

Psychology 020
Chapter 5 (part 2)
Tuesday October 16

● **Vision**

The Stimulus: Light Waves

-Objects and surfaces in our environment absorb certain wavelengths

● **Focal Deficits**

Myopia: (near-sighted)

-closer objects most focused

Hyperopia: (far-sighted)

-Distant objects most focused

Astigmatism:

-Refractive errors due to a curvature of the cornea

Properties of Photoreceptors:

Rods:

-black and white brightness receptors

-500x more sensitive to light than cones

-more prevalent on the peripheral visual field

-allow us to see at night and in very dim light

Cones:

-colour receptors

-function best in bright light

-more prevalent in the central area of the retina (fovea)

● **Neural Transduction (Visual Pathways in the Brain)**

-Photoreceptors

-Optic Nerve

-Thalamus

-Optic Chiasm

-Visual cortex

Central vision (ipsilateral)

Peripheral vision (contralateral)

● **Retinal Image**

-Image is projected upside-down and flipped left to right on the retina

● **Theories of Colour Vision**

- 450nm of blue
- 550nm of green
- and 650nm of red

=your visual system will perceive white light
=additive colour mixing

=Subtractive colour mixing
→what is being reflected back and not absorbed (is what we see)
→wavelengths NOT absorbed (i.e. subtracted) are reflected to the eye

●**Theories of Colour Vision**

1. Trichromatic Theory (Young & van Helmholtz –1800)

- 3 specialized types of receptors
- code the wavelength we perceive as colour
- cannot explain after images

In support of the Trichromatic Theory

Cone Photoreceptors:

- 3 types of cones (blue cones, green cones and red cones)
- Each type contains photopigments that are most sensitive to wavelengths corresponding to the colours Blue, Green, and Red.
- Patterns of activity results in our perception of colour.

2. Opponent Process Theory (Ewald Hering)

- 3 opposing sets of colour

●**Evaluating Opponent-Process Theory of Colour Vision**

- Trichromatic process in retina
- Opponent process in (ganglian cells and higher in visual system)
- Yellow opponent process a bit more complex (both red and green)
→*Additive colour mixing*

●**Which Theory of Colour Vision is Correct?**

Dual Process Theory

Trichromatic Theory (3 types of cone receptors)

AND

Opponent Process Theory

- But not in the cones, in the ganglian cells.
- In the retina and higher in the visual system

●**Visual Deficits**

Colour Blindness

Dichromat

- Individuals missing one type of opponent system (lack of photo-pigment)
- Most common *Red-Green* deficit

● **Perceiving Shapes and Edges**

Feature Detector Neurons

- In the visual cortex respond maximally to very specific information
- e.g. only vertical lines or only diagonal lines

Parallel Processing

- Many systems simultaneously analyzing and integrating information

● **Perceiving Depth**

Monocular Cues

- Light and shadow
- Linear perspective
- Relative size
- Height in the horizontal plane
- Interposition
- Motion Parallax

Binocular Cues

- Require the use of both eyes

Binocular Disparity

- Each eye sees a slightly different image

Convergence

- Feedback from muscles that turn your eye inward to view a nearby object

● **Depth Cues**

Shading

- variations in light can make 2-D objects appear 3-D

Linear Perspective

● **Perception of Movement**

- movement of stimulus across the retina
- relative movement of an object against a stationary background

● **Perceptual Principles (Making Sense of a Complex World)**

Involves:

- Expectations
- Perceptual constancies
- Hypothesis testing

Is Organized:

-Gestalt principles

●Gestalt Principles**Figure-Ground**

-Tendency to perceive an object against background

Law of Similarity

-Tendency to perceive similar forms as belonging together

→Grouping by size or colour

Law of Proximity

-Tendency to perceive forms that are near one another as belonging together.

Law of Continuity

-Tendency to link together individual elements in a way that makes sense.

Law of Closure

-Tendency to close open figures and fill in gaps in an incomplete figure

Tend to ignore inconsistent elements

-Example: A bird in the the bush

Imposing order**Hypothesis Testing**

Perception: involves “making sense” of stimuli.

-Search for “best” interpretation based on past experiences, and schemas

-Hypothesis testing involves “top-down” processing.

Ambiguous Figures

-Example: the word liar that looks like a face

●Illusions

-Compelling but incorrect perceptions

-Faulty Hypothesis Testing