Brain Science: How Early Experiences Shape the Brain

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Same or Different?

English

Spanish

Hindi
The Genius of Children

Adapted from Johnson and Newport, 1989
Rapid Brain Growth

Birth: 25%
1 year: 70%
3 years: 85%
5 years: 92%
7 years: 95%
10 years: 98%
Adult: 100%

Gray's Clinical Neuroanatomy, 2010
When we learn something new…

Neurons Make Connections

…we build connections between neurons

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Building an Ecosystem
Experience Drives Connections

Newborn  6 Months  4 Years  6 Years
A Thriving Brain

Blooming

Pruning

Thriving

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Bursts of Brain Growth
Looking Inside the Brain (MEG)
Language Regions

Language Perception

Language Production
Building a Coordinated Brain

Language Perception

Newborn

6-month-old

12-month-old

Language Production

Adapted from Imada et al., 2006
Specializing Based on Experiences

Strength of Brain Response

SPANISH

ENGLISH

Bilinguals

Monolinguals

Ferjan Ramirez et al., 2016
Experiences Impact Brain Processing

Raizada et al., 2008

Socio-Economic Status

Lower SES  Higher SES

Brain Processing

Less Efficient  More Efficient
Brain: Biology + Experience
Components of nurturing care

- Good Health
- Adequate Nutrition
- Opportunities for Early Learning
- Security and Safety
- Responsive Caregiving

Unicef, World Bank, WHO

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Where are children?
• **Parents** are best able to support children when...
  - their basic needs are met
  - they have time to engage with their child
  - their stress level is low or manageable

• **Children** thrive when...
  - their basic needs are met
  - they are in the context of relationships with caring and responsive adults
Parent Coaching Works

- Coach feedback on recordings of language at home
- Listen to audio samples
- Discuss upcoming language milestones
- Find times for interactive activities, like book sharing

Ferjan Ramirez et al., 2018
Parent Coaching Works

Language to child

Parentese

Babbling

Ferjan Ramirez et al., 2018
Access to information in preferred language

Family Leave Policies

Living Wage

Affordable Housing

Access to Services: Medical Care, Libraries, etc.

Transportation

High-quality Childcare

Available Childcare Slots

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What skills will the next generation need?
What skills will the next generation need?

- Solve Problems
- Lead and follow in play
- Self-regulate
- Control impulses
- Explore the environment
- Understands routines
- Is aware of emotions
- Shift attention well
- Take turns & seek help

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Thank you!