Brain Development, Parenting and Early Stress

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Acknowledgements

THREE CORE CONCEPTS IN EARLY DEVELOPMENT

Core Concept #1
Early experience builds brain architecture.
Early experience builds brain architecture

- Genes are the blueprint but experience is like the carpenter
- Together, they establish a weak or sturdy foundation
Reflection

- How does the idea that early experience builds brain architecture relevant to your work?
- Why is this important? What are the implications for kids, parents, service providers and researchers?

Core concept #2

Caregiver-child interaction shapes brain circuitry.

Serve & Return interaction shapes brain circuitry

- Children serve
- Caregivers return their serves
- This back and forth is key to wiring the brain
- Works best within a trusting relationship
- Occurs inside and outside the home
Reflection

• Think an examples of serve and return interaction.
• Think of a child who experiences plenty of Serve & Return.
• Think of a child who does not.

Core Concept #3

Toxic stress derails healthy brain development.

Toxic stress derails healthy development

• When we are stressed, our bodies activate physiological response
• Short lived stress can promote growth
• Toxic stress can weaken the architecture of the developing brain
The Biology of Adversity: Three Levels of Stress

**Positive**
Brief increases in heart rate, mild elevations in stress hormone levels.

**Tolerable**
Serious, temporary stress responses, buffered by supportive relationships.

**Toxic**
Prolonged activation of stress response systems in the absence of protective relationships.

Barriers to Educational Achievement Emerge Early

Children with Developmental Delays

- 1-2: 20%
- 3: 40%
- 4: 60%
- 5: 80%
- 6: 100%

Source: Barth, et al. (2008)

Developmental Status of Maltreated Children

As adversity increases so does risk

Reflection

- Do you work with families who experience toxic stress? What does toxic stress look like for them?
- In your experience, how does adversity and toxic stress impact development?
Keys to Healthy Development

A balanced approach to emotional, social, cognitive, and language development, starting in the earliest years of life.

Supportive relationships and positive learning experiences that begin with parents but are strengthened by others outside the home.

Highly specialized interventions as early as possible for children and families experiencing significant adversity.

SNAP Lab Research

- Specific effects of toxic stress
- Brain plasticity

The HPA Axis

- Hypothalamic-pituitary-adrenal axis
- Part of the neuroendocrine system
- Involved in stress regulation and other bodily processes (digestion, immune system, mood)
- Cortisol plays an important role

Cortisol Levels in Foster Children
Low Cortisol in Foster Children

- Is associated with neglect (i.e. the failure of Serve & Return)
- The same pattern of cortisol activity has been observed in other studies of foster children and in internationally adopted children
- Important: Low cortisol levels are NOT the result of physical or sexual abuse

Neglect

![Graph showing reported maltreatment types]

Source: USDHHS, 2010

Reflection

- Does it surprise you that kids in foster care showed an atypical pattern of cortisol levels?
- Is it surprising that those patterns normalized after six months of treatment?
- What are the implications?
Response to Corrective Feedback

Brain Activity Shows Neural Response to Corrective Feedback

Community Control Group

EEG electrical activity

Gap = greater brain activity to feedback when wrong

Correct answer

800 milliseconds

Incorrect answer

800 milliseconds

Children with Toxic Stress:
No Response to Corrective Feedback

Regular Foster Care Group

Correct answer

NO GAP!

Incorrect answer

Source: Bruce, McDermott, Fisher, & Fox (2009)
Intervention & Brain Plasticity

The Good News

Some Toxic stress effects can be overcome with systematic and well-timed family based interventions

Reflection

- Based on your experience working with kids and families, what do you think of these findings?
In Conclusion

- Early experience shapes brain architecture
- Especially, early caregiver-child interaction
- Toxic stress can derail brain development
- But these effects can be overcome by well timed, family based intervention.

Online Resources

- Harvard Center on the Developing Child
  – http://developingchild.harvard.edu/
- Stress Neurobiology and Prevention Lab
  – http://pages.uoregon.edu/snaplab/SNAP/Welcome.html

Thank You

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