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## Building Baby Brains: The Importance of Early Experiences

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Director of Outreach and Education

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### What do you hear?



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### Learning Before Birth...

- o Children are exposed to language in the womb
- o Hours after birth, infants differentiate between native and foreign language sounds



Moon, Lagercrantz & Kuhl, 2013

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### ...And Learning After Birth



Meltzoff & Moore, 1977, 1983

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*"It is not only the skills children have when they enter school that matter for later success but also the path they followed in getting to these skills."*

- Rowe, Raudenbush & Goldin-Meadow, 2012

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### Building Baby Brains

- o Experiences prepare children's brains for learning
- o The ingredients of everyday experiences
- o Early experiences are the building blocks for later success

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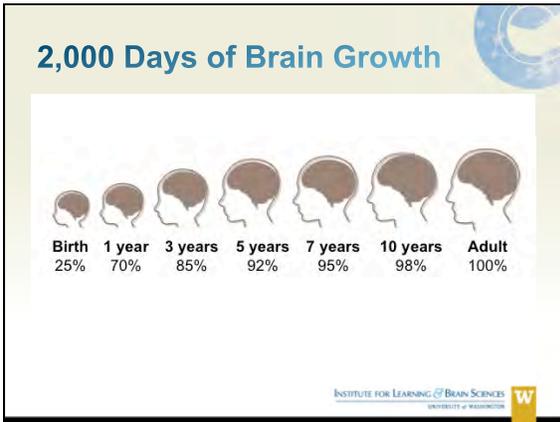
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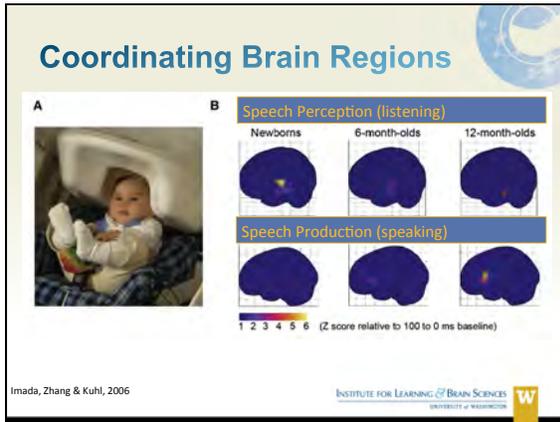
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### The Science of Early Learning

- o Experiences prepare children's brains for learning
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### Does the type of experience matter?

**Live Interaction**    **DVD Session**    **Audio (CD) Session**

- 9-month-old Seattle infants
- Naturalistic Mandarin Chinese exposure (play & books)
- 12 sessions, 25 minutes each

Do infants learn to discriminate Mandarin sounds?

Kuhl, Tsao & Liu, 2003

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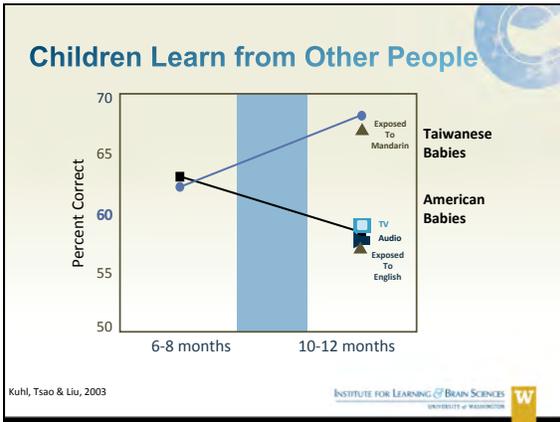
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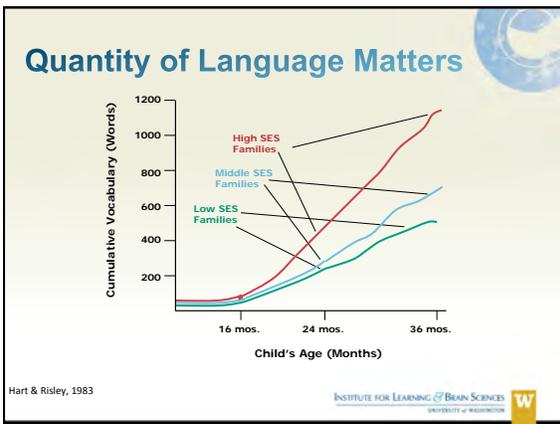
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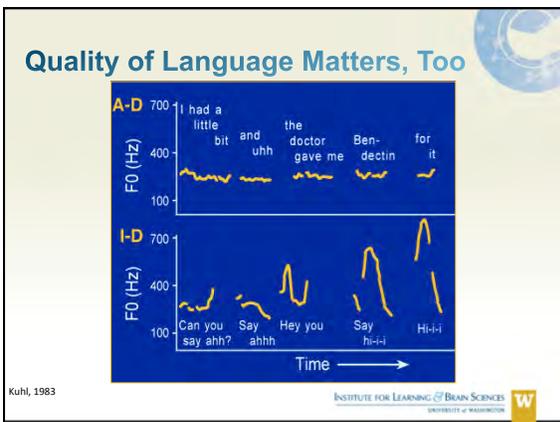
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### Quality of Language Matters, Too

↑ Infant-Directed Speech  
↑ Babbling

↑ Adult-Directed Speech  
↓ Babbling

Garcia-Sierra et al., 2011; Ramirez-Esparza et al., 2014

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### Quality of Language Matters, Too

↑ Infant-Directed Speech at 12 mo.  
↑ Vocabulary at 24 mo.

= Quality AND Quantity

Ramirez-Esparza, Garcia-Sierra & Kuhl, 2014

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### Understanding Emotions

That makes me angry

SEE

HEAR

Repacholi & Meltzoff, 2007

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### Children Learn from Eye Gaze



Brooks & Meltzoff, 2002

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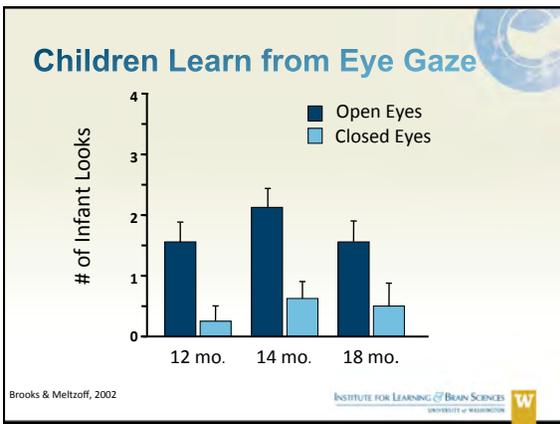
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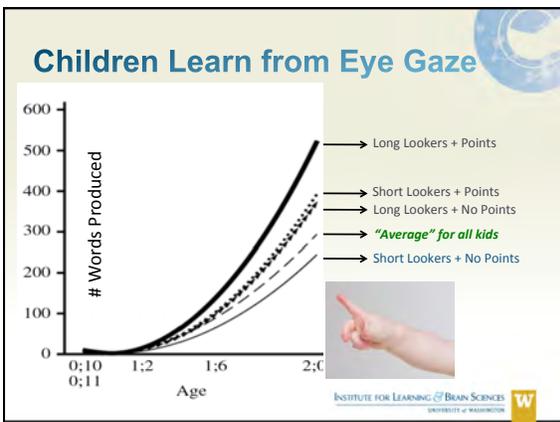
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### Children Learn through Imitation



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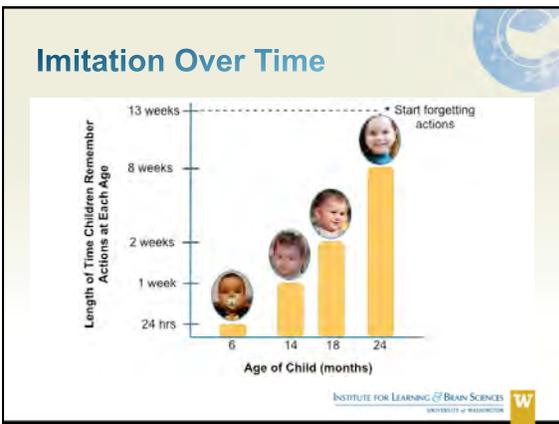
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### Children Learn through Imitation

#### What the Baby Saw



**Hand Touch**      **Foot Touch**

Saby, Meltzoff & Marshall, 2013

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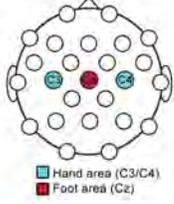
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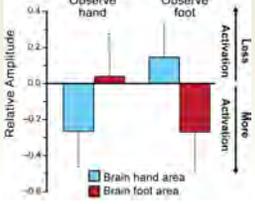
### Children Learn through Imitation

**How Baby Brain Measured**



■ Hand area (C3/C4)  
■ Foot area (Cz)

**Baby Brain Response**



Relative Amplitude

Observe hand    Observe foot

■ Brain hand area    ■ Brain foot area

Lose Activation  
More Activation

Saby, Meltzoff & Marshall, 2013

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### Back-and-Forth Interactions



Roseberry, Hirsh-Pasek & Golinkoff, 2014

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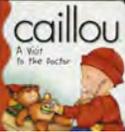
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### Children Learn from Scaffolding



Do you remember going to the doctor like Caillou?

What do you think Caillou will do at the doctor's office?

That's a tongue depressor! Can you stick out your tongue like Caillou?



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### Boosting Scaffolding



"Ask your child to sort cans of fruit from cans of vegetables."

"Help your child count their money to pay for the groceries."

"Squash"  
"Asparagus"  
"Dairy"  
"Eggplant"

"Milk comes from a cow. What else comes from a cow?"

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### Ingredients of Quality Interactions



Quality of Language (IQS)

Quantity of Language

Eye Gaze

Emotions

Live Interactions

Back-and-Forth Interactions

Imitation

Scaffolding

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### Early Learning Sets the Stage

A horizontal timeline with a red arrow pointing right, labeled with ages: 7 mo., 1 yr., 2 yr., 3 yr., 4 yr., and 5 yr. Below the timeline are four colored boxes with text: a blue box for 'Gray matter → Vocabulary', a dark blue box for 'Hearing infant-directed speech → later vocab', a yellow box for 'Reading social cues → later vocab', and a red box for 'Speech perception → language growth'. A red box at the bottom right says 'Links to reading readiness at age 5'. The bottom left contains small text: 'Dentz Can et al., 2013; Brooks & Meltzoff, 2008; Esparza et al., 2014; Kuhl et al., 2005; Lebedeva et al., 2010;'. The bottom right has the logo for the 'INSTITUTE FOR LEARNING & BRAIN SCIENCES UNIVERSITY OF WASHINGTON' with a 'W' icon.

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### What Makes a School-Ready Child?

A central image of a smiling young boy is surrounded by four circular callouts: 'Supportive Relationships', 'Communication Skills', 'Understanding Emotions', and 'Everyday Experiences & Play'. The bottom right features the logo for the 'INSTITUTE FOR LEARNING & BRAIN SCIENCES UNIVERSITY OF WASHINGTON' with a 'W' icon.

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Four small square images showing children in different contexts: a group of children playing, a close-up of a baby's face, a child being held, and two children interacting. The bottom right has the logo for the 'INSTITUTE FOR LEARNING & BRAIN SCIENCES UNIVERSITY OF WASHINGTON' with a 'W' icon.

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