September 29 & October 1 2015

Chapter 4: Perception

THE STIMULUS: LIGHT
- form of electromagnetic radiation that travels as a wave moving naturally at the speed of light
- light waves vary in amplitude (affects perception of brightness), wavelength (perception of colour) & purity (how varied the mix is)

THE EYE: A LIVING OPTICAL INSTRUMENT
- eye channels light to the neural tissue that receives it (retina) & they house that tissue
- light enters eye through cornea
- lens is the transparent eye structure that focuses the light rays falling on the retina

THE RETINA: THE BRAIN'S ENBOY IN THE EYE
- optic disk is a hole in the retina where the optic nerve fibre exit the eye (bc its a hole you cant see the image that falls on it aka blindspot)
- 2 receptors: rods & cones
- cones are specialized visual receptors that play a key role in daylight vision and colour vision
- fovea is a tiny spot in the centre of the retina that contains only cones; visual acuity is greatest at this spot
- when you want to see something sharply, you usually move your eyes to centre the object in the fovea
- rods are specialized visual receptors that play a key role in night vision and peripheral vision

SENSATION:
- based on activity of the sense receptors
- how physical energy is transformed into neural impulses
    - ex. light = wavelengths —hit retina— transformed into sight by the brain

    Bottom-Up Processing:
    - from the outer world, to the senses, to the brain

PERCEPTION:
- elaboration, transformation, interpretation of what is registered by the senses
- assignment of *meaning* to sensory experiences

    Feature Analysis:
    - the process of detecting specific elements in visual input and assembling them into a more complex form

    *T*op-Down Processing:
    - progression from the whole to the elements
    - subjective contours is the perception of contours where none actually exist
    - ex. the triangle shown in Figure 4.23. We see the contours of the triangle easily, even though no physical edges or lines are present.

    The Role of Interpretation
    - you see the world that you have made

- but you do not see yourself as the image maker

PERCEPTUAL ORGANIZATION: (what is perceptual constancy)

a) Visual Capture
- sight has preeminence over other senses

b) Form Perception
- Gestalt Principles
- figure-ground relationship
- object changes depending on what you decide the background to be
- grouping principles (similarity, proximity, closure & continuity)

Phi Phenomenon:
- illusion of movement created by presenting visual stimuli in rapid succession (movies & TV consist of separate still pictures projected rapidly)

Distal Stimuli:
- stimuli that lie in the distance (ex. world outside the body)

Proximal Stimuli:
- stimulus energies that impinge directly on sensory receptors

Perceptual Hypothesis:
- inference about which distal stimuli could be responsible for the proximal stimuli sensed

PERCEPTUAL ORGANIZATION: DEPTH PERCEPTION:

How do we transform 2D info into a 3D perception?

i) Binocular Cues
- distances within 25 ft
- retinal disparity (slightly diff image that each retina has of the world, how far something is)
- angle of convergence (based on muscular movement necessary to focus on something)

ii) Monocular Cues
- important for distant objects
  - relative size (whats closer is bigger)
  - linear perspective (parallel lines, brain assumes the lines are moving far away in the horizon)
  - texture gradient (far away objects are coarser, texture isn't as fine)
  - overlap (2 objects, one is overlapping the other)
  - relative height (perceive higher object as being further away, depth from height)
  - motion parallax

Perceptual Constancy:
- tendency to experience a stable perception in the face of continually changing sensory input

THE AUDITORY SYSTEM
- characterized by amplitude, wavelength & purity affect the psychological qualities of loudness, pitch & timbre
- measured in Hz (20 to 20000)

Sensory Processing in the Ear
- external ear depends on vibration of air molecules
- middle ear depends on vibration of movable bones

- inner ear depends on waves in a fluid (cochlea, fluid-filled coiled tunnel that contains receptors for hearing) ; basilar membrane holds the auditory receptors

SMELL
- chemical stimuli activate receptors (olfactory cilia), which line the nasal passages
- most of these receptors respond to more than one odour
- only sensory system where incoming info isn't routed through thalamus before it projects to the cortex
- pheromones are chemical messages sent by one organism and usually received by another member of the same species

OUR SENSE OF TOUCH:
- mechanical, thermal & chemical energy that impinge on the skin

Feeling Pleasure
- receptive field is an area of skin that, when stimulated, affects the firing of a cell that responds to pressure on the skin
- nerve fibres carrying incoming info about tactile stimulation are routed thru the spinal cord to the brain them, fibres cross over, tactile pathway then projects thru thalamus and onto the somatosensory cortex in the parietal lobe

Feeling Pain
- pain messages follow 2 types of pathways
  -> fast pathway registers localized pain and relays it to the cortex in a fraction of a second (ex. sharp pain when you first cut your finger) (depends on A-delta fibres, thick neurons)
  -> slow pathway that lags a second or two behind the fast system.
  -> this pathway (which also carries information about temperature) conveys the less localized, longer-lasting, aching or burning pain that comes after the initial injury (depends on C fibres, thin neurons)

Gate-Control Theory
- incoming pain sensations must pass through a “gate” in the spinal cord that can be closed, thus blocking ascending pain signals
- endorphins and a descending neural pathway appear to be responsible for the suppression of pain by the central nervous system
- glial cells contribute to the modulation of chronic pain

KINESTHETIC SYSTEM
- monitors the positions of the various parts of the body

THE VESTIBULAR SYSTEM
- responds to gravity & keeps you informed of your body’s location in space
- in the inner ear, composed of semicircular canals

INTERORETATION
a) Sensory Restriction
- for some aspects of visual perception, experience is critical

b) Perceptual Sets

- needs, beliefs & expectations influence perceptions (you see what you want to see)
- context effects
- contrast effects

ESP: EXTRA-SENSORY PERCEPTION

- claims that you can perceive things that you don't see or hear or that may not have happened yet
- e,g, telepathy
- clairvoyance (when you can perceive somethings thats happening in another place)
- precognition
- telekinesis
- parapsychologists study paranormal phenomena
- ESP phenomena doesn't survive scientific scrutiny

b) Subliminal Perception

- perception below the level of awareness can influence behaviour
- has acquired credible evidence