

Attention and executive functioning: An Overview for Parents, Educators & Clinicians

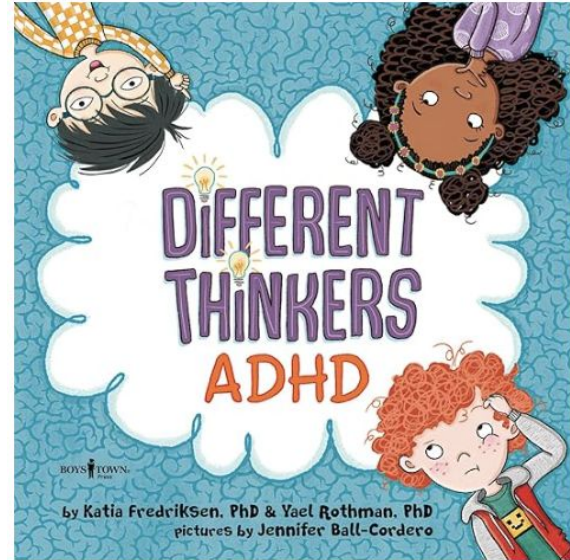
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THE STIXRUD GROUP
A LIFESPAN NEUROPSYCHOLOGY PRACTICE

EST 1985



Outline

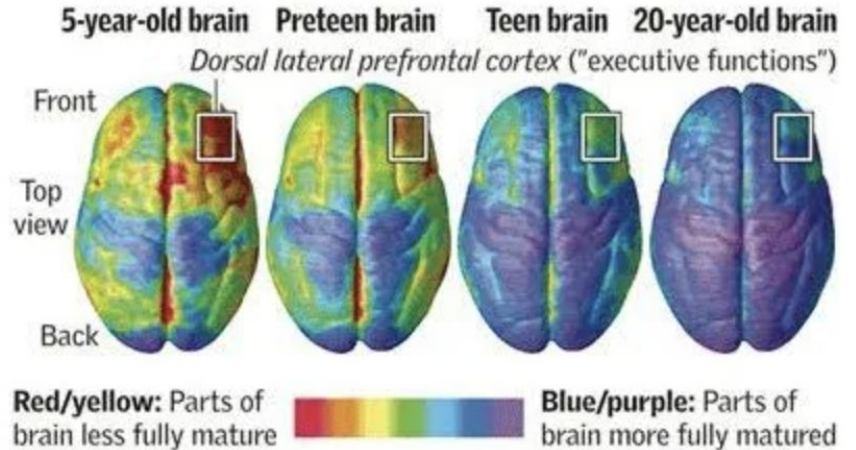
- What is executive functioning?
- What is ADHD?
 - Genetics and brain-based differences
 - Diagnosis and prevalence
 - Misconceptions
 - Strengths
 - Intersection with executive functioning
 - Emotional repercussions
 - Why/how to share diagnosis
- Changes across the lifespan
 - Adolescence
 - Adulthood
- Comorbidities
- Resources



What is executive functioning?



- Attention
- Working Memory
- Inhibiting impulses
- Planning ahead
- Organizing
- Cognitive flexibility
- Self/task monitoring



Sources: National Institute of Mental Health;
Paul Thompson, Ph.D., UCLA Laboratory of
Neuro Imaging

Thomas McKay | The Denver Post

Surges and factors affecting development



- Surges
 - Approx. age 5-6 (i.e., kindergarten)
 - Mid childhood (i.e., approx. grade 3-4)
 - Mid to late adolescence (i.e., transition to post-secondary)
- Environmental factors
 - Consistent, reliable, positive core relationships
 - Support children's efforts, model and practice skills, allow creativity and exploration, gradually guide toward independence
 - Protect from toxic stress, provide economic/social stability
 - Adequate sleep, exercise, and nutrition
- Genetic factors, including neurodevelopmental disorders, such as ADHD



What is ADHD?



- 3 core traits + subtypes
- Multiple environments
- Dysregulation, not deficit

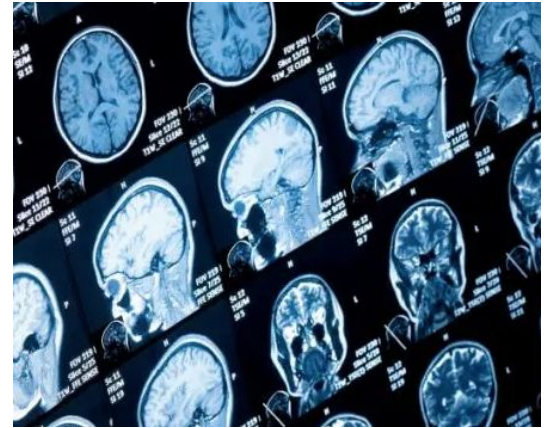
Role of genetics



- One of the most heritable medical conditions (75-90%)
 - Height = 70-90% heritability
- If child has ADHD, 50% likelihood that parent does too
- 25+ different genes associated with ADHD
- Possible environmental influences
 - Premature birth
 - Low birth weight
 - Prenatal exposure to smoking/alcohol
 - Exposure to toxins, e.g., lead

Brain based differences

- Rate of development (and brain develops from back to front)
 - Prefrontal cortex
 - Executive functioning skills
- Structure/size
 - Basal ganglia
 - Movement, decision-making, reward, emotion
 - Cerebellum
 - Motor control, attention
- Neurotransmitters
 - Dopamine
 - Motivation, perceived reward
- Connectivity
 - Default mode network (mind wandering/introspection)
 - Attention, cognitive control



How to diagnose ADHD

- Not yet via brain scans!
- Diagnosis that can be made through various professionals
 - Pediatrician
 - Psychiatrist
 - Psychologist
 - Neuropsychologist
- Benefits of a full neuropsychological evaluation
 - Most thorough approach
 - 30-50% have co-occurring learning disorder

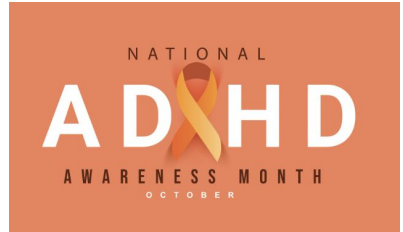


Prevalence data



- 11.4% of children aged 3-17 (i.e., 7.1 million) dx with ADHD at some point
- 10.5% of children aged 3-17 (i.e., 6.5 million) have current dx
- By gender:
 - 13.3% of boys aged 3-17
 - 7.5% of girls
- By race/ethnicity:
 - 10.9% of White children aged 3-17
 - 10.9% of Black
 - 8.4% of Native American
 - 8.1% of Latino
 - 3.5% of Asian
 - 11.8% of two or more races
- Global prevalence
 - Rates closer to 8-9%

Concerns about overdiagnosis



- Increased awareness/exposure and destigmatization
- “Milder” cases and masking
 - Adults aged 30 and above, especially women, now have highest rates of dx
 - Dx in adults growing 4x faster than in kids

It's important to:

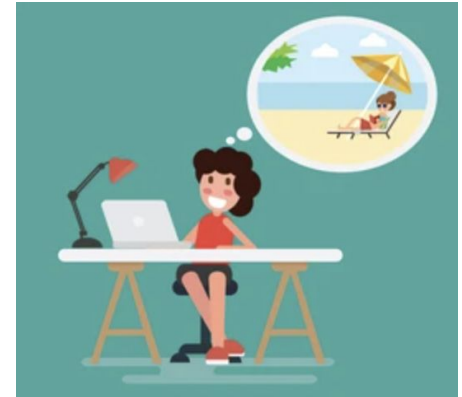
- Attend to developmental expectations
- Consider differential diagnosis
 - Sleep disorder
 - Anxiety
 - Depression
 - Learning disorder
 - Trauma



Girls and ADHD

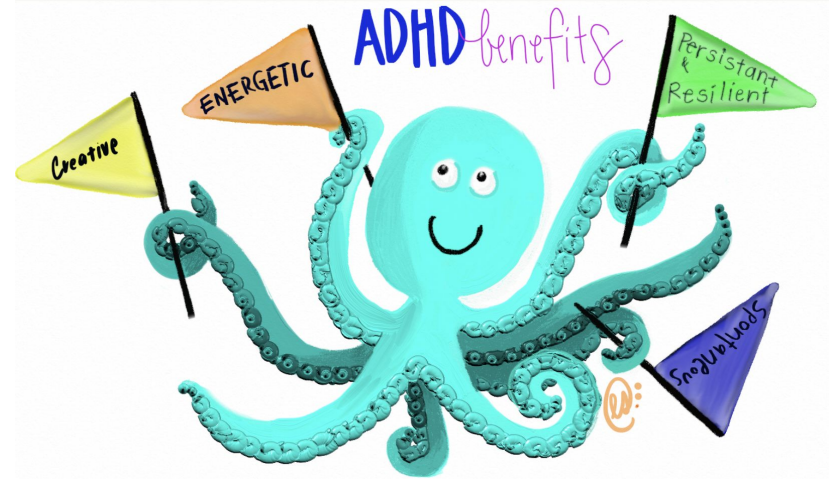


- Early diagnostic criteria emphasized hyperactivity/impulsivity as a hallmark symptom
- Girls often still overlooked or diagnosed later
 - Less likely to show interfering behaviors in school
 - Better able to mask
 - More likely to be misdiagnosed (e.g., anxiety)



Strengths often seen in ADHD

- Focus on preferred topics (can help with career, social)
- Creative thinking, entrepreneurship
- Willingness to take risks
- Resilience
- Spontaneity
- Energy



Visual from The Affinity Center

Intersection of EF and ADHD

- Sustaining attention/avoiding distractibility
- Missing details, making careless mistakes
- Following through on instructions, finishing tasks
- Organizing tasks and activities
- Keeping track of materials, losing things
- Forgetfulness in daily activities
- Navigating daily routines
- Staying seated when expected
- Blurting out, interrupting, waiting turn
- Remembering to hand in homework and bring home materials
- Managing workload/planning schedule
- Managing academics with higher executive demands (e.g., writing)



A handy rule of thumb

EXECUTIVE FUNCTIONING AGES FOR ADHD KIDS

based on Dr. Russell Barkley's 30% Rule

Biological Age	30% Behind Age	Biological Age	30% Behind Age
5	3.5	13	9.1
6	4.2	14	9.8
7	4.9	15	10.5
8	5.6	16	11.21
9	6.3	17	11.9
10	7	18	12.6
11	7.7	19	13.3
12	8.4	20	14

ADHD and emotions

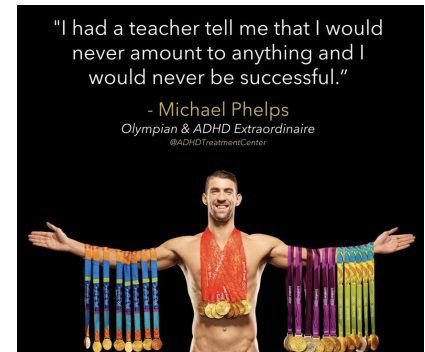
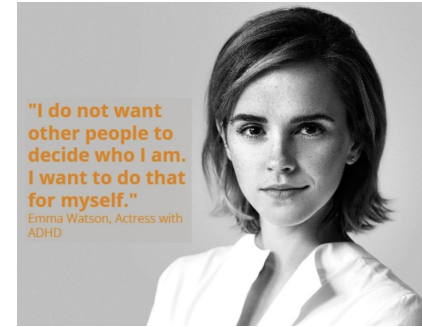


- Broader self-regulatory issues
 - Sensory
 - Sleep
 - Emotions
- Increased reactivity to stress triggers (“N.U.T.S.”)
- Inflexibility
- Anxiety
- Effects on:
 - Capacity to persist with challenging tasks
 - Self-esteem/mood
 - Social functioning



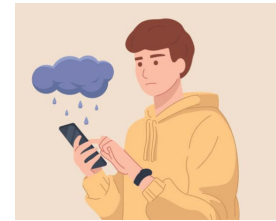
Why and how to share the diagnosis with your child

- Why?
 - Negative self-attributions
 - Changing the narrative
- How?
 - Mind your language, tone, framing
 - Use trusted words
 - Introduce idea of neurodiversity
 - Celebrate strengths
 - Discuss difficulties - and silver linings where appropriate
 - Offer role models
 - Discuss the roadmap
 - Offer [resources](#)
 - Leave room for questions



Psychosocial changes in adolescence

- Identity versus role confusion (Erikson)
 - explore values, morals, beliefs, political views
 - question family norms
 - experiment with style, interests, social roles
 - develop gender and sexual identity
- Increased importance of peer relationships
 - need for belonging, peer approval
 - social comparison intensifies (plus social media)
 - increased desire for autonomy from parents
 - conflict/emotional distancing from parents



More changes in adolescence

- Academic intensity
 - growing demands
 - poor performance can have real consequences
- Emotional intensity
 - including worries about the upcoming post-secondary transition, and about the world at large
- Access to potentially risky situations
 - substance use
 - driving
 - sex



Neurological changes in adolescence

- Stress signals are amplified
 - HPA (hypothalamic-pituitary-adrenal) axis more reactive
 - teens release more cortisol in response to stress
 - cortisol elevated for longer
- Rise in sex hormones increases emotional reactivity
 - estrogen - increased cortisol production, emotional memory, amygdala sensitivity
 - testosterone - increased emotional reactivity, reward-seeking, social sensitivity
- Frontal lobe is still developing
 - Reduced ability to logically problem-solve, plan ahead, consider repercussions, etc.



Hormones as regards ADHD



- Boys
 - Changing testosterone levels = increased risk-taking behavior
 - Greater risk for externalizing behaviors
 - Mitigated by ADHD meds
- Girls
 - Higher levels of estrogen and progesterone affect med efficacy
 - 1st 2 weeks of cycle - rising estrogen promotes release of dopamine and serotonin - meds may “work” better
 - 2nd 2 weeks of cycle - rising progesterone diminishes effect of estrogen - meds may feel weaker, leading to increased emotional dysregulation premenstrually
 - At greater risk for internalizing issues

Positives of the teen brain



- Very adaptable and resilient
- Readily learns and adapts
- Quickly absorbs new information and learns from new experiences
- High motivation when something feels meaningful
- Strengthening of social brain networks
- Executive functions continuing to develop

Supporting the launch to college

- Students with ADHD have lower levels of “college readiness”
- More likely to experience academic issues and require academic support at college
- Protective factors:
 - Fewer depressive symptoms
 - Better learned EF skills, e.g., planning and time management
 - History of educational accommodations in high school
 - Supports in college



ADHD in adulthood

- 75% persistence from childhood to adolescence; 50% adolescence to adulthood
- Dates back to childhood - no “adult onset” ADHD
- Global prevalence 3-7% (i.e., 140-366 million; Song et al., 2021)
- Changes in presentation - more attention/executive
- Common issues:
 - Misplacing important items
 - Difficulty attending to details and focusing when less interested
 - Forgetting appointments and obligations
 - Interrupting others or losing focus during conversations, meetings, etc.
 - Making decisions without considering consequences
 - Feeling restless and fidgety
 - Difficulties with relationships, jobs, finances
 - Higher risk of car accidents, substance use, etc.
- And strengths!
 - Entrepreneurial, hyperfocus on interests, adventurousness, creativity

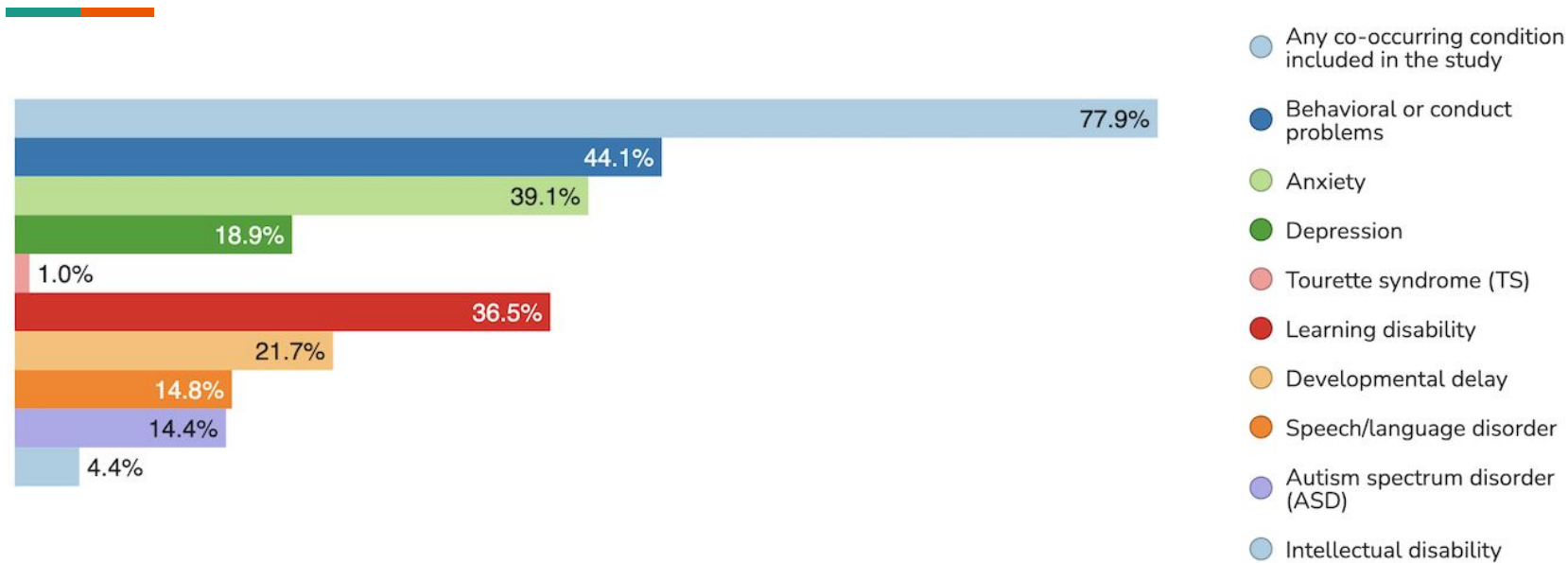


ADHD in adult women

- Likely to be similar to girls
- More likely than men to be diagnosed for the first time in adulthood
- “Master maskers”
- Perimenopause and menopause
 - Falling estrogen levels
 - Worsening executive functioning
 - memory/brain fog
 - focus
 - time management
 - organization
 - Reduced medication efficacy
 - adjust dose
 - consider HRT



Common comorbidities in kids



<https://www.cdc.gov/adhd/data/index.html>; Danielson, Claussen, Bitsko, et al (2024), using data from 2022 National Survey of Children's Health.

Common comorbidities in adults



Choi, Woo, Wang, et al (2022)

- As many as 80% have at least one comorbid disorder
- Most common are:
 - Substance use disorder
 - Mood disorder
 - Anxiety disorder
 - Personality disorder

Resources - Books and websites

- Bill Stixrud and Ned Johnson's book, *The Self-Driven Child*
- *The Disengaged Teen*, by Jenny Anderson and Rebecca Winthrop
- *Smart but Scattered*, by Peg Dawson and Richard Guare
- *10 Rules for Raising Kids in a High Tech World*, by Jean Twenge
- "Late, Lost and Unprepared," by Joyce Cooper-Kahn and Laurie Dietzel
- "Smart but Scattered," by Peg Dawson and Richard Guare
- "Taking Charge of ADHD," by Russell Barkley
- "Getting Ahead of ADHD," by Joel Nigg
- "ADHD 2.0," by Edward Hallowell
- "Understanding Girls with ADHD," by Kathleen Nadeau and Ellen Littman
- "Raising a Girl with ADHD," by Allison Tyler
- "Different Thinkers: ADHD," by Katia Fredriksen and Yael Rothman
- "Thriving with ADHD Workbook for Kids," by Kelli Miller
- www.chadd.org
- Jessica McCabe's YouTube channel, "How to ADHD"
- Russell Barkley's YouTube channel
- Catherine McCarthy's talk on the Lab School of Washington Speaker Series, Jan. 2025

Resources - Apps

- Things 3, Remember the Milk - to-do lists, help with planning
- GoalsonTrack - setting goals, with sub-goals
- My Study Life, myHomework Student Planner, Homework 2 - student planners
- Joon - gamified task lists
- Time Timer - customizable visual timer
- OneNote, Notability - write, record notes
- Google Keep - note-taking/organization with color-coding features
- WorkFlowy - helps teachers and students make lists and stay organized
- Choiceworks Calendar - visual schedules/task management
- Quizlet, Study Stack, Kahoot - gamified studying, flash cards
- Forest - gamified way of avoiding distractions during work time - plant a seed, watch it grow
- Photomath - step-by-step instructions to solve problems
- Here Comes the Bus - tracks the school bus and sends alerts
- Calm - mindfulness/meditation
- Headspace - guided meditation
- Mindful Powers - care for cute creature to support mindfulness and self-control