



ADHD AND THE ADOLESCENT BRAIN

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LEARNING OBJECTIVES

Participants will learn:

- ❖ what is ADD/ADHD?
- ❖ How does ADHD affect brain development?
- ❖ what are Executive Functions (EF)?
- ❖ How does ADHD affect teenagers?
- ❖ How to support teens with ADHD

ADHD IS A NEUROBIOLOGICAL DISORDER THAT IMPACTS THOSE AFFECTED THROUGHOUT THEIR LIVES.



The American Psychiatric Association has established diagnostic criteria for ADHD which includes:

- ❖ Symptoms evident for at least six months, with onset before age twelve.
- ❖ Marked behaviors that are long-lasting and create significant difficulty in at least two areas of life such as home, social settings, school and/or work.

ADHD

DIAGNOSTIC SUBTYPES

Although often referred to as either ADD or ADHD, ADHD is the clinical name for the disorder.

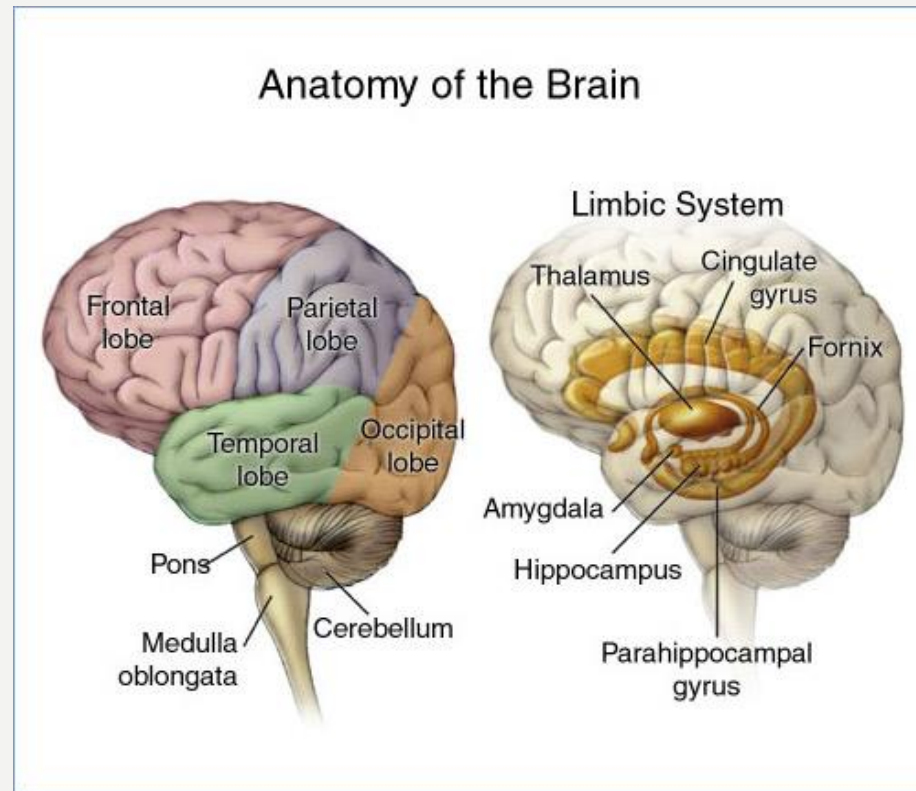
The following subtypes categorize symptoms:

- ❖ Primarily Inattentive Presentation
- ❖ Primarily Hyperactive/Impulsive Presentation
- ❖ Combined Presentation

ADHD FACTS

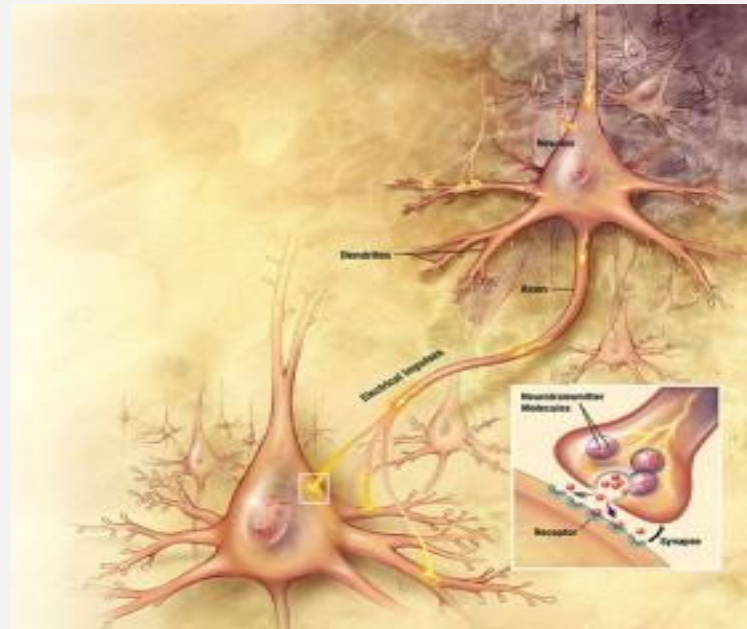
- ❖ ADHD impacts all aspects of one's life.
- ❖ Symptoms are present from early age.
- ❖ Children currently diagnosed with ADHD ages ranging from 4-17: 1 in 11
 - ❖ ages 4-10 1 in 15
 - ❖ ages 11-14 1 in 9
 - ❖ ages 15-17 1 in 10
- ❖ Boys are identified 2-3 times more than females.
- ❖ Recent research is pointing to more females with disorder than previously suspected.
- ❖ Approximately 50% will also experience co-existing diagnoses.
- ❖ Approximately 70% of children with ADHD will continue to experience symptoms as adults.

RECENT RESEARCH POINTS TO DEFICITS IN
FRONTAL LOBE BRAIN FUNCTIONAL ACTIVITY
AS LIKELY ORIGINS OF MANY ADHD
SYMPTOMS- FROM ATTENTIONAL TO
EMOTIONAL DYSREGULATION.



SO, WHAT ACTIVITY ARE WE TALKING ABOUT?

- ❖ In brief, neurotransmitters are like electrical impulses that send messages/hormones throughout our brains.
- ❖ These impulses (or synapses) regulate our behaviors. Research has shown that individuals with ADHD have deficits in the efficiency of these transmissions.
- ❖ The results are problems with executive functioning.



**THE DEVELOPMENTAL DELAY IN
KIDS WHO HAVE ADHD IS
ABOUT 30%.**

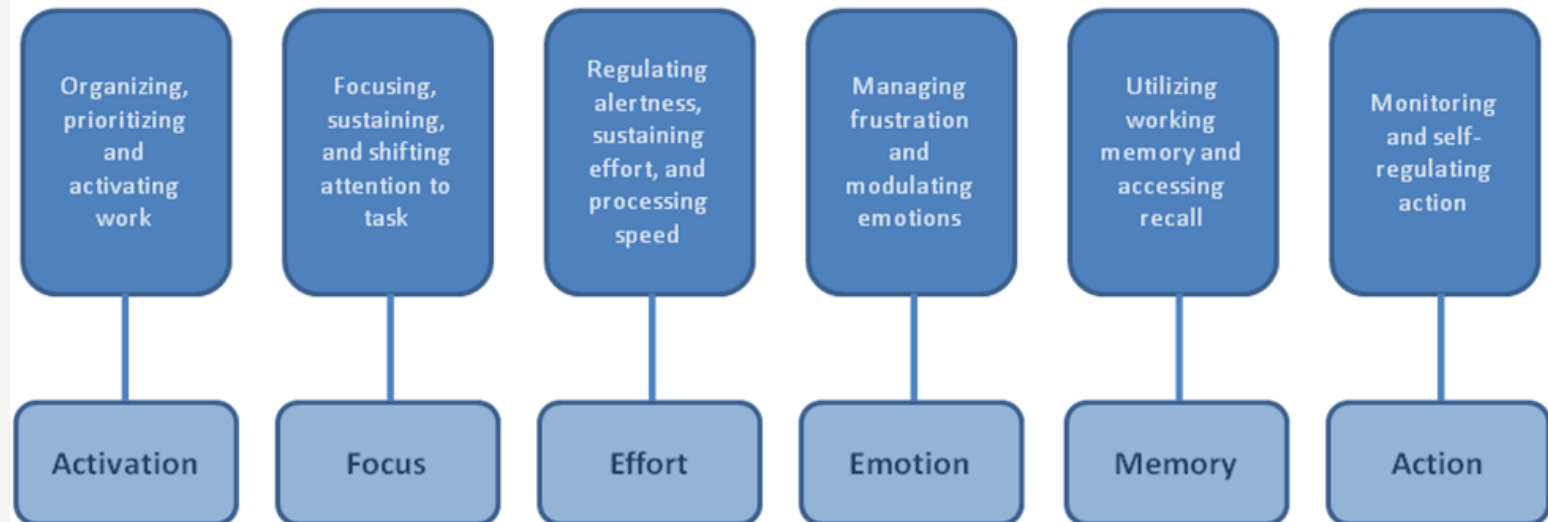
EXECUTIVE FUNCTIONING IS HARD WIRED

“The Prefrontal Cortex of the brain (when working well) provides “the capacity to formulate goals, to make plans for their execution, to carry them out in an effective way and to change course and improvise in the face of obstacles or failure, and to do so successfully, in the absence of external direction or structure. The capacity of the individual to generate goals and to achieve them is considered to be an essential aspect of a mature and effective personality. It is *not* a social convention or an artifact of culture. It is hard wired in the construction of the PFC and its connections.”

Gualtieri, 1996

Executive Functions

(work together in various combinations)



T. Brown, 2008

LET'S LOOK AT THE MULTIPLE SEQUENTIAL STEPS INVOLVED IN PLANNING AND TASK COMPLETION..

- ❖ Must formulate an idea.
- ❖ Must utilize “working memory” in the process.
- ❖ Must have a mental picture of each step needed *and* how long each step will take to complete.
- ❖ Must be able to think abstractly while making concrete plans, without losing focus or becoming confused.
- ❖ Must be able to “hold onto” previous information needed and actually begin the action, while also “pulling up” the mental or big picture.
- ❖ Must do all of the above and maintain attention until each step is complete.
- ❖ Then must be able to maintain focus/attention/energy in order to switch gears/transition to do next step needed. Must “pull up” another mental picture.
- ❖ Must also be able to adapt to any unanticipated changes, distractions, additional stimuli, or “stay on track.”
- ❖ Must do this and continue to hold details in working memory.
- ❖ At the same time, must be able to self regulate emotions, frustration tolerance, impulses to give up.
- ❖ Must be able to do all of these things intrinsically, without external help.
- ❖ Must recognize when entire task is completed, anticipate consequence or impact of completed task.

DEFINITIONS OF EF

- ❖ Response Inhibition: the capacity to think before they act.
- ❖ Working Memory – the ability to hold information in memory while performing complex task.
- ❖ **Emotional Control – the ability to manage emotions in order to achieve goals, complete tasks, or control and direct behavior.**
- ❖ Flexibility – the ability to revise plans in the face of obstacles, setbacks, new information or mistakes.

DEFINITIONS OF EF

- ❖ Sustained Attention – the capacity to maintain attention to a situation or task in spite of distractions, fatigue or boredom.
- ❖ Task Initiation – the ability to begin projects without undue procrastination, in an efficient and timely manner.
- ❖ Planning/Prioritization – the ability to create a roadmap to reach a goal or complete a task. It also involves being able to make decisions about what's important and what's not.

DEFINITIONS OF EF

- ❖ Organization – the ability to create and maintain a system to keep track of information or materials.
- ❖ Time Management – the capacity to estimate how much time one has, how to allocate it and to stay within time limits.
- ❖ Goal-directed persistence – the capacity to have a goal, follow through the completion of the goal and not be put off or directed by competing interests.

SPECIFIC AREAS OF DIFFICULTY IN EXECUTIVE FUNCTION DEFICITS

- ❖ Attentional difficulties
- ❖ Distractibility
- ❖ Lack of perseverance
- ❖ Impulse control issues
- ❖ Hyperactivity/Restlessness
- ❖ Poor time concept/management
- ❖ Difficulties in Organizing/Planning
- ❖ *Emotional and perceptual dysregulation
- ❖ Lack of sound judgment
- ❖ Difficulties learning from experience/mistakes/working memory
- ❖ Critical and forward thinking
- ❖ Social, test anxiety
- ❖ Self monitoring behaviors/Inhibition

“The executive functions impaired in ADD syndrome are not skills to be learned or aspects of willpower to be exercised, but natural activities of complex neural networks of the brain. “

Brown, 2005

SYMPTOMS OF ADHD CHANGE WITH AGE



WHAT ADHD MIGHT LOOK LIKE...

- Acts without thinking
- Interrupts others
- Overreacts to small problems
- Upset by changes in plans
- Overwhelmed by large assignments
- Talks or plays too loudly
- Resists change of routine
- Doesn't notice impact of behavior on others
- Doesn't see their behavior as part of the issue

WHAT ADHD MIGHT LOOK LIKE...

- Easily overstimulated and has trouble calming down
- Gets stuck on one topic or activity
- Gets overly upset about “little things”
- Out of control more than peers
- Cant’ comp up with more than one way to solve a problem
- Low tolerance for frustration
- Acts wild or out of control

WHAT ADHD MIGHT LOOK LIKE...

- Doesn't bother to write things down
- Forgets directions
- Forgets to bring materials
- Keeps putting off homework
- Runs out of steam before finish work
- Chooses "fun stuff" over homework or chores
- Passive study method or don't study
- Forgets homework or forgets to turn it in
- Leaves long-term assignments to the last minute

WHAT ADHD MIGHT LOOK LIKE...

- Can't break down long-term assignments
- Sloppy work
- Messy notebooks
- Loses or misplaces things
- Can't find things

TEENS WITH ADHD



SYMPTOMS IN TEENS

- Poor self-esteem
- Mood is frequently negative (anger, anxiety, sadness, stress)
- Problems recalling procedures for algebra & higher math.
- Poor reading for cause/effect, compare/contrast, inference.
- Written narratives lack cohesion, seem disjointed/scattered
- Pursue entertainment more than academic activities.
- Take unhealthy risks to fit in with peers.
- At risk for substance abuse.
- At risk for teen pregnancy.
- At risk for auto accidents.

MIDDLE SCHOOL AND HIGH SCHOOL

- Social issues may emerge or increase.
- Risky behaviors might begin due to problems with impulsivity and need to belong.

Nadeau, 2010

ADHD ISSUES UNIQUE TO GIRLS AND WOMEN

- Some girls struggle with academics due to ADHD symptoms OR they may “hold it together” until they are home.
- Girls with ADHD are more likely than boys to have Learning Disabilities, and tend to work much harder than peers to keep up.
- May feel “different” than other girls, resulting in low self-esteem.
- Girls and Women with ADHD are more likely to experience PMS and mood swings each month.
- May have emotional “meltdowns.”
- These difficulties are typically NOT seen as part of ADHD.
- May be misdiagnosed as depression, anxiety, bipolar illness.
- OR..May have co-existing diagnosis.



THE ADD/ADHD ICEBERG

Only 1/8 of an iceberg is visible!!
Most of it is hidden beneath the surface!!

THE TIP OF THE ICEBERG: The Obvious ADD/ADHD Behaviors

HYPERACTIVITY
Restless Talks a lot
Fidgets Can't sit still
Runs or climbs a lot Always on the go

IMPAULSIVITY
Lacks self-control Difficulty awaiting turn
Blurts out Interrupts
Tells untruths Intrudes
Talks back Loses temper

INATTENTION
Disorganized Doesn't follow through
Doesn't pay attention Is forgetful
Doesn't seem to listen Distractible
Makes careless mistakes Loses things
Doesn't do school work

HIDDEN BENEATH THE SURFACE: The Not So Obvious Behaviors!!

NEUROTRANSMITTER DEFICITS
IMPACT BEHAVIOR
Inefficient levels of neurotransmitters,
dopamine, norepinephrine, & serotonin,
result in reduced brain activity
on thinking tasks.

WEAK EXECUTIVE FUNCTIONING
Working Memory and Recall
Activation, Alertness, and Effort
Internalizing language
Controlling emotions
Complex Problem Solving

IMPAIRED SENSE OF TIME
Doesn't judge passage of time accurately
Loses track of time
Often late
Doesn't have skills to plan ahead
Forgets long-term projects or is late
Difficulty estimating time required for tasks
Difficulty planning for future
Impatient
Hates waiting
Time creeps
Homework takes forever
Avoids doing homework

SLEEP DISTURBANCE (56%)
Doesn't get restful sleep
Can't fall asleep
Can't wake up
Late for school
Sleeps in class
Sleep deprived
Irritable
Morning battles with parents

30 PERCENT
DEVELOPMENTAL DELAY
Less mature
Less responsible
18 yr. old acts like 12

NOT LEARNING EASILY FROM
REWARDS AND PUNISHMENT
Repeats misbehavior
May be difficult to discipline
Less likely to follow rules
Difficulty managing his own behavior
Doesn't study past behavior
Doesn't learn from past behavior
Acts without sense of hindsight
Must have immediate rewards
Long-term rewards don't work
Doesn't examine his own behavior
Difficulty changing his behavior

COEXISTING CONDITIONS
2/3 have at least one other condition
Anxiety (34%) Depression (29%)
Bipolar (12%) Substance Abuse (5-40%)
Tourette Disorder (11%)
Obsessive Compulsive Disorder (4%)
Oppositional Defiant Disorder (54-57%)
Conduct Disorder (22-43%)

SERIOUS LEARNING PROBLEMS (90%)
Specific Learning Disability (25-50%)
Poor working memory Can't memorize easily
Forgets teacher and parent requests
Slow math calculation (26%)
Spelling Problems (24%)
Poor written expression (65%)
Difficulty writing essays
Slow retrieval of information
Poor listening and reading comprehension
Difficulty describing the world in words
Difficulty rapidly putting words together
Disorganization
Slow cognitive processing speed
Poor fine motor coordination
Poor handwriting
Inattention Impulsive learning style

LOW FRUSTRATION TOLERANCE
Difficulty Controlling Emotions
Short fuse Emotionally reactive
Loses temper easily
May give up more easily
Doesn't stick with things
Speaks or acts before thinking
Concerned with own feelings
Difficulty seeing others perspective
May be self-centered
May be selfish

ADD/ADHD is often more complex than most people realize!
Like icebergs, many problems related to ADD/ADHD are not visible. ADD/ADHD may be mild, moderate, or severe,
is likely to coexist with other conditions, and may be a disability for some students.

COEXISTING CONDITIONS TO LOOK OUT FOR:



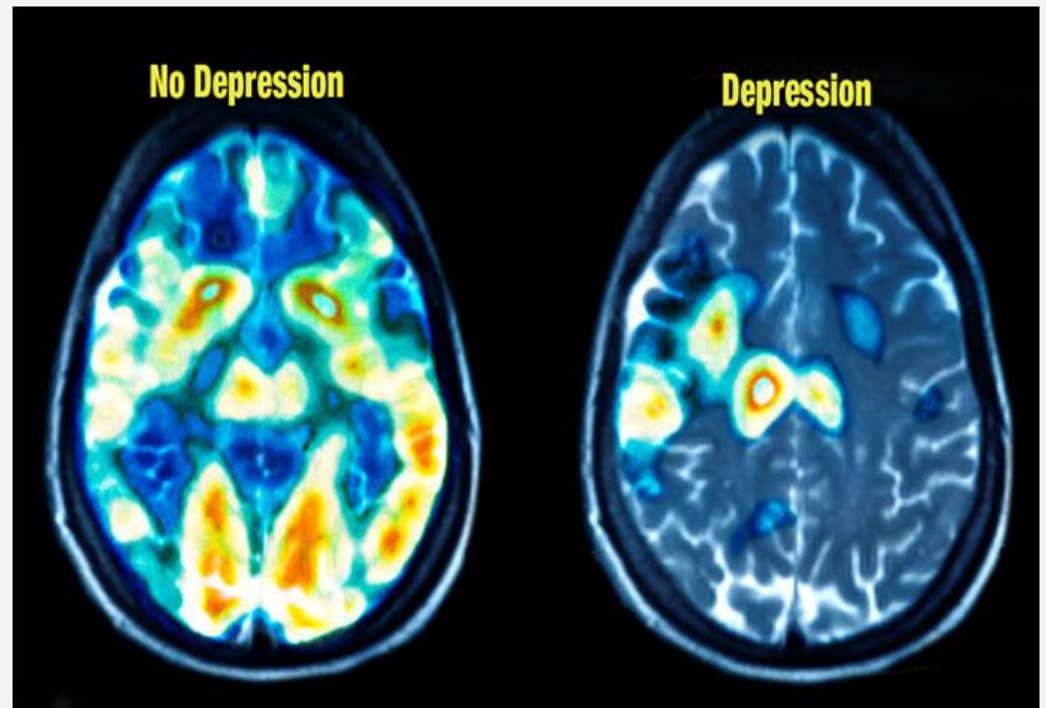
WHAT DOES DEPRESSION LOOK AND SOUND LIKE?

- ❖ Sleeping too much during the day
- ❖ Not getting enough sleep
- ❖ Low or no affect
- ❖ Showing little interest in activities
- ❖ Laying in a dark room
- ❖ “I’m too tired to move”
- ❖ “It’s bright, can you turn the lights off?”
- ❖ “What’s the point?”
- ❖ “I don’t want to do anything”
- ❖ “It would be easier if I wasn’t here”

THE BRAIN & DEPRESSION

There are three parts of the brain that play a role in depression

- ❖ Hippocampus
- ❖ Amygdala
- ❖ Prefrontal Cortex



COEXISTING CONDITIONS TO LOOK OUT FOR:



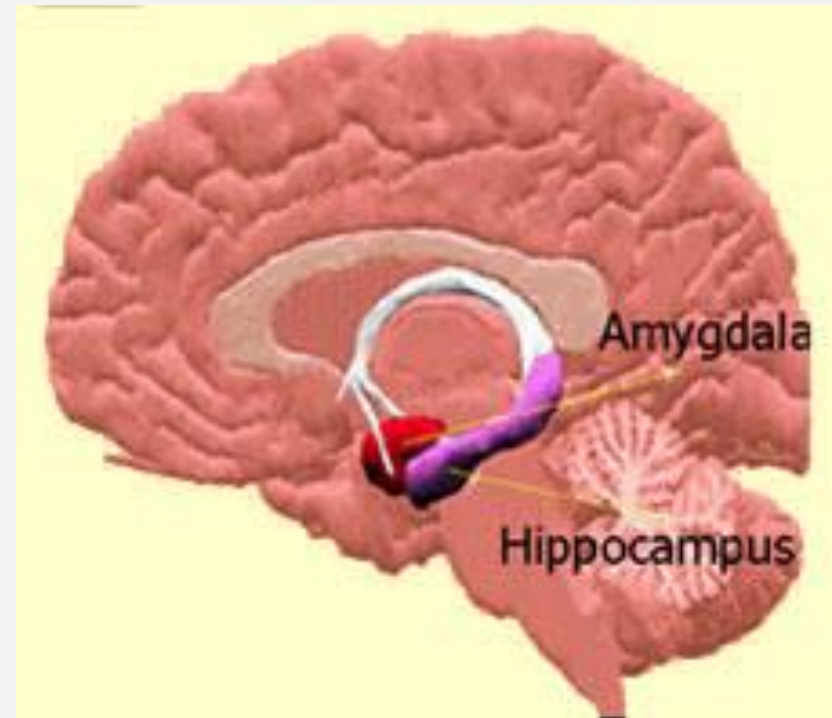
WHAT DOES ANXIETY LOOK AND SOUND LIKE?

- ❖ Stress
- ❖ Restlessness; difficulty relaxing
- ❖ Muscle pain, especially in the neck, shoulders, and back
- ❖ Headaches
- ❖ Elevated heart rate and other physical symptoms
- ❖ “I’m so overwhelmed.”
- ❖ “I can’t sleep.”
- ❖ “I have too much to do.”
- ❖ “What if it goes wrong?”
- ❖ “I can’t handle it.”

THE BRAIN & ANXIETY

There are three parts of the brain that play a role in anxiety (they might look familiar!)

- ❖ Hippocampus
- ❖ Amygdala
- ❖ Prefrontal Cortex



COPING WITH DEPRESSION AND ANXIETY

- ❖ Reduce stress level
- ❖ Improve sleep patterns
- ❖ Develop good nutrition habits
- ❖ Keep up with activities
- ❖ Learn positive thinking patterns
- ❖ Create a wellness toolbox
- ❖ Develop a strong support network
- ❖ Exercise



STRATEGIES

- Get educated about ADHD and how affects your child
- Identify the lagging skills and EF weaknesses
- Establish routines, structures and be consistent
- Know your child's/teen interests
- Build on their creativity
- Advocate
- Balance screen time

STRATEGIES

- Exercise
- Nutrition
- Use of apps
- Timers
- Reminders
- Meditation/Relaxation
- Teach the lagging skills: how to organized, how to use a timer, ask questions

IS THERE A LIGHT AT THE END OF THE TUNNEL?

- ❖ Yes! But it will take action. It is important to seek education, appropriate treatment and SUPPORT.
- ❖ Research shows us that early intervention, diagnosis and treatment from a qualified medical and/or mental health professional is vital.
- ❖ It is important to raise awareness and understanding among family members and the community.
- ❖ Although many children and adolescents behavioral problems can be significantly impacting, it is important to be aware that all individuals are affected differently, on spectrum from mild to severe. There are many “successful” people who learn how to overcome these challenges, so don’t give up!

KEYS TO SUCCESS FOR HIGH SCHOOL & COLLEGE

Develop a relationship with Disability Support Services and access accommodations.

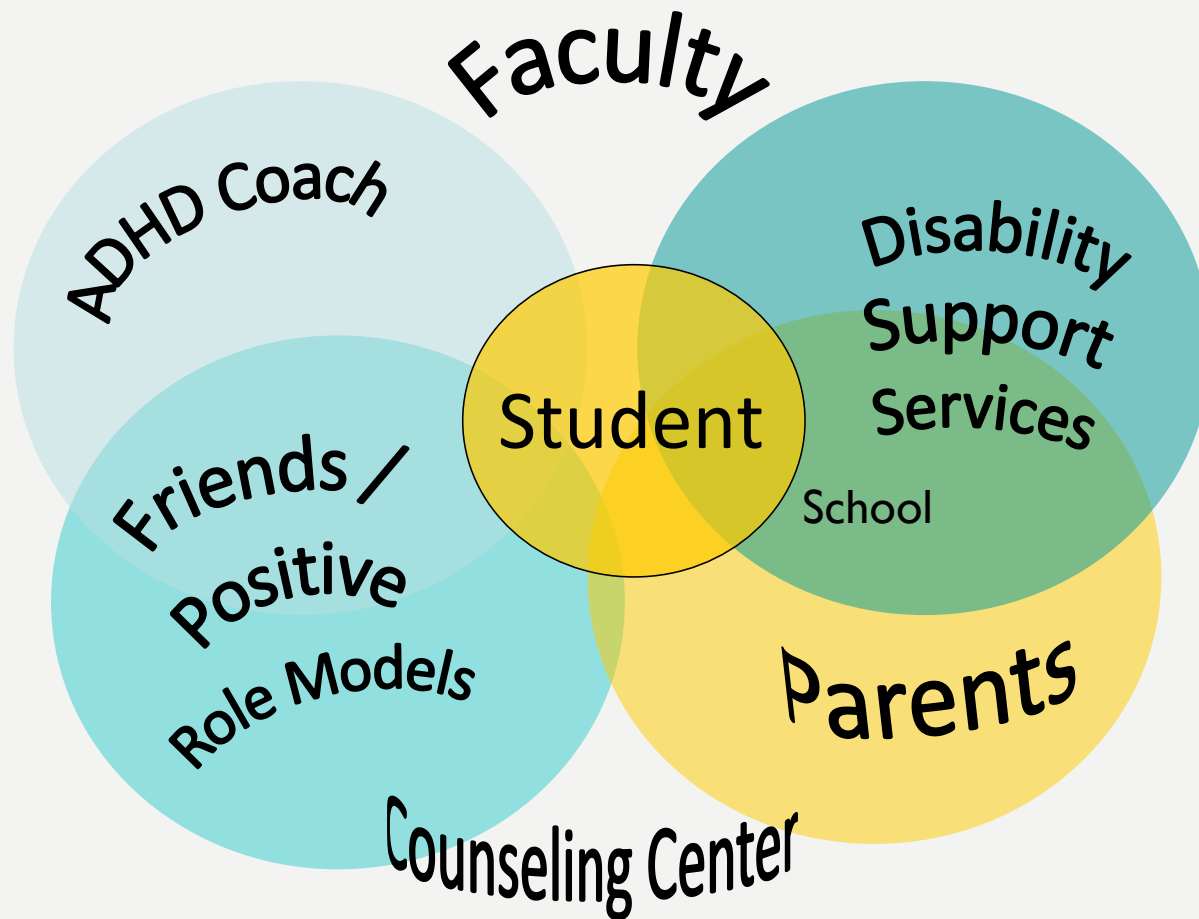
Common accommodations for ADHD students:

- ❖ Extended time on testing
- ❖ Distraction reduced testing
- ❖ Note taker
- ❖ Use of assistive technology

KEYS TO SUCCESS (MORE STRATEGIES)

- ❖ Understand your disability and your needs now
- ❖ Self-Advocacy
- ❖ Disclose early
- ❖ Meet your Disability Support Provider
- ❖ Identify a point person when you need assistance
- ❖ Talk with your faculty and discuss your needs
- ❖ Create a support network
- ❖ Get organized
- ❖ Develop a career plan

KEYS TO SUCCESS (MORE STRATEGIES)



REFERENCES

- www.chadd.org
- American Psychiatric Association, 2000
- Barkley, Russell, 2010
- Brown, 2005
- Dory, 2007
- Gualtieri, Thomas, 1996
- Ramsey & Rostain, 2008

**CHILDREN LEARN WHAT THEY LIVE
BY DOROTHY LAW NOLTE, PH.D.**

*IF CHILDREN LIVE WITH CRITICISM,
THEY LEARN TO CONDEMN.*

*IF CHILDREN LIVE WITH HOSTILITY,
THEY LEARN TO FIGHT.*

*IF CHILDREN LIVE WITH FEAR,
THEY LEARN TO BE APPREHENSIVE.*

*IF CHILDREN LIVE WITH PITY,
THEY LEARN TO FEEL SORRY FOR THEMSELVES.*

*IF CHILDREN LIVE WITH RIDICULE,
THEY LEARN TO FEEL SHY.*

*IF CHILDREN LIVE WITH JEALOUSY,
THEY LEARN TO FEEL ENVY.*

*IF CHILDREN LIVE WITH SHAME,
THEY LEARN TO FEEL GUILTY.*

IF CHILDREN LIVE WITH ENCOURAGEMENT,
THEY LEARN CONFIDENCE.

IF CHILDREN LIVE WITH TOLERANCE,
THEY LEARN PATIENCE.

IF CHILDREN LIVE WITH PRAISE,
THEY LEARN APPRECIATION.

IF CHILDREN LIVE WITH ACCEPTANCE,
THEY LEARN TO LOVE.

IF CHILDREN LIVE WITH APPROVAL,
THEY LEARN TO LIKE THEMSELVES.

IF CHILDREN LIVE WITH RECOGNITION,
THEY LEARN IT IS GOOD TO HAVE A GOAL.

IF CHILDREN LIVE WITH SHARING,
THEY LEARN GENEROSITY.

IF CHILDREN LIVE WITH HONESTY,
THEY LEARN TRUTHFULNESS.

IF CHILDREN LIVE WITH FAIRNESS,
THEY LEARN JUSTICE.

IF CHILDREN LIVE WITH KINDNESS AND CONSIDERATION,
THEY LEARN RESPECT.

IF CHILDREN LIVE WITH SECURITY, THEY LEARN TO HAVE
FAITH IN THEMSELVES AND IN THOSE ABOUT THEM.

IF CHILDREN LIVE WITH FRIENDLINESS,
THEY LEARN THE WORLD IS A NICE PLACE IN WHICH TO
LIVE.



Questions?

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