“Do you see what I hear?”
Infant Perception
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Outline

Integrate

Understand

What do infants see?

Visual Acuity

20/400 @ Birth

Fantz’s Visual Preference Procedure
CONES = COLOR!

Birth 3~4mo/Adult

Infant Vision

- Infant eye tracking is
- Jerky (saccade)
- That’s good
- Disorganized
- That’s not.
- Easily tired

Infant Eye Tracking

Presented by Scott Johnson at Cornell Baby Lab

4 mo

Presented by Scott Johnson at Cornell Baby Lab

6mo

Presented by Scott Johnson at Cornell Baby Lab
What do infants really see?
What do you see?

• 4-month-olds are just as freaked out as you by that display. Therefore, they must see the world in depth with separate individual objects.
• But HOW? You ask?
  • Retinal Disparity
  • Edges (interposition)
  • Texture Gradient
  • Relative Size

But what do they really see?
What do you see?

• Retinal Disparity

What each eye sees is a little different. The amount of disparity (difference) between the two images can be used as a cue for distance.

Some children have difficulty with this - *Strabismus*.

Use of edges: Interposition

- What shapes do you see?
- Which ones are closer?
- The shapes aren’t there.
- We use edges to see.
- And so do 3-month-old infants!

Things that move together…

Texture Gradient: Visual Cliff
What do infants hear? And how would we know?

- And how do we know?
- Watch babies reactions.
- Auditory Threshold - quietest sound you can hear.
  - Higher or lower in infants?
  - Higher.

What does infant hear?

- Newborns hear well, though not quite as accurately as adults.
- Could be because of fluid in the ear canal, or lack of experience.
- Infants’ hearing is best for sounds that have pitches in the range of human speech.
- Infants use sound to locate objects.

Sucking procedure

Hearing

Sensory Integration
Intersensory Redundancy

That’s right! —> Infants prefer information presented simultaneously to different senses.

Which one do infants prefer?

Redundancy is good

In a world of many complicated signals.

Intersensory redundancy gets attention

If something visual is moving simultaneously with a sound... this can, literally, help you hear better.

Three types of video

Synchronized Display - Video was synchronized with the target audio.

Unsynchronized Display - Video was the opposite of the target audio.

Static Display - Video was a single static frame presented throughout.

Combined Results

Target Words
NonTarget Words
Take home message:

Infants can use what they see to hear better!

Locomotion & Dynamic Systems

- Differentiation of component skills (posture/balance, stepping, and perceptual factors).
- Integration of different component skills.

Perception & Walking

- Walking involves more than just putting one foot in front of the other.
- Even newborns have the stepping reflex.
- Walking involves differentiation & integration of skills.
- Like standing, balance, & visual perception...

Moving room

What about the rest?
Smell is more sensitive!

- Tested with facial expression, and preference.
- Newborns react strongly to vinegar, ammonia, rotten eggs, shrimp.
- 1-week-old’s recognize mom’s odor: breast smell.

Taste pretty sensitive too!

- The expression says it all.
- “Sweet-tooth” over bitter, sour, salty, or neutral.
- And will nurse more if mom drank vanilla.
- More sensitive than adults!

Touch: Pain & Temp

- The nerves are there (same proportions as adults)!
- Reaction says it all.
  - Babies cry when given shot. (newborns even more distressed than 5-11 mos.)
  - Circumcision very stressful
    - esp with no anesthesia
    - high plasma cortisol level.
    - But topical anesthesia and sweets help.
  - Won’t drink milk if too hot.
  - Become more active when it gets cold.

Summary

- Seeing and hearing are poor at birth but get better quickly.
- Smell, taste, and touch: well developed at birth, and probably better than they will ever be.

So what?

- Great! Infants can see, hear, smell, taste and touch.
- Why can’t they pay attention more than five seconds?

Attention

Rothbart & Co. suggest two kinds:

**Orienting System** - Look towards new things. (e.g. Reactivity/reflexive/visual grasp).

**Focus System** - Ability to stay focused on object (e.g. task-directed, voluntary, executive control).
Orienting response

Habituation

• Present same stimulus over and over till babies bored
• Useful for testing because orienting something new means children noticed a change.
• Rapid habituators tend to be smarter.

Habituation

Attention problems

• Infants and young children not as selective in attention as adolescents and adults.
• Frontal lobes are late to develop.
• Results in a baby that can’t stop orienting response.
• And a lack of focused attention or executive control.

ADHD

• Symptoms: inattentive, hyperactive, impulsive
• Mostly boys. Do poorly in school and are often disliked.
• Causes:
  – Not sugar, TV, food allergies, or poor home life.
  – Heredity, stress, poor frontal lobe activation.
• 37-50% of children with ADHD have problems as adults.
• Not necessarily over-diagnosed, we are just more aware.
• Treatment: medication (stimulants) + psychosocial (academic).

Increasing Attention

• We can help children be more attentive by
  • reminding them to be attentive
  • teaching strategies to be attentive. (systematic search)
  • removing distractions