
Brain Research Self Defense for Gifted Advocates (2016)

**By Wenda Sheard,
JD, PhD**

**SENG Conference
July 21-24, 2016**

Preliminaries

APPRECIATIONS: Many thanks to Supporting the Emotional Needs of the Gifted (SENG), to Hoagies' Gifted Education Page, to the Brain Café Facebook Group, and to Gifted Research and Outreach (GRO).

PERMISSIONS: Permission to copy for education and advocacy purposes will freely given upon request to wendasheard@gmail.com.

EXPLANATION: My Ph.D. is in political science with an emphasis on education policy.

POSTING: This presentation will soon be posted on Hoagies' Gifted Education Page and on the Supporting Gifted Learners website.

Recent Brain Research for Teachers and Other Curious Souls

By Wenda Sheard, J.D., Ph.D.
Updated 2013

See this 2013 presentation for information on intelligence, the role of dopamine, the effect of some parasites, and the use of hands while thinking and learning.

The Firehose Experience

When searching for recent brain research for this presentation during June and July 2016, I faced a firehose of new information. Although I originally intended to gather information from the past year, I found so much information that I was unable to gather backwards a full year.

Today

- ❖ Why Learn Brain Research?
- ❖ Brain Research Caveats
- ❖ Brain Differences Exist
- ❖ Brain/Gut Connection
- ❖ Poverty
- ❖ Social Media and More
- ❖ (Notice there's no section on education/learning. Why? Because we don't yet know whether experiences in the laboratory will transfer to classroom learning situations, and we don't yet know whether that the effects of laboratory experiences will persist past the date of the experiment.)

Today

- ❖ **NOW: Why Learn Brain Research?**
- ❖ Brain Research Caveats
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- ❖ Brain/Gut Connection
- ❖ Poverty
- ❖ Social Media and More

Why Learn Brain Research?

- ❖ We want to be the best parents / teachers possible for our children. (WITH KNOWLEDGE)
- ❖ We want to advocate effectively (WITH EVIDENCE) for diverse educational programs and funding to meet the needs of all children.

Can Rethinking

Potential

BY DONNA WILSON, MARCUS CONYERS, AND KELLY ROSE

The mission statements of many schools echo a common theme: All students *can* learn, and we will help them succeed. However, few schools are delivering specific instruction consistently about brain plasticity, malleable intelligence, and the application of metacognitive and cognitive skills that would help children achieve more of their academic potential.

In this vacuum, widely held but often unacknowledged misconceptions about the nature of learning capacity persist. In particular, a mistaken notion of innate intelligence as destiny runs through our culture. Americans are inclined to associate accomplishment with genetically endowed capabilities and to label people in the top tiers of their fields as naturally gifted, implying that their successes are out of reach for the rest of us.

ILLUSTRATION BY MARK ALLEN MILLER

How Instruction on Brain Plasticity, Intelligence, and Metacognition Boosts Academic Outcomes

Published in
Independent School. Fall 2015,
Vol. 75 Issue 1,
p50-54. 5p.

Rethinking Learning Potential

Abstract: “The article focuses on how **instruction on brain plasticity, intelligence and metacognition** boosts academic outcomes. * * * “

Rethinking Learning Potential

“[A] mistaken notion of innate intelligence as destiny runs through our culture. Americans are inclined to associate accomplishment with genetically endowed capabilities and to label people in the top tiers of their fields as naturally gifted, implying that their successes are out of reach for the rest of us.”

SOUNDS LIKE WHO?

Rethinking Learning Potential

“After extensive research in this area, psychology professor K. Anders Ericsson determined that committing to **5,000 to 10,000 hours of practice is the true secret of success.** * * *

These cognitive assets can be taught to and learned by students of all ages, supporting the view of intelligence as dynamic and malleable.”

SOUNDS LIKE WHO?

PROBLEMS WITH THIS?

Rethinking Learning Potential

- ❖ 1. Teach students about their brains' amazing neuroplasticity. **AND how about teaching them that brain differences exist between people?**
- ❖ 2. Use the brain's various learning pathways in classrooms and schools.
- ❖ 3. Personalize classroom instruction. **YES! Great idea, if funds exist.**
- ❖ 4. Guide students to become smarter * * * “Essentially, what we want is for educators to imagine what schools can be like if they apply strategies aimed at **setting aside misconceptions about innate talent and intelligence**, focusing instead on guiding students to drive their brains to achieve their learning potential.”
- ❖ **PROBLEMS WITH THIS?**

“Rethinking Learning Potential”

Published in **Independent School**. Fall 2015, Vol. 75 Issue 1, p50-54. 5p.

By:

Donna Wilson, nsu@**brainsmart.org**

Marcus Conyers

Kelly Rose

(Notice the URL of the lead author. What’s her motivation for writing the article? Her business?)

Yes. The first two authors are involved in this business.

Graduate Students:
Click here to order materials
Contact: nsu@brainsmart.org

Publications
& Presentations

Read Dr. Donna
Wilson's blog

Read Marcus
Conyers' blog

Follow us on

Welcome!

Since 1998 we have been empowering educators with the BrainSMART® framework for connecting the science of learning to the practice of teaching. We have partnered with institutions such as Florida Atlantic University for an initiative supported by an Annenberg Challenge Grant Award and with Nova Southeastern University to research and develop NCATE-accredited graduate degree programs. Studies show a positive impact on teaching practice and on student learning [\[Read Studies\]](#). We have presented study results at AERA, IACEP, AACTE and at the Implementation Science Conference at Cambridge University. We have worked with 160,000 educators reaching more than two million students through district, state, and national initiatives and have authored 20 books.

Studies show the Positive Impact of the BrainSMART® Program.

Professional Development

International presenter and best-selling author, Dr. Donna Wilson, will give your educators dynamic, research-based keynotes and professional development based on her many books and on graduate programs she has co-developed connecting the science of learning to the practice of teaching.

Books and Resources

Strategies, Tips, and Articles

Professional Development Flyer

Contact Dr. Wilson at
donna@brainsmart.org

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Today

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Brain Research Caveats

- ❖ 1. Beware: “Neurobabble”
- ❖ 2. Caveats from John Geake’s *The Brain at School*
- ❖ 3. News Articles vs. Research Articles
- ❖ 4. Better Tools
- ❖ 5. Transcranial Electric Stimulation

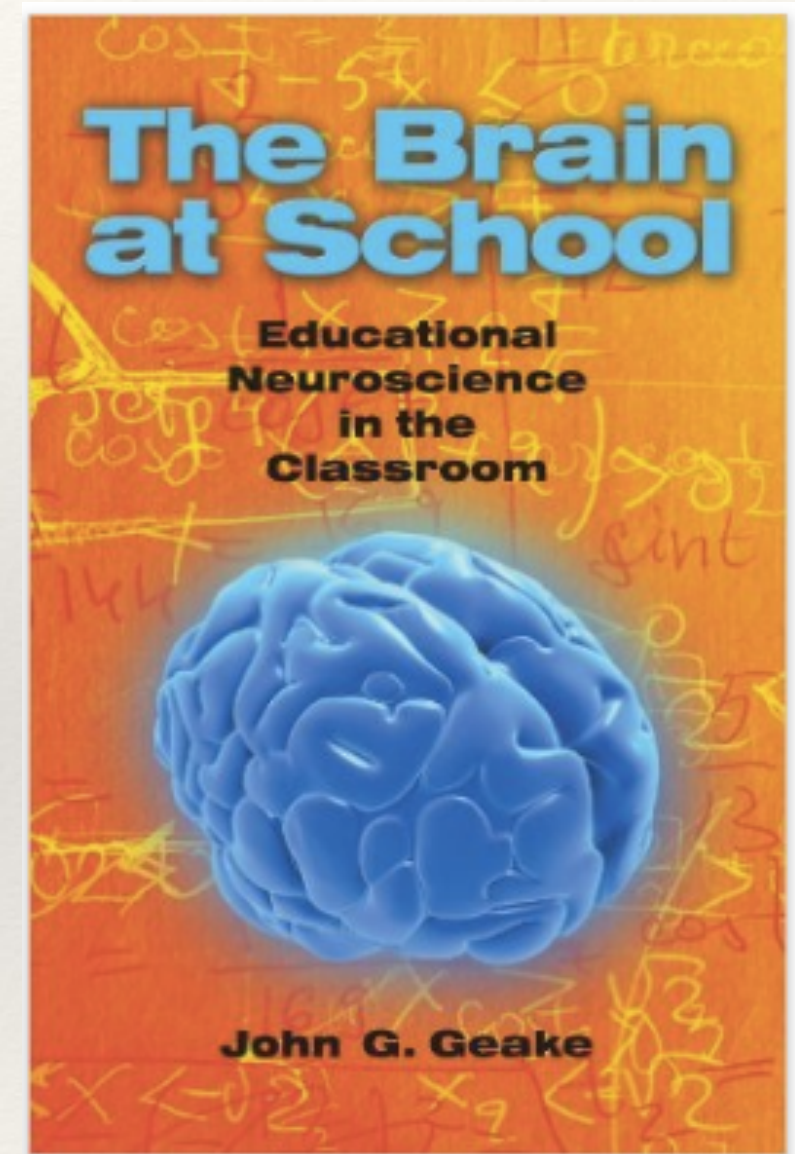
Yale & “Neurobabble”

- ❖ *The Seductive Allure of Neuroscience Explanations.*
- ❖ The scientists conducted three experiments and discovered that non-experts “judged that explanations with logically irrelevant neuroscience information were more satisfying than explanations without.”
- ❖ More troubling: The subjects were Yale undergraduates enrolled in a neuroscience course. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2778755>

John Geake's

The Brain at School (2009)

- ❖ Levels of analysis are confounded when we try to port neuroscience over to education
- ❖ Correlation is not proof of causation.
- ❖ Cognitive neuroscientists and educators are not well connected.
- ❖ Neuroscience tools will improve in the future.



John Geake & “Neuromythologies”

- ❖ *“[At education research conferences] I rarely hear an education/practitioner researcher stand up and say that a particular theoretical position, much less a piece of research, is wrong, or silly, or useless in the classroom. Or say that here is evidence that this particular pedagogic approach is ineffective. Instead, it all gets added into a cornucopia of unpredictable flubber recently expanded, to make matters worse, with the latest neuromythologies.”*

I met the late John Geake at the Wallace Symposium years ago. I highly recommend this symposium. It's the place where leaders in our field gather and here from each other and from outside experts in related fields. Next one: April 29-May 1, 2018.



COLLEGE OF
EDUCATION

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THE WALLACE RESEARCH & POLICY SYMPOSIUM ON TALENT DEVELOPMENT

The Wallace Research and Policy Symposium is a premiere scholarly conference at which the latest research findings and policy implications for gifted education and talent development are addressed.

The next conference will be held April 29-May 1, 2018. More specific details will be available soon.

News Articles vs. Research Articles

- ❖ News articles: consider the publication, the sensationalism
- ❖ My favorite news source: NeuroscienceNews.com
- ❖ Research articles: consider subjects used, sample sizes, methods, selection bias, techniques, discussion.

Better Tools

“Functional magnetic resonance imaging (fMRI) has revolutionized our understanding of the human brain, but the method is now approaching the limit of its capabilities.

<http://mcgovern.mit.edu/principal-investigators/alan-jasanoff>

What's on his head?



Photo from: <http://www.nimh.nih.gov/health/publications/neuroimaging-and-mental-illness-a-window-into-the-brain/neuroimaging-and-mental-illness-a-window-into-the-brain.shtml>

Magnetoencephalography (MEG machine)

- ❖ “A direct measure.” (not a measure of metabolism products)
- ❖ “A very high temporal resolution device.” (only milliseconds)
- ❖ “Sources can be localized with an accuracy of millimeters.”
- ❖ “Completely non-invasive. Injection of isotopes or exposure to X-rays or magnetic fields is not required.”

<http://www.meg-brain-mapping.pitt.edu/index.html>

April 2016: New “Penny-Sized” Microscope

“A microscope about the size of a penny is giving scientists a new window into the everyday activity of cells within the spinal cord. The innovative technology revealed that astrocytes—cells in the nervous system that do not conduct electrical signals and were traditionally viewed as merely supportive—unexpectedly react to intense sensation.”

RESEARCH ARTICLE: “Imaging large-scale cellular activity in spinal cord of freely behaving mice” by Kohei J. Sekiguchi, Pavel Shekhtmeyster, Katharina Merten, Alexander Arena, Daniela Cook, Elizabeth Hoffman, Alexander Ngo and Axel Nimmerjahn in Nature Communications. Published online April 28 2016 doi:10.1038/

FROM: <http://neurosciencenews.com/spinal-cord-astrocytes-als-4136/>

April 2016: Astrocytes —> Not Passive

“As synaptic dysfunction is thought to trigger or exacerbate many neurological diseases, a deeper understanding of how synaptic communication is regulated [by astrocytes] will aid in discovering disease mechanisms and developing treatments. **Our work shows that astrocytes could be a potential target of novel therapeutics.**”

FROM: “Astrocytes regulate heterogeneity of presynaptic strengths in hippocampal networks” by Letellier M, Park YK, Chater TE, Chipman PH, Gautam SG, Oshima-Takago T, and Goda Y in PNAS during the week of April 25 2016.

April 2016: Neural Circuit Tracing 20x Better

“Long distance connections between neurons are key to what is called global processing in the brain. Imagine a ball sailing toward a catcher. The catcher’s visual circuits will process the information about the ball and send that information over to the brain’s motor circuits. The motor circuits then direct nerves in the catcher’s arm and hand to grab the ball. **That global processing relies on long-distance neural circuits forming precise connections to specific neuron types; these circuits can be revealed with rabies viral tracers.**”

“Improved Monosynaptic Neural Circuit Tracing Using Engineered Rabies Virus Glycoproteins” by Euseok J. Kim, Matthew W. Jacobs, Tony Ito-Cole, and Edward M. Callaway in Cell Reports. Published online April 14 2016 doi:10.1016/j.celrep.2016.03.067

FROM: <http://neurosciencenews.com/brain-mapping-rabies-4057/>

May 2016: Tracking Critical Development in the Young Brain

“A recent study led by Doug Dean III of the Waisman Center at the University of Wisconsin—Madison and published in the journal NeuroImage **combined two related but different imaging techniques** to non-invasively track the rate at which nerve fibers in children’s brains become wrapped in myelin.”

<http://neurosciencenews.com/myelin-neurodevelopment-mri-4170/> (May 5th)

May 2016: Tracking Critical Development in the Young Brain

- ❖ “[W]e present the first quantitative study of myelin g-ratio index changes across childhood, examining 18 typically developing children 3 months to 7.5 years of age. We report a spatio-temporal pattern of maturation that is consistent with histological and developmental MRI studies, as well as theoretical studies of the myelin g-ratio. This work represents the **first ever in vivo visualization of the evolution of white matter g-ratio indices throughout early childhood.**”
- ❖ “Mapping an index of the myelin g-ratio in infants using magnetic resonance imaging” by Douglas C. Dean III, Jonathan O’Muircheartaigh, Holly Dirks, Brittany G. Travers, Nagesh Adluru, Andrew L. Alexander, and Sean C.L. Deoni in NeuroImage. Published online May 5 2016 doi:10.1016/j.neuroimage.2016.02.040

July 20, 2016: A Multi-Modal Parcellation of Human Cerebral Cortex

“[W]e delineated 180 areas per hemisphere bounded by sharp changes in cortical architecture, function, connectivity, and / or topography in a precisely aligned **group average of 210 healthy young adults. We characterized 97 new areas and 83 areas previously reported**”

Matthew F. Glasser, Timothy S. Coalson, Emma C. Robinson, Carl D. Hacker, John Harwell, Essa Yacoub, Kamil Ugurbil, Jesper Andersson, Christian F. Beckmann, Mark Jenkinson, Stephen M. Smith & David C. Van Essen
Nature (2016) doi:10.1038/nature18933

July 21, 2016: New Imaging Tool

“[A]ll current approaches for measuring synaptic density in humans require brain tissue from autopsy or surgical resection. We report the use of the synaptic vesicle glycoprotein 2A (SV2A) radioligand [11C]UCB-J **combined** with positron emission tomography (PET) **to quantify synaptic density in the living human brain.**”

“Imaging synaptic density in the living human brain” by Sjoerd J. Finnema, Nabeel B. Nabulsi, Tore Eid, Kamil Detyniecki, Shu-fei Lin, Ming-Kai Chen, Roni Dhaher, David Matuskey, Evan Baum, Daniel Holden, Dennis D. Spencer, Joël Mercier, Jonas Hannestad, Yiyun Huang and Richard E. Carson in Science Translational Medicine. Published online July 20 2016 doi:10.1126/scitranslmed.aaf6667

July 2016: Transcranial Direct Electric Current Stimulation: Big Caveats!

“We perceive an ethical obligation to draw the attention of both professionals and DIY users to some of these issues”

A Letter From Researchers:

“The Use and Abuse of Transcranial Magnetic Stimulation to Modulate Corticospinal Excitability in Humans”

<http://neurosciencenews.com/tdcs-warning-neuroscience-4639/>

<http://onlinelibrary.wiley.com/doi/10.1002/ana.24689/full>

Rachel Wurzman, Roy H. Hamilton, Alvaro Pascual-Leone and Michael D. Fox in Annals of

July 2016: Transcranial Direct Electric Current Stimulation: Big Caveats!

- ❖ Stimulation affects more of the brain than a user may think.
- ❖ Enhancement of some cognitive abilities may come at the cost of others.
- ❖ Effects are highly variable across different people.

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Brain Differences Exists



Photo by Wenda Sheard, July 2012

March 2016: Brain Metabolism Predicts Fluid Intelligence

“A healthy brain is critical to a person's cognitive abilities, but measuring brain health can be a complicated endeavor. A new study reports that **healthy brain metabolism corresponds with fluid intelligence** -- a measure of one's ability to solve unusual or complex problems -- in young adults.” - Science Daily

: [https://www.sciencedaily.com/releases/2016/03/160322133819.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A%20sciencedaily%2Fmind_brain%2Fintelligence%20\(Intelligence%20News%20--%20ScienceDaily\)](https://www.sciencedaily.com/releases/2016/03/160322133819.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A%20sciencedaily%2Fmind_brain%2Fintelligence%20(Intelligence%20News%20--%20ScienceDaily))

Aki Nikolaidis, Pauline L. Baniqued, Michael B. Kranz, Claire J. Scavuzzo, Aron K. Barbey, Arthur F. Kramer, and Ryan J. Larsen. Multivariate Associations of Fluid Intelligence and NAA. Cerebral Cortex, March 2016 DOI: 10.1093/cercor/bhw070

July 2016: Variation & Connection = Higher IQ

“Human intelligence is being defined and measured for the first time ever, by researchers at the University of Warwick.”

“Led by Professor Jianfeng Feng in the **Department of Computer Science**, studies at Warwick and in China have been recently undertaken to quantify the brain’s dynamic functions, and identify how different parts of the brain interact with each other at different times – namely, to discover how intellect works.”

“Professor Jianfeng finds that **the more variable a brain is, and the more its different parts frequently connect with each other, the higher a person’s IQ and creativity are.**”

FROM: <http://neurosciencenews.com/human-intelligence-defined-measured-4694/>

July 2016: Variation & Connection = Higher IQ

“Using resting-state MRI analysis on thousands of people’s brains around the world, the research has found that the areas of the brain which are associated with learning and development show high levels of variability, meaning that they change their neural connections with other parts of the brain more frequently, over a matter of minutes or seconds.”

July 2016: Variation & Connection = Higher IQ

“Altered patterns of variability were observed in the brain’s default [resting] network with schizophrenia, autism and Attention Deficit Hyperactivity Disorder (ADHD) patients.”

THE STUDY: Neural, electrophysiological and anatomical basis of brain-network variability and its characteristic changes in mental disorders” by Jie Zhang, Wei Cheng, Zhaowen Liu, Kai Zhang, Xu Lei, Ye Yao, Benjamin Becker, Yicen Liu, Keith M. Kendrick, Guangming Lu, and Jianfeng Feng in Brain. Published online July 14 2016 doi:10.1093/brain/aww143

July 2016: Variation & Connection = Higher IQ

“Specifically, we draw attention to the identification of diametrically opposing patterns of variability changes between schizophrenia and attention deficit hyperactivity disorder / autism. **Regions of the default-mode network demonstrate lower variability in patients with schizophrenia, but high variability [not as cohesive as a network] in patients with autism / attention deficit hyperactivity disorder**, compared with respective controls. In contrast, subcortical regions, especially the thalamus, show higher variability in schizophrenia patients, but lower variability in patients with attention deficit hyperactivity disorder. **The changes in variability of these regions are also closely related to symptom scores.**”

July 2016: Stress/Resilience

“[A] Yale-led team reports that **flexible brain activity** in a particular area of the brain (ventral medial prefrontal cortex (VmPFC)) **may predict resilience**. Conversely, its absence can help pinpoint those most at risk for binge drinking, emotional eating, and angry outbursts* * *

[30 participants, fMRI scans, images, interviews]

<http://neurosciencenews.com/vmpfc-resilience-neuroscience-4697/>

July 2016: Stress/Resilience

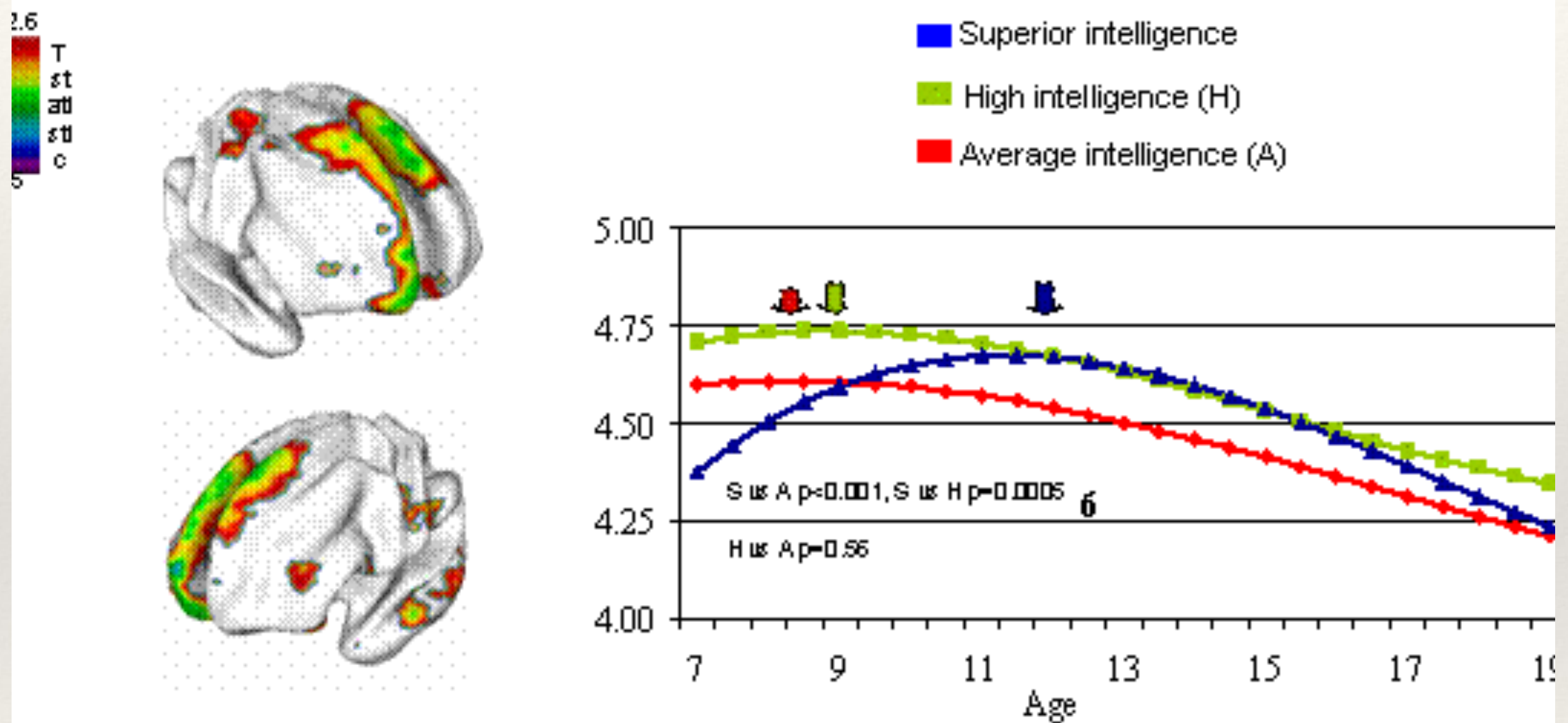
“Prior studies have shown consistently that **repeated and chronic stress causes great damage to neural structures, connections, and functions** of the prefrontal cortex, the seat of higher order cognition that helps regulate emotions, and more primitive areas of the brain.”

“Dynamic neural activity during stress signals resilient coping” by Rajita Sinha, Cheryl M. Lacadie, R. Todd Constable, and Dongju Seo in PNAS. Published online July 18 2016 doi:10.1073/pnas.1600965113

Later Development of Executive Function for Superior Intelligence? 2006

- ❖ The development of executive function appears to be delayed in preadolescent children with superior intelligence, perhaps because their advanced development in other aspects of the brain take more time.
- ❖ Cortex Matures Faster in Youth with Highest IQ <http://www.nimh.nih.gov/science-news/2006/cortex-matures-faster-in-youth-with-highest-iq.shtml> (2006)

From the NIH Study, 2006



Cortex Matures Faster in Youth with Highest IQ <http://www.nimh.nih.gov/science-news/2006/cortex-matures-faster-in-youth-with-highest-iq.shtml> (2006)

French Study of Infants, 2011

- ❖ Literature Review: “children identified as ‘high-level potentialities’ or ‘intellectually gifted’ develop sensory, locomotor, neuropsychological, and language skills earlier than typically expected.”
- ❖ Hypothesis: **“the earlier development originates from biological processes affecting the physical development of the brain and in turn even intellectual abilities are developed earlier, potentially allowing for advanced development”** (Cont. next slide)

French Study of Infants, 2011

- ❖ Findings: “Development data evidences an advance in neurosensory-motor maturation among “high-level potentialities” children, both **in postural, motor, and locomotor acquisitions, and in eye/motor coordination and attentional abilities.** These results point to the reticular formation coming into play at an early stage in the form of awareness and attention and to rapid transmission speed of nerve input, as has been corroborated by different studies, leading to greater processing speeds.” (Cont. next slide)

French Study of Infants, 2011

- ❖ Discussion: “[H]ow these developmental advances interact with the social environment and in certain circumstances **may entail increased risk for developing socioemotional difficulties and learning disabilities** that often go unaddressed due to the masking by the advance intellectual abilities.”

International Journal of Pediatrics, Volume 2011 (2011), Article ID 420297, doi:10.1155/2011/420297
Review Article Developmental and Cognitive Characteristics of “High-Level Potentialities” (Highly Gifted) Children
Laurence Vaivre-Douret^{1,2,3}
<http://www.hindawi.com/journals/ijped/2011/420297/>

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Gut/Brain Connection

Explosion of research in the past year!

2015: Relationships between diet-related changes in the gut microbiome and cognitive flexibility

“The high-sucrose diet group was significantly impaired in early development of a spatial bias for long-term memory, short-term memory and reversal training, compared to **mice** on normal diet. * * * Higher percentages of Clostridiales and lower expression of Bacteroidales in high-energy diets were related to the poorer cognitive flexibility in the reversal trials. These results suggest that **changes in the microbiome may contribute to cognitive changes** associated with eating a Western diet.”

<http://www.ncbi.nlm.nih.gov/pubmed/25982560>; Magnusson, K., Hauck, L., Jeffrey, B., Elias, V., Humphrey, A., Nath, R., & ... Bermudez, L. (2015). Relationships between diet-related changes in the gut microbiome and cognitive flexibility. *Neuroscience*, 300128-140. doi:10.1016/j.neuroscience.2015.05.016

April 2016: Regulation of Prefrontal Cortex Myelination by the Microbiota

“[W]e believe we demonstrate for the first time that **the microbiome is necessary for appropriate and dynamic regulation of myelin-related genes** with clear implications for cortical myelination at an ultrastructural level. The microbiota is therefore a potential therapeutic target for psychiatric disorders involving dynamic myelination in the PFC.” (mice)

In: Translational Psychiatry (2016) 6, e774; doi:10.1038/tp.2016.42 Published online 5 April 2016. Also in: <http://www.nature.com/tp/journal/v6/n4/full/tp201642a.html>

June 2016: Maintenance of Gastrointestinal Glucose Homeostasis by the Gut-Brain Axis

“Gut-brain axis is composed of enteric nervous system, central nervous system, and all the efferent and afferent neurons that are involved in signal transduction between the brain and gut-brain. Gut-brain axis is influenced by the gut-microbiota as well as numerous neurotransmitters.” (animal lab)

<http://www.ncbi.nlm.nih.gov/pubmed/27356933> Curr Protein Pept Sci. 2016 Jun 26. [Epub ahead of print] Maintenance of Gastrointestinal Glucose Homeostasis by the Gut-Brain Axis. Chen X, Eslamfam S, Fang L, Qiao S, Ma X1.

June 2016: Chronic Fatigue Syndrome Is Not in Your Head, It's in Your Gut

“In a study published June 23 in the journal Microbiome, the team describes how they **correctly diagnosed myalgic encephalomyelitis / chronic fatigue syndrome (ME / CFS) in 83 percent of patients** through stool samples and blood work, offering a noninvasive diagnosis and a step toward understanding the cause of the disease.”

From: <http://neurosciencenews.com/chronic-fatigue-microbiome-4581/>

“Reduced diversity and altered composition of the gut microbiome in individuals with myalgic encephalomyelitis / chronic fatigue syndrome” by Ludovic Giloteaux, Julia K. Goodrich, William A. Walters, Susan M. Levine, Ruth E. Ley and Maureen R. Hanson in Microbiome. Published online June 23 2016 doi:10.1186/s40168-016-0171-4

June 2016: Early-Life Events, Including Mode of Delivery and Type of Feeding, Siblings and Gender, Shape the Developing Gut Microbiota.

“[A]ltered colonization has been associated with a higher risk of diseases later in life. Fecal samples were collected from **108 healthy neonates** * * *. The composition and functionality of the microbiota was characterized * * * ”

(in Japan and The Netherlands)

PMID: 27362264 DOI: 10.1371/journal.pone.0158498 <http://www.ncbi.nlm.nih.gov/pubmed/27362264> and in PLoS One. 2016 Jun 30;11(6):e0158498. doi: 10.1371/journal.pone.0158498. eCollection 2016.

Nutrition to Gut/Brain?

Far too many news and research articles to cover in our one hour together.
Here's a sampling of titles from Neuroscience News.com:

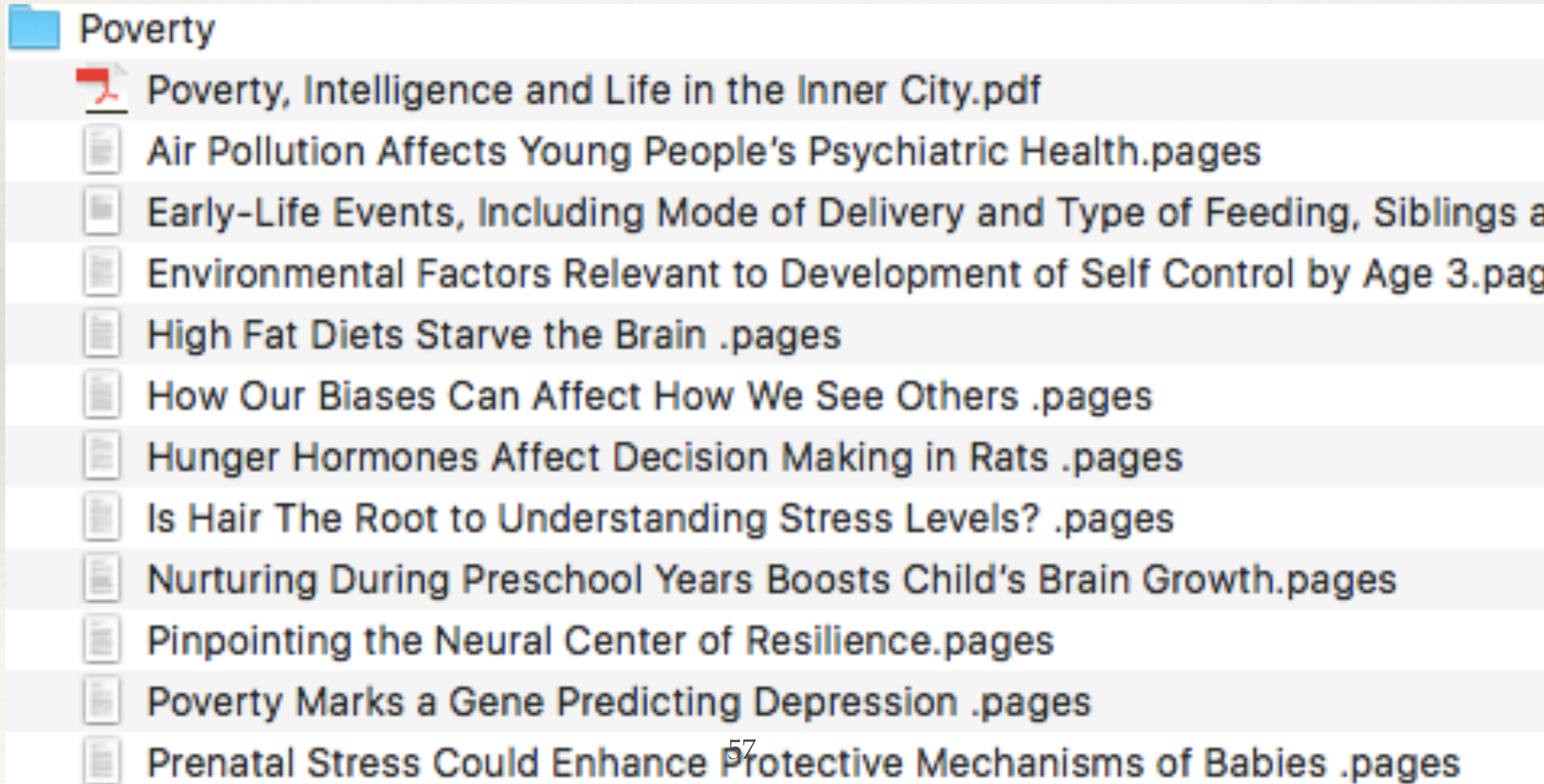
- 
- Nutrition**
-  Brain metabolism predicts fluid intelligence in young adults .pages
 -  Functional Foods and Health Effects/ A Nutritional Biochemistry Perspe
 -  Modulating adult neurogenesis through dietary interventions.pages
 -  Nutrition - Breast Milk Linked to Significant Early Brain Growth in Prete
 -  Obese People and Taste.pages
 -  Omega 3 Rich Diet May Reverse Genetic Damage Caused by Fructose
 -  Prenatal Fruit Consumption May Boost Baby's Cognitive Development.
 -  Sugar Consumption Produces Effects Similar to Early Life Stress Expos

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Poverty

For the purpose of this set of Neuroscience News articles and for no other purpose, I define “poverty” broadly, in that a child of millionaires who was traumatized, living in a city with severe air pollution, or otherwise deprived of a good childhood from loving parents would be “impoverished.”



1968: Whitney M. Young, Jr.

“Poverty, Intelligence and Life in the Inner City”

“EDITOR’S NOTE: * * * While I implied in my commentary that Young’s appeal to the ‘elite of our citizenry’ for solutions was something of a relic from another era, his call for the direct engagement of the disability field in the broader debate on income inequality still rings true.”

INTELLECTUAL AND DEVELOPMENTAL DISABILITIES AAIDD 2015, Vol. 53, No. 6, 418–425 DOI: 10.1352/1934-9556-53.6.418

April 2016: Nurturing During Preschool Years Boosts Child's Brain Growth

“The researchers studied a **series of brain scans of children** from preschool through early adolescence, **finding a sharper rise in the volume of the hippocampus in the kids whose mothers supported and nurtured** them during the preschool years. That region of the brain is critical to learning, memory and regulating emotions.”

<http://neurosciencenews.com/hippocampus-neurodevelopment-nurturing-4121/> “Preschool is a sensitive period for the influence of maternal support on the trajectory of hippocampal development” by Joan L. Luby, Andy Belden, Michael P. Harms, Rebecca Tillman, and Deanna M. Barch in PNAS. Published online April 25 2016 doi:10.1073/pnas.1601443113

April 2016: Environmental Factors Relevant to Development of Self Control by Age 3

“By age 3, we see that one twin’s exposure to either shared family influences or unique **environmental influences such as more or less negativity from parents, or an accident or illness** the co-twin did not experience, are both important influences over their capacity for self-regulation,’ Gagne said.

(Negativity in mid-1980s Hart & Risley “3 million word gap” study: professional families 6 / 1 & welfare families 1 / 2 encouragement / discouragement ratios.)

<http://neurosciencenews.com/environmental-factors-relevant-to-development-of-self-control-by-age-3/> “The development of inhibitory control in early childhood: A twin study from 2–3 years” by Jeffrey R. Gagne and Kimberly J. Saudino in Developmental Psychology. Published online March 2016 doi:10.1037/dev0000090

May 2016: Poverty Marks a Gene Predicting Depression

“Adolescents growing up in households with lower socioeconomic status were shown to **accumulate greater quantities of a chemical tag on a depression-linked gene** over the course of two years. These “epigenetic” tags work by altering the activity of genes. The more chemical tags an individual had near a gene called SLC6A4, the **more responsive was their amygdala** — a brain area that coordinates the body’s reactions to threat — to photographs of fearful faces as they underwent functional MRI brain scans.” [n=132]

<http://neurosciencenews.com/poverty-genetics-depression-4296/> and “An epigenetic mechanism links socioeconomic status to changes in depression-related brain function in high-risk adolescents” by J R Swartz, A R Hariri and D E Williamson in Molecular Psychiatry. Published online May 24 2016 doi:10.1038/MP.2016.82

June 2016: Air Pollution Affects Young People's Psychiatric Health

- ❖ “Swedish National Register **data on dispensed medications** for a broad range of psychiatric disorders, including sedative medications, sleeping pills and antipsychotic medications, **together with socioeconomic and demographic data and a national land use regression model for air pollution concentrations for NO₂, PM₁₀ and PM_{2.5}.**”
- ❖ “The **entire population under 18 years of age** in 4 major counties.”

<http://neurosciencenews.com/mental-health-air-pollution-4413/> “Association between neighbourhood air pollution concentrations and dispensed medication for psychiatric disorders in a large longitudinal cohort of Swedish children and adolescents” by Anna Oudin, Lennart Bråbäck, Daniel Oudin Åström, Magnus Strömberg, and Bertil Forsberg in BMJ Open. Published online June 3 2016 doi:10.1136/bmjopen-2015-010004

Today

- ❖ Why Learn Brain Research?
- ❖ Brain Research Caveats
- ❖ Brain Differences Exist
- ❖ Brain/Gut Connection
- ❖ Poverty
- ❖ **NOW: Social Media and More**

April 2016: Social Media Addictive

“In the present study, 23,533 adults * * * participated in an online cross-sectional survey examining whether demographic variables, symptoms of attention-deficit/hyperactivity disorder (ADHD), obsessive-compulsive disorder (OCD), anxiety, and depression could explain variance in addictive use * * * of two types of modern online technologies: social media and video games. Correlations * * * all positive and significant.”

<http://neurosciencenews.com/adhd-video-game-addiction-4114/> and see “The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: A large-scale cross-sectional study” by Andreassen, Cecilie Schou; Billieux, Joël; Griffiths, Mark D.; Kuss, Daria J.; Demetrovics, Zsolt; Mazzoni, Elvis; and Pallesen, Ståle in Psychology of Addictive Behaviors. Published online March 2016 doi:Not Available

May 2016: Teenage Brain on Social Media

“The **same brain circuits that are activated** by eating chocolate and winning money are activated when teenagers see large numbers of “likes” on their own photos or the photos of peers in a social network, according to a first-of-its-kind **UCLA study that scanned teens’ brains while using social media.**”

<http://neurosciencenews.com/nucleus-accumbens-social-media-4348/> and see “The Power of the Like in Adolescence: Effects of Peer Influence on Neural and Behavioral Responses to Social Media” by Lauren E. Sherman, Ashley A. Payton, Leanna M. Hernandez, Patricia M. Greenfield, and Mirella Dapretto in Psychological Science. Published online May 31 2016 doi:10.1177/0956797616645673

April 2016: Complex Ideas Can Automatically Enter Consciousness

- ❖ [SF State researcher Ezequiel] Morsella said the study provides more support for the passive frame theory that he proposed along with his colleagues last year, a potentially groundbreaking idea that suggests consciousness is more of a conduit for information in the brain rather than an active creator of information.
- ❖ <http://neurosciencenews.com/consciousness-complex-ideas-psychology-4071/> and see “Involuntary symbol manipulation (Pig Latin) from external control: Implications for thought suppression” by Hyein Cho, Pareezad Zarolia, Adam Gazzaley, and Ezequiel Morsella in *Acta Psychologica*. Published online April 1 2016 doi:10.1016/j.actpsy.2016.03.004

April 2016: You May Have Already Decided to Read This Article

- ❖ “Do people know when, or whether, they have made a conscious choice? Here, we explore the possibility that choices can seem to occur before they are actually made.”
- ❖ “These findings suggest that * * * people may systematically overestimate the role that consciousness plays in their chosen behavior.”
- ❖ <http://neurosciencenews.com/decision-making-psychology-4148/> and see “A Simple Task Uncovers a Postdictive Illusion of Choice” by Adam Bear and Paul Bloom in Psychological Science. Published online April 28 2016 doi:10.1177/0956797616641943

April 2016: “You May Have Already Decided to Read This Article”

- ❖ Some scientists are finding that many thought processes operate subconsciously.
- ❖ If true, then does anxiety happen because our gifted children don't know how they know certain things?
- ❖ Also, if so, is the processing speed of gifted children slowed down because they have to wait for the complexity of thought that happens at the subconscious level to “pop up” to the conscious level?

Thank You

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