Perceptual development

IIE 366: Developmental Psychology

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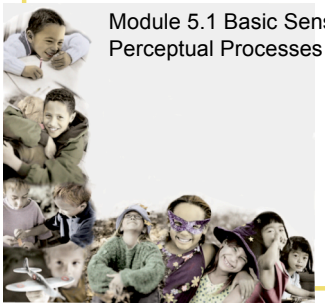
Lecture 11

Chapter 5: Perceptual and Motor Development



Module 5.1 Basic Sensory and Perceptual Processes

Children and Their Development, 4/e by Robert Kail

Methods of Testing Infant Perception

1. Preference

Give them two things to look at.

IF they spend more time looking at one than the other (controlling for side and random variation), it means two things:

a. They can tell them apart (discriminate), AND…

b. they like one more than the other.

Methods of Testing Infant Perception

2. Habituation

As infants look at something more, they become less likely to look at it, and to change respiration and heart rate. In other words, they prefer novelty (other things being equal).

Taken as a sign of learning

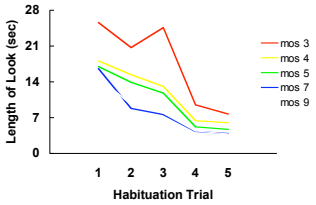
Good for measuring discrimination

Hearing speech

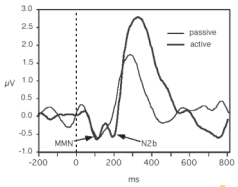
- Babies like perceived changes
- When the syllable changes
  - babies suck more often
  - ba, ba, …, pa, pa, pa, pa, pa,…
- Moreover, they hear things the way adults do
  - you can change the pronunciation (timing) of ba and still hear it as ba
  - babies hear it the same way

BA PA

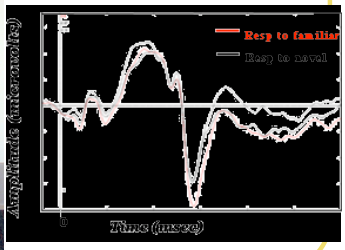
Typical Habituation Results



3. Evoked potentials (or Event Related Potentials, ERP)



- Baby ERP



4. High-amplitude sucking

Used to test operant conditioning

(if press lever, get food; if study hard, get good grade)

The challenge: what response, and what reinforcer?

Response: sucking. Reinforcer: interesting sight or sound. Measure whether sucking increases in rate and/or intensity.

Conditioning from about 3 months.

Taste and Smell

- Sensitivity to taste and smell develops before birth.
- Newborns innately prefer sweet flavors.
- Infant sense of smell draws them to their mothers.
- Infants are sensitive to the smell of breast milk.

Infant tasting lemon

To test the ability of an infant to identify his own mother's odor, two breast pads—one belonging to his mother (marked X) and the other belonging to a stranger (plain)—are placed on either side of the baby's face.

The baby turns far to his left to his own mother's breast pad.

Touch

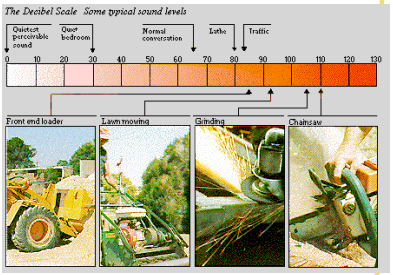
- Infants explore the world orally for the first few months.
- From 4 months on, infants begin to rub, finger, probe, and bang objects.
- Increase in manual control facilitates visual exploration.

Intermodal Perception

- Infants are able to combine information from two or more senses.
- Very young infants link oral and visual experiences.
- As they get older, infants integrate visual and tactile explorations.
- Infants at about 4 months can integrate speaking sounds with a picture of lips moving.
  - An integral part of understanding speech
    - » McGurk effect

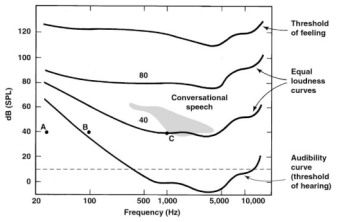
5.1 Hearing

- Infants hear well, though not quite as accurately as adults
- Sound intensity is defined in decibels



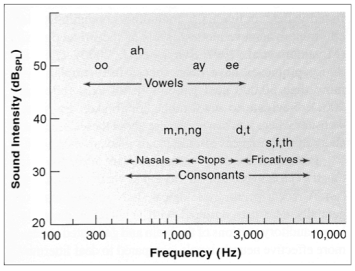
5.1 Hearing

- Infants' hearing is best for sounds that have pitches in the range of human speech



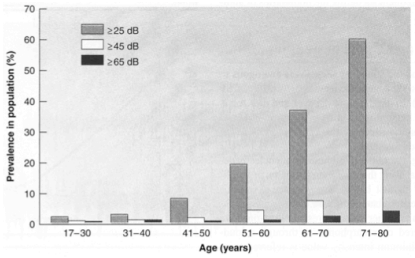
Speech sounds

- Speech sounds are an especially important stimulus
- They cover particular frequency ranges to which people are very sensitive



Hearing loss

- As people age, their threshold intensity for hearing tends to go up
- Usually this is because of exposure to loud sounds

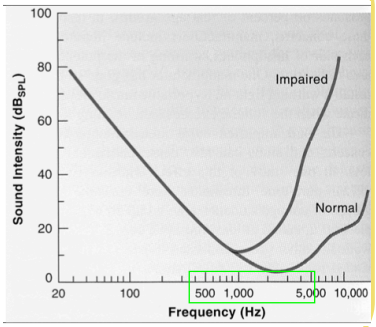


iPods

- Unfortunately, people now listen to quite loud sounds fairly often
- And they turn up the volume in environments with loud surrounding sounds

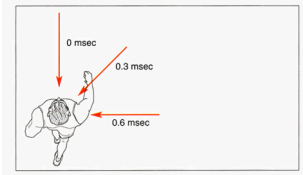
Hearing loss

- Worse still, hearing loss tends to cover the range of frequencies that include speech
- No one "gets used" to a noisy environment, it means you are going deaf.



Auditory location

- Infants use audition to identify the location of sound sources in the environment
- A sound source will hit the two ears at slightly different times and intensities
- The time differences are small, but they are enough for the auditory system to judge the left-right position of the sound source
  - The speed of sound is around 340 m/s (it depends on air pressure, temperature, humidity,…)



5.1 Seeing

- *Acuity* is given a ratio of numbers (e.g., 20/20)
  - Numerator refers to the distance in feet from which a person can reliably distinguish a pair of objects.
  - The denominator is the distance from which a person with standard VA would be able to distinguish them.
  - The metric equivalent is 6/6 vision
- Acuity is 20/200 to 20/400 at birth but improves rapidly

Development

- Month 1
  - Eyes follow moving objects, not always perfectly
  - Preference for black and white objects (checkerboards)
- Month 2
  - Some coordinated fixation
  - Awareness of red and yellow (still a preference for black and white)
- Month 3
  - Coordinated fixation
  - Attention to red and yellow
  - Interest in faces

Development

- Month 4
  - Interest in own hands (finger tracking)
  - Acuity 20/200 to 20/300
- Month 5
  - Smoother eye movements
  - Shift gaze from near to far
- Month 6
  - Acuity 20/200 or better
  - Smooth and coordinated eye movements
  - Recognizes faces at 6 feet

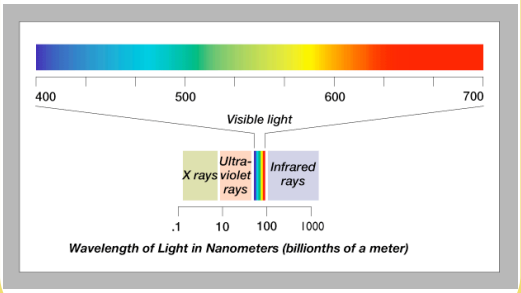
5.1: Seeing

Development

- Months 6-9
  - Near normal acuity
- Month 9-12
  - Smoother eye movements
  - Shift gaze from near to far
- Year 1
  - Mild farsightedness
  - Normal depth perception
  - Accommodation

5.1: Seeing

Wavelength of Light



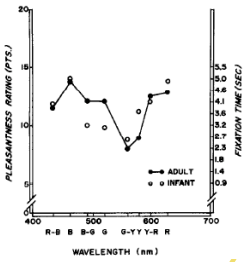
5.1: Seeing

5.1 Seeing

Infants (4-5months)

- Cones in the retina of the eye detect color
- By 3 or 4 months, infants' color perception is similar to adults' color perception

adults



Amblyopia

- "Lazy eye"
- Central vision fails to develop for one eye (the amblyopic eye)
  - For lots of different reasons
- If untreated, the brain stops responding to the problem eye, which becomes effectively blind
- Infants and children sometimes make the problem worse by favoring the good eye over the bad
  - Squinting, closing bad eye

Amblyopia

- Treatment
  - Force infant or child to use the amblyopic eye
- Not always effective

Next time

- Complex perception and attentional development