Depth Perception

Kimberley A. Clow

kclow2@uwo.ca
http://instruct.uwo.ca/psychology/215a-570

Outline

- Oculomotor Cues
- Pictorial Cues
- Motion Based Cues
- Stereopsis
- Development of Depth Perception
- Effects of Experience

Types

Types of Depth Perception

- absolute distance
  + distance from observer to an object

- relative distance
  + distance between one object and another object
Importance

- Recognition of location in space is essential for almost all activities
  - navigating/avoiding objects
  - jumping
  - catching/throwing
  - reaching/grasping
  - size judgements and recognition
- As a result, many redundant systems available for assessing depth and distance

How Do We Perceive Depth?

Cue Theory’s Sources of Environmental Information

- Monocular Factors
  - No Movement
  - Eye Movements
  - Retinal Cues
  - Motion Parallax
  - Elevation
- Binocular Factors
  - Convergence
  - Binocular Parallax

Oculomotor Cues
Occlusion

Height in Visual Field

Moon Illusion
Possibility

How it works
Can Create Illusions...

“Excuse me for shouting—thought you were farther away.”

Which is Bigger?
Linear Perspective

Which Line is Longer?
S had ing

Original

Reversed

Shading

Pictorial Cues Together
Illusion

Explanation
Motion Based Cues

- These cues depend on
  - Geometric changes in the scene
  - Effects of self-motion
  - Movement through the visual field

Motion Parallax

Biological Motion
Optic Flow

Binocular Cues

- Two eyes
  - Slightly displaced images in each eye
  - Info about relative depth
  - Based on the geometry of the images reaching the eye

Important Terms
Retinal Disparity

Example

Crossed & Uncrossed
Physiological Basis

- How can cortical neurons process disparity information?
  - Cortical neurons that code retinal disparity
  - Respond based on the positions of the images on the two retinæ
Example

Motion Illusion

Size Constancy

Why does someone walking away NOT appear to shrink?
The Holway-Boring Experiment

Which Line is Longer?

Explanation
Development

The Effects of Experience