

LECTURE 7

Jan 27th

Body position and movement

our kinesthetic sense provides info to our brains about the positions and movements of our muscles and joints

proprioceptors: specialized nerve ending that provide a constant stream of information from your muscles, they tell you where your limbs are in space

our vestibular sense monitors the body's position in space: **semicircular canals** (tubes located in inner ear, filled with fluid and tiny hair cells, fluid moves back and forth, causing movement of hair cells, which then send info to the brain about the relative position of the body) and

vestibular sacs (connects the cochlea to the semicircular canal, when crystals are moved back and forth in the sacs, info is sent to the cerebellum who's function is to maintain body balance)

Perception

a way to organize and interpret sensory information, influenced by past experiences

Attention and perception

endogenous attention: coming from within, something you willingly focus on amongst other distractions

exogenous attention: directed by external events, something that grabs your attention

inattentional blindness: when there is too much info around you and you only focus on selected things, failure to perceive a given stimulus, driving and texting

change blindness: failure to detect drastic visual changes in our surroundings, not being able to notice difference between two pictures

change deafness: failure to detect drastic auditory changes in our surroundings

choice blindness: failure to detect changes to choices a person has made

pop-out stimuli

pre attentive processing: a complex processing of information that occurs without the person's conscious awareness, works as a filter

multitasking: the act of juggling independent sensory inputs, brain attention decreases

theory of perception

Helmholtz said we learn spatial references through experience, blocking moon with finger

top-down processing: brain have natural desire to create logic and order in everything we perceive

unconscious interference: our visual system uses sensory information to draw conclusion about what we see

illusory contour: a visual illusion in which lines are perceived without actually being present

perceptual sets: a mental disposition that is based on previous experiences, our previous experiences influence our perceptions, also influenced by culture, expecting something different than what is actually occurring

if a child gives you a drawing filled with squiggly lines and they tell you its a horse, you will automatically try to picture a horse and you will see it eventually

Gestalt principles

we perceive the whole rather than the individual parts

law of pragnanz: we organize all stimuli into its simplest form, can do this by the age of 6 months,

laws include **proximity, similarity, closure, continuity, symmetry** and **common fate** (if parts of a stimulus are moving together in one direction, we see them as being part of a whole, example: if you see 4 people standing together at a party and two walk in one direction and two walk in the other direction, you perceive them as 2 pairs)

Gestalt principles: figure ground relationships

when organizing stimulus, we try to distinguish between figure and ground, the figure with the most details stands out and the figure with least detail becomes the background
example: in movies, the actors are in more focus and the background is blurred
it is an innate response, we are born with this

object recognition

view dependant: previously seen objects are stored as a template, or mental representation, that is compared to a viewed shape on the retinal image

view independent: the visual system recognizes objects as a combination of their visual parts

every stimulus you see can be broken down into the simplest and basic parts of the object
when you break stuff down, you recombine them with 2 processes:

1) parallel processing: detect visual features of the object (color, shape, movement, location), dorsal and ventral streams

2) serial processing: put all of these features together to form the object (by memory or experience)

recognition by components theory (irving biederman): all objects are made of specific 3D shapes called geons, most important part in piecing together an object is its external edges

context and motion (gunnar johansson): recognize objects by motion, attached lights to joints of human and they were filmed standing/walking, when people visualized this they couldn't recognize an individual standing but as soon as this individual started walking, people pointed out that it was someone walking

perceptual interpretation

do we learn to perceive the world through experience or are we born with an innate ability to interpret our surroundings?

immanuel kant: argued that perceptual knowledge exists at birth

john locke: argued that perceptual knowledge was learned through experience

most studies have shown that there is critical period in our lives in which sensory and perception development takes place

example: individuals born blind with their sight restored, they have trouble recognizing objects, part of your sensory and perceptual experience is innate and part of it has to be learned
therefore both kant and locke were right

synaesthesia

a condition in which signals from sensory organs are processed in the wrong cortical areas of the brain, individuals that can 'taste' words

you see a chair and you have a taste in your mouth

different types of synaesthesia:

1) letter/digit color: most common form, seeing/hearing/thinking about a number/letter produces a visual experience of a specific color

example: when you hear "FIVE" you see the color blue

2) time/space: experience time as occupying a specific spatial location

example: when you hear "january 27th" you see it located somewhere in your surroundings

3) number/form: experience numbers in spatial arrangements

example: you hear "count from 1-10 and close your eyes", people will see these number in some sort of spatial arrangement (in a circle, horizontally)

1 in 2000 people experience synaesthesia

First test will include everything up to the end of 'sensation and perception' (60 MC, fill in blank and short answers)

Genetics and Evolution

Natural Selection: organisms with features best adapted to their environments are more likely to survive and reproduce

Charles Darwin: "It is not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change."

Genetic Mechanisms

Chromosomes: 22 true pairs of chromosomes, the 23rd pair determines our sex (XX for female, XY for male)

Genes and DNA: DNA contains code for all genes, shaped as a double-helix, only one function is to control protein synthesis, any section of the DNA is referred to as a gene, which contains the recipes for the different types of protein that are synthesized in the body, this means that your genes and genetic info will have an impact on your traits and behaviour

egg cells and sperm cells only have only 23 chromosomes, sex cells are called gametes the chromosomes contributed by each parent are going to pair up and create a pair

the human genome

genetically we are all very similar

the human genome project: developed to find every gene in the body, ended up finding 30000 genes

identified 100 autism-related genes which affect a wide spectrum of the structures in the brain (amygdala, hippocampus, etc)

which part of the brain is not affected by the brain? they are all affected in some way

Genes and the environment

external environment: refers to things happening in the outside world (socioeconomic/family status)

example: mice who have not given birth normally are going to avoid their offspring. if you continually expose the mother mouse to the offspring, cells and genes will activate in her brain and she will start attending to her young

internal environment: outside environment influences internal environment, production of oxytocin (chemical in the brain that motivates the mother mouse to attend to her young)

Genotype and phenotype

genotype: entire set of genes you inherit

phenotype: entire set of properties of these genes, physical makeup of these genes (hair color, bone structure, body mass, etc)

even if individuals have the same genotype, they can display different phenotypic characteristics

or behaviours because phenotype is largely influenced by your environment

****example: architect designs a home, what he does is that he draws up a blueprint and gives it to a contractor who builds the home based on the designs. Genetically speaking, the blueprint for the house is the genotype and the house is the phenotype****

Mendelian Heredity

- how are traits passed on from parents to children?

mendelian heredity: refers to the idea that units of heredity (genes) come in pairs and one pair can dominate while the other can be recessive

alleles: genes that are located on the same position on chromosome

if both genes are identical, it is called homozygous

if both genes are different, it is called heterozygous

body chooses the dominant allele which will always be expressed

genes for brown eyes always dominate genes for blue eyes

- dominant and recessive genes

homozygous:

heterozygous:

sexual reproduction

zygote: the product of a sperm and egg coming together, contains 23 pairs of chromosomes

sexual reproduction is advantageous for a species because of a new combination of genes

which can help it survive and reproduce the best in its environment