

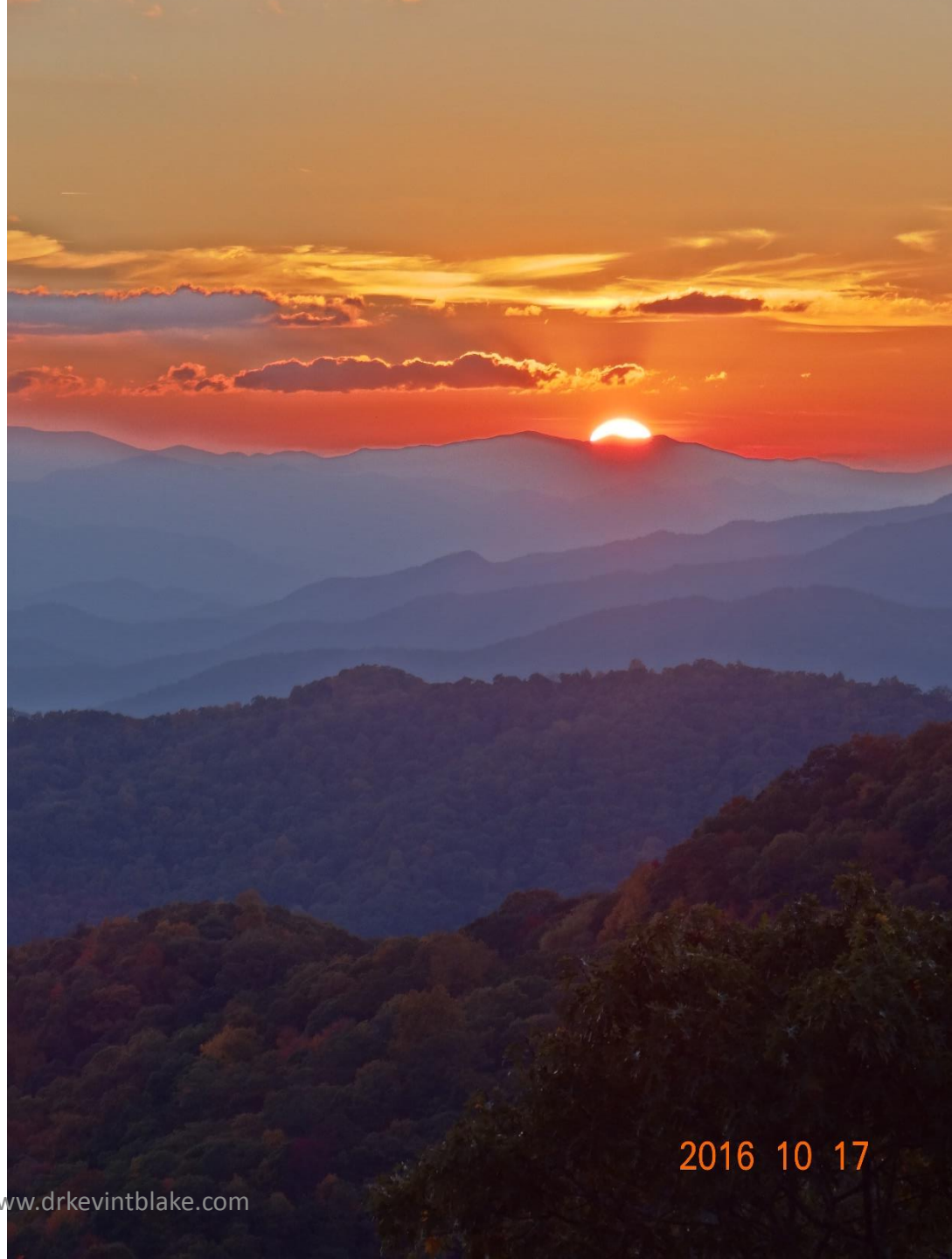
Executive Dysfunction In Adults: Strategies at Home and at Work

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Announcements, Disclosures and Paperwork



Executive Function & Phineas Gage



2014 03 19



Phineas Gage

- **Vermont, 1848 was 25 year old railroad working tamping gun powder in a drilled hole in rock excavation.**
 - **Explosion forced 3 foot iron rod through his left cheek and out the top of his skull.**
 - **Lost his left eye, but not consciousness; no focal neurological deficits; left facial weakness.**
 - **Massive personality change:**
 - **Prior to accident was, “the most efficient and capable foreman”**
 - **After accident was childish, obstinate, could not control his desires, his friends did not consider him to be Phineas Gage.**
 - **He had problems with short-term memory, motor attention and inhibitory control.**
- Odriscoll and Leach (1998)**
- **Damage to right & left prefrontal lobes = Problems with rational decisions and processing emotion**

--Damasio, et al. (1994)

What is Executive Function (EF)?

Executive Function Defined

Denckla defined executive functions as, “...the proactive elements of interference control, effortful and flexible organization, and strategic planning—that is, anticipatory, goal-oriented ‘preparedness to act.’ Executive function also may be construed to include working memory..., highlighting as it does the elements of delay between stimulus and response or maintenance of internal representations to guide actions” (p. 117-118).

--Denckla, M.B. (1994)

When You Have to Use EF

- **Those that involve planning or decision making.**
- **Those that involve error correction or troubleshooting.**
- **Situations when responses are not well rehearsed or contain novel sequences of actions.**
- **Dangerous or technically difficult situations.**
- **Situations that require the overcoming of a strong habitual response or resisting temptation.**

--Goldstein, S. (November 9, 2017)

Frontal Lobes

- In humans, a disproportionate expansion the frontal lobe.
- Prefrontal Cortex key player in vast networks of associative areas
- These areas also include the inferior parietal and anterior temporal regions
- Up to 40 times larger in humans than in macaques
- It allows us to read
- They allow us to transmit knowledge to younger generations

--Dehaene (2009)

Theories of Executive Function

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Baddeley's Executive Function Theory

“The term working memory refers to a brain system that provides temporary storage and manipulation of the information necessary for such complex cognitive tasks as language comprehension, learning, and reasoning. This definition has evolved from the concept of a unitary short-term memory system. Working memory has been found to require the simultaneous storage and processing of information. It can be divided into the following three subcomponents...” (p. 556).

Baddeley's Executive Function Theory

- **Central Executive:** “The central executive, which is assumed to be an attentional-controlling system, is important in skills such as chess playing and is particularly susceptible to the effects of Alzheimer's disease; and two slave systems, namely...” (p. 556).

Baddeley's Executive Function Theory (Cont'd)

➤ **Phonological Loop: “The phonological loop, which stores and rehearses speech-based information and is necessary for the acquisition of both native and second-language vocabulary” (p. 556).**

➤ **Visual-Spatial Sketchpad: “...which manipulates visual images” (p. 556).**

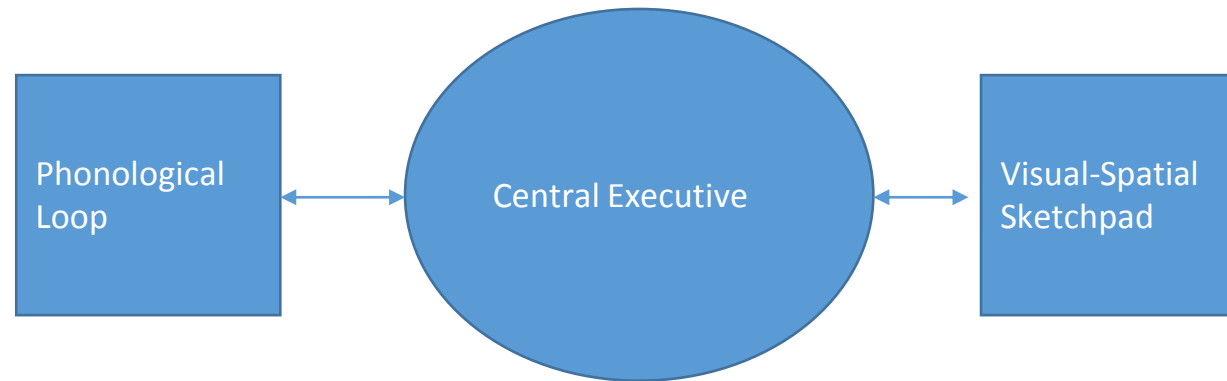
--Baddeley (1992)

Baddeley's Executive Function Theory (Cont'd)

These systems, “...allow humans to comprehend and mentally represent their immediate environment, to retain information about their immediate past, to support the acquisition of new knowledge, to solve problems, and to formulate, relate, and act on current goals”(p. 28).

--Baddeley (1992)

Baddeley's Executive Function Theory (Cont'd)



--Baddeley (1992)

Summary of Barkley's Theory Of Executive Function

Step 1: *Response Delay*

Step 2: *Prolongation*

Step 3: *Rule Governed Behavior*

Step 4: *Dismemberment of the Environment*

--Barkley (2006); (2007)

Barkley's Hierarchy of Executive Capacities

- **Spatial: Spatial distance to achieve goal & means to attain it**
- **Temporal: Time event horizon**
- **Motivational**
 - **Hot: Emotional**
 - **Cold: Informational**
- **Inhibitory: Capacity to restrain action**
- **Conceptual/Abstract: Abstractness of rules being considered**

Barkley's Hierarchy of Executive Capacities

- **Behavioral-Structural: Motor consequences and behavioral complexity to achieve a goal over time**
- **Social: Cooperating with others to achieve goal**
- **Cultural: The degree that one's culture plays a part in attaining a goal (p. 68-70)**

--Barkley (2012)

Definitions of Executive Function

Executive Function Defined

“Executive functioning is a higher level psychological process responsible for cuing, directing and coordinating multiple aspects of perception, cognition, emotion, and behavior during purposeful, goal directed, problem solving behavior” (p. 29).

--Dehn (2014)

Naglieri & Goldstein's Definition of Executive Function

“Executive Function is how efficiently you decide what to do.”

--Naglieri, J.A. et al. (2012); Goldstein, S. (November 9, 2017)

“Executive Function”

- **1. Set goal; 2. gather info; 3. rate routes; 4. select route; 5. monitor; 6. change route; 7. solution**

--Naglieri, J.A. et al. (2012)

- **Those that involve planning or decision making.**
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--Goldstein, S. (November 9, 2017)

When You Have to Use EF

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--Goldstein, S. (November 9, 2017)

Brain Areas Involved in EF

2014 12 27

Brain Areas Involved in EF

- **Prefrontal Cortex**
- **Basal Ganglia**
- **Amygdala**
- **Limbic System**
- **Cerebellum**

Barkley (2012)

--

- **Prefrontal, subcortical and brain stem**
 - **Dorsolateral Prefrontal Cortex – Integrates behavior and cognition**
 - **Anterior cingulate cortex**
-- emotional drives decision making and inhibition
 - **Orbital prefrontal cortex-maintenance of set, monitor of behavior for appropriateness**
--Goldstein, S. (November 9, 2017)

The Cerebellum, Executive Function & AD/HD

“One such area is the cerebellum which contributes not only to motor coordination, but also to language, verbal working memory, processing of emotions, and other executive functions. Structural abnormalities have been found in the cerebella of persons with ADHD” (p. 28).

--Brown (2013)

The Cerebellum & Social Interaction

“The Cerebellum has only recently been implicated in the normal functioning of social behavior...new research has shown that the cerebellum is important as a mediator in cognition. To perceive an object or event, we must pull together the various sensory qualities and any relevant memories or thoughts in a carefully timed way...the cerebellum assists in delaying or accelerating these associations, and regulates attentional states...”

The Cerebellum & Social Interaction (Continued)

“...Coordinating associations and attention is essential to entering into a relationship with another human being. Communication, conversation and graceful social interaction all depend on being able to pay attention to another person and to one’s own internal states and to alternate easily back and forth between them.” (p.305)

--Ratey (2001)

Adolescent & Adult Brain Development and EF



Adolescent Brain Development

- **The Prefrontal Cortex and its connections undergo very significant changes during adolescence.**
- **These changes underlie important cognitive developments.**
- **Prefrontal Cortex development is variable across adolescents and adults; some people never attain what might be called “mature” frontal lobes (i.e., adults with AD/HD).**

--Turkstra, L.S. et al. (December 1, 2010)

Processing and Speed Executive Function Development During Adolescence

- **Processing speed increases significantly due to brain myelination and significant increase of gray matter volume development. These changes are as sweeping as are seen in children in the first two years of life. Hormone and environmental changes are particularly important during brain development in adolescence.**
- **“Executive function sees selective attention, decision-making and response inhibition skills, along with the ability to carry out multiple tasks at once, might improve during adolescence...Different aspects of executive function, therefore, may have different developmental trajectories.”**

--McCalla, A. (December 11, 2017)

Down Turn in Executive Function in Adolescence

Around age 12 to 13 puberty starts and there is massive amounts of new synapses created and myelin laid down. Executive function abilities initially blossom, but between ages 15 and 17 they tend to deteriorate to prepubescent levels, because the signal to noise ratio between needed new synapses and unneeded ones is out of balance. Eventually, by about age 27 to 30 the pruning of unneeded synapses is back in balance and adult level executive function is typically achieved.

--McCalla, A. (December 11, 2017)

Executive Function Adolescent Development

- **Around age 12 there is an increase in goal setting abilities.**
- **Between ages 11 and 15 there is a significant increase of planning abilities. This is when girls executive function exceeds boys.**
- **Age 14 working memory starts to increase.**
- **About age 15 shifting attention, inhibition and working memory approaches adult levels. Planning skills reach adult levels, but pros are given more weight than cons.**
- **As the individual reaches about 19 more weight given to cons and reward system more adult-like.**
- **16 year olds do not have adult working memory spans.****

--McCalla, A. (December 11, 2017; Elif, I. et al. (May 27, 2015)**

Difference Between Well Developed Adult Executive Function and Adolescent Executive Function

“Though, the teen is functioning at or near adult levels, their self-monitoring and self-reflective abilities are not fully mature. Further, when placed in highly complex situations or a situation in which one is required to integrate numerous pieces of information to make an informed decision, the teen will show shortcomings. They tend to base decisions on the advantage of a given situation versus the disadvantages.

Decisions and actions are based on the specific moment and do not consider the long-term consequences, rather making decisions based on their view of themselves at the moment and how they will be perceived by outsiders.”

--McCalla, A. (December 11, 2017)

Older Adult EF Development



Older Adults and EF Development

- **Short-Term memory peaks at age 25 to 30.**
- **People in their 80s tend to have lower IQs due to slower processing speed, lower performance on visual tasks and reduced perceptual reasoning. Verbal comprehension and working memory tend to be intact.**
- **They have difficulty switching attention and slower on selective attention and more like young adults on vigilance.**
- **Higher cognitively functioning older adults were typically higher cognitively functioning younger adults.**
- **From middle adulthood EF, memory and attention decline.**

--Princiotta, DeVries, and Goldstein (2014)

Older Adults and EF Development

- **The prefrontal cortex is vulnerable to aging. This is one of the first areas to show degeneration due to age.**
- **The prefrontal cortex, cerebellum, and basal ganglia suffer loss of total volume due to reduction of myelination of these brain regions.**

--Princiotta, DeVries, and Goldstein (2014)

- **Older adults with EF difficulty will have significant difficulty with slow gait when walking over obstacles (i.e., degree of locomotion + sensory adaptation to complete task). They also have difficulty performing tasks of everyday living.**
- **Older adults walk slower when carrying a package when they have good EF. Connection of EF and walking speed found earlier.**

--Coppin (November, 2006)

Assessment of Executive Function



Assessment of Executive Function

- **Every assessment needs:**
 - **Standardized testing of psychological processing**
 - **Informal methods**
 - **Observations**
 - **Interviews**
 - **“Assessment of attention and executive functions depends heavily on the use of rating scales, as direct measurements of these processes are limited” (p. 213).**

--Dehn (2014 A)

Abilities Accessed by Executive Function

- **Attention**
- **Emotional Regulation**
- **Flexibility**
- **Inhibitory Control**

--Goldstein, S. (November 9, 2017)

- **Initiation**
- **Organization**
- **Planning**
- **Self-monitoring**
- **Working Memory**

EF Assessment Instruments

- **Adult Executive Functioning Inventory (ADEXI)**
- **Behavior Rating Inventory of Executive Function—Adult Version (Brief-A)**
- **Executive Skills Questionnaire — Adults**
- **NIH Toolbox Cognition Batteries:**
 - <http://www.healthmeasures.net/explore-measurement-systems/nih-toolbox/intro-to-nih-toolbox>
 - <http://www.healthmeasures.net/explore-measurement-systems/nih-toolbox/intro-to-nih-toolbox/cognition>
 - http://www.healthmeasures.net/images/nihtoolbox/NIH_Toolbox_brochure_June_2017.pdf
- **Barkley Deficits in Executive Functioning – Children and Adolescents, Daily Activities (BDEFS-CA)**
- **Barkley Deficits in Executive Functioning Scale (BDEFS for Adults)**
- **Comprehensive Executive Function Inventory Adult (CEFI Adult)**
- **NIH Toolbox Cognition Battery (NIHTB-CB)**
- **WAIS-IV**
- **WJ-IV Cognitive Battery**

Negative Influences On Executive Function



Negative Influences of Executive Function

- **“People with ADHD, depression, learning disabilities, and autism often have difficulties with executive function. Alzheimer’s disease or brain damage (for example from concussion or stroke) can also affect executive function. Some research has found an association between OCD and problems with executive function.**
- **People with no executive function impairment can experience temporary problems. For example, being overly stressed, sad, or sleep-deprived can hinder a person’s executive function ability”.***

--American Psychiatric Association (January 19, 2017)*; Diamond (September, 27, 2012)

Diamond's Literature Review of EF

- **Good EF in childhood-Typically will have it through life**
- **EF can be taught throughout life and practice can improve it**
- **Predicts: achievement, quality of life, physical and financial health**
- **Fluid Intelligence (decision making/problem solving) can be taught and practice can improve it**
- **Interference Control (selective attention/inhibition) may be he part of EF that protects what is in working memory**
- **Sleepiness, loneliness, and lack of fitness can hurt executive function**

--Diamond (September 27, 2012)

Interventions for Executive Functions



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Teaching Executive Function

Goldstein (2017) states, “Children can be taught to be more strategic.” Or, more efficient with executive function. He went on to say this is also true throughout the lifespan.

--Goldstein, S. (November 9, 2017)

Interventions for Executive Functions

- **Teach Self-Monitoring and Self-Talk**
- **COGMED**
- **Teach Metacognitive Strategies, Planning and Decision Making**
- **Teach Multisensory Memory**
- **Associate things to remember with familiar place-Loci**
- **Goldstein (2017) states, “Children can be taught to be more strategic.” Or, more efficient with executive function.**

--Dehn (2014 A); Goldstein (November 9, 2017)

Coaching and Executive Functioning

- **Coaching can work to relieve executive function difficulties in adolescents.**
- **Coaching is more directive than counseling/talk therapy.**

--Goldstein, S. (November 9, 2017)

Helping with Executive Function Difficulties

- **Cognitive Behavioral Therapy (CBT): “Stop, Look, Listen”**
- **Must teach at the point of performance.**
- **“A strategy is a procedure that a learner uses to perform a task.”**
- **It is thinking, “how do I accomplish what I want to do.”**
- **Practice, practice, practice...until it is automatic**
- **Teach “Metacognition”, Thinking about thinking”, this works with everyone.**

--Goldstein, S. (November 9, 2017)

Interventions for Executive Dysfunction

➤ Guiding Principals:

- Automatize new behaviors-habits
- Self-Awareness-strengths & weaknesses
- Teach goal setting, planning and review

➤ Organization & Planning:

- One master schedule (or, 1 @ home, 1 @ work/school) (paper/digital)
- Keep all notes in one place

➤ Clutter Control:

- Everything has a “home”
- Rules for how long you keep things
- “Touch it once”
- Schedule organization times

➤ Financial Organization:

- ID problem areas
- Set short, mid, and long-term \$ goals
- Learn where \$ is going and keep track of it

Interventions for Executive Dysfunction

- Automatic payments, etc.
- Make “habit”
- **Time Management:**
 - Learn how long you can work without distraction
 - Set goal of time you will work without distraction
 - ID distractors in work environment & get rid of them
- **Getting Projects Done:**
 - **Set goal;**
 - Use S.M.A.R.T. (Specific, Measurable, Attainable, Relevant & Timely) create “to do list”, to understand task and required outcome.
 - **Process:**
 - Write down all steps
 - Determine realistic amount of time needed for each step
 - Set priorities and schedule time for each step
 - Start working plan and monitor progress

Interventions for Executive Dysfunction

➤ **Healthy Living:**

- **Good sleep every night**
- **Good diet; no excesses**
- **Weekly exercise plan-possibly develop with physician's help**
- **Allow for rest and relaxation-learn relaxation technique (automatize)**
- **Monitor mood; if bad 2 weeks get help**

➤ **Adaptive Thinking:**

- **Monitor & chart negative and positive self-talk**
- **Learn to counter negative self-talk with positive**
- **Practice relaxation technique**
- **Automatize**

--Jennings, and Nqugen (August 27, 2014)

Memory Difficulties



Memory Problems Everyone Has

- **Transience: problems accessing memory over time**
- **Absent-mindedness: lapses in attention**
- **Blocking: tip of the tongue experience**
- **Suggestibility: the incorporation of misinformation into memory**
- **Bias: altering memory to fit beliefs**
- **Misattribution: believing you heard something you didn't.**

Murray, B. (October, 2003); Schacter, D. (2001)

Memory Disorders

Dysnomia:

- **“...is a word-finding problem in remembering and expressing words.” (p. 373)**
- **“Dyslexic people are slower at naming series of various types of familiar stimulus items—objects, colors, numbers, letters.” (p. 29)**
- **This is part of the Rapid Automatized Naming Deficit, or “Double Deficit” of SLD-dyslexia.**

Lerner, J. (1997); Clark, D.B. (1988); Wolf, M., and O’Brien, B. (2001)

Two General Memory Systems

- **Declarative Memory**: Remembering the what, i.e. Facts and Events
- **Procedural Memory**: Knowing how to do something
- Proficient Reading is a skill and is a product of procedural memory.
- With procedural memory robust gains in knowledge are made after training is terminated.
- Train until the person's new behavior plateaus, stop training then allow to sleep. The next day they will have improved behavior and less errors.

Two Memory Systems (Continued)

- **This will not happen if the person is not allowed to sleep and/or if they are then taught a competing task.**
- **If the training situation is considered novel, learning will continue to increase.**

Karni, A. (November 3, 2004); Karni, Tanne, Rubenstein, Askensay, and Saji, (1994)

Sleep and Memory

- **“...sleep allows us to process and retain new memories and skills.” (p. 58)**
- **Deprive sleep/block training improvement in skill**
- **“Evidence for sleep’s effect on declarative memory is much weaker than its effect on procedural memory.” (p. 59)**

-- Strickgold, R., et al. (January 28, 2013); Winerman, L. (January, 2006); Stickgold, R. (2005)

Working Memory



Executive Function Memory Problems

- **Working Memory:**
 - **“...denotes a person’s information-processing capacity” (p. 4-5)**
 - **Is the “memory buffer in the brain.”**
 - **It allows for “theory of mind.”**
 - **“Remembering so as to do.”(non-informational)**

**Wechsler Adult Intelligence Scale- Third Edition, Wechsler Memory Scale-Third Edition (1997);
Brown, T. E. (October 11, 2001); Frith, C. D. and Frith, U. (1999); Barkley, R.A. (2008).**

Possible Working Memory Computer Training Programs

Working Memory Training:

- **Cogmed:**
www.cogmed.com
--Klingberg (February, 2006);
Barkley, (February, 2006); Ingersoll
(October 26, 2006)
- **Posit Science:**
www.positscience.com
- <https://www.brainhq.com/>
--Smith et al. (2009)

Literature Review of Working Memory Training:

It only works to train the person how to do better with the training program. It does not generalize.

--Shipstead, Redick, and Randall (2012)

Richard Abby on Working Memory

- **WM is the best predictor of academic success:**
 - **Reading Comprehension, Math Word Problems, Computation, Verbal Mediation, Complex Reasoning and Inhibition**
--Abby (2014)

- **Rehearsal is best for temporary storage**
- **When item in WM is lost it cannot be recovered.**
- **80% with working memory problems have significant difficulty with reading, or math, or both**

Richard Abby on Working Memory

➤ Things that disrupt Working Memory:

- Background noise
- Distraction
- Switching Attention
- Too much information to encode by rote
- Too much mental manipulation required to retain information
- Never encoding it into Long-Term Memory

➤ What helps Working Memory:

- Silent environment
- White noise
- Repeat over and over by rote
- Associating it with something in Long-term memory
- Rhyming, Mnemonics, chunking.

--Abby et al. (October 27, 2010), (November 12, 2014)

Aids for Working Memory



Techniques that Help Memory

- **Periodically testing ones memory of things one wants to remember to weed out poor techniques**

--Anderson, A. (January/February, 2011)

- **“Self-Imagining” in a made up story of the content you want to remember (episodic memory)**

--Grilli, and Glisk (August 5, 2012)

Working Memory Interventions

➤ Teach

- N-Back
- Chunking
- Rehearsal
- How to ask for help

➤ Reduce Cognitive Load

- Match amount of information to WM limit
- Repetition, Repetition...
- No multitasking
- Provide memory prompts

➤ Reduce Cognitive Load

- Self-paced learning
- Allow extended time
- Provide note taker/recorder
- Stay on topic
- Use only Key examples
- Allow step by step directions on desk

--Dehn (2014 A)

Treatments For Memory Disorders

- Mnemonics-memory tricks
- Diaries and Social Statements
- Check for sleep disorders.*
- Nootropic Medications

Nosek (1997); Smith, and Godfrey (1995); Barkley (1998); Fawcett (October 29, 2010); Goldstein, and Goldstein (1997)

- www.doctormemory.com
- Doctor memory
- Lucas, J. and Lorayne, H. (1974). The Memory Book. New York, NY: Ballantine.

Technology for Memory Difficulties

- Watchminder 2:
www.watchminder.com/
- Record lectures with a digital device
- Time Management Organizer
www.FranklinCovey.com
- Professional Organizer:
www.napo.org
- California Closets:
www.californiaclosets.com
- Rolodex Organizer:
www.franklin.com
- Livescribe Smartpen:
www.livescribe.com
- Brookstone Wireless Keyfinder:
www.brookstone.com/Wireless-Key-Finder.html
- Get 168 hour desk blotter

Professionals Who Can Help with Memory

- AD/HD Coaches: www.addbrain.com
- Professional Organizers: www.napo.net
- Psychiatrists: www.apa@psych.org
- Psychologists: www.apa.org
- Masters Level Counselors: www.nbcc.org
- Social Workers: www.naswdc.org
- Behavioral Neurologists: www.anpaonline.org
- Speech-Language Pathologists:
www.professional.asha.org
- Association for Persons in Supported Employment (APSE): www.apse.org

Anxiety & Executive Function



Working Memory & Anxiety

- **“Acute stress can almost halve a person’s mental capacity.”**

--Klingberg (2013)

- **Anxiety can significantly reduce working memory capacity**
- **Verbal IQ can go down 20 points with anxiety**
- **Working Memory is connected to Impulse Control**
- **First grade anxiety predicts Fifth grade anxiety**
- **As anxiety goes up the ability to initiate new activities goes down.**

--Minahan (November 12, 2014)

Working Memory & Anxiety

Problem Times for Anxious People

- **Unstructured Time**
- **Writing Tasks**
- **Transitions**
- **Unexpected Changes**
- **Social Demands**

--Minahan (November 12, 2014)

Teach

**Emotional
Thermometer
(Body Sensation)**

**Self-Monitoring, Practice
Relaxation**

**Collect Calming
Activities**

Attention-Deficit/Hyperactivity Disorder

ADHD is NOT new!

In 1775 Melchor Adam Weikart, of Germany described a syndrome very similar to AD/HD. He recommended horseback riding and exercise as treatment.

--Barkley (2012)

Brain Areas Associated with AD/HD

Neuroimaging of AD/HD Findings

- **Frontostriatal dysfunction**
 - **Anterior cingulum**
 - **Prefrontal cortex**
 - **Orbital prefrontal cortex**
 - **Superior parietal regions**
 - **Caudate nucleus**
 - **Thalamus**
 - **Amygdala**
 - **Cerebellum**
- Kasperek et al (2013)

Impulsivity and The Medial Prefrontal Cortex

- **Impulsivity appears to be centered in the medial prefrontal cortex, dorsolateral prefrontal cortex, and the ventral striatum. These areas represent the daily-life system connected to reward related decision making.**
- **This area is probably dysfunctional in those with AD/HD, Parkinson's disease and pathological gambling.**

Executive function & The Adult with AD/HD

- **AD/HD adults do significantly worse than adults without AD/HD in overall EF and on speeded tasks.**
- **In AD/HD adults poor EF and performance on speeded task is related to symptoms of inattention.**
- **If the AD/HD adult has a tendency toward rapid incorrect response style it is related to hyperactive/impulsive symptoms.**

--Nigg, et al. (November, 2005).

AD/HD, Working Memory, & Reinforcement

- **When given standard intensity of reinforcement children with AD/HD have significantly more difficulty with central executive, short-term memory, and working memory performance than controls.**
- **High intensity reinforcement significantly improved working memory and short-term memory in AD/HD children, but not so much in controls. However the AD/HD children did not normalize.**

AD/HD, Working Memory, & Reinforcement

- **Motivational deficits negatively effect visual-spatial working memory and short-term memory in AD/HD children.**
- **There is a life long problem with working memory in those with AD/HD, however, the central executive difficulties abate somewhat**

--Dovis, et al. (2013)

--Alderson et al. (2013)

Neuropsychology & Persistent AD/HD

“These data confirm the presence of neuropsychological deficits in late childhood/early adolescence among those previously diagnosed with ADHD. The data also suggest that greater cognitive impairment is a feature of persistent ADHD” (p. 154).

--Robinson and Tripp (2013)

The Dismal 5



AD/HD & DSM-5©

In DSM-5© there is one type of Attention-Deficit/Hyperactivity Disorder and it is Attention-Deficit/Hyperactivity Disorder, Combined Type. Since DSM-IV© was published in 1994, longitudinal studies have found Attention-Deficit/Hyperactivity Disorder/Impulsive Type is the early manifestation of Combined Type AD/HD

AD/HD & DSM-5©

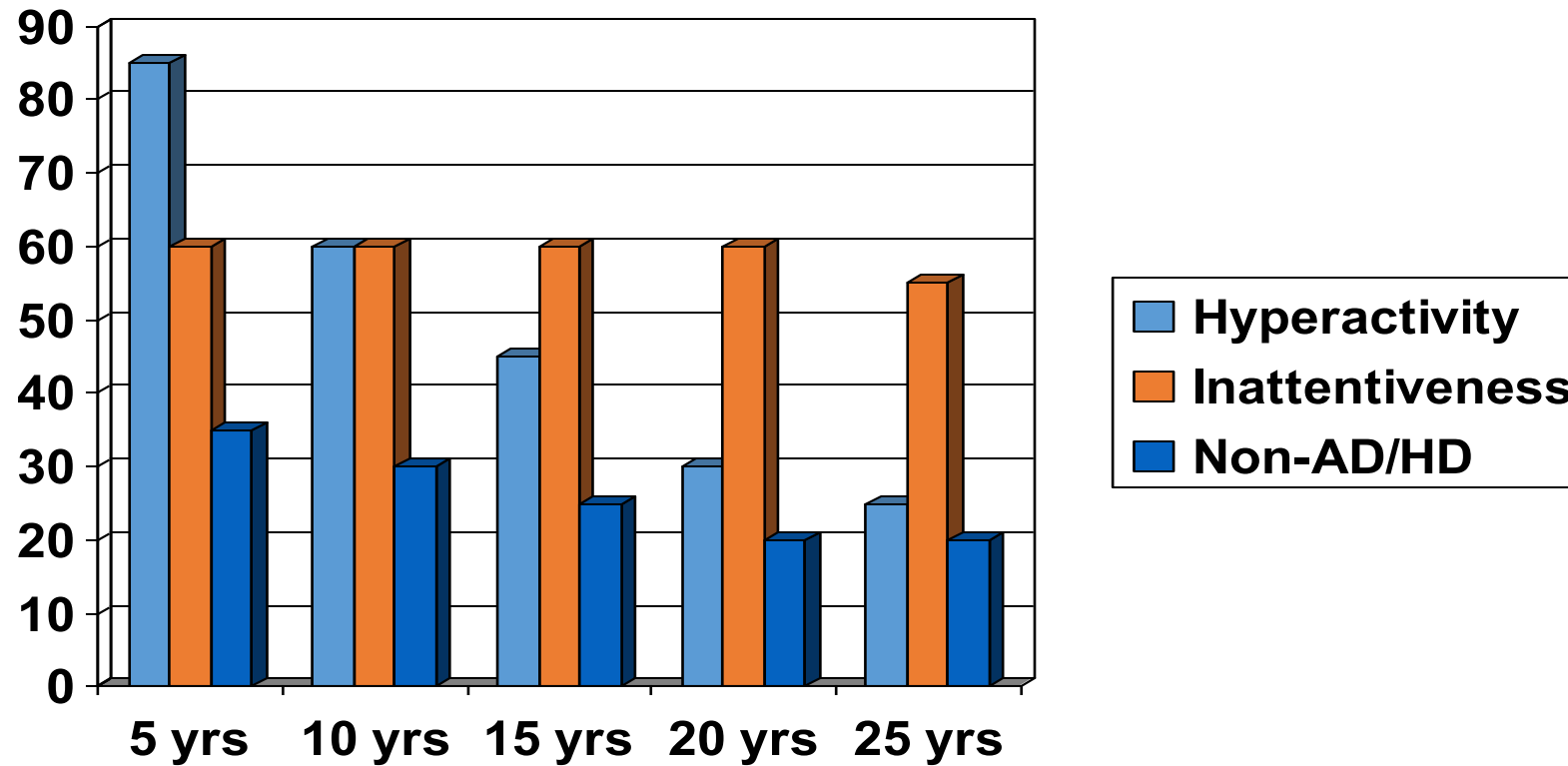
... in preschool and early grade school. As the child ages and his/her frontal lobe develops, they gain more control of their hyperactive motor movements and begin to appear as what was called (in DSM-IV© and DSM-IV, TR©) Combined Type. This process continues until their late 20's/early 30's when their frontal lobes are fully developed. By that time they appear to be the *Inattentive Type*...

AD/HD & DSM-5©

...when their current adult behavior is compared to their non-AD/HD peers. Remember, when you diagnose someone with AD/HD, you compare them to their non-AD/HD age peers.

--Swanson, Hinshaw, Hechtman, and Barkley (2012)

Longitudinal Studies of AD/HD



--Barkley, Murphy, and Fischer, M. (2008)

--Weiss, and Hechtman (1993)

Attention-Deficit/Hyperactivity Disorder, Inattentive Presentation (Restrictive)



Inattentive AD/HD?

What about Attention-Deficit/Hyperactivity Disorder, Inattentive Type? It is a separate and distinct disorder behaviorally, neuro-biologically and genetically from AD/HD. It is not included in the DSM-5. In research it may be referred to as AD/HD, Inattentive (Restrictive) Presentation, Sluggish Cognitive Tempo, Concentration Deficit Disorder and/or Crichton Syndrome.

--Author (2010) American Psychiatric Association. --Barkley, R. A. (November 9, 2012)

➤ **Sluggish Cognitive Tempo case difficulties in Executive Function, but they are different from those seen in AD/HD.**

--Goldstein, S. (November 9, 2017)

“Neurobiological”



What does *Neurobiological* mean?

- **Stephen Pinker – The Blank Slate: The Modern Denial of Human Nature or better stated, the Lie of the Blank Slate.**

Pinker, S. (2002)

- **AD/HD is not caused by child rearing practices or environmental experience.**

Barkley (2002)

- **65 to 75% of cases of Combined Type ADHD are caused by genetic anomalies.**

Barkley (2008)

- **These people are said to have developmental ADHD.**

Barkley (2008)

- **80 to 85% of the variance of those with developmental ADHD is genetic.**

- **I.Q. is 60 to 65% genetic.**

Barkley (2002)

Acquired ADHD

- **25 to 35% of cases of ADHD are acquired/caused by brain trauma**
- **15 to 25% of cases of ADHD are acquired/caused by pre-natal and perinatal brain injuries: Maternal smoking/drinking, premature birth, etc.**
- **3 to 7% of cases of ADHD are acquired/caused by post-natal brain injuries: head trauma, infections, tumors, lead poisoning, PANDAS, etc.**
- **Most of those with acquired ADHD are males.**
- **The male brain is more prone to injury and genetic difficulties than the female brain.**

--Barkley (2008)

Acquired ADHD

- **Most of those with acquired ADHD are males.**
- **The male brain is more prone to injury and genetic difficulties than the female brain.**

--Barkley (2008)

What does **Neurobiological** mean?

1. **Damage to different neural networks may cause AD/HD symptoms.**
2. **More commonly differences in Brain Development may cause them as well.**
3. **AD/HD, “...is a condition of the brain produced by genes.”**
4. **ADHD has multiple causes**

--Swanson and Castellanos (1998)

--Biederman (2006)

--Barkley (2008)

❖ **Russell Barkley, Ph.D. (2008) said regarding Combined Type ADHD, “You cannot train out this disorder, period!” He went on to say the counselor is a *shepherd* of a disabled person.**

--Barkley (2008)

Theories of AD/HD

Summary of Barkley's Theory Of AD/HD, Combined Type

Step 1: *Response Delay*

Step 2: *Prolongation*

Step 3: *Rule Governed Behavior*

Step 4: *Dismemberment of the Environment*

--Barkley (1997)

--Barkley (2006)

Barkley's 30%-40% Rule for Combined AD/HD

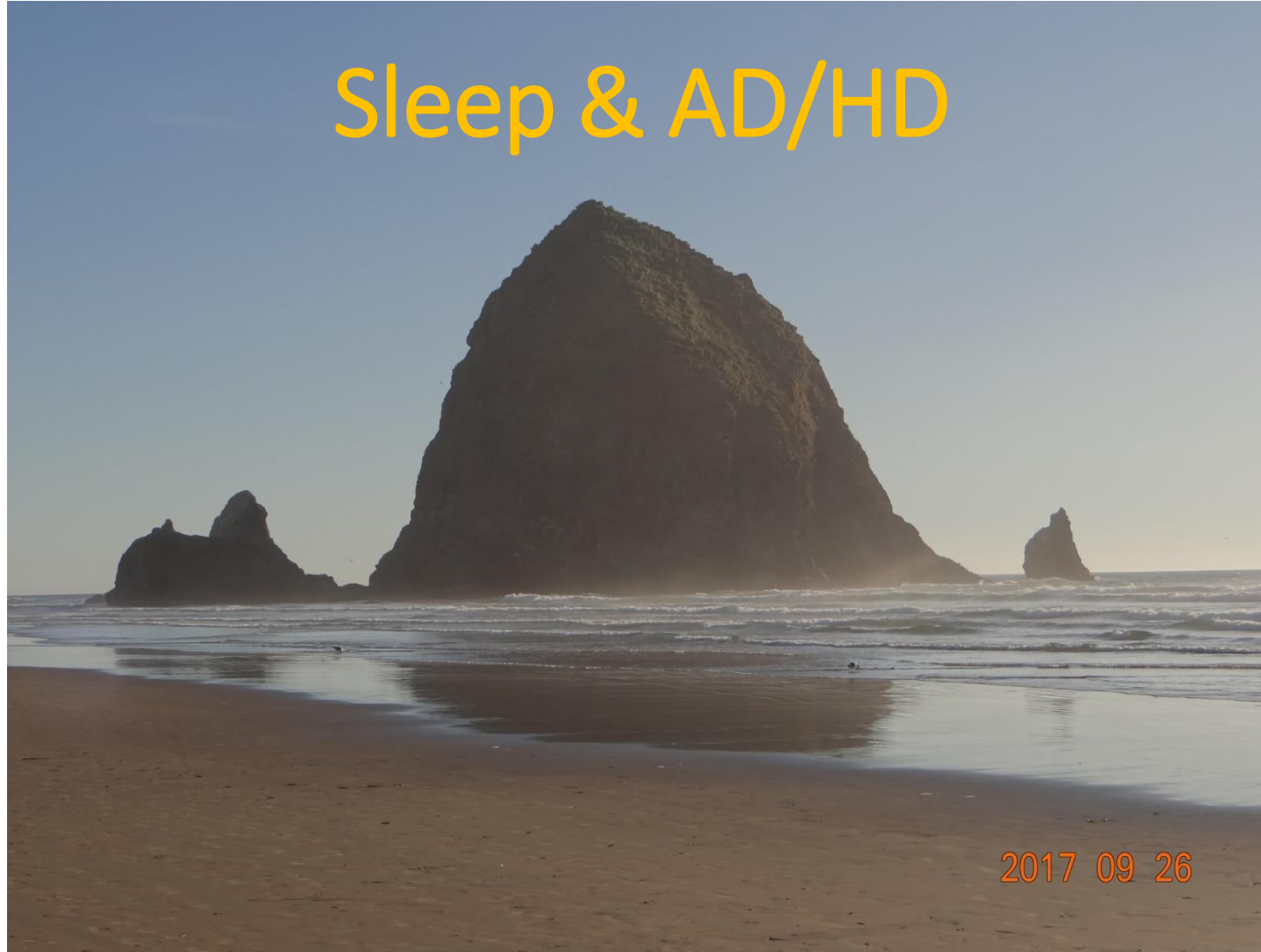
People with Combined Type AD/HD tend to be on average 30% - 40% less mature in controlling their hyperactivity, impulsivity, and inattentiveness than their non-disabled age peers.

--Barkley, R.A. (1998), (2008)

Warning for Health Class Instructors!

- People with AD/HD may have a ***significantly reduced life expectancy*** due to an impulsive lack of concern for health related issues, exercise, diet, drugs, etc.
--Barkley (1998), (2006)
- It is useful to spend significantly more time with them emphasizing the importance of good health and developing ways to ensure they follow through with annual check-ups, etc.

Sleep & AD/HD



AD/HD & Sleep

❖ Children with AD/HD:

- Up to 39% sleep walk
- 56% have trouble going to sleep
- Have fewer sleep hours than non-AD/HD children
- Have more movement during sleep
- Have more periods of sleepiness during the day

- Stimulant medications can lengthen sleep onset
- Sleep problems may exacerbate academic/work problems, but if academic/work problems not caused by Sleep problem, better sleep may not translate to fewer waking problems.

--Barkley (2012); --Craig, S.G., et al. (January 16, 2017)

AD/HD Treatment

Treatment of AD/HD

“ADHD is currently understood as a neurodevelopmental syndrome with symptoms that are highly heritable and neurobiological in origin. Pharmacotherapy stands alone as the single most efficacious treatment for ADHD for individuals of all ages. Medications, psychostimulants in particular are effective in reducing the core symptoms of inattention, hyperactivity and impulsivity.” (p. 3)

--Ramsay (2010)

- 1. Diagnosis**
- 2. Psychoeducation about AD/HD**
- 3. Medication**
- 4. Accommodation**

--Barkley (1998), (2006)

Your Tax Dollars at Work

The Multimodal Treatment Study of Children with Attention Deficit Hyperactivity Disorder

--Jensen, et al. (2001)

(MTA Study = Multimodal Treatment Assessment of AD/HD)

1999

The MTA Study

- **Mid-1990s**
- **579 AD/HD, Combined Type Children**
- **Demographics matched the 1990 US Census**
- **Randomly assigned to one of four groups**
- **After assigned to group each child was thoroughly reassessed to make sure they were AD/HD, CT**

The MTA Study

- **Group 1: “Experimental Medication”**
 - **Three medications used**
 - **Methylphenidate (Ritalin)**
 - **D Amphetamine (Dexedrine)**
 - **Pemoline (Cylert)****
 - **If medication one did not work or there was a side effect, changed to the next medication and so on.**
 - **Each month parent and child was seen by physician. Child checked for response to treatment and side effects. Each month questionnaires given to parents and teachers.**

The MTA Study

➤ **Group 2: Behavior Modification**

- **Parents taught how to use token economies at home and daily report cards, teachers taught how to teach AD/HD child, how to use token economies in the classroom, and daily report cards, AD/HD children were sent to special camp for AD/HD kids, parents and teachers given “800” number for consultation 24/7, continued on for 14 months!**

The MTA Study

- **Group 3: “Experimental Medication Plus Behavior Modification Group”**
- **Group 4: “Community Services”**
 - **The parents are told their child has Combined Type AD/HD and they are encouraged to go out to their community and get what services they want for their child...This was the “Control Group.”**
 - **Medication, aroma therapy, etc.**

MTA Study

- **Medication Management Treatment Group did best with a 50% decline in symptoms.**
- **Medication with Behavioral Modification Group did no better.**
- **Behavior Modification Group did better than placebo.**
- **Community Treatment had only a 25% decline in symptoms.**
- **Medication helps with social interaction.**

Author (December, 1999). A 14-month randomized clinical trial of treatment strategies for attention-deficit/hyperactivity disorder. The MTA Cooperative Group. Multimodal Treatment Study of Children with ADHD. Achieves of General Psychiatry, 56(12), 1073-1086.

Author (December, 2009). The Multimodal Treatment of Attention Deficit Hyperactivity Disorder Study (MTA): Questions and Answers. Bethesda, MD: National Institute of Mental Health (NIMH). From website: <https://www.nimh.nih.gov/funding/clinical-research/practical/mta/the-multimodal-treatment-of-attention-deficit-hyperactivity-disorder-study-mta-questions-and-answers.shtml>.

MTA Study

“In that study (MTA Cooperative Group, 1999) psychosocial treatment alone was very poor compared to medication effects and psychosocial treatment with methylphenidate was no better than methylphenidate alone...Medication was found to reduce negative social interactions both by the treated children and by their peers toward the child with ADHD.” (p. 55)

--Semrud-Clickman (2007)

AD/HD Response Rate to Stimulant Titration

“If methylphenidate (sic., Ritalin) is not effective or if there are side effects then the next alternative is dextroamphetamine (sic., Dexedrine)...If the diagnosis has been appropriately made, the response rate is about 80% to 96%.”

--Mahoney (2002)

“When the discussion is specifically reserved to symptom relief and impairment reduction for ADHD, this series of articles adds to an impressive body of scientific literature demonstrating that medication treatment, in the case of methylphenidate, is cost efficient and may be all that is needed for good responders.” (p. 3)

--Goldstein (December, 2004)

AD/HD Persistence in Follow-Up Study of Subjects from the MTA Study

Researchers recently conducted a follow-up study of the children, now adults (average age 25) who were in the MTA AD/HD study in the 1990's. They found those who persisted in their impairing AD/HD symptomatology in adulthood were the ones who had more symptom severity in childhood, more childhood comorbidities, and more parents with mental health issues than did non-persisters.

--Hecthman, R.A., et al. (November, 2016)

German MTA Study of AD/HD

- **The Cologne Adaptive Multimodal Treatment (CAMT) study of AD/HD initially found the same results as the American MTA study and at the 18 month follow-up.**
- **The same was true of the German's 8 year follow up.**

--Dopfner, M. et al (February 2015); Dopfner, M. et al. (July 22, 2017)

Long-Term Medication Treatment and Adult AD/HD

Researchers found that adults with AD/HD between the ages of 18 and 54 have structural changes in their cool executive functioning network. It is thought to demonstrate an improvement in this type of executive functioning. This appears to be due to long-term treatment with stimulant medication. Hence, this is another study that demonstrates that stimulant treatment for AD/HD is neuroprotective.

--Moreno-Alcazar, A. et al. (August 30, 2016)

GeneSight for AD/HD, & Mood Disorder

Developed through research at the Mayo and Cleveland Clinics. Swab inside of your cheek for DNA. Sample sent to GeneSight lab. Within 36 hours doctor gets report. Can choose appropriate medication and dose by your genes.

➤ www.genesight.com

➤ <http://mayoresearch.mayo.edu/center-for-individualized-medicine/drug-gene-testing.asp>

Non-Medical AD/HD Treatments

ADULT AD/HD & TREATMENT

- **Cognitive Behavioral Therapy works with AD/HD adults because they have better developed frontal lobes than children. They still need medication, however.**
- **This means adults with AD/HD can get some good out of social skills training whereas AD/HD children typically do not.**

--Barkley (2006); Ramsay, (2010)

AD/HD Coaching and Professional Organizing

AD/HD Coaching

“Coaching is a supportive, pragmatic, and collaborative process in which the coach and adult with ADHD work together via daily 10-to-15 minute telephone conversations to identify goals and strategies to meet those goals.” (p. 590)

--Murphy (1998)

“Conclusion: ADHD coaching helped participants enhance their self-control as they responded to the multifaceted demands of undergraduate life.”

**--Parker, Hoffman, Sawilowsky, and Rolands
(December 15, 2011)**

Professional Organizers and AD/HD

“Generally speaking a professional organizer differs from a coach by providing on-site, hands-on help with organizing. Typically, the primary focus is on helping a client to organize her environment, rather than teaching her how to remain organized.” (p. 256)

--Nadeau (2002)

Exercise & ADHD



Exercise and AD/HD

- **After 20 minutes of exercise AD/HD children:**
 - **Greater response accuracy**
 - **Better regulation**
 - **Seated longer**
 - **Duration of reading**
 - **Better reading and math**
 - **Better inhibitory control**
 - **Sign. Bigger than controls**

--Pontifex, Saliba, Raine, Picchetti, and Hillman(March, 2013)
- **Have children with ADHD take their toughest classes in the morning after aerobic exercise.**
- **After the more difficult class take fun/easier class.**
- **If they have a choice to cram 20 extra minutes for an exam or exercise 20 minutes, it would be better to exercise.**

Mindfulness Training and AD/HD



Mindfulness Training and AD/HD

“Our study shows preliminary evidence for the effectiveness of mindfulness for children with ADHD and their parents, as rated by parents. However, in the absence of substantial effects on teacher-ratings, we cannot ascertain effects are due to specific treatment procedures.” (p. 139)

--Van der Oord, Bogels, and Peijnenburg (February, 2012)

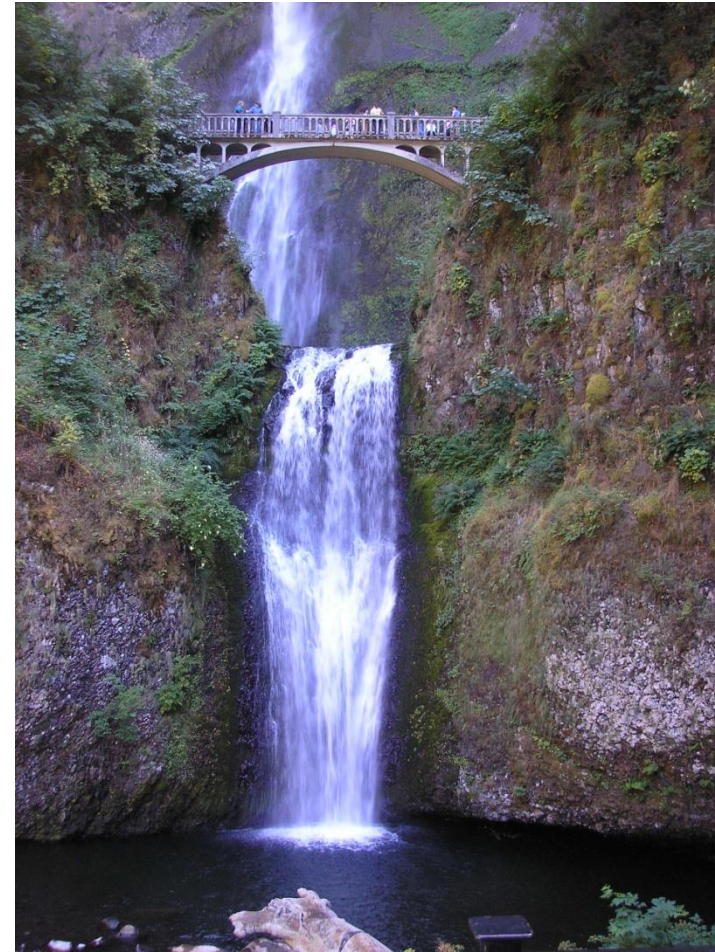
Dogs & AD/HD

Canine Assisted Therapy and AD/HD

Researchers from California created a 12 week cognitive behavioral intervention to AD/HD children with and without canine assisted therapy. The children were randomly assigned to groups and their parents simultaneously attended weekly parenting groups. Both groups saw a significant decline in the AD/HD symptomatology, but the group that also received canine assisted therapy saw a more significant decline in symptom severity than that control group.

--Schuck, SE et al. (February 19, 2015)

Academic Accommodations for College Students with AD/HD



College Accommodations and AD/HD

“Treat them like a 13 year old.”

- 1. SMALLER CLASSES**
- 2. Fewer Classes**
- 3. Hand pick faculty**
- 4. More curricular materials like videos and handouts**
- 5. Studying with older student who already took the course perhaps**
- 6. Taking five years to complete a B.A. rather than four.”**

--Barkley (2002A-Tape 2)

College Accommodations and AD/HD

1. **Formal Tutoring**
2. **Attending all faculty extra help sessions**
3. **Taking a time management seminar**
4. **Taking advantage of disability support services**
5. **Individual psychotherapy**

--Barkley (2002)

6. **Alternative method exams**
7. **Get an AD/HD coach**
8. **Ask faculty to post assignments weekly on website**
9. **House in a substance-free dorm**
10. **Career counseling several years before graduation**

--Barkley (2002)

❖ **No extended time, but breaks**

--Barkley (2008)

Barkley's Recommendations for Employers of Adults With AD/HD



Barkley's Recommendations for Employers of Adults With AD/HD

1. Understand AD/HD is a neurobiological disorder
2. AD/HD Adults have a deficit in self-regulation compared to others
3. AD/HD employees need directions spoken and written for them
4. AD/HD employees have *time blindness* and need external time reminders
5. Long-term projects need to be broken down into many short-term projects
6. AD/HD employees need to check in with bosses much more than others
7. Working in teams can help them stay on task
8. AD/HD adults may do better with self-employment, commission work, and hourly wages
9. The AD/HD adult can set up their own *self-reinforcement* system
10. AD/HD adults tend to do better with physical work and work with social interaction

Barkley's Recommendations for Employers of Adults With AD/HD

- 11. AD/HD adults do poorly at tedious, boring and repetitive work. They do better with variety.**
- 12. Often they do not do well in team leadership positions due to their impulsivity**
- 13. Some AD/HD adults may need vocational assessment and counseling**
- 14. Some may need an AD/HD coach and/or professional organizer**
- 15. Research has shown many with AD/HD are more alert in the mid-afternoon and evening; second shift work may work better**
- 16. Frequent short breaks and having a non-distracting work environment may be helpful**
- 17. Using sound suppression and/or music to block out distracting noise can help**
- 18. Encourage them to take medication if it has been found to be helpful for them**
- 19. Give reasonable accommodations under ADAAA**

--Barkley (March, 2013)

Vocational Counseling and AD/HD

Things to Consider in AD/HD Career Evaluation:

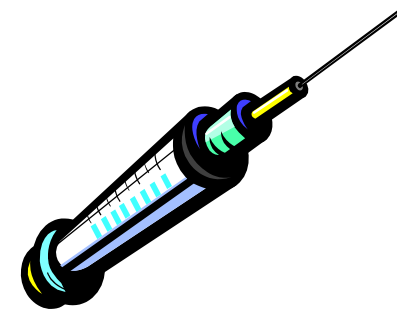
1. Difficulty with transitions
2. Difficulty with time management
3. Difficulty with disorganization
4. Difficulty with self-image
5. Difficulty with others
6. Lack of understanding of AD/HD
7. Inconsistency
8. Lack of self-management
9. Lack of self-advocacy
10. Lack of job life skills



--Ratey and Griffith-Haynie (1998)

Workplace Accommodations

1. **More accountability to others**
2. **Shorter term goals**
3. **Externalize time**
4. **Report many times a day on tasks**
5. **Medication (drug screening issue, too)**



--Barkley (2002)

Specific Learning Disorder



What Does “Neurobiological” Mean?

- **Stephen Pinker – “The Blank Slate: The Modern Denial of Human Nature” or better stated, “The Lie of the Blank Slate.”**

--Pinker, S. (2002)

- **“Although learning disabilities (specific learning disorder, sic.) may be exacerbated by other variables, such as ineffective teaching strategies or socioeconomic barriers, this paper supports the position that the essence of learning disabilities is neurobiological in nature.” (p. 61)**

--Fiedorowicz, C., et.al. (2001)

Specific Learning Disorder with Impairment in Reading/"Dyslexia" is NOT new!

- Sally Shaywitz (2003) Reported that Rudolf Berlin a physician from Stuttgart, Germany wrote of "dyslexia" in 1887.

Shaywitz, S. (2003)

- 70% of Dyslexia is genetic
- If you have an anomaly on the DCDC2 gene you are 19 times more likely to be dyslexic
- If you have an anomaly on the FOXP2 gene you are twice as likely to be dyslexic

Wilcke (November 14, 2014)



Differences in the Dyslexic Brain

Differences in the Dyslexic Brain

Duane (1993); Riccio, and Hynd (1996); Fiedorowicz, et. al. (2001); Richardson (1994); Filipek, et.al. (1999); Livingstone (1999) Fawcett, and Nicolson (2001); Quinghua, et al. (July 31, 2013); Evans, et al (April 13, 2013)

- An irregularity in the cellular architecture of the posterior planum temporale region of Wernike's area in the left temporal lobe
- They have ectopias and dysplasias in far greater numbers
- 2/3rds of normals have asymmetry of planum temporale (Lt > Rt)₃
- Dyslexics' planum temporale are symmetrical
- Increased posterior symmetry₄
- Dyslexics with severe language delay have reversed parietal-occipital asymmetry – RT planum > LT
- Dyslexics tend to have a larger right hemisphere than left in adulthood
- "...several studies on low-level visual processing have found that people with dyslexia show visual abnormalities that implicate a deficit in the transient (magnocellular) subdivision of the visual pathway" (p. 81)
- "...differences in cell size and cell-size distribution in posterior and anterior cerebellar cortex, and inferior olive with no differences in the output areas (the dentate nucleus)" (p. 98-99)
- Dyslexic female brains differ from Dyslexic male brains

SLD: Dyslexia and The Cerebellum

- *80% of dyslexics show signs of cerebellar problems!*
- **Automaticity is the problem!**
- **When multitasking and rapid processing are needed**
- **Thinking is a frontal lobe function**
- **It is a problem of fluency**
- **“...fluency is in essence the ability to repeat previous actions or thoughts more and more quickly without conscious thought.” (p. 101)**

--Fawcett, and Nicolson (2001); Fawcett (August 11, 2010)

SLD: Dyslexia and The Cerebellum

Nicolson Said Bottom Line:

“...That means if you have a task that takes 4 hours for the non-dyslexic kid to learn, it will take twice as long for the dyslexic kid; 8 hours. But, its not linear. You have a task which takes 100 hours it will take 10 times as long...”

Nicolson, and Fawcett (November, 2000)

“...If you have a task that takes 10,000 hours it will take 100 times as long, and so on. Therefore if you have something like reading, writing and spelling which takes 100s of hours that’s the sort of thing in which dyslexic children are particularly adversely affected.”

SLD: Dyslexia and Procedural Training

❖ The *Square Root Rule*:

“The extra time needed for a dyslexic child to master a task is proportional to the square root of the time a non-dyslexic child takes.”

--Fawcett (November 5, 2004)

SLD: Dyslexia and Automaticity

- **DAD: Dyslexia Automaticity Deficit**
- **Dyslexics get tired more quickly when learning and/or performing a new skill than the norm.**
- **CC: “This states that, despite their more limited automaticity of skill, dyslexic children are able to perform at apparently normal levels most of the time by ‘consciously compensating,’ that is consciously concentrating (controlled processing) on performance that would normally be automatic.” (pp. 68-69)**

--Nicolson and Fawcett (2008)

- **Dyslexics are slower at unlearning than non-dyslexics.**

--Nicolson and Fawcett (November 14, 2014)

Dyslexia, Automaticity, & Sleep



Automaticity, Sleep, & Dyslexia

- **Approximately 50% of dyslexics have failures of overnight sleep procedural memory consolidation of a simple motor skill.**

--Nicolson, Fawcett, Brookes, and Needle (August, 2010)

- **Bruni and colleagues discovered dyslexics have irregular EEGs during non-REM sleep that appear to be related to their disability. The hippocampus is involved in this difference.**

--Bruni et al. (2009)

Your Tax Dollars at Work
RESEARCH PROGRAM IN READING
DEVELOPMENT, READING DISORDERS, AND
READING INSTRUCTION
Initiated 1965

**Fletcher, J.M., Lyon, G.R., Fuchs, L.S. and Barnes,
M.A. (2007). Learning Disabilities: From
Identification to Intervention. New York, NY:
Guilford.**

Your Tax Dollars At Work

- Run by the National Institute of Child Health and Development (NICHD)
- Which is part of the National Institute of Health (NIH)
- Study began in 1965 and continues today!
- As of 1999 over ***\$150,000,000.00*** has been spent!
- Study now budgeted for ***\$15,000,00.00*** per year!

Your Tax Dollars At Work

- **Conducted at 42 sites in the U.S. and Europe**
- **Follow-up studies for over 14 years**
- **Much of the neurological research in this presentation comes from this study.**
- **China, England, Israel, Russia, Sweden and Turkey have conducted similar studies...**

--Lyon, G.R. (1999)

Your Tax Dollars At Work

- **30,000 scientific works from NICHD research**
- **44,000 studied, 5 years old and up; with 5 year follow-ups**

--Lyon (Thursday, February 27, 2003)

Your Tax Dollars At Work

- **30,000 scientific works from NICHD research**
- **44,000 studied, 5 years old and up; with 5 year follow-ups**
- **8,000 children have been in the study as of 2004. The follow-up study is now 21 years.**
- **3,800 in new adult study**
- **“2 to 6% of the population are the ‘Hard Core’ Dyslexics that will not improve with ‘Good Instruction’. They have the full dyslexic neurology and need multi-sensory approaches.”**

--Lyon, G.R. (March 19, 2004).

Your Tax Dollars At Work

- **7% of the population will meet criteria for Major Depressive Disorder in any year**
- **Persistent Depressive Disorder (Dysthymia) is 0.05.**
- **3 to 13% Social Anxiety Disorder (Social Phobia) is 7%**
- **0.9% in teens & 2.9% in adults Generalized Anxiety Disorder**
- **Bipolar Disorder 0.6%**

--Author (2013)

Reading Disorder-Dyslexia

“The idea that learning to read is just like learning to speak is accepted by no responsible linguist, psychologist, or cognitive scientist in the research community.” (pp. 285-286)

--Stanovich (1994)

Symptoms of Dyslexia



SLD-Dyslexia

The Symptoms of Dyslexia are:

1. Weak Phonemic Awareness

2. Slow, Rapid Automatized Naming (WM deficit: Fluency)

3. Poor Orthographic Processing

4. Exceptionally Poor Automatization

5. Poor Coordination

- ❖ Some Dyslexics had all the symptoms.
- ❖ Some only had one.
- ❖ Four had none of the aforementioned deficits.

--Reid (November 11, 2006)

--Fawcett (2001); Blake (2003); Berg (November 12, 2014)

Definition Of Dyslexia

“Dyslexia is a specific learning disability that is neurological in origin. It is characterized by difficulties with accurate and/or fluent word recognition as well as by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the lack of provision of effective classroom instruction. Secondary consequences may include...

Definition Of Dyslexia

...problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge.”

Adopted by the National Institutes of Health (NIH) and the International Dyslexia Association (IDA) 2002

--International Dyslexia Association (April 20, 2005)

THE PAOMNNEHAL PWEOR OF THE HMUAN MNID

Aoccrdnig to rscheearch at Cmabrigde Uinervisy, it deosn't mttar in waht oredr the ltteers in a wrod are, the olny iprmoatnt tihng is taht the frist and lsat ltteer be in the rghit pclae. The rset can be a taotl mses and you can sitll raed it wouthit a porbelm.

--Davis (2003); Rawlinson (1999)

The “Dyslexia **bd** **pq** Phenomenon”

“When children learn to read they must “unlearn” mirror generalization in order to process ‘b’ and ‘d’ as distinct letters. In some children, this unlearning process, which goes against the spontaneous abilities inherited from evolution, seems to present a specific source of impairment.” (p. 253)

“Mirror writing occurs in all cultures, including China and Japan. It appears for a short period of time at the age when children first begin to write, and then it promptly vanishes. Unless this phenomenon extends beyond the ages of eight to ten, there is no cause for alarm. At this age, mirror errors are indeed more frequent in dyslexic children, though they can disappear later.” (p. 265)

--Dehaene (2009)

“LEXDEXIA”

“reversals” (seeing “was” as “saw”) and “rotations” (“b” as “p”; “p” as “d”, etc.) occur in most children up through fourth grade. This is typical in the development of visual orthographic memory.

- The brain automatically learns what something looks like in mirror image (this is an instinct).
- Only about 7% of adult dyslexics have this concern.
- Dyslexics are slower at unlearning than non-dyslexics.
- ❖ **Dyslexia is not seeing the word “WAS” as “SAW”.**

--Anderson (January 23, 2006); Dehaene (2009); Badian (2005); Nicolson and Fawcett (November 14, 2014)

Dyslexia & Executive Function



Dyslexia and EF

- **People with dyslexia have weaknesses in the central executive and phonological loop.**
 - **The visual-spatial sketchpad controls orthographic processing**
 - **Spelling involves phonological loop, visual-spatial sketchpad and central executive-All weaknesses in dyslexics**
 - **Dyslexics-STM & WM problems**
 - **Can predict if Dyslexic by WM scores**
 - **WM predicts reading fluency and comprehension**
 - **WM independent of IQ, as is Dyslexia**
- Berg (November 12, 2014)

Academic EF Problems Experienced by Dyslexic Adults

- **Adults with Dyslexia can be weak in any, or all of the following:**
 - **Phonological Word-Form Storage (learning of novel word-like sound patterns)**
 - **Time Sensitive Phonological Loop (sustaining phonological loop over time/keeping information “on-line”)**
 - **EF involving Phonology**
- **The above can predict reading and writing outcomes as well as word-form processing.**
- **Executive Function training can improve oral reading, but nothing else in terms of reading and writing.**

--Berninger, et al. (2006)

Dyslexia, Adults, EF and The World of Work

- **Phonological processing problems appear not to be related to the fluency (automatization) problems seen in adult dyslexics in the workplace.**
- **It appears these problems are related to EF**
- **Dyslexic adults report problems with working memory, planning,**
- task monitoring, and organization that negatively affect activities of daily living. These are significantly more severe than the norm.**
- **They report problems in set shifting, working memory, and inhibition.**
- **They report no difficulty in emotional regulation and behavior.**

Smith-Spark, et al. (June-July, 2016)

Dyslexia, Adults, EF and The World of Work

- **It appears dyslexia negatively affects almost all areas of the world of work.**
- **The longer an adult with dyslexia is at a job the more negative affect these EF difficulties.**
- **In the world of work there seems to be a negative bias toward dyslexics in the workplace, by people with dyslexia, employers, supervisors and colleagues.**
- **This is not true of teachers with dyslexia, however.**

--De Beer, et al. (2014)

Reading and Working Memory

- **There are limited working memory resources for reading comprehension in dyslexics. Working memory is independent from reading fluency.**

–Swanson and O'Connor (September 10, 2009)

- **Verbal working memory is a very strong predictor of reading skills, but visual-spatial working memory is significant in predicting in reading skills and plays a significant role in reading comprehension.**

–Pharm and Hasson (May 31, 2014)

Reading Comprehension

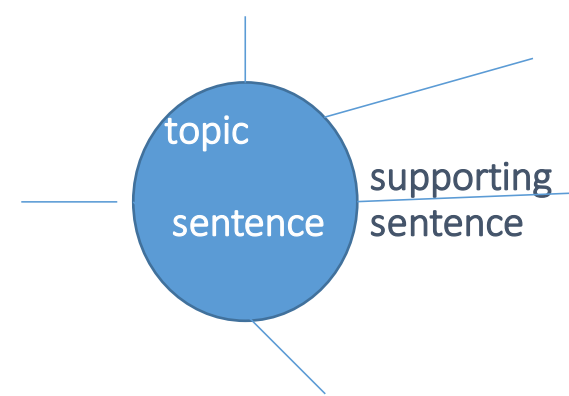


Dyslexia, Comprehension & Working Memory

“Reading comprehension relies heavily on working memory and thus requires sufficient working memory resources...A reader who is using working memory to decode words usually does not have enough working memory capacity remaining to devote to comprehension” (p. 52).

--Dehn (2014 A)

EF Treatments for Dyslexia



- **Develop automatic decoding of letters**
- **Teach using guided response interactions**
- **Use an explicit, systematic, and strategically focused teaching model**

--Berg (November 12, 2014)

- **Teach how to read with graphic organizers and rules for highlighting to chunk information**
- **Teach logic and visualization strategies to reduce burden on WM and to compensate for rote memory weaknesses**

Multisensory Teaching Techniques

- **Orton-Gillingham Approach**
- **Alphabetic Phonics**
- **Association Method**
- **Language!**
- **Lexia-Herman Method**
- **Lindamood-Bell**

International Dyslexia Association (2005)

- **Project Read**
- **Slingerland**
- **Sondag System**
- **Sounds in Symbols**
- **Spalding Method**
- **Starting Over**
- **Wilson Foundations & Wilson Reading**

Technology for Dyslexia

- Intel Reader: www.intel.com/pressroom/kits/healthcare/reader/
- Kreader Mobile: <http://www.knfbreader.com/index.php>
- Kurzweil 1000: www.kurzweiled.com/kurzweil-1000-v13-windows.html
- Dragon NaturallySpeaking: www.nuance.com/dragon/index.htm
- Ginger: www.gingersoftware.com
- WizcomTech Reading Pen 2TS: <http://www.wizcomtech.com/eng/catalog/a/rp/>
- Franklin Spelling Ace: www.franklin.com
- LearningAlly: www.learningally.org

Specific Learning Disorder-Reading Comprehension



Reading Comprehension

Good reading comprehension requires a mental model of the situation, good word reading and comprehension, an understanding of words, discourse and sentences. All of the above needs to be well coordinated.

--Cain (November 12, 2014)

Specific Learning Disorder with Impairment in Reading Comprehension

An anomaly in the left frontal gyrus, which is connected to atypical hippocampal, parahippocampal, and prefrontal function when compared to dyslexics and controls when processing low frequency words. It appears those with Specific Learning Disorder with Impairment in Reading Comprehension are significantly impaired in lexical-semantic representations during the processing and recognition of low frequency words when compared to dyslexics and controls.

--Cutting, et al. (2013)

Treatment of SLD-Reading Comprehension



Treatment of Specific Learning Disorder with Impairment in Reading Comprehension

- 1) Stimulant Medication
- 2) SQ4R
- 3) Bell, N. (1991). Visualizing and Verbalizing for Language Comprehension and Thinking. San Luis Obispo, CA: Grandeur Educational Publishing.
- 4) Cogmed (www.cogmed.com) ?*
- 5) Work with a Speech Language Pathologist

For Details go to:

Blake, K. (May, 2013). Two Common Reading Problems Experienced By Many AD/HD Adults, 2013 Edition.
www.drkevintblake.com.

(Click link on top of home page entitled: “Presentations On Disorders”)

Autism Spectrum Disorder



2014 06 30

Autism Spectrum Disorder

People who were diagnosed with Asperger's disorder, autism, pervasive developmental disorder, and pervasive developmental disorder-not otherwise specified using DSM-IV[®]/DSM-IV, TR[®] criterion have autism spectrum disorder by DSM-5[®] criterion. Those with social communication problems only have social (pragmatic) communication disorder.

--Author (May 18, 2013).

ASD's Central Difficulty

“Regardless of the diagnosed person’s global intelligence, savant-like talents, verbal ability, or mechanical giftedness, social difficulties are the primary source of impairment for most people with ASD and central to the diagnostic criteria of ASD” (p. 124).*

***--White, Scahill, and Ollendick (2013); Klin (2001)**

Autism and Genetics

“Autism (Spectrum Disorder, sic) is known to be a genetic disorder, at least in part.” (p. 2 of 3)

Author (No Date). Fact Sheet: Study to Explore Early Development (SEED). Center for Disease Control and Prevention. From website:
<http://www.cdc.gov/ncbddd/autism/states/new/CADDRE%20Fact%20Sheet%20July%202007.pdf>

“It is now abundantly clear that ASD has a genetic component, with the best evidence suggesting moderate genetic heritability” (p. 41).

--Durand (2014)

There are 239 likely candidate genes for autism.

--Issifove, I. et al. (October 13, 2015)

What does NEUROBIOLOGICAL mean?

- “The latest thinking in this area is that ASD is a developmental neurobiological disorder, meaning that a variety of developmental changes occur in the brains of people with this disorder” (p. 5).

--Durand (2014); Schultz, R.T., Romanski, L.M. and Tsatsanis, K.D. (2000)

- At present few workers in the field of ASD believe that psychological or social influences play a major role in the development of this disorder” (p. 40).

--Durand (2014)

- “The field has come a long way since parents were considered to be the cause of autism spectrum disorders.” (p. 64)*

*Ozonoff, S., Dawson, G. and McPartland, J. (2002); Kaiser, M.D., et al. (November 15, 2010)



Brain Differences in ASD

Neuroanatomy of ASD

- **Increased grey matter anterior temporal & dorsolateral prefrontal lobe**
- **Decreased grey matter occipital and medial parietal areas**
- **Significant reduction in size of cerebellum (fewer Purkinje cells)**
--Ecker, et al. (February 8, 2012);
Durand (2014)
- **Large grey matter differences in the following:**
 - **cingulate, motor area, basal ganglia, amygdala, inferior parietal lobe, prefrontal lobe**
- **Reductions in white matter volume**
- **These differences are linked to autistic symptoms and persist throughout life.**

Executive Functioning and ASD

***“Behaviors observed in individuals with ASD are suggestive of executive dysfunction; these include response perseveration, disinhibition, narrow range of interests, concrete thinking, difficulty with flexibly shifting perspectives, as well as challenges with self-monitoring and planning” (86).**

--*Tsatsanis (2014); Scarpa (2013)

EF in ASD Adults

- **Parents of adults with ASD and average/above IQ report their challenged children with ASD have significant problems with EF at work and in their adaptive function.**
- **This is typically paired with significant depression and anxiety.**
- **The profile of EF difficulties in an ASD adult matches those seen in ASD children and adolescents: especially high weaknesses in flexibility and planning/organization.**
- **It appears the EF flexibility problems are related to anxiety.**
- **Depressive symptoms seem to be related to metacognitive processing problems and impaired adaptive functioning.**
- **None of the above appears to be related to possible comorbid AD/HD.**
- **Should evaluate EF in ASD adults, too.**

--Wallace et al. (2016)

Compassion



Compassion

- **Three things make humans behaviorally different from all other species:**
 - **Our capacity to delay our response to our environment (Bronowski, 1977).**
 - **Our capacity for compassion (Leakey, 1995).**
 - **Our capacity for long-term compassion (Grandin, 1995).**

--Bronowski (1977); Leakey (1995); Grandin (1995)

Compassion

“In the summer of 1982 Kat was newly pregnant and Washoe doted over her belly, asking about her BABY. Unfortunately, Kat suffered a miscarriage. Knowing that Washoe had lost two of her own children, Kat decided to tell her the truth. MY BABY DIED, Kat signed to her. Washoe looked down to the ground. Then she looked into Kat’s eyes and signed CRY, touching her cheek just below the eye. When Kat had to leave that day, Washoe would not let her go. PLEASE, PERSON HUG, she signed.” (Fouts, 1997; Edwards, 2000)

--Fouts (1997); Edwards, (Spring, 2000)

Compassion

Bonobo: Pan Paniscus Vs.

Chimpanzee: Pan Troglodytes

- **Shares 98% of its genetic profile with humans.**
- **They have been compared to australopithecines**
- **“In physique, a bonobo is as different from a chimpanzee as a Concorde is from a Boeing 747.” (p. 3 of 14)**

--DeWaal, F.B.M. (March 1995)

Chimpanzee, Bonobos, Humans & Vasopressin

“Similar genetic variation in the human *AVPR1A* may contribute to variations in human social behavior including extremes outside the normal range of behavior and those found in autism spectrum disorders.” (p. 2187)

--Hammock and Young (December, 2006)

Chimpanzee, Bonobos, Humans & Vasopressin

“Our two closest primate cousins – chimpanzees and bonobos –also have different lengths of this gene, which match their social behaviors. Chimpanzees, who have the shorter gene, live in territorially based societies controlled by males who make frequent, fatal war raids on neighboring troops. Bonobos are run by female hierarchies and seal every interaction with a bit of sexual rubbing...”

“...they are exceptionally social and have a long version of the gene. The human version of the gene is more like the bonobo gene. It would seem that those with the longer version of the gene are more socially responsive. For example, this gene is shorter in humans with autism...” (p. 74)

--Brizendine (2006)

Teco, The Autistic Bonobo Toddler

- **Bonobo social brain closer to humans than chimps.**
- **18 month old bonobo, Teco, male is autistic.**
- **Has repetitive movements**
- **Strict adherence to routines, or gets agitated**
- **Repetitive behaviors**
- **Likes objects, not bonobos**
- **Likes parts of objects**
- **No joint attention**
- **Avoids eye contact**
- **At two months nursing difficulties**

--Deweert (April 15, 2011)

Alexithymia



2014 07 02

What is Alexithymia?

- 1. Tends not to have fantasies, no feelings and have sharply limited emotional vocabularies.**
- 2. They have colorless dreams.**
- 3. They cannot tell bodily sensations from emotions and are baffled by them.**
- 4. They have great difficulty making decisions because they lack “gut feelings.”**

--Goleman (1995)

Alexithymia

- Medial prefrontal areas explicit representations of the self
- Posterior superior sulcus detection of biological motion and representation of others
- Suggests the, "...ability to mentalize from a system for representing actions" (p. 1692).

--Frith, C.D. and Frith, U. (1999)

- The medial prefrontal cortex allows for theory of mind

➤ *"...that successful social adaptation requires the 'dual task' ability to stay in touch with the needs of others while paying due attention to one's own needs."* (p. 20)

Lane (2000)

Mirror Neurons

- Italian study of macaque monkeys in 1992
 - Known for years cells of premotor cortex fire just before movement.
 - Discovered that same cells fired in the same pattern when another primate was seen making the same movement!
 - Humans have these **MIRROR NEURONS** too.
 - They allow us to intuit others intentions and to feel their pain.

--Rizzolatti, Fogassi, and Gallese (November, 2006); Lametti (June 9, 2009)

Mirror Neurons

- **Mirror Neuron System:**
 - **Superior Temporal Sulcus**
 - **Inferior Frontal Cortex**
 - **Rostral Inferior Frontal Lobe**
- Goldstein, Naglieri, & Ozonoff, (2009).

Mirror Neurons:
**Help us begin to generate
appropriate social responses.**

--Caggiano, Fogassi, Rizzolatti, Their, & Casile (April 2009)

Mirror Neurons & Executive Functions

“Studies show that the capacity to imitate the actions of others is now virtually an instinct at the level of neuronal functioning. The PFC (Prefrontal Cortex, sic) responds to viewing others’ actions by activating the same sensory-motor regions of the brain as the acting person is using to create the behavior. The mirror-neuronal system has been linked to theory of mind and to empathy, among other human attributes related to EF (Executive Functions, sic.)” (p. 117).

--Barkley, R.A. (2012)

Mirror Neurons & AD/HD

“If the mirror neuron system serves as a bridge in this process, then in addition to providing an understanding of other peoples intentions, it may have evolved to become an important component in the human capacity for observation-based learning and sophisticated cognitive skills.” (p. 61)

- Rizzolatti, Fogassi, and Gallese, (November, 2006)

Barkley (2008) said that those with AD/HD and comorbid Alexithymia typically have intact mirror neurons, they just do not use their mirror neurons due to their frontal lobe difficulties.

--Barkley (2008)

Mirror Neurons & Autism Spectrum Disorder

- **“Broken mirror neurons” MAY explain isolation and lack of empathy.**
- **Those with autism spectrum disorder lack activity in many areas associated with mirror neurons.**

--Ramachandran, and Oberman (November, 2006)

Uta Frith: Question Can you combine emotional working memory finding with mirror neuron research to explain ASD?
Answer: How do you explain a sociopath?

--Frith (November 1, 2007)

The Three Types of Empathy

- **Motor Empathy**
- **Cognitive Empathy**
- **Emotional Empathy**

➤ **Sociopaths:**

- **Excellent motor empathy**
- **Excellent Cognitive Empathy**
- **Poor Emotional Empathy**

➤ **ASD**

- **Poor Motor and Cognitive Empathy**
- **Better Emotional Empathy**

--Blair (December, 2005)

--Baron-Cohen (2011)

Mirror Neurons

“Our results show that this ‘mirror system’ integrates observed actions of others with an individual’s personal motor repertoire and suggests the human brain understands actions by motor stimulation” (p. 1243).*

--*Calvi-Merino, Glaser, Greeze, Passingham, and Haggard (2005). Glaser (January 2005).

Alexithymia and AD/HD, ASD

➤ **22% of adults with AD/HD meet criteria for alexithymia**

--Edel, et al. (September 24, 2010)

“...some individuals with ASD may experience characteristics of *alexithymia*, a diminished vocabulary to describe the different levels of emotional experience, especially the more subtle emotions” (p. 35).*

--*Attwood, T, and Scarpa, A. (2013).

-- Attwood, T. (2007).

“Symptoms” of Alexithymia

- **Difficulty identifying different types of feelings**
- **Difficulty distinguishing between emotional feelings and bodily feelings**
- **Limited understanding of what caused the feelings**
- **Difficulty verbalizing feelings**
- **Limited emotional content in the imagination**
- **Functional style of thinking**
- **Lack of enjoyment and pleasure-seeking**
- **Stiff, wooden posture**

--Author (January 23, 2003)

Diagnostic Tools for Alexithymia

- **Toronto Alexithymia Scale (TAS-20)**

--Taylor (1992)

- **Observer Alexithymia Scale (OAS)**

--Haviland, Warren, and Riggs (October, 2000)

- **Bermond–Vorst Alexithymia Questionnaire (BVAQ)**

--Vorst, and Bermond (February, 2001).

Mirror Neuron Treatment



Treatment for Emotional Working Memory Difficulties

➤ **Stimulant Medication?**

- **Lessens Hyperactivity and Impulsivity in AD/HD, Combined Type Individuals**
- **Hundreds of Double Blind Studies to Support**

--Barkley (2006)

Oxytocin & Vasopressin In Autism

“Oxytocin and vasopressin contribute to a wide variety of social behaviors, including social recognition, communication, parental care, territorial aggression and social bonding.” (p. 2187)

--Hammock and Young (December, 2006)

Emotional Salience Landscape Difficulties- Mirror Neurons

“In a typical child, sensory information is relayed to the amygdala, the gateway to the emotion-regulation limbic system. Using input from stored knowledge, the amygdala determines how the child should respond emotionally to each stimulus, creating a salience landscape of the child’s environment. In children with autism, the connections between the sensory areas and the amygdala may be altered, resulting in extreme emotional responses to trivial events and objects.” (p. 68)

--Ramachandran, and Oberman (November, 2006)

Some Treatments For Mirror Neuron Difficulties

- **Risperidone and MDMA (ecstasy):**
To raise oxytocin levels
- **Biofeedback:**
To help control anxiety
- **Oxytocin Nasal Spray**

--Author (1997); Ramachandran, and Oberman (November, 2006); Guastella, , Einfeld, Gray, Rinehart, Tonge, Lambert, and Hickie (April 1, 2010); Bate (2013)

MDMA & Oxytocin Nasal Spray ARE EXPERIMENTAL TREATMENTS!!!!

Emotional Salience Landscape Difficulties-Mirror Neurons

- Temple Grandin's "squeeze machine"
- Hirstein's "squeeze vest"
Elmhurst College
- Risperidone or MDMA (ecstasy)
- Biofeedback
- Under Armor-- Compression underwear: www.underarmour.com

--Grandin (1992); Ramachandran, and Oberman (November, 2006); Author (1997)

THE ABOVE ARE EXPERIMENTAL TREATMENTS!!!!!!

Theory of Mind & Mirror Neuron “Software”

“Able individuals with autism spectrum disorders can with time and practice achieve awareness of mental states by compensatory learning.” (p. 977)

--Frith (2001)

❑ Possible Treatment Techniques

- **Carol Gray – Social Stories**
- **Laurel Falvo- Social Response Pyramid:**
- **www.thegraycenter.org**

ASD CBT Alexithymia Treatment

“Affective education within CBT aims to improve the vocabulary of the child or adolescent with ASD to describe emotions, thereby diminishing the effects of alexithymia. One approach is to quantify the degree of expression, such that if the precise word is elusive, the child or adolescent can calibrate and express his or her degree of emotion using a thermometer or numerical rating, thus indicating intensity of emotional experience” (p. 35).

--Attwood, and Scarpa (2013)

Professionals Who Can Help With Alexithymia

- Psychologists-American Psychological Association: www.apa.org
- Psychiatrists-American Psychiatric Association: www.apa@psych.org
- Social Workers-National Association of Social Workers: www.naswdc.org
- American Association of Marriage and Family Therapists: www.aamft.org
- Counselors-National Board of Certified Counselors: www.nbcc@nbcc.org
- Behavioral Neurology/Neuropsychiatry-American Neuropsychiatric Association: www.anpaonline.org
- Speech Language Pathologist – American Speech-Language Hearing Association: www.professional.asha.org

ASD And AD/HD

DSM-5[®] says that Autism Spectrum Disorders can be comorbid with AD/HD however most will have the *restrictive* Inattentive/Sluggish Cognitive Tempo type.

--Author (May 18, 2013); Author (May 3, 2012); Goldstein, and Naglieri (August, 2011)

AD/HD Vs. ASD

A study comparing adults with AD/HD and adults with ASD found ASD adults had a slow but accurate response style, but AD/HD adults had an inaccurate and rapid response style.

--Johnston, Madden, Bramham, and Russell, (2011).

“Children with ASD and children with an ASD and comorbid anxiety disorder improved in their parent reported social skills. Children with ASD and comorbid attention deficit/hyperactivity disorder failed to improve” (p. 439).

--Antshel, Polacek, McMahon, Dygert, Spencely, Dygert, Miller, and Faisal (July-August, 2011)

ASD Treatment

2014 12 02

ASD Treatment

“The foundation of most interventions for ASD is educational. Behavioral and other rehabilitative strategies are used to teach necessary skills and to help reduce the frequency and intensity of problem behaviors. Most current medical interventions are palliative (i.e., are meant to reduce symptoms such as anxiety or irritability) or are designed to manage problems such as sleep disorders or seizures. To date, there are no medical interventions that have been demonstrated to correct the central problems of social communication deficits and restrictive repetitive behaviors” (p. 85-85).

--Durand (2014)

What a Multidisciplinary Clinic for ASD Needs

- **Speech-Language Therapy**
- **Occupational Therapy**
- **Physical Therapy**
- **Ear, Nose, and Throat Doctor**
- **Gastroenterology**
- **Neurology**
- **General Medicine**
- **Psychiatry/Psychology**
- **Etc.**

Bauman, M., et al. (November 7, 2014).

Sleep & ASD

- **50% to 80% of Children with ASD have sleep problems**
- **Main problems:**
 - **Prolonged Sleep Latency, Disruption at Bedtime, Decreased Sleep Efficiency and Duration**
 - **Those with ASD may have a problem with the inhibitory neurotransmitter GABA and melatonin which may cause problems with circadian sleep-wake cycles**
 - **Cognitive Behavioral Treatment may help**
 - Durand (2014); Nadeau, J. M., et al. (September 20, 2014).

Therapy Dogs



ASD & Dogs

“When the therapy dog was present, the children (with ASD, sic.) were significantly more focused, more playful, and more aware of interactions than either of the other conditions (stuffed dog, or ball present)” (p. 185).

--Johnson, R.A. (2011)

“Our results indicate that concentrations of beta-endorphin, oxytocin, prolactin, beta-phenylethylamine, and dopamine increased in both species after positive interspecies interaction, while that of cortisol decreased in the humans only.” (p. 296)

--Odendaal, and Meintjes (2003)

ASD & Dogs

Children with autism and pervasive developmental disorders are significantly more present, playful and aware of social interactions when a dog is present.

--Martin, and Farnum (2002)

Children with autism who bond with their dogs have better social skills.

--Carlisle, G.K. (May 2015).

- **4Paws For Ability**
- **253 Dayton Avenue**
- **Xenia, OH 45385**
- **Training Center:**
 - **937-374-0385**

Website:

www.4pawsforability.org

CBT & ASD



CBT, Anxiety, & ASD

“Thus, CBT, when adapted for the special needs of youth with ASD, is potentially effective at decreasing anxiety in this population, but more replication is necessary to establish the efficacy of these programs” (p. 91).

--Green and Wood (2013)

CBT & ASD

☐ KICK Plan

☐ K = Knowing I'm nervous

☐ I = Icky thoughts

☐ C = Calm thoughts

☐ K = Keep practicing

--Green and Wood (2013)

Relaxation Tools & ASD

- **Take a break**
- **Sit by self**
- **Talk to someone**
- **Stretch**
- **Deep breaths**
- **Exercise**
- **Sports**
- **“Creative Destruction”**

Taking out the trash

- **Music**
- **Drawing**
- **Solitude**
- **Massage**
- **Reading**
- **Repetitive Action**
- **Sleep**

--Scapra, Reyes, and Attwood (2013)

Other Things to Consider When Working with ASD

- ❖ **One-Track Mind: Set shifting**
- ❖ **Fear of Making a Mistake**
- ❖ **Consistency and Certainty**
- ❖ **Special Interests & Talents**
- ❖ **Converting Thoughts to Speech: Texting instead of face to face**
- ❖ **Problems with Pragmatics, Syntax and Prosody**

Other Things to Consider When Working with ASD

- ❖ **Teaching Theory of Mind (ToM)**
- ❖ **Dealing with Sensory Sensitivity**
- ❖ **Between-Session Projects**
 - ❖ **Workbooks**
- ❖ **Selection of Group Participants**
- ❖ **Time with Guardians/Loved Ones After Every Session**

--Attwood, and Scarpa (2013)

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