

REWIRED

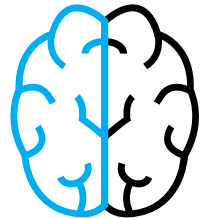
Protecting Your Brain in the Digital Age

Carl D. Marci, M.D.
April 2026



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1. Media and the Brain
2. Attention in the Age of Distraction
3. Neuroscience of Screens from Birth to Adulthood
4. Protecting Your Brain in the Digital Age
5. A Note on Artificial Intelligence (AI)



Media and the Brain



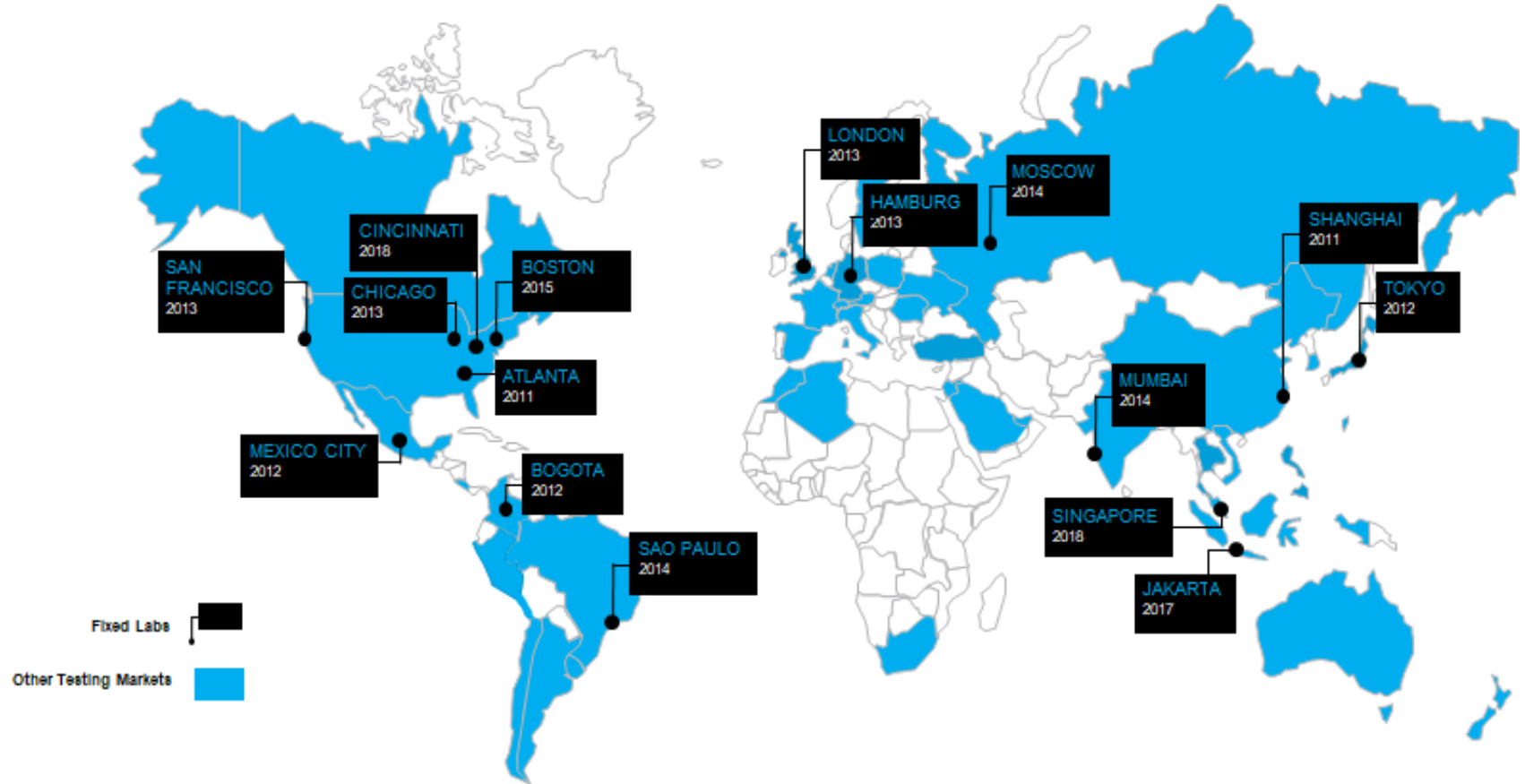
CONSUMER NEUROSCIENCE



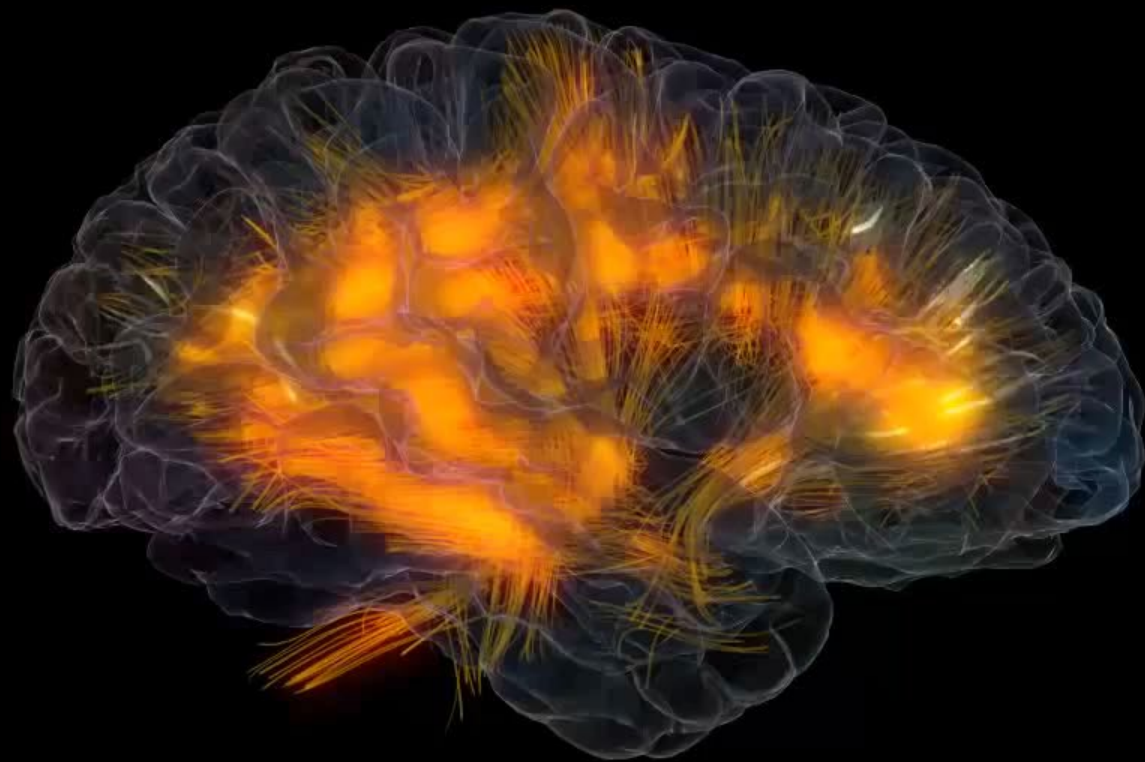
Application of neuroscience knowledge and techniques applied to market and media research questions for a deeper understanding of consumer attitudes and behaviors.



NIELSEN CONSUMER NEUROSCIENCE FOOTPRINT



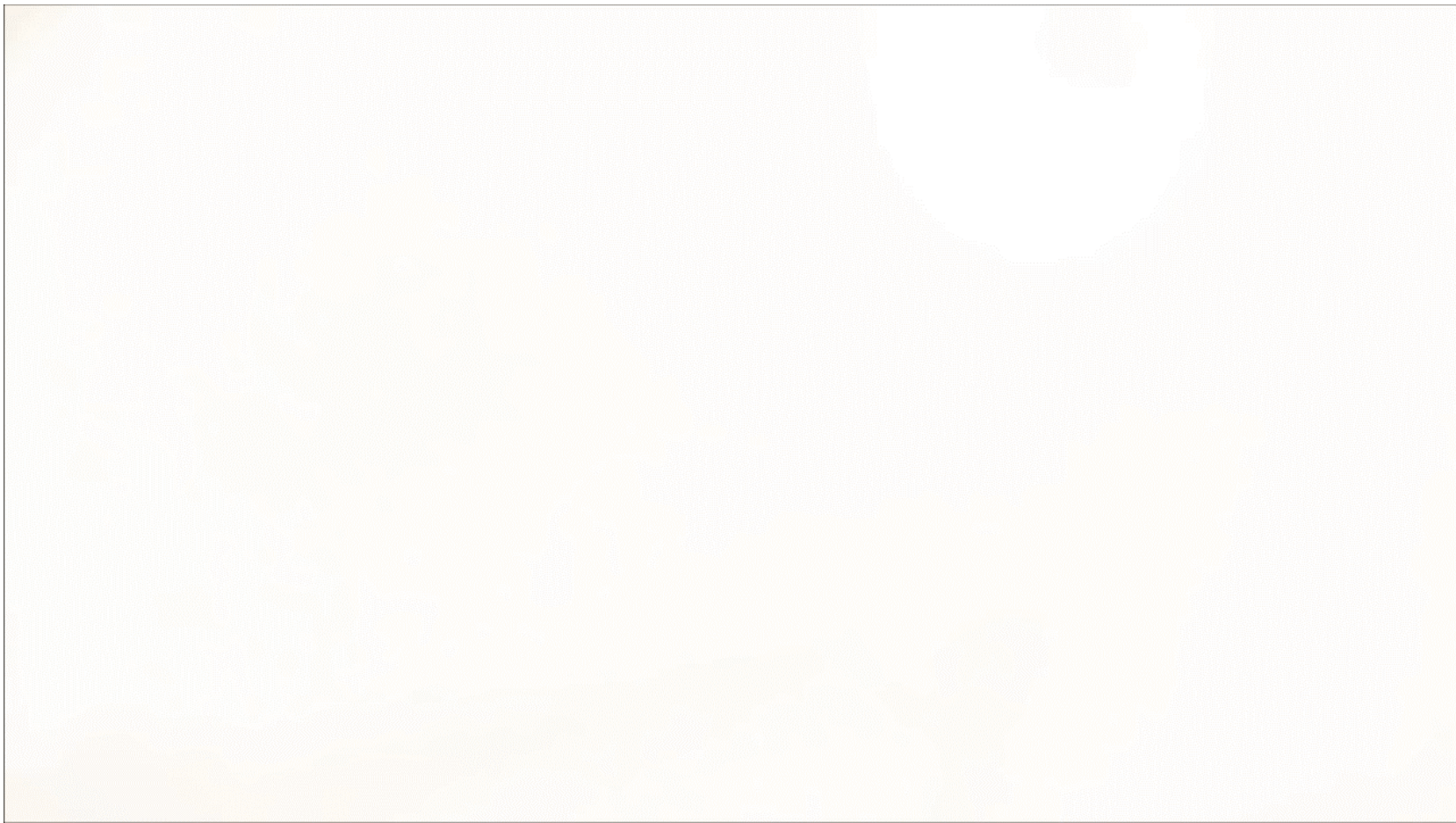




THINKING



Based on D. Kahneman, *Thinking, Fast and Slow* 2011



***Australopithecus
afarensis***

Homo erectus

Homo sapiens

brain larger

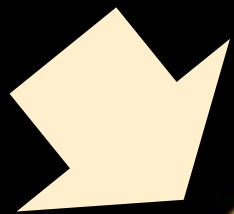


jaw and teeth smaller

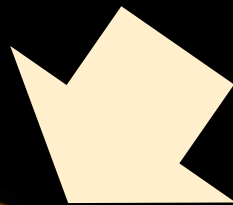
The skull of *A. afarensis* is similar to that of the modern chimpanzee.

chimpanzee





Modern Human

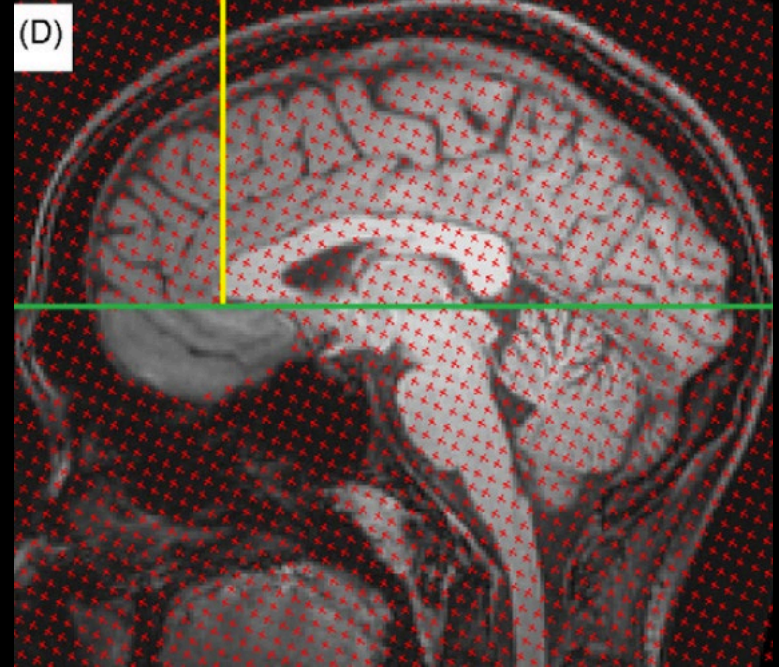
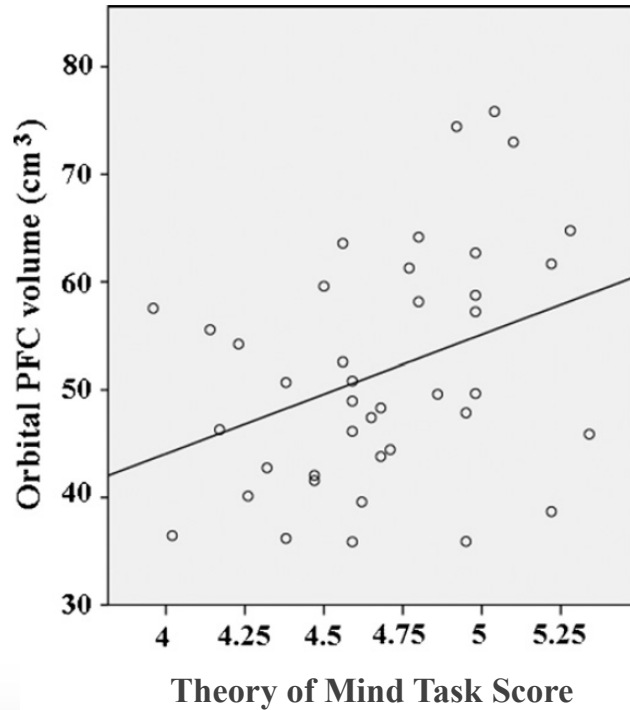


Neanderthal



Denisovan

SOCIAL BRAIN HYPOTHESIS

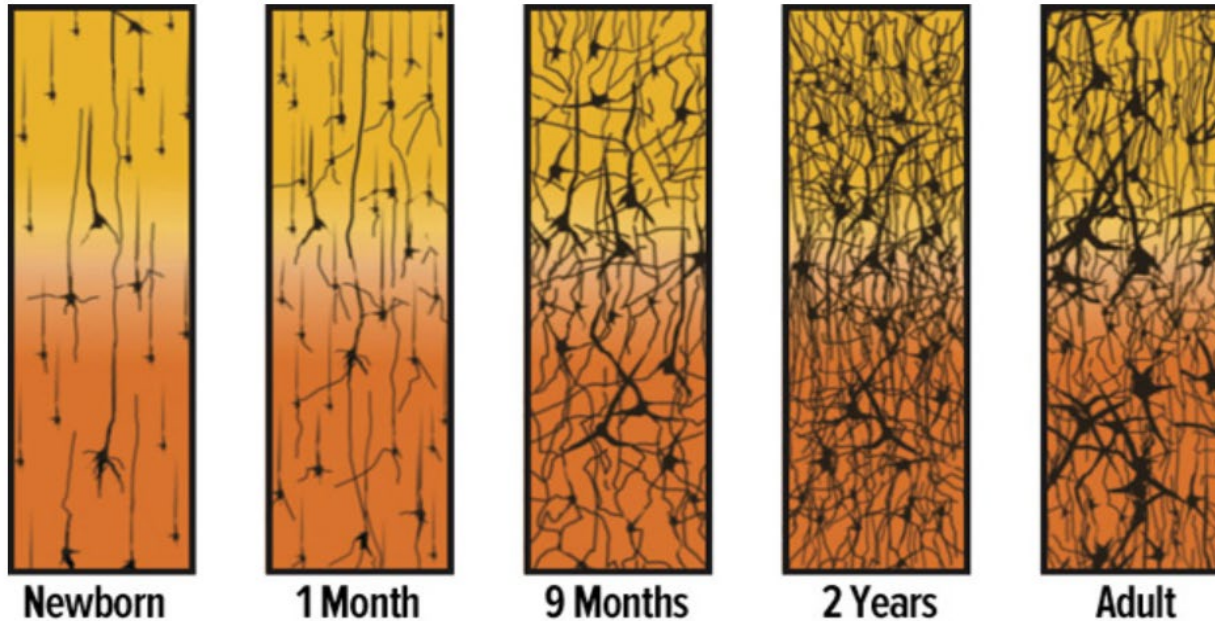




PREFRONTAL CORTEX

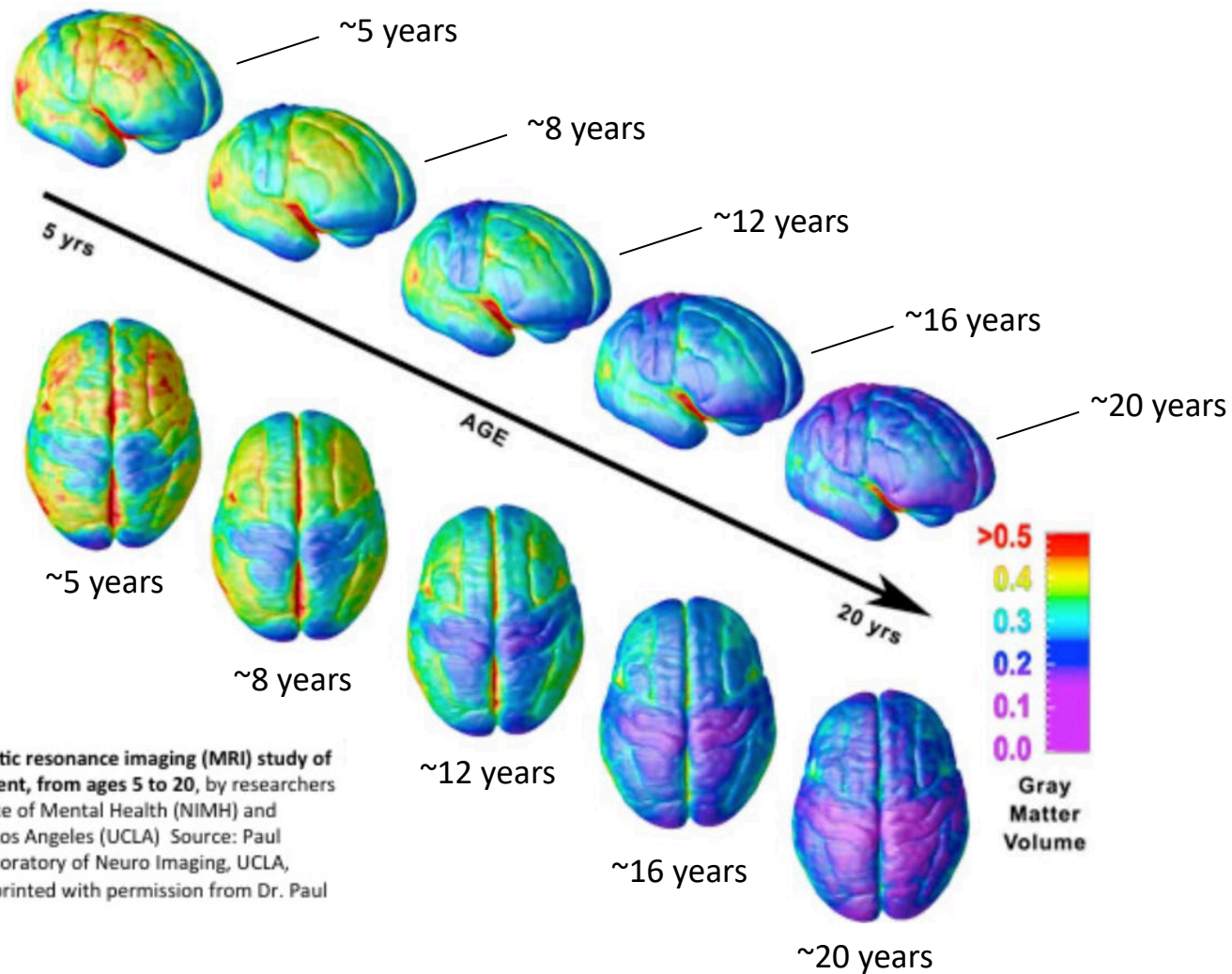
- Most interconnected region of the brain
- Takes up 1/3 of grey matter and 1/3 of calories consumed
- Directs attention, emotion regulation, memory storage
- Impulse control, task focus, planning, visualization of the future and past
- Critical for the formation of strong social bonds and the size of our social network
- Critical for the discovery and sharing of ideas
- A healthy PFC is the difference between focus and inattention, insight and impulse, habit and addiction and ultimately, reaction and reflection.
- Metaphor: *Conductor of your personal brain symphony*

BRAIN GROWTH TAKES TIME



Synapse Density Over Time

Source: Adapted from Corel, J.L. The postnatal development of the human cerebral cortex. Cambridge, MA: Harvard University Press; 1975.



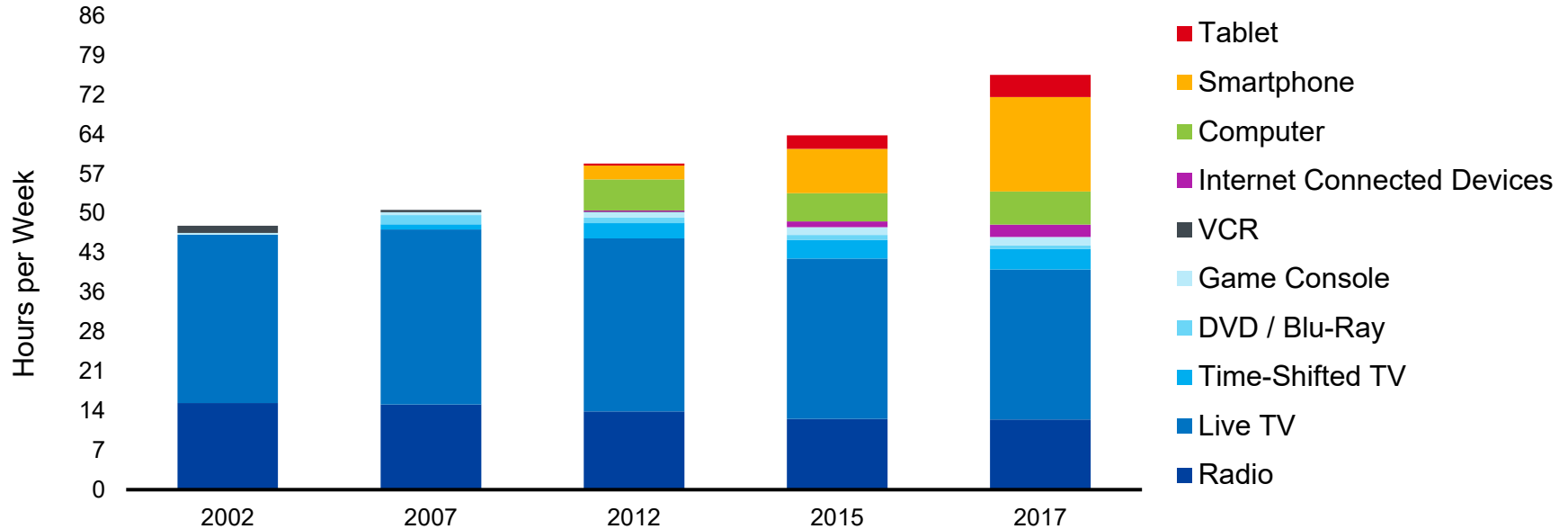
The decade-long magnetic resonance imaging (MRI) study of normal brain development, from ages 5 to 20, by researchers at NIH's National Institute of Mental Health (NIMH) and University of California Los Angeles (UCLA) Source: Paul M.Thompson, Ph.D., Laboratory of Neuro Imaging, UCLA, NIMH/UCLA Project Reprinted with permission from Dr. Paul Thompson.

Attention in the Age of Distraction



OVERALL MEDIA USAGE IS INCREASING

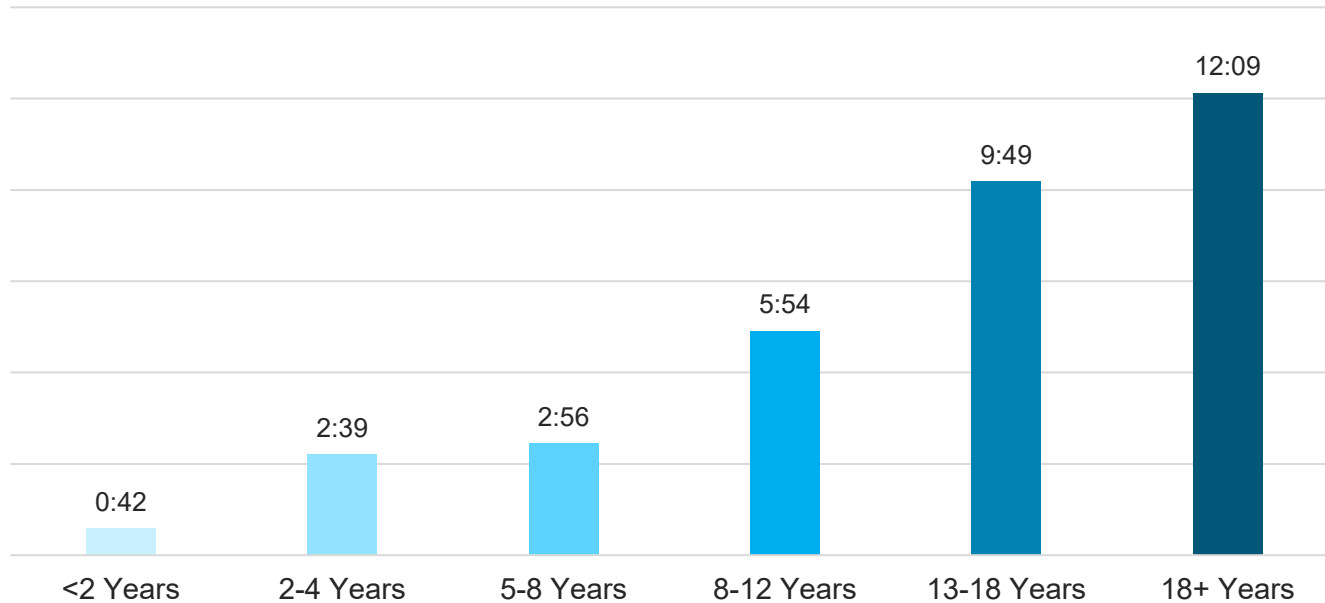
Weekly Time Spent Based on the Total US Population P18+



Note: Some amount of simultaneous usage may occur across devices. Nielsen Total Audience Report.

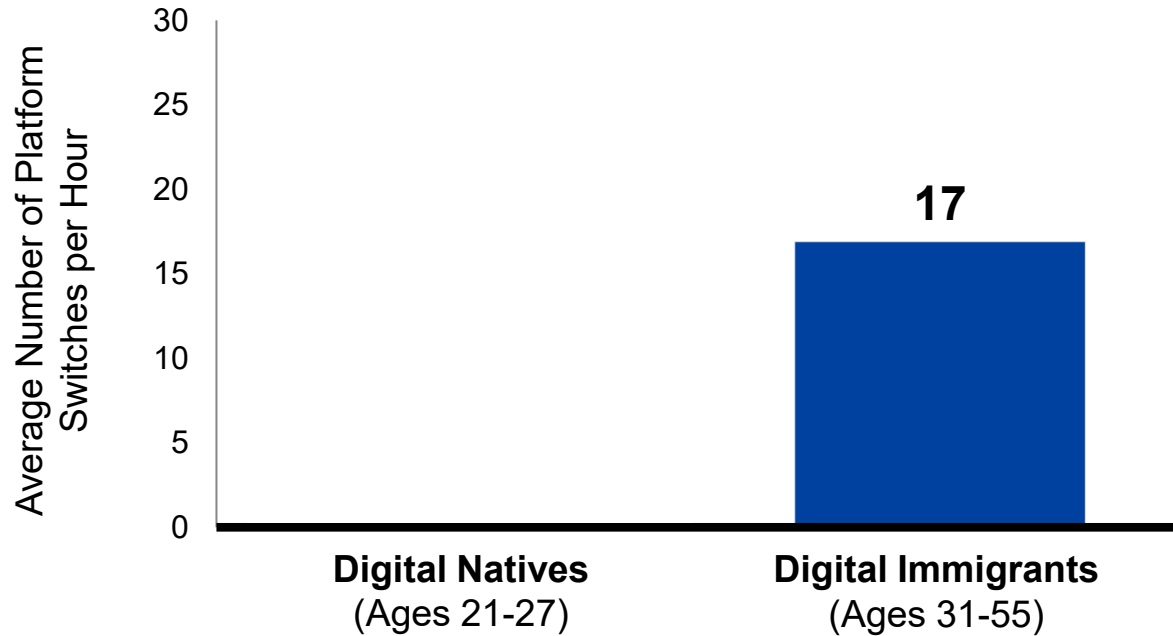
AVERAGE TOTAL MEDIA CONSUMPTION BY AGE

Total Average Media Time by Age (Hrs:Min) Per Day



Sources: a) Rideout V. The Common Sense Census: Media Use by Kids Age Zero to Eight. 2017. Common Sense Media. b) Rideout V. & Robb M.B. The Common Sense Census: Media Use by Teens and Tweens. 2019. Common Sense Media. c) Dolliver M. U.S. Time Spent with Media. 2019. eMarketer.

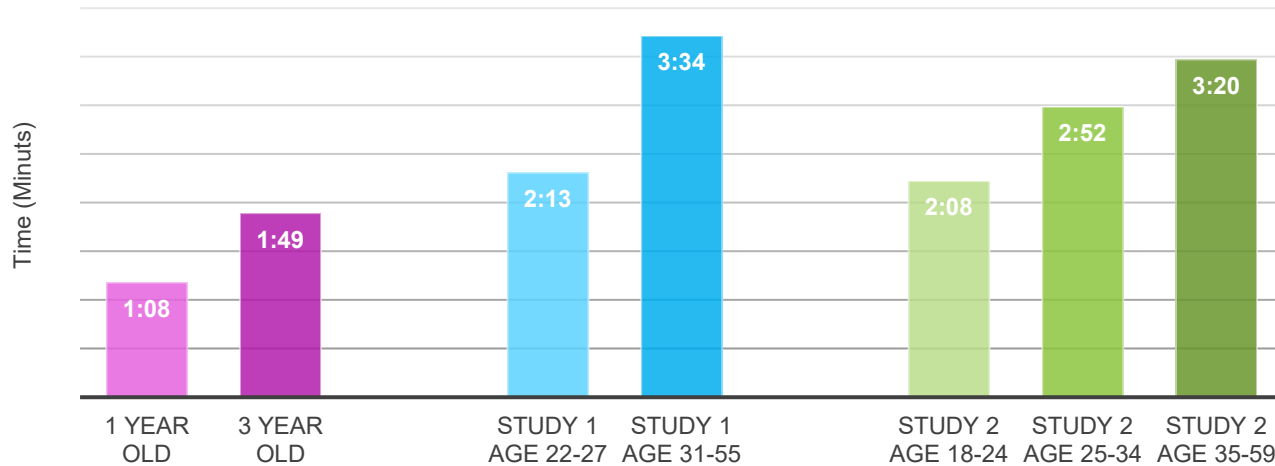
MEASURING MEDIA ATTENTION SPANS



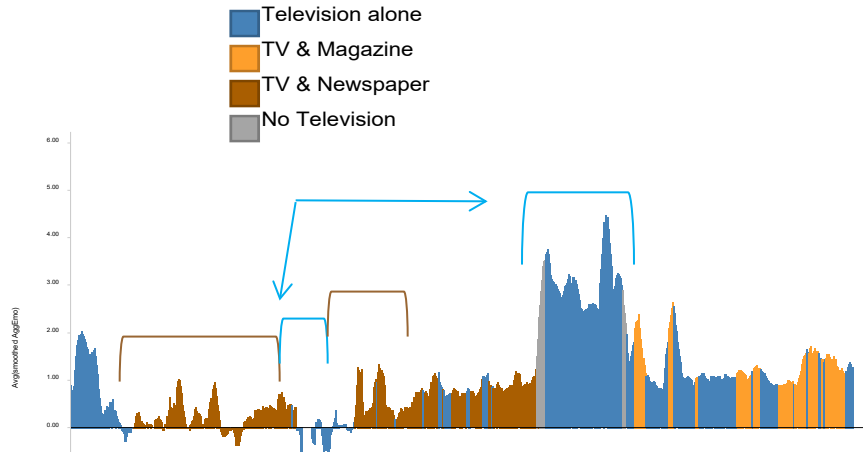
Source: Time Warner-Innerscope Research study presented at 2012 ARF Conference

MEASURING MEDIA ATTENTION SPANS

Average Media Attention Span by Age (Min:Sec)

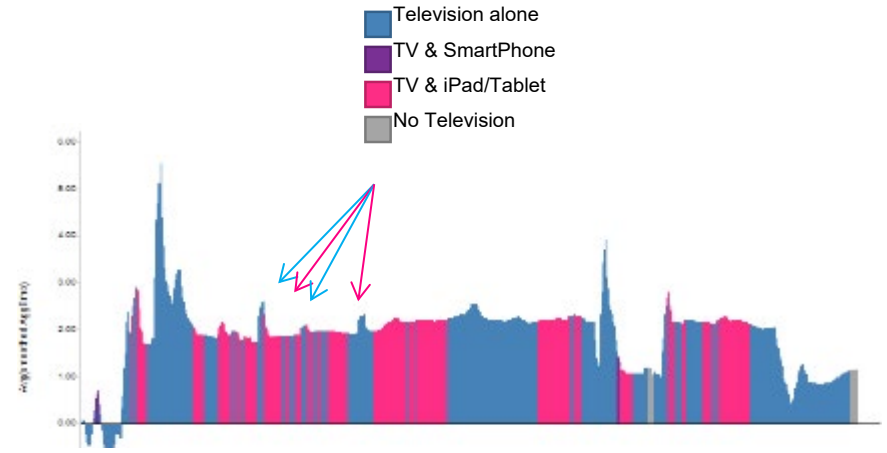


MEDIA AS A MOOD REGULATOR



Digital Immigrant - Isaac

Wider spans between switching from single platform to multiplatform



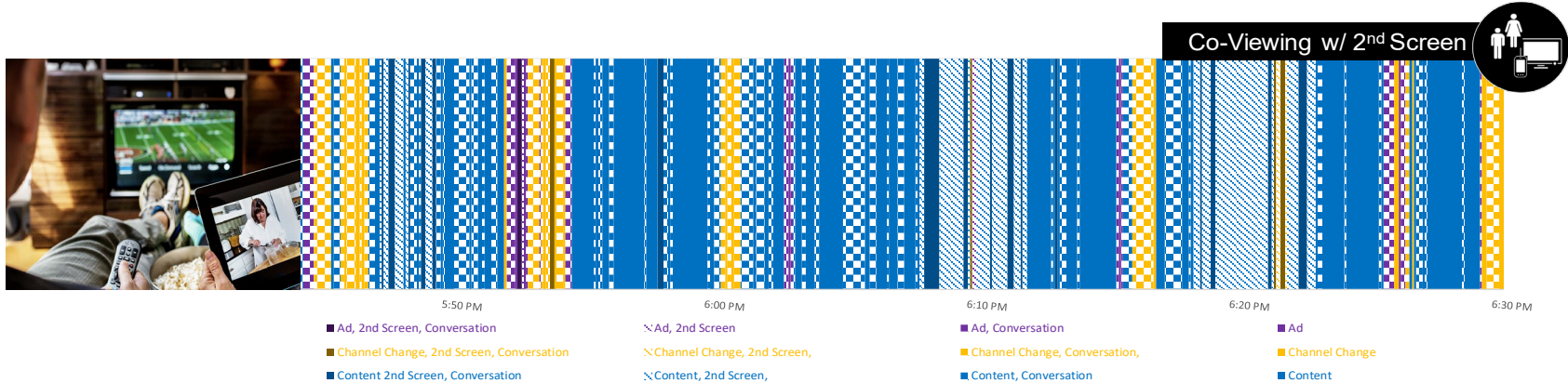
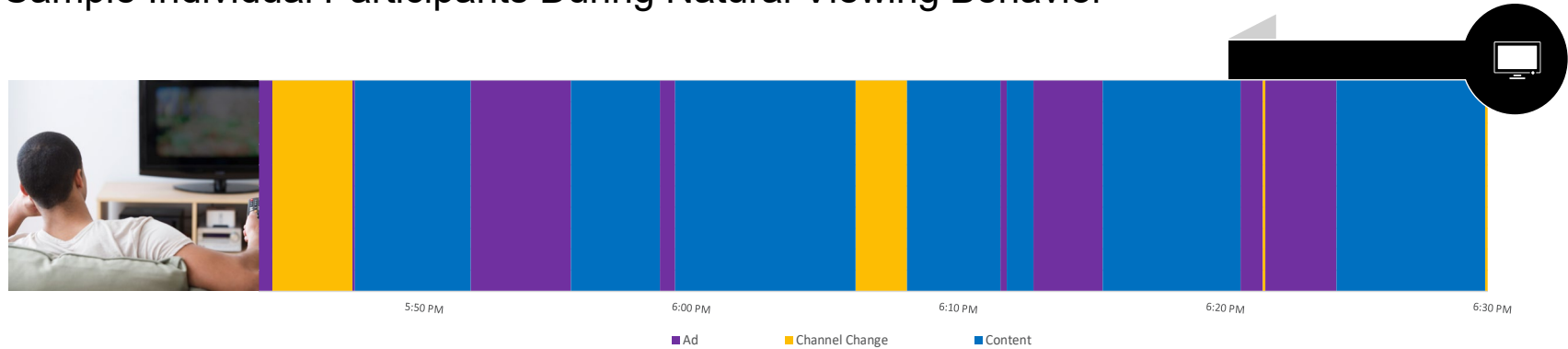
Digital Native - Nate

Shorter spans between switching from single platform to multiplatform

Source: Time Warner-Innerscope Research study presented at 2012 ARF Conference

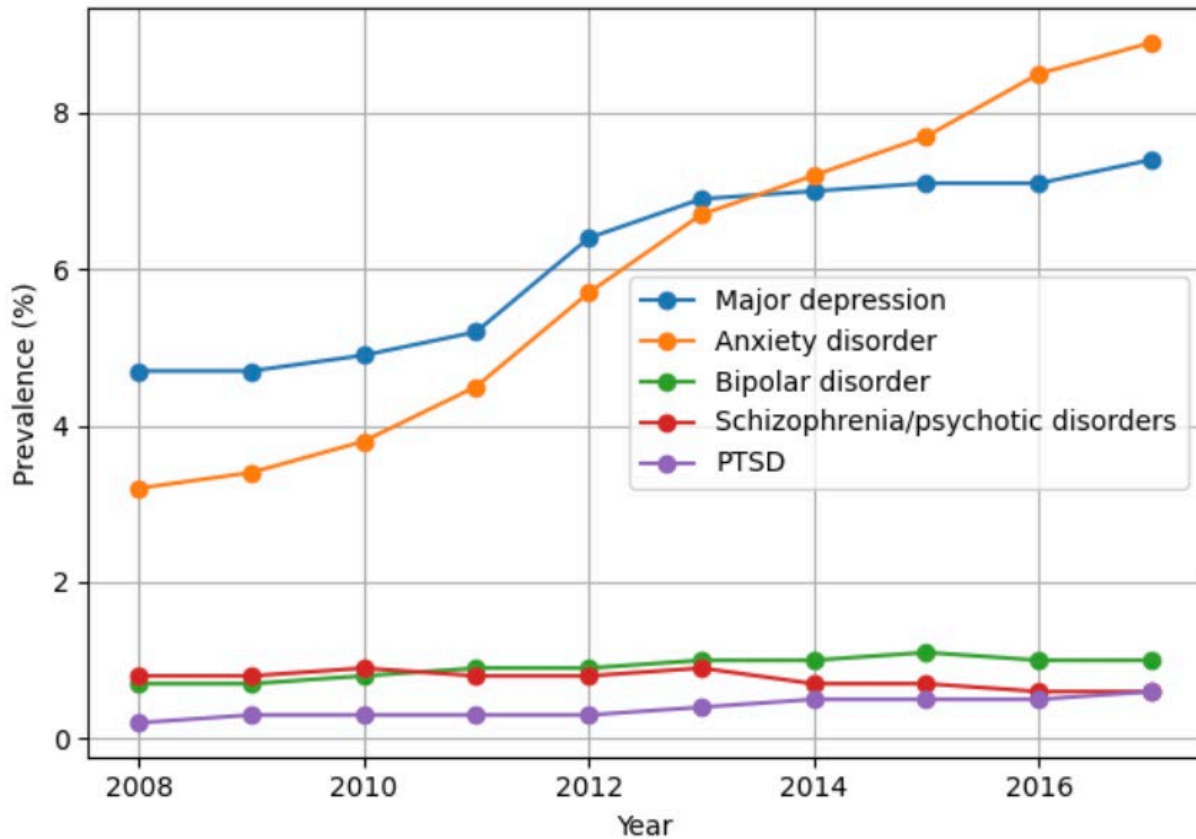
VIEWING BEHAVIOR WITH 2ND SCREEN

Sample Individual Participants During Natural Viewing Behavior



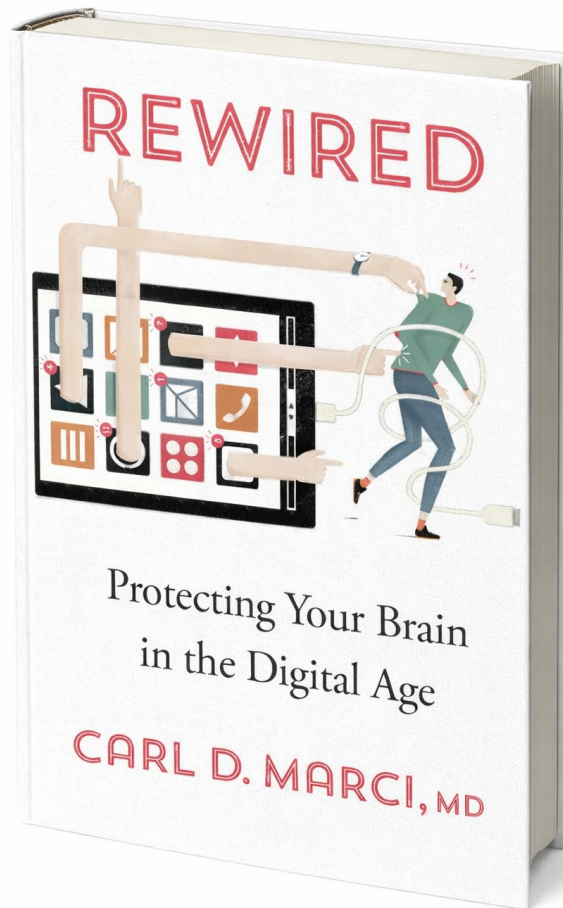
Source: Council of Research Excellence Report, September 2016

Prevalence of Mental Health Disorders (2008-2017)



Neuroscience of Screens from Birth to Adulthood

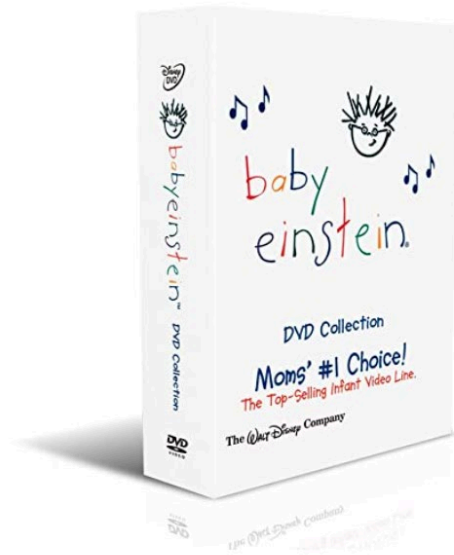






**AGES 0-3
THE VIDEO
TRANSFER
DEFICIT**

BABY EINSTEIN



BABY EINSTEIN



"imagine that"

★★★★★ **Best learning for young ones**

Reviewed in the United States 🇺🇸 on June 9, 2021

Verified Purchase

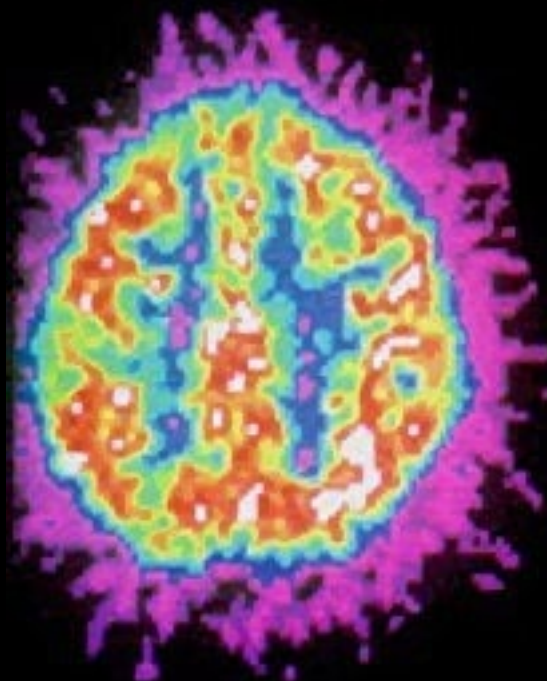
I love the baby Einstein DVD set...I purchase a set every time I'm invited to a baby shower because I used these for my kids and also the foster children I used to care for

One person found this helpful

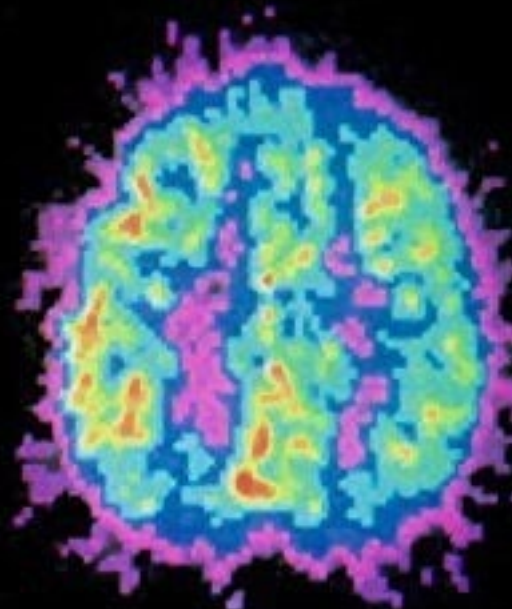
Helpful

| Report abuse

NO ADHD



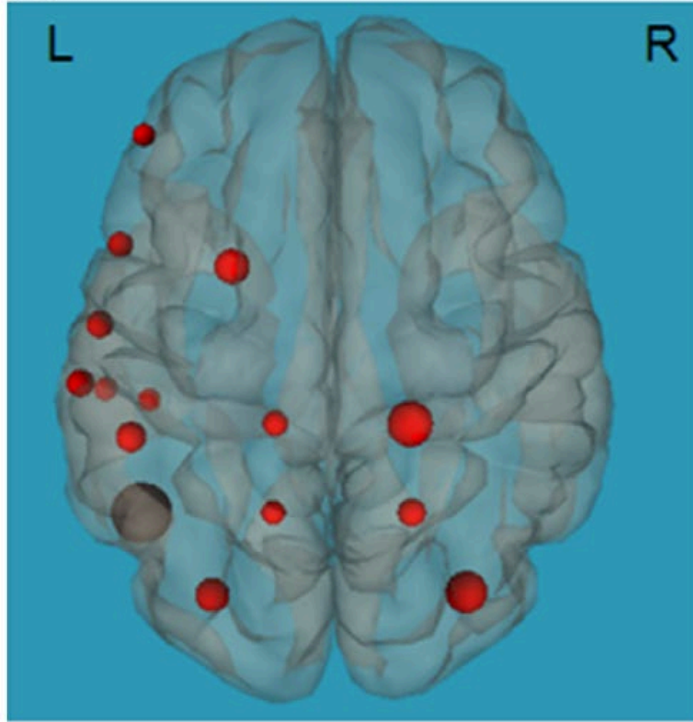
ADHD



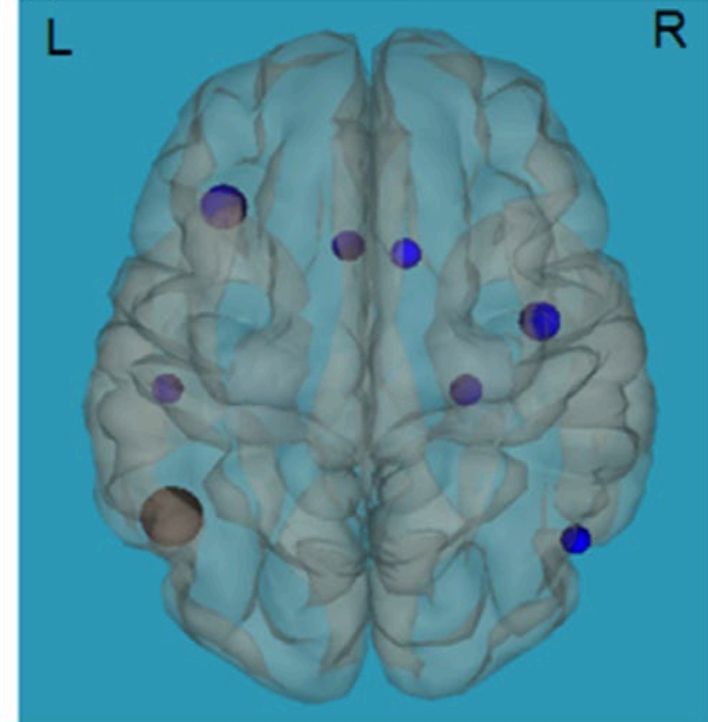
**AGES 3-5:
THE IMPORTANCE
OF READING**



(A)

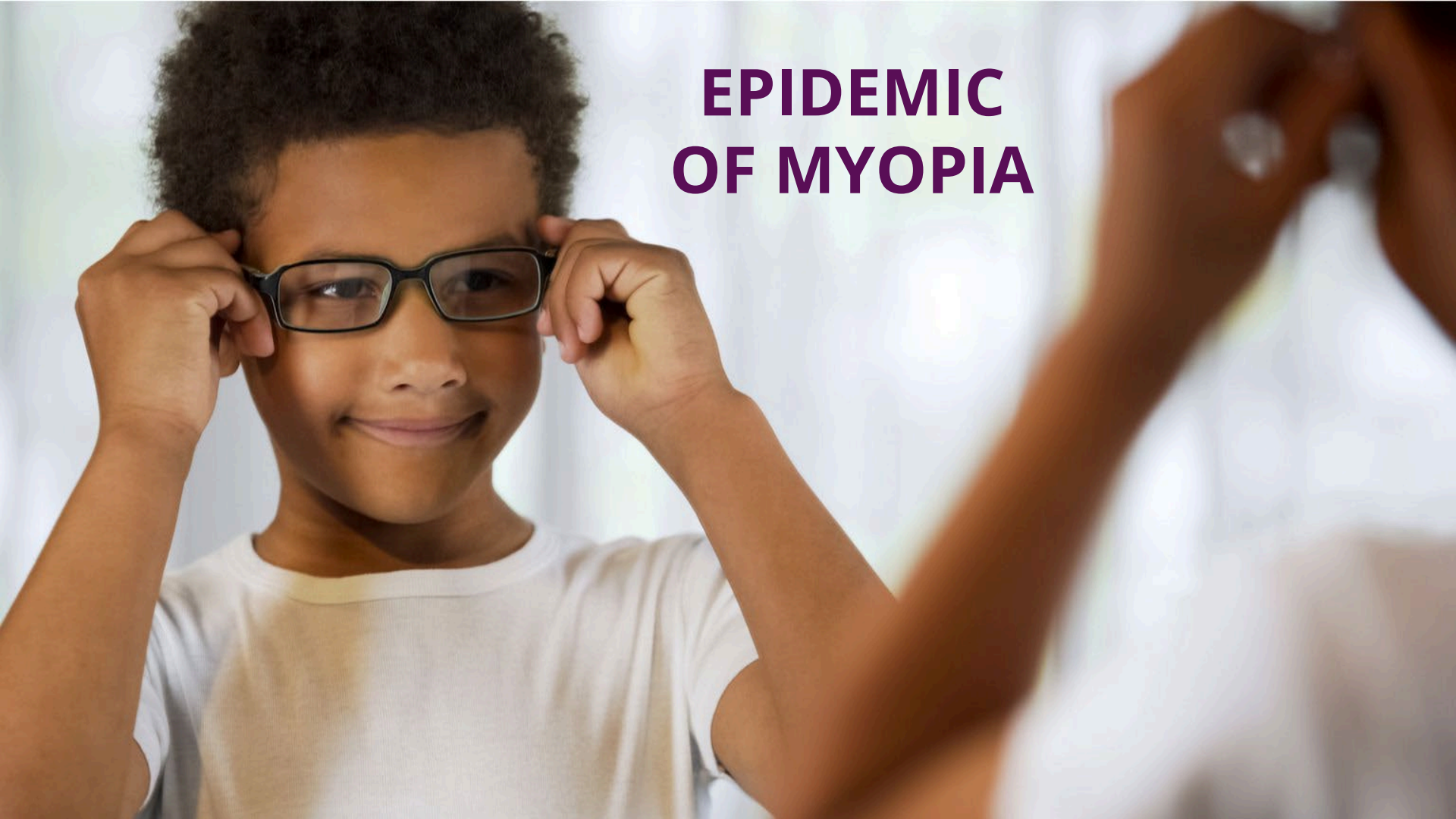


(B)

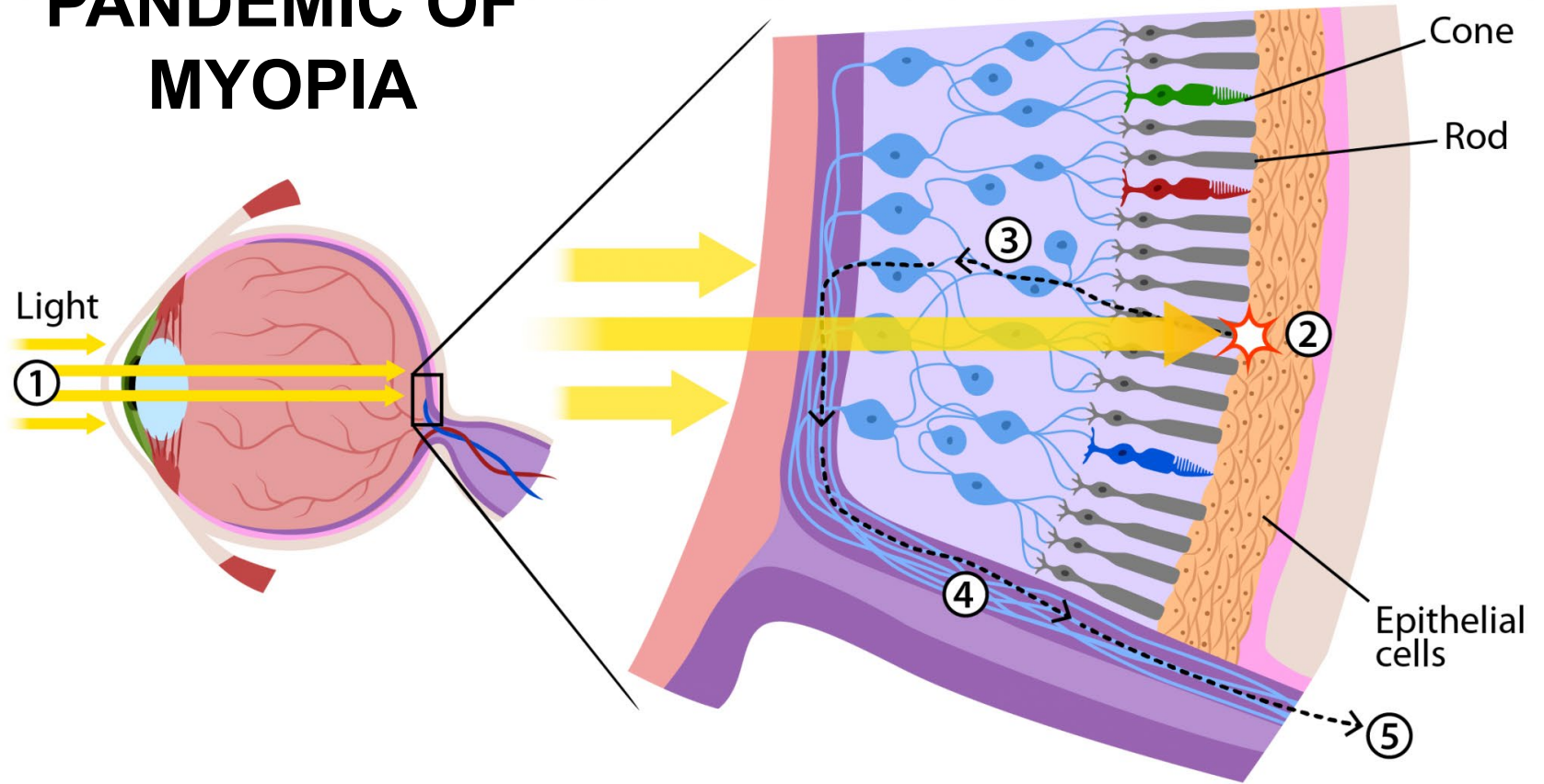



Tzipi Horowitz-Kraus, John S. Hutton, "Brain Connectivity in Children is Increased by the Time They Spend Reading Books and Decreased by the Length of Exposure to Screen-Based Media," *Acta Paediatrica* 107, no. 4 (2018):685-693

EPIDEMIC OF MYOPIA



PANDEMIC OF MYOPIA





**AGES 6-12:
RISE OF MEDIA
MULTITASKING**

IMPACT OF MEDIA MULTITASKING

- Reduced working memory
- Reduced long-term memory
- Filter failure
- Inability to sustain focus
- Increased impulsivity
- More anxiety and depression
- Lower grades and test scores (especially with social media)



EPIDEMIC OF OBESITY

- Not due to lack of exercise
- Irregular mealtimes
- Poor snack choices
- Decreased sleep
- Too much media exposure



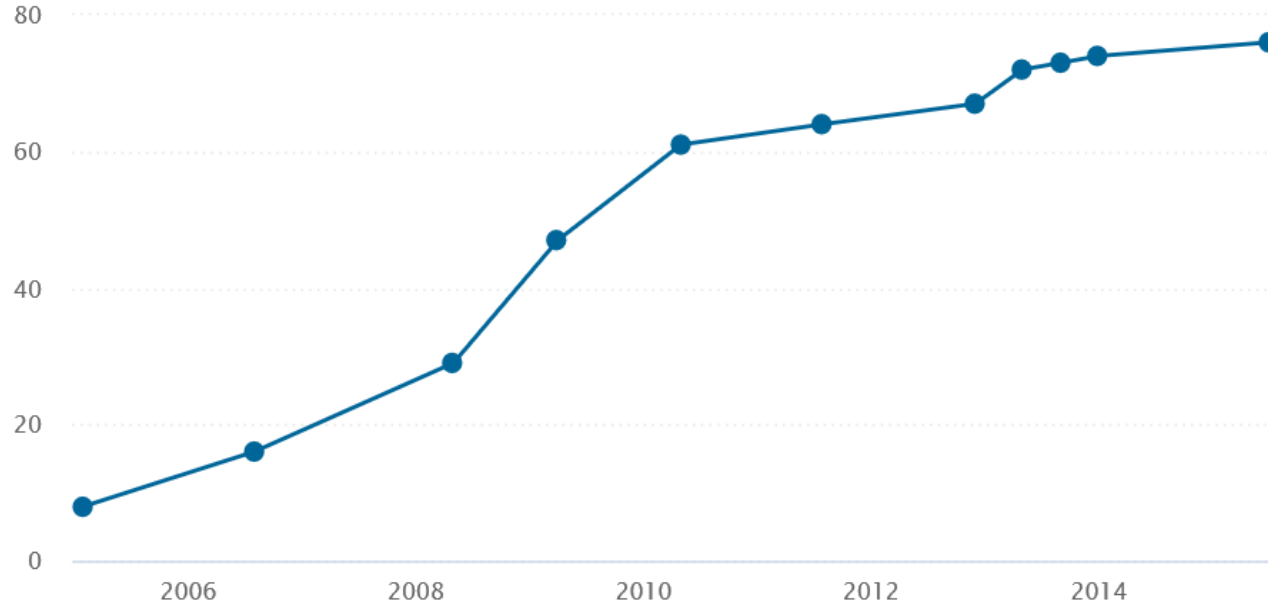
AGES 13-18
RISE OF
SOCIAL
MEDIA





RISE OF SOCIAL MEDIA

% of people online using a social media site




ARE TEENAGERS ADDICTED TO SOCIAL MEDIA?

Source: Sherman et. al. Effects of Peer Influence on Neural and Behavioral Responses to Social Media. Psychological Science. Vol. 27, Issue 7, 2016



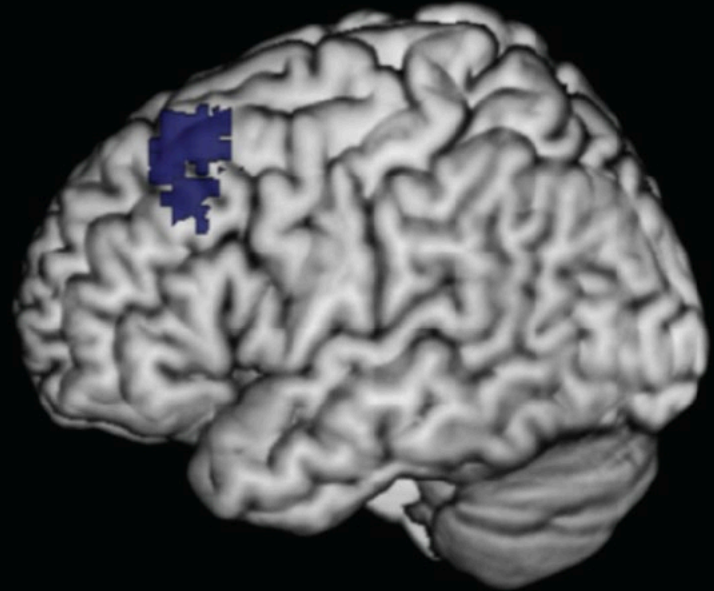
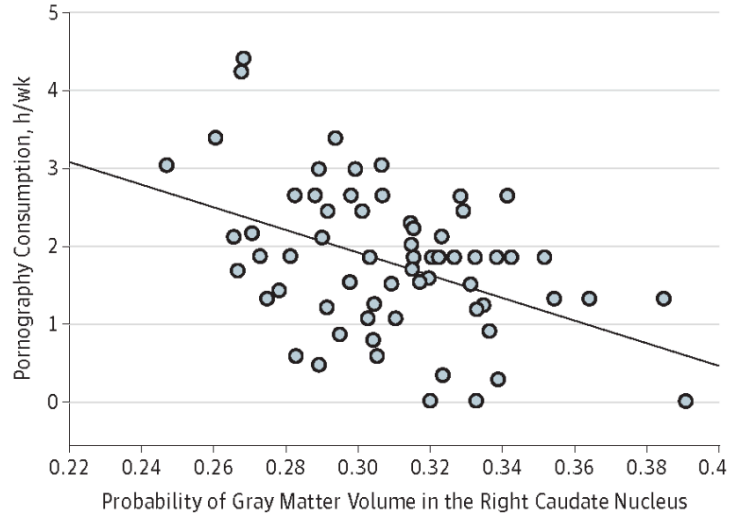
A young man with dark hair, wearing a white t-shirt and dark jeans, is slumped over a wooden desk, fast asleep. His head is resting on his arms, which are spread across several open textbooks. The desk is cluttered with multiple open books of various sizes and colors, some showing text and diagrams. The background is a plain, light-colored wall. The overall scene conveys a sense of academic pressure and exhaustion.

LOST SLEEP IN ADOLESCENTS

A man with a beard and blue eyes is looking at a laptop screen in a dark room. He is wearing a blue and yellow plaid shirt. The lighting is dim, with the primary light source being the laptop screen, which casts a blue glow on his face and hands. The background is dark and indistinct.

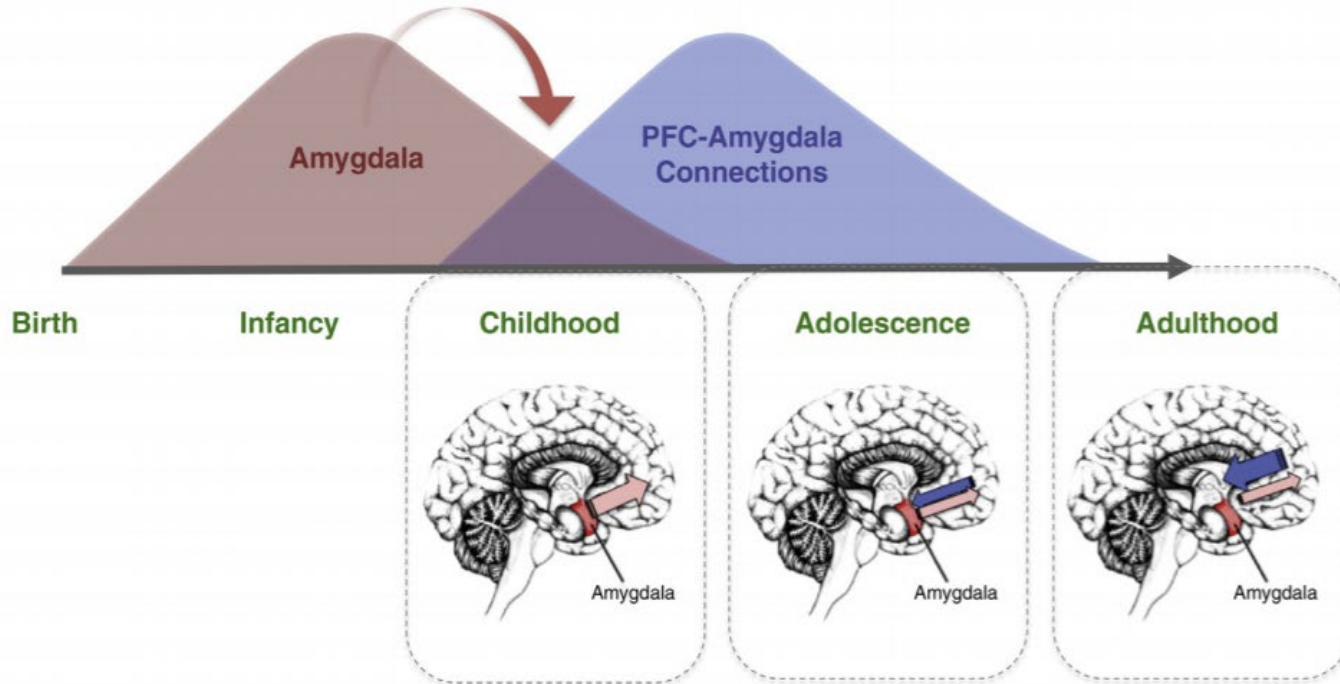
**A GROWING
PROBLEM OF
ERECTILE
DYSFUNCTION**

BRAIN ON PORN



Kühn S, Gallinat J, "Brain Structure and Functional Connectivity Associated with Pornography Consumption: The Brain on Porn," *JAMA Psychiatry* 71, no. 7 (2014): 827-834.

TOO MUCH GAS, NOT ENOUGH BRAKE



Tottenham N., Gabard-Durnam LJ. The developing amygdala: a student of the world and a teacher of the cortex. *Current Opinions in Psychology*. 2017;17:55-60.



**ADULTS 18+
THERE WILL BE
CONSEQUENCES**



esmith_images · 1 month ago



+ Follow

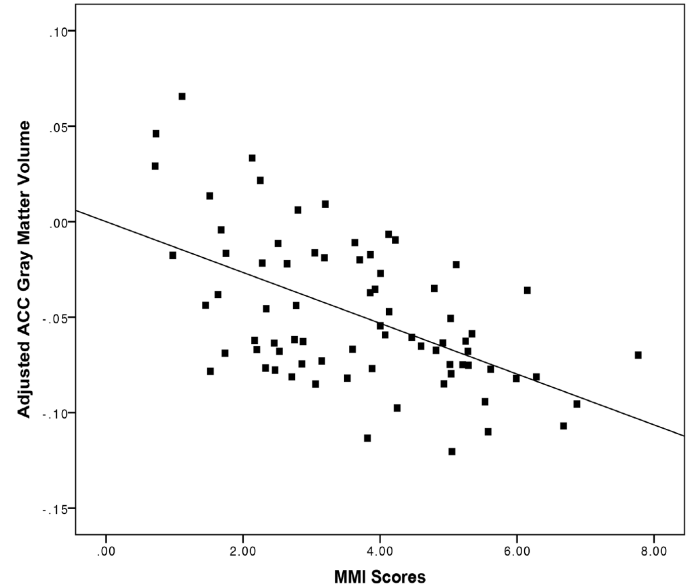


A sign of the times.

3,461 likes 421 comments

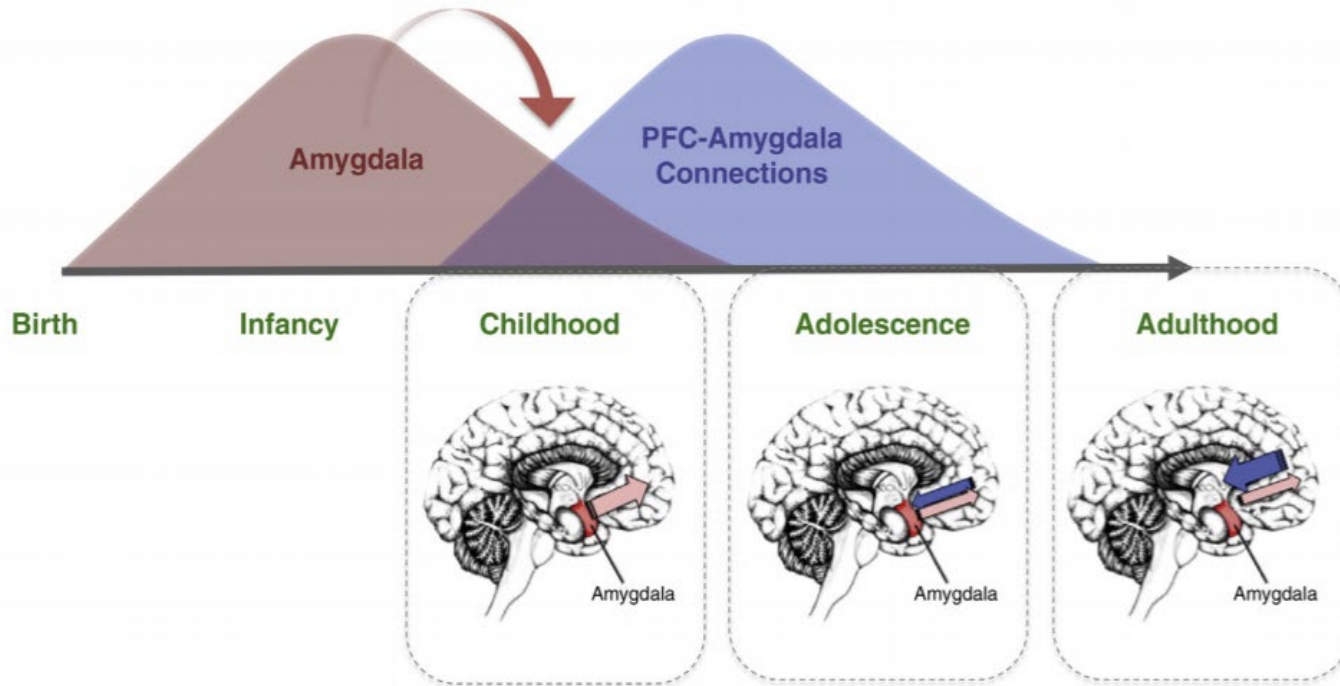
Instagram

MECHANISM OF MEDIA MULTITASKING



Loh KK, Kanai R, Neural Correlates of Media Multitasking, PLOS one, 9 (9) 2014

MORE MOOD & ANXIETY DISORDERS



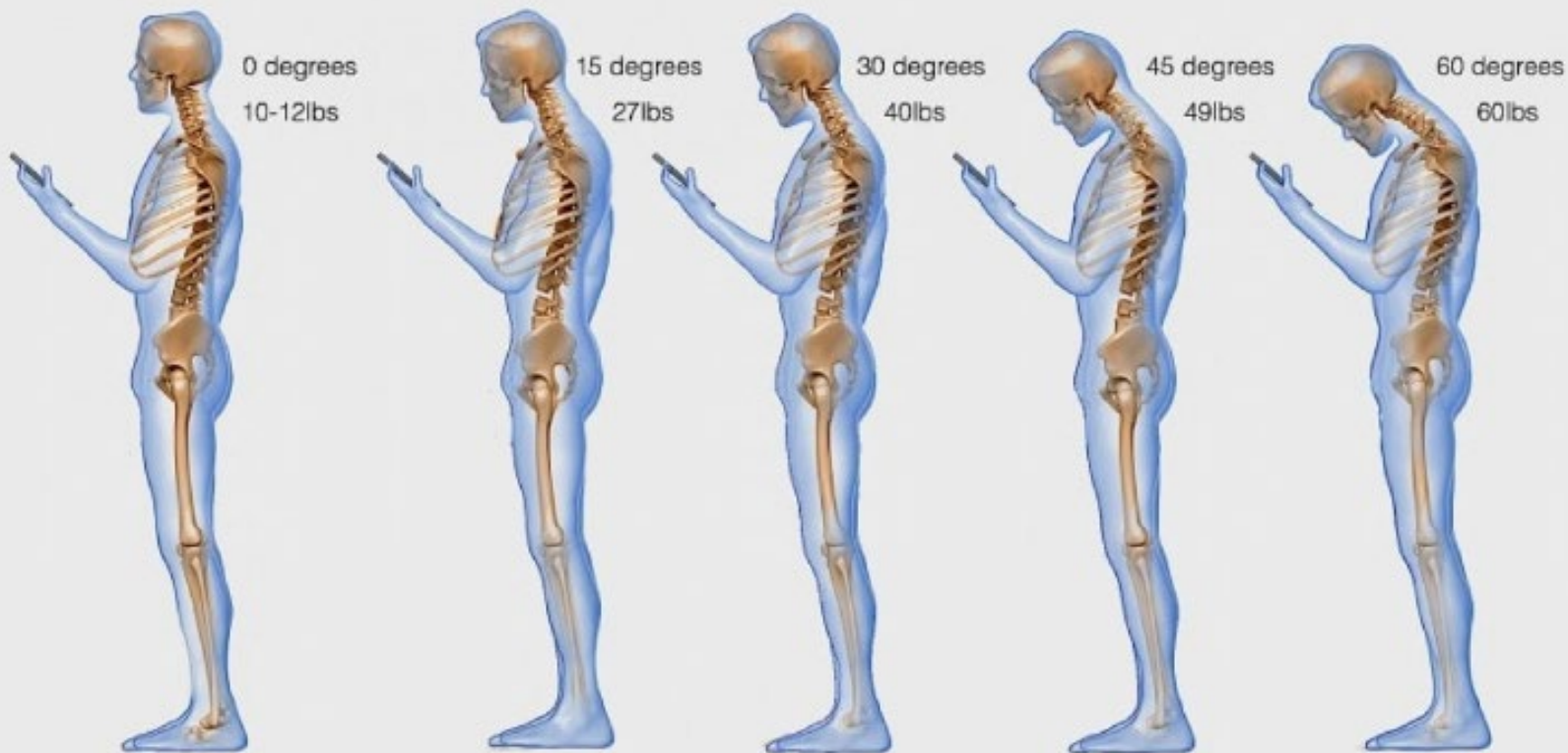
Tottenham N., Gabard-Durnam LJ. The developing amygdala: a student of the world and a teacher of the cortex. *Current Opinions in Psychology*. 2017;17:55-60.



MENTAL HEALTH ISSUES

- Increased anxiety
- Increased depression
- Increased SUD
- Increased suicide
- Decreased empathy
- Increase narcissism
- Increased loneliness

TEXT NECK



AUTOMOBILE ACCIDENTS ON THE RISE

After 40 years of decline, 2016 was a turning point, why?



Protecting Your Brain in the Digital Age





ROAD SIGNS FOR THE INFORMATION SUPER HIGHWAY



FIRST, RECOGNIZE THE PROBLEM

1. Increased time spent with a particular technology or technologies
2. Increased time spent alone with technology (social isolation with tech)
3. Preoccupation with a particular app or video game or social media platform
4. Loss of interest in other activities that were previously engaging and enjoyable
5. Increased irritability, anxiety or depressed mood (particularly to questions about tech)
6. Attempts to hide use of tech
7. Unsuccessful attempts to quit or reduce time or withdrawal symptoms when away from tech
8. Use interferes with social relationships, work or school performance
9. Pre-existing mental health issues (e.g., ADHD, PTSD, SUD, mood/anxiety disorders)

10 RECOMMENDATIONS

Building Better Brains in the Digital Age

1. Stop Media Multitasking
2. Choose JOMO over FOMO
3. Don't Confuse Online vs. Real World Identity
4. T.H.I.N.K. Before You Post
5. Prioritize Strong Bonds Over Weak Bonds

10 RECOMMENDATIONS

Building Better Brains in the Digital Age

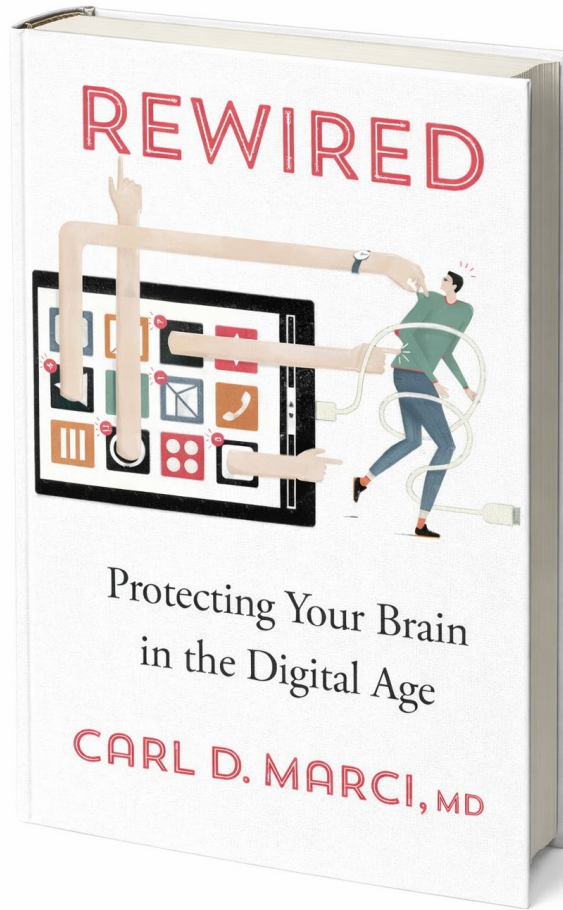
6. Avoid Attention Vampires and Compulsion Loops
7. Choose Paper Over Pixels when Reading
8. Don't Bring Technology into the Bedroom
9. Put Your Phone Down and Lock It Up While Driving
10. Take a Real Break

NOTES ON AI COMPANIONS

Should we be scared???

1. Like social media companies, ChatGPT's goal is to maximize engagement and screen time
2. ChatGPT style AI was quickly adopted as a therapist without training or supervision
3. Most AI companies do NOT rigorously self-regulate nor do they employ safety features
4. Most vulnerable: severe mental illness, conspiracy theorists, extremists, very old and very young
5. Common high-risk scenarios: a) encouraging suicide and/or self-harm; b) tendency to validate delusional beliefs; c) lonely people overly attach; d) unsolicited sexual advances on young people; e) pro-anorexic advice.
6. Same recommendations apply; keep "human in the loop"





Protecting Your Brain
in the Digital Age

CARL D. MARCI, MD

THANK YOU

