directly from the source, 2) indirectly as reflected off of a surface |
| Cornea | A clear membrane that covers the eye. It serves to protect the eye and bends light waves so the image can be focused on the retina. |
| Procedure used to remove small portions of the cornea in order to change the curvature of the membrane and thereby improve focus | LASIK |
| Iris | Round muscle of the eye |
| Aqueous Humor | Fluid filled layer behind the cornea that supplies nourishment to the eye |
| Provides the color to the eye | Iris |
| The round muscle of the eye | Iris |
| Small hole in the Iris | Pupil |
| The image on the pupil is focused and manipulated by this | The Iris |
| A clear structure behind the Iris that is suspended by muscles and changes shape to bring objects into focus | Lens |
| the change in the thickness of the lens as the eye focuses on objects that are far away | Visual accommodation |
| Rods | Visual sensory receptors found at the back of the retina, responsible for non-color sensitivity to low levels of light |
| Cones | Visual sensory receptors found at the back of the retina, responsible for color vision and sharpness of vision |
| Light sensitive area at the back of the eye containing three layers including the ganglion cells, bipolar cells, and photoreceptors | retina |
| The area of the retina that contains the greatest density of photoreceptors | fovea |
| A type of interneuron that has a single dendrite at one end and a single axon at the other | Bipolar cell |
| The axons of the retinal ganglion | Optic nerve |
| Blind spot | Area in the retina where the axons of three layers of retinal cells exit the eye to form the optic nerve, insensitive to light |
| Light from the left visual field falls on the ( ) side of each retina | Right |
| Light from the right visual field falls on the ( ) side of each retina | Left |
| Light from the left visual field falls on the right side of each retina and goes directly to the | Right visual cortex |
| Light from the right visual filed falls on the left side of each retinal and goes directly to the | Left visual cortex |
| Optic chiasm | The crossover point of the visual information from the eyes to the brain |
| Light adaptation | The recovery of the eye’s sensitivity to visual stimuli in light after exposure to darkness |
| Dark adaptation | The recovery of the eye’s sensitivity to visual stimuli in darkness after exposure to bright lights |
| Trichromatic theory | Theory of color vision that proposes three types of cones: red, blue, and green |
| The pathway that visual information takes to the occipital lobe | Lateral geniculate nucleus |
| Color blindness | Vision that is color deficient due to having either no cones or cones that do not work properly |
| Opponent-process theory | Theory of color vision that proposes visual neurons are stimulated by light of one color and inhibited by light of another color |
| Hertz (hz) | Cycles or waves per second, a measurement of frequency |
| Afterimages | Images that occur when a visual sensation persists for a brief time even after the original stimulus is removed |
| Sound | Vibrations of the air molecules around us |
| Three properties of sound waves | Wavelength, amplitude, purity |
| Wavelengths in sound are | Frequency or pitch |
| Amplitude in sound is | volume |
| Purity of sound is | Timbre or richness of tone |
| Limits of the human auditory spectrum | 20Hz and 20,000 Hz |
| Pinna | The visible part of the ear |
| Auditory canal | Short tunnel that runs from the pinna to the eardrum |
| Cochlea | Snail-shaped structure of the inner ear that is filled with fluid |
| Auditory nerve | Bundle of axons from the hair cells in the inner ear |
| Three bones of the middle ear | Hammer (malleus), anvil (incus), stirrup (stapes) |
| Membrane of the inner ear | Oval window |
| Basilar membrane | Membrane that runs down the middle of the cochlea |
| Organ of corti | The receptor cells for the sense of hearing found on the basilar membrane |
| Pitch | Psychological experience of sound that corresponds to the frequency of sound waves; higher frequencies are perceived as higher pitches |
| Place theory | Theory of pitch that states that different pitches are experienced by the stimulation of hair cells in different locations on the organ of Corti |
| Frequency theory | Theory of pitch that states that pitch is related to the speed of vibrations in the basilar membrane |
| Volley principle | Theory of pitch that states that frequencies from about 400 Hz to 4000Hz cause the hair cells (auditory neurons) to fire in a volley pattern, or take turns in firing |
| Two types of hearing impairments | Conduction hearing impairment and nerve hearing impairment |
| A hearing impairment where sound vibrations cannot be passed from the eardrum to the cochlea | Conduction hearing impairment |
| A hearing impairment where the problem lies in the inner ear or the auditory pathways and cortical areas of the brain | Nerve hearing impairment |
| Hearing damage caused by a damaged eardrum or damage to the bones of the middle ear | Conduction hearing impairment |
| Treatment for conduction hearing impairments | Hearing aids |
| Hearing damage caused by exposure to loud noises | Nerve hearing impairment |
| Treatment for nerve hearing impairment | Cochlear implants |
| The two chemical senses | Gustation and olfaction |
| Gustation | The sensation of taste |
| Olfaction | The sensation of smell |
| Taste buds | Common name for taste receptor cells |
| Bumps on the tongue | Papillae |
| Taste buds line the walls of the | Papillae |
| Five basic tastes | Sweet, sour, salty, bitter, umami |
| Neurotransmitter that gives umami it’s brothy tastes | Glutamate |
| Supertasters | People with greater than average numbers of taste buds |
| Food preference is impacted by | Individual, cultural, genetic influences, weight. |
| True/false taste sensations are processed all over the tongue | True |
| Olfactory bulbs | Areas of the brain located just above the sinus cavity and just below the frontal lobes that receive information from the olfactory receptor cells |
| Somesthetic senses | The body senses consisting of the skin senses, the kinesthetic sense, and the vestibular senses |
| Pacinian corpuscles | Skin receptors that respond to pressure |
| Visceral pain | Pain detected by receptors in the organs |
| Somatic pain | Detected by receptors in the skin, muscles, tendons, and joints |
| Somatic pain is a signal of | The body being damaged or about to be damaged |
| Skin senses | The sensation of touch, pressure, temperature, and pain. |
| Kinesthetic sense | Sense of the location of body parts in relation to the ground and each other |
| Vestibular sense | The sensations of movement, balance, and body position |
| Congenital analgesia | Pain conditions where individuals cannot feel pain |
| Congenital insensitivity to pain with anhidrosis | Disorder where individuals do not feel pain and also cannot sweat |
| Phantom limb | Condition where a person can still feel pain in a limb that has been amputated |
| Gate-control theory | Theory of pain where a chemical substance for pain is released into the spinal cord and passes through a gate on the way to the brain. The brain then sends a reverse message either further opening the gate or closing the gate. |
| Increase pain | Anxiety, fear, helplessness |
| Decreases pain | Laughter, distraction, sense of control, competing signals from other senses |
| Otolith organs | Tiny sacs of gelatin fluid and tiny crystals found just above the cochlea that help to tell a person the location of their head in relationship to their body and movement |
| Semicircular canals | Three somewhat circular tubes that coordinate with a specific plane of body movement |
| Sensory conflict theory | An explanation of motion sickness in which the information from the eyes conflicts with the information from the vestibular senses, resulting in dizziness, nausea and other physical discomfort. |
| Perception | The methods by which the sensations experienced at any given moment are interpreted and organized in some meaningful fashion |
| Size constancy | The tendency to interpret an object as always being the same actual size, regardless of distance |
| Shape constancy | The tendency to interpret the shape of an object as being constant, even when its shape changes on the retina |
| Brightness constancy | The tendency to perceive the apparent brightness of an object as the same even when the light conditions change |
| Figure-ground | The tendency to perceive objects, or figures, as existing on a background |
| Reversible figures | Visual illusions in which the figure and ground can be reversed |
| Proximity | The tendency to perceive objects that are close to each other as part of the same grouping |
| Similarity | The tendency to perceive things that look similar to each other as being part of the same group |
| Closure | The tendency to complete figures that are incomplete |
| Continuity | The tendency to perceive things as simply as possible with a continuous pattern rather than with a complex broken-up pattern |
| Contiguity | The tendency to perceive two things that happen close together in time as being related |
| Depth perception | The ability to perceive the world in three dimensions |
| Monocular cues | Cues for perceiving depth based on one eye only |
| Linear perspective | The tendency for parallel lines to appear to converge on each other |
| Binocular cues | Cues for perceiving depth based on both eyes |
| Overlap | The assumption that an object appears to be blocking part of another object is in front of the second object and closer to the viewer |
| Aerial perspective | The haziness that surrounds objects that are farther away from the viewer, causing the distance to be perceived as greater. |
| Texture gradient | The tendency for textured surfaces to appear to become smaller and finer as distance from the viewer increases |
| Relative size | Perception that occurs when objects that a person expects to be of a certain size appear to be small and are, therefore, assumed to be much farther away |
| Motion parallax | The perception of motion of objects in which close objects appear to move more quickly than objects that are farther away |
| Accommodation | As a monocular cue, the brain’s use of information about the changing thickness of the lens of the eye in response to looking at objects that are close or far away. |
| Convergence | The rotation of the two eyes in their sockets to focus on a single object, resulting in greater convergence for closer objects and lesser convergence if objects are distant. |
| Binocular disparity | The difference in images between the two eyes, which is greater for objects that are close and smaller for distant objects |
| Perceptual set | The tendency to perceive things a certain way because of previous experiences or expectations influence those perceptions |
| Top-down processing | The use of preexisting knowledge to organize individual features into a unified whole |
| Bottom-up processing | The analysis of the smaller features to build up to a complete perception |
| Synesthesia | Disorder in which the signals from various sensory organs are processed in the wrong cortical areas, resulting in the sense information being interpreted as more than one sensation |