

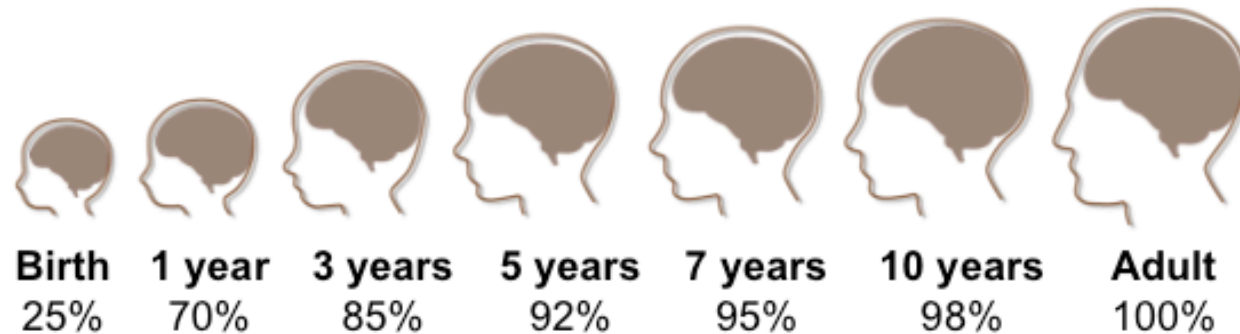
The First 2,000 Days: Early Learning Sets the Stage

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Director of Translation, Outreach, and Education

The First 2,000 Days



2,000 Days of Rapid Brain Growth



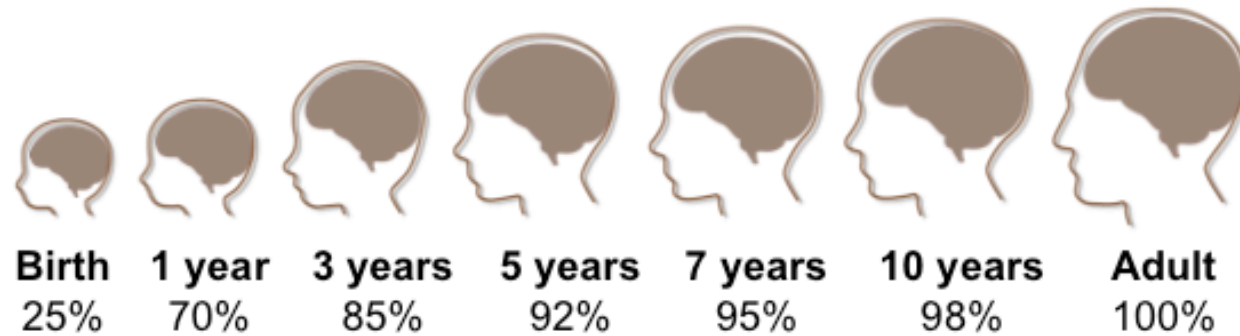
Learning Begins Before Birth

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

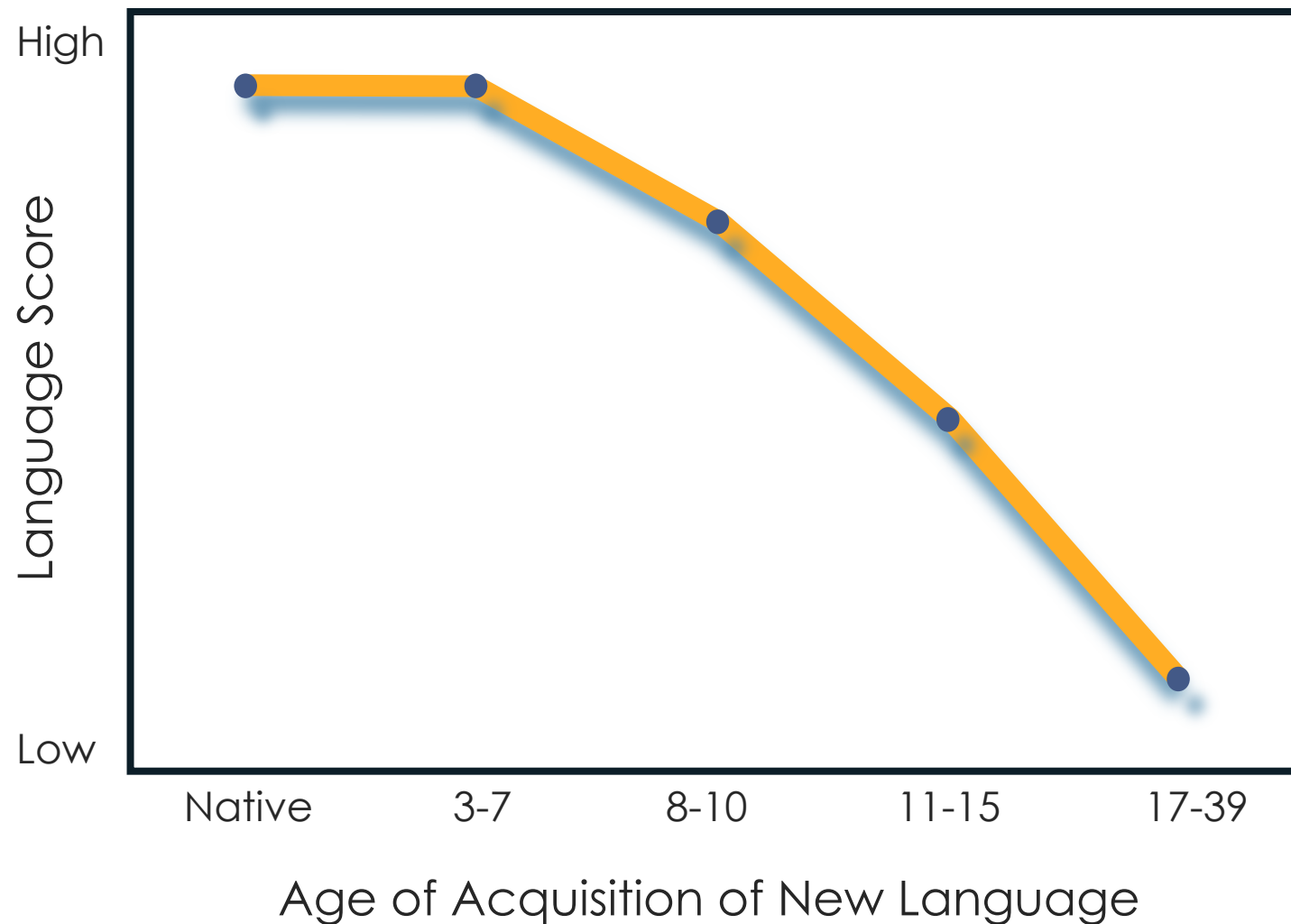


Moon, Lagercrantz & Kuhl, 2013

2,000 Days of Rapid Brain Growth

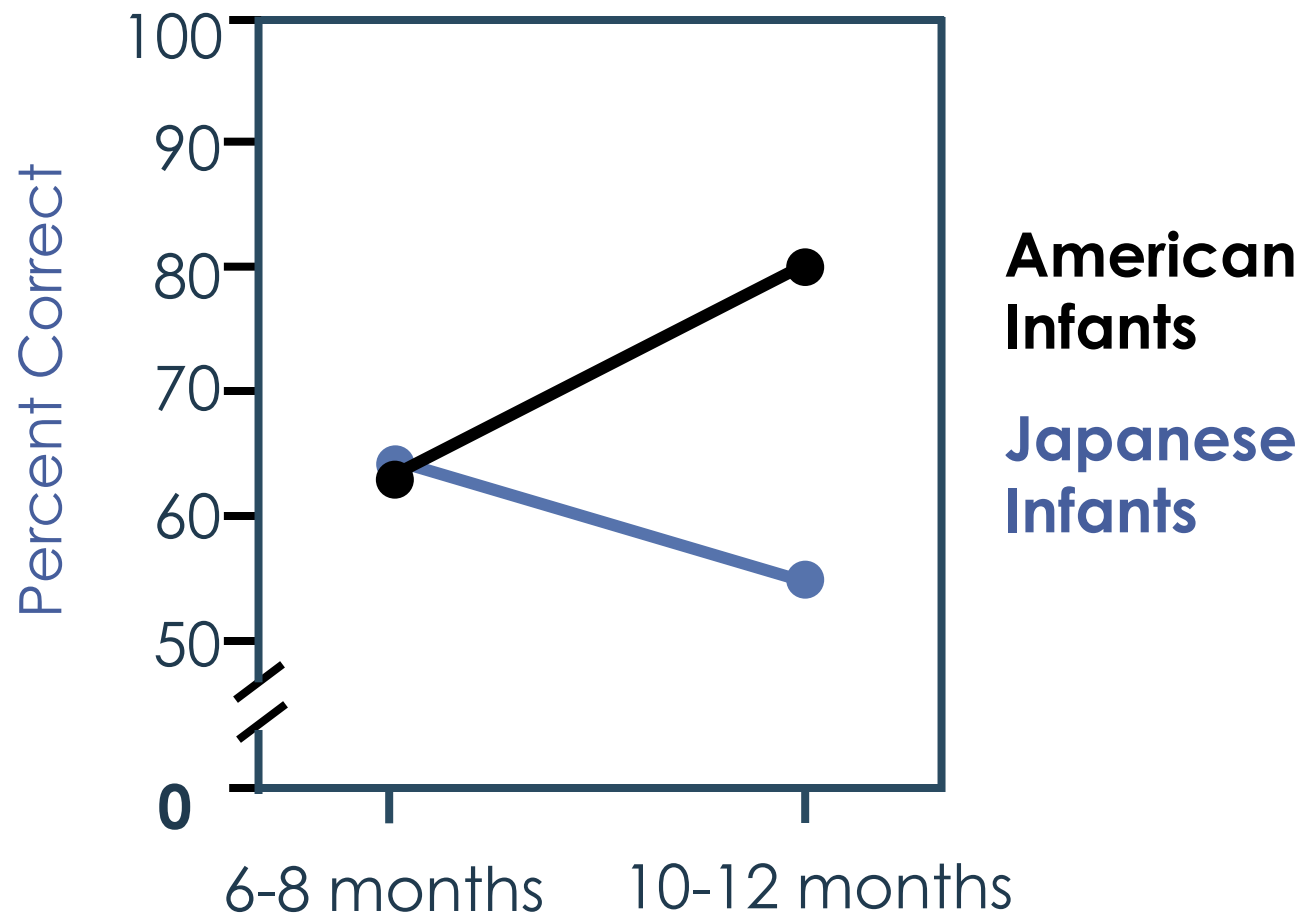


The 'Critical Period' for Language



Experience Shapes Language

Infant perception of /ra/-/la/



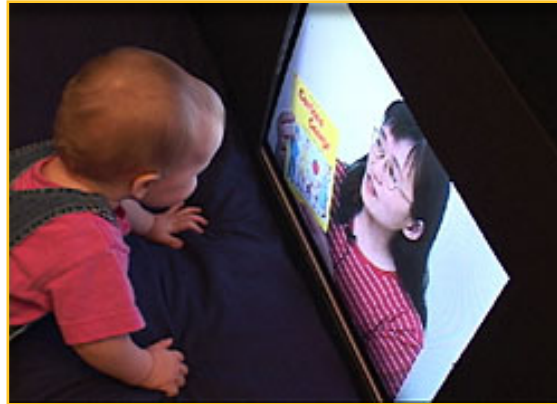
Kuhl et al., 2006

Are all experiences equal?

Live Interaction



DVD Session



Audio (CD) Session

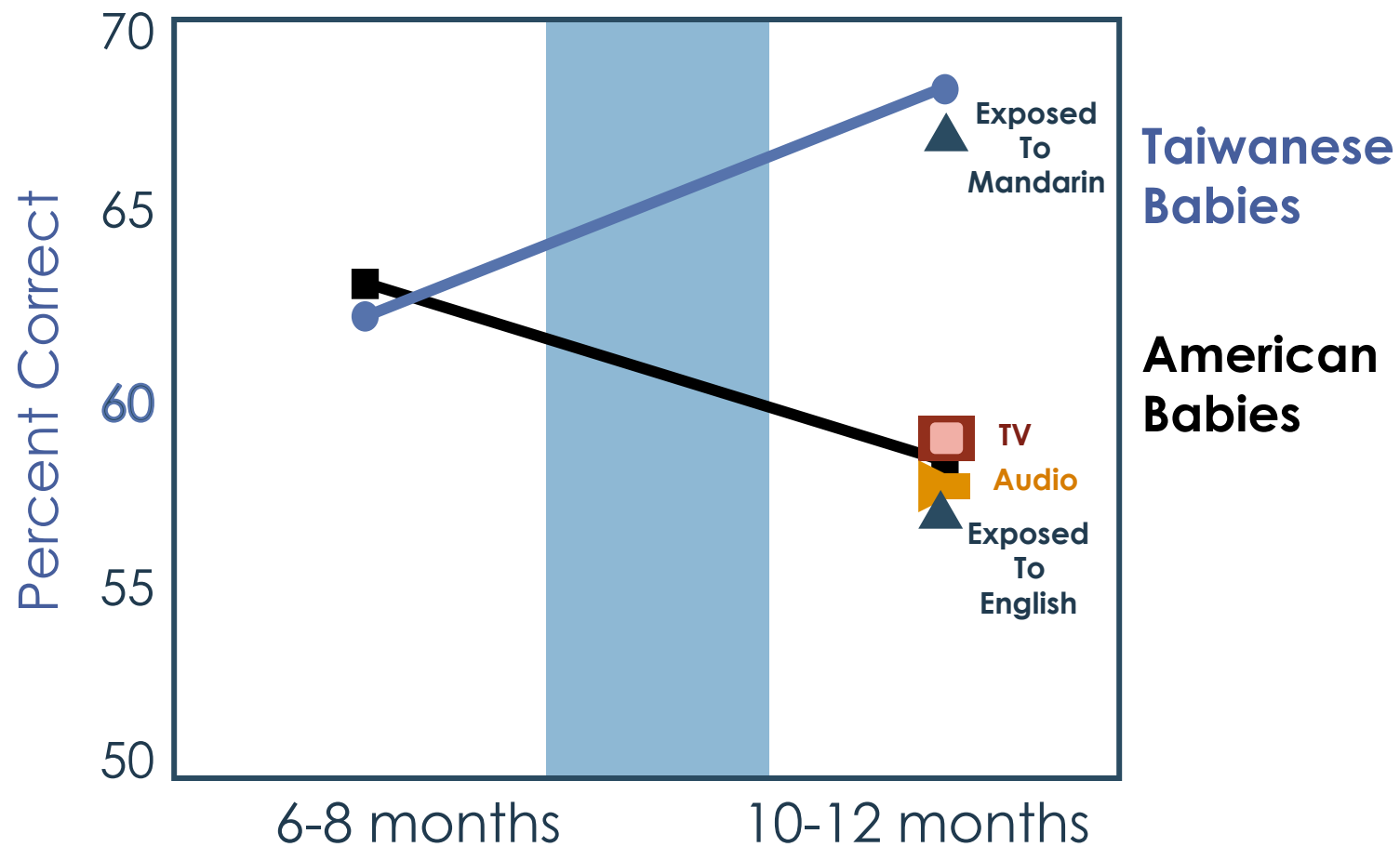


- 9-month-old Seattle infants
- Naturalistic Mandarin Chinese exposure (play & books)
- 12 sessions, 25 minutes each

Do infants learn to discriminate Mandarin sounds?

Kuhl, Tsao & Liu, 2003

Humans Learn From Other Humans

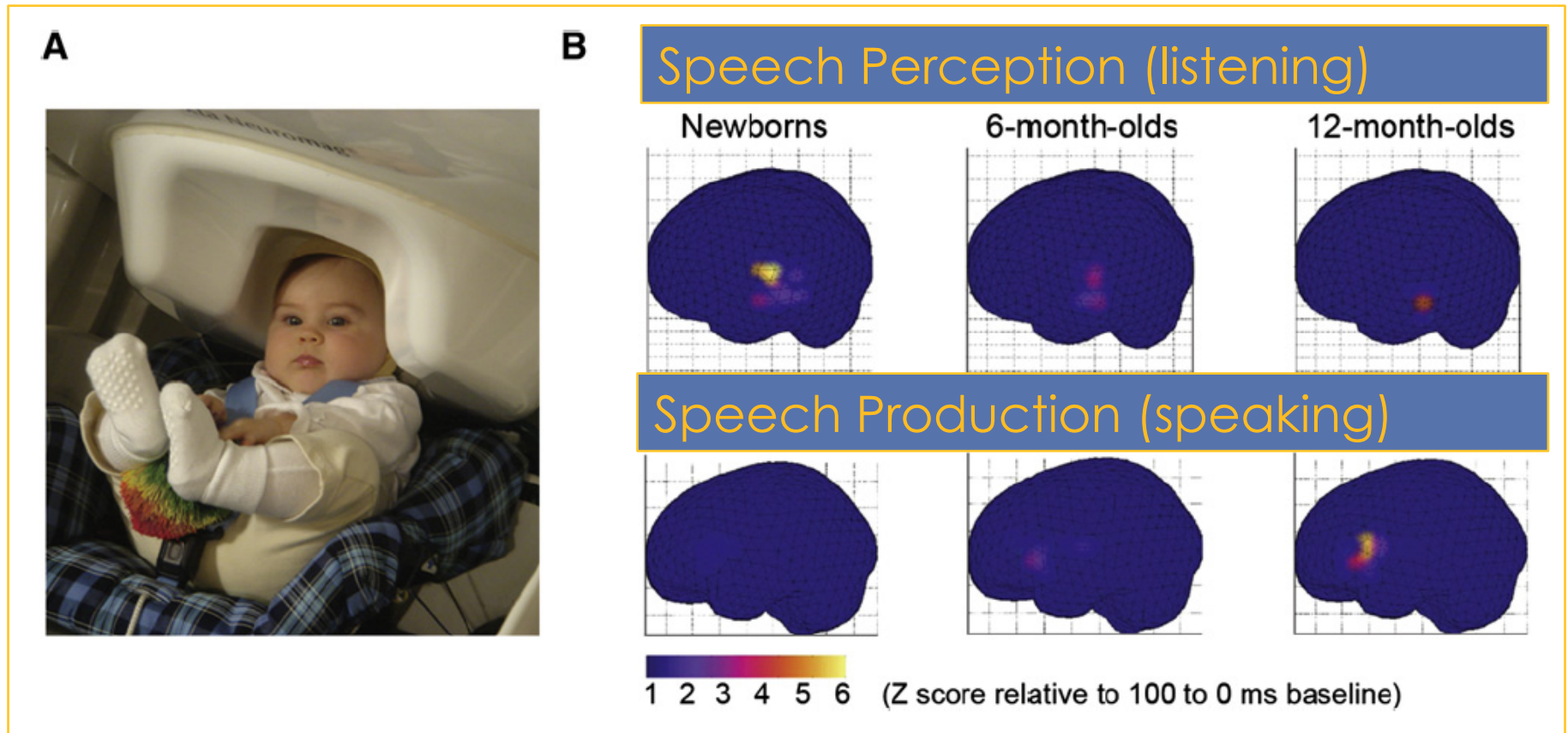


Kuhl, Tsao & Liu, 2003

Magnetoencephalography (MEG)

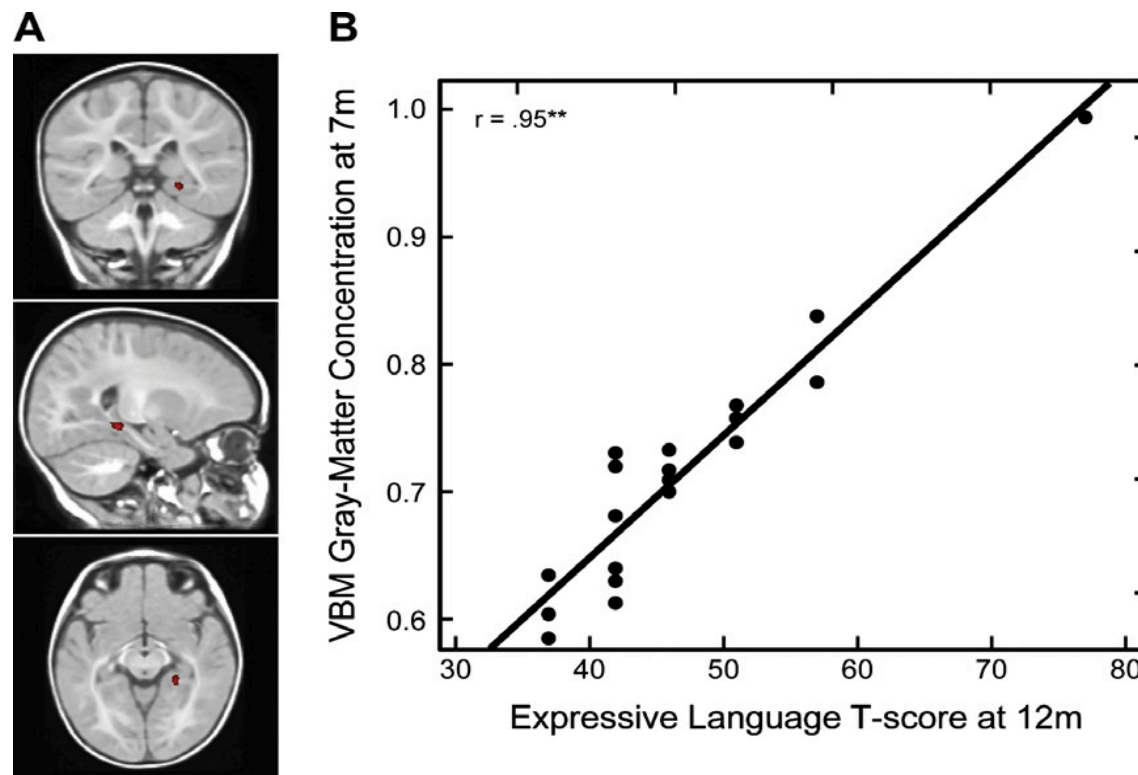


Real-time Coordination Between Brain Regions



Imada, Zhang & Kuhl, 2006

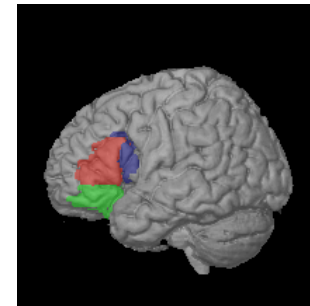
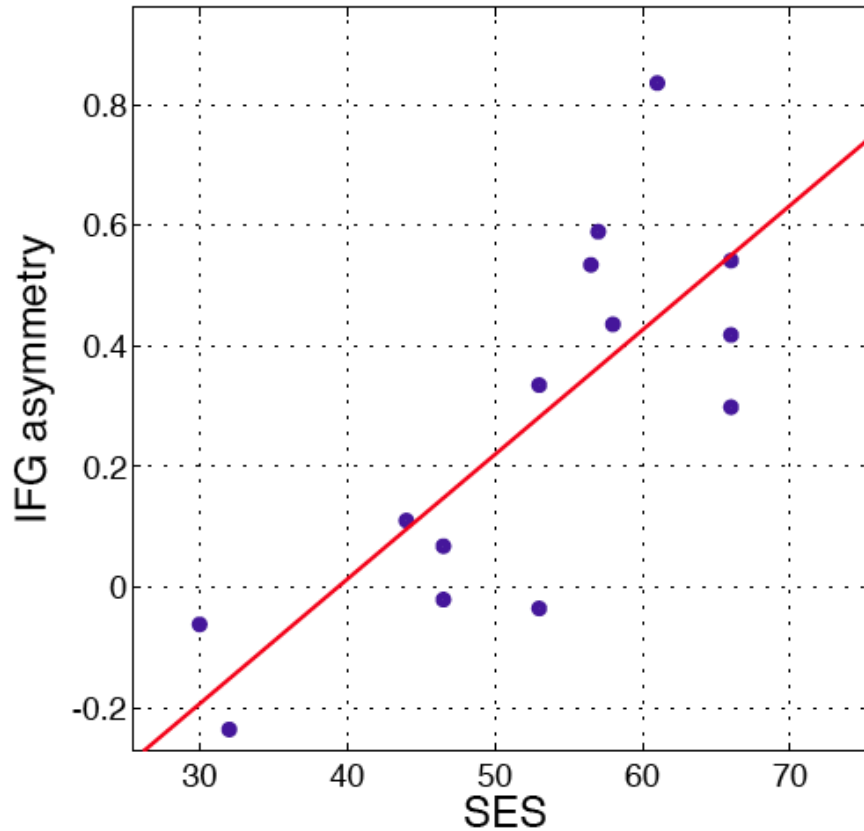
Early Brain Development is Predictive



- Volume of gray matter in 7-month-olds predicts receptive and expressive vocabulary at 12 months

Deniz Can, Richards & Kuhl, 2013

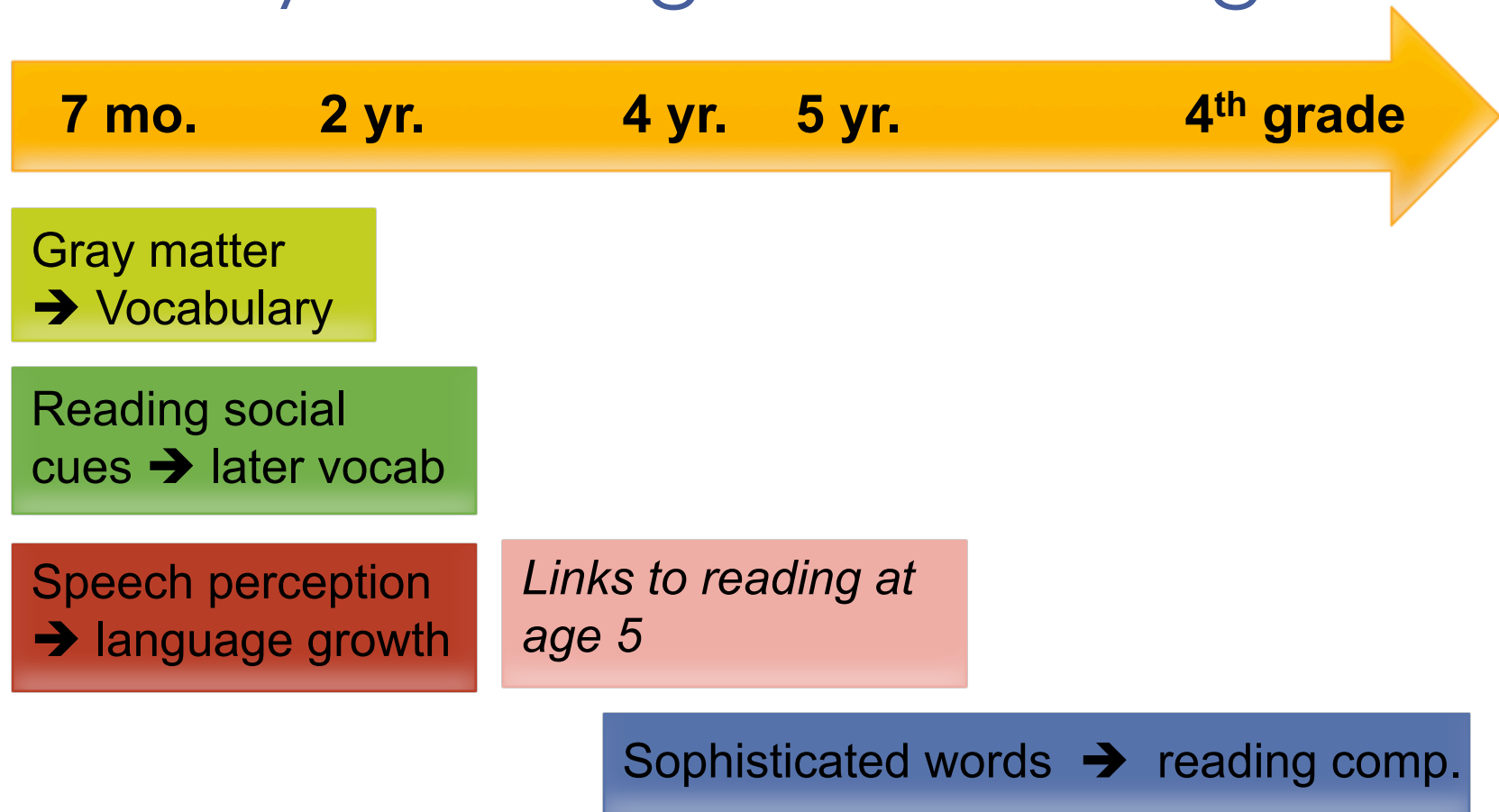
Fewer Experiences → Reduced Brain Dev't



Lower SES is related to less specialized brain function in 5-year-olds

Raizada, Brooks, Meltzoff & Kuhl, 2008

Early Learning Sets the Stage



Deniz Can et al., 2013; Brooks & Meltzoff, 2008;
Kuhl et al., 2005; Lebedeva et al., 2010; Dickinson & Porche, 2011

By the 2,000th Day...

School Readiness

- Imitate & be imitated
- Use objects as symbols
- Take turns & seek help
- Solve problems
- Self-regulate
- Control impulses
- Experience rich input
- Explore environment
- Understand routines
- Lead & follow in play
- Be aware of emotions
- Shift attention well

Gratefully acknowledging our partners, collaborators, colleagues, & supporters



- NSF Science of Learning Center grant to the University of Washington's LIFE Center
- The National Institutes of Health (NIH)
- The Hsin-Yi Foundation
- The McDonnell Foundation
- The Human Frontiers Science Program
- Cure Autism Now

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