ADHD, Sleep Problems, and Executive Functioning: What are the links?

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You’ve made an important first step for yourself and/or your child...

...you’ve started searching for help with frustrating and overwhelming issues in your life. We’re here to help sort through the confusion.

Through our assessment process, CNLD’s expert staff can identify specific barriers to success and will develop an intervention plan, custom-built for you.

What sets us apart from other options?

Who Do We Help?
Our clients come from all stages of life. We like to say we see children from ages 2 through 92.

Read more...

Why Come to Us?
We are known for our work with complex cases. We specialize in helping our clients understand both their strengths and weaknesses so that frustrations can be minimized.

Read more...

Did You Know?
Every thought and action is controlled by the brain — the body’s most complex organ. The brain is divided into functional units with particular tasks, like processing visual information.

Read more...

Think critically: Intelligence plus character – that is the goal of true education. ~ Martin Luther King Jr.
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Did You Know?
The human brain is thought to be one of the most complex objects in the universe. Psychologists and philosophers have struggled for ages to understand the relationship...
Read more...

The brain is a muscle, and I'm a kind of body-builder. - Karl Lagerfeld
Everything you ever wanted to know about sleep....

...but were too tired to ask!
Everything you always wanted to know about ADHD and sleep.....

....but forgot to ask!!
Goals for Talk

- Review the importance of sleep
- Discuss the basics of sleep
- Talk about evaluation of sleep problems
- Examine the connection of ADHD and sleep
- Review impact of sleep on ADHD & executive functions (EFs)
- Address solutions for EF & sleep problems
Importance of Sleep

- Activity you devote 1/3 of your time to
- Rest & recovery from stresses of life, but actually a *dynamic activity* during which processes *vital* to health & well-being take place.
- Essential to maintain mood, memory & cognitive performance (executive functions).
- Chronic lack of sleep can lead to heart disease, high blood pressure, stroke, weight gain and diabetes
How much sleep do you need?

<table>
<thead>
<tr>
<th>Age</th>
<th>Hours of Needed Sleep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborns (0-2 months)</td>
<td>12–18 hours</td>
</tr>
<tr>
<td>Infants (3-11 months)</td>
<td>14–15 hours</td>
</tr>
<tr>
<td>Toddlers (1-3 years)</td>
<td>12-14 hours</td>
</tr>
<tr>
<td>Preschoolers (3-5 years)</td>
<td>11-13 hours</td>
</tr>
<tr>
<td>School-age Children (5-10 years)</td>
<td>10-11 hours</td>
</tr>
<tr>
<td>Teens (10-17 years)</td>
<td>8.5-9.25 hours</td>
</tr>
<tr>
<td>Adults (18+ years)</td>
<td>7-9 hours</td>
</tr>
</tbody>
</table>
22% of Americans struggle with insomnia every night.
### Adults Reporting Selected Sleep Behaviors in 12 States by Characteristics Behavioral Risk Factor Surveillance System, United States, 2009

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Unintentionally fell asleep during day at least once in the past month</th>
<th>Nodded off or fell asleep while driving in the past month</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 to &lt;25</td>
<td>43.7%</td>
<td>4.5%</td>
</tr>
<tr>
<td>25 to &lt;35</td>
<td>36.1%</td>
<td>7.2%</td>
</tr>
<tr>
<td>35 to &lt;45</td>
<td>34.0%</td>
<td>5.7%</td>
</tr>
<tr>
<td>45 to &lt;55</td>
<td>35.3%</td>
<td>3.9%</td>
</tr>
<tr>
<td>55 to &lt;65</td>
<td>36.5%</td>
<td>3.1%</td>
</tr>
<tr>
<td>≥65</td>
<td>44.6%</td>
<td>2.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Unintentionally fell asleep during day at least once in the past month</th>
<th>Nodded off or fell asleep while driving in the past month</th>
</tr>
</thead>
<tbody>
<tr>
<td>White non-Hispanic</td>
<td>33.4%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Black non-Hispanic</td>
<td>52.4%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>41.9%</td>
<td>6.3%</td>
</tr>
<tr>
<td>Other non-Hispanic</td>
<td>41.0%</td>
<td>7.2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex</th>
<th>Unintentionally fell asleep during day at least once in the past month</th>
<th>Nodded off or fell asleep while driving in the past month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>38.4%</td>
<td>5.8%</td>
</tr>
<tr>
<td>Female</td>
<td>37.3%</td>
<td>3.5%</td>
</tr>
</tbody>
</table>
## Activities Keeping Mobile Owners Up Late at Night

(of *smartphone owners* who engaged in this activity in the past week, the % who stayed up late last night doing this)

**August 2012**

<table>
<thead>
<tr>
<th>Activity</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watching a TV show on TV</td>
<td>74%</td>
</tr>
<tr>
<td>Playing a game on computer</td>
<td>66%</td>
</tr>
<tr>
<td>Browsing the internet on computer</td>
<td>64%</td>
</tr>
<tr>
<td>Watching a movie on TV</td>
<td>62%</td>
</tr>
<tr>
<td>Watching a video, movie, or TV show on iPad/tablet</td>
<td>59%</td>
</tr>
<tr>
<td>Watching a video, movie, or TV on mobile</td>
<td>55%</td>
</tr>
<tr>
<td>Playing a game on iPad/tablet</td>
<td>54%</td>
</tr>
<tr>
<td>Watching a video, movie, or TV show on computer</td>
<td>51%</td>
</tr>
<tr>
<td>Playing a game on console</td>
<td>51%</td>
</tr>
<tr>
<td>Browsing the internet on iPad/tablet</td>
<td>47%</td>
</tr>
<tr>
<td>Playing a game on mobile</td>
<td>46%</td>
</tr>
<tr>
<td>Browsing the internet on mobile</td>
<td>32%</td>
</tr>
</tbody>
</table>

Source: Wave Collapse LLC
Medications can interfere with sleep

- Medications may wake you at night with nausea, night sweats or need to use the bathroom.

- Stimulants in medications can cause poor quality sleep or lack of sleep (e.g., steroids, antidepressants, meds for migraines, heart disease, hypertension and allergies).
Medications can interfere with sleep

- Misuse of sleeping pills can impact sleep as they are intended for short-term use (e.g., tolerance, rebound insomnia, daytime sleepiness, strange behaviors while sleeping - walking, binge eating, driving).

- Medications impact length of slow wave sleep (SWS) and REM sleep, as well as cause arousals.
### Common Sleeping Pills

<table>
<thead>
<tr>
<th>BRAND NAME</th>
<th>GENERIC NAME</th>
<th>CLASS</th>
<th>DAILY DOSAGE RANGE *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambien</td>
<td>zolpidem</td>
<td>nonbenzodiazepine</td>
<td>5 mg – 10 mg</td>
</tr>
<tr>
<td>Ativan</td>
<td>lorazepam</td>
<td>benzodiazepine</td>
<td>2 mg – 6 mg</td>
</tr>
<tr>
<td>BuSpar</td>
<td>buspirone</td>
<td>nonbenzodiazepine</td>
<td>15 mg – 60 mg</td>
</tr>
<tr>
<td>Edular</td>
<td>zolpidem tartrate</td>
<td>nonbenzodiazepine</td>
<td>5 mg – 10 mg</td>
</tr>
<tr>
<td>Klonopin</td>
<td>clonazepam</td>
<td>benzodiazepine</td>
<td>0.5 mg – 4 mg</td>
</tr>
<tr>
<td>Lunesta</td>
<td>eszopiclone</td>
<td>nonbenzodiazepine</td>
<td>1 mg – 3 mg</td>
</tr>
<tr>
<td>Rozerem</td>
<td>ramelteon</td>
<td>melatonin type</td>
<td>8 mg</td>
</tr>
<tr>
<td>Sonata</td>
<td>zaleplon</td>
<td>nonbenzodiazepine</td>
<td>5 mg – 10 mg</td>
</tr>
<tr>
<td>Valium</td>
<td>diazepam</td>
<td>benzodiazepine</td>
<td>5 mg – 40 mg</td>
</tr>
<tr>
<td>Xanax</td>
<td>alprazolam</td>
<td>benzodiazepine</td>
<td>0.5 mg – 4 mg</td>
</tr>
</tbody>
</table>

* Suggested adult dose  
Note: Dosage ranges may vary depending on source, and may also vary according to age.
Adults using sleep aids

Figure 1. Percentage of adults aged 20 and over who used prescription sleep aids in the past 30 days, by age:
United States, 2005–2010

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>4.1</td>
</tr>
<tr>
<td>20–39</td>
<td>1.8</td>
</tr>
<tr>
<td>40–49</td>
<td>4.9</td>
</tr>
<tr>
<td>50–59</td>
<td>6.0</td>
</tr>
<tr>
<td>60–69</td>
<td>5.5</td>
</tr>
<tr>
<td>70–79</td>
<td>5.7</td>
</tr>
<tr>
<td>80 and over</td>
<td>17.0</td>
</tr>
</tbody>
</table>

*Significant increasing linear trend by age (p < 0.05).
NOTE: Sleep aids include all hypnotic drugs and four antidepressant or sedative medications commonly prescribed for insomnia or depression.
SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey.
Basics of Sleep

- Necessary for life
- Often overlooked as possible source of daytime problems
- Set by environmental and biological clocks
- Sleep/Wake Cycle: Homeostasis & Circadian Rhythms
Sleep-Wake Cycle (8/16): 2 main processes
Homeostasis

- Body maintains a “steady state” including sleep, blood pressure, body temperature, etc...
- When you wake up the drive for sleep starts and peaks in evening.
- Brain process not fully understood but one hypothesis is role of neurotransmitter adenosine.
  - Awake = adenosine↑; need for sleep↑
  - Asleep = adenosine↓; need for sleep↓
  - Caffeine- works by blocking adenosine receptors
How Caffeine Works

Adenosine helps prepare the body for sleep by curbing the chatter between nerve cells and by widening blood vessels to increase the flow of oxygen.

Receptors on the surface of brain cells can't tell the difference between adenosine (A) and caffeine (C). So when you consume caffeine, it attaches itself to the receptors and adenosine is shut out.

Without adenosine to make you sleepy, your brain activity perks up and you're more alert. By blocking adenosine, caffeine also constricts your blood vessels, which makes your headache disappear.
<table>
<thead>
<tr>
<th>Item</th>
<th>Caffeine Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starbucks Vente</td>
<td>550 mg</td>
</tr>
<tr>
<td>Starbucks Grande</td>
<td>375 mg</td>
</tr>
<tr>
<td>Starbucks Tall</td>
<td>250 mg</td>
</tr>
<tr>
<td>Espresso (2 oz.)</td>
<td>100 mg</td>
</tr>
<tr>
<td>Instant Coffee</td>
<td>65-100 mg</td>
</tr>
<tr>
<td>Red Bull</td>
<td>80 mg</td>
</tr>
<tr>
<td>Jolt</td>
<td>72 mg</td>
</tr>
<tr>
<td>Mountain Dew</td>
<td>55 mg</td>
</tr>
<tr>
<td>Diet Coke</td>
<td>46 mg</td>
</tr>
<tr>
<td>Iced Tea (black)</td>
<td>40-60 mg</td>
</tr>
<tr>
<td>Green Tea</td>
<td>35 mg</td>
</tr>
<tr>
<td>HD Coffee Ice Cream</td>
<td>58 mg</td>
</tr>
<tr>
<td>Dark Chocolate (1 oz.)</td>
<td>35 mg</td>
</tr>
<tr>
<td>Milk Chocolate (1 oz.)</td>
<td>15 mg</td>
</tr>
<tr>
<td>NoDoz</td>
<td>200 mg</td>
</tr>
<tr>
<td>Excedrin (2)</td>
<td>130 mg</td>
</tr>
</tbody>
</table>
Figure Above: An fMRI image - the **yellow** area shows increased frontal lobe activity after the subjects ingested 100 mg of caffeine (about 2 cups of coffee).
Circadian Rhythms

- Cyclical changes like body temperature, hormone levels and sleep over a 24-hour period.
- Driven by brain’s biological clock (group of neurons in the hypothalamus called suprachiasmatic nucleus (SCN)).
- 24-hour rhythms synchronized to environment and work/social schedules.
- Humans- light is strongest synchronizing agent.
High alertness: 10:00
Highest testosterone secretion: 09:00
Bowel movement likely: 08:30
Melatonin secretion stops: 07:30
Sharpest rise in blood pressure: 06:45
Lowest body temperature: 04:30
Deepest sleep: 02:00
Midnight: 00:00
Noon: 12:00
Best coordination: 14:30
Fastest reaction time: 15:30
Greatest cardiovascular efficiency and muscle strength: 17:00
18:30 Highest blood pressure
19:00 Highest body temperature
21:00 Melatonin secretion starts
22:30 Bowel movements suppressed
Circadian Rhythms

- Light & Darkness “set” biological clock & help determine when to wake up or go to sleep.
- Homeostatic system- makes us sleepier as go through day.
- Circadian system- tends to keep us up as long as there is daylight.
- Circadian system- intolerant of major alterations in sleep/wake schedules (e.g., travel, graveyard shift).
The circadian rhythm is a complex system. Activated by sunlight during daytime, SCN project inhibitory information to PVN in hypothalamus. The long axons of PVN then send nerve pulses down to the preganglionic sympathetic neurons of the spinal cord, which in turn modulate the activity of the superior cervical ganglia. The latter further project to the pineal gland to regulate the secretion of melatonin.

The circadian rhythm can be disrupted:
- Exposure to 400-500nm light at night
- Not receiving the light in the morning
- Jet lag - results in an imbalance of neurotransmitters and hormones
- Shift work where workers are exposed to visible light at night, de-regulates a gene involved in controlling the circadian rhythm.
- Exposure to light at abnormal times or due to change in location will either disrupt the clock gene function or cause activation of the 'wake state' of the circadian cycle at an abnormal time, such as in the evening.
Circadian Rhythms and the Body

Different body functions rise and fall over a 24 hour period based on Circadian rhythms.

Body temperature
Cortisol hormone
Blood pressure

Melatonin
Growth hormone
Testosterone
Prolactin
Normal circadian sleep rhythm. Sleep urge is greatest at night with a small increase at midday. Sleep need increases throughout the waking hours and is replenished during sleep.
Sleep Stages

**Stage 1**
Light sleep & can be easily awakened

**REM Stage**
Breathing becomes more rapid, irregular, and shallow

**Stage 2**
Eye movement & brain waves slow down

**Stage 3**
Delta waves begin to appear

**Stage 4**
No eye movement or muscle activity & difficult to wake up

Sleep Cycle
### 100% Sleep Cycle

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Stage 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-5%</td>
<td>45-55%</td>
<td>4-6%</td>
<td>12-15%</td>
<td>20-25%</td>
</tr>
</tbody>
</table>

**Stage 1**
- 4-5%
- Light sleep.
- Muscle activity slows down.
- Occasional muscle twitching.

**Stage 2**
- 45-55%
- Breathing pattern and heart rate slows.
- Slight decrease in body temperature.

**Stage 3**
- 4-6%
- Deep sleep begins.
- Brain begins to generate slow delta waves.

**Stage 4**
- 12-15%
- Very deep sleep.
- Rhythmic breathing.
- Limited muscle activity.
- Brain produces delta waves.

**Stage 5**
- 20-25%
- Rapid eye movement.
- Brainwaves speed up and dreaming occurs.
- Muscles relax and heart rate increases.
- Breathing is rapid and shallow.
Awake
Beta waves

Drowsy, Relaxed
Alpha waves

Stage 1 Sleep
Theta waves

Stage 2 Sleep
Sleep spindles, K complexes

Stage 3/Stage 4 Sleep
Delta waves

REM Sleep
Fast, random

Theta waves
Sleep spindle
K complex
Delta activity
Sawtooth waves
Sleep Architecture

- Predictable pattern of REM and non-REM sleep alternating through the night.
- Complete sleep cycle: every 90-110 minutes repeated 4-6 times per night.
- As night wears on, REM increases and slow wave sleep decreases.
- Morning- mostly stages 1 & 2, and REM.
REM increases and slow wave sleep decreases
Functions of Slow Wave Sleep (SWS- delta waves)

- Restorative phase of sleep for recuperation of mind-body system.
- Growth hormone secreted for healing muscles & repairing tissues.
- Strengthening of immune system
- Prepares for memory consolidation
- Glial cells in brain are restored with sugars to provide energy for the brain
Problems associated with SWS

- Bedwetting
- Night terrors
- Sleep-walking
- Sleep-related eating disorder
Functions of REM Sleep

- Recall & learning: formation of new memories
- Stimulates the central nervous system & restores brain chemistry to a normal balance
- Physiological support for dreaming
Problems associated with REM sleep

- REM behavior disorder - moving limbs or engaging in activities associated with waking.
- Sleep talking, shouting, screaming, hitting or punching.
- Sleep walking
ADHD and Sleep Problems

- Distractibility
- Poor attention span
- Defiance
- Insufficient sleep
- Anxiety
- Poor organizational skills
- Depression
- Poor motivation
- Easily frustrated
- Irritable
### Adults and children react differently to being tired

<table>
<thead>
<tr>
<th>Adults become sluggish</th>
<th>Children tend to overcompensate and speed up</th>
</tr>
</thead>
</table>

![Image of adult looking tired](BLD891621 [RF] © www.visuStock.com)

![Image of children playing](visualphotos.com)
ADHD or Sleep Problems?

ADHD symptoms
- Inattention
- Hyperactivity
- Impulsivity
- Distractibility
- Difficulty waiting or taking turns

Sleep deprivation symptoms
- Hyperactivity
- Inattention and daydreaming
- Impulsivity and restlessness
- Oppositional and aggressive behaviors
- Moodiness and irritability
- Difficulty waking up in the morning

** Unlike adults, many children who are sleep deprived do not present with complaints of daytime sleepiness.**
ADHD and Sleep problems

- Common, Highly Interrelated & Heterogenous

For example:
- Sleep problems may mimic ADHD symptoms.
- Sleep problems may exacerbate ADHD symptoms.
- Sleep problems may be associated with or exacerbated by ADHD.
- Medications used to treat ADHD may result in sleep problems (varies by duration of treatment - greater frequency when start meds).
Research Findings

- ADHD is strongly associated with
  - difficulty falling asleep,
  - achieving adequate sleep duration, and
  - tiredness during the day.
- 50% to 80% of adults with ADHD report sleep problems.
- Delayed sleep onset is a common side effect of stimulants.
- Delayed sleep phase syndrome is another side effect to the point of day/night reversal, particularly in teens.
Research Findings

• Reported sleep problems in adults with ADHD include: daytime sleepiness, insomnia, delayed sleep phase syndrome, fractured sleep, restless leg syndrome and sleep disordered breathing/sleep apnea.

• More vulnerable to adverse sleep effects if person has a pre-existing sleep disorder prior to stimulant treatment or co-morbid anxiety or depression.

• For a subset of adults, stimulant medication may actually lead to improved sleep.
Screening for sleep problems in ADHD

Figure 2. Common causes of insomnia complaints (©MM Ohayon, 2008)

**Life style**
- Shift working, irregular sleep-wake schedule, poor sleep hygiene, stress

**Psychiatric disorders**
- Depressive disorders, bipolar disorders, psychotic disorders, anxiety disorders, eating disorders

**Use, abuse or withdrawal of medication and psycho-active substances**
- Alcohol, caffeine, hypnotics, anxiolytics, sedative, cocaine, amphetamines, opioid, antihypertensives, anticholinergics, hormones, sympathomimetic amines, antineoplastics

**Medical conditions**
- Arthritis, asthma, headache, migraine, Parkinson's disease, cerebrovascular disease, head injury, stomach or gastric ulcer, gastrointestinal disease, heart disease, obesity, epilepsy, viral or bacterial infection, food or milk allergy, Huntington's disease

**Sleep breathing disorders**
- Sleep apnea, hypoventilation

**Other sleep disorders**
- Restless legs syndrome, Periodic limb movement disorder, Narcolepsy, Circadian rhythm disorders, Nocturnal leg cramps

**Personality traits**

**Insomnia complaints**
- Prevalence: 18% to 38%

- 10%
- 30%-40%
- 3%-7%
- 4%-11%
- 5%-9%
- 15%
Disorders that ‘mimic’ ADHD should first be ruled-out
Screening for Sleep Problems

- Medical history w/ MD
- Sleep-wake agenda
- Wrist actigraphy

Records movements that can be used to estimate sleep parameters using software programs.
Screening for Sleep Problems

- Sleep study
  - Sleep Disorders Centers
    - UMMC (734.936.9068)
    - St. Joe’s (734.712.2276)
- Neuropsychological investigations

Do You Have A Sleep Disorder?
If you answer "yes" to any of these questions, you may have a sleep disorder:
- Do you fall asleep or feel sleepy during dinner, while entertaining friends, at work or driving?
- Do you snore?
- Do you gasp for air?
- Do you have morning headaches?
- Do you have trouble concentrating?
- Do you have difficulty falling asleep or staying asleep?
- Do you have a creepy, crawly, tingly or burning feeling in your legs at night?
- Do you wake up in the middle of the night with heartburn?
- Do you feel anxious or depressed at times?
Your Sleep Study
What to expect

1. Patient arrives
2. Electrode application
3. Head electrodes
4. Body electrodes
5. Lights out
6. Tech monitors patient
7. Patient sleeping
8. Lights on
9. Patient leaves
Sleep Disorders

- **Insomnias**
  Difficulty initiating and maintaining sleep

  "No wonder you have insomnia... lying there awake all night."

- **Hypersomnias**
  Disorders of excessive somnolence
Sleep Disorders

• Parasomnias
  Episodic behavioral manifestations in sleep

• Disorders of the sleep-wake schedule
Examples of Parasomnias

- Rhythmic behaviors (body rocking, head banging)
- Bruxism (teeth grinding)
- Enuresis (bedwetting)
- Night Terrors
- Sleep walking
- Talking while sleeping
- REM Sleep Behavior Disorder
Symptoms of Sleep Apnea

- Disordered sleep, snoring, agitation
- Morning headaches, nausea, and sore throat
- Daytime sleepiness (prolonged unrefreshing naps, difficulty staying awake while sitting)
- Rapid changes in personality (irritability, mood swings)
- Cognitive deficits (alertness, processing speed, attention, memory problems and IQ decline)
Brain works while we sleep

- REM sleep and memory consolidation
- All-nighters will negatively impact frontal lobes (EFs) and memory functioning
- EF skills, such as creativity, planning, problem-solving
- Vulnerable areas: math, sciences, oral presentations, debates, etc.
Greater impact: creative, divergent and innovative aspects of thinking.

Less impact: convergent and rule-based reasoning, decision making and planning tasks.

Some aspects of higher level cognitive capacities remain degraded by sleep deprivation despite restoration of alertness and vigilance with stimulant countermeasures.
Brain Activity During Sleep

Red & Yellow areas: active
Blue areas: less active
Rested vs. Sleep Deprived Brain

Well rested brain (top) shows greater activity on fMRI scan during an attention task than a brain after 24 hours of sleep deprivation.
Brain Activity in ADHD

Control Subject

ADHD Subject
Delayed brain maturation in ADHD

From Shaw P. et al., (2007)

Ns: ADHD=223; controls = 223
Metaphor for Executive Functions (EF)

EFs are the **brain’s conductor**, which instructs other regions to perform, or be silenced, and generally coordinates their synchronized activity *(Goldberg, 2001)*.
Definition of EFs

Meta-Cognition
- Initiate
- Plan/Organize
- Monitor
- Organization of Materials
- Working Memory
- Initiate

Behavioral Regulation
- Emotional Control
- Shift
- Inhibit
Behavioral Definitions for EFs

- **Inhibit**: Control impulses; stop behavior
- **Shift**: Move freely from one activity/situation to another; transition; problem-solve flexibly
- **Emotional Control**: Modulate emotional responses appropriately
Behavioral Definitions for EFs

- **Initiate**: Begin activity; generate ideas
- **Working Memory**: Hold information in mind for purpose of completing a task
- **Plan/Organize**: Anticipate future events; set goals; develop steps; grasp main ideas
- **Monitor**: Check work; assess own performance
Methods of Assessing EF

Micro
Genetics

Structural & Functional Imaging

Performance Tests
Goal: Count the number of moves

Problem: Inhibit, Shift, Emotional, WM, Plan/Org, Materials, Monitor

Macro
Observations
EF performance tests

- **Grouping/sorting tests**: categorization, concept formation, classification & judgment
- **20 questions**: concept formation
- **Tower tests**: inhibition, planning & problem solving
- **Stroop tests**: inhibition & cognitive flexibility
- **Fluency tests**: categorization and fast retrieval
- **Trail-making tests**: scanning, sequencing, speed
- **Proverb tests**: abstraction
- **Theory of Mind** (Baron-Cohen): perspective taking
EF Help: The Basics

- Pay close attention to emotional and behavioral responses to assigned tasks once you know EF weaknesses (e.g., initiation, shifting, organization).

- *Task avoidance*- consider possibility cannot do it given EF struggles or delays.

- *Essential* to figure out what EF’s task requires and ask yourself whether the person possesses these skills (e.g., initiation and sequencing/working memory; managing social conflict).
Foundation for Intervention

- Begin by *developing a relationship* with the person that is emotionally supportive.
- Emphasize that you *want* the person to succeed (e.g., build self-esteem & resiliency).
- Help the person to *understand their struggles* and that there are strategies they can use to improve performance.
- Underscore that it is *not* an ability issue, but a problem with performance.
Solutions to ADHD Sleep problems

Adjust ADHD Medication
Solutions to ADHD Sleep problems

Stick to a Sleep Schedule 7 days a week

Wake up and go to bed at the same time every day
Solutions to ADHD Sleep problems

• **Exercise**: boosts the effect of natural sleep hormones like melatonin. Morning is ideal, not 2-3 hours before bed.

• **Reserve bed for sleep and sex**: keep electronics out of bedroom.

• **Keep environment comfortable**: quiet, dark & cool environment, examine location of bed, comfortable pillow & bedding, use white noise or ear plugs.
Solutions to ADHD Sleep problems

**Start a sleep ritual:** signals the body and mind that it’s time for sleep (e.g., glass of warm milk, bath, calm music).

**Do not nap:** Can interfere with restorative value of night-time sleep.

**Eat**- but not too much: small healthy snack

**Avoid alcohol, caffeine and tobacco:** wine and chocolate should not be a bedtime snack- both act as stimulants. Also, avoid acidic foods that cause heartburn.
Solutions to ADHD Sleep problems

- **De-stress**: daytime worries can surface at night and stress is a stimulant. Learn relaxation (breathing, mindfulness, yoga).

- **Limit time spent in bed**: If cannot fall asleep get up and start routine again.

- **Get checked**: an urge to move your legs, snoring or a burning pain in your stomach are symptoms of 3 common sleep disrupters - restless leg syndrome, sleep apnea and GERD.
TECHNOLOGY affects SLEEP

Gone are the days when all a bedroom contained was a bed, clothes and a few personal items. Modern bedrooms are now filled with a range of technology and gadgets, which means we have got constant access to our phones, tablets, games and more. But how does all this modern technology affect our sleeping patterns? Find out with our infographic.

According to a National Sleep Foundation study...

- 60% of 13-64 year olds experience problems sleeping
- 63% of those surveyed did not feel they get enough sleep
- 15% of 19-64 year olds get less than 6 hours on weeknights
- 95% use electronics in the hour before they went to sleep
Why No Electronics?

Small electronic devices emit sufficient light to miscue the brain and promote wakefulness.

Using electronics as sleep aid to relax leads to later bed time, less sleep, and increased fatigue.

Having TV in bedroom causes later bedtimes, more difficulty initiating sleep, and shorter total sleep times.

Texting and emailing in bed, even once per week, dramatically increases self-reported daytime sleepiness.
But what about...

The Best Sleep Apps for ADHDers
Where to start if you think you may have sleep problems?

- Talk to your physician and report any sleep concerns
- Keep sleep log
- Request a sleep study
- Obtain comprehensive neuropsychological assessment to help determine source and severity of problem (sleep deprivation? ADHD?) and to help at work, school and home.
References

- National Sleep Foundation
- American Academy of Sleep Medicine
- American Sleep Apnea Association
- American Association of Respiratory Care
- Society of Behavioral Sleep Medicine
- National Resource Center for ADHD
- Workplace Strategies for Mental Health
THANK YOU!
You’ve made an important first step for yourself and/or your child...

...you’ve started searching for help with frustrating and overwhelming issues in your life. We’re here to help sort through the confusion.

Through our assessment process, CNLD’s expert staff can identify specific barriers to success and will develop an intervention plan, custom-built for you.

What sets us apart from other options?

Who Do We Help?
Our clients come from all stages of life. We like to say we see children from ages 2 through 92.
Read more...

Why Come to Us?
We are known for our work with complex cases. We specialize in helping our clients understand both their strengths and weaknesses so that frustrations can be minimized.
Read more...

Did You Know?
Every thought and action is controlled by the brain — the body’s most complex organ. The brain is divided into functional units with particular tasks, like processing visual information.
Read more...

Think critically: Intelligence plus character – that is the goal of true education. ~ Martin Luther King Jr.
Center for Neuropsychology, Learning & Development

Neuropsychological services for complex cases

- Expert diagnostic skills
- Personalized intervention plans
- Advocacy at school or the workplace
- Therapy for children, teens, adults, & families
- Testing for kids ages 2-92
- Current research posted on Facebook, Twitter, LinkedIn
- More than 22 years of helping in the Ann Arbor community
- A NEW look for our website CNLD.org