The Psychology of Vision

Chapter 8

Gray, Psychology, 6e
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Anatomy of the Eye

Photoreceptors: Rods and Cones

- Rods allow you to see your way in the dark woods
- Cones allow you to see the intricate details of your lover’s eyes and the colors of the rainbow

- How might you expect the numbers of rods and cones in an eye to differ based on whether an animal is nocturnal or diurnal?
Review!

• Turn to a classmate and explain how information from the outside world gets translated by the eye
• Now, switch. Have your partner explain to you how the sensory information translates from the eye to a meaningful signal in the brain

Differences in Color Vision

- Human's Eye View
- Bird's Eye View

How Color Is Produced

• Photons - waves of light, such as those projected from the sun
• Pigments - absorb light, reflecting the waves that are not absorbed
Two Types of Color Mixing

- Subtractive color mixing
  - When you mix two or more pigments, you are subtracting the wavelengths that can be reflected
- Additive color mixing
  - When you mix two or more colored lights, you are adding the wavelengths that are perceived

How Additive Color Mixing Is Explained

- Three-primaries law
  - Explained by trichromatic theory (three cones each sense waves from a different part of the color spectrum)
- Law of complementarity
  - Explained by opponent-process theory (two neurons associated with each cone are excited or inhibited in response to wavelengths

Consider This...

- In our ancient past, what might it have been important to see? How could that explain why we sense particular wavelengths?
To See What’s Important in Our World, We Have Evolved:

- Contour exaggeration
  - Occurs via lateral inhibition
- Feature detectors
  - Occurs via parallel processing
- Feature integration
  - Occurs via serial processing

Gestalt Principles of Grouping

- Proximity
- Similarity
- Closure
- Good continuation
- Common movement
- Good form

How We See Whole Objects

- Recognition-by-components theory
  - Geons to whole object
- Evidence from visual agnosia
  - Form and object
Visual Processing Pathways

- “What” pathway - identifying objects
- “Where” pathway - localizing 3 dimensional images in space

How Do We See in 3D?

- Depth perception
  - Binocular vision (eye convergence and binocular disparity)
  - Monocular vision
    - Motion parallax
    - Pictorial cues
      - Occlusion
      - Relative image size for familiar objects
      - Linear perspective
      - Texture gradient
      - Position relative to horizon
      - Differential lighting of surfaces

Assessment

- In what ways is the human eye like a camera?
- How do we see the world in color?
- How do we see in 3 dimensions?
- What allows us to see individual objects in our world, rather than partial objects or a blur of combined objects?