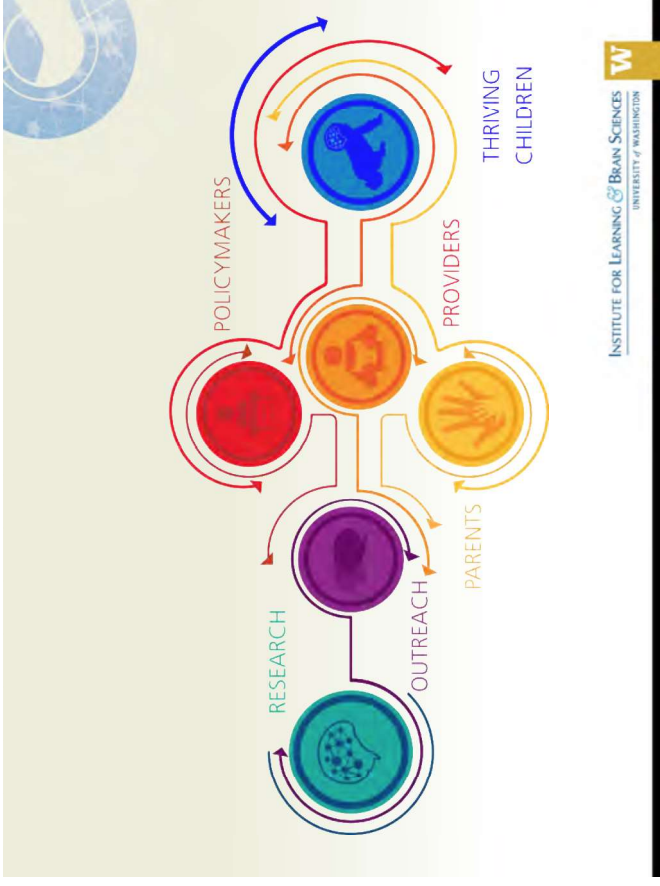


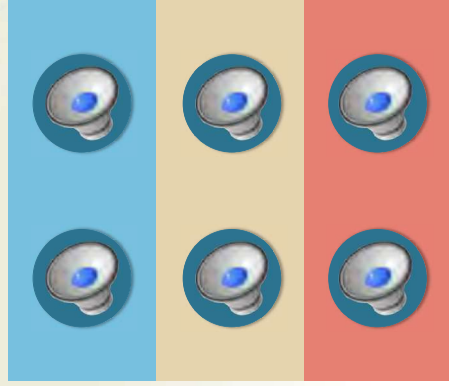
Why Early Childhood Education Matters: The Science of Brain Development.

Amelia Bachleda, Ph.D.
Outreach and Education Team

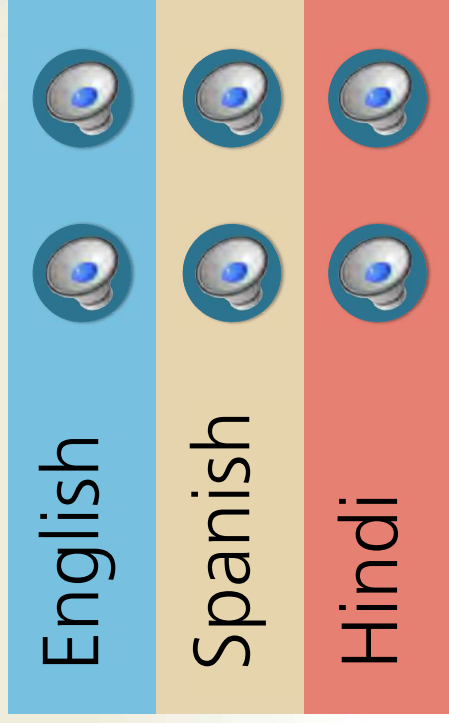
© 1977-2017 University of Washington. All rights reserved.



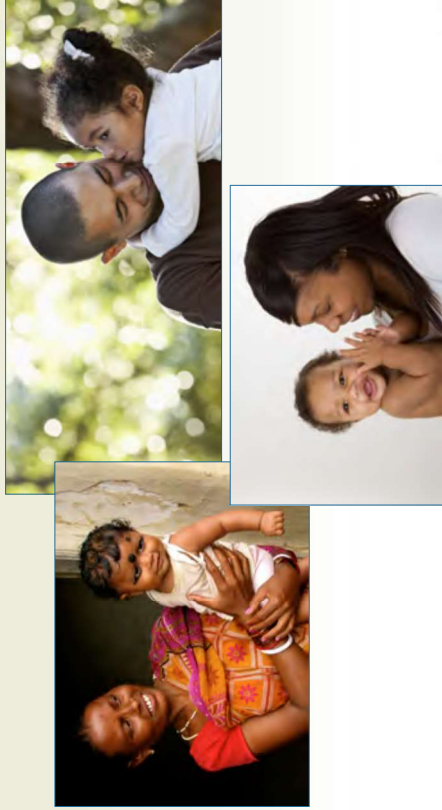
Same or Different?



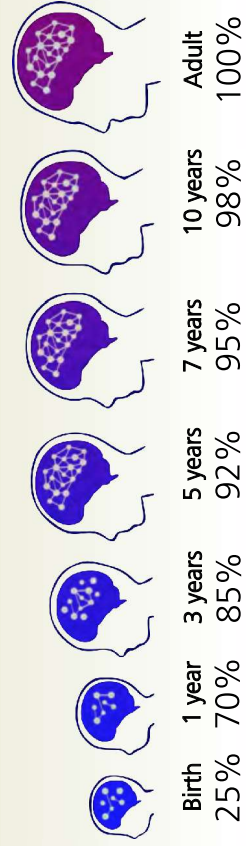
Same or Different?



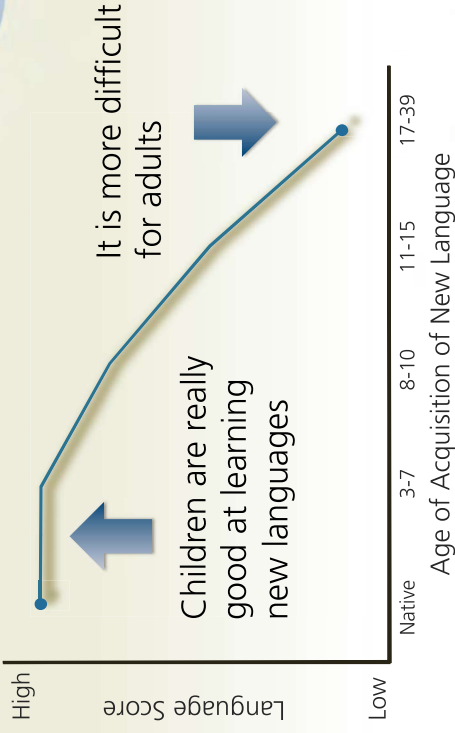
Experiences Shape the Brain



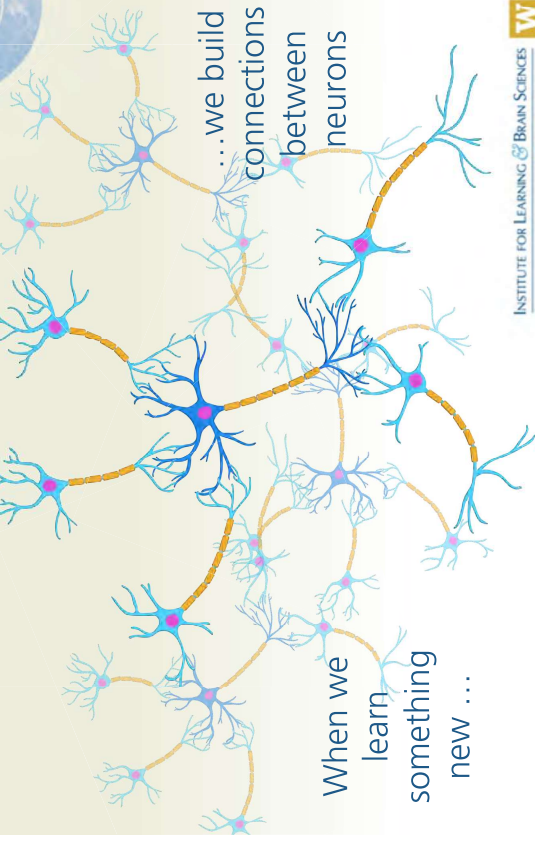
Rapid Brain Growth



The Genius of Children



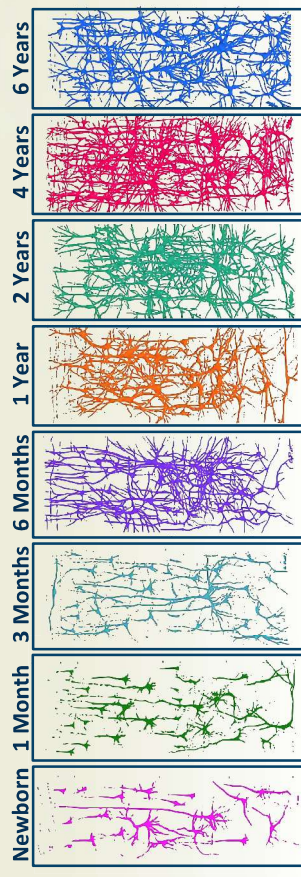
Neurons Make Connections



Experience Builds Connections



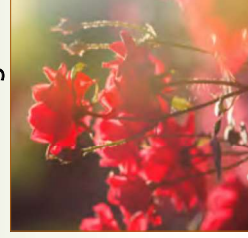
Experiences Drive Connections



A Thriving Brain



Thriving



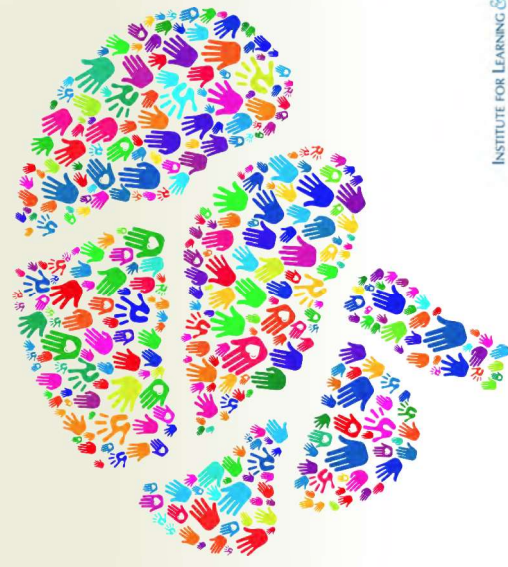
Pruning



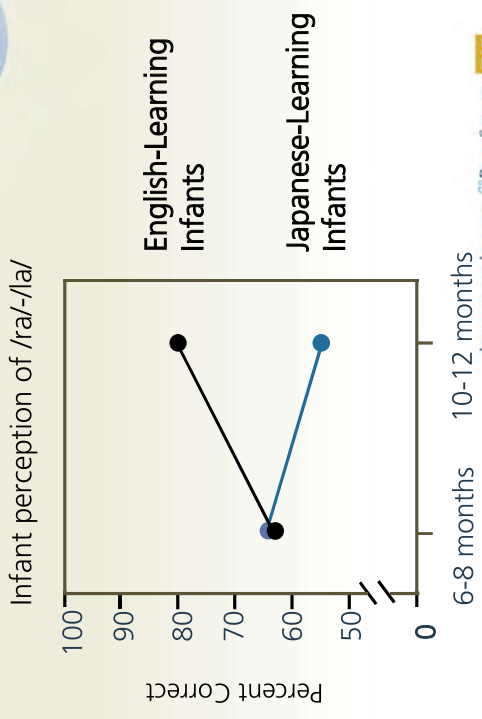
Blooming



Brain: Biology + Experience



Experience Shapes Language

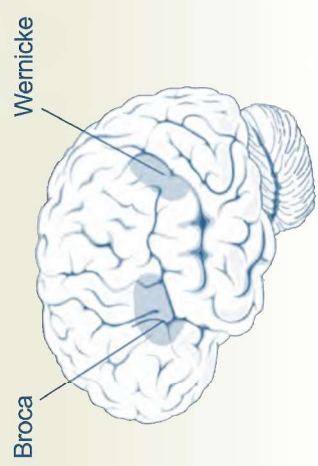


Kuhl et al., 2006

Looking Inside the Brain - MEG



Regions Involved in Language

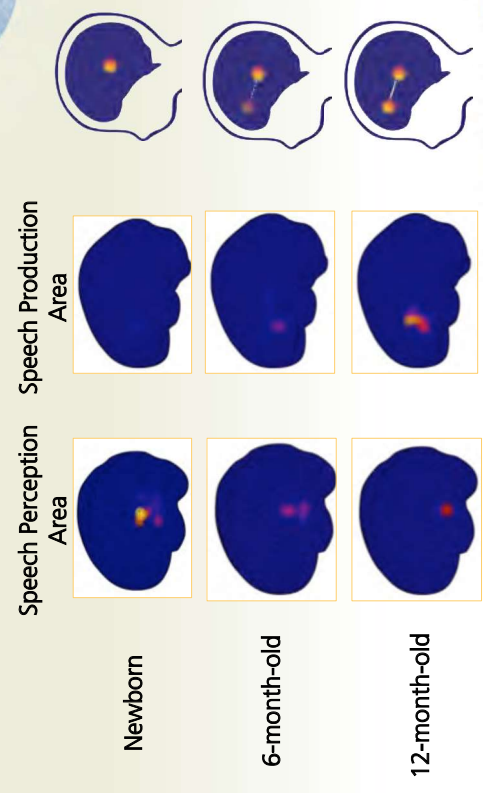


Wernicke's Area:
Language Perception

Broca's Area:
Language Production

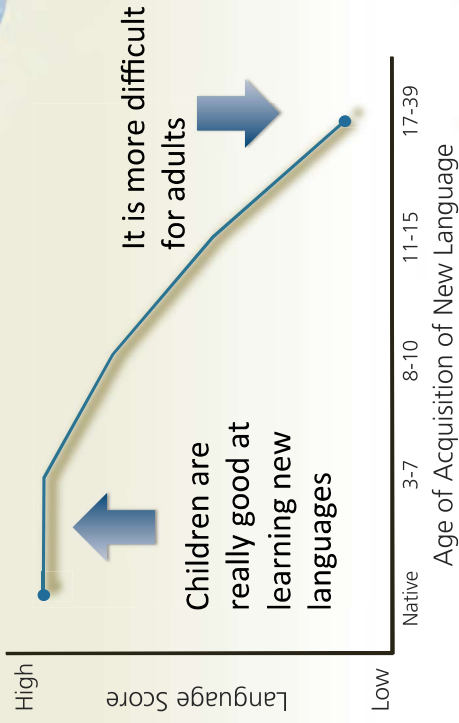
Front Left Side View Back

Building a Coordinated Brain

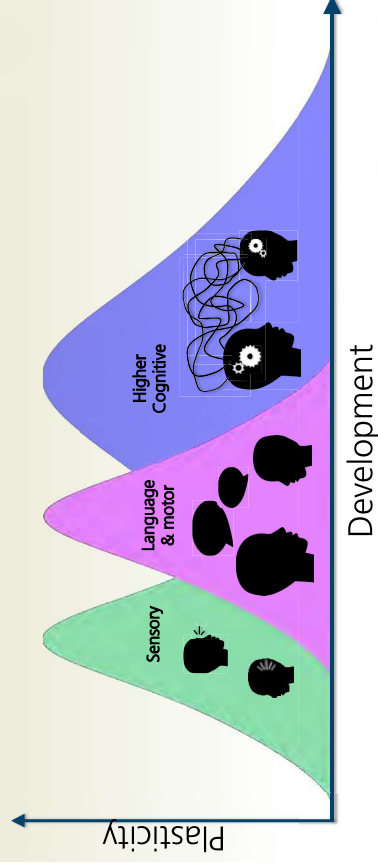


Imada et al., 2006

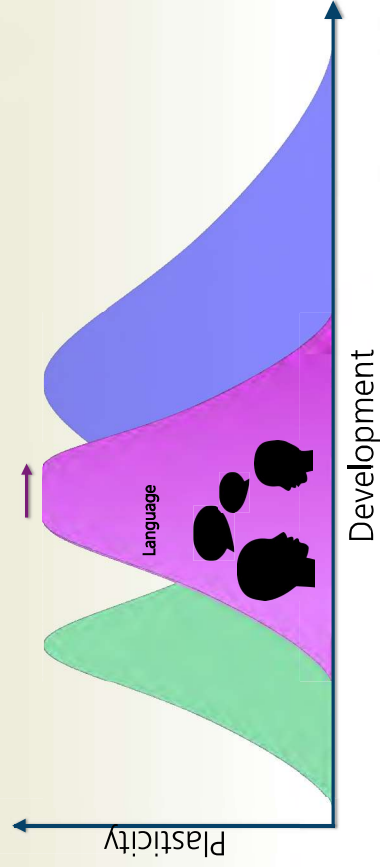
The Genius of Children



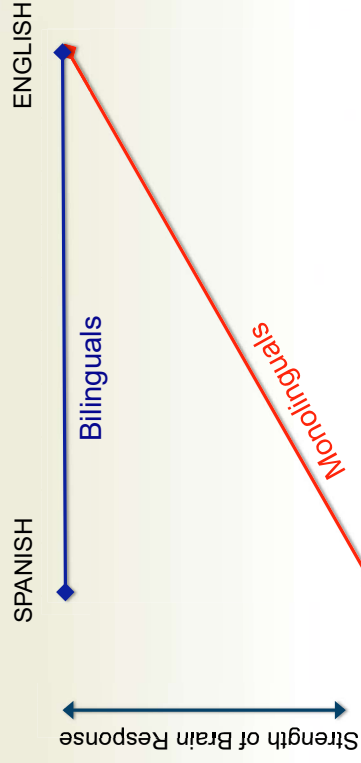
Bursts of Great Growth



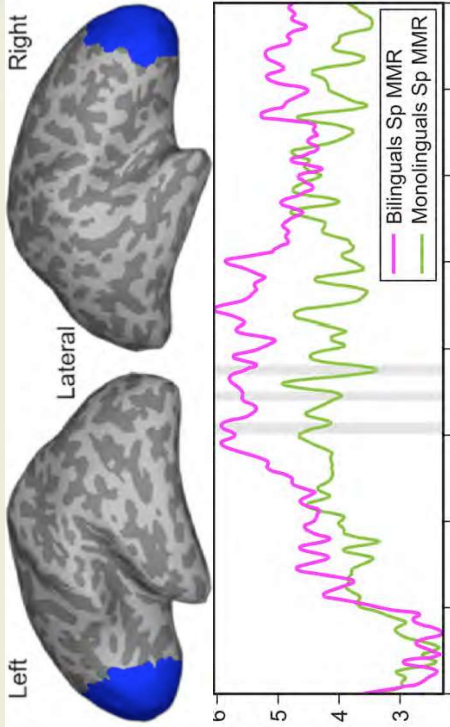
What About Two Languages?



Specialized for Two Languages



Increased Prefrontal Activity



Ferjan Ramirez et al., 2016

Cognitive Flexibility

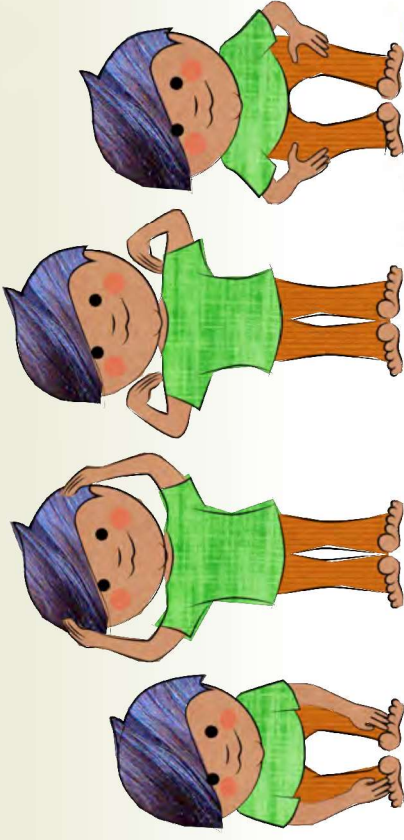


Ferjan Ramirez et al., 2016

Cognitive Flexibility



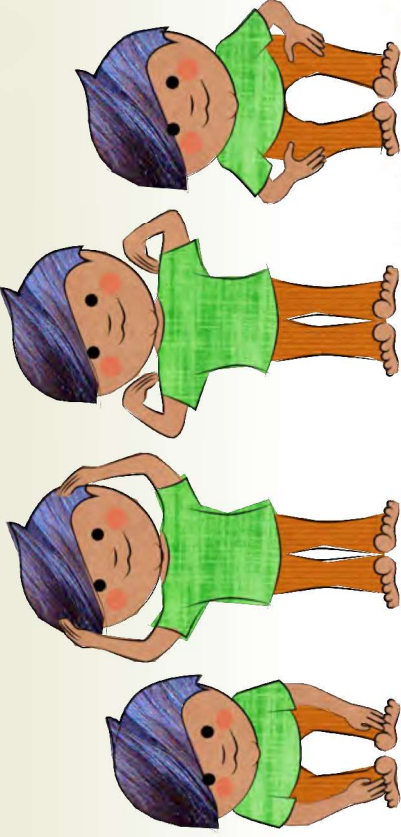
Head! Toes! Knees! Shoulders!



McClelland et al., 2014

Executive Function

Head! Toes! Knees! Shoulders!

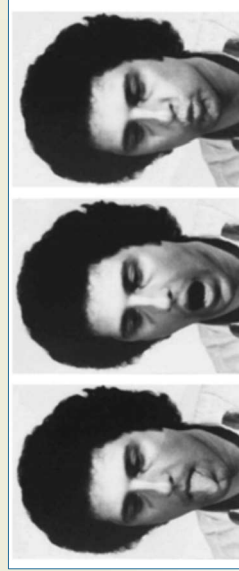


McClelland et al., 2014

Supporting Brain Development



Social Learning from Birth



Meltzoff & Moore, 1977; 1983

Social Learning is Key

Live Interaction



DVD Session

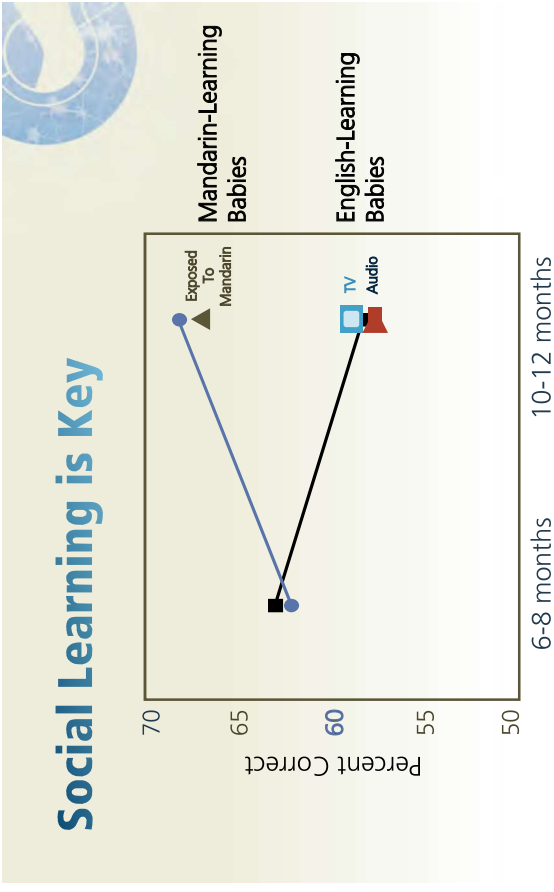


Audio Session



Do infants learn to discriminate Mandarin sounds?

Kuhl, Tsao & Liu, 2003



Quality of Language Matters

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

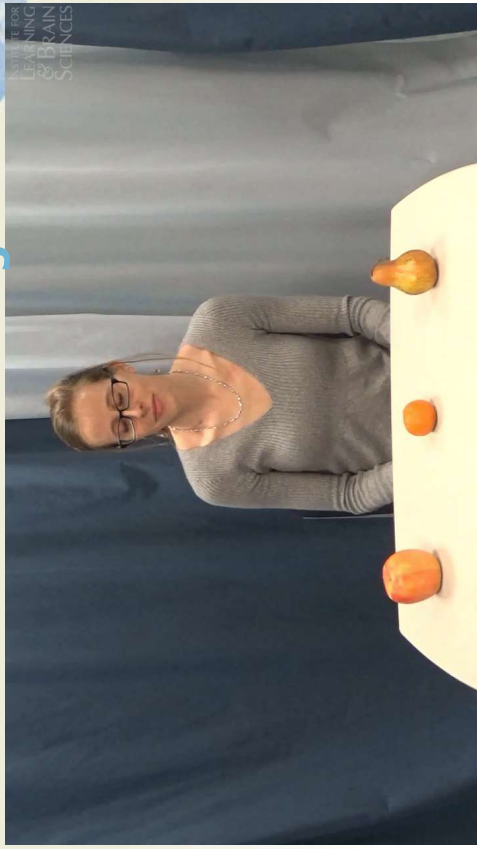
Quality of Language Matters

↑ Infant-Directed Speech
↑ Babbling

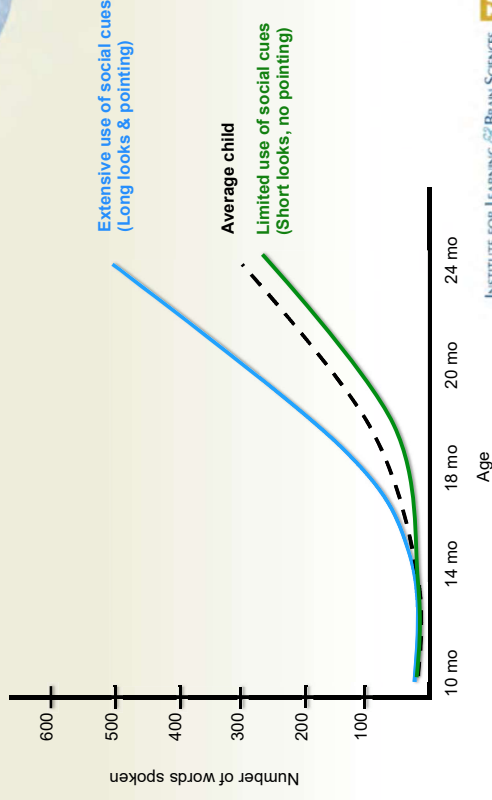
↑ Infant-Directed Speech at 12 m
↑ Vocabulary at 24 m

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

Social Cues Boost Learning



Social Cues Boost Learning



Adapted from Brooks & Meltzoff, 2008

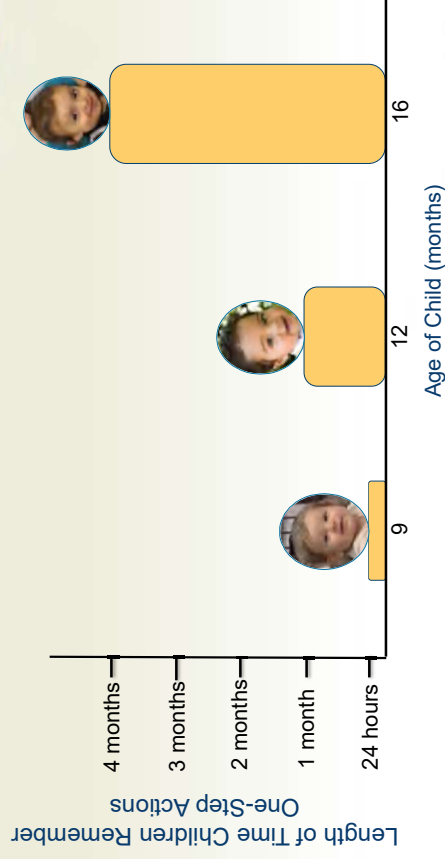
Watching and Imitating



Watching and Learning

INSTITUTE FOR
LEARNING
& BRAIN
SCIENCES
University of Washington

Watching, Imitating, and Remembering



Adapted from Klein & Meltzoff, 1999; Meltzoff, 1998, 1995, 1999

Goldstein & Schwade, 2008

Back-and-Forth Boost Learning



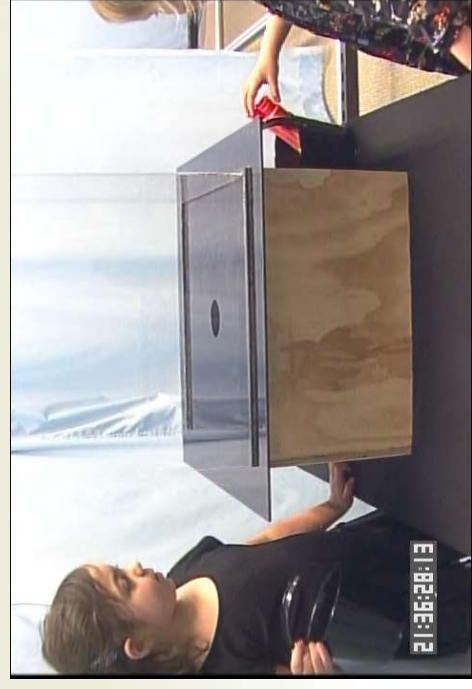
Being In Sync Boost Learning



Rabinowitch & Meltzoff, 2017

Rabinowitch & Meltzoff, 2017

Social Learning and Collaboration

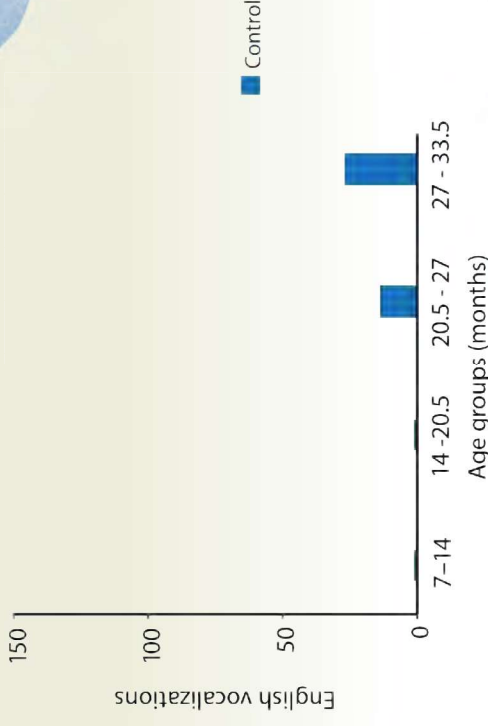


Developing a High Quality Early Learning Program



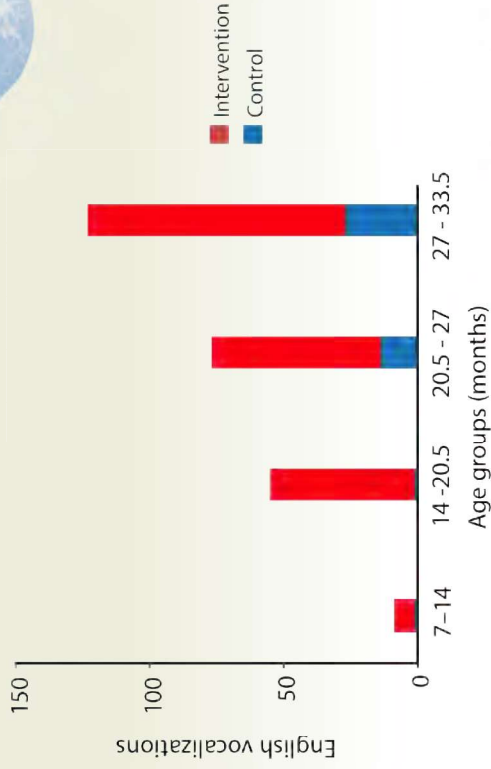
Ferjan Ramirez & Kuhl, 2017

High Quality = Learning Gains



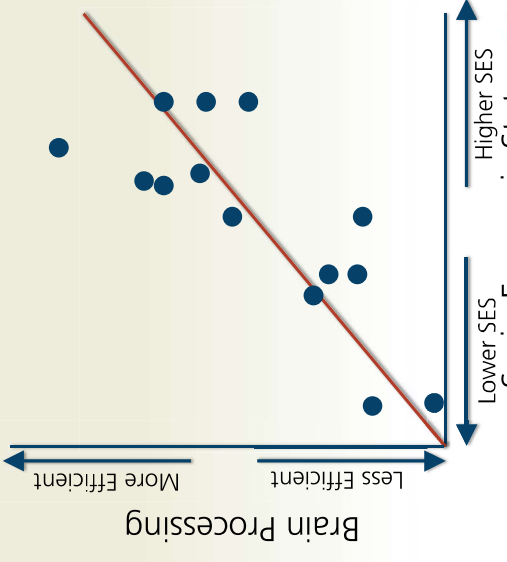
Ferjan Ramirez & Kuhl, 2017

High Quality = Learning Gains



Ferjan Ramirez & Kuhl, 2017

Experiences Impact Brain Processing



Adapted from Raizada et al., 2008

Early Learning Sets the Stage



7 mo.

2 yr.

3 yr.

4 yr.

5 yr.

Hearing IDS → later vocab

Reading social cues → later vocab

Mental words → Theory of Mind

Speech perception → later vocab

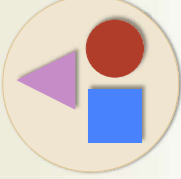
Links to reading at age 5

Executive functioning skills → growth in all academic outcomes

Brooks & Meltzoff, 2008; 2014, 2015;
Kuhl et al., 2005; Lebedeva et al., 2010;
McClelland et al., 2014

Creating Lifelong Learners

red
blue
purple



ABCs

123s

Creating Lifelong Learners



ilabs.uw.edu

For I-LABS Training Modules:
modules.ilabs.uw.edu

