


Opening the Reading Door for Students in Poverty



Cory Armes, M.Ed.

1



African Elephant

2

Poverty stats


- 40% of children living in poverty aren't prepared for primary schooling.
 - Children that live below the poverty line are 1.3 times more likely to have developmental delays or learning disabilities.
- By the end of the 4th grade, many African-American, Hispanic and low-income students are already 2 years behind grade level.
 - By the time they reach the 12th grade they are 4+ years behind.
- 16 to 24-years-old students who come from low-income families are seven times more likely to drop out.
- Less than 30% of students in the bottom quarter of incomes enroll in a 4-year school.
 - Among that group – less than 50% graduate.

3

Agenda


- DEALING WITH STRESS
- COGNITIVE SKILLS & LANGUAGE
- NEUROSCIENCE CAN HELP
- THINGS TO DO

4



Dealing with stress

5

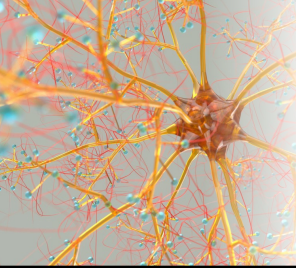


Obviously, the last few years have increased everyone's stress levels. In which of these areas are you seeing the greatest impact in your students?

1. Decreased communication
2. Change in activity performance
3. Inability to focus
4. Change in behavior

6


Children in Stressful Environments



- Compared with healthy neurons, stressed neurons
 - handle less blood flow;
 - process less oxygen;
 - generate weaker signals, and
 - extend fewer connective branches to nearby cells.
- Unpredictable stressors severely impair the brain's capacity to learn and remember.
- Ongoing stress has the potential to negatively affect the architecture of the developing brain.

7


Tolerable Stress



- if stress occurs over limited time periods
 - Allows for the brain to recover and thereby reverse potentially harmful effects
 - Always in the context of ongoing, supportive relationships with adults

8

Toxic Stress




- Strong, frequent, or prolonged activation of the body's stress management system.
- Stressful events that are chronic, uncontrollable, and/or experienced without children having access to support from caring adults
- This wear and tear increases the risk of stress-related physical and mental illness later in life.

Extreme exposure to toxic stress changes the stress response system

- Responds at lower thresholds to events that might not be stressful to others.
- Activates more frequently and for longer periods than is necessary, like revving a car engine for hours every day.

9

Effects of poverty on school performance




Chronic Stress:

- Links to over 50% of all absences
- Impairs attention and concentration
- Reduces cognition, creativity and memory
- Diminishes social skills and judgment
- Reduces motivation, determination and effort
- Increases the likelihood of depression
- Reduces neurogenesis (growth of new brain cells)


10

Language & cognitive skills



11

POLL



Of the students you work with struggling with reading comprehension, what proportion do you feel have underlying memory and attention issues?

- 15%
- 25%
- 33%
- 50 or more

12

Life Skills (Executive Function) Skills

Attentional Control
Working Memory


Promote the capacity to:

- follow classroom rules
- regulate affect
- sit still, and
- learn on-demand through listening and watching

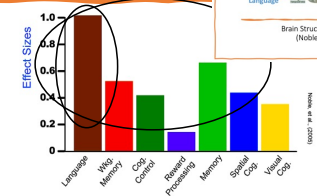
McClelland et al., 2007

13

How are the brains from poverty different?



Brain Structure and Poverty (Noble et al., 2015)



Domain	Effect Size (approx.)
Language	1.0
Working Memory	0.5
Cog Control	0.4
Reasoning	0.2
Memory	0.6
Spatial Cog	0.4
Verbal Cog	0.3


(effect size in yellow)

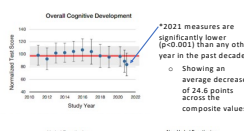
14

The impact of COVID on young children

Yearly trends in overall cognitive development, Dioni et al., 2022

The COVID-19 Pandemic & Early Child Cognitive Development.

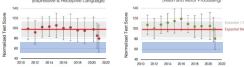





Overall Cognitive Development

*2021 measures are significantly lower (p < 0.001) than any other year in the past decade.

○ Showing an average decrease of 2.6 points across the composite values.



Verbal Functioning (Expressive & Receptive Language)



Non-Verbal Functioning (Abstract Reasoning)


Note: Composite scores from a standard assessment (see table). Scores of 100 are average scores calculated per year. *No children (0% female, 1 month to 3 years of age, 148 total children).

15

Reuters Health

July 20, 2015

Poverty's effect on brains may explain poor kids' lower test scores



- Poor attentional processing
 - Focused attention – tasks
 - Global attention – driving
- 20% of the gap in test scores between poor children and middle-class children may be a result of **poor brain development in the frontal and temporal lobes**

Pfeifer, E., et al. (2012) JAMA Pediatrics

16

Illustration: Attention

Read the color

RED	GREEN	BLUE	YELLOW	PINK
ORANGE	BLUE	GREEN	BLUE	WHITE
GREEN	YELLOW	ORANGE	BLUE	WHITE
BROWN	RED	BLUE	YELLOW	GREEN
PINK	YELLOW	GREEN	BLUE	RED

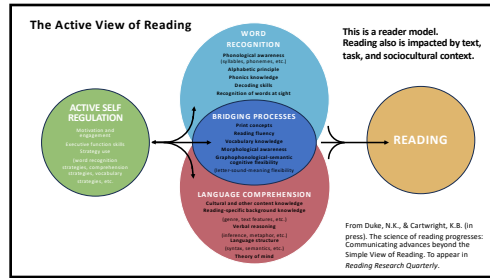
17

Illustration: Attention

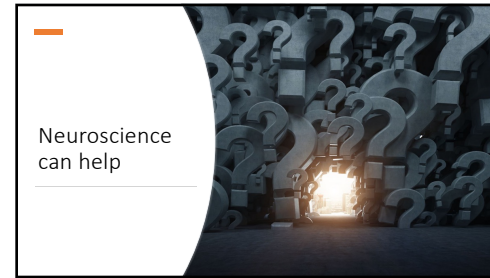
Say the color

RED	GREEN	BLUE	YELLOW	PINK
ORANGE	BLUE	GREEN	BLUE	WHITE
GREEN	YELLOW	ORANGE	BLUE	WHITE
BROWN	RED	BLUE	YELLOW	GREEN
PINK	YELLOW	GREEN	BLUE	RED

18



19



20

Finding Solutions

Neuroscience and the Future of Early Childhood Policy

- Positive experiences after infancy have been shown to compensate to some degree for the negative behavioral consequences
 - Being exposed to an environment rich in opportunities for exploration and social play,
 - Caring and positive relationships with adults
- Computer activities designed to target the skills that are impacted can turn around some effects of poverty

Jack P. Shonkoff and The Lead Center for Advanced Learning and Brain Development, Harvard University, Cambridge, MA 02138, USA
Copyright © 2014 National Academy of Sciences. All rights reserved. For more information, visit www.nationalacademies.org. DOI: 10.17906/1089-2901.10000000

21

The Role of Neuroscience Technology

Well-designed neuroscience-based technology builds the underlying capacities that are reduced in some children of poverty or with learning issues.

22

Brain Fitness: Word List Challenge

Now write down as many words as you can in one minute.

23

Now, check Your List


- pill
- epic
- rose
- kind
- moose
- unlikely
- sip
- district
- direct
- soap
- weathervane
- statue
- mistake
- natural
- photo

24



How Fit is Your Brain?

- Average 20-year-old recalls 7 words
- Average 80-year-old recalls 4 words

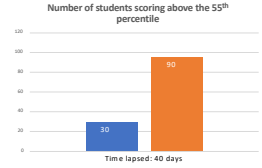


25

West Virginia District

Number of students scoring above the 55th percentile

Within the first 40 days of the 2023-24 school year, 322 K-3 students experienced a six-month gain in their reading proficiency levels.

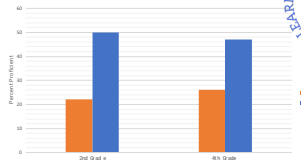


Time elapsed	Number of students
40 days	30
6 months	90

26

©2020 ANDRÉ CARNEIRO | CONFIDENTIAL


How does that translate to test scores?



Elementary Schools
iReady Reading Proficiency Gains

LONG LIVE LEARNING - LONG LIVE LEARNING - LONG LIVE LEARNING

27




Things to do

1. Ascd.org/el/articles
2. Search – what's behind the rise

<https://www.ascd.org/el/articles/whats-behind-the-rise-in-problem-behavior-in-us-schools>

28



Action steps

The growing human brain desperately needs coherent, novel, and challenging input or it will scale back its growth trajectory.

When a child is neglected, the brain does not grow as much.

- Connect and validate (caring)
- Educate and respond (engagement)
- Lead and succeed (strengths)

29

Delivering New Content

You can teach faster, but students will just forget even faster.

- Never use more than 50% of instructional time to deliver new content.
- If you give students at least half the learning time to process the content, they will understand and remember it longer.
- Give time for:
 - Working on comprehension questions
 - Generate test questions
 - Peer teaching


30



Enrichment counterattack

- Minimize negative stress and strengthen coping skills
- Use a cognitively challenging curriculum
- Provide tutoring and pullout services to build skills
- Foster close relationships with staff and peers
- Offer plenty of exercise options
- Provide wraparound health and medical services

31



“I’m giving you these comments because I have very high expectations and I know that you can reach them.”

The Culture Code: The Secrets of Highly Successful Groups, Daniel Coyle

Wise feedback research from *Breaking the cycle of mistrust: Wise intervention to provide critical feedback across the racial divide*

32


- Total: 168 hours per week (24 x 7)
- Miscellaneous events eliminate 84-91 hours (12-13 hours per day x 7 days)
- Out of remaining 84 hours, school gets 30 hours per week (at most)
 - >1260 hours per year for changing lives
- Key: you have >1,260 out of 4,368 hours or 28% of students’ waking time

Your 1,260 hours per year must be so spectacular that they can overcome the other 7,476 hours in your students’ lives this year.

How much time do you have?

Secrets of the Teenage Brain; Sheryl Feinstein

33




Key points

- Poverty is associated with chronic stress which can have a toxic effect on brain architecture.
- Language and cognitive skills are the foundation for reading & learning.
- Neuroscience technology is available to target the skills that are impacted can turn around some effects of poverty.
- We can change students’ learning trajectories.

34

Education is the only profession whose job is to change the human brain ... EVERY DAY.



35

Want a PDF copy of Cory's slides?
Email her at:
carnes@carnegielearning.com

Thank you!

Joe Piazza, Account Executive, MD
jpiazza@carnegielearning.com
443.686.0570

36