"Do you see what I hear?"

Infant Perception

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Outline

Integrate

Understand
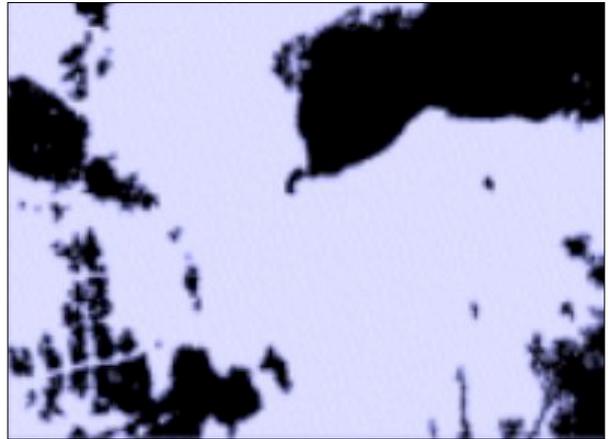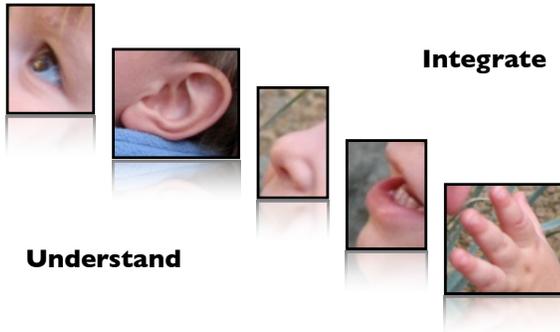
What do infant's see?

Visual Acuity

Fantz's Visual Preference Procedure

## 20/400 @ Birth
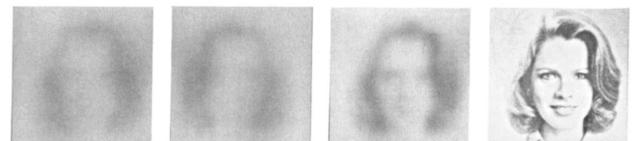
1 Month   2 Months   3 Months   1yr

CONES = COLOR!

Birth → 3~4mo/Adult
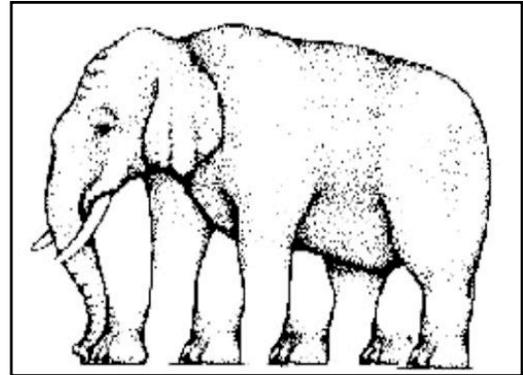

## Infant Vision

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

Infant Eye Tracking

1-Month-Olds — 3-Month-Olds

Finish — Start

Finish

Start — Start
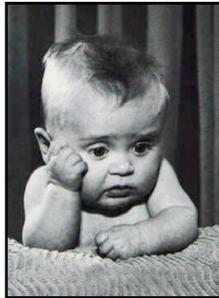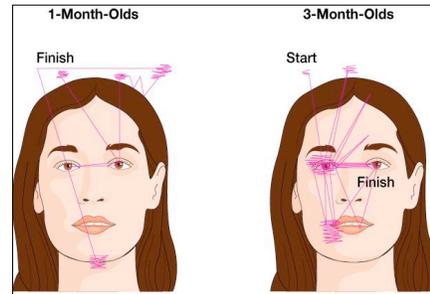
4 mo
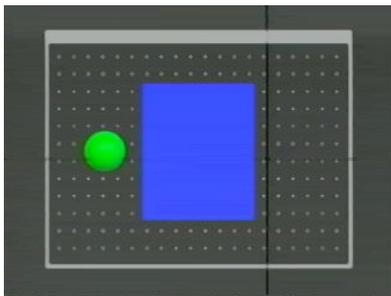
Presented by Scott Johnson at Cornell Baby Lab

6mo
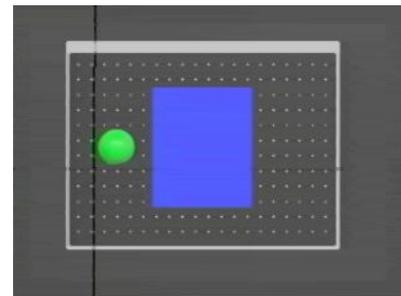
Presented by Scott Johnson at Cornell Baby Lab

What do infants really see? What do you see?

But what do they 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 (interpostion)
  - Texture Gradient
  - Relative Size

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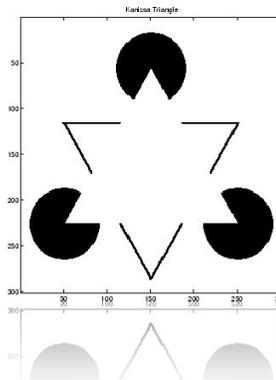
- What shapes do you see?
- Which ones are closer?
- The shapes aren't there.
- We use edges to see.
- And so do 3-month-old infants!

Things that move together…
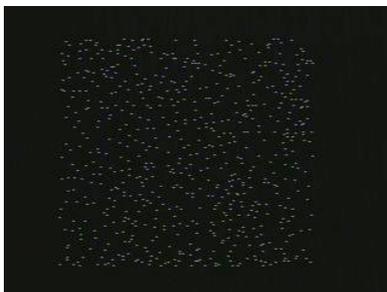
Texture Gradient: Visual Cliff
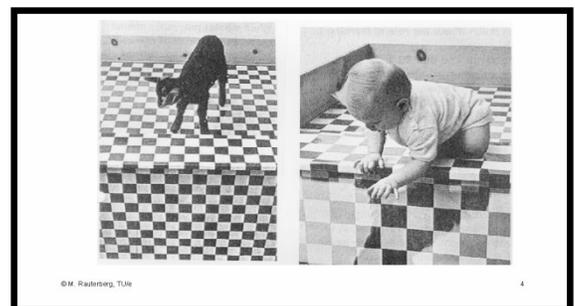
Relative Size - Ames room

This end closer
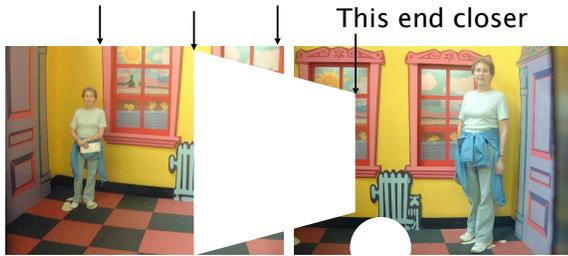
What do infants hear?

And how would we know?

What does infant hear?

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

Sucking procedure

ba, ba, ba, ba... pa

Child with pacifier

Recorder
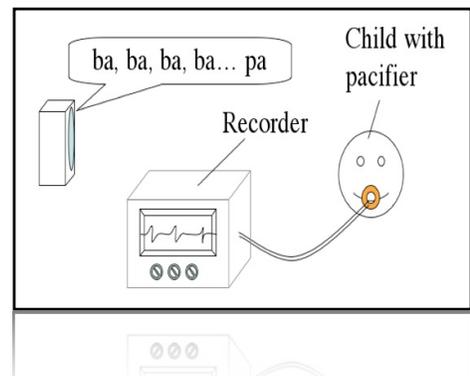
Hearing

- 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.

+

Sensory Integration

Intersensory Redundancy

That's right! —> Infants prefer information presented *simultaneously* to different senses.
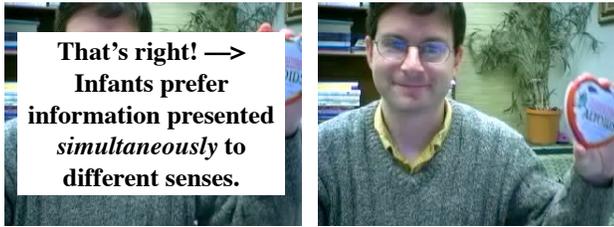
Which one do infants prefer?


Redundancy is good

In a world of many complicated signals.

Intersensory redundancy gets *attention*

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

Design

Familiarization   *Test*
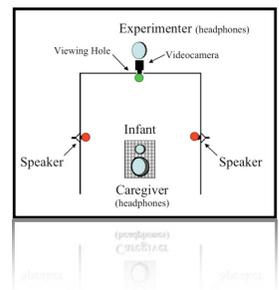
Three types of video

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
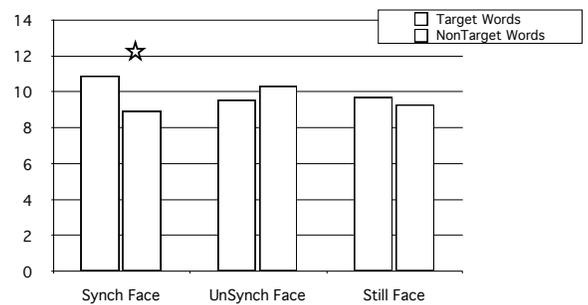
Take home message:

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.

| 0 month: Fetal posture | 1 month: Chin up | 2 months: Chest up | 3 months: Reach and miss |
| 4 months: Sit with support | 5 months: Sit on lap, grasp object | 6–7 months: Sit alone | 7–8 months: Stand with help |
| 7–8 months: Crawl | 8 months: Pull to stand by furniture | 11 months: Stand alone | 12 months: Walk alone |
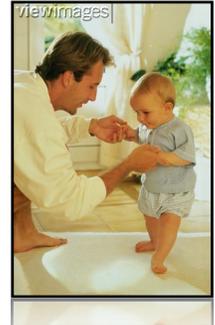
Perception & Walking

- 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

Room Motion
Movable Room
Perceived Motion
Body Movement
Stationary Floor
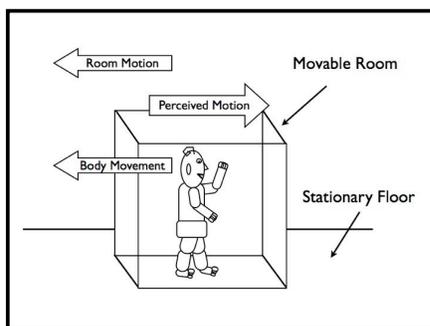
What about the rest?

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 5-11mos.)
  - 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

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.

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