Sensory and Perceptual Development
What Are Sensation and Perception?

- **Sensation** — occurs when external “information” is picked up by sensory receptors *(what your 5-senses do)*

- **Perception** — how your brain interprets the “information” from your 5-senses
Studying Infant Perception

- **Visual preference method** — to determine if infants can distinguish between various stimuli

- **Habituation and Dishabituation**
  - **Habituation** — decreased responsiveness to stimulus
  - **Dishabituation** — recovery of habituated response

- **Tracking** — moving eyes and/or head to follow moving objects

- Video equipment, reasonably fast computer
## Infants’ Visual Perception

<table>
<thead>
<tr>
<th>Visual Acuity</th>
<th>20/600 at birth, near adult levels by 1 year</th>
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<td>Can see color at birth, attracted to sharp-contrast</td>
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<td>Perceiving Patterns</td>
<td>Prefer clear patterns to blank or complex stimuli</td>
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## Infants’ Visual Perception

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<td><strong>Tracking &amp; Scanning</strong></td>
<td>Face scanning improves by 2 mos; Smooth tracking by 8 mos</td>
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Visual scanning of a geometric figure by 1- and 2-month-old infants

Visual scanning of the human face by 1- and 2-month-old infants

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### Infants’ Visual Perception

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<td><strong>Depth Perception</strong></td>
<td>Begins at 2-4 mos, well developed by 7-8 months</td>
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## Perceptual Constancy

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<th>Size constancy</th>
<th>Shape constancy</th>
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<td>Recognition that object remains the same even though the retinal image changes</td>
<td>Recognition that object remains the same even though its orientation changes</td>
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</table>
Vision in Childhood

- Improved color detection, visual expectations, controlling eye movements (for reading)
- Preschoolers may be farsighted
- Signs of vision problems
  - Rubbing eyes, blinking, squinting
  - Irritability at games requiring distance vision (nearsighted) or when reading (farsighted)
  - Closing one eye, tilting head to see, thrusting head forward to see
Aging Vision In Adulthood

• Loss of Accommodation — **presbyopia**
• Decreased blood supply to eye — smaller visual field, increased **blind spot**
• Slower **dark adaptation**, decline in motion sensitivity
• Declining color vision: greens, blues, violets
• Declining depth perception — problems with steps or curbs
Adult - Diseases of the Eye

- **Cataracts** — thickening eye lens that causes vision to become cloudy, opaque, distorted
- **Glaucoma** — damage to optic nerve because of pressure created by buildup of fluid in eye
- **Macular degeneration** — involves deterioration of retina
A) cataracts, B) glaucoma, C) diabetes retinopathy, D) age-related macular degeneration, and E) retinitis pigmentosa
# Sensory and Perceptual Development

## Hearing

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<th>Stage</th>
<th>Characteristics</th>
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<td>Prenatal</td>
<td>• Can hear before birth</td>
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<tr>
<td>Infancy</td>
<td>• Improve sensitivity to soft sounds, pitches</td>
</tr>
<tr>
<td></td>
<td>• Ability to localize</td>
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<tr>
<td>Childhood</td>
<td>• Hearing usually fine</td>
</tr>
<tr>
<td></td>
<td>• Danger of otitis media</td>
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<tr>
<td>Adolescence</td>
<td>• Most have excellent hearing</td>
</tr>
<tr>
<td></td>
<td>• Danger from loud music</td>
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<tr>
<td>Adulthood</td>
<td>• Few changes until middle adulthood</td>
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<td>• Hearing impairment increases with age</td>
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The Adult – Speech Perception

• Speech perception is dependent on:
  – the ability to hear
  – cognitive processes such as attention and memory

• To understand conversation,
  – Listening conditions are important; background noise is problematic
  – Increased attentional demands (divided attention) are problematic

• Auditory perception is more difficult when the tasks are novel and complex, and the listening conditions are poor
  – Familiar conditions allow use of contextual cues
The Infant – Taste and Smell

• Newborns can distinguish sweet, bitter, and sour tastes
  – Prefer sweet
  – Facial expressions reflect taste sensations

• Olfaction – sensory receptors for smell – work well at birth
  – Will turn head away from unpleasant smells
  – All babies prefer the smell of human milk over formula, even if previously consumed formula
  – At 1 to 2 weeks, breast-fed babies can recognize the smell of their mother’s breasts or underarms
The Adolescent – Taste and Smell

• Changes in taste during adolescence
  – Slight decline in preference for sweets
  – Increased sensitivity to sour tastes
  – Likely to acquire taste for previously disliked or avoided foods

• Sense of smell in adolescence
  – Women generally demonstrate greater sensitivity than men to a variety of odors (including body odor)
The Adult – Taste and Smell

• General decline in sensitivity to taste
  – Older men have somewhat greater decline than older women
  – But great variability in individual experiences

• Ability to perceive odors typically declines with age
  – Health adults retain their sense of smell better than those have diseases, smoke, or take medications
The Infant – Touch, Temperature, and Pain

• The senses of touch and motion develop before birth
  – Touch soothes a fussy baby
  – Systematic massage helps premature infants to gain weight, be more relaxed, and develop more regular sleep patterns
• Newborns are sensitive to warm and cold and to painful stimuli
  – Infants respond to pain and learn from the experience
  – The American Academy of Pediatricians recommend that newborn males be given local anesthesia at circumcision
The Adult – Touch, Temperature, and Pain

• Older adults appear to be less sensitive to weak levels of pain but are not less sensitive to stronger pain stimuli
  – Older adults are more likely to experience chronic pain, but less likely to obtain adequate pain relief
    • Adequate pain relief could improve the daily functioning and psychological well-being of older adults.
Cross-modal Perception

- The ability to relate and integrate information about two or more sensory modalities, such as vision and hearing
- Exists in newborns; sharpens with experience in first year
The Infant – Influences on Early Perceptual Development

• The visual system requires stimulation early in life to develop normally
  • Early visual deficits (i.e., congenital cataracts, or “lazy eye”) can affect later visual perception

• Early exposure to auditory stimulation affects the brain “wiring” and influences auditory perception skills
The Infant – The Infant’s Active Role

• Gibson (1988) suggested that infants engage in three phases of exploratory behavior
  – From birth to 4 months,
    • infants explore their immediate surroundings by looking and listening and especially by mouthing objects and watching them move
  – From 5 to 7 months,
    • once infants can grasp, they explore objects with their hands as well as with their eyes
  – By 8 or 9 months
    • infants use crawling to extend their explorations into the larger environment and carefully examine an object by fingering it, poking it, and watching it
The Child

• Sensory and perceptual development is largely complete at the end of infancy and becomes more refined during childhood
  – Childhood is a time when children learn to use their senses more intelligently
  – Childhood is also a time when attention is developed, in particular (selective attention)
The Child – The Development of Attention

• Newborns and young infants are “captured by” something – they react to environmental events (*passive*)
  – They have an “orienting system”
• Older infants and children are “directed toward” something
  – They have a focusing system that seeks out and maintains attention to events (*active*)
The Child – Longer Attention Span

• Children have short (but expanding) attention spans
  • Children ages 2 to 3 worked for an average of 18 minutes and were easily distracted
  • Children ages 5 to 6 often persisted for 1 hour or more
• Improvements relate to continued myelination
  • Beyond ages 8-9, there is little increase in the length of children’s sustained attention
The Child – Problems of Attention

• Attention deficit disorder (ADHD) is characterized by three general symptoms:
  – Inattention
  – Impulsivity
  – Hyperactivity
The Adolescent – Attention

• The ability to sustain attention improves considerably between childhood and adulthood
• Adolescents are more efficient at ignoring distractions in order to concentrate
• Adolescents can divide their attention systematically between two tasks
The Adult – Attention and Visual Search

• Older adults are less able to divide attention between two tasks or to selectively attend to stimuli while ignoring distractions
  – ...just be patient with them 😊