Child Development of Visual Perception

- Background
- Methods
- Specific Visual Tasks
- Possible Applications

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Background

- **Nativism**: Kant and Descartes, human skills are inborn
- **Empiricism**: Locke and Berkeley, Helmholtz, skills learned through experience or 'effort'
- **Constuctivism**: Piaget, kids need to go through conceptual development
- **Maturation**: skills aquired after birth might not be learning, but could be maturation of the brain
- more modern approach – a mix - Fantz: using experiments to determine the different development timelines for different skills

Methods With Infants

in places like the Infant Cognition Lab at MIT or Harvard

- Looking time paradigm – habituation and preferential looking
- Eye tracking
- Training with reward – see how they generalize their conditioned response
- Reaching
- Photorefraction – measuring the focus of their eyes
- Noninvasive electrode recordings

Visual Skills

- Depth: stereo vision, paralax, linear perspective, occlusion
- Maps, Models, and Symbols
- Special Task: Face Perception
- Color and Texture
- Miscelaneous

* Difference between perception of real depth and depth in 2D images

Visual Cliff

- Paralax probably inborn
- Show placing reflex, but don't crawl accordingly
- Paralax and stereo acutity increase at 3-4mo.
- Pattern size cues come later
- Avoid cliff at 7-8 months

…depth…

- Stereo vision: 4-5 mo.: using glasses
- Linear perspective and occlusion: using trapezoidal window

Figure/Ground

- Before 3 mo., no continuity behind occluder
- At first only works with real 3D objects
- Grouping by motion behind an occluder

Maps, Models, and Symbols

- 3 year olds can relate a map to a setting, 2 year olds fail
- 2 year olds suceed when tricked into thinking the representation *is* the original

Face Perception

- Seems inherent – infants look at face-like arrangements of dots
- Newborns initially look at the outline of the face
- Later they look at the eyes
- Continues development through adulthood

Color

- Argued over: at birth / at 3 months
- At 4.5 mo., used with texture to descriminate objects
- Used even more by 8 mo olds and adults

Misc…

- 2 mo: know an object must move with its container
- 3 mo: descrimination of grating orientation
- 5 mo: understanding that unsupported objects should fall
- 6 mo: know an object must be smaller than its container
- ~12 mo: babies learn to follow gazes
- 12.5 mo: understand balance and weight distribution

Some Applications

- People in space or other environments
- Making a display appropriate for the viewer's age